KENTUCKY-AMERICAN WATER COMPANY, INC.

CASE NO. 2023-00191

DIRECT TESTIMONY

OF

PATRICK L. BARYENBRUCH

Q. Please state your name, position and business address.

A. My name is Patrick L. Baryenbruch. I am the President of my own consulting practice, Baryenbruch & Company, LLC, which was established in 1985. In that capacity, I provide consulting services to utilities and their regulators. My business address is 2832 Claremont Road, Raleigh, North Carolina 27608.

Q. Summarize your academic and professional background.

A. I received a Bachelor's degree in Accounting from the University of Wisconsin Oshkosh and a Master's in Business Administration degree from the University of Michigan. I am a member of the American Institute of Certified Public Accountants and the North Carolina Association of Certified Public Accountants.

I began my career with Arthur Andersen & Company, where I performed financial audits of utilities, banks and finance companies. I left to pursue an M.B.A. degree. Upon graduation from business school, I worked with the management consulting firms of Theodore Barry & Associates and Scott Consulting Group (now ScottMadden) before establishing my own firm.

Q. Do you hold any professional certifications?

A. Yes. I am a Certified Public Accountant (CPA) with an active license from the states of Wisconsin and North Carolina. I am a Certified Information Technology Professional (CITP), an accreditation awarded by the American Institute of Certified Public Accountants to CPA professionals who can demonstrate expertise in information technology management. I also hold a Global Information Assurance Certification (GIAC) in cybersecurity from the SANS Institute.

Q. Have you provided testimony in other regulatory proceedings on the issue of utility/affiliate transactions?

A. Yes. In the course of my career, I have performed more than 130 evaluations of affiliate charges to 45 utility companies. I have acted as an expert witness on utility/affiliate charges in nearly 100 rate case proceedings before regulators in 20 states. Exhibit PLB 1 presents my previous affiliate transaction-related assignments.

Q. What other work experience do you have with the utility industry?

A. Besides my rate case support work, much of my career has been spent as a management consultant for projects related to the utility industry. I have performed consulting assignments for more than 60 utilities and 10 public service commissions. I have participated as project manager, lead consultant or staff consultant for 24 commission-ordered management and prudence audits of public utilities. Of these, I have been responsible for evaluating the area of affiliate charges and allocation of corporate expenses in the commission-ordered audits of Connecticut Light and Power, Connecticut Natural Gas, General Water Corporation (now United Water Company), Philadelphia Suburban Water Company (now Aqua America), and Pacific Gas & Electric Company.

My firm performed the commission-ordered audit of Southern California Edison's 2002, 2003, 2004 and 2005 transactions with its non-regulated affiliate companies.

For 20 years, I was heavily involved in providing consulting services related to information technology (IT) infrastructure within the utility industry. These projects involve improvements in IT business management practices of utility IT organizations, covering processes such as business planning, risk management, performance measurement and reporting, cost recovery, budgeting, cost management and personnel development. I acted as the project manager or member of the project management team for several very large-scale IT implementation projects involving the work of hundreds of utility client employees and contractor personnel.

Q. Please describe the basis for your direct testimony in this case.

A. I am presenting the results of my evaluation of the necessity of services provided by American Water Works Service Company, Inc. ("Service Company") to Kentucky-American Water Company ("KAWC" or the "Company") and the reasonableness of the associated charges during 2022.

Q. Are you sponsoring any exhibits in your testimony?

A. Yes. I am sponsoring Exhibit PLB-1, which presents my previous affiliate transaction-related assignments, and Exhibit PLB-2, which is the Market-to-Cost Comparison of Service Company charges to KAWC during 2022.

Q. What were the objectives of your study?

A. This study was undertaken to answer the following five questions concerning the reasonableness and necessity of services provided by the Service Company to KAWC.

<u>Reasonableness</u>

1) Were the Service Company's charges to KAWC during 2022 reasonable compared to charges from other service companies to their regulated utility affiliates?

2) Were KAWC's 2022 total expenses, including those incurred directly by KAWC and those allocated to it by the Service Company, reasonable? This question evaluates a broader set of costs beyond Service Company charges to KAWC.

3) Was KAWC charged the lower of cost or market for managerial and professional services provided by the Service Company during 2022?

4) Were KAWC's 2022 costs of Service Company's customer accounts services comparable to those of other utilities?

<u>Necessity</u>

5) Are the services KAWC receives from the Service Company necessary?

Q. What conclusions were you able to draw concerning question number 1, whether the Service Company charges to KAWC were reasonable?

A. I was able to determine that the Service Company's 2022 cost per KAWC customer is reasonable because it is in line with the cost per customer for the proxy service companies. During 2022, KAWC was charged $80 per customer for administrative and general (A&G)-related services provided by the Service Company. This compares to an average of $127 per customer for service companies reporting to the FERC. Sixteen of the 22 utility service companies that filed a FERC Form 60 for 2021 had a higher per-customer A&G cost than KAWC's 2022 charges from the Service Company.

Q. Why is a comparison of A&G costs useful to a determination of the reasonableness of the Service Company's charges to KAWC?

A. A&G-related services are managerial and professional services associated with the functions identified in the table below. They provide a useful basis of comparison because the processes involved in delivering these services are similar across utility types.

Executive Management	Information Technology
Finance	Procurement
Accounting	Rates and Regulatory
Taxes	Legal
Financial Planning and Analysis	Human Resources

Internal Auditing	Customer Services

Q. What conclusions were you able to draw concerning question number 2, whether KAWC's 2022 total utilities expenses are reasonable?

A. This question extends the reasonableness test to two broader sets of expenses--total Customer Accounts/A&G expenses and total Operations and Maintenance (O&M) expenses. I was able to draw the following conclusions:

- KAWC's 2022 total Customer Accounts and A&G expenses per customer are $142. Although this is somewhat above the 2021 average of $123 per customer for a comparison group of Kentucky water companies with a similar profile, seven of the comparison group's 13 water companies had a higher cost. Therefore, the Company's Customer Accounts and A&G expense lie within a reasonable range.
- KAWC's 2022 total O&M expenses per customer are $276. This is significantly lower than the comparison group 2021 average of $392. Twelve of the comparison group's 13 water companies had a higher cost. This metric reflects all expenses to operate a utility and deliver service to its customers.
- Based upon the total cost comparisons developed for this question, I also can conclude that KAWC's total O&M expenses are reasonable.

Q. Do the services KAWC receives from the Service Company contribute to its relatively low total O&M expenses?

A. Yes. The Service Company's services are economically beneficial to KAWC. Examples of just a few of these are as follows:

- Supply Chain - increased purchasing power results in lower costs for materials, supplies and outside services

- Customer Service – centralized services delivered by shared resources enable greater economies of scale and enhanced service levels
- Field Resource Coordination – enables KAWC to focus its resources more efficiently and effectively
- Belleville Lab – central lab testing services are delivered at cost by qualified analysts
- Accounting – work is performed by shared resources, without the need for KAWC to retain full-time staff
- Human Resources – economies of scale are achieved through centralized payroll and benefits administration

Q. What conclusions were you able to draw concerning question number 3, whether KAWC was charged the lower of cost or market services provided by the Service Company?

A. I was able to draw the following conclusions:

1) KAWC was charged the lower of cost or market for managerial and professional services during 2022.

2) On average, the hourly rates for outside service providers are 60% higher than the Service Company's hourly rates.

3) The managerial and professional services provided by the Service Company are vital and could not be procured externally by KAWC without careful supervision on the part of KAWC. If these services were contracted entirely to outside providers, KAWC would have to add at least two positions to manage the activities of outside firms. These positions would be required to ensure the quality and timeliness of services provided.

4) If all the managerial and professional services now provided by the Service Company had been outsourced during 2022, KAWC and its customers would have incurred approximately $5.4 million in additional expenses. This amount includes the higher cost of outside providers and the cost of two new KAWC positions needed to direct the outsourced work.

5) This study's hourly rate comparison understates the cost advantages that accrue to KAWC from its use of the Service Company. Outside service providers generally bill for every hour worked. Service Company exempt personnel, on the other hand, charge a maximum of eight hours per day even when they work more hours. If all overtime hours of Service Company personnel were factored into the hourly rate calculation, the Service Company would have had an even greater annual dollar advantage than the $5.4 million cited above.

6) It would be difficult for KAWC to find local service providers with the same specialized water industry expertise as possessed by the Service Company staff. Service Company personnel spend substantially all their time serving operating water companies. This specialization brings with it a unique knowledge of water utility operations and regulation that may not be available from local service providers.

7) Service Company fees do not include any profit markup. Only its actual cost of service is being recovered from KAWC ratepayers.

Q. What conclusions were you able to draw concerning question number 4, whether the 2022 costs of the Service Company's customer account services, including those of the National Call Centers, were reasonable?

A. The costs of the Service Company's customer accounts services, including those provided by the National Call Centers, were reasonable. Such costs are below the average of the neighboring electric utility comparison group. This group of companies provides a reasonable proxy group for comparison to a regulated utility of the size and scope of the Service Company and KAWC. During 2022, the cost of customer accounts services for KAWC customers was $25.09 compared to the 2021 average of $27.43 for neighboring electric utilities. Sixteen of the comparison group's 28 utilities had a higher cost than KAWC.

Q. What conclusions were you able to draw concerning question number 5, whether the services KAWC receives from the Service Company are necessary?

A. I was able to draw the following conclusions:

(1) The services that the Service Company provides are necessary and are required for a water and wastewater utility.

(2) There is no redundancy or overlap in the services provided by the Service Company to KAWC.

Q. Does this complete your Direct Testimony?

A. Yes.

VERIFICATION

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

The undersigned, Patrick L. Baryenbruch, being duly sworn, deposes and says that he is the President of Baryenbruch & Company, LLC, that he has personal knowledge of the matters set forth in the accompanying testimony for which he is identified as the responsible witness, and that the answers contained therein are true and correct to the best of his information, knowledge, and belief.

Patrick Baryenbruch

Patrick L. Baryenbruch

Subscribed and sworn to before me, a Notary Public in and before said County and State, this 26 day of June, 2023.

Jennifer C Cantinieri

Notary Public

My Commission Expires:

May 30 2027

JENNIFER C CANTINIERI
Notary Public, North Carolina
Wake County
My Commission Expires
May 30, 2027

Exhibit PLB-1

Patrick Baryenbruch's Previous Affiliate Transactions and Rate Case Engagements

Client	State	Year	Purpose	Rate Case Witness?
1 Connecticut American Water	Connecticut	1999	Rate Case	Yes
2 Illinois American Water	Illinois	2007	Rate Case	Yes
	Illinois	2021	Rate Case	Yes
3 Indiana American Water	Indiana	2017	Rate Case	Yes
	Indiana	2022	Rate Case	Yes
4 Iowa American Water	Iowa	2020	Rate Case	Yes
5 Kentucky American Water	Kentucky	2003	Rate Case	Yes
	Kentucky	2006	Rate Case	Yes
	Kentucky	2008	Rate Case	Yes
	Kentucky	2009	Rate Case	Yes
	Kentucky	2018	Rate Case	Yes
6 Massachusetts American Water	Massachusetts	2000	Rate Case	Yes
7 Missouri American Water	Missouri	2002	Rate Case	Yes
	Missouri	2008	Rate Case	Yes
	Missouri	2014	Rate Case	Yes
	Missouri	2016	Rate Case	Yes
	Missouri	2019	Rate Case	Yes
8 New Jersey American Water	New Jersey	2005	Rate Case	Yes
	New Jersey	2007	Rate Case	Yes
	New Jersey	2009	Rate Case	Yes
	New Jersey	2010	Rate Case	Yes
	New Jersey	2014	Rate Case	Yes
	New Jersey	2017	Rate Case	Yes
	New Jersey	2019	Rate Case	Yes
9 New Mexico American Water	New Mexico	2007	Rate Case	Yes
10 New York American Water	New York	2006	Rate Case	Yes
	New York	2010	Rate Case	Yes
	New York	2013	Rate Case	Yes
	New York	2015	Rate Case	Yes
11 Ohio American Water	Ohio	2006	Rate Case	Yes
	Ohio	2010	Rate Case	Yes
12 Pennsylvania American Water	Pennsylvania	2008	Compliance	No
	Pennsylvania	2011	Compliance	No
	Pennsylvania	2014	Compliance	No
	Pennsylvania	2017	Compliance	No
	Pennsylvania	2020	Compliance	No
13 Tennessee American Water	Tennessee	2006	Rate Case	Yes
	Tennessee	2010	Rate Case	Yes
14 Virginia American Water	Virginia	1996	Rate Case	Yes
	Virginia	1999	Rate Case	Yes
	Virginia	2000	Rate Case	Yes
	Virginia	2001	Rate Case	Yes
	Virginia	2003	Rate Case	Yes
	Virginia	2007	Rate Case	Yes
	Virginia	2009	Rate Case	Yes
	Virginia	2011	Rate Case	Yes
	Virginia	2014	Rate Case	Yes
	Virginia	2018	Rate Case	Yes
	Virginia	2021	Rate Case	Yes
15 West Virginia American Water	West Virginia	2002	Rate Case	Yes
	West Virginia	2006	Rate Case	Yes
	West Virginia	2007	Rate Case	Yes
	West Virginia	2009	Rate Case	Yes
	West Virginia	2012	Rate Case	Yes
	West Virginia	2014	Rate Case	Yes
	West Virginia	2017	Rate Case	Yes
	West Virginia	2020	Rate Case	Yes
16 Atlanta Gas Light (Southern Co)	Georgia	2009	Rate Case	Yes
17 Atmos Energy Corporation	Virginia	2004	Compliance	No
18 Columbia Gas of Kentucky	Kentucky	2015	Rate Case	Yes
19 Columbia Gas of Maryland	Maryland	2015	Rate Case	Yes
20 Columbia Gas of Massachusetts	Massachusetts	2004	Rate Case	Yes
	Massachusetts	2006	Internal Info	No
	Massachusetts	2011	Internal Info	No
	Massachusetts	2012	Internal Info	No
	Massachusetts	2014	Internal Info	No
	Massachusetts	2017	Internal Info	No
21 Northern Indiana Public Service	Indiana	2015	Internal Info	No
	Indiana	2016	Rate Case	Yes
	Indiana	2020	Rate Case	Yes
	Indiana	2021	Rate Case	Yes

Client	State	Year	Purpose	Rate Case Witness?
22 Columbia Gas of Virginia	Virginia	2003	Compliance	No
	Virginia	2004	Compliance	No
	Virginia	2005	Rate Case	Yes
	Virginia	2006	Compliance	No
	Virginia	2007	Compliance	No
	Virginia	2008	Compliance	No
	Virginia	2009	Rate Case	Yes
	Virginia	2010	Compliance	No
	Virginia	2011	Compliance	No
	Virginia	2012	Compliance	No
	Virginia	2013	Rate Case	Yes
	Virginia	2014	Compliance	No
	Virginia	2015	Rate Case	Yes
	Virginia	2016	Compliance	No
	Virginia	2017	Rate Case	Yes
	Virginia	2018	Compliance	No
	Virginia	2019	Compliance	No
	Virginia	2020	Compliance	No
	Virginia	2021	Rate Case	Yes
	Virginia	2022	Compliance	No
23 Columbia Gas of Pennsylvania	Pennsylvania	2015	Internal Info	No
	Pennsylvania	2020	Rate Case	Yes
24 Dominion Energy, Inc.	Virginia	2008	Rate Case	Yes
	Virginia	2009	Compliance	No
	Virginia	2010	Compliance	No
	Virginia	2011	Compliance	No
	Virginia	2012	Compliance	No
	Virginia	2014	Compliance	No
	Virginia	2017	Compliance	No
	Virginia	2019	Compliance	No
25 Duke Energy	North Carolina	2006	Compliance	No
26 Elizabethtown Gas (Southern Co)	New Jersey	2008	Rate Case	Yes
27 Electric Transmission Texas	Texas	2016	Rate Case	Yes
	Texas	2020	Rate Case	Yes
	Texas	2022	Rate Case	Yes
28 General Water Works of Rio Rancho	New Mexico	1993	Rate Case	Yes
29 General Water Works of Virginia	Virginia	1992	Rate Case	Yes
30 Po River Water and Sewer	Virginia	1993	Rate Case	Yes
	Virginia	2007	Rate Case	Yes
	Virginia	2008	Rate Case	Yes
31 Progress Energy	North Carolina	2001	Internal Info	No
32 Roanoke Gas	Virginia	2006	Compliance	No
33 Southern California Edison	California	2002	Compliance	No
	California	2003	Compliance	No
	California	2004	Compliance	No
	California	2005	Compliance	No
34 AEP Texas	Texas	2018	Rate Case	Yes
35 Appalachian Power	Virginia	2021	Rate Case	Yes
36 Southwestern Electric Power	Texas	2016	Rate Case	Yes
	Texas	2020	Rate Case	Yes
37 Kentucky Utilities	Virginia	2020	Rate Case	Yes
38 Virginia Natural Gas (Southern Co)	Virginia	2004	Compliance	No
	Virginia	2005	Rate Case	Yes
	Virginia	2010	Rate Case	Yes
39 United Water of Pennsylvania	Pennsylvania	2004	Rate Case	Yes
40 Corix Infrastructure/Water Services	Enterprise	2018	Internal Info	No
Corp.	Enterprise	2019	Internal Info	No
	Enterprise	2021	Internal Info	No
41 Community Utilities of Indiana	Indiana	2020	Rate Case	No
42 Massanutten Public Service	Virginia	2006	Rate Case	Yes
Company	Virginia	2008	Rate Case	Yes
	Virginia	2013	Rate Case	Yes
	Virginia	2019	Rate Case	Yes
43 Water Service Corporation	Kentucky	2010	Rate Case	Yes
Kentucky	Kentucky	2012	Rate Case	Yes
	Kentucky	2019	Rate Case	Yes
	Kentucky	2021	Rate Case	Yes
44 Corix Utilities Oklahoma	Oklahoma	2019	Compliance	Yes
45 Great Basin Water Company	Nevada	2019	Rate Case	Yes
	Nevada	2021	Rate Case	Yes

Total Studies	141
Number of Rate Cases	98
Number of Utility Clients	45
Number of States	20

Market-to-Cost Comparison of Service Company Charges to Kentucky-American Water Company, Inc.

12 Months Ended December 31, 2022

May 2023

Baryenbruch & Company, LLC

Kentucky-American Water Company, Inc.
Market-to-Cost Comparison of Service Company Charges
12 Months Ended December 31, 2022

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Purpose of This Study

This Market-to-Cost Comparison of 2022 Service Company Charges to Kentucky-American Water Company, Inc. (KAWC) study was undertaken to answer five questions concerning the services provided by American Water Works Service Company, Inc., (Service Company) to KAWC:

Reasonableness

1. Were the Service Company's charges to KAWC during 2022 reasonable compared to charges from other service companies to their regulated utility affiliates?

2. Were KAWC's 2022 total expenses, including those incurred directly by KAWC and those allocated to it by the Service Company, reasonable? This question evaluates a broader set of costs beyond Service Company charges to KAWC.

3. Was KAWC charged the lower of cost or market for managerial and professional services provided by the Service Company during 2022?

4. Were 2022 costs of Service Company's customer account services, including those of the National Call Centers, comparable to those of other utilities?

Necessity

5. Are the services KAWC receives from the Service Company necessary?

Study Results

Concerning question 1, the following conclusion was reached:

- The Service Company's 2022 cost per KAWC customer is reasonable compared to costs per customer for electric and combination electric/gas service companies. During 2022, KAWC was charged $80 per customer for administrative and general (A&G)-related services provided by the Service Company. This compares to an average of $127 per customer for service companies reporting to the Federal Energy Regulatory Commission (FERC). Sixteen of the 22 utility service companies that filed a FERC Form 60 for 2021 had higher per-customer A&G costs than KAWC's 2022 charges from the Service Company.

Question 2 extends the reasonableness test to two broader sets of expenses--total Customer Accounts/A&G expenses and Total Operations and Maintenance (O&M) expenses. The following conclusions were reached:

- KAWC's 2022 total Customer Accounts and A&G expenses per customer are $142. This is just above the 2021 average of $123 per customer for a comparison group of Kentucky water companies with a similar profile. Seven of the comparison group's 13 water companies have a higher cost.

- KAWC's 2022 total O&M expenses per customer are $276. This is significantly lower than the comparison group 2021 average of $392. Twelve of the comparison group's 13 water companies had a higher cost. KAWC can achieve low O&M expenses thanks to the services it receives from the Service Company. Examples of just a few of these economically beneficial services include the following:

- Supply Chain - increased purchasing power results in lower costs for materials, supplies and outside services
- Customer Service – centralized services delivered by shared resources enable greater economies of scale and enhanced service levels
- Field Resource Coordination - enables KAWC to focus its resources more efficiently and effectively
- Belleville Lab – central lab testing services are delivered at cost by qualified analysts
- Accounting – work is performed by shared resources, without the need for KAWC to retain full-time staff
- Human Resources – economies of scale are achieved through centralized payroll and benefits administration

- Based upon the total cost comparisons developed for this question, it can be concluded that KAWC's total costs are reasonable.

Concerning question 3, the following conclusions were reached from this study:

- KAWC was charged the lower of cost or market for managerial and professional services during 2022.
- On average, the hourly rates for outside service providers are 60% higher than the Service Company's hourly rates.
- The managerial and professional services provided by the Service Company are vital and could not be procured externally by KAWC without careful supervision on the part of KAWC. If these services were contracted entirely to outside providers, KAWC would have to add at least two positions to manage the activities of outside firms. These positions would be required to ensure the quality and timeliness of services provided.
- If all the managerial and professional services now provided by the Service Company had been outsourced during 2022, KAWC and its customers would have incurred approximately $5.4 million in additional expenses. This amount includes the higher cost of outside providers and the cost of two new KAWC positions needed to direct the outsourced work.
- This study's hourly rate comparison understates the cost advantages that accrue to KAWC from its use of the Service Company. Outside service providers generally bill for every hour worked. Service Company exempt personnel, on the other hand, charge a maximum of eight hours per day even when they work more hours. If all overtime hours of Service Company personnel were factored into the hourly rate calculation, the Service Company would have had an even greater annual dollar advantage than the $5.4 million cited above.
- It would be difficult for KAWC to find local service providers with the same specialized water and wastewater industry expertise as that possessed by the Service Company staff. Service Company personnel spend substantially all their time serving operating water and wastewater companies. This specialization brings with it a unique knowledge of water and wastewater utility operations and regulation that may not be available from local service providers.
- Service Company fees do not include any profit markup. Only its actual cost of service is being recovered from KAWC customers.

Concerning question 4, the following conclusion was reached:

- The costs of the Service Company's customer accounts services, including those provided by the National Call Centers, were reasonable. Such costs are below the average of the neighboring electric utility comparison group. This group of companies provides a reasonable proxy group for comparison to a regulated utility of the size and scope of the Service Company and KAWC. During 2022, the cost of customer accounts services for KAWC customers was $25.09 compared to the 2021 average of $27.43 for neighboring electric utilities. Sixteen of the comparison group's 28 utilities had a higher cost than KAWC.

Concerning question 5, the following conclusions were drawn:

- The services that the Service Company provides are necessary and are required for water and wastewater utilities.

- Furthermore, there is no redundancy or overlap in the services provided by the Service Company to KAWC. For all the services provided (Exhibit 13), there was only one entity primarily responsible for the service.

Overview of American Water Works Service Company

American Water's Service Company exists to provide certain shared services to American Water subsidiaries. It follows a service company model used by many utility holding companies that own multiple regulated utilities. By consolidating executive and professional services into a single service company, utility holding companies are able to realize the following benefits for customers:

- Purchasing Economies – Common expenses (e.g., insurance, chemicals, piping) can be procured on a much larger scale, thereby providing greater bargaining power for the combined entity compared to individual utility operating companies. A service company facilitates enterprise-wide purchasing programs through its procurement and contract administration functions.

- Operating Economies of Scale – A service company is able to deliver services more efficiently because workloads can be balanced across more persons and facilities. For instance, American Water's Service Company is able to maintain one principal water testing laboratory for the entire organization. This is much more cost-efficient than each operating utility funding its own testing arrangements.

- Continuity of Service – Centralizing service company personnel who perform similar services facilitates job cross-training and sharing of knowledge and expertise. This makes it easier to manage staff turnover and absences and to sustain high levels of service to operating utilities. An individual operating utility might experience considerable disruption if a key professional left and it were necessary to hire outside to fill the vacancy.

- Maintenance of Enterprise-Wide Standards – Personnel in American Water's Service Company establish standards for many functions (e.g., engineering designs, operating procedures and maintenance practices). It is easier to align operating utility operations because their implementation is supported by the Service Company.

- Improved Support and Guidance – American Water's Service Company provides another dimension of management and financial support and guidance that supplements local operating utility management. The Service Company facilitates standard planning and reporting, which helps ensure that operating utilities meet the requirements of their customers in a cost-effective manner.

- Retention of Personnel – A service company organization provides operating utility personnel with another career path beyond what may be available on a local level. These opportunities tend to improve employee retention.

American Water follows the model for other utility service companies in another important regard: its services are provided to affiliate operating utilities, like KAWC, at cost. American Water's Service Company is not a profit-making entity. It assigns only its actual expenses to the American Water subsidiaries it services.

II – Background

The Service Company provides services to American Water operating companies from the following locations:

- One Water Street – Service Company employees at One Water Street provide corporate governance and service functions, including executive management, finance, accounting, audit, tax, regulatory, external affairs, engineering, supply chain, human resources and benefits services. One Water Street also includes American Water's main Information Technology (IT) Services center for employees, provides software delivery and enhancements and provides local on-site support as well as the IT Service Desk for remote assistance for all employees using personal computers in the performance of their day-to-day activities. Further, One Water Street supports mission-critical systems such as supervisory control and data acquisition (SCADA) as well as emerging technologies such as geographic information systems and mobility. It provides technical expertise in project governance and release management while ensuring compliance with all governmental regulations.

- Central Lab – The national trace substance laboratory is located in Belleville, Illinois, and performs testing for all American Water operating companies.

- Customer Relations and Customer Service – Provide customer relations, field resource coordination services, customer communication, and billing and collection services from various locations.

- Information Technology Services Center – The IT Services Center supports the technology infrastructure required to run business applications and communications systems for American Water's operating companies. American Water's primary data center is an IBM facility in Sterling Forest, New York.

- Regional Support Services – Operating companies are provided with certain support services that are delivered more effectively on a regional basis because individual operating company workloads are not sufficient to warrant maintaining their own full-time staff for these activities. These services require closer proximity to operating companies and therefore are located closer to the operating companies the employees provide service to instead of one of the corporate locations.

Service Company Accounting

Service Company maintains an accounting ledger for recording transactions (e.g., labor, expenses, overhead, capital and other assets, liabilities and equity) in a Service Company ledger separate from affiliates' ledgers. Monthly financial statements are prepared that summarize month-to-date and year-to-date costs, budgets and prior year, with variances and explanations, by category and function. Accounting categories by transaction type are described below:

- Service Company Labor: The Service Company utilizes a system that tracks time and attendance. Employees electronically enter hours worked (including vacation, sick, family leave, etc.) and accounting information (e.g., business unit; formula; pay type) and electronically submit the timesheet for approval. Submitted timesheets are electronically routed to authorized approvers. Time sheets require approval (of hours and accounting information such as formulas, etc.) by an authorized timesheet approver in the employee's home business unit.

- Service Company Expenses: Expenditures (i.e., standard invoices, purchase orders, electronic disbursements, miscellaneous invoices, recurring invoices, recurring vouchers, and procurement cards) and journal entries require a preparer to enter accounting coding details (e.g., cost center, cost element and Work Breakdown Structure (WBS)) and a reviewer to approve the information in accordance with the corporate Delegation of Authority Policy. Expenditures are processed electronically and are automatically routed to the employee's supervisor for approval. Costs are posted many times daily, in detail, in the business unit selected. Journal entries are submitted as prepared to the appropriate reviewer and posted as approved.

- Service Company Assets: Service Company assets are procured directly by Service Company or through a capital leasing arrangement with Laurel Oak Properties (LOP). Service Company capitalizes these LOP leases as Non-Utility Plant assets in accordance with generally accepted accounting principles. Generally speaking, Service Company assets (including hardware, servers, laptops, desktops, servers, storage racks, furniture, laboratory and test equipment, security cameras, monitors and leasehold improvements) are acquired through LOP via a capital lease. LOP, on behalf of the Service Company, will acquire the necessary materials and services to build the assets that are needed for the Service Company to meet its business needs. One Water Street (OWS), which owns the Camden headquarters, is providing furniture, fixtures and office-related equipment for the first 7 years of the lease with the Service Company.

- Service Company Overhead: Costs for support personnel (e.g., administrative assistants, mailroom clerks), rents, facility expenses, pension, medical insurance, taxes, general office supplies and other similar expenses are recorded in the ledger of the cost center responsible for incurring the charge. Overhead expenditures are posted using the labor and expense processes noted above, and are recorded, in detail, in the ledger of the cost center responsible for the charge, using an overhead WBS.

Service Company Billing and Clearing

Service Company has developed a billing system that charges directly or allocates costs for services provided to Affiliates. Service Company billing is processed monthly and includes all Service Company costs charged to Affiliates using the WBS element selected for each transaction.

- WBS element: Every Service Company transaction (vouchers, journal entries, payroll batch, etc.) requires a WBS element within the account coding string. Each WBS element is configured in SAP with the following: Affiliate(s) to be charged, percent of charge to be billed to each Affiliate (total must equal 100%), receiving object (e.g., Affiliate's cost center) for O&M costs or an Affiliate's WBS element for capital expenditures (CAPEX). WBS elements are configured in SAP with an end date (month/year) to prevent transactions from using an expired WBS during data input.

- Affiliate Billing Process: Service Company billing is a two-step process that first calculates allocations of transactions for all non-overhead WBS elements. The second step calculates overhead transaction allocations using the ratio of direct labor (Cost Element 5012000) allocations to Affiliates from the first step above multiplied by the pool of overhead expenses by physical location.

- Bill Clearing Process: Service Company billings are cleared through American Water Capital Corp., (an affiliate) monthly via an intercompany journal entry to GL Account 23120000 (Notes Payable – Associated Companies) posted on the last day of the month. Payments are estimated for each Affiliate using the prior month actual billing (current month estimate) with adjustment for prior month actual to estimate (previous month funding) true-up.

Service Company 2022 Charges

During 2022, the Service Company billed KAWC a total of approximately $16.5 million, as shown in the table below. These charges were subjected to a market-to-cost comparison.

	2020
Support Services - O&M	$ 12,020,271
Support Services - Capital	$ 4,487,819
Total Service Company Charges	$ 16,508,090

For purposes of comparing these charges to certain outside benchmarks, Service Company services were placed into three categories:

- Managerial and Professional Services – Includes such services as management, accounting, legal, human resources, engineering and information technology.
- Customer Account Services – Includes customer-related services, such as call handling, credit, billing, collection and payment processing.
- Field Resource Coordination Services – Includes tracking and dispatching service orders for field representatives and distribution crews to carry out.

Total 2022 Service Company dollar and hour charges break down between management and professional services and customer account services as follows:

	2022	
	Amount	Hours
Management and Professional Services	$ 13,484,075	55,719
Customer Account Services	$ 2,582,859	26,853
Field Resource Coordination Services	$ 441,156	8,973
Total Service Company Charges	$16,508,090	91,545

Cost Comparison Approach

This study's first question—whether the Service Company 2022 charges are reasonable—was determined by comparing KAWC's A&G-related Service Company charges per regulated retail customer to the same charges for utility companies that must file the Federal Energy Regulatory Commission (FERC) Form 60 – Annual Report of Service Companies.

The second question—whether KAWC's 2022 total Customer Accounts/A&G expenses and total O&M expenses are reasonable—was determined by comparing KAWC's costs to those of a comparison group of Kentucky water companies that are regulated by the Kentucky Public Service Commission (KPSC). Comparison group data was obtained from the 2021 annual reports filed with the KPSC.

The third question—whether the Service Company charges during 2022 were at the lower of cost or market—was evaluated by comparing the cost per hour for managerial and professional services provided by Service Company personnel to hourly billing rates that would be charged by outside providers of equivalent services. Service Company costs per hour were based on actual charges to KAWC during 2022. Outside providers' billing rates came from surveys or other information from professionals who could perform the services now provided by the Service Company.

The fourth question—whether Service Company's 2022 customer account services charges were comparable to other utilities—was addressed by comparing KAWC's customer account services expenses to those of neighboring investor-owned electric utilities. This utility comparison group was selected because the cost of outside providers of customer account services is proprietary and not publicly available. Comparison to electric utilities is appropriate because all utilities, regardless of service type, must perform customer account services activities, including updating customer records for meter reads, printing and mailing bills, and collecting and processing customer payments. Electric utility costs are available from the FERC Form 1; thus, there is appropriate data transparency. The selection of electric utilities from Kentucky and neighboring states provides a sufficiently sized comparison group.

The fifth question—the necessity of Service Company services—was investigated by defining the services provided to KAWC and determining if these services would be required if KAWC were not part of the American Water organization.

Methodology

Utility service companies deliver a variety of services. Some may support their regulated utility affiliate's operations-related functions (e.g., transmission, distribution). All utility service companies, however, provide A&G services to their affiliates. This is the case because considerable economies of scale derive from centralizing the management of corporate A&G services such as finance, human resources and information technology. Because A&G-related services are delivered by all utility service companies, this study uses A&G charges per customer as the metric by which to test the reasonableness of affiliate charges.

KAWC's Service Company A&G Cost per Customer

During 2022, KAWC was charged $80 per customer by the Service Company for A&G-related services. The calculation of this amount, shown in the table below, starts with total Service Company charges and adjusts for capital and non-A&G function (e.g., engineering, operations and water quality) charges. These adjustments are necessary to develop a per-customer cost that can be compared to the cost of the utility service company comparison group.

	2022
Total Service Company Charges	$16,508,090
Less: Capital Charges	$ (4,487,819)
Less: Non-A&G Charges	
Engineering	$ (132,460)
Operations	$ (716,263)
Water Quality	$ (88,311)
A&G Service Company Charges	$11,083,237
KAWC Customer Count	138,409
A&G SC Charges per Customer	$ 80

Comparison Group Cost Per Customer

Every centralized service company in a holding company system subject to regulation by the FERC must file a Form 60 in accordance with the Public Utility Holding Company Act of 2005, Section 1270, Section 390 of the Federal Power Act, and 18 Code of Federal Regulations paragraph 366.23. The Form 60 is designed to collect financial information from service companies within a holding company structure.

Charges to utility affiliates for the comparison group service companies were obtained from Schedule XVI – Analysis of Charges for Service Associate and Non-Associate Companies (p. 303 to 306) of each entity's FERC Form 60. Information from Form 60 schedule Account 457 – Analysis of Billing – Associate Companies was also used to isolate and eliminate charges to non-regulated affiliates from the cost pool used to calculate A&G expenses per regulated service customer.

For 2021, a Form 60 was filed by service companies associated with 22 utility holding companies. These service companies support utilities that provide regulated electric and, in some cases, gas service to retail customers.

IV – Question 1 – Reasonableness of Service Company Charges

FERC Form 60 shows service company charges to affiliates by FERC account. The table below shows a list of FERC A&G accounts and designates which correspond to services the Service Company provides to KAWC. Amounts in the designated FERC accounts are included in the calculation of service company A&G expenses per regulated customer.

FERC Account	Included In Cost Calculation
901 - Supervision	X
902 - Meter reading expenses	
903 - Customer records and collection expenses	X
904 - Uncollectible accounts	
905 - Miscellaneous customer accounts expenses	X
907 - Supervision	
908 - Customer assistance expenses	
909 - Informational And Instructional Advertising Expenses	
910 - Miscellaneous Customer Service And Informational Exp	X
911 - Supervision	
912 - Demonstrating and Selling Expenses	
913 - Advertising Expenses	
916 - Miscellaneous Sales Expenses	
920 - Administrative and General Salaries	X
921 - Office Supplies and Expenses	X
923 - Outside Services Employed	X
924 - Property Insurance	X
925 - Injuries and Damages	
926 - Employee Pensions and Benefits	X
928 - Regulatory Commission Expenses	
930.1 - General Advertising Expenses	
930.2 - Miscellaneous General Expenses	X
931 - Rents	X
935 - Maintenance of Structures and Equipment	X

The A&G expenses per regulated utility customer for the 22 utility companies whose service companies filed a Form 60 for 2021 are calculated in Exhibit 1 (page 11).

Exhibit 2 (page 12) shows KAWC's 2022 Service Company cost per customer of $80 to be lower than the average of $127 per customer for the comparison group service companies. Sixteen of the 22 comparison group service companies had higher per-customer A&G costs than KAWC's charges from the Service Company. Based on this result, it is possible to conclude that the Service Company's charges to KAWC were reasonable.

Exhibit 1

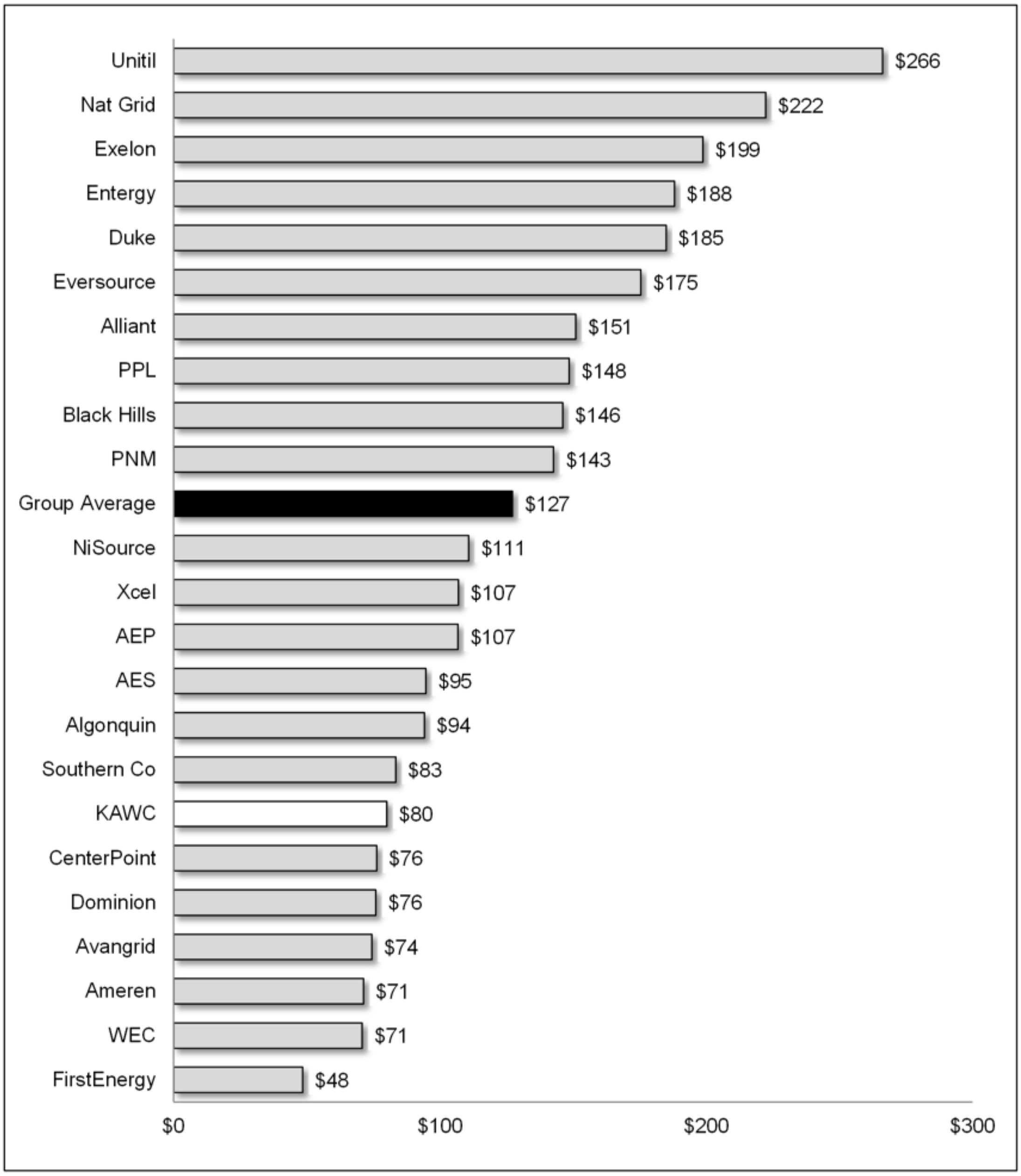
Kentucky-American Water Company, Inc.
Calculation of 2021 Service Company A&G Expenses Per Customer

Utility Company	2021 Regulated Retail Service Company A&G Expenses	Regulated Retail Customers	Cost per Customer
AEP	$587,302,141	5,500,000	$ 107
AES	$93,876,438	991,229	$ 95
Algonquin	$102,935,011	1,093,000	$ 94
Alliant	$210,615,298	1,395,000	$ 151
Ameren	$235,318,183	3,300,000	$ 71
Avangrid	$245,518,798	3,300,000	$ 74
Black Hills	$184,957,652	1,265,945	$ 146
CenterPoint	$445,622,560	5,842,684	$ 76
Dominion	$506,009,294	6,664,000	$ 76
Duke	$1,738,513,167	9,400,000	$ 185
Entergy	$602,866,456	3,206,000	$ 188
Eversource	$703,118,546	4,009,000	$ 175
Exelon	$2,027,101,694	10,200,000	$ 199
FirstEnergy	$290,715,426	6,000,000	$ 48
Nat Grid	$1,556,479,671	7,000,000	$ 222
NiSource	$395,939,148	3,573,000	$ 111
PNM	$112,122,878	786,000	$ 143
PPL	$405,058,651	2,728,000	$ 148
Southern Co	$751,067,052	9,000,000	$ 83
Unitil	$51,725,393	194,300	$ 266
WEC	$325,723,396	4,600,600	$ 71
Xcel	$620,259,894	5,800,000	$ 107
Total/Average	$12,192,846,747	95,848,758	$ 127

Source: FERC Form 60; Baryenbruch & Company, LLC, analysis

Exhibit 2

Kentucky-American Water Company, Inc.
Comparison of Service Company A&G Charges Per Customer



Source: Company information; 2021 FERC Form 60; Baryenbruch & Company, LLC, analysis

This study benchmarked KAWC's total expenses, which include charges from the Service Company and expenses incurred directly by KAWC. This comparison presents a broader view of KAWC's expenses beyond Service Company charges.

The comparison group of Kentucky water companies was selected based on the following criteria:

- The water company filed an annual report for 2021 with the KPSC
- The water company has 6,000 or more customers

Based on these criteria, the water companies in the table below were selected for inclusion in the comparison group. A number of these companies purchase their entire water supply. Thus, the comparison group contains a combination of integrated and distribution-only water companies.

		Source of Water Supply Percent		
Comparison Group Companies (2021)	Customers	Produced	Purchased	Total
Northern Kentucky Water District	85,838	100%	0%	100%
Warren County Water District	31,754	0%	100%	100%
Hardin County Water District 2	29,332	86%	14%	100%
Boone County Water District	27,574	0%	100%	100%
Mountain Water District	16,576	58%	42%	100%
Daviess County Water District	13,416	0%	100%	100%
Edmonson County Water District	10,941	100%	0%	100%
Hardin County Water District 1	10,702	57%	43%	100%
Western Pulaski County Water District	9,154	0%	100%	100%
Oldham County Water District	8,871	100%	0%	100%
Green River Valley Water District	7,759	100%	0%	100%
Bullock Pen Water District	7,486	22%	78%	100%
Rowan Water Inc.	7,426	0%	100%	100%
Grayson County Water District	7,077	59%	41%	100%
Henry County Water District 2	6,724	100%	0%	100%
Henderson County Water District	6,504	0%	100%	100%
Marion County Water District	6,284	0%	100%	100%
McCreary County Water District	6,258	100%	0%	100%
Laurel County Water District 2	6,251	100%	0%	100%
Harrison County Water Association Inc.	6,030	0%	100%	100%
Ohio County Water District	6,091	100%	0%	100%
Garrard County Water Association Inc.	6,008	0%	100%	100%
Muhlenberg County Water District	5,976	0%	100%	100%
Total Comparsion Group Customers	330,032			
Kentucky-American Water Company -2022	137,065	99%	1%	100%

Source: 2021 Annual Reports to the Kentucky Public Service Commission; Company information

Information necessary to perform the cost comparison was obtained from the 2021 annual reports to the KPSC. The following metrics were developed for comparison:

- Customer Accounts and A&G Expenses per customer
- Total O&M Expenses (including Operations, Maintenance, Customer Accounts and A&G Expenses) per customer.

The calculation of costs per customer is shown in Exhibit 3 (page 14). A set of calculations are presented for all comparison group companies and those that do not purchase 100% of their water supply.

Exhibit 3

Kentucky-American Water Company, Inc.
Total Expenses Per Customer

	Cost per Customer (All Companies)				
	Cust Accts & A&G Exp	Total Utility Exp	Total Customers	Cost Per Customer CA & A&G Exp	Cost Per Customer Total Util Exp
Kentucky-American Water Company (2022)	$ 19,468,715	$ 37,865,084	137,065	$ 142	$ 276
Comparison Group (2021)					
Boone County Water District	$ 1,244,240	$ 14,946,958	27,574	$ 45	$ 542
Bullock Pen Water District	$ 697,122	$ 3,763,526	7,486	$ 93	$ 503
Daviess County Water District	$ 816,262	$ 4,939,677	13,416	$ 61	$ 368
Edmonson County Water District	$ 681,843	$ 2,101,760	10,941	$ 62	$ 192
Garrard County Water Association Inc.	$ 439,243	$ 1,816,068	6,008	$ 73	$ 302
Grayson County Water District	$ 1,034,348	$ 2,704,476	7,077	$ 146	$ 382
Green River Valley Water District	$ 1,207,400	$ 3,461,194	7,759	$ 156	$ 446
Hardin County Water District 1	$ 3,217,579	$ 8,650,929	10,702	$ 301	$ 808
Hardin County Water District 2	$ 2,968,975	$ 10,482,388	29,332	$ 101	$ 357
Harrison County Water Association Inc.	$ 576,399	$ 2,469,413	6,030	$ 96	$ 410
Henderson County Water District	$ 840,399	$ 2,581,287	6,504	$ 129	$ 397
Henry County Water District 2	$ 620,381	$ 2,571,203	6,724	$ 92	$ 382
Laurel County Water District 2	$ 898,258	$ 1,970,980	6,251	$ 144	$ 315
Marion County Water District	$ 672,516	$ 3,324,601	6,284	$ 107	$ 529
McCreary County Water District	$ 894,282	$ 3,127,798	6,258	$ 143	$ 500
Mountain Water District	$ 2,463,483	$ 7,366,502	16,576	$ 149	$ 444
Muhlenberg County Water District	$ 1,383,866	$ 3,387,374	5,976	$ 232	$ 567
Northern Kentucky Water District	$ 9,024,386	$ 29,154,232	85,838	$ 105	$ 340
Ohio County Water District	$ 721,444	$ 3,528,624	6,091	$ 118	$ 579
Oldham County Water District	$ 1,449,645	$ 3,338,315	8,871	$ 163	$ 376
Rowan Water Inc.	$ 582,714	$ 2,819,988	7,426	$ 78	$ 380
Warren County Water District	$ 2,113,572	$ 10,244,038	31,754	$ 67	$ 323
Western Pulaski County Water District	$ 884,191	$ 2,768,311	9,154	$ 97	$ 302
Comparison Group Total	$ 35,432,547	$ 131,519,642	330,032	**$ 107**	**$ 399**

Excluding Water Companies with 100% Purchased Water

	Cost per Customer (ex 100% Purchased Water)				
	Cust Accts & A&G Exp	Total Utility Exp	Total Customers	Cost Per Customer CA & A&G Exp	Cost Per Customer Total Util Exp
Kentucky-American Water Company (2022)	$ 19,468,715	$ 37,865,084	137,065	$ 142	$ 276
Comparison Group (2021)					
Bullock Pen Water District	$ 697,122	$ 3,763,526	7,486	$ 93	$ 503
Edmonson County Water District	$ 681,843	$ 2,101,760	10,941	$ 62	$ 192
Grayson County Water District	$ 1,034,348	$ 2,704,476	7,077	$ 146	$ 382
Green River Valley Water District	$ 1,207,400	$ 3,461,194	7,759	$ 156	$ 446
Hardin County Water District 1	$ 3,217,579	$ 8,650,929	10,702	$ 301	$ 808
Hardin County Water District 2	$ 2,968,975	$ 10,482,388	29,332	$ 101	$ 357
Henry County Water District 2	$ 620,381	$ 2,571,203	6,724	$ 92	$ 382
Laurel County Water District 2	$ 898,258	$ 1,970,980	6,251	$ 144	$ 315
McCreary County Water District	$ 894,282	$ 3,127,798	6,258	$ 143	$ 500
Mountain Water District	$ 2,463,483	$ 7,366,502	16,576	$ 149	$ 444
Northern Kentucky Water District	$ 9,024,386	$ 29,154,232	85,838	$ 105	$ 340
Ohio County Water District	$ 721,444	$ 3,528,624	6,091	$ 118	$ 579
Oldham County Water District	$ 1,449,645	$ 3,338,315	8,871	$ 163	$ 376
Comparison Group Total	$ 25,879,145	$ 82,221,927	209,906	**$ 123**	**$ 392**

Source: 2021 Annual Reports to the Kentucky Public Service Commission; Company information

The table below shows the positions of KAWC's 2022 expenses per customer against all comparison group companies' 2021 expenses.

All Comparison Group Companies

Customer Accounts and A&G Expenses

Company	Cost/Customer	
Hardin County Water District 1	$	301
Muhlenberg County Water District	$	232
Oldham County Water District	$	163
Green River Valley Water District	$	156
Mountain Water District	$	149
Grayson County Water District	$	146
Laurel County Water District 2	$	144
McCreary County Water District	$	143
Kentucky-American Water Company	**$**	**142**
Henderson County Water District	$	129
Ohio County Water District	$	118
Comparison Group Average	**$**	**107**
Marion County Water District	$	107
Northern Kentucky Water District	$	105
Hardin County Water District 2	$	101
Western Pulaski County Water District	$	97
Harrison County Water Association Inc.	$	96
Bullock Pen Water District	$	93
Henry County Water District 2	$	92
Rowan Water Inc.	$	78
Garrard County Water Association Inc.	$	73
Warren County Water District	$	67
Edmonson County Water District	$	62
Daviess County Water District	$	61
Boone County Water District	$	45

Total O&M Expenses

Company	Cost/Customer	
Hardin County Water District 1	$	808
Ohio County Water District	$	579
Muhlenberg County Water District	$	567
Boone County Water District	$	542
Marion County Water District	$	529
Bullock Pen Water District	$	503
McCreary County Water District	$	500
Green River Valley Water District	$	446
Mountain Water District	$	444
Harrison County Water Association Inc.	$	410
Comparison Group Average	**$**	**399**
Henderson County Water District	$	397
Henry County Water District 2	$	382
Grayson County Water District	$	382
Rowan Water Inc.	$	380
Oldham County Water District	$	376
Daviess County Water District	$	368
Hardin County Water District 2	$	357
Northern Kentucky Water District	$	340
Warren County Water District	$	323
Laurel County Water District 2	$	315
Western Pulaski County Water District	$	302
Garrard County Water Association Inc.	$	302
Kentucky-American Water Company	**$**	**276**
Edmonson County Water District	$	192

Source: 2021 Annual Reports to the Kentucky Public Service Commission; Company information

When water companies that purchase 100% of their water supply are excluded from the comparison, KAWC's customer accounts and A&G are just above average, with 7 other water companies having higher costs per customer. KAWC's total O&M expenses are lower than all but one comparison group water company.

Excluding Companies with 100% Purchased Water

Customer Accounts and A&G Expenses

Company	Cost/Customer	
Hardin County Water District 1	$	301
Oldham County Water District	$	163
Green River Valley Water District	$	156
Mountain Water District	$	149
Grayson County Water District	$	146
Laurel County Water District 2	$	144
McCreary County Water District	$	143
Kentucky-American Water Company	**$**	**142**
Comparison Group Average	**$**	**123**
Ohio County Water District	$	118
Northern Kentucky Water District	$	105
Hardin County Water District 2	$	101
Bullock Pen Water District	$	93
Henry County Water District 2	$	92
Edmonson County Water District	$	62

Total O&M Expenses

Company	Cost/Customer	
Hardin County Water District 1	$	808
Ohio County Water District	$	579
Bullock Pen Water District	$	503
McCreary County Water District	$	500
Mountain Water District	$	444
Green River Valley Water District	$	446
Comparison Group Average	**$**	**392**
Henry County Water District 2	$	382
Grayson County Water District	$	382
Oldham County Water District	$	376
Hardin County Water District 2	$	357
Northern Kentucky Water District	$	340
Laurel County Water District 2	$	315
Kentucky-American Water Company	**$**	**276**
Edmonson County Water District	$	192

Source: 2021 Annual Reports to the Kentucky Public Service Commission; Company information

Total O&M expenses per customer reflect all costs to operate a utility and deliver service to its customers. KAWC achieves low O&M expenses thanks to the services it receives from the Service Company. Examples of just a few of these economically beneficial services include the following:

- Supply Chain - increased purchasing power results in lower costs for materials, supplies and outside services
- Customer Service – centralized services delivered by shared resources enable greater economies of scale and enhanced service levels
- Field Resource Coordination Services - enable KAWC to focus its resources more efficiently and effectively
- Belleville Lab – central lab testing services are delivered at cost by qualified analysts
- Accounting – work is performed by shared resources, without the need for KAWC to retain full-time staff
- Human Resources – economies of scale are achieved through centralized payroll and benefits administration

Based upon the cost comparisons presented in this chapter, it can be concluded that KAWC's total O&M expenses are reasonable.

Methodology

The value of services comparison is accomplished by comparing the cost per hour for Service Company managerial and professional services to those of outside service providers to whom these duties could be assigned. Based on the nature of the Service Company services, it was determined that the following outside providers could perform the categories of services indicated below:

- Management Consultants – executive and administrative management, risk management, human resources and communications services
- Attorneys – legal services
- Certified Public Accountants – accounting, financial and rates and revenues services
- IT Professionals – information technology services
- Professional Engineers – engineering, operations and water quality services.

Service Company's hourly rates were calculated for each of the five outside service provider categories, based on the dollars and hours charged to KAWC during 2022. Hourly billing rates for outside service providers were developed using third party surveys or directly from information furnished by outside providers themselves.

It should be noted that by using the Service Company's hours charged to KAWC during 2022, its hourly rates are actually overstated because some Service Company personnel charge a maximum of 8 hours per day even when they work more. Outside service providers generally bill for every hour worked. If all overtime hours of Service Company personnel had been factored into the hourly rate calculation, Service Company hourly rates would have been lower.

The last step in the lower-of-cost-or-market comparison was to compare the Service Company's average cost per hour to the average cost per hour for outside providers.

Service Company Hourly Rates

Exhibit 4 (page 19) details the assignment of 2022 management and professional Service Company charges by outsider provider category. Exhibit 5 (page 20) shows the same assignment for Service Company management and professional hours charged to KAWC during 2022.

Adjustments to these dollar amounts were necessary to calculate Service Company hourly rates that are directly comparable to those of outside providers. Adjustments were made to the following non-labor Service Company charges for 2022:

- Contract Services – 2022 Service Company charges to KAWC include expenses associated with the use of outside professional firms to perform certain enterprise-wide services (e.g., legal, financial audit, actuarial services). These professional fees are excluded from the Service Company hourly rate calculation because the related services have effectively been out-sourced already.
- IT Infrastructure Expenses – Included in 2022 Service Company charges to KAWC are leases, maintenance fees and depreciation related to American Water's enterprise computing and network infrastructure and business applications. An outside provider that takes over operation of this infrastructure would recover these expenses over and above the cost of personnel necessary to operate the data center.

- Non-Service-Related Expenses – These are corporate expenses such current and deferred income tax expense, line of credit fees and board expenses. These are not related to the provision of services by Service Company personnel and have been excluded.
- Travel Expenses – In general, client-related travel expenses incurred by outside service providers are not recovered through their hourly billing rates. Rather, actual out-of-pocket travel expenses are billed to clients in addition to fees for professional services. Thus, it is appropriate to remove these Service Company charges from the hourly rate calculation.

Exhibit 5 (page 21) shows how contract services, travel expenses, T&I infrastructure and non-service-related Service Company charges are assigned to the five outside provider categories.

Based on the assignment of expenses and hours shown in Exhibits 3 and 4 and the excludable items shown in Exhibit 5, the Service Company's equivalent costs per hour for 2022 are calculated below.

	2022					
	Attorney	Management Consultant	Certified Public Accountant	T&I Professional	Professional Engineer	Total
Total management, professional & technical services charges	$ 543,396	$ 4,650,814	$ 2,053,527	$ 5,697,791	$ 538,546	$ 13,484,075
Less: Exclusions						
Contract services	$ 27,441	$ 342,723	$ 259,890	$ 2,515,071	$ 19,596	$ 3,164,720
IT infrastructure expenses	$ -	$ 587,502	$ 88	$ 1,334,370	$ 3	$ 1,921,963
Non-service related expenses	$ 42,083	$ (37,515)	$ (191,069)	$ 4,146	$ 17,486	$ (164,868)
Travel expenses	$ 7,528	$ 51,056	$ 44,632	$ 23,072	$ 25,700	$ 151,988
Total Exclusions	$ 77,052	$ 943,766	$ 113,540	$ 3,876,659	$ 62,786	$ 5,073,804
Net Service-Related Charges (A)	$ 466,344	$ 3,707,047	$ 1,939,987	$ 1,821,132	$ 475,761	$ 8,410,271
Total Hours (B)	1,772	16,023	19,121	14,717	4,086	55,719
Average Hourly Rate (A / B)	**$ 263**	**$ 231**	**$ 101**	**$ 124**	**$ 116**	

Exhibit 4

Kentucky-American Water Company, Inc.
2022 Service Company Charges by Location and Function

Location	Function	2022 Service Company Charges: Attorney	Management Consultant	Certified Public Accountant	T&I Professional	Professional Engineer	Total
Belleville Lab	Water Quality	$ -	$ -	$ -	$ -	$ 88,311	$ 88,311
Call Centers	Human Resources	$ -	$ 279	$ -	$ -	$ -	$ 279
Corporate	Accounting	$ -	$ -	$ 857,855	$ -	$ -	$ 857,855
	Administration	$ -	$ 2,426,318	$ -	$ -	$ -	$ 2,426,318
	Audit	$ -	$ -	$ 208,009	$ -	$ -	$ 208,009
	Business Development	$ -	$ 94,197	$ -	$ -	$ -	$ 94,197
	Communications	$ -	$ 247,643	$ -	$ -	$ -	$ 247,643
	Engineering	$ -	$ -	$ -	$ -	$ 445,682	$ 445,682
	External Affairs	$ -	$ 1,417	$ -	$ -	$ -	$ 1,417
	Finance	$ -	-$ 27,401	$ 393,619	$ -	$ -	$ 366,218
	Human Resources	$ -	$ 898,480	$ -	$ -	$ -	$ 898,480
	Information Technology	$ -	$ -	$ -	$ 71,739	$ -	$ 71,739
	Legal	$ 259,391	$ -	$ -	$ -	$ -	$ 259,391
	Operations	$ -	$ 404,167	$ -	$ -	$ -	$ 404,167
	Supply Chain	$ -	$ -	$ 299,582	$ -	$ -	$ 299,582
Regional Offices	Administration	$ -	$ 565,932	$ -	$ -	$ -	$ 565,932
	Business Development	$ -	$ 1,848	$ -	$ -	$ -	$ 1,848
	Engineering	$ -	$ -	$ -	$ -	$ 4,553	$ 4,553
	External Affairs	$ -	$ 3,359	$ -	$ -	$ -	$ 3,359
	Finance	$ -	$ -	$ 292,717	$ -	$ -	$ 292,717
	Human Resources	$ -	$ 5,420	$ -	$ -	$ -	$ 5,420
	Legal	$ 284,005	$ -	$ -	$ -	$ -	$ 284,005
	Operations	$ -	$ 29,154	$ -	$ -	$ -	$ 29,154
	Rates & Regulatory	$ -	$ -	$ 1,745	$ -	$ -	$ 1,745
Information Technology	Information Technology	$ -	$ 1	$ -	$ 5,626,052	$ -	$ 5,626,053
Total Charges		**$ 543,396**	**$ 4,650,814**	**$ 2,053,527**	**$ 5,697,791**	**$ 538,546**	**$ 13,484,075**

Exhibit 5

Kentucky-American Water Company, Inc.
2022 Service Company Hours by Location and Function

		2022 Service Company Hours					
Location	Function	Attorney	Management Consultant	Certified Public Accountant	T&I Professional	Professional Engineer	Total
Belleville Lab	Water Quality	-	-	-	-	807	807
Call Centers	Human Resources	-	-	-	-	-	-
Corporate	Accounting	-	-	8,289	-	-	8,289
	Administration	-	3,597	-	-	-	3,597
	Audit	-	-	1,321	-	-	1,321
	Business Development	-	440	-	-	-	440
	Communications	-	1,382	-	-	-	1,382
	Engineering	-	-	-	-	3,279	3,279
	External Affairs	-	-	-	-	-	-
	Finance	-	247	4,304	-	-	4,551
	Human Resources	-	6,498	-	-	-	6,498
	Information Technology	-	-	-	698	-	698
	Legal	662	-	-	-	-	662
	Operations	-	1,799	-	-	-	1,799
	Supply Chain	-	-	2,614	-	-	2,614
Regional Offices	Administration	-	1,780	-	-	-	1,780
	Business Development	-	-	-	-	-	-
	Engineering						-
	External Affairs	-		-	-	-	-
	Finance	-	-	2,593	-	-	2,593
	Human Resources	-	10	-	-	-	10
	Legal	1,109	-	-	-	-	1,109
	Operations	-	269	-	-	-	269
	Rates & Regulatory	-	-	-	-	-	-
Information Technology	Information Technology	-	-	-	14,019	-	14,019
Total Hours Charged		**1,772**	**16,023**	**19,121**	**14,717**	**4,086**	**55,719**

Exhibit 5

Kentucky-American Water Company, Inc.

2022 Service Company Charges Excludable from the Hourly Rate Calculation

Charges By Function	Exclusions From Hourly Rate Calculation: Contract Services	Enterprise IT Expenses	Non-Services-Related Items	Travel Expenses	Total	Outside Service Provider Category
Accounting	$ 88,929	$ 5	$ (56,239)	$ 7,063	$ 39,758	Certified Public Accountant
Administration	$ 172,033	$ 587,502	$ (44,159)	$ 35,474	$ 750,849	Management Consultant
Audit	$ 60,633		$ (836)	$ 10,597	$ 70,394	Certified Public Accountant
Business Development	$ 11,585		$ (1,572)	$ 1,345	$ 11,358	Management Consultant
Communications	$ 36,225		$ 3,324	$ 1,978	$ 41,527	Management Consultant
Engineering	$ 9,435	$ 2	$ (11,242)	$ 15,072	$ 13,267	Professional Engineer
External Affairs	$ 79		$ 7	$ 794	$ 880	Management Consultant
Finance	$ 103,212		$ (135,275)	$ 20,154	$ (11,909)	Certified Public Accountant
Human Resources	$ 122,802		$ 4,885	$ 11,465	$ 139,152	Management Consultant
Information Technology	$ 2,515,071	$ 1,334,370	$ 4,146	$ 23,072	$ 3,876,659	IT Professional
Legal	$ 27,441		$ 42,083	$ 7,528	$ 77,052	Attorney
Operations	$ 12,460	$ 1	$ 3,628	$ 10,650	$ 26,739	Professional Engineer
Rates & Regulatory	$ 10	$ 82	$ -	$ 37	$ 130	Certified Public Accountant
Supply Chain	$ 7,106		$ 1,281	$ 6,780	$ 15,167	Certified Public Accountant
Water Quality	$ (2,300)		$ 25,101	$ (21)	$ 22,779	Professional Engineer
Total	**$ 3,164,720**	**$ 1,921,963**	**$ (164,868)**	**$ 151,988**	**$ 5,073,804**	

Recap By Outside Provider	Exclusions From Hourly Rate Calculation: Contract Services	Enterprise IT Expenses	Non-Services-Related Items	Travel Expenses	Total
Attorney	$ 27,441	$ -	$ 42,083	$ 7,528	$ 77,052
Management Consultant	$ 342,723	$ 587,502	$ (37,515)	$ 51,056	$ 943,766
Certified Public Accountant	$ 259,890	$ 88	$ (191,069)	$ 44,632	$ 113,540
IT Professional	$ 2,515,071	$ 1,334,370	$ 4,146	$ 23,072	$ 3,876,659
Professional Engineer	$ 19,596	$ 3	$ 17,486	$ 25,700	$ 62,786
Total	**$ 3,164,720**	**$ 1,921,963**	**$ (164,868)**	**$ 151,988**	**$ 5,073,804**

Outside Service Provider Hourly Rates

The next step in the lower-of-cost-or-market comparison was to obtain the average billing rates for outside service providers. The source of this information and the determination of the average rates are described in the paragraphs that follow.

It should be noted that professionals working for three of the five outside provider categories may be licensed to practice by state regulatory bodies. However, not every professional working for these firms is licensed. For instance, among US certified public accounting firms, only more experienced staff are predominantly CPAs (see table below). Some Service Company employees also have professional licenses. Thus, it is valid to compare the Service Company's hourly rates to those of the outside professional service providers included in this study.

Position	US Average
Partners/Owners	98%
Directors (11+ years experience)	87%
Managers (6-10 years experience)	79%
Sr Associates (4-5 years experience)	50%
Associates (1-3 years experience)	22%
New Professionals	10%

Source: AICPA's National PCPS/TSCPA Management of an Accounting Practice Survey (2010)

Attorneys

An estimate of Kentucky attorney rates was developed from National Law Journal's Survey of Law Firm Economics Report. As shown in Exhibit 7 (page 24), data from this survey has been adjusted for cost-of-living differences between each law firm's location and Lexington, Kentucky. The National Law Review billing survey hourly rates data is for 2020. The survey's calculated average rate was escalated to June 30, 2022—the midpoint of 2022.

Management Consultants

The cost per hour for management consultants was developed from a survey performed by Rodenhauser & Company LLC, a research company that monitors the consulting industry. The survey includes rates that were in effect during 2022 for firms throughout the United States. Consultants typically do not limit their practice to any one region and must travel to a client's location. Thus, the U.S. national average is appropriate for comparison.

The first step in the calculation, presented in Exhibit 8 (page 25), was to determine an average rate by consultant position level. From these rates, a single weighted average hourly rate was calculated based upon the percentage of time that is typically applied to a consulting assignment by each consultant position level.

Certified Public Accountants

The average hourly rate for Kentucky CPAs was developed from a 2020 survey performed by the American Institute of Certified Public Accountants (AICPA). As shown in Exhibit 9 (page 26), a weighted average hourly rate was developed based on a set of accountant positions and a percentage of time that is typically applied to an accounting assignment, based on Baryenbruch & Company, LLC's, experience. Since the survey includes hourly rates that were in effect as of December 31, 2020, the calculated average rate was escalated to June 30, 2022—the midpoint of 2022.

Information Technology Professionals

The 2022 average hourly rate for information technology consultants and contractors was developed from two sources: The Service Company for IT contractor rates and a survey performed by Rodenhauser & Company LLC, for IT consultants. As shown in Exhibit 10 (page 27), that data was compiled and a weighted average was calculated based on a percentage of time that is typically applied to an IT consulting assignment, based on Baryenbruch & Company, LLC's, experience.

Professional Engineers

The Company provided hourly rate information for outside engineering firms that provided KAWC with their rate schedules. As presented in Exhibit 11 (page 28), an average rate was developed for each engineering position level. Then, using the Service Company's percentage mix by engineering position, a weighted average cost per hour was calculated.

Kentucky-American Water Company, Inc.
Estimated Billing Rates for Attorneys

Average Hourly Billing Rates as During 2020

	Avg Billing Rates (Note A)		Weighted Avg Rate Calculation			Cost of Living (COL) Adjustment			
			0.25	0.75	(X)	COL Indices (Note B)		(Y)	(X x Y)
Region	Partner	Associate	Partner	Associate	Weighted Average	Region	Lexington, KY	COL Adjustment	Adjusted Rate
Northeast	$ 480	$ 313	$ 120	$ 234	$ 354	121.1	88.4	73.0%	$ 259
Midwest	$ 375	$ 225	$ 94	$ 169	$ 263	94.0	88.4	94.1%	$ 247
South	$ 450	$ 350	$ 113	$ 263	$ 375	94.1	88.4	93.9%	$ 352
West	$ 350	$ 260	$ 88	$ 195	$ 283	108.4	88.4	81.6%	$ 230
Overall Average Hourly Billing Rate									$ 272
Escalation to 2022 Midpoint (June 30, 2022)									
CPI at December 31, 2020									260.5
CPI at June 30, 2022									296.3
Inflation/Escalation (Note C)									13.8%
Average Hourly Billing Rate For Attorneys At June 30, 2022									$ 310

Note A: 2021 Survey of Law Firm Economics Report, National Law Journal
Note B: Cost of Living Index, Source Council for Community and Economic Research
Note C: U.S. Bureau of Labor Statistics (http://data.bls.gov/cgi-bin/surveymost)

Exhibit 8

Kentucky-American Water Company, Inc.
Billing Rates of U.S. Management Consultants

Survey billing rates in effect in 2022 (Note A)

A. Calculation of Average Hourly Billing Rate by Consultant Position

	Average Hourly Rates (Note A)				
	Analyst Consultant	Associate	Sr. Assoc/ Manager	Principal	Partner
Average	$ 247	$ 299	$ 366	$ 553	$ 688

B. Calculation of Overall Average Hourly Billing Rate Based on a Typical Distribution of Time on an Engagement

	Entry-Level Consultant	Associate Consultant	Senior Consultant	Junior Partner	Senior Partner	Weighted Average
Average Hourly Billing Rate (from above)	$ 247	$ 299	$ 366	$ 553	$ 688	
Percent of Consulting Assignment	30%	30%	25%	10%	5%	
	$ 74	$ 90	$ 91	$ 55	$ 34	$ 345

Average Hourly Billing Rate For Management Consultants During 2022 $ 345

Note A: Source is Rodenhauser & Company LLC; Baryenbruch & Company, LLC, analysis

Kentucky-American Water Company, Inc.

Billing Rates of Certified Public Accountants

A. Calculation of Average Hourly Billing Rate by Public Accounting Position
Survey billing rates were those in effect in 2020 (Note A)

	Average Hourly Billing Rate (Notes A and B)				
	Staff Accountant	Senior Accountant	Manager	Partner	
Average Hourly Billing Rate by CPA Firm Position	$ 113	$ 149	$ 199	$ 280	Weighted Average
Percent of Accounting Assignment	30%	30%	20%	20%	
	$ 34	$ 45	$ 40	$ 56	$ 174

National Average Hourly Billing Rate (above)	$ 174
Cost of Living Adjustment	
COL Index for Lexington, KY	88.4
Average COL Index	100.0
Adjustment Percentage	88.4%
Cost of Living Adjusted Hourly Rate	$ 154
<u>Escalation to TY 2023 Midpoint (August 31, 2022)</u>	
CPI at December 31, 2020	260.5
CPI at June 30, 2022	296.3
Inflation/Escalation (Note C)	13.8%
Average Hourly Billing Rate For CPAs at June 30, 2022	$ 175

Note A: Source is AICPA's 2020 National PCPS/TSCPA Management of an Accounting Practice Survey
Note B: Source is Cost of Living Index, Source Council for Community and Economic Research
Note C: Source is U.S. Bureau of Labor Statistics (https://data.bls.gov/cgi-bin/surveymost)

Kentucky-American Water Company, Inc.
Billing Rates for Information Technology Professionals

A. Calculation of Average Hourly Billing Rate by Information Technology Position
Survey billing rates were those in effect in 2022 (Note A)

	Average Hourly Billing Rate (Note A)					
	Contractor Positions		Consultant Positions			
	Contractor	Senior Contractor	Associate	Manager	Partner	
Average Hourly Billing Rate by IT Position Category	$ 91	$ 121	$ 271	$ 377	$ 502	
Percent of IT Assignment	25%	25%	25%	15%	10%	Weighted Average
	$ 23	$ 30	$ 68	$ 57	$ 50	$ 228

Average Hourly Billing Rate For IT Professionals During 2022 $ 228

Note A: Source is American Water Works Service Company, Rodenhauser & Company and Baryenbruch & Company, LLC

Kentucky-American Water Company, Inc.
Billing Rates of Professional Engineers

A. Calculation of Average 2022 Hourly Rate by Engineer Position (Note A)

Name of Firm	Average Hourly Billing Rates Technician Senior Technician	Engineer Design Engineer Project Engineer	Project Manager Sr. Mgr. Engineer	Officer Principal Engineer
Firm #1	$140	$144	$199	$261
Firm #2	$90		$170	$300
Firm #3	$98	$117	$165	$210
Firm #4	$102	$143	$244	$315
Firm #5	$99	$123	$171	$200
Firm #6	$100	$125	$180	$210
Firm #7	$97	$120	$176	$201
Firm #8	$115	$108	$165	$230
Firm #9	$71	$127	$168	$210
Firm #10	$90	$130	$142	$205
Firm #11	$105	$156	$195	$236
Firm #12	$103	$122	$153	$165
Firm #13	$135	$100	$199	$295
Firm #14	$99	$151	$195	
Firm #15	$120	$142	$212	$240
Firm #16	$119	$105	$156	$260
Firm #17	$130	$159	$198	$240
Firm #18	$97	$132	$178	$180
Firm #19	$95	$127	$188	$220

B. Calculation of Overall Average Engineering Hourly Billing Rate

	Technician Senior Technician	Engineer Design Engineer Project Engineer	Project Manager Sr. Mgr. Engineer	Officer Principal Engineer	
Average Hourly Billing Rate (From Above)	$106	$129	$182	$232	
Typical Percent of Time on an Engineering Assignment	13%	31%	46%	10%	Weighted Average
	$14	$40	$83	$24	$161

Note A: Source is American Water Service Company information.

Service Company versus Outside Provider Cost Comparison

As shown in the table below, Service Company costs per hour are considerably lower than those of outside providers.

	2022		
Service Provider	Service Company	Outside Provider	Difference-- Service Co. Greater(Less) Than Outside
Attorney	$ 263	$ 310	$ (47)
Management Consultant	$ 231	$ 345	$ (114)
Certified Public Accountant	$ 101	$ 175	$ (74)
T&I Professional	$ 124	$ 228	$ (104)
Professional Engineer	$ 116	$ 161	$ (45)

Based on these cost-per-hour differentials and the number of managerial and professional services hours billed to KAWC during 2022, outside service providers would have cost $5,039,298 more than the Service Company (see table below). Thus, on average, outside providers' hourly rates are 60% higher than those of the Service Company ($5,039,298 / $8,410,271).

	2022		
Service Provider	Hourly Rate Difference-- Service Co. Greater(Less) Than Outside	Service Company Hours Charged	Dollar Difference
Attorney	$ (47)	1,772	$ (83,284)
Management Consultant	$ (114)	16,023	$ (1,826,622)
Certified Public Accountant	$ (74)	19,121	$ (1,414,954)
T&I Professional	$ (104)	14,717	$ (1,530,568)
Professional Engineer	$ (45)	4,086	$ (183,870)
Service Company Less Than Outside Providers			$ (5,039,298)

It should be noted that the cost differential associated with using outside providers is even greater because exempt Service Company personnel do not charge more than 8 hours per day even when they work more. Outside providers generally charge clients for all hours worked. Thus, KAWC would have been charged by outside providers for overtime worked by Service Company personnel who are not paid for that time.

If KAWC were to use outside service providers rather than the Service Company for managerial and professional services, it would incur other additional expenses besides those associated with higher hourly rates. Managing outside firms who would perform approximately 55,700 hours of work (approximately 31 full-time equivalents at 1,800 "billable" hours per FTE per year) would add a significant workload to the existing KAWC management team. Thus, it would be necessary for KAWC to add at least 2 positions to supervise the outside firms and ensure they deliver quality and timely services. The individuals who would fill these positions would need a good understanding of each profession being managed. These persons must also have management experience and the authority necessary to provide credibility with outside firms. As calculated in the table below, the new positions would add $364,000 per year to KAWC's personnel expenses.

Cost of Adding Two Professional Positions To KAWC's Staff

	Total
New Positions' Salary	$ 130,000
Benefits (at 25%)	$ 32,500
Office Expenses (15%)	$ 19,500
Total Cost per Position	$ 182,000
Number of Positions Required	2
Total Cost of Added KAWC Staff	$ 364,000

Thus, the total effect on KAWC customers of contracting all services now provided by Service Company would be an increase in their costs of $5,403,387 ($5,039,298 + $364,000). Based on the results of this comparison, it is possible to conclude that the Service Company charged KAWC at the lower of cost or market for services provided during 2022.

Background

Customer account services involve the processes that occur from the time meter-read data is recorded in the customer information system through the printing and mailing of bills, concluding with the collection and processing of customer payments. Customer account services are accomplished by the following utility functions:

- Customer Service Operations – customer calls/contact, credit, order taking/disposition, bill collection efforts and outage calls
- Call Center IT – support of phone banks, voice recognition units, call center software applications and telecommunications
- Customer billing – bill printing, stuffing and mailing
- Remittance processing – processing customer payments received in the mail
- Bill payment centers – processing customer payments at locations where customers can pay their bills in person

Neighboring electric utility cost information comes from the FERC Form 1 that each utility subject to FERC regulation must file. FERC's chart of accounts is defined in Chapter 18, Part 101 of the Code of Federal Regulations. FERC accounts that contain expenses related to customer account services are Account 903 Customer Accounts Expense – Records and Collection Expense and Account 905 Customer Accounts Expense – Miscellaneous Customer Accounts Expense. Exhibit 12 (page 32) provides FERC's definition of the type of expenses that should be recorded in these accounts.

In addition to the charges in these FERC accounts, labor-related overhead charged to the following FERC accounts must be added to the labor components of Accounts 903 and 905:

- Account 926 Employee Pension and Benefits
- Account 408 Taxes Other Than Income (employer's portion of FICA)

Comparison Group

Electric utilities included in the comparison group are shown in the table below. These are companies whose FERC Form 1 reports show amounts for accounts 903 and 905.

Utility	State	Utility	State
Duke Energy Kentucky	Kentucky	Duke Energy Indiana	Indiana
Kentucky Power	Kentucky	Indiana Michigan Power	Indiana
Kentucky Utilities	Kentucky	Indianapolis Power & Light	Indiana
Louisville Gas & Electric	Kentucky	No. Indiana Public Service	Indiana
Virginia Electric & Power	Virginia	So. Indiana Gas and Electric	Indiana
Cleveland Electric Illuminating	Ohio	Kingsport Power	Tennessee
Dayton Power & Light	Ohio	Empire District Electric	Missouri
Duke Energy - Ohio	Ohio	Evergy Metro	Missouri
Ohio Edison	Ohio	Evergy Missouri West	Missouri
Ohio Power	Ohio	Union Electric Company	Missouri
Toledo Edison	Ohio	Appalachian Power	West Virginia
Ameren Illinois	Illinois	Monongahela Power	West Virginia
Commonwealth Edison	Illinois	Potomac Edison	West Virginia
MidAmerican Energy	Illinois	Wheeling Power	West Virginia

Kentucky-American Water Company, Inc.
FERC Account Descriptions

903 – Customer Records and Collection Expenses
This account shall include the cost of labor, materials used and expenses incurred in work on customer applications, contracts, orders, credit investigations, billing and accounting, collections and complaints.

Labor

1. Receiving, preparing, recording and handling routine orders for service, disconnections, transfers or meter tests initiated by the customer, excluding the cost of carrying out such orders, which is chargeable to the account appropriate for the work called for by such orders.
2. Investigations of customers' credit and keeping of records pertaining thereto, including records of uncollectible accounts written off.
3. Receiving, refunding or applying customer deposits and maintaining customer deposit, line extension, and other miscellaneous records.
4. Checking consumption shown by meter readers' reports where incidental to preparation of billing data.
5. Preparing address plates and addressing bills and delinquent notices.
6. Preparing billing data.
7. Operating billing and bookkeeping machines.
8. Verifying billing records with contracts or rate schedules.
9. Preparing bills for delivery, and mailing or delivering bills.
10. Collecting revenues, including collection from prepayment meters unless incidental to meter reading operations.
11. Balancing collections, preparing collections for deposit, and preparing cash reports.
12. Posting collections and other credits or charges to customer accounts and extending unpaid balances.
13. Balancing customer accounts and controls.
14. Preparing, mailing, or delivering delinquent notices and preparing reports of delinquent accounts.
15. Final meter reading of delinquent accounts when done by collectors incidental to regular activities.
16. Disconnecting and reconnecting services because of nonpayment of bills.
17. Receiving, recording, and handling of inquiries, complaints, and requests for investigations from customers, including preparation of necessary orders, but excluding the cost of carrying out such orders, which is chargeable to the account appropriate for the work called for by such orders.
18. Statistical and tabulating work on customer accounts and revenues, but not including special analyses for sales department, rate department, or other general purposes, unless incidental to regular customer accounting routines.
19. Preparing and periodically rewriting meter reading sheets.
20. Determining consumption and computing estimated or average consumption when performed by employees other than those engaged in reading meters.

Materials and expenses

21. Address plates and supplies.
22. Cash overages and shortages.
23. Commissions or fees to others for collecting.
24. Payments to credit organizations for investigations and reports.
25. Postage.
26. Transportation expenses, including transportation of customer bills and meter books under centralized billing procedure.
27. Transportation, meals, and incidental expenses.
28. Bank charges, exchange, and other fees for cashing and depositing customers' checks.
29. Forms for recording orders for services, removals, etc.
30. Rent of mechanical equipment.

905 – Miscellaneous Customer Accounts Expenses
This account shall include the cost of labor, materials used and expenses incurred not provided for in other accounts.

Labor

1. General clerical and stenographic work.
2. Miscellaneous labor.

Materials and expenses

3. Communication service.
4. Miscellaneous office supplies and expenses and stationery and printing other than those specifically provided for in accounts 902 and 903.

KAWC's Cost per Customer

As calculated below, KAWC's customer account services expense per customer was $25.09 for 2022. The cost pool used to calculate this average includes charges for Service Company services (e.g., call center, billing, payment processing) and postage and forms expenses, which are incurred directly by KAWC. It is necessary to adjust the Service Company's charges because electric utilities experience an average of 1.25 calls per customer compared to American Water's 0.86 calls per customer during 2022. Thus, the Service Company's expenses had to be increased, for comparison purposes, to reflect its costs if it had had 1.25 calls per customer.

Kentucky American Water Company, Inc.	Cost Component	2022 Service Co Charges	Adjustment Fewer Calls For Water Cos. (A)	Adjusted	
Service Company	Call processing, order processing, credit, bill collection, forms, postage	$ 2,558,987	$ 375,841	$ 2,934,829	
	Customer payment processing			$ 126,149	(B)
KAWC	Customer Advocacy unit			$ 411,046	
			Cost Pool Total	$ 3,472,024	
			Total Customers	138,409	
			2022 Cost Per KAWC Customer	$ 25.09	

Note A: Adjustment for American Water's fewer calls per customer
This adjustment is necessary because water utilities experience fewer calls per customer than do electric utilities

Call handling expenses		$ 830,404
Electric utility industry's avg calls/customer	1.25	
American Water's avg calls/customer	0.86	
Percent different	45%	45%
Total Adjustment		$ 375,841

Note B: Estimated customer payment processing expenses

Number of customer bills	1,588,780
Bank charge per item	$ 0.0794
Total estimated annual expense	$ 126,149

Electric Utility Group Cost per Customer

Exhibit 13 (page 34) shows the calculation of customer account expense per customer for 2021 for the electric utility comparison group. All of the underlying data was taken from the utilities' FERC Form 1.

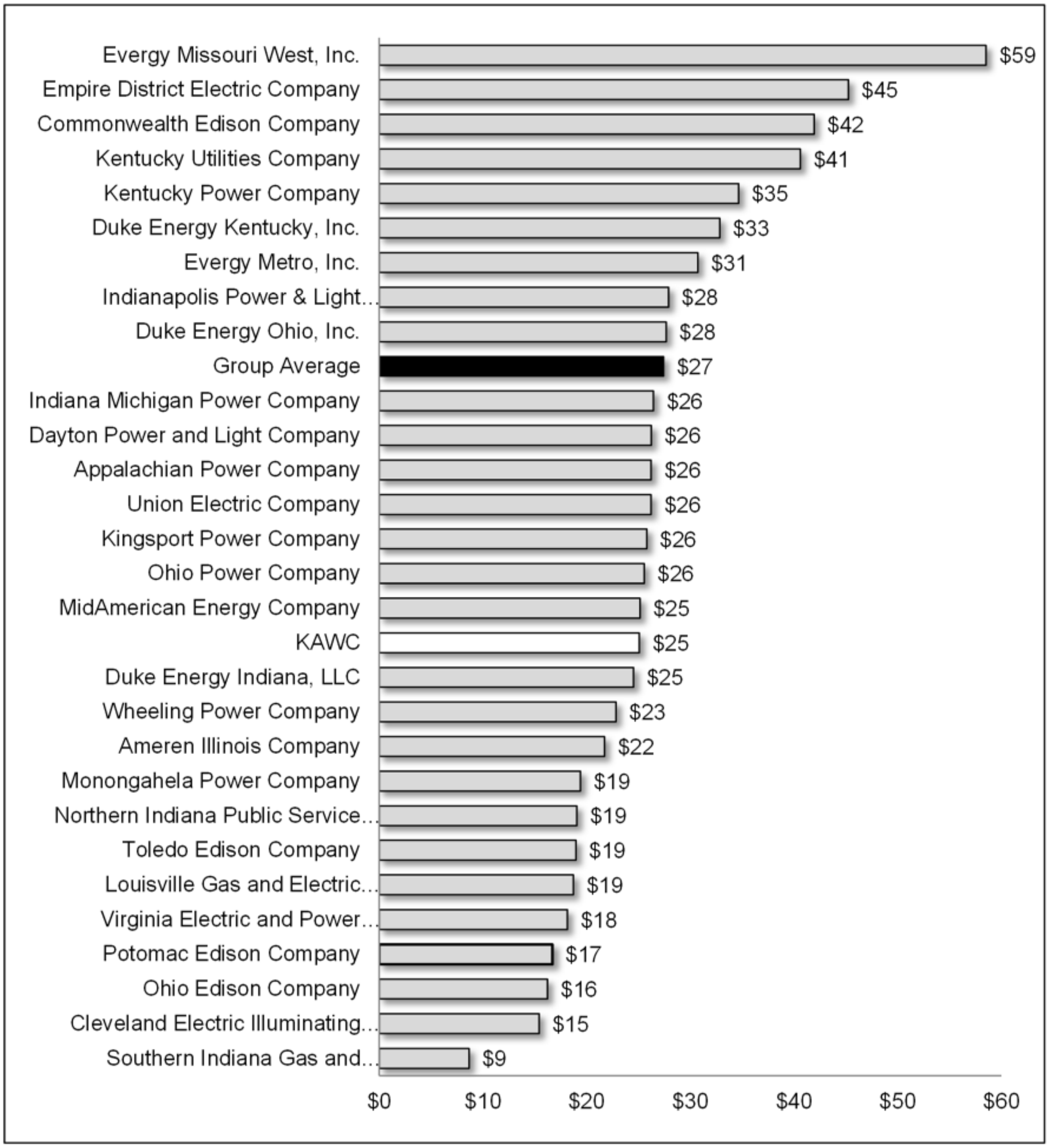
Kentucky-American Water Company, Inc.
Comparison Group 2021 Customer Account Expense Per Customer

Comparison Group	Account 903 and 905	Employee Pension and Benefits	Payroll Taxes	Total Cost Pool	Total Retail Customers	Customer Account Services Expenses per Customer
	Customer Accounts Services Cost Pool					
		Employee Benefits				
Ameren Illinois Company	$ 25,366,891	$ 184,536	$ 1,154,869	$ 26,706,297	1,228,564	$ 21.74
Appalachian Power Company	$ 24,450,987	$ 228,885	$ 615,434	$ 25,295,306	964,442	$ 26.23
Cleveland Electric Illuminating Company	$ 9,465,114	$ 1,911,767	$ 270,846	$ 11,647,727	755,210	$ 15.42
Commonwealth Edison Company	$ 153,562,879	$ 11,728,609	$ 6,558,389	$ 171,849,877	4,095,261	$ 41.96
Dayton Power and Light Company	$ 12,320,976	$ 1,103,897	$ 592,203	$ 14,017,076	534,192	$ 26.24
Empire District Electric Company	$ 6,942,283	$ 1,949,178	$ 371,387	$ 9,262,848	204,638	$ 45.26
Duke Energy Indiana, LLC	$ 19,196,005	$ 1,069,114	$ 845,330	$ 21,110,449	860,972	$ 24.52
Duke Energy Kentucky, Inc.	$ 4,510,377	$ 156,456	$ 144,588	$ 4,811,420	146,514	$ 32.84
Duke Energy Ohio, Inc.	$ 19,199,720	$ 436,078	$ 736,936	$ 20,372,735	735,922	$ 27.68
Indiana Michigan Power Company	$ 15,030,389	$ 468,752	$ 485,914	$ 15,985,055	604,549	$ 26.44
Indianapolis Power & Light Company	$ 11,342,788	$ 805,416	$ 598,307	$ 12,746,511	456,739	$ 27.91
Evergy Metro, Inc.	$ 12,916,946	$ 3,836,689	$ 756,690	$ 17,510,325	570,013	$ 30.72
Evergy Missouri West, Inc.	$ 16,542,347	$ 2,653,551	$ 507,925	$ 19,703,823	336,644	$ 58.53
Kentucky Power Company	$ 5,584,749	$ 36,945	$ 110,459	$ 5,732,154	165,416	$ 34.65
Kentucky Utilities Company	$ 20,384,244	$ 1,776,217	$ 788,445	$ 22,948,906	565,153	$ 40.61
Kingsport Power Company	$ 1,219,617	$ 7,870	$ 26,496	$ 1,253,983	48,597	$ 25.80
Louisville Gas and Electric Company	$ 7,150,277	$ 553,331	$ 294,954	$ 7,998,562	427,163	$ 18.72
MidAmerican Energy Company	$ 18,704,490	$ 495,628	$ 1,029,272	$ 20,229,390	804,312	$ 25.15
Monongahela Power Company	$ 5,782,393	$ 1,628,157	$ 254,946	$ 7,665,496	395,031	$ 19.40
Northern Indiana Public Service Company	$ 8,481,043	$ 230,293	$ 455,963	$ 9,167,298	481,132	$ 19.05
Ohio Edison Company	$ 13,694,961	$ 3,133,765	$ 419,690	$ 17,248,416	1,062,269	$ 16.24
Ohio Power Company	$ 37,427,045	$ 254,609	$ 963,410	$ 38,645,064	1,511,444	$ 25.57
Potomac Edison Company	$ 5,313,757	$ 1,662,606	$ 202,937	$ 7,179,301	429,677	$ 16.71
Southern Indiana Gas and Electric Company	$ 1,219,103	$ 60,270	$ 49,263	$ 1,328,635	153,433	$ 8.66
Toledo Edison Company	$ 4,669,487	$ 1,151,822	$ 145,512	$ 5,966,821	314,440	$ 18.98
Union Electric Company	$ 30,862,317	$ 248,736	$ 1,512,454	$ 32,623,507	1,244,260	$ 26.22
Virginia Electric and Power Company	$ 45,470,021	$ 1,813,746	$ 1,684,432	$ 48,968,199	2,698,553	$ 18.15
Wheeling Power Company	$ 920,404	$ 17,508	$ 13,836	$ 951,748	41,685	$ 22.83
Total/Average	$ 537,731,610	$ 39,604,432	$ 21,590,888	$ 598,926,931	21,836,225	$ 27.43

Source: FERC Form 1; Baryenbruch & Company, LLC, analysis

Summary of Results

As shown in the table below, KAWC's 2022 cost per customer is below the 2021 average cost of the neighboring electric utility comparison group. It can be concluded that KAWC's total 2022 customer account expenses, including charges from the Service Company, are comparable to those of other utilities.



Source: Company information; FERC Form 1 (2021); Baryenbruch & Company, LLC, analysis

Analysis of Services

The final aspect of this study is an assessment of whether the services provided to KAWC by the Service Company would be necessary if KAWC were not part of the American Water organization. The first step in this evaluation was to determine specifically what the Service Company does for KAWC. Based on discussions with Service Company personnel, the matrix in Exhibit 14 (pages 37-39) was created showing which entity—KAWC or a Service Company location—is responsible for each of the functions KAWC requires to ultimately provide service to its customers. This matrix was reviewed to determine: (1) if there was redundancy or overlap in the services being provided by the Service Company and (2) if Service Company services are typical of those needed by a stand-alone water utility.

Upon review of Exhibit 14, the following conclusions can be drawn:

- The services that the Service Company provides are necessary and are required for water and wastewater utilities.

- There is no redundancy or overlap in the services provided by the Service Company to KAWC. For all of the services listed in Exhibit 14, there was only one entity that was primarily responsible for the service.

Kentucky-American Water Company, Inc.
Designation of Responsibility for Water Utility Functions

P - Primarily Responsible S - Provides Support	Performed By:				
		American Water Service Company			
Water Company Function	KAWC	Customer Call Center	Central Services	IT Service Centers	Central Lab
Engineering and Construction Management					
CPS Preparation	P		S		
Five-Year System Planning	P		S		
Engineering Standards & Policies Development	S		P		
Project Design					
Major Projects (e.g., new treatment plant)	P		S		
Special Projects	P/S (1)		P/S (1)		
Minor Projects (e.g., pipelines)	P				
Construction Project Management					
Major Projects	P		S		
Special Projects	P		S		
Minor Projects	P				
Hydraulics Review	P		S		
Developers Extensions	P				
Tank Painting	P				
Water Quality and Purification					
Water Quality Standards Development	P (2)		P (2)		S
Research Studies	S		P		S
Water Quality Program Implementation	P		S		S
Water Treatment Operations & Maintenance	P		S		
Compliance Sampling	P				S
Testing/Other Sampling	P				S
Transmission and Distribution					
Preventive Maintenance Program Development	P		S		
System Maintenance	P				
Leak Detection	P				
Customer Service					
Community Relations	P		S		
Customer Contact	P (3)	P (3)			
Call Processing		P			
Service Order Processing	P	S			
Customer Credit	P	S			
Meter Reading	P			S	
Customer Bill Preparation	S	P		S	
Bill Collection	S	P		S	
Customer Payment Processing	S		P	S	
Meter Standards Development	S		P	P	
Meter Testing, Maintenance & Replacement	P				

Note 1: Primary responsibility depends on the type of project
Note 2: KAWC responsible for State regulations, Central Services responsible for Federal regulations
Note 3: KAWC provide in-person customer contact while Service Company call centers provide customer phone contact

Kentucky-American Water Company, Inc.
Designation of Responsibility for Water Utility Functions

P - Primarily Responsible S - Provides Support	Performed By:				
		American Water Service Company			
Water Company Function	KAWC	Customer Call Center	Central Services	IT Service Centers	Central Lab
Financial Management					
Financial Planning	S		P		
Financings--Equity	S		P		
Financings--Long Term Debt & Preferred	S		P (4)		
Short Term Lines of Credit Arrangements	S		P (4)		
Investor Relations	S		P		
Insurance Program Administration	S		P		
Loss Control/Safety Program Administration	S		P		
Pension Fund Asset Management			P		
Cash Management/Disbursements			P		
Internal Auditing			P		
Budgeting and Variance Reporting					
Corporate Guidelines & Instructions	S		P		
Budget Preparation					
Revenue and O&M	S		P		
Depreciation and Interest Expense	S		P		
Budget Preparation--Service Company Charges	S	S	P	S	S
Capital Budget Preparation—Projects	P		S		
Capital Budget Preparation—Non-Project Work	P		S		
Prepare Monthly Budget Variance Report	S		P		
Prepare Capital Project Budget Status Report	P				
Year-End Projections	S		P		
Accounting and Taxes					
Accounts Payable Accounting	S		P		
Payroll Accounting	S		P		
Work Order Accounting	S		P		
Fixed Asset Accounting	S		P		
Journal Entry Preparations--Billing Corrections	S		P		
Journal Entry Preparation--All Others	S		P		
Financial Statement Preparation	S		P		
State Commission Reporting	S		P		
Income Taxes--State			P		
Income Taxes--Federal			P		
Property Taxes	S		P		
Gross Receipts (Town) Taxes	S		P		

Note 4: Lines of credit are the responsibility of American Water Capital Corporation ("AWCC"). AWCC is also responsible for Corporate financings which may be distributed to the regulated subsidiaries. KAWC has the abilility to issue LTD.

Kentucky-American Water Company, Inc.
Designation of Responsibility for Water Utility Functions

P - Primarily Responsible **S - Provides Support**	Performed By:				
		American Water Service Company			
Water Company Function	KAWC	Customer Call Center	Central Services	IT Service Centers	Central Lab
Rates					
Rate Studies & Tariff Change Administration	P		P		
Rate Case Planning and Preparation	P		S		
Rate Case Administration	P		S		
Commission Inquiry Response	P		S		
Legal	S		P		
Purchasing and Materials Management – National (pipe, chemicals, meters, etc.)					
Specification Development	S		P		
Bid Solicitation	S		P		
Contract Administration	S		P		
Purchasing and Materials Management – State (state supplier service agreements)					
Specification Development	P		S		
Bid Solicitation	P		S		
Contract Administration	P		S		
Ordering	P		S		
Inventory Management	P				
Human Resources Management					
Benefit Program Development			P		
Benefits Program Administration	S		P		
Management Compensation Administration	S		P		
Wage & Salary Program Design	S		P		
Wage & Salary Administration	S		P		
Labor Negotiations--Wages	S		P		
Labor Negotiations--Benefits	S		P		
Labor Negotiations-- Work Rules	P		S		
Training Program Development	S		P		
Training--Course Delivery	P/S (5)		P/S (5)		
Affirmative Action/EEO--Plan Development	S		P		
Affirmative Action/EEO--Implementation	P		S		
Information Technology Services					
Service Company Data Centers					
System Operations & Maintenance				P	
Software Maintenance				P	
Network Administration	S			P	
Workstation Acquisition & Support	S			P	
Help Desk	S			P	

Note 5: Primary responsibility depends on the type of training

Governance Practices Associated with Service Company Charges

There are several ways by which KAWC exercises control over Service Company services and charges. The most important of these are described below.

1. Chief Operating Officer Oversight – The Chief Operating Officer (COO) is on the Executive Leadership Team (ELT) of American Water. This position is responsible for the overall performance of each operating company in American Water. As part of the ELT, the COO has equal say with other ELT members in major business decisions of American Water and has the ability to monitor Service Company performance quality and spending. The COO also addresses local concerns with each operating company president.

2. Operating Company Board Oversight – The KAWC board of directors includes members of the KAWC management team and external business and community leaders. This diverse board ensures that KAWC's needs are a factor in the delivery of Service Company services. The KAWC board meets at a minimum of four times each year and at every meeting financial and operational reports and issues are discussed.

3. KAWC President's Oversight – The KAWC President is responsible for the overall performance of KAWC and, as such, monitors services and charges received from the Service Company. The KAWC President reports to the Deputy Chief Operating Officer who, in turn, reports to the Chief Operating Officer of Regulated Operations who has a significant voice in major business decisions that impact the Service Company's quality and cost of services.

4. CFO Operations and supporting staff (Finance team) – The Finance team is responsible for monitoring the overall financial performance of KAWC. This includes overseeing KAWC's financial reporting process, performing revenue and expense analysis, the annual budgeting process, and monitoring internal control performance. Every month, the Finance team performs a detailed expense analysis that includes Service Company charges. Month-to-date actual and year-to-date actual performance is compared against budget and prior period actuals. The Finance team also reviews and investigates monthly Service Company charges based on the results of the team's analytical procedures in order to determine the appropriateness of the charges.

5. Service Company Budget Review/Approval – The Service Company Board of Directors (BOD) formally reviews and approves the budget for Service Company on an annual basis. The Service Company BOD consists of: (a) the AW ELT, (b) several key Executive Management representatives from Corporate operations and (c) a number of State Presidents from the individual Operating Companies. These budgeted charges are consolidated with the operating company's own spending into an overall budget that must be approved by the operating company's board of directors. The Service Company's overall budget is assigned to each operating company, which consolidates these charges with its own direct spending to arrive at a total operating company budget. This is presented to the operating company's board of directors (e.g., KAWC) for their approval.

6. Major Project Review and Approval – Before major Service Company non-capital projects are undertaken, they must be reviewed and approved by American Water's Executive Leadership Team which includes the Deputy and Chief Operating Officers. The Deputy Chief Operating Officer, with significant input from his direct reports, has the ability to impact all new initiatives and projects before they are authorized. Major non-capital projects and initiatives for the Service Company are approved through the Business

Planning process. As part of the business planning process a technology roadmap of initiatives is developed from American Water's vision, strategy, operational objectives and key business programs. The alignment of these initiatives with enterprise goals is approved by the Executive Leadership Team and key business leaders from various operational and functional areas of American Water. The roadmap is updated annually to produce a rolling roadmap and investment plan.

7. Capital Program Management (CPM) – CPM covers capital and asset planning and is employed throughout American Water, including the Service Company. CPM provides a full range of governance practices, including a formal protocol for assessing system needs, prioritizing capital expenditures, managing the capital program, approving project spending, delivering projects and measuring outputs. CPM ensures that:

   - Capital expenditure plans are aligned with the strategic intent of the business
   - The impact of capital expenditures is fully reflected in operating expense plans
   - The impacts of these plans on state operating company budgets and operating results are understood
   - Effective controls are in place over budgets (through business plans) and individual capital projects (through appropriate authorization thresholds, management and reporting processes).

   The CPM process was designed to optimize the effectiveness of asset investment. The process is managed at two levels for all American Water companies, including all KAWC Operating Units. Monthly meetings of the CPM are held to review capital spending compared to plan, review new project requests and review updates or modifications to existing projects. The KAWC management team participates, as necessary, and provides the data used in the monthly review schedules.

8. Accounting and Financial Reporting – The Service Company follows the same accounting and financial reporting processes as American Water's regulated utilities. At month-end, the Service Company Finance team reviews key transactions and analyzes month-to-date variance to budget to ensure accuracy before the billing process takes place. Once completed, the Service Company bill is produced, and the actuals are directly charged or allocated to the states based on predetermined formulas. After the billing, Service Company Finance completes the monthly reports. At this time, the operating companies may question expenses and spending for better understanding of results. KAWC's Finance team reviews the monthly Service Company bill for accuracy and reasonableness on a monthly basis. Any errors or overcharges are corrected on a subsequent billing.

9. Operating Company Budget Variance Analysis – Each month a Service Company Affiliate Billing Analysis Report is prepared and provided to operating companies. This report allows operating companies to monitor their Service Company budget-versus-actual charges for the month and year-to-date.

10. Service Company Budget Variance Analysis - Each function within a Service Company is responsible for reviewing the budget-versus-actual charges for the month and year-to-date. On a monthly basis, Service Company actual results vs budget variances are reviewed with State Presidents as well as the ELT. Key variances by function are presented and discussed.

COMMONWEALTH OF KENTUCKY

BEFORE THE PUBLIC SERVICE COMMISSION

IN THE MATTER OF:	)	
	)	
ELECTRONIC APPLICATION OF KENTUCKY-AMERICAN WATER COMPANY FOR AN ADJUSTMENT OF RATES, A CERTIFICATE OF PUBLIC CONVENIENCE AND NECESSITY FOR INSTALLATION OF ADVANCED METERING INFRASTRUCTURE, APPROVAL OF CERTAIN REGULATORY AND ACCOUNTING TREATMENTS, AND TARIFF REVISIONS	)))))))))	**CASE NO. 2023-00191**
	)	

DIRECT TESTIMONY OF ANN E. BULKLEY

June 30, 2023

I. INTRODUCTION AND QUALIFICATIONS

Q. Please state your name, affiliation and business address.

A. My name is Ann E. Bulkley. I am a Principal at The Brattle Group ("Brattle"). My business address is One Beacon Street, Suite 2600, Boston, Massachusetts 02108.

Q. On whose behalf are you submitting this testimony?

A. I am submitting this testimony on behalf of Kentucky-American Water Company ("KAWC" or the "Company"), a wholly-owned subsidiary of American Water Works Company Inc. ("AWK").

Q. Please describe your education and experience.

A. I hold a Bachelor's degree in Economics and Finance from Simmons College and a Master's degree in Economics from Boston University, with over 25 years of experience consulting to the regulated utility industry. I have advised numerous energy and utility clients on a wide range of financial and economic issues with primary concentrations in valuation and utility rate matters. Many of these assignments have included the determination of the cost of capital for valuation and ratemaking purposes. My resume and a summary of testimony that I have filed in other proceedings are presented in more detail in Appendix A.

II. PURPOSE AND OVERVIEW OF DIRECT TESTIMONY

Q. Please describe the purpose of your Direct Testimony.

A. The purpose of my Direct Testimony is to present evidence and provide a recommendation regarding the appropriate return on equity ("ROE") for the Company and to provide and assessment of the reasonableness of KAWC's proposed capital structure for ratemaking purposes.

Q. Are you sponsoring any exhibits in support of your direct testimony?

A. Yes. I am sponsoring the following exhibits, which were prepared by me or under my direction.

Exhibit Number	Exhibit Description
Exhibit AEB-1	Summary of ROE Analyses
Exhibit AEB-2	Proxy Group Selection
Exhibit AEB-3	Constant Growth DCF Analysis
Exhibit AEB-4	CAPM Analysis
Exhibit AEB-5	Historical Proxy Group Betas
Exhibit AEB-6	S&P 500 Market Return
Exhibit AEB-7	Flotation Costs
Exhibit AEB-8	Regulatory Risk Analysis
Exhibit AEB-9	Capital Structure Analysis

Q. Please provide a brief overview of the analyses that led to your ROE recommendation.

A. As discussed in more detail below, it is important to consider the results of several analytical approaches in determining a reasonable recommendation for the Company's

ROE. To develop my ROE recommendation, I first developed a proxy group of utility companies. I did not limit the proxy group to water utilities, but included a broader group of utilities that face risk similar to KAWC because a proxy group composed only of water utilities would result in a small group of companies for which data is limited. To that proxy group, I applied the Constant Growth Form of the Discounted Cash Flow ("DCF") model, the Capital Asset Pricing Model ("CAPM"), and the Empirical Capital Asset Pricing Model ("ECAPM"). My recommendation also takes into consideration the following factors:

1. KAWC's capital expenditure program relative to the proxy group companies;
2. flotation costs associated with AWK's recent equity issuance;
3. the risks related to environmental and water quality regulation;
4. the regulatory risk of KAWC relative to the proxy group; and
5. KAWC's proposed capital structure as compared to the capital structures of the proxy group companies.[1]

While I did not make specific adjustments to my recommended ROE for these factors, I did consider them in the aggregate when determining where my recommended ROE falls within the range of the analytical results.

Q. How is the remainder of your Direct Testimony organized?

A. The remainder of my direct testimony is organized as follows:

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[1] The selection and purpose of developing a group of comparable companies will be discussed in detail in Section VI of my Direct Testimony.

- Section III provides a summary of my analyses and conclusions.
- Section IV reviews the regulatory guidelines pertinent to the development of the cost of capital.
- Section V discusses current and projected capital market conditions and the effect of those conditions on KAWC's cost of equity.
- Section VI explains my selection of the proxy group for KAWC.
- Section VII describes my analyses and the analytical basis for my recommendation of the appropriate ROE for KAWC.
- Section VIII provides a discussion of specific regulatory, business, and financial risks that have a direct bearing on the ROE to be authorized for KAWC in this case.
- Section IX provides an assessment of the reasonableness of KAWC's proposed capital structure relative to the proxy group.
- Section X presents my conclusions and recommendations.

III. SUMMARY OF ANALYSIS AND CONCLUSIONS

Q. Please summarize the key factors considered in your analyses and upon which you base your recommended ROE.

A. The key factors that I considered in my cost of equity analyses and recommended ROE for the Company in this proceeding are:

- The United States Supreme Court's *Hope* and *Bluefield* decisions[2] established the standards for determining a fair and reasonable authorized ROE for public utilities, including consistency of the allowed return with the returns of other businesses having similar risk, adequacy of the return to provide access to capital and support credit quality, and the requirement that the result lead to just and reasonable rates.
- The effect of current and prospective capital market conditions on the cost of equity estimation models and on investors' return requirements.

[2] Federal Power Commission v. Hope Natural Gas Co., 320 U.S. 591 (1944) ("Hope"); Bluefield Waterworks & Improvement Co., v. Public Service Commission of West Virginia, 262 U.S. 679 (1923) ("Bluefield").

- The results of several analytical approaches that provide estimates of the Company's cost of equity. Because the Company's authorized ROE should be a forward-looking estimate over the period during which the rates will be in effect, these analyses rely on forward-looking inputs and assumptions (*e.g.*, projected analyst growth rates in the DCF model, forecasted risk-free rate and market risk premium in the CAPM analysis).
- Although the companies in my proxy group are generally comparable to KAWC, each company is unique, and no two companies have the exact same business and financial risk profiles. Accordingly, I considered the Company's regulatory, business, and financial risks relative to the proxy group of comparable companies in determining where the Company's ROE should fall within the reasonable range of analytical results to appropriately account for any residual differences in risk.

Q. What are the results of the models that you have used to estimate the cost of equity for KAWC?

A. Figure 1 (and Exhibit AEB-1) summarizes the range of results produced by the Constant Growth DCF, CAPM, and ECAPM analyses.

Figure 1: Summary of ROE Results

	Low Growth Rate	Average Growth Rate	High Growth Rate
Constant Growth DCF			
Mean Results:			
30-Day Average	8.13%	9.31%	10.66%
90-Day Average	8.10%	9.28%	10.63%
180-Day Average	8.13%	9.31%	10.65%
Average	8.12%	9.30%	10.65%
Median Results:			
30-Day Average	8.36%	9.95%	10.52%
90-Day Average	8.38%	9.93%	10.51%
180-Day Average	8.41%	9.97%	10.55%
Average	8.39%	9.95%	10.52%
	Current 30-day Average 30-Year Treasury Bond Yield	Near-Term Forecast 30-Year Treasury Yield	Longer-Term Forecast 30-Year Treasury Yield

CAPM:			
Current Value Line Beta	10.49%	10.50%	10.53%
Current Bloomberg Beta	10.07%	10.09%	10.12%
Long-term Avg. Beta	9.76%	9.78%	9.82%
ECAPM:			
Current Value Line Beta	10.87%	10.88%	10.90%
Current Bloomberg Beta	10.55%	10.56%	10.59%
Long-term Avg. Beta	10.32%	10.34%	10.37%

As shown in Figure 1 (and Exhibit AEB-1), the range of results produced by the models used to estimate the cost of equity is wide. For example, the low end of the DCF results are below any ROE that has been authorized by a regulatory commission for a water utility whereas the range set by the higher end of the DCF model overlap the results of the other risk premium-based methodologies. While it is common to consider multiple models to estimate the cost of equity, it is particularly important when the range of results varies considerably across methodologies.

Q. Are prospective capital market conditions expected to affect the results of the cost of equity for KAWC during the period in which the rates established in this proceeding will be in effect?

A. Yes. Capital market conditions are expected to affect the results of the cost of equity estimation models. Specifically:

- Inflation is expected to persist over the near-term, which increases the operating risk of the utility during the period in which rates will be in effect.
- Long-term interest rates have increased substantially in the past year and are expected to remain relatively high at least over the next year in response to inflation.

- Because utility dividend yields are now less attractive than the risk-free rates of government bonds, and interest rates are expected to remain near current levels over the next year, and as utility stock prices are inversely related to changes in interest rates, it is likely that utility share prices will decline.

- Rating agencies have responded to the risks of the utility sector, with Moody's Investors Service ("Moody's") most recently indicating its outlook for the industry in 2023 is "negative", citing increasing interest rates, inflation and high natural gas prices, all of which create pressures for customer affordability and prompt rate recovery.

- Similarly, equity analysts have noted the increased risk for the utility sector as a result of rising interest rates and expect the sector to underperform over the near-term.

- Consequently, the results of the DCF model, which relies on current utility share prices, is likely to understate the cost of equity during the period that the Company's rates will be in effect.

It is appropriate to consider all of these factors when estimating a reasonable range of the investor-required cost of equity and the recommended ROE for KAWC.

Q. What is your conclusion regarding the appropriate authorized ROE for KAWC in this proceeding?

A. Considering the analytical results presented in Figure 1, current and prospective capital market conditions, as well as the level of regulatory, business, and financial risk faced by KAWC's water operations in Kentucky relative to the proxy group, I believe a range from 10.00 percent to 11.00 percent is reasonable. Taking into consideration the results of the analytical models, current market conditions, and the Company's relative risk, an ROE in the higher end of that range- 10.75 percent- is reasonable and appropriate.

Q. Is KAWC's requested capital structure reasonable and appropriate?

A. Yes. Comparing the Company's proposed equity ratio of 52.45 percent to the proxy group demonstrates that the Company's requested equity ratio is well within the range of equity ratios for the proxy group. Further, the Company's proposed equity ratio is reasonable considering that credit rating agencies have identified the outlook for the utility sector as "negative" due to the negative effect on the cash flows and credit metrics associated with increasing interest rates, inflation and commodity costs, and the pressure that those factors place on customer affordability and utilities' prompt rate recovery.

IV. REGULATORY GUIDELINES

Q. Please describe the guiding principles to be used in establishing the cost of capital for a regulated utility.

A. The U.S. Supreme Court's precedent-setting *Hope* and *Bluefield* cases established the standards for determining the fairness and reasonableness of a utility's authorized ROE. Among the standards established by the Court in those cases are: (1) consistency with other businesses having similar or comparable risks; (2) adequacy of the return to support credit quality and access to capital; and (3) the principle that the specific means of arriving at a fair return are not important, only that the end result leads to just and reasonable rates.[3]

Q. Is fixing a proper rate of return just about protecting the utility's interests?

A. No. As the Court noted in *Bluefield*, a proper rate of return not only assures "confidence in the financial soundness of the utility and should be adequate, under efficient and

[3] *Bluefield*, 262 U.S. at 692-93; *Hope*, 320 U.S. at 603.

economical management, to maintain and support its credit [but also] enable[s the utility] to raise the money necessary for the proper discharge of its public duties."[4] As the Court went on to explain in *Hope*, "[t]the rate-making process … involves balancing of the investor and consumer interests."[5]

Q. Has the Kentucky Public Service Commission ("Commission") provided similar guidance in establishing the appropriate return on common equity?

A. Yes. Part 1 of Kentucky Revised Statute ("KRS") 278.030 states that "every utility may demand, collect and receive fair, just and reasonable rates for the services rendered or to be rendered by it to any person".[6] Therefore, the Commission which regulates utilities based on the provisions outlined in KRS 278 must ultimately ensure that the calculated rates allow the utility the opportunity to earn a reasonable return for its shareholders. This position was supported by Commission in a 2014 news article:

> Like every other investor owned utility in the state, Kentucky Power is entitled – by both Kentucky and federal law - to the opportunity to earn a reasonable but not excessive rate of return on equity for its shareholders.[7]

Q. Why is it important for a utility to be allowed the opportunity to earn a return that is adequate to attract capital at reasonable terms?

A. A return that is adequate to attract capital at reasonable terms enables KAWC to continue efficiently to provide safe, reliable water service while maintaining its financial integrity.

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[4] *Bluefield*, 262 U.S. at 693.
[5] *Hope*, 320 U.S. at 603.
[6] Kentucky Revised Statute ("KRS") 278.030 part (1).
[7] Public Service Commission. "PSC Responds to Criticism of Ky. Power." The Mountain Eagle, 2014, www.themountaineagle.com/articles/psc-responds-to-criticism-of-ky-power/.

That return should be commensurate with returns expected elsewhere in the market for investments of equivalent risk. If it is not, debt and equity investors will seek alternative investment opportunities for which the expected return reflects the perceived risks, thereby inhibiting KAWC's ability to attract capital at reasonable cost. When the Company is afforded a reasonable opportunity to earn its market-based cost of capital, a fair and reasonable balance will be achieved between customers' and shareholders' interests.

Q. Is a utility's ability to attract capital also affected by the ROEs authorized for other utilities?

A. Yes. Utilities compete directly for capital with other investments of similar risk, which include other water, natural gas, and electric utilities. Therefore, the ROE authorized for a utility sends an important signal to investors regarding whether there is regulatory support for financial integrity, dividends, growth, and fair compensation for business and financial risk. The cost of capital represents an opportunity cost to investors. If higher returns are available elsewhere for other investments of comparable risk over the same time-period, investors have an incentive to direct their capital to those alternative investments. Thus, an authorized ROE significantly below authorized ROEs for other water, natural gas, and electric utilities can inhibit the utility's ability to attract capital for investment.

Q. Is the regulatory framework and the authorized ROE and equity ratio important to the financial community?

A. Yes. The regulatory framework is one of the most important factors in debt and equity investors' assessments of risk. Specifically regarding debt investors, credit rating agencies consider the authorized ROE and equity ratio for regulated utilities to be very important for two reasons: (1) they help determine the cash flows and credit metrics of the regulated utility; and (2) they provide an indication of the degree of regulatory support for credit quality in the jurisdiction. To the extent that the authorized returns in a jurisdiction are lower than the returns that have been authorized more broadly, credit rating agencies will consider this in the overall risk assessment of the regulatory jurisdiction in which the company operates. Not only do credit ratings affect the overall cost of borrowing, they also act as a signal to equity investors about the risk of investing in the equity of a company.

Q. What are your conclusions regarding regulatory guidelines?

A. The ratemaking process is premised on the principle that, in order for investors and companies to commit the capital needed to provide safe and reliable utility services, a utility must have a reasonable opportunity to recover the return of, and the market-required return on, its invested capital. Accordingly, the Commission's order in this proceeding should establish rates that provide the Company with a reasonable opportunity to earn a ROE that is: (1) adequate to attract capital at reasonable terms; (2) sufficient to ensure its financial integrity; and (3) commensurate with returns on investments in enterprises with similar risk. It is important for the ROE authorized in this proceeding to take into consideration current and projected capital market conditions, as well as investors' expectations and requirements for both risks and returns. Because utility operations are capital-intensive, regulatory decisions should enable the utility to attract capital at reasonable terms under a variety of economic and financial market conditions. Providing the opportunity to earn a market-based cost of capital supports the financial integrity of the Company, which is in the interest of both customers and shareholders.

V. CAPITAL MARKET CONDITIONS

Q. Why is it important to analyze capital market conditions?

A. The models used to estimate the cost of equity rely on market data that are either specific to the proxy group, in the case of the DCF model, or to the expectations of market risk, in the case of the CAPM and ECAPM. The results of the cost of equity estimation models can be affected by prevailing market conditions at the time the analysis is performed. While the ROE established in a rate proceeding is intended to be forward-looking, the analyst uses current and projected market data, specifically stock prices, dividends, growth rates and interest rates, in the cost of equity estimation models in order to estimate the investor-required return for the subject company.

As a result, it is important to consider the effect of the market conditions on these models when determining an appropriate range for the ROE and the recommended ROE for ratemaking purposes for a future period. If investors do not expect current market conditions to be sustained in the future, it is possible that the cost of equity estimation models will not provide an accurate estimate of investors' required return during that rate period. Therefore, it is very important to consider projected market data to estimate the return for that forward-looking period.

Q. What factors are affecting the cost of equity for regulated utilities in the current and prospective capital markets?

A. The cost of equity for regulated utility companies is being affected by several factors in the current and prospective capital markets, including: (1) changes in monetary policy; (2)

relatively high inflation; and (3) increased interest rates that also are expected to remain relatively high over the next few years. These factors affect the assumptions used in the cost of equity estimation models.

Q. What effect do current and prospective market conditions have on the cost of equity for the Company?

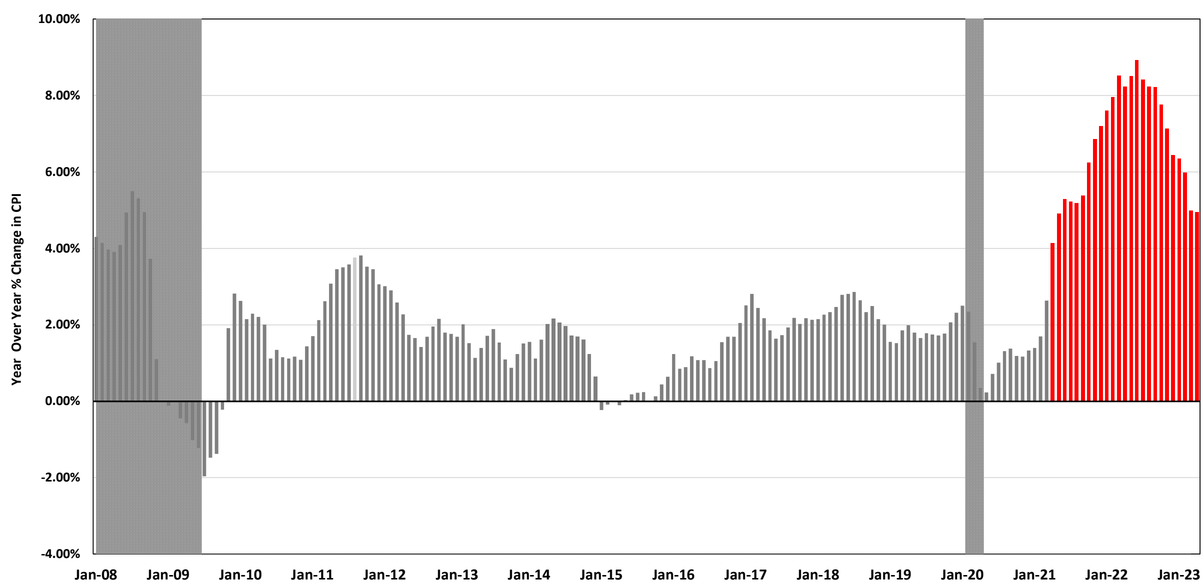
A. The combination of persistently high inflation, and the Federal Reserve's changes in monetary policy contribute to an expectation of increased market risk and an increase in the cost of the investor-required return on equity. It is essential that these factors be considered in setting the forward-looking ROE. Inflation has recently been at some of the highest levels seen in approximately 40 years, and while inflation has declined from these recent peaks, it remains relatively high. Interest rates, which have increased significantly from pandemic-related lows seen in 2020, are expected to continue to remain relatively high in direct response to the Federal Reserve's use of monetary policy to combat inflation. Because there is a strong historical inverse correlation between interest rates and the share prices of utility stocks (*i.e.*, as utility share prices decline, utility dividend yields increase), it is reasonable to expect that investors' required return for utility companies will also increase. Therefore, cost of equity estimates based solely on current market conditions will understate the cost of equity required by investors during the future period that the Company's rates determined in this proceeding will be in effect.

V.A. Inflationary Expectations in Current and Projected Capital Market Conditions

Q. Has inflation increased significantly over the past year?

A. Yes. As shown in Figure **2**, the year-over-year ("YOY") change in the Consumer Price Index ("CPI") published by the Bureau of Labor statistics has increased steadily since the beginning of 2021, rising from 1.37 percent in January 2021 to a high of 9.0 percent YOY change in June 2022, which was the largest 12-month increase since 1981 and significantly greater than any level seen since January 2008. As shown in Figure 2, since that time, while inflation has declined in response to the Federal Reserve's tightening monetary policy, inflation continues to remain elevated above the Federal Reserve's target levels.

Figure 2: Consumer Price Index – YOY Percent Change January 2008 through April 2023[8]



[8] Bureau of Labor Statistics, shaded area indicates a recession.

Q. What are the expectations for inflation over the near-term?

A. The Federal Reserve has indicated that it expects inflation will remain elevated above its target level at least until 2025 and that short-term interest rates will need to remain elevated to reduce inflation. For example, Federal Reserve Chair Powell at the Federal Open Market Committee ("FOMC") meeting in June 2023 observed that while inflation is off of its recent highs, it remains significantly above the Federal Reserve's long-term target and noted that further policy firming is likely including additional increases in the federal funds rate:

> Since early last year, the FOMC has significantly tightened the stance of monetary policy. We have raised our policy interest rate by 5 percentage points and have continued to reduce our securities holdings at a brisk pace. We have covered a lot of ground, and the full effects of our tightening have yet to be felt. In light of how far we have come in tightening policy, the uncertain lags with which monetary policy affects the economy, and potential headwinds from credit tightening, today we decided to leave our policy interest rate unchanged and to continue to reduce our securities holdings. Looking ahead, nearly all Committee participants view it as likely that some further rate increases will be appropriate this year to bring inflation down to 2 percent over time.[9]

Chair Powell also continued to reiterate that "[r]educing inflation is likely to require a period of below-trend growth and some softening in labor market conditions."[10]

V.B. The Use of Monetary Policy to Address Inflation

9 Federal Reserve, Transcript of Chair Powell's Press Conference, June 14, 2023, p 1.
10 Federal Reserve, Transcript of Chair Powell's Press Conference, June 14, 2023, p. 4.

Q. What policy actions has the Federal Reserve enacted to respond to increased inflation?

A. The dramatic increase in inflation has prompted the Federal Reserve to pursue an aggressive normalization of monetary policy, removing the accommodative policy programs used to mitigate the economic effects of COVID-19. Beginning in March 2022 and through May 2023, the Federal Reserve increased the target federal funds rate through a series of increases from a range of 0.00 – 0.25 percent to a range of 5.00 percent to 5.25 percent.[11] Further, while the Federal Reserve did not increase the federal funds rate at the June 2023 meeting, the Federal Reserve did project two additional 25 basis points increase in the federal funds rate in 2023.[12] Therefore, the Federal Reserve anticipates the continued need to maintain the Federal Funds rate at a restrictive level in order to achieve its goal of 2 percent inflation over the long-run

V.C. The Effect of Inflation and Monetary Policy on Interest Rates and the Investor-Required Return

Q. What effect will inflation and the Federal Reserve's normalization of monetary policy have on long-term interest rates?

A. Inflation and the Federal Reserve's normalization of monetary policy are expected to result in long-term interest rates remaining relatively high over at least the next year. Specifically, inflation reduces the purchasing power of the future interest payments an

[11] Federal Reserve, Press Releases, March 16, 2022, May 4, 2022, June 15, 2022, September 22, 2022, November 2, 2022, February 1, 2023, March 22, 2023, and May 3, 2023.

[12] Federal Reserve, Summary of Economic Projections, June 14, 2023, https://www.federalreserve.gov/monetarypolicy/files/fomcprojtabl20230614.pdf.

investor expects to receive over the duration of the bond. As a result, if investors expect increased levels of inflation, they will require higher yields to compensate for the increased risk of inflation, which means interest rates will also remain relatively high.

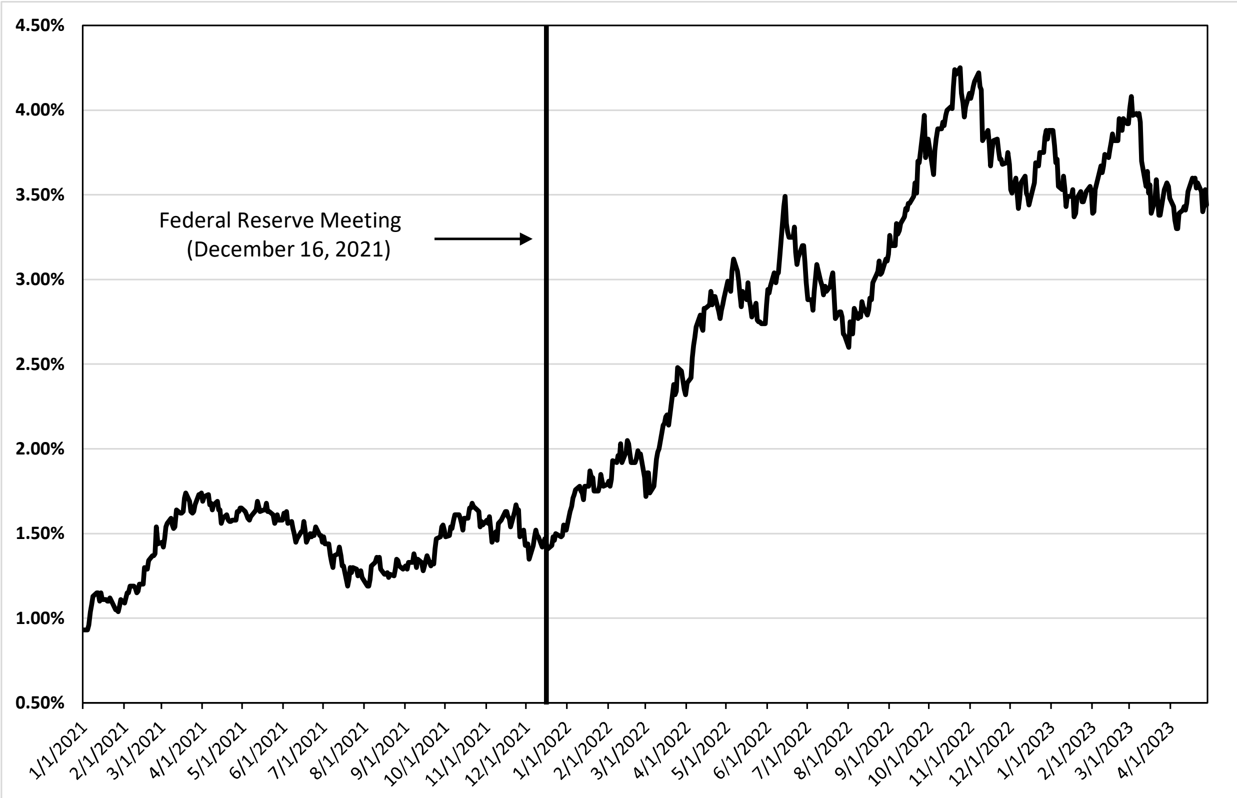
Q. Have the yields on long-term government bonds increased in response to inflation and the Federal Reserve's normalization of monetary policy?

A. Yes. At the FOMC meetings throughout 2022 and thus far into 2023, the Federal Reserve has continued to note its concerns over the sustained increased levels of inflation and has continued to accelerate the process of normalizing monetary policy to combat inflation. As shown in Figure 3, since the Federal Reserve's December 2021 meeting, the yield on 10-year Treasury bond has more than doubled, increasing from 1.47 percent on December 15, 2021 to 3.44 percent on April 28, 2023. The increase is due to the Federal Reserve's announcements at the each of the meetings since December 2021 and the continued elevated levels of inflation.

Figure 3: 10-Year Treasury Bond Yield[13]

January 2021 through April 2023

[13] S&P Capital IQ Pro.



Q. What have equity analysts said about long-term government bond yields?

A. Leading equity analysts have noted that they expect the yields on long-term government bonds to remain elevated. According to the most recent *Blue Chip Financial Forecasts* report, the consensus estimate of the average yield on the 10-year Treasury Bond is approximately 3.40 percent through the third quarter of 2024.[14]

Q. How have interest rates and inflation changed since the Company's last rate case?

A. As shown in Figure 4, when the Commission authorized an ROE of 9.70 percent in the Company's 2019 rate proceeding, interest rates (as measured by the 30-year Treasury bond

[14] *Blue Chip Financial Forecasts*, Vol. 42, No. 5, May 1, 2023.

yield) were 2.63 percent at the time of the Commission decision, and inflation was 1.65 percent. However, since the Company's last rate proceeding, the yield on the 30 year Treasury bond has increased over 100 basis points, the yield on the Moody's Bas utility bond index has increased 128 basis points, and inflation has increased over 300 basis points.

Figure 4: Change in Market Conditions Since Company's Last Rate Case

Docket	Decision Date	Federal Funds Rate	30-Day Average of 30-Year Treasury Bond Yield	Moody's Baa Utility Bond Index	Inflation Rate	Authorized ROE
Case No. 2018-00358	06/27/2019	2.38%	2.63%	4.37%	1.65%	9.70%
Current	04/28/2023	4.83%	3.69%	5.53%	4.96%	
Change		2.45%	1.06%	1.16%	3.31%	

V.D. Expected Performance of Utility Stocks and the Investor-Required Return on Utility Investments

Q. Are utility share prices correlated to changes in the yields on long-term government bonds?

A. Yes. Interest rates and utility share prices are inversely correlated, which means that increases in interest rates result in declines in the share prices of utilities and vice versa. For example, Goldman Sachs and Deutsche Bank examined the sensitivity of share prices of different industries to changes in interest rates over the past five years. Both Goldman Sachs and Deutsche Bank found that utilities had one of the strongest negative relationships with bond yields (*i.e.*, increases in bond yields resulted in the decline of utility share prices).[15]

Q. How do equity analysts expect the utilities sector to perform in an increasing interest rate environment?

A. Equity analysts project that utilities will underperform the broader market given high inflation and the recent increases in interest rates. Fidelity classifies the utility sector as underweight,[16] and Keybanc Capital Markets analyst Sophie Karp recently noted she had a negative view of the sector in 2023 and expects a decline in the relative valuation of the utilities sector as compared to the S&P 500:

> The utility sector's relative outperformance came on the back of the pre-recessionary environment in the U.S. in 2022, analyst Karp said. She noted that the sector now traded at a 2.8 times premium to the S&P 500 Index, which is relatively wide by historical standards.
>
> *She said the utility sector is relatively overvalued and will see a mean reversion in 2023*, adding that the last time such a premium over the S&P 500 Index happened was in 2004.
>
> "*We are therefore negative on the sector overall going into 2023 and our OW picks grow fewer*," Karp said.
>
> *There has been a surprising deterioration of the regulatory environment across multiple jurisdictions, including the historically stronger ones*, she noted. Some regulatory developments, according to the analyst, are driven by the regulator's desire to moderate the impact on customer bills. "Given that power and commodity prices remain elevated, we expect to continue seeing regulators getting 'creative' with assumptions and rate mechanisms to achieve that goal," she added.

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[15] Lee, Justina. "Wall Street Is Rethinking the Treasury Threat to Big Tech Stocks." Bloomberg.com, 11 Mar. 2021, www.bloomberg.com/news/articles/2021-03-11/wall-street-is-rethinking-the-treasury-threat-to-big-tech-stocks.

[16] Fidelity. "Second Quarter 2023 Investment Research Update." April 21, 2023.

> Karp said she would focus on rate affordability, as inflationary pressures will likely be a factor for the foreseeable future.
>
> "As we turn to 2023, we believe that the sector will find it difficult to defend this relative valuation position, particularly as macro headwinds persist and begin to take a toll on utility earnings," she added.[17]

Similarly, Barron's recently noted that the decline in share prices can be attributed to the relatively high valuations and low dividend yields of utilities as compared to other asset classes such as Treasuries.[18] According to Barron's, even after the recent decline in share prices, the Utilities Select ETF was yielding 2.85 percent, which is a yield that will not "lure in buyers when the ultrasafe 10-year Treasury note yields close to 4%."[19]

Q. Do standard market indicators support analysts' position that utilities will underperform over the near-term?

A. Yes. As discussed, the utility sector is considered a "bond proxy" or a sector that investors view as a "safe haven" alternative to bonds, and changes in utility stock prices are therefore inversely related to changes in interest rates. For example, the utility sector tends to perform well when interest rates are low since the dividend yields for utilities offer investors the prospect of higher returns when compared to the yields on long-term government bonds. Therefore, I examined the difference between the dividend yields of utility stocks and the yields on long-term government bonds (i.e., the "yield spread"). I selected the dividend yield on the S&P Utilities Index as the measure of the dividend yields

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[17] Market Insider. "After A 'Good Run' For Utilities In 2022, Analyst Says 'Trade Is Over – For Now,' But Retains Bullish Bias On These Stocks", January 17, 2023. (emphasis added)

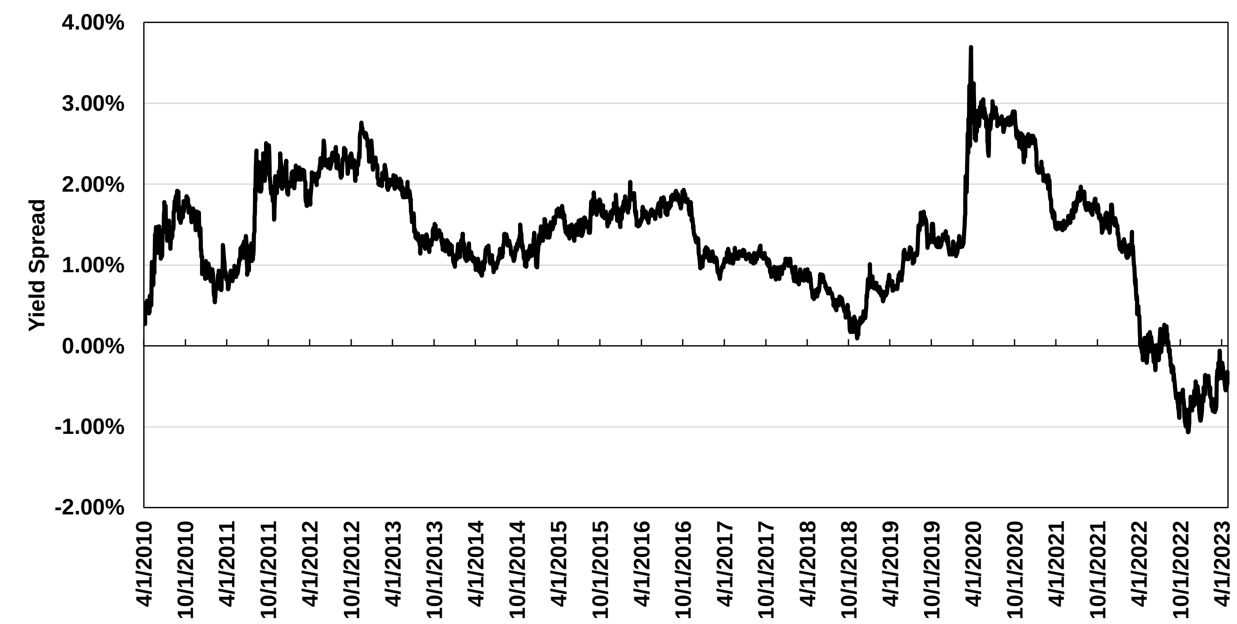
[18] Sonenshine, Jacob, "Utilities Stocks Have Fallen off a Cliff. They Just Got Downgraded, Too," Barron's, October 17, 2022.

[19] *Id*.

for the utility sector and the yield on the 10-year Treasury bond as the estimate of the yield on long-term government bonds.

As shown in Figure 5, the yield spread as of April 28, 2023 was negative 0.36 percent, meaning that the yield on the 10-year Treasury bond exceeds the dividend yield for the S&P Utilities Index. Furthermore, the current negative yield spread is well below the long-term average yield spread since 2010 of 1.32 percent. Given that the yield spread is currently well below the long-term average, as well as the expectation that interest rates will remain relatively high at least through the next year, it is reasonable to conclude that the utility sector will most likely underperform over the near-term. This is because investors that purchased utility stocks as an alternative to the lower yields on long-term government bonds would otherwise be inclined to rotate back into government bonds, particularly as the yields on long-term government bonds remain elevated, thus resulting in a decrease in the share prices of utilities.

Figure 5: Spread between the S&P Utilities Index Dividend Yield and the 10-Year Treasury Bond Yield, Januay 2010 – April 2023[20]



Q. Do you have any further context as to how unlikely it is to have a negative yield spread of this magnitude?

A. Yes. For further context as to how unlikely it is to have a yield spread of negative 0.36 percent, I calculated the z-score for the current yield spread, which measures the number of standard deviations from the mean. The current yield spread of negative 0.36 percent has a z-score of -2.19, indicating that a yield spread of negative 0.36 percent is over 2 standard deviations from the mean of 1.32 percent.[21] In other words, 95 percent of the daily yield spread observations from 2010 through April 2023 fall between -0.22 percent and 2.86 percent, with the current yield spread of negative 0.36 percent being outside of

[20] S&P Capital IQ Pro and Bloomberg Professional.

[21] The z-score is calculated as: (yield spread at April 28, 2023 minus average yield spread 2010 through April 2023)/standard deviation of yield spread from 2010 through April 2023. This equals: (-0.36 minus 1.32)/0.0077.

that range. Thus, the current yield spread is an outlier, which is why equity analysts do not expect this current level to hold.

V.E. Conclusion

Q. What are your conclusions regarding the effect of current market conditions on the cost of equity for the Company?

A. Investors expect long-term interest rates to remain relatively high through 2023, in response to continued elevated levels of inflation and the Federal Reserve's normalization of monetary policy. Because the share prices of utilities are inversely correlated to interest rates, and government bond yields are already substantially greater than utility stock dividend yields, the share prices of utilities are likely to continue to decline, which is the reason a number of equity analysts have classified the sector as either underperform or underweight. The expected underperformance of utilities means that DCF models using recent historical data likely underestimate investors' required return over the period that rates will be in effect. Therefore, this expected change in market conditions supports consideration of the higher end of the range of cost of equity results produced by the DCF models. Moreover, prospective market conditions warrant consideration of and placing more weight on, forward-looking cost of equity estimation models such as the CAPM and ECAPM, which better reflect expected market conditions.

VI. PROXY GROUP SELECTION

Q. Why have you used a group of proxy companies to estimate the cost of equity for KAWC?

A. In this proceeding, I am estimating the cost of equity for KAWC, which is a rate-regulated subsidiary of AWK. Because the ROE is a market-based concept, and given the fact that KAWC's operations do not make up the entirety of a publicly-traded entity, it is necessary to establish a group of companies that is both publicly-traded and comparable to the Company in certain fundamental business and financial respects to serve as its "proxy" for purposes of the ROE estimation process. The proxy companies used in my analyses all possess a set of operating and financial risk characteristics that are substantially comparable to KAWC, and, therefore, provide a reasonable basis for deriving the appropriate ROE.

Q. Please provide a brief profile of KAWC.

A. KAWC, a wholly-owned subsidiary of AWK, provides water distribution service to approximately 137,605 customers and wastewater services to approximately 1,346 customers in Kentucky.[22] The Company can access debt markets through American Water Capital Corp. ("AWCC") or independently. The current credit ratings for AWCC and

[22] Company provided data.

AWK are as follows: (1) S&P - A (Outlook: Stable)[23]; and (2) Moody's - Baa1 (Outlook: Stable).[24]

Q. How did you select the companies in your proxy group?

A. I began with the group of U.S. utilities that Value Line classifies as "Water Utilities" and "Natural Gas Distribution Companies". That combined group includes 16 domestic U.S. utilities. I simultaneously applied the following screening criteria to select companies that:

- pay consistent quarterly cash dividends because companies that do not cannot be analyzed using the Constant Growth DCF model;
- have investment grade long-term issuer ratings from S&P and/or Moody's;
- are covered by at least two utility industry analysts;
- have positive long-term earnings growth forecasts from at least two utility industry equity analysts;
- derive more than 60.00 percent of their total operating income from regulated operations; and
- were not parties to a merger or transformative transaction during the analytical periods relied on.

Q. Did you consider any additional companies for inclusion in your proxy group?

A. Yes. I also considered the group of 36 companies that Value Line classifies as "Electric Utilities". In determining which electric utilities would qualify for inclusion in my proxy group, I started by relying on the criteria used to screen the water and natural gas utilities.

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23 S&P Global Ratings, American Water Works Co. Inc., February 6, 2023.

24 Moody's Investors Service, accessed March 21, 2023. Moody's last rating change for American Water Works Company, Inc was as of April 1, 2019. (https://www.moodys.com/research/Moodys-downgrades-American-Water-and-American-Water-Capital-Corp-to--PR_397640)

I then applied two additional screening criteria to only include electric utilities that would be considered risk comparable to KAWC:

- have owned generation comprising less than 10 percent of the Company's MWh sales to ultimate customers to ensure that the electric utilities included did not own a substantial amount of generation and therefore had operations that were primarily transmission and distribution; and
- own water operations.

Q. Did you include AWK in your proxy group?

A. No. Consistent with my general practice of excluding the subject company, or its parent holding company, from the proxy group, I have excluded AWK from my proxy group for KAWC.

Q. What is the composition of your proxy group?

A. The screening criteria discussed above resulted in a proxy group consisting of the companies in Figure 6 (see also Exhibit AEB-2).

Figure 6: Proxy Group

Company	Ticker
Atmos Energy Corporation	ATO
NiSource Inc.	NI
Northwest Natural Gas Company	NWN
ONE Gas, Inc.	OGS
Spire, Inc.	SR
Eversource Energy	ES
American States Water Company	AWR
California Water Service Group	CWT
Middlesex Water Company	MSEX
SJW Group	SJW
Essential Utilities, Inc.	WTRG

Q. Why did you include electric utilities and natural gas distribution companies in the proxy group?

A. Value Line currently classifies only seven companies as water utilities. Therefore, the universe of water utilities is already small before a set of screening criteria are applied. Additionally, there has been a recent trend towards consolidation in the utility industry, which reduces the number of available proxy companies.[25] Because there are a small number of companies that are available for inclusion in the proxy group, I also considered electric utilities and natural gas distribution companies that meet the screening criteria.

Q. Are electric utilities and natural gas distribution companies reasonably comparable to water utilities to be included in a proxy group used to estimate the cost of equity for a water utility?

A. Yes, I believe that it is reasonable to rely on a combined proxy group. As noted above, due to consolidation in the water utility industry, there is only a small group of water companies that can be included in the proxy group. In addition, the screening criteria relied on for my proxy group require that a company derive more than 60 percent of their operating income from regulated operations. Therefore, the electric utilities and natural gas distribution companies included in my proxy group generate a large portion of their operating income from regulated operations similar to KAWC and the water utilities that will be included in

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[25] Chediak, Mark, et al. "Utility M&A Is So Hot Not Even Berkshire's Billions Won a Bid." Bloomberg.com, Bloomberg, 3 Jan. 2018, www.bloomberg.com/news/articles/2018-01-03/utility-m-a-is-so-hot-not-even-berkshire-s-billions-won-a-bid.

the proxy group. As a result, I believe that it is appropriate to include electric utilities and natural gas distribution companies in my proxy group.

Q. Has the Commission considered the inclusion of other utility industry segments in the proxy group used to estimate the cost of equity for a water utility?

A. Yes. In Case No. 2018-00358 for KAWC, the Commission noted that the authorized ROE for KAWC was within the range of DCF and CAPM results produced by KAWC and the Attorney General.[26] To develop the DCF and CAPM models, KAWC and the Attorney General relied on two proxy groups: (1) a water only proxy group; and (2) a combined proxy group which included natural gas utilities.[27] Therefore, the Commission has also considered, when determining the authorized ROE for a water company, ROE results based on a proxy group that includes both natural gas and water utilities.

Q. Have other regulators also considered the inclusion of other utility industry segments in the proxy group used to estimate the cost of equity for a water utility?

A. Yes. The Massachusetts Department of Public Utilities ("MDPU"), the Florida Public Service Commission ("FPUC") and the Illinois Commerce Commission ("ICC") have considered the results of a proxy group that includes natural gas companies when determining the authorized ROE for water and wastewater utilities. In Docket No. 17-90, the MDPU determined that the use of a natural gas utility proxy group was appropriate for

[26] Case No. 2018-00358, In the matter of: Electronic Application of Kentucky-American Water Company for an Adjustment of Rates, Order, June 27, 2019, at 66.
[27] Id., at 55-56.

the purpose of demonstrating the comparability of the investment risk of the proxy group to Aquarion Water Company.[28]

In Docket No. 20180006-WS, the FPUC modified the methodology used to estimate the ROE for water and wastewater utilities in Florida to include a combined proxy group of natural gas and water utilities.[29] The FPUC has previously relied on a natural gas only proxy group to estimate the ROE for water and wastewater utilities[30]; however, to increase the size of the proxy group, the FPUC decided to rely on a combined proxy group. Specifically, the FPUC noted:

> The leverage formula methodology shall be modified to include a combined proxy group of natural gas and WAW utilities as proxy companies in calculating the leverage formula. We find that the selected natural gas utilities and WAW utilities that derive at least 50 percent of their revenue from regulated rates. These utilities have market power and are influenced significantly by economic regulation. In Attachment 1, the returns calculated using the proxy group are adjusted to reflect the risks faced by Florida WAW utilities. The updated index consists of five natural gas companies and seven WAW companies that derive at least 50 percent of their total revenue from regulated operations. These companies have a median Standard and Poor's bond rating of "A"[31]

[28] Massachusetts Department of Public Utilities, Docket No. 17-90, Petition of Aquarion Water Company of Massachusetts, Inc., pursuant to G.L. c. 164, § 94, and G.L. c. 165, § 2, for Approval of a General Rate Increase as set forth in M.D.P.U. No. 3., October 31, 2018, p. 286-287.

[29] Docket No. 20180006-WS, In re. Water and wastewater industry annual reestablishment of authorized range of return on common equity for water and wastewater utilities pursuant to Section 367.081(4)(f),F.S., Order No. PSC-2018-0327-PAA-WS, at 7.

[30] Docket No. 170006-WS, In re. Water and wastewater industry annual reestablishment of authorized range of return on common equity for water and wastewater utilities pursuant to Section 367.081(4)(f),F.S., Order No. PSC-17-0249-PAA-WS, at 2.

[31] Docket No. 20180006-WS, In re. Water and wastewater industry annual reestablishment of authorized range of return on common equity for water and wastewater utilities pursuant to Section 367.081(4)(f),F.S., Order No. PSC-2018-0327-PAA-WS, at 8.

Finally, in Case No. 22-0210, for Illinois-American Water Company, the ICC agreed that a proxy group of water and public utility companies was a reasonable sample upon which to apply the various COE estimation models.[32]

VII. COST OF EQUITY ESTIMATION

Q. Please briefly discuss the ROE in the context of the regulated rate of return.

A. The ROE is the cost of common equity capital in the utility's capital structure for ratemaking purposes. The overall rate of return for a regulated utility is the weighted average cost of capital, in which the cost rates of the individual sources of capital are weighted by their respective book values. While the costs of debt and preferred stock can be directly observed, the cost of equity is market-based and, therefore, must be estimated based on observable market data.

Q. How is the required cost of equity determined?

A. The required cost of equity is estimated by using analytical techniques that rely on market-based data to quantify investor expectations regarding equity returns, adjusted for certain incremental costs and risks. Informed judgment is then applied to determine where the given company's cost of equity falls within the range of results produced by multiple analytical techniques. The key consideration in determining the cost of equity is to ensure that the methodologies employed reasonably reflect investors' views of the financial

[32] Illinois Commerce Commission, Illinois-American Water Company Proposed Rate increases for Water and Sewer Service (tariffs filed February 10, 2022), Docket No. 22-0210, Order, December 15, 2022, at 102.

markets in general, as well as the subject company (in the context of the proxy group), in particular.

Q. What methods did you use to estimate KAWC's cost of equity?

A. I considered the results of the Constant Growth DCF model, the CAPM, and the ECAPM. As discussed in more detail below, a reasonable ROE estimate considers alternative methodologies, observable market data, and the reasonableness of their individual and collective results.

VII.A. Importance of Multiple Analytical Approaches

Q. Is it important to use more than one analytical approach?

A. Yes. Because the cost of equity is not directly observable, it must be estimated based on both quantitative and qualitative information. When faced with the task of estimating the cost of equity, analysts and investors are inclined to gather and evaluate as much relevant data as reasonably can be analyzed. Several models have been developed to estimate the cost of equity, and I use multiple approaches to estimate the cost of equity. As a practical matter, however, all of the models available for estimating the cost of equity are subject to limiting assumptions or other methodological constraints. Consequently, many well-regarded finance texts recommend using multiple approaches when estimating the cost of equity. For example, Copeland, Koller, and Murrin[33] suggest using the CAPM and

[33] Tom Copeland, Tim Koller and Jack Murrin, Valuation: Measuring and Managing the Value of Companies, 3rd Ed. (New York: McKinsey & Company, Inc., 2000), at 214.

Arbitrage Pricing Theory model, while Brigham and Gapenski[34] recommend the CAPM, DCF, and Bond Yield Plus Risk Premium approaches.

Q. Do current market conditions support the reliance on more than one analytical approach?

A. Yes. As I discussed above, interest rates have increased substantially over the past year and are expected to remain elevated over at least the next year from the lows seen during the COVID-19 pandemic. The benefit of using multiple models is that each model relies on different assumptions, certain of which may better reflect current and projected market conditions at different times. As discussed previously, the CAPM, and the ECAPM analyses offer some balance through the use of projected interest rates since the effect of changes in interest rates, particularly the recent increase in interest rates, may not be captured as well in the DCF model at this time. Therefore, it is important to use multiple analytical approaches to ensure that the cost of equity results reflect market conditions that are expected during the period that the Company's rates will be in effect.

Q. Has the Commission made similar findings regarding the reliance on multiple models?

A. Yes, it has. In its decision in the Company's last rate case, the Commission noted that in determining the authorized ROE for KAWC, the Commission considered all of the evidence presented in the case. Specifically, the Commission's Order explained:

[34] Eugene Brigham, Louis Gapenski, Financial Management: Theory and Practice, 7th Ed. (Orlando: Dryden Press, 1994), at 341.

> In evaluating the ROE for Kentucky-American, the Commission must evaluate and review each model and all parties' positions, and balance the financial integrity of the utility with the interests of the consumer and the statutory obligation that rates be fair, just, and reasonable.[35]
>
> ***
>
> For the reasons set forth above, the Commission awards Kentucky-American an ROE of 9.70 percent. This award appropriately balances the needs of Kentucky-American and its customers, is within the range of recent awards to comparable companies, and is compatible, if not slightly larger than, the industry average and American Water average. Furthermore, this award is within the mean and median results of Kentucky-American's DCF models and supports the revised DCF and CAPM of the Attorney General as presented by Kentucky-American and within the range of the DCF models presented by the Attorney General. The impact on the revenue recruitment is a decrease of $3,347,811.[36]

VII.B. Constant Growth DCF Model

Q. Please describe the DCF approach.

A. The DCF approach is based on the theory that a stock's current price represents the present value of all expected future cash flows. In its most general form, the DCF model is expressed as follows:

$$P_0 = \frac{D_1}{(1+k)} + \frac{D_2}{(1+k)^2} + \cdots + \frac{D_\infty}{(1+k)^\infty} \qquad [1]$$

Where P_0 represents the current stock price, D1…D∞ are all expected future dividends, and k is the discount rate, or required ROE. Equation [1] is a standard present value calculation that can be simplified and rearranged into the following form:

35 Case No. 2018-00358, In the matter of: Electronic Application of Kentucky-American Water Company for an Adjustment of Rates, Order, June 27, 2019, at 65.

36 *Id.*, at 66.

$$k = \frac{D_0(1+g)}{P_0} + g \qquad [2]$$

Equation [2] is often referred to as the Constant Growth DCF model in which the first term is the expected dividend yield and the second term is the expected long-term growth rate.

Q. What assumptions are required for the Constant Growth DCF model?

A. The Constant Growth DCF model requires the following four assumptions: (1) a constant growth rate for earnings and dividends; (2) a stable dividend payout ratio; (3) a constant price-to-earnings ratio; and (4) a discount rate greater than the expected growth rate. To the extent that any of these assumptions are not objectively valid, considered judgment and/or specific adjustments should be applied to the results.

Q. What market data do you use to calculate the dividend yield in your Constant Growth DCF model?

A. The dividend yield in my Constant Growth DCF model is based on the proxy group companies' current annualized dividend and average closing stock prices over the 30-, 90-, and 180-trading days ended April 28, 2023.

Q. Why do you use 30-, 90-, and 180-day averaging periods?

A. I use an average of recent trading days to calculate the term P_0 in the DCF model to reflect current market data while also ensuring that the result of the model is not skewed by anomalous events that may affect stock prices on any given trading day.

Q. Did you make any adjustments to the dividend yield to account for periodic growth in dividends?

A. Yes, I did. Because utility companies tend to increase their quarterly dividends at different times throughout the year, it is reasonable to assume that dividend increases will be evenly distributed over calendar quarters. Given that assumption, it is reasonable to apply one-half of the expected annual dividend growth rate for purposes of calculating the expected dividend yield component of the DCF model. This adjustment ensures that the expected first-year dividend yield is, on average, representative of the coming twelve-month period, and does not overstate the aggregated dividends to be paid during that time.

Q. Why is it important to select appropriate measures of long-term growth in applying the DCF model?

A. In its Constant Growth form, the DCF model (*i.e.*, Equation [2]) assumes a single growth estimate in perpetuity. To reduce the long-term growth rate to a single measure, one must assume that the payout ratio remains constant and that earnings per share, dividends per share and book value per share all grow at the same constant rate. Over the long run, however, dividend growth can only be sustained by earnings growth. Therefore, it is important to consider a variety of sources in arriving at a singular long-term earnings growth rate for the Constant Growth DCF model.

Q. Which sources of long-term earnings growth rates did you use?

A. My Constant Growth DCF model incorporates three sources of long-term earnings growth rates: (1) Zacks Investment Research; (2) Yahoo! Finance; and (3) *Value Line Investment Survey* ("*Value Line*").

Q. How did you calculate the range of results for the Constant Growth DCF Model?

A. I calculated a low end result for my DCF model using the minimum growth rate of the three sources (*i.e.*, the lowest of the Zacks, Yahoo Finance, and *Value Line* projected earnings growth rates) for each of the proxy group companies. I used a similar approach to calculate a high end result, using the maximum growth rate of the three sources for each proxy group company. The mean results were calculated using the average growth rate from all three sources for each proxy group company.

Q. What were the results of your DCF analyses?

A. Figure 7 summarizes the results of my DCF analyses. As shown in Figure 7, the mean and median DCF results using the average growth rates range from 9.28 percent to 9.97 percent, and the mean and median results using the maximum growth rates range from 10.51 percent to 10.66 percent. While I also summarize the DCF results using the minimum growth rates, given the expected underperformance of utility stocks going forward and thus the likelihood that the DCF model is understating the cost of equity, I do not believe it is appropriate to consider these understated DCF results at this time. It is important to note that there have been no relevant regulatory decisions where a commission has determined that the appropriate ROE for a water utility should be set in the range resulting from the use of the minimum growth rates in the DCF model.

Figure 7: Summary of Constant Growth DCF Results

	Low Growth Rate	Average Growth Rate	High Growth Rate
Constant Growth DCF Mean Results:			
30-Day Average	8.13%	9.31%	10.66%
90-Day Average	8.10%	9.28%	10.63%
180-Day Average	8.13%	9.31%	10.65%
Average	8.12%	9.30%	10.65%
Median Results:			
30-Day Average	8.36%	9.95%	10.52%
90-Day Average	8.38%	9.93%	10.51%
180-Day Average	8.41%	9.97%	10.55%
Average	8.38%	9.95%	10.53%

Q. What are your conclusions about the results of the DCF models?

A. As discussed previously, one primary assumption of the DCF models is a constant price-to-earnings ratio. That assumption is heavily influenced by the market price of utility stocks. Because utility stocks are expected to underperform the broader market over the near-term as interest rates remain elevated and yields on long-term government bonds exceed utility dividend yields, it is important to consider the results of the DCF models with caution. Therefore, although I have given weight to the results of the Constant Growth DCF model, my recommendation also gives weight to the results of other cost of equity estimation models that take into greater consideration current and expected market conditions.

VII.C. CAPM Analysis

Q. Please briefly describe the CAPM.

A. The CAPM is a risk premium approach that estimates the cost of equity for a given security as a function of a risk-free return plus a risk premium to compensate investors for the non-diversifiable or "systematic" risk of that security. Systematic risk is the risk inherent in the entire market or market segment—which cannot be diversified away using a portfolio of assets. Unsystematic risk is the risk of a specific company that can, theoretically, be mitigated through portfolio diversification.

The CAPM is defined by four components, each of which must theoretically be a forward-looking estimate:

$$K_e = r_f + \beta(r_m - r_f) \qquad [3]$$

Where:

Ke = the required market ROE;

β = beta coefficient of an individual security;

rf = the risk-free rate of return; and

r_m = the required return on the market.

In this specification, the term ($r_m - r_f$) represents the market risk premium. According to the theory underlying the CAPM, because unsystematic risk can be diversified away, investors should only be concerned with systematic or non-diversifiable risk. Non-diversifiable risk is measured by beta, which is defined as:

$$\beta = \frac{Covariance(r_e, r_m)}{Variance(r_m)} \quad [4]$$

The variance of the market return (*i.e.*, Variance (r_m)) is a measure of the uncertainty of the general market, and the Covariance between the return on a specific security and the general market (*i.e.*, Covariance (r_e, r_m)) reflects the extent to which the return on that security will respond to a given change in the general market return. Thus, beta represents the risk of the security relative to the general market.

Q. What risk-free rate did you use in your CAPM analysis?

A. I relied on three sources for my estimate of the risk-free rate: (1) the current 30-day average yield on 30-year U.S. Treasury bonds, which is 3.69 percent;[37] (2) the average projected 30-year U.S. Treasury bond yield for the third quarter of 2023 through the third quarter of 2024, which is 3.76 percent;[38] and (3) the average projected 30-year U.S. Treasury bond yield for 2024 through 2028, which is 3.90 percent.[39]

Q. What Beta coefficients did you use in your CAPM analyses?

A. As shown in Exhibit AEB-4, I used the average Beta coefficients for the proxy group companies as reported by Bloomberg and *Value Line*. The beta coefficients reported by Bloomberg are calculated using ten years of weekly returns relative to the S&P 500 Index. Value Line's calculation of the beta coefficients is based on five years of weekly returns relative to the New York Stock Exchange Composite Index ("NYSE"). Additionally, as shown on Exhibit AEB-4 and Exhibit AEB-5, I also considered an additional CAPM

[37] Bloomberg Professional as of April 30, 2023.
[38] Blue Chip Financial Forecasts, Vol. 42, No. 5, May 1, 2023, at 2.
[39] Blue Chip Financial Forecasts, Vol. 41, No. 12, December 2, 2022, at 14.

analysis that relies on the long-term average utility beta coefficient for the companies in my proxy group, which is calculated as an average of the *Value Line* beta coefficients for the companies in my proxy group from 2013 through 2022.

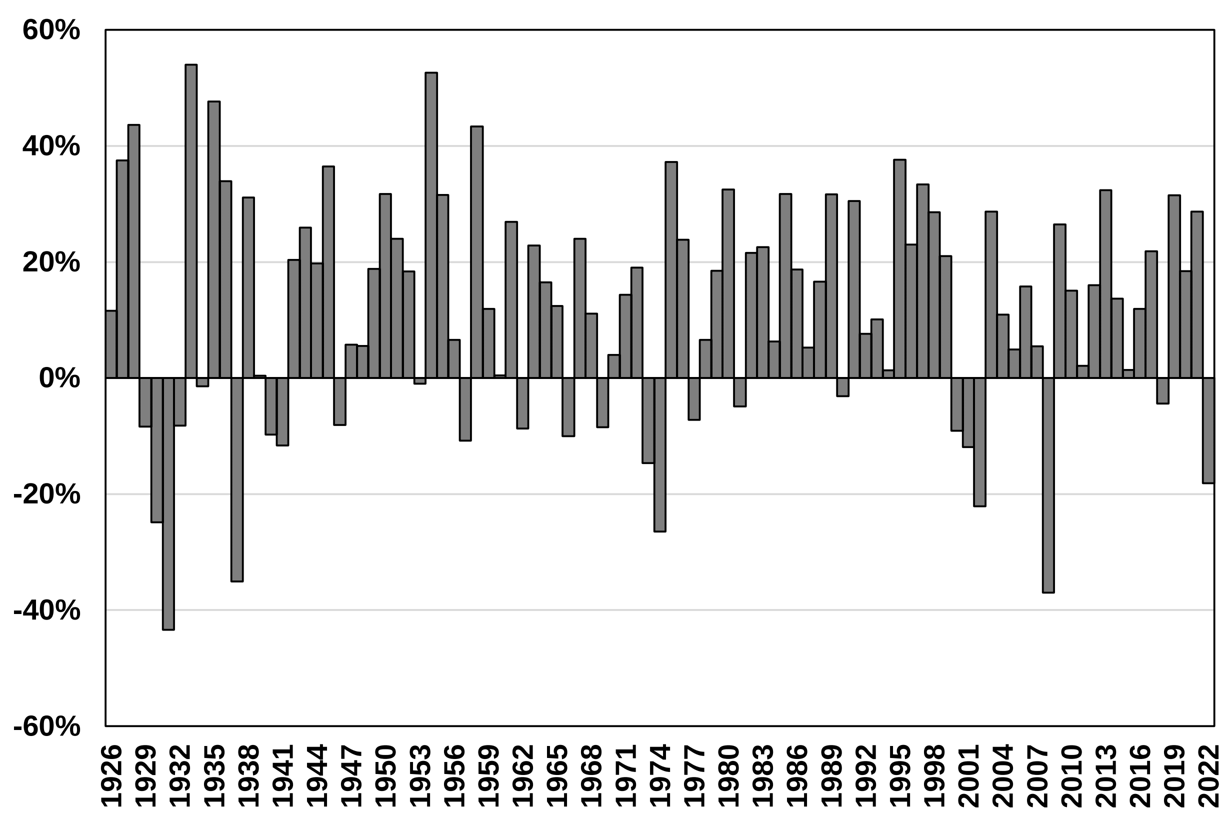
Q. How did you estimate the Market Risk Premium in the CAPM?

A. I estimated the market risk premium as the difference between the implied expected equity market return and the risk-free rate. As shown in Exhibit AEB-6, the expected market return is calculated using the Constant Growth DCF model discussed earlier in my testimony for the companies in the S&P 500 Index. Based on an estimated market capitalization-weighted dividend yield of 1.73 percent and a weighted long-term earnings growth rate of 10.19 percent, the estimated required market return for the S&P 500 Index as of April 28, 2023 is 12 percent. Based on the three risk-free rates considered, the implied market risk premia ranges from 8.10 percent to 8.31 percent.

Q. How does the current expected market return compare to observed historical market returns?

A. As shown in Figure 8, given the range of annual equity returns that have been observed over the past century, a current expected market return of 12 percent is not unreasonable. As shown, in 51 out of the past 97 years (or roughly 53 percent of observations), the realized equity market return was at least 12 percent or greater.

Figure 8: Realized U.S. Equity Market Returns (1926-2022)[40]



Q. Did you consider another form of the CAPM in your analysis?

A. Yes. I have also considered the results of an ECAPM in estimating the cost of equity for KAWC.[41] The ECAPM calculates the product of the adjusted beta coefficient and the market risk premium and applies a weight of 75.00 percent to that result. The model then applies a 25.00 percent weight to the market risk premium without any effect from the beta coefficient. The results of the two calculations are summed, along with the risk-free rate, to produce the ECAPM result, as noted in Equation [5] below:

$$k_e = r_f + 0.75\beta(r_m - r_f) + 0.25(r_m - r_f) \qquad [5]$$

[40] Depicts total annual returns on large company stocks, as reported in the 2023 Kroll SBBI Yearbook.
[41] See, e.g., Roger A. Morin, New Regulatory Finance, Public Utilities Reports, Inc., 2006, at 189.

Where:

k_e = the required market ROE

β = Adjusted Beta coefficient of an individual security

r_f = the risk-free rate of return

r_m = the required return on the market as a whole

In essence, the empirical form of the CAPM addresses the tendency of the "traditional" CAPM to underestimate the cost of equity for companies with low beta coefficients such as regulated utilities. In that regard, the ECAPM is not redundant to the use of adjusted betas in the traditional CAPM; rather, it recognizes the results of academic research indicating that the risk-return relationship is different (in essence, flatter) than estimated by the CAPM, and that the CAPM underestimates the "alpha," or the constant return term.[42]

As with the CAPM, my application of the ECAPM uses the forward-looking market risk premium estimates, the three yields on 30-year Treasury securities noted earlier as the risk-free rate, and the current Bloomberg and *Value Line* and long-term *Value Line* beta coefficients.

Q. What are the results of your CAPM analyses?

A. As shown in Figure 9 (*see* also Exhibit AEB-4), my traditional CAPM analyses produce a range of returns from 9.76 percent to 10.53 percent. The ECAPM analysis results range from 10.32 percent to 10.90 percent.

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[42] Id., at 191.

Figure 9: CAPM Results

	Current 30-day Average 30-Year Treasury Bond Yield	Near-Term Forecast 30-Year Treasury Yield	Longer-Term Forecast 30-Year Treasury Yield
CAPM:			
Current Value Line Beta	10.49%	10.50%	10.53%
Current Bloomberg Beta	10.07%	10.09%	10.12%
Long-term Avg. Beta	9.76%	9.78%	9.82%
ECAPM:			
Current Value Line Beta	10.87%	10.88%	10.90%
Current Bloomberg Beta	10.55%	10.56%	10.59%
Long-term Avg. Beta	10.32%	10.34%	10.37%

VIII. REGULATORY AND BUSINESS RISKS

Q. Taken alone, do the results from the cost of equity estimation models for the proxy group provide an appropriate estimate of the cost of equity for the Company?

A. No. These results provide only a range for the appropriate estimate of the Company's cost of equity. There are several additional factors that must be taken into consideration when determining where the Company's cost of equity falls within the range of results. These factors, which are discussed below, should be considered with respect to their overall effect on the Company's risk profile.

VIII.A. Flotation Costs

Q. What are flotation costs?

A. Flotation costs are the costs associated with the sale of new issues of common stock. These costs include out-of-pocket expenditures for preparation, filing, underwriting, and other issuance costs.

Q. Why is it important to consider flotation costs in the allowed ROE?

A. A regulated utility must have the opportunity to earn an ROE that is both competitive and compensatory to attract and retain new investors. To the extent that a company is denied the opportunity to recover prudently incurred flotation costs, actual returns will fall short of expected (or required) returns, thereby diluting equity share value.

Q. Are flotation costs part of the utility's invested costs or part of the utility's expenses?

A. Flotation costs are part of the invested costs of the utility, which are properly reflected on the balance sheet under "paid in capital." They are not current expenses, and, therefore, are not reflected on the income statement. Rather, like investments in rate base or the issuance costs of long-term debt, flotation costs are incurred over time. As a result, the great majority of a utility's flotation cost is incurred prior to the test year but remains part of the cost structure that exists during the test year and beyond, and as such, should be recognized for ratemaking purposes. Therefore, it is irrelevant whether an issuance occurs during the test year or is planned for the test year because failure to allow recovery of past flotation costs may deny KAWC the opportunity to earn its required rate of return in the future.

Q. Please provide an example of why a flotation cost adjustment is necessary to compensate investors for the capital they have invested?

A. As shown in Exhibit AEB-7 in AWK's most recent stock issuance, the offering price was $135.5 per share of common stock. After paying flotation costs associated with the equity issuance, which include fees paid to underwriters and attorneys, among others, AWK's net proceeds are only $133.41 per share invested. AWK invests that $133.41 per share in plant used to serve its customers, which becomes part of rate base. Absent a flotation cost adjustment, the investor will thereafter earn a return on only the $133.41 per share invested in rate base, even though the contribution was $135.50. Making a small flotation cost adjustment gives the investor a reasonable opportunity to earn the authorized return, rather than the lower return that results when the authorized return is applied to an amount less than what the investor contributed.

Q. Is the need to consider flotation costs eliminated because KAWC is a wholly-owned subsidiary of AWK?

A. No. Although KAWC is a wholly-owned subsidiary of AWK, it is appropriate to consider flotation costs because wholly-owned subsidiaries receive equity capital from their parent and provide returns on the capital that roll up to the parent, which is designated to attract and raise capital based upon the returns of those subsidiaries. To deny recovery of issuance costs associated with the capital that is invested in the subsidiaries ultimately penalizes the investors that fund the utility operations and could inhibit the utility's ability to obtain new equity capital at a reasonable cost. This is important for KAWC because, as I will discuss in more detail below, the Company is planning significant capital expenditures in the near term.

Q. Is the need to consider flotation costs recognized by the academic and financial communities?

A. Yes. The need to reimburse shareholders for the lost returns associated with equity issuance costs is recognized by the academic and financial communities in the same spirit that investors are reimbursed for the costs of issuing debt. This treatment is consistent with the philosophy of a fair rate of return. According to Dr. Shannon Pratt:

> Flotation costs occur when new issues of stock or debt are sold to the public. The firm usually incurs several kinds of flotation or transaction costs, which reduce the actual proceeds received by the firm. Some of these are direct out-of-pocket outlays, such as fees paid to underwriters, legal expenses, and prospectus preparation costs. Because of this reduction in proceeds, the firm's required returns on these proceeds equate to a higher return to compensate for the additional costs. Flotation costs can be accounted for either by amortizing the cost, thus reducing the cash flow to discount, or by incorporating the cost into the cost of capital. Because flotation costs are not typically applied to operating cash flow, one must incorporate them into the cost of capital.[43]

Q. How did you calculate the flotation costs for KAWC?

A. My flotation cost calculation is based on the costs incurred by AWK in that company's most recent equity offering as of March 3, 2023. That flotation cost percentage is then applied to the DCF analysis to estimate impact on ROE. As shown in Exhibit AEB-7, based on the flotation costs incurred in the most recent AWK issuance, the impact on the

[43] Shannon P. Pratt, Cost of Capital Estimation and Applications, Second Edition, at 220-221.

proxy group's cost of equity amounts to 3 basis points (i.e., 0.3 percent) based on the median and 5 basis points (i.e., 0.5 percent) based on the mean.

Q. Do your final results include an adjustment for flotation cost recovery?

A. No. While the final ROE results do not incorporate an explicit adjustment for flotation costs, the estimated effect of flotation cost on ROE is considered in identifying a recommended ROE within the range of ROE estimates from the various models.

VIII.B. Capital Expenditures

Q. How is KAWC's risk profile affected by its substantial capital expenditure program?

A. KAWC projects that the Company will spend approximately $440 million on capital investments for the period from 2024-2028, including significant investment to replace aging infrastructure necessary to meet the needs of its customers and to comply with various regulations.[44]

From a credit perspective, the additional pressure on cash flows associated with high levels of capital expenditures exerts corresponding pressure on credit metrics and, therefore, credit ratings. An S&P report explains:

> [T]here is little doubt that the U.S. electric industry needs to make record capital expenditures to comply with the proposed carbon pollution rules over the next several years, while maintaining safety standards and grid stability. We believe the higher capital spending and subsequent rise in debt levels could strain these companies' financial measures, resulting in an almost consistent negative discretionary cash flow throughout this higher construction period. To meet the higher capital spending requirements, companies will require ongoing and steady access to the capital markets,

[44] Data provided by KAWC.

> necessitating that the industry maintains its high credit quality. We expect that utilities will continue to effectively manage their regulatory risk by using various creative means to recover their costs and to finance their necessary higher spending.[45]

Although this S&P report refers to electric utilities, the same applies to water utilities. In an August 2016 report, S&P explained the importance of regulatory support for large capital projects:

> When applicable, a jurisdiction's willingness to support large capital projects with cash during construction is an important aspect of our analysis. This is especially true when the project represents a major addition to rate base and entails long lead times and technological risks that make it susceptible to construction delays. Broad support for all capital spending is the most credit-sustaining. Support for only specific types of capital spending, such as specific environmental projects or system integrity plans, is less so, but still favorable for creditors. Allowance of a cash return on construction work-in-progress or similar ratemaking methods historically were extraordinary measures for use in unusual circumstances, but when construction costs are rising, cash flow support could be crucial to maintain credit quality through the spending program. Even more favorable are those jurisdictions that present an opportunity for a higher return on capital projects as an incentive to investors.[46]

Q. Does KAWC have a mechanism for timely recovery of infrastructure replacements?

A. Yes. KAWC has a Qualified Infrastructure Program ("QIP") that allows the Company a somewhat limited opportunity to recover costs associated with replacing some limited aging infrastructure. The recovery of costs through the QIP surcharge are established on an annual basis and recover limited qualified plant additions for the upcoming year. The QIP rider is limited to a set amount of aging mains and does not include the costs of

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[45] S&P, Ratings Direct, "U.S. Regulated Electric Utilities' Annual Capital Spending is Poised to Eclipse $100 Billion," July 2014.

[46] S&P Global Ratings, "Assessing U.S. Investor-Owned Utility Regulatory Environments," August 10, 2016, at 7.

expansion projects. Although the QIP rider is certainly a positive aspect of Kentucky regulation, it should be noted that such clauses have both become quite commonplace in utility regulation and that other jurisdictions have more expansive cost recovery mechanisms. In fact, as shown in Exhibit AEB-8 approximately 79 percent of the companies in the proxy group have implemented infrastructure replacement recovery mechanisms. Consequently, the presence of the QIP while a positive regulatory mechanism, does not reduce the Company's risk vis-à-vis that of the proxy group.

Q. What are your conclusions regarding the effect of KAWC's capital spending program on its risk profile and cost of capital?

A. The Company's capital expenditure requirements as a percentage of net utility plant are significant and will continue over the next few years. Additionally, similar to a number of the operating subsidiaries of the proxy group, KAWC does have a capital tracking mechanism to recover some of the Company's projected capital expenditures, albeit more limited in scope than such clauses in other jurisdictions.

VIII.C. Environmental and Water Quality Regulation

Q. Please provide an overview of the risks associated with water quantity, water quality, and other environmental regulations applicable to KAWC's water supply facilities and operations.

A. Water supply utilities are subject to a complex array of regulations at the federal, state, and river basin commission levels, with respect to water quantity, water quality, and other environmental aspects of their facilities and operations. The testimony of Company

Witness Porter provides an overview of the types of capital investments that the Company either has made and will make over the near-term to meet water quality requirements, maintain infrastructure and increase efficiency. As discussed in Ms. Porter's Direct Testimony, KAWC has several replacement capital projects that will replace existing infrastructure that is at or near the end of its useful life, or that needs to be replaced or upgraded to meet current environmental regulations.

Q. How do these more stringent regulations potentially impact the cost of capital for water utilities?

A. As discussed in the direct testimony of Mr. Lewis, emerging environmental standards for drinking water require enhancements and improvements to water treatment and distribution facilities. Such standards include; 1) the 2021 revision to the Lead and Copper Rule; 2) the Long Term 2 Enhanced Surface Water Treatment Rule; 3) the Safe Drinking Water Act, and the EPA's actions to address sampling and containment of per- and polyfluoroalkyl substances ("PFAS"). The uncertainty regarding which regulations will be approved by the EPA, and how regulations will change over time, serves to increase the perceived risk among investors. Higher costs could become a key credit issue for regulated water utilities given the importance of managing customer rate increases. This has implications for relations with regulators, as well as economic and political ramifications that could heighten business risk. Any rating actions would likely not occur until there is further clarity from a utility about environmental regulations and recovery of compliance costs.

Q. What is your conclusion with respect to the effect of the risk associated with environmental regulations and water quality regulations on KAWC's cost of equity?

A. KAWC has significant risk and uncertainty associated with environmental and water quality regulations, and the recovery of costs to comply with those regulations. It is clear that the financial community recognizes the additional risks to credit quality associated with the capital investment required to meet environmental and water quality regulations. As discussed in Section VI of my testimony, in order to establish a proxy group of sufficient size, the group is composed of water utilities, natural gas utilities and electric utilities. When considering this risk factor, and the issues faced by the electric and natural gas utilities in the proxy group, these environmental risk factors, in addition to the magnitude of the capital program that the Company has planned to help ensure compliance, indicate increased risk for KAWC relative to the proxy group as a whole.

VIII.D. Regulatory Environment

Q. How does the regulatory environment affect investors' risk assessments?

A. The ratemaking process is premised on the principle that, for investors and companies to commit the capital needed to provide safe and reliable utility service, the subject utility must have the opportunity to recover the return of, and the market-required return on, invested capital. Regulatory authorities recognize that because utility operations are capital intensive, regulatory decisions should enable the utility to attract capital at reasonable terms, and doing so balances the long-term interests of investors and customers. To achieve this balance, the Company must be able to finance its operations assuming a reasonable opportunity to earn an appropriate return on invested capital to maintain an acceptable financial profile. In that respect, the regulatory environment is one of the most important factors considered in both debt and equity investors' risk assessments.

From the perspective of debt investors, the authorized return should enable the utility to generate the cash flow needed to meet its near-term financial obligations, make the capital investments needed to maintain and expand its systems, and maintain the necessary levels of liquidity to fund unexpected events. This financial liquidity must be derived not only from internally-generated funds, but also by efficient access to capital markets. Moreover, because fixed income investors have many investment alternatives, even within a given market sector, the utility's financial profile must be adequate on a relative basis to ensure its ability to attract capital under a variety of economic and financial market conditions.

In addition, equity investors require that the authorized return be adequate to provide a risk-comparable return on the equity portion of the utility's capital investments. Because equity investors are the residual claimants on the utility's cash flows (which is to say that the equity return is subordinate to interest payments), they are particularly concerned with the strength of regulatory support and its effect on future cash flows.

Q. Please explain how credit rating agencies consider regulatory risk in establishing a company's credit rating.

A. Both S&P and Moody's consider the overall regulatory framework in establishing credit ratings. Moody's establishes credit ratings based on four key factors: (1) business profile; (2) financial policy; (3) leverage and coverage; and (4) uplift for structural considerations. Within the business profile criteria, stability and predictability of regulatory environment and cost and investment recovery (sufficiency and timeliness) are each given a broad rating factor of 15.0 percent, while revenue risk is given a rating factor of 5.0 percent. Therefore, Moody's assigns regulatory risk a 35.0 percent weighting in the overall assessment of business and financial risk for regulated utilities.[47]

Q. How does the regulatory environment in which a utility operates affect its access to and cost of capital?

A. The regulatory environment can significantly affect both the access to, and cost of capital in several ways. First, the proportion and cost of debt capital available to utility companies are influenced by the rating agencies' assessment of the regulatory environment. As noted by Moody's, "the characteristics and transparency of the concession(s) and regulations under which the utility operates, the track record of the regulatory regime in setting tariffs and applying regulations consistently are key elements in assessing the overall stability of a water utility's business profile."[48]

Q. Have you conducted any analysis of the risk associated with the regulatory framework in a relative to the jurisdictions in which the utility operating subsidiaries of the companies in your proxy group operate?

A. Yes. I have evaluated the regulatory framework in Kentucky on three factors that are important in terms of providing a regulated utility a reasonable opportunity to earn its authorized ROE: (1) test year convention (i.e., forecast vs. historical); (2) use of revenue decoupling mechanisms or other clauses that provide revenue stabilization; and (3) the

[47] Moody's Investors Service, Rating Methodology: Regulated Water Utilities, June 8, 2018, at 4.
[48] Moody's Investors Service, Rating Methodology: Regulated Water Utilities, June 8, 2018, at 7.

prevalence of capital cost recovery between rate cases. The results of this regulatory risk assessment are shown in Exhibit AEB-8 and are summarized as follows:

1. Test year convention: KAWC is proposing to rely on a fully forecasted test year for the period of February 2024 through January 2025. Approximately 51.79 percent of the operating companies held by the proxy group provide service in jurisdictions that use a fully or partially forecast test year. Forecasted test years have been relied on for several years and produce cost estimates that are more reflective of future costs which results in more accurate recovery of incurred costs and mitigates the regulatory lag associated with historical test years.
2. Volumetric Risk: KAWC does not currently have protection against volumetric risk in Kentucky. By comparison, approximately 58.93 percent of the operating companies held by the proxy group have some form of protection against volumetric risk.
3. Capital Cost Recovery: As discussed above, KAWC has a limited capital tracking mechanism (i.e., QIP) to recover a portion of the Company's capital investment costs. This is consistent with the proxy group where 78.57 percent of the operating companies held by the proxy group have some form of capital cost recovery mechanism in place

Q. What is the effect on KAWC of having relatively fewer timely cost recovery mechanisms?

A. The lack of timely cost recovery mechanisms can result in regulatory lag. Regulatory lag occurs when a regulated utility is not able to recover its just and reasonable costs of providing service to customers on a timely basis. Regulatory lag is reflected in a utility's financial performance through earnings attrition, which is the inability of the utility to earn its authorized ROE due to delays in the recovery of allowable costs that have been incurred to provide regulated service to customers.

Q. Has Regulatory Research Associates ("RRA") provided recent commentary regarding its regulatory ranking for Kentucky?

A. Yes. RRA downgraded its ranking of Kentucky from Average/1 to Average/2 in March 2022 and recently noted the following:

> Historically, Kentucky regulation was somewhat more constructive than average from an investor perspective. Rate cases were typically resolved via settlements, and authorized equity returns, when specified, generally approximated prevailing nationwide industry averages at the time established. In most instances, the PSC has relied on historical test periods, contributing to regulatory lag. Cost recovery mechanisms are in place that mitigate the impact of regulatory lag to some extent; these mechanisms address costs related to fuel, purchased power, environmental compliance, including a cash return on environmental construction work in progress, and infrastructure replacement. The gas utilities are permitted to retain a portion of the margins associated with their off-system sales and capacity release activities.
>
> On March 3, 2022, RRA lowered the ranking of Kentucky regulation to Average/2 from Average/1, to account for the PSC's pattern of modifying rate case settlements, specifically for Duke Energy Corp. subsidiary Duke Energy Kentucky Inc., NiSource Inc. subsidiary Columbia Gas of Kentucky Inc., Essential Utilities Inc. subsidiary Delta Natural Gas Co. and PPL Corp. subsidiaries Louisville Gas and Electric Co. and Kentucky Utilities Co. The PSC imposed modest reductions to the stipulated ROEs in several of these proceedings and for Columbia Gas, the commission rejected a settlement provision that called for inclusion of Aldyl-A materials in the company's pipe rider; the PSC also adopted certain other minor adjustments that were not included in the agreements.
>
> ***
>
> Although there is currently only one major rate proceeding before the commission, 2023 could be an active year for the utilities under the PSC's purview, seeking to obtain rate recognition of increased operating costs attributable to broad inflation trends and higher costs of capital and to secure approval of fossil plant retirement plans and financing options. On a constructive note, legislation enacted in March allows the electric utilities to securitize certain costs associated with retired generation facilities and

> storm restoration efforts. Several companies could utilize this framework in the coming years.[49]

Q. What are your conclusions regarding the perceived risks related to the Kentucky regulatory environment?

A. As discussed throughout this section of my testimony, both Moody's and S&P have identified the supportiveness of the regulatory environment as an important consideration in developing their overall credit ratings for regulated utilities. Considering the regulatory adjustment mechanisms, many of the companies in the proxy group have more timely cost recovery (through forecasted test years, cost recovery trackers and revenue stabilization mechanisms) than KAWC has in Kentucky.[50] As a result, I conclude that the Company has greater than average regulatory risk when compared to the proxy group.

IX. CAPITAL STRUCTURE

Q. Is the capital structure of the Company an important consideration in the determination of the appropriate ROE?

A. Yes, it is. The equity ratio is the primary indicator of financial risk for a regulated utility such as KAWC. Assuming other factors equal, a higher debt ratio increases the risk to equity investors. For debt holders, higher debt ratios result in a greater portion of the available cash flow being required to meet debt service, thereby increasing the risk associated with the payments on debt. The result of increased risk is a higher interest rate. The incremental risk of a higher debt ratio is more significant for common equity

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[49] RRA, Commission Profile of the Kentucky Public Service Commission, accessed June 1, 2023.

[50] While the Kentucky Commission has generally utilized a historical test year based on known and measurable changes, statutes permit the use of a forecasted test year using a 13 month average rate base.

shareholders, whose claim on the cash flow of the Company is secondary to debt holders. Therefore, the greater the debt service requirement, the less cash flow is available for common equity holders. To the extent the equity ratio is reduced, it is necessary to increase the authorized ROE to compensate investors for the greater financial risk associated with a lower equity ratio.

Q. What is the KAWC's proposed capital structure?

A. KAWC is proposing a rate-making capital structure composed of 52.45 percent common equity, 46.21 percent long-term debt, 0.96 percent short-term debt and 0.38 percent preferred stock.

Q. Have you conducted any analysis to determine a reasonable equity ratio for KAWC?

A. Yes, I reviewed the capital structures of the proxy companies.

Q. Why is it appropriate to consider the equity ratio for the proxy companies?

A. The determination of the ROE is based on the expected return for a proxy group of companies that are comparable in risk to KAWC. The equity ratio is a measure of the financial risk of the company, and the authorized ROE is the return to compensate investors for that risk. If the Commission is going to rely on the ROE estimates for the proxy companies to establish the authorized ROE for KAWC, it is important that the financial risk of KAWC be similar to the financial risk of the proxy group. This is accomplished when the equity ratio of the subject company (in this case KAWC) is within the range established by the proxy group.

Q. How did you conduct your analysis of the proxy group capital structures?

A. Specifically, I calculated the mean proportions of common equity, long-term debt and short-term debt over the past three years for each of companies in the proxy group at the operating subsidiary level. Exhibit AEB-9 summarizes the actual capital structures of the operating subsidiaries. As shown, the average equity ratios for the operating subsidiaries of the proxy group range from 43.92 percent to 61.47 percent, with a mean of 53.69 percent. KAWC's proposed equity ratio of 52.45 percent is below the mean equity ratio of the proxy group and well within the equity ratio range established by the utility operating subsidiaries of the proxy group.

Q. Are there other factors to be considered in setting the Company's capital structure?

A. Yes, there are other factors that should be considered in setting the Companies' capital structures, namely the challenges that the credit rating agencies have highlighted as placing pressure on the outlook for utilities in 2023.

For example, Moody's recently revised its 2023 outlook for the regulated gas and electric utilities sector to "negative" based on ongoing challenges of inflation, increasing interest rates and higher natural gas prices. Moody's noted that these challenges increase the pressure on customer affordability, and thus face heightened public scrutiny and the ability of utilities to promptly recover their costs. Moody's concluded that regulated utilities' financial metrics are already under pressure with little cushion, and that sustained capital spending is likely as utilities continue progress towards emissions reductions and net-zero goals. Moody's noted that the outlook could return to stable if regulatory support remains intact, natural gas prices are at a level where utilities are able to recover their fuel and purchased power costs without delay beyond 12 months, overall inflation moderates, interest rates stabilize and/or utilities' aggregate funds from operations-to-debt ratio remains between 14% and 15%.[51]

Fitch Ratings ("Fitch") also highlights similar factors identified by Moody's as challenging utilities' outlook for 2023, stating that the sector faces mounting cost pressures due to "elevated commodity prices, inflationary headwinds and rising interest costs," and that some offset in managing these headwinds include "higher authorized ROEs and the use of tools such as securitization of under-recovered fuel balances."[52]

Likewise, S&P also continues to maintain a negative outlook for the utility industry, noting that downgrades have outpaced upgrades for the third consecutive year in 2022 with a median investor-owned utility credit rating of "BBB+".[53] Further, S&P expects the industry to have negative discretionary cash flow as a result of significant capital spending and consistent dividends.[54] Therefore, the utility industry will need ongoing access to capital markets to fund the capital expenditures. However, S&P notes that inflation, rising interests rates and decreasing equity prices may "hamper" consistent access to capital markets and result in additional pressure on cash flows.[55] Moreover, S&P indicates that if

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[51] Moody's Investors Service, Outlook. "2023 outlook negative due to higher natural gas prices, inflation and rising interest rates." November 10, 2022; Moody's Investors Service. Outlook, Sector In-Depth. "Inflation, high natural gas prices complicate prospects for supportive rate increases." November 11, 2022.

[52] Fitch Ratings. "North American Utilities, Power & Gas Outlook 2023." December 7, 2022, at 1-2.

[53] S&P Global Ratings. Industry Top Trends, "North American Regulated Utilities: The industries outlook remains negative." January 23, 2023.

[54] *Id*.

[55] *Id*.

inflation risks persist over the near-term and customer bills increase, regulatory credit support could decrease resulting in weaker financial metrics for the industry:

> Over the past decade the industry's financial measures have weakened from a combination of rising capital spending, regulatory lag, and lower authorized return on equity (ROE). The industry's return on capital was about 6% a decade ago and today is closer to 4%. More recently, we have seen instances where not only is the authorized ROE lowered but also the equity ratio is lowered. These results have weakened the industry's financial measures, pressuring credit quality. Under our base case of moderating inflationary risks during 2023, we expect the industry's credit measures to generally remain flat. However, if inflationary risks persist, it may further pressure the customer bill, potentially decreasing the level of regulatory credit support, weakening the industry's financial performance.[56]

The credit ratings agencies' continued concerns over the negative effects of inflation and increased capital expenditures underscore the importance of maintaining adequate cash flow metrics for the industry as a whole, and KAWC in particular in the context of this proceeding.

Q. What is your conclusion with regard to KAWC's proposed capital structure?

A. Considering the actual capital structures of the proxy group operating companies, I believe that KAWC's proposed common equity ratio of 52.45 percent is reasonable. The proposed equity ratio is well within the range and slightly below the mean established by the capital structures of the utility operating subsidiaries of the proxy companies.

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[56] *Id*.

X. CONCLUSION AND RECOMMENDATIONS

Q. What is your conclusion regarding a fair ROE for KAWC?

Based on the various quantitative analyses summarized in Figure 1 above and the qualitative analyses presented in my Direct Testimony, a reasonable range of ROE results for KAWC is from 10.00 percent to 11.00 percent. Within that range, I believe that an ROE of 10.75 percent is reasonable and appropriate. The recommended ROE takes into consideration the current conditions in capital markets including the high interest rates, and elevated inflationary pressures, both of which increase the cost of capital as well as the need to recover flotation costs and the relative business and financial risk of KAWC as compared to the proxy group. This ROE would enable the company to attract capital at reasonable terms under a variety of economic and financial market conditions, while continuing to provide safe, reliable and affordable water service to customers in Kentucky

Q. What is your conclusion regarding KAWC's proposed capital structure?

A. My conclusion is that KAWC's proposed rate-making capital structure consisting of 52.45 percent common equity, 46.21 percent long-term debt, 0.96 percent short-term debt and 0.38 percent preferred stock is reasonable as compared to the proxy group companies and should be used for setting rates in this case.

Q. Does this conclude you direct testimony?

A. Yes, it does.

VERIFICATION

COMMONWEALTH OF MASSACHUSETTS)
) SS:
COUNTY OF SUFFOLK)

The undersigned, Ann E. Bulkley, being duly sworn, deposes and says she is a Principal with The Brattle Group, 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.

Ann E. Bulkley

Ann E. Bulkley

Subscribed and sworn to before me, a Notary Public in and before said County and State, this 20th day of June, 2023.

My Commission Expires: March 22, 2030

JENNIFER M. OSSEN
Notary Public, Commonwealth of Massachusetts
My Commission Expires March 22, 2030

Ann E. Bulkley

PRINCIPAL

Boston 508.981.0866 Ann.Bulkley@brattle.com

With more than 25 years of experience in the energy industry, Ms. Bulkley specializes in regulatory economics for the electric and natural gas sectors, including rate of return, cost of equity, and capital structure issues.

Ms. Bulkley has extensive state and federal regulatory experience, and she has provided expert testimony on the cost of capital in nearly 100 regulatory proceedings before 32 state regulatory commissions and the Federal Energy Regulatory Commission (FERC).

In addition to her regulatory experience, Ms. Bulkley has provided valuation and appraisal services for a variety of purposes, including the sale or acquisition of utility assets, regulated ratemaking, ad valorem tax disputes, and other litigation purposes. In addition, she has experience in the areas of contract and business unit valuation, strategic alliances, market restructuring, and regulatory and litigation support.

Ms. Bulkley is a Certified General Appraiser licensed in the Commonwealth of Massachusetts and the State of New Hampshire.

Prior to joining Brattle, Ms. Bulkley was a Senior Vice President at an economic consultancy and held senior positions at several other consulting firms.

AREAS OF EXPERTISE

- Regulatory Economics, Finance & Rates
- Regulatory Investigations & Enforcement
- Tax Controversy & Transfer Pricing
- Electricity Litigation & Regulatory Disputes
- M&A Litigation

EDUCATION

- **Boston University**
  MA in Economics
- **Simmons College**
  BA in Economics and Finance

PROFESSIONAL EXPERIENCE

- **The Brattle Group (2022–Present)**
  Principal
- **Concentric Energy Advisors, Inc. (2002–2021)**
  Senior Vice President
  Vice President
  Assistant Vice President
  Project Manager
- **Navigant Consulting, Inc. (1997–2002)**
  Project Manager
- **Reed Consulting Group (1995-1997)**
  Consultant- Project Manager
- **Cahners Publishing Company (1995)**
  Economist

SELECTED CONSULTING EXPERIENCE & EXPERT TESTIMONY

REGULATORY ANALYSIS AND RATEMAKING

Have provided a range of advisory services relating to regulatory policy analysis and many aspects of utility ratemaking, with specific services including:

- Cost of capital and return on equity testimony, cost of service and rate design analysis and testimony, development of ratemaking strategies
- Development of merchant function exit strategies

- Analysis and program development to address residual energy supply and/or provider of last resort obligations
- Stranded costs assessment and recovery
  Performance-based ratemaking analysis and design
- Many aspects of traditional utility ratemaking (e.g., rate design, rate base valuation)

COST OF CAPITAL

Have provided expert testimony on the cost of capital and capital structure in nearly 100 regulatory proceedings before state and federal regulatory commissions in the United States.

RATEMAKING

Have assisted several clients with analysis to support investor-owned and municipal utility clients in the preparation of rate cases. Sample engagements include:

- Assisted several investor-owned and municipal clients on cost allocation and rate design issues including the development of expert testimony supporting recommended rate alternatives.
- Worked with Canadian regulatory staff to establish filing requirements for a rate review of a newly regulated electric utility. Along with analyzing and evaluating rate application, attended hearings and conducted investigation of rate application for regulatory staff. And prepared, supported, and defended recommendations for revenue requirements and rates for the company. Additionally, developed rates for gas utility for transportation program and ancillary services.

VALUATION

Have provided valuation services to utility clients, unregulated generators, and private equity clients for a variety of purposes, including ratemaking, fair value, ad valorem tax, litigation and damages, and acquisition. Appraisal practices are consistent with the national standards established by the Uniform Standards of Professional Appraisal Practice.

Representative projects/clients have included:

- Prepared appraisals of electric utility transmission and distribution assets for ad valorem tax purposes.
- Prepared appraisals of several hydroelectric generating facilities for ad valorem tax purposes.
- Conducted appraisals of fossil fuel generating facilities for ad valorem tax purposes.
- Conducted appraisals of generating assets for the purposes of unwinding sale-leaseback agreements.
- For a confidential utility client, prepared valuation of fossil and nuclear generation assets for financing purposes for regulated utility client.

- Prepared a valuation of a portfolio of generation assets for a large energy utility to be used for strategic planning purposes. Valuation approach included an income approach, a real options analysis, and a risk analysis.
- Assisted clients in the restructuring of NUG contracts through the valuation of the underlying assets. Performed analysis to determine the option value of a plant in a competitively priced electricity market following the settlement of the NUG contract.
- Prepared market valuations of several purchase power contracts for large electric utilities in the sale of purchase power contracts. Assignment included an assessment of the regional power market, analysis of the underlying purchase power contracts, and a traditional discounted cash flow valuation approach, as well as a risk analysis. Analyzed bids from potential acquirers using income and risk analysis approached. Prepared an assessment of the credit issues and value at risk for the selling utility.
- Prepared appraisal of a portfolio of generating facilities for a large electric utility to be used for financing purposes.
- Prepared fair value rate base analyses for Northern Indiana Public Service Company for several electric rate proceedings. Valuation approaches used in this project included income, cost, and comparable sales approaches.
- Prepared an appraisal of a fleet of fossil generating assets for a large electric utility to establish the value of assets transferred from utility property.
- Conducted due diligence on an electric transmission and distribution system as part of a buy-side due diligence team.
- Provided analytical support for and prepared appraisal reports of generation assets to be used in ad valorem tax disputes.
- Provided analytical support and prepared testimony regarding the valuation of electric distribution system assets in five communities in a condemnation proceeding.
- Prepared feasibility reports analyzing the expected net benefits resulting from municipal ownership of investor-owned utility operations.
- Prepared independent analyses of proposal for the proposed government condemnation of the investor-owned utilities in Maine and the formation of a public power district.
- Valued purchase power agreements in the transfer of assets to a deregulated electric market.

STRATEGIC AND FINANCIAL ADVISORY SERVICES

Have assisted several clients across North America with analytically-based strategic planning, due diligence, and financial advisory services.

Representative projects include:

- Preparation of feasibility studies for bond issuances for municipal and district steam clients.
- Assisted in the development of a generation strategy for an electric utility. Analyzed various NERC regions to identify potential market entry points. Evaluated potential competitors and alliance partners. Assisted in the development of gas and electric price forecasts. Developed a framework for the implementation of a risk management program.
- Assisted clients in identifying potential joint venture opportunities and alliance partners. Contacted interviewed and evaluated potential alliance candidates based on company-established criteria for several LDCs and marketing companies. Worked with several LDCs and unregulated marketing companies to establish alliances to enter into the retail energy market. Prepared testimony in support of several merger cases and participated in the regulatory process to obtain approval for these mergers.
- Assisted clients in several buy-side due diligence efforts, providing regulatory insight and developing valuation recommendations for acquisitions of both electric and gas properties.

SPONSOR	DATE	CASE/APPLICANT	DOCKET /CASE NO.	SUBJECT
Arizona Corporation Commission				
UNS Electric	11/22	UNS Electric	Docket No. E-04204A-15-0251	Return on Equity
Tucson Electric Power Company	6/22	Tucson Electric Power Company	Docket No. G-01933A-22-0107	Return on Equity
Southwest Gas Corporation	12/21	Southwest Gas Corporation	Docket No. G-01551A-21-0368	Return on Equity
Arizona Public Service Company	10/19	Arizona Public Service Company	Docket No. E-01345A-19-0236	Return on Equity
Tucson Electric Power Company	04/19	Tucson Electric Power Company	Docket No. E-01933A-19-0028	Return on Equity
Tucson Electric Power Company	11/15	Tucson Electric Power Company	Docket No. E-01933A-15-0322	Return on Equity
UNS Electric	05/15	UNS Electric	Docket No. E-04204A-15-0142	Return on Equity
UNS Electric	12/12	UNS Electric	Docket No. E-04204A-12-0504	Return on Equity

SPONSOR	DATE	CASE/APPLICANT	DOCKET /CASE NO.	SUBJECT
Arkansas Public Service Commission				
Oklahoma Gas and Electric Co	10/21	Oklahoma Gas and Electric Co	Docket No. D-18-046-FR	Return on Equity
Arkansas Oklahoma Gas Corporation	10/13	Arkansas Oklahoma Gas Corporation	Docket No. 13-078-U	Return on Equity
California Public Utilities Commission				
PacifiCorp, d/b/a Pacific Power	5/22	PacifiCorp, d/b/a Pacific Power	Docket No. A-22-05-006	Return on Equity
San Jose Water Company	05/21	San Jose Water Company	A2105004	Return on Equity
Colorado Public Utilities Commission				
Public Service Company of Colorado	11/22	Public Service Company of Colorado	Docket No. 22AL-0530E	Return on Equity
Public Service Company of Colorado	01/22	Public Service Company of Colorado	Docket No. 22AL-0046G	Return on Equity
Public Service Company of Colorado	07/21	Public Service Company of Colorado	21AL-0317E	Return on Equity
Public Service Company of Colorado	02/20	Public Service Company of Colorado	20AL-0049G	Return on Equity
Public Service Company of Colorado	05/19	Public Service Company of Colorado	19AL-0268E	Return on Equity
Public Service Company of Colorado	01/19	Public Service Company of Colorado	19AL-0063ST	Return on Equity
Atmos Energy Corporation	05/15	Atmos Energy Corporation	Docket No. 15AL-0299G	Return on Equity
Atmos Energy Corporation	04/14	Atmos Energy Corporation	Docket No. 14AL-0300G	Return on Equity
Atmos Energy Corporation	05/13	Atmos Energy Corporation	Docket No. 13AL-0496G	Return on Equity

SPONSOR	DATE	CASE/APPLICANT	DOCKET /CASE NO.	SUBJECT
Connecticut Public Utilities Regulatory Authority				
United Illuminating	09/22	United Illuminating	Docket No. 22-08-08	Return on Equity
United Illuminating	05/21	United Illuminating	Docket No. 17-12-03RE11	Return on Equity
Connecticut Water Company	01/21	Connecticut Water Company	Docket No. 20-12-30	Return on Equity
Connecticut Natural Gas Corporation	06/18	Connecticut Natural Gas Corporation	Docket No. 18-05-16	Return on Equity
Yankee Gas Services Co. d/b/a Eversource Energy	06/18	Yankee Gas Services Co. d/b/a Eversource Energy	Docket No. 18-05-10	Return on Equity
The Southern Connecticut Gas Company	06/17	The Southern Connecticut Gas Company	Docket No. 17-05-42	Return on Equity
The United Illuminating Company	07/16	The United Illuminating Company	Docket No. 16-06-04	Return on Equity
Federal Energy Regulatory Commission				
Sea Robin Pipeline	12/22	Sea Robin Pipeline	Docket No. RP22-___	Return on Equity
Northern Natural Gas Company	07/22	Northern Natural Gas Company	Docket No. RP22-___	Return on Equity
Transwestern Pipeline Company, LLC	07/22	Transwestern Pipeline Company, LLC	Docket No. RP22-___	Return on Equity
Florida Gas Transmission	02/21	Florida Gas Transmission	Docket No. RP21-441	Return on Equity
TransCanyon	01/21	TransCanyon	Docket No. ER21-1065	Return on Equity
Duke Energy	12/20	Duke Energy	Docket No. EL21-9-000	Return on Equity
Wisconsin Electric Power Company	08/20	Wisconsin Electric Power Company	Docket No. EL20-57-000	Return on Equity

SPONSOR	DATE	CASE/APPLICANT	DOCKET /CASE NO.	SUBJECT
Panhandle Eastern Pipe Line Company, LP	10/19	Panhandle Eastern Pipe Line Company, LP	Docket Nos. RP19-78-000 RP19-78-001	Return on Equity
Panhandle Eastern Pipe Line Company, LP	08/19	Panhandle Eastern Pipe Line Company, LP	Docket Nos. RP19-1523	Return on Equity
Sea Robin Pipeline Company LLC	11/18	Sea Robin Pipeline Company LLC	Docket# RP19-352-000	Return on Equity
Tallgrass Interstate Gas Transmission	10/15	Tallgrass Interstate Gas Transmission	RP16-137	Return on Equity
Idaho Public Utilities Commission				
Intermountain Gas Co	12/22	Intermountain Gas Co	C-INT-G-22-07	Return on Equity
PacifiCorp d/b/a Rocky Mountain Power	05/21	PacifiCorp d/b/a Rocky Mountain Power	Case No. PAC-E-21-07	Return on Equity
Illinois Commerce Commission				
Peoples Gas Light & Coke Company	01/23	Peoples Gas Light & Coke Company	D-23-0069	Return on Equity
North Shore Gas Company	01/23	North Shore Gas Company	D-23-0068	Return on Equity
Illinois American Water	02/22	Illinois American Water	Docket No. 22-0210	Return on Equity
North Shore Gas Company	02/21	North Shore Gas Company	No. 20-0810	Return on Equity
Indiana Utility Regulatory Commission				
Indiana Michigan Power Co.	07/21	Indiana Michigan Power Co.	IURC Cause No. 45576	Return on Equity
Indiana Gas Company Inc.	12/20	Indiana Gas Company Inc.	IURC Cause No. 45468	Return on Equity

SPONSOR	DATE	CASE/APPLICANT	DOCKET /CASE NO.	SUBJECT
Southern Indiana Gas and Electric Company	10/20	Southern Indiana Gas and Electric Company	IURC Cause No. 45447	Return on Equity
Indiana and Michigan American Water Company	09/18	Indiana and Michigan American Water Company	IURC Cause No. 45142	Return on Equity
Indianapolis Power and Light Company	12/17	Indianapolis Power and Light Company	Cause No. 45029	Fair Value
Northern Indiana Public Service Company	09/17	Northern Indiana Public Service Company	Cause No. 44988	Fair Value
Indianapolis Power and Light Company	12/16	Indianapolis Power and Light Company	Cause No.44893	Fair Value
Northern Indiana Public Service Company	10/15	Northern Indiana Public Service Company	Cause No. 44688	Fair Value
Indianapolis Power and Light Company	09/15	Indianapolis Power and Light Company	Cause No. 44576 Cause No. 44602	Fair Value
Kokomo Gas and Fuel Company	09/10	Kokomo Gas and Fuel Company	Cause No. 43942	Fair Value
Northern Indiana Fuel and Light Company, Inc.	09/10	Northern Indiana Fuel and Light Company, Inc.	Cause No. 43943	Fair Value
Iowa Department of Commerce Utilities Board				
MidAmerican Energy Company	01/22	MidAmerican Energy Company	Docket No. RPU-2022-0001	Return on Equity
Iowa-American Water Company	08/20	Iowa-American Water Company	Docket No. RPU-2020-0001	Return on Equity
Kansas Corporation Commission				
Evergy Kansas	04/23	Evergy Kansas	**Docket No. 23-_____-_____-RTS**	Return on Equity

SPONSOR	DATE	CASE/APPLICANT	DOCKET /CASE NO.	SUBJECT
Atmos Energy Corporation	08/15	Atmos Energy Corporation	Docket No. 16-ATMG-079-RTS	Return on Equity
Kentucky Public Service Commission				
Kentucky American Water Company	11/18	Kentucky American Water Company	Docket No. 2018-00358	Return on Equity
Maine Public Utilities Commission				
Central Maine Power	08/22	Central Maine Power	Docket No. 2022-00152	Return on Equity
Central Maine Power	10/18	Central Maine Power	Docket No. 2018-194	Return on Equity
Maryland Public Service Commission				
Maryland American Water Company	06/18	Maryland American Water Company	Case No. 9487	Return on Equity
Massachusetts Appellate Tax Board				
Hopkinton LNG Corporation	03/20	Hopkinton LNG Corporation	Docket No.	Valuation of LNG Facility
FirstLight Hydro Generating Company	06/17	FirstLight Hydro Generating Company	Docket No. F-325471 Docket No. F-325472 Docket No. F-325473 Docket No. F-325474	Valuation of Electric Generation Assets
Massachusetts Department of Public Utilities				
National Grid USA	11/20	Boston Gas Company	DPU 20-120	Return on Equity
Berkshire Gas Company	05/18	Berkshire Gas Company	DPU 18-40	Return on Equity
Unitil Corporation	01/04	Fitchburg Gas and Electric	DTE 03-52	Integrated Resource Plan; Gas Demand Forecast
Michigan Public Service Commission				
Michigan Gas Utilities Corporation	03/23	Michigan Gas Utilities Corporation	Case No. U-21366	Return on Equity

SPONSOR	DATE	CASE/APPLICANT	DOCKET /CASE NO.	SUBJECT
Michigan Gas Utilities Corporation	03/21	Michigan Gas Utilities Corporation	Case No. U-20718	Return on Equity
Wisconsin Electric Power Company	12/11	Wisconsin Electric Power Company	Case No. U-16830	Return on Equity
Michigan Tax Tribunal				
New Covert Generating Co., LLC.	03/18	The Township of New Covert Michigan	MTT Docket No. 000248TT and 16-001888-TT	Valuation of Electric Generation Assets
Covert Township	07/14	New Covert Generating Co., LLC.	Docket No. 399578	Valuation of Electric Generation Assets
Minnesota Public Utilities Commission				
Minnesota Energy Resources Corporation	11/22	Minnesota Energy Resources Corporation	Docket No. G011/GR-22-504	Return on Equity
CenterPoint Energy Resources	11/21	CenterPoint Energy Resources	D-G-008/GR-21-435	Return on Equity
Allete, Inc. d/b/a Minnesota Power	11/21	Allete, Inc. d/b/a Minnesota Power	D-E-015/GR-21-630	Return on Equity
Otter Tail Power Company	11/20	Otter Tail Power Company	E017/GR-20-719	Return on Equity
Allete, Inc. d/b/a Minnesota Power	11/19	Allete, Inc. d/b/a Minnesota Power	E015/GR-19-442	Return on Equity
CenterPoint Energy Resources Corporation d/b/a CenterPoint Energy Minnesota Gas	10/19	CenterPoint Energy Resources Corporation d/b/a CenterPoint Energy Minnesota Gas	G-008/GR-19-524	Return on Equity
Great Plains Natural Gas Co.	09/19	Great Plains Natural Gas Co.	Docket No. G004/GR-19-511	Return on Equity

SPONSOR	DATE	CASE/APPLICANT	DOCKET /CASE NO.	SUBJECT
Minnesota Energy Resources Corporation	10/17	Minnesota Energy Resources Corporation	Docket No. G011/GR-17-563	Return on Equity
Missouri Public Service Commission				
Ameren Missouri	08/22	Ameren Missouri	File No. ER-2022-0337	Return on Equity
Missouri American Water Company	07/22	Missouri American Water Company	Case No. WR-2022-0303 Case No. SR-2022-0304	Return on Equity
Evergy Missouri West	1/22	Evergy Missouri West	File No. ER-2022-0130	Return on Equity
Evergy Missouri Metro	1/22	Evergy Missouri Metro	File No. ER-2022-0129	Return on Equity
Ameren Missouri	03/21	Ameren Missouri	Docket No. ER-2021-0240 Docket No. GR-2021-0241	Return on Equity
Missouri American Water Company	06/20	Missouri American Water Company	Case No. WR-2020-0344 Case No. SR-2020-0345	Return on Equity
Missouri American Water Company	06/17	Missouri American Water Company	Case No. WR-17-0285 Case No. SR-17-0286	Return on Equity
Montana Public Service Commission				
Montana-Dakota Utilities Co.	11/22	Montana-Dakota Utilities Co.	D2022.11.099	Return on Equity
Montana-Dakota Utilities Co.	06/20	Montana-Dakota Utilities Co.	D2020.06.076	Return on Equity

SPONSOR	DATE	CASE/APPLICANT	DOCKET /CASE NO.	SUBJECT
Montana-Dakota Utilities Co.	09/18	Montana-Dakota Utilities Co.	D2018.9.60	Return on Equity
New Hampshire - Board of Tax and Land Appeals				
Public Service Company of New Hampshire d/b/a Eversource Energy	11/19 12/19	Public Service Company of New Hampshire d/b/a Eversource Energy	Master Docket No. 28873-14-15-16-17PT	Valuation of Utility Property and Generating Assets
New Hampshire Public Utilities Commission				
Public Service Company of New Hampshire	05/19	Public Service Company of New Hampshire	DE-19-057	Return on Equity
New Hampshire-Merrimack County Superior Court				
Northern New England Telephone Operations, LLC d/b/a FairPoint Communications, NNE	04/18	Northern New England Telephone Operations, LLC d/b/a FairPoint Communications, NNE	220-2012-CV-1100	Valuation of Utility Property
New Hampshire-Rockingham Superior Court				
Eversource Energy	05/18	Public Service Commission of New Hampshire	218-2016-CV-00899 218-2017-CV-00917	Valuation of Utility Property
New Jersey Board of Public Utilities				
New Jersey American Water Company, Inc.	01/22	New Jersey American Water Company, Inc.	WR22010019	Return on Equity
Public Service Electric and Gas Company	10/20	Public Service Electric and Gas Company	EO18101115	Return on Equity
New Jersey American Water Company, Inc.	12/19	New Jersey American Water Company, Inc.	WR19121516	Return on Equity
Public Service Electric and Gas Company	04/19	Public Service Electric and Gas Company	EO18060629 GO18060630	Return on Equity

SPONSOR	DATE	CASE/APPLICANT	DOCKET /CASE NO.	SUBJECT
Public Service Electric and Gas Company	02/18	Public Service Electric and Gas Company	GR17070776	Return on Equity
Public Service Electric and Gas Company	01/18	Public Service Electric and Gas Company	ER18010029 GR18010030	Return on Equity
New Mexico Public Regulation Commission				
Southwestern Public Service Company	07/19	Southwestern Public Service Company	19-00170-UT	Return on Equity
Southwestern Public Service Company	10/17	Southwestern Public Service Company	Case No. 17-00255-UT	Return on Equity
Southwestern Public Service Company	12/16	Southwestern Public Service Company	Case No. 16-00269-UT	Return on Equity
Southwestern Public Service Company	10/15	Southwestern Public Service Company	Case No. 15-00296-UT	Return on Equity
Southwestern Public Service Company	06/15	Southwestern Public Service Company	Case No. 15-00139-UT	Return on Equity
New York State Department of Public Service				
New York State Electric and Gas Company Rochester Gas and Electric	05/22	New York State Electric and Gas Company Rochester Gas and Electric	22-E-0317 22-G-0318 22-E-0319 22-G-0320	Return on Equity
Corning Natural Gas Corporation	07/21	Corning Natural Gas Corporation	Case No. 21-G-0394	Return on Equity
Central Hudson Gas and Electric Corporation	08/20	Central Hudson Gas and Electric Corporation	Electric 20-E-0428 Gas 20-G-0429	Return on Equity
Niagara Mohawk Power Corporation	07/20	National Grid USA	Case No. 20-E-0380 20-G-0381	Return on Equity
Corning Natural Gas Corporation	02/20	Corning Natural Gas Corporation	Case No. 20-G-0101	Return on Equity

SPONSOR	DATE	CASE/APPLICANT	DOCKET /CASE NO.	SUBJECT
New York State Electric and Gas Company Rochester Gas and Electric	05/19	New York State Electric and Gas Company Rochester Gas and Electric	19-E-0378 19-G-0379 19-E-0380 19-G-0381	Return on Equity
Brooklyn Union Gas Company d/b/a National Grid NY KeySpan Gas East Corporation d/b/a National Grid	04/19	Brooklyn Union Gas Company d/b/a National Grid NY KeySpan Gas East Corporation d/b/a National Grid	19-G-0309 19-G-0310	Return on Equity
Central Hudson Gas and Electric Corporation	07/17	Central Hudson Gas and Electric Corporation	Electric 17-E-0459 Gas 17-G-0460	Return on Equity
Niagara Mohawk Power Corporation	04/17	National Grid USA	Case No. 17-E-0238 17-G-0239	Return on Equity
Corning Natural Gas Corporation	06/16	Corning Natural Gas Corporation	Case No. 16-G-0369	Return on Equity
National Fuel Gas Company	04/16	National Fuel Gas Company	Case No. 16-G-0257	Return on Equity
KeySpan Energy Delivery	01/16	KeySpan Energy Delivery	Case No. 15-G-0058 Case No. 15-G-0059	Return on Equity
New York State Electric and Gas Company Rochester Gas and Electric	05/15	New York State Electric and Gas Company Rochester Gas and Electric	Case No. 15-E-0283 Case No. 15-G-0284 Case No. 15-E-0285 Case No. 15-G-0286	Return on Equity
North Dakota Public Service Commission				
Montana-Dakota Utilities Co.	05/22	Montana-Dakota Utilities Co.	C-PU-22-194	Return on Equity
Montana-Dakota Utilities Co.	08/20	Montana-Dakota Utilities Co.	C-PU-20-379	Return on Equity

SPONSOR	DATE	CASE/APPLICANT	DOCKET /CASE NO.	SUBJECT
Northern States Power Company	12/12	Northern States Power Company	C-PU-12-813	Return on Equity
Northern States Power Company	12/10	Northern States Power Company	C-PU-10-657	Return on Equity
Oklahoma Corporation Commission				
Oklahoma Gas & Electric	12/21	Oklahoma Gas & Electric	Cause No. PUD 202100164	Return on Equity
Arkansas Oklahoma Gas Corporation	01/13	Arkansas Oklahoma Gas Corporation	Cause No. PUD 201200236	Return on Equity
Oregon Public Service Commission				
PacifiCorp d/b/a Pacific Power & Light	03/22	PacifiCorp d/b/a Pacific Power & Light	Docket No. UE-399	Return on Equity
PacifiCorp d/b/a Pacific Power & Light	02/20	PacifiCorp d/b/a Pacific Power & Light	Docket No. UE-374	Return on Equity
Pennsylvania Public Utility Commission				
American Water Works Company Inc.	04/22	Pennsylvania-American Water Company	Docket No. R-2020-3031672 (water) Docket No. R-2020-3031673 (wastewater)	Return on Equity
American Water Works Company Inc.	04/20	Pennsylvania-American Water Company	Docket No. R-2020-3019369 (water) Docket No. R-2020-3019371 (wastewater)	Return on Equity
American Water Works Company Inc.	04/17	Pennsylvania-American Water Company	Docket No. R-2017-2595853	Return on Equity
South Dakota Public Utilities Commission				
MidAmerican Energy Company	05/22	MidAmerican Energy Company	D-NG22-005	Return on Equity

SPONSOR	DATE	CASE/APPLICANT	DOCKET /CASE NO.	SUBJECT
Northern States Power Company	06/14	Northern States Power Company	Docket No. EL14-058	Return on Equity
Texas Public Utility Commission				
Entergy Texas, Inc.	07/22	Entergy Texas, Inc.	D-53719	Return on Equity
Southwestern Public Service Commission	08/19	Southwestern Public Service Commission	Docket No. D-49831	Return on Equity
Southwestern Public Service Company	01/14	Southwestern Public Service Company	Docket No. 42004	Return on Equity
Utah Public Service Commission				
PacifiCorp d/b/a Rocky Mountain Power	05/20	PacifiCorp d/b/a Rocky Mountain Power	Docket No. 20-035-04	Return on Equity
Virginia State Corporation Commission				
Virginia American Water Company, Inc.	11/21	Virginia American Water Company, Inc.	Docket No. PUR-2021-00255	Return on Equity
Virginia American Water Company, Inc.	11/18	Virginia American Water Company, Inc.	Docket No. PUR-2018-00175	Return on Equity
Washington Utilities Transportation Commission				
PacifiCorp d/b/a Pacific Power & Light	03/23	PacifiCorp d/b/a Pacific Power & Light	Docket No. UE-230172	Return on Equity
Cascade Natural Gas Corporation	06/20	Cascade Natural Gas Corporation	Docket No. UG-200568	Return on Equity
PacifiCorp d/b/a Pacific Power & Light	12/19	PacifiCorp d/b/a Pacific Power & Light	Docket No. UE-191024	Return on Equity
Cascade Natural Gas Corporation	04/19	Cascade Natural Gas Corporation	Docket No. UG-190210	Return on Equity
West Virginia Public Service Commission				
West Virginia American Water Company	04/21	West Virginia American Water Company	Case No. 21-02369-W-42T	Return on Equity

SPONSOR	DATE	CASE/APPLICANT	DOCKET /CASE NO.	SUBJECT
West Virginia American Water Company	04/18	West Virginia American Water Company	Case No. 18-0573-W-42T Case No. 18-0576-S-42T	Return on Equity
Wisconsin Public Service Commission				
Wisconsin Electric Power Company and Wisconsin Gas LLC	04/22	Wisconsin Electric Power Company and Wisconsin Gas LLC	Docket No. 05-UR-110	Return on Equity
Wisconsin Public Service Corp.	04/22	Wisconsin Public Service Corp.	6690-UR-127	Return on Equity
Alliant Energy		Alliant Energy		Return on Equity
Wisconsin Electric Power Company and Wisconsin Gas LLC	03/19	Wisconsin Electric Power Company and Wisconsin Gas LLC	Docket No. 05-UR-109	Return on Equity
Wisconsin Public Service Corp.	03/19	Wisconsin Public Service Corp.	6690-UR-126	Return on Equity
Wyoming Public Service Commission				
PacifiCorp d/b/a Rocky Mountain Power	02/23	PacifiCorp d/b/a Rocky Mountain Power	Docket No. 20000-633-ER-23	Return on Equity
PacifiCorp d/b/a Rocky Mountain Power	03/20	PacifiCorp d/b/a Rocky Mountain Power	Docket No. 20000-578-ER-20	Return on Equity
Montana-Dakota Utilities Co.	05/19	Montana-Dakota Utilities Co.	30013-351-GR-19	Return on Equity

CERTIFICATIONS/ACCREDITATIONS

Certified General Appraiser, licensed in the Commonwealth of Massachusetts and the State of New Hampshire

SUMMARY OF ROE ANALYSES RESULTS

	Minimum Growth Rate	Average Growth Rate	Maximum Growth Rate
Constant Growth DCF			
Mean Results:			
30-Day Average	8.13%	9.31%	10.66%
90-Day Average	8.10%	9.28%	10.63%
180-Day Average	8.13%	9.31%	10.65%
Average	8.12%	9.30%	10.65%
Median Results:			
30-Day Average	8.36%	9.95%	10.52%
90-Day Average	8.38%	9.93%	10.51%
180-Day Average	8.41%	9.97%	10.55%
Average	8.39%	9.95%	10.52%

	Current 30-day Average 30-Year Treasury Bond Yield	Near-Term Forecast 30-Year Treasury Yield	Longer-Term Forecast 30-Year Treasury Yield
CAPM:			
Current Value Line Beta	10.49%	10.50%	10.53%
Current Bloomberg Beta	10.07%	10.09%	10.12%
Long-term Avg. Beta	9.76%	9.78%	9.82%
ECAPM:			
Current Value Line Beta	10.87%	10.88%	10.90%
Current Bloomberg Beta	10.55%	10.56%	10.59%
Long-term Avg. Beta	10.32%	10.34%	10.37%

PROXY GROUP SCREENING DATA AND RESULTS - FINAL PROXY GROUP

		[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]
Company	Ticker	Dividends	S&P Credit Rating Between BBB- and AAA	% Regulated Operating Income > 60%	Announced Merger	Covered by More Than 1 Analyst	Positive Growth Rates from at least two sources (Value Line, Yahoo! First Call, and Zacks)	Electric Companies with < 10% Generation	Electric Companies with Water Operations
Atmos Energy Corporation	ATO	Yes	A-	100.00%	No	Yes	Yes	n/a	n/a
NiSource Inc.	NI	Yes	BBB+	100.17%	No	Yes	Yes	n/a	n/a
Northwest Natural Gas Company	NWN	Yes	A+	99.84%	No	Yes	Yes	n/a	n/a
ONE Gas, Inc.	OGS	Yes	A-	100.00%	No	Yes	Yes	n/a	n/a
Spire, Inc.	SR	Yes	A-	86.84%	No	Yes	Yes	n/a	n/a
Eversource Energy	ES	Yes	A-	92.38%	No	Yes	Yes	0.06%	Yes
American States Water Company	AWR	Yes	A+	83.04%	No	Yes	Yes	n/a	n/a
California Water Service Group	CWT	Yes	A+	97.98%	No	Yes	Yes	n/a	n/a
Middlesex Water Company	MSEX	Yes	A	91.18%	No	Yes	Yes	n/a	n/a
SJW Group	SJW	Yes	A-	98.70%	No	Yes	Yes	n/a	n/a
Essential Utilities, Inc.	WTRG	Yes	A	98.55%	No	Yes	Yes	n/a	n/a

Notes:
[1] Source: Bloomberg Professional
[2] Source: Bloomberg Professional
[3] Source: Form 10-K's for 2022, 2021, and 2020
[4] Source: S&P Capital IQ Pro Financial News Releases
[5] Source: Yahoo! Finance and Zacks
[6] Source: Yahoo! Finance, Value Line Investment Survey, and Zacks
[7] Source: S&P Capital IQ Pro
[8] Source: S&P Capital IQ Pro

PROXY GROUP SCREENING DATA AND RESULTS - FINAL PROXY GROUP

		[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]
Company	Ticker	Dividends	S&P Credit Rating Between BBB- and AAA	% Regulated Operating Income > 60%	Announced Merger	Covered by More Than 1 Analyst	Positive Growth Rates from at least two sources (Value Line, Yahoo! First Call, and Zacks)	Electric Companies with < 10% Generation	Electric Companies with Water Operations
Atmos Energy Corporation	ATO	Yes	A-	100.00%	No	Yes	Yes	n/a	n/a
NiSource Inc.	NI	Yes	BBB+	100.17%	No	Yes	Yes	n/a	n/a
Northwest Natural Gas Company	NWN	Yes	A+	99.84%	No	Yes	Yes	n/a	n/a
ONE Gas, Inc.	OGS	Yes	A-	100.00%	No	Yes	Yes	n/a	n/a
Spire, Inc.	SR	Yes	A-	86.84%	No	Yes	Yes	n/a	n/a
Eversource Energy	ES	Yes	A-	92.38%	No	Yes	Yes	0.06%	Yes
American States Water Company	AWR	Yes	A+	83.04%	No	Yes	Yes	n/a	n/a
California Water Service Group	CWT	Yes	A+	97.98%	No	Yes	Yes	n/a	n/a
Middlesex Water Company	MSEX	Yes	A	91.18%	No	Yes	Yes	n/a	n/a
SJW Group	SJW	Yes	A-	98.70%	No	Yes	Yes	n/a	n/a
Essential Utilities, Inc.	WTRG	Yes	A	98.55%	No	Yes	Yes	n/a	n/a

Notes:
[1] Source: Bloomberg Professional
[2] Source: Bloomberg Professional
[3] Source: Form 10-K's for 2022, 2021, and 2020
[4] Source: S&P Capital IQ Pro Financial News Releases
[5] Source: Yahoo! Finance and Zacks
[6] Source: Yahoo! Finance, Value Line Investment Survey, and Zacks
[7] Source: S&P Capital IQ Pro
[8] Source: S&P Capital IQ Pro

30-DAY CONSTANT GROWTH DCF -- KYAWC PROXY GROUP

		[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]
Company	Ticker	Annualized Dividend	Stock Price	Dividend Yield	Expected Dividend Yield	Value Line Earnings Growth	Yahoo! Finance Earnings Growth	Zacks Earnings Growth	Average Growth Rate	Low ROE	Mean ROE	High ROE
Atmos Energy Corporation	ATO	$2.96	$113.21	2.61%	2.71%	7.00%	7.80%	7.50%	7.43%	9.71%	10.15%	10.52%
NiSource Inc.	NI	$1.00	$27.74	3.61%	3.74%	9.50%	6.70%	6.90%	7.70%	10.43%	11.44%	13.28%
Northwest Natural Gas Company	NWN	$1.94	$46.87	4.14%	4.23%	6.50%	2.80%	3.70%	4.33%	7.00%	8.56%	10.77%
ONE Gas, Inc.	OGS	$2.60	$79.34	3.28%	3.36%	6.00%	5.00%	5.00%	5.33%	8.36%	8.70%	9.38%
Spire, Inc.	SR	$2.88	$69.52	4.14%	4.27%	8.00%	n/a	4.20%	6.10%	8.43%	10.37%	12.31%
Eversource Energy	ES	$2.70	$77.89	3.47%	3.58%	6.50%	6.70%	6.30%	6.50%	9.88%	10.08%	10.28%
American States Water Company	AWR	$1.59	$89.39	1.78%	1.83%	6.50%	4.40%	n/a	5.45%	6.22%	7.28%	8.34%
California Water Service Group	CWT	$1.04	$57.99	1.79%	1.87%	6.50%	11.70%	n/a	9.10%	8.35%	10.97%	13.60%
Middlesex Water Company	MSEX	$1.25	$77.63	1.61%	1.64%	5.00%	2.70%	n/a	3.85%	4.33%	5.49%	6.65%
SJW Group	SJW	$1.52	$77.25	1.97%	2.05%	6.00%	9.80%	n/a	7.90%	8.03%	9.95%	11.86%
Essential Utilities, Inc.	WTRG	$1.15	$43.14	2.66%	2.75%	7.50%	6.60%	6.00%	6.70%	8.74%	9.45%	10.26%
Mean				2.82%	2.91%	6.82%	6.42%	5.66%	6.40%	8.13%	9.31%	10.66%
Median				2.66%	2.75%	6.50%	6.65%	6.00%	6.50%	8.36%	9.95%	10.52%

Notes:
[1] Source: Bloomberg Professional
[2] Source: Bloomberg Professional, equals 30-day average as of April 30, 2023
[3] Equals [1] / [2]
[4] Equals [3] x (1 + 0.50 x [8])
[5] Source: Value Line
[6] Source: Yahoo! Finance
[7] Source: Zacks
[8] Equals Average ([5], [6], [7])
[9] Equals [3] x (1 + 0.50 x Minimum ([5], [6], [7]) + Minimum ([5], [6], [7])
[10] Equals [4] + [8]
[11] Equals [3] x (1 + 0.50 x Maximum ([5], [6], [7]) + Maximum ([5], [6], [7])

90-DAY CONSTANT GROWTH DCF -- KYAWC PROXY GROUP

Company	Ticker	[1] Annualized Dividend	[2] Stock Price	[3] Dividend Yield	[4] Expected Dividend Yield	[5] Value Line Earnings Growth	[6] Yahoo! Finance Earnings Growth	[7] Zacks Earnings Growth	[8] Average Growth Rate	[9] Low ROE	[10] Mean ROE	[11] High ROE
Atmos Energy Corporation	ATO	$2.96	$113.63	2.60%	2.70%	7.00%	7.80%	7.50%	7.43%	9.70%	10.13%	10.51%
NiSource Inc.	NI	$1.00	$27.27	3.67%	3.81%	9.50%	6.70%	6.90%	7.70%	10.49%	11.51%	13.34%
Northwest Natural Gas Company	NWN	$1.94	$47.47	4.09%	4.18%	6.50%	2.80%	3.70%	4.33%	6.94%	8.51%	10.72%
ONE Gas, Inc.	OGS	$2.60	$78.77	3.30%	3.39%	6.00%	5.00%	5.00%	5.33%	8.38%	8.72%	9.40%
Spire, Inc.	SR	$2.88	$69.96	4.12%	4.24%	8.00%	n/a	4.20%	6.10%	8.40%	10.34%	12.28%
Eversource Energy	ES	$2.70	$79.10	3.41%	3.52%	6.50%	6.70%	6.30%	6.50%	9.82%	10.02%	10.23%
American States Water Company	AWR	$1.59	$91.32	1.74%	1.79%	6.50%	4.40%	n/a	5.45%	6.18%	7.24%	8.30%
California Water Service Group	CWT	$1.04	$59.32	1.75%	1.83%	6.50%	11.70%	n/a	9.10%	8.31%	10.93%	13.56%
Middlesex Water Company	MSEX	$1.25	$80.46	1.55%	1.58%	5.00%	2.70%	n/a	3.85%	4.27%	5.43%	6.59%
SJW Group	SJW	$1.52	$77.77	1.95%	2.03%	6.00%	9.80%	n/a	7.90%	8.01%	9.93%	11.85%
Essential Utilities, Inc.	WTRG	$1.15	$44.93	2.55%	2.64%	7.50%	6.60%	6.00%	6.70%	8.63%	9.34%	10.15%
Mean				2.80%	2.88%	6.82%	6.42%	5.66%	6.40%	8.10%	9.28%	10.63%
Median				2.60%	2.70%	6.50%	6.65%	6.00%	6.50%	8.38%	9.93%	10.51%

Notes:
[1] Source: Bloomberg Professional
[2] Source: Bloomberg Professional, equals 90-day average as of April 30, 2023
[3] Equals [1] / [2]
[4] Equals [3] x (1 + 0.50 x [8])
[5] Source: Value Line
[6] Source: Yahoo! Finance
[7] Source: Zacks
[8] Equals Average ([5], [6], [7])
[9] Equals [3] x (1 + 0.50 x Minimum ([5], [6], [7]) + Minimum ([5], [6], [7])
[10] Equals [4] + [8]
[11] Equals [3] x (1 + 0.50 x Maximum ([5], [6], [7]) + Maximum ([5], [6], [7])

180-DAY CONSTANT GROWTH DCF -- KYAWC PROXY GROUP

Company	Ticker	[1] Annualized Dividend	[2] Stock Price	[3] Dividend Yield	[4] Expected Dividend Yield	[5] Value Line Earnings Growth	[6] Yahoo! Finance Earnings Growth	[7] Zacks Earnings Growth	[8] Average Growth Rate	[9] Low ROE	[10] Mean ROE	[11] High ROE
Atmos Energy Corporation	ATO	$2.96	$111.86	2.65%	2.74%	7.00%	7.80%	7.50%	7.43%	9.74%	10.18%	10.55%
NiSource Inc.	NI	$1.00	$27.06	3.70%	3.84%	9.50%	6.70%	6.90%	7.70%	10.52%	11.54%	13.37%
Northwest Natural Gas Company	NWN	$1.94	$46.95	4.13%	4.22%	6.50%	2.80%	3.70%	4.33%	6.99%	8.55%	10.77%
ONE Gas, Inc.	OGS	$2.60	$78.04	3.33%	3.42%	6.00%	5.00%	5.00%	5.33%	8.41%	8.75%	9.43%
Spire, Inc.	SR	$2.88	$68.77	4.19%	4.32%	8.00%	n/a	4.20%	6.10%	8.48%	10.42%	12.36%
Eversource Energy	ES	$2.70	$80.27	3.36%	3.47%	6.50%	6.70%	6.30%	6.50%	9.77%	9.97%	10.18%
American States Water Company	AWR	$1.59	$89.58	1.77%	1.82%	6.50%	4.40%	n/a	5.45%	6.21%	7.27%	8.33%
California Water Service Group	CWT	$1.04	$59.24	1.76%	1.84%	6.50%	11.70%	n/a	9.10%	8.31%	10.94%	13.56%
Middlesex Water Company	MSEX	$1.25	$83.83	1.49%	1.52%	5.00%	2.70%	n/a	3.85%	4.21%	5.37%	6.53%
SJW Group	SJW	$1.52	$72.47	2.10%	2.18%	6.00%	9.80%	n/a	7.90%	8.16%	10.08%	12.00%
Essential Utilities, Inc.	WTRG	$1.15	$45.31	2.53%	2.62%	7.50%	6.60%	6.00%	6.70%	8.61%	9.32%	10.13%
Mean				2.82%	2.91%	6.82%	6.42%	5.66%	6.40%	8.13%	9.31%	10.65%
Median				2.65%	2.74%	6.50%	6.65%	6.00%	6.50%	8.41%	9.97%	10.55%

Notes:
[1] Source: Bloomberg Professional
[2] Source: Bloomberg Professional, equals 180-day average as of April 30, 2023
[3] Equals [1] / [2]
[4] Equals [3] x (1 + 0.50 x [8])
[5] Source: Value Line
[6] Source: Yahoo! Finance
[7] Source: Zacks
[8] Equals Average ([5], [6], [7])
[9] Equals [3] x (1 + 0.50 x Minimum ([5], [6], [7]) + Minimum ([5], [6], [7])
[10] Equals [4] + [8]
[11] Equals [3] x (1 + 0.50 x Maximum ([5], [6], [7]) + Maximum ([5], [6], [7])

CAPITAL ASSET PRICING MODEL -- CURRENT RISK-FREE RATE & VL BETA

$$K = Rf + \beta\ (Rm - Rf)$$
$$K = Rf + 0.25 \times (Rm - Rf) + 0.75 \times \beta \times (Rm - Rf)$$

Company	Ticker	[1] Current 30-day average of 30-year U.S. Treasury bond yield	[2] Beta (β)	[3] Market Return (Rm)	[4] Market Risk Premium (Rm − Rf)	[5] CAPM ROE	[6] ECAPM ROE
Atmos Energy Corporation	ATO	3.69%	0.85	12.00%	8.31%	10.76%	11.07%
NiSource Inc.	NI	3.69%	0.90	12.00%	8.31%	11.17%	11.38%
Northwest Natural Gas Company	NWN	3.69%	0.80	12.00%	8.31%	10.34%	10.76%
ONE Gas, Inc.	OGS	3.69%	0.80	12.00%	8.31%	10.34%	10.76%
Spire, Inc.	SR	3.69%	0.85	12.00%	8.31%	10.76%	11.07%
Eversource Energy	ES	3.69%	0.90	12.00%	8.31%	11.17%	11.38%
American States Water Company	AWR	3.69%	0.70	12.00%	8.31%	9.51%	10.13%
California Water Service Group	CWT	3.69%	0.70	12.00%	8.31%	9.51%	10.13%
Middlesex Water Company	MSEX	3.69%	0.75	12.00%	8.31%	9.93%	10.45%
SJW Group	SJW	3.69%	0.80	12.00%	8.31%	10.34%	10.76%
Essential Utilities, Inc.	WTRG	3.69%	0.95	12.00%	8.31%	11.59%	11.69%
Mean						10.49%	10.87%
Median						10.34%	10.76%

Notes:
[1] Source: Bloomberg Professional 30-day average as of April 30, 2023
[2] Source: Value Line reports
[3] Source: Exhibit AEB-6
[4] Equals [3] - [1]
[5] Equals [1] + [2] x [4]
[6] Equals [1] + 0.25 x ([4]) + 0.75 x ([2] x [4])

CAPITAL ASSET PRICING MODEL -- NEAR-TERM PROJECTED RISK-FREE RATE & VL BETA

$$K = Rf + \beta\ (Rm - Rf)$$
$$K = Rf + 0.25 \times (Rm - Rf) + 0.75 \times \beta \times (Rm - Rf)$$

Company	Ticker	[1] Near-term projected 30-year U.S. Treasury bond yield (Q3 2023 - Q3 2024)	[2] Beta (β)	[3] Market Return (Rm)	[4] Market Risk Premium (Rm − Rf)	[5] CAPM ROE	[6] ECAPM ROE
Atmos Energy Corporation	ATO	3.76%	0.85	12.00%	8.24%	10.77%	11.08%
NiSource Inc.	NI	3.76%	0.90	12.00%	8.24%	11.18%	11.39%
Northwest Natural Gas Company	NWN	3.76%	0.80	12.00%	8.24%	10.35%	10.77%
ONE Gas, Inc.	OGS	3.76%	0.80	12.00%	8.24%	10.35%	10.77%
Spire, Inc.	SR	3.76%	0.85	12.00%	8.24%	10.77%	11.08%
Eversource Energy	ES	3.76%	0.90	12.00%	8.24%	11.18%	11.39%
American States Water Company	AWR	3.76%	0.70	12.00%	8.24%	9.53%	10.15%
California Water Service Group	CWT	3.76%	0.70	12.00%	8.24%	9.53%	10.15%
Middlesex Water Company	MSEX	3.76%	0.75	12.00%	8.24%	9.94%	10.46%
SJW Group	SJW	3.76%	0.80	12.00%	8.24%	10.35%	10.77%
Essential Utilities, Inc.	WTRG	3.76%	0.95	12.00%	8.24%	11.59%	11.69%
Mean						10.50%	10.88%
Median						10.35%	10.77%

Notes:
[1] Blue Chip Financial Forecasts, Vol. 42, No. 5, May 2, 2023, at 2
[2] Source: Value Line reports
[3] Source: Exhibit AEB-6
[4] Equals [3] - [1]
[5] Equals [1] + [2] x [4]
[6] Equals [1] + 0.25 x ([4]) + 0.75 x ([2] x [4])

CAPITAL ASSET PRICING MODEL -- LONG-TERM PROJECTED RISK-FREE RATE & VL BETA

$$K = Rf + \beta\ (Rm - Rf)$$
$$K = Rf + 0.25 \times (Rm - Rf) + 0.75 \times \beta \times (Rm - Rf)$$

Company	Ticker	[1] Projected 30-year U.S. Treasury bond yield (2024 - 2028)	[2] Beta (β)	[3] Market Return (Rm)	[4] Market Risk Premium (Rm − Rf)	[5] CAPM ROE	[6] ECAPM ROE
Atmos Energy Corporation	ATO	3.90%	0.85	12.00%	8.10%	10.79%	11.09%
NiSource Inc.	NI	3.90%	0.90	12.00%	8.10%	11.19%	11.40%
Northwest Natural Gas Company	NWN	3.90%	0.80	12.00%	8.10%	10.38%	10.79%
ONE Gas, Inc.	OGS	3.90%	0.80	12.00%	8.10%	10.38%	10.79%
Spire, Inc.	SR	3.90%	0.85	12.00%	8.10%	10.79%	11.09%
Eversource Energy	ES	3.90%	0.90	12.00%	8.10%	11.19%	11.40%
American States Water Company	AWR	3.90%	0.70	12.00%	8.10%	9.57%	10.18%
California Water Service Group	CWT	3.90%	0.70	12.00%	8.10%	9.57%	10.18%
Middlesex Water Company	MSEX	3.90%	0.75	12.00%	8.10%	9.98%	10.48%
SJW Group	SJW	3.90%	0.80	12.00%	8.10%	10.38%	10.79%
Essential Utilities, Inc.	WTRG	3.90%	0.95	12.00%	8.10%	11.60%	11.70%
Mean						10.53%	10.90%
Median						10.38%	10.79%

Notes:
[1] Source: Blue Chip Financial Forecasts, Vol. 41, No. 12, December 2, 2022, at 14
[2] Source: Value Line reports
[3] Source: Exhibit AEB-6
[4] Equals [3] - [1]
[5] Equals [1] + [2] x [4]
[6] Equals [1] + 0.25 x ([4]) + 0.75 x ([2] x [4])

CAPITAL ASSET PRICING MODEL -- CURRENT RISK-FREE RATE & BLOOMBERG BETA

$$K = Rf + \beta\ (Rm - Rf)$$
$$K = Rf + 0.25 \times (Rm - Rf) + 0.75 \times \beta \times (Rm - Rf)$$

Company	Ticker	[1] Current 30-day average of 30-year U.S. Treasury bond yield	[2] Beta (β)	[3] Market Return (Rm)	[4] Market Risk Premium (Rm − Rf)	[5] CAPM ROE	[6] ECAPM ROE
Atmos Energy Corporation	ATO	3.69%	0.76	12.00%	8.31%	10.01%	10.51%
NiSource Inc.	NI	3.69%	0.82	12.00%	8.31%	10.51%	10.88%
Northwest Natural Gas Company	NWN	3.69%	0.70	12.00%	8.31%	9.55%	10.16%
ONE Gas, Inc.	OGS	3.69%	0.79	12.00%	8.31%	10.24%	10.68%
Spire, Inc.	SR	3.69%	0.77	12.00%	8.31%	10.06%	10.55%
Eversource Energy	ES	3.69%	0.81	12.00%	8.31%	10.41%	10.81%
American States Water Company	AWR	3.69%	0.66	12.00%	8.31%	9.19%	9.89%
California Water Service Group	CWT	3.69%	0.70	12.00%	8.31%	9.49%	10.12%
Middlesex Water Company	MSEX	3.69%	0.77	12.00%	8.31%	10.12%	10.59%
SJW Group	SJW	3.69%	0.81	12.00%	8.31%	10.39%	10.79%
Essential Utilities, Inc.	WTRG	3.69%	0.86	12.00%	8.31%	10.81%	11.109%
Mean						10.07%	10.55%
Median						10.12%	10.59%

Notes:
[1] Source: Bloomberg Professional 30-day average as of April 30, 2023
[2] Source: Bloomberg Professional
[3] Source: Exhibit AEB-6
[4] Equals [3] - [1]
[5] Equals [1] + [2] x [4]
[6] Equals [1] + 0.25 x ([4]) + 0.75 x ([2] x [4])

CAPITAL ASSET PRICING MODEL -- NEAR-TERM PROJECTED RISK-FREE RATE & BLOOMBERG BETA

$$K = Rf + \beta\ (Rm - Rf)$$
$$K = Rf + 0.25 \times (Rm - Rf) + 0.75 \times \beta \times (Rm - Rf)$$

		[1]	[2]	[3]	[4]	[5]	[6]
Company	Ticker	Near-term projected 30-year U.S. Treasury bond yield (Q3 2023 - Q3 2024)	Beta (β)	Market Return (Rm)	Market Risk Premium (Rm − Rf)	CAPM ROE	ECAPM ROE
Atmos Energy Corporation	ATO	3.76%	0.76	12.00%	8.24%	10.03%	10.52%
NiSource Inc.	NI	3.76%	0.82	12.00%	8.24%	10.52%	10.89%
Northwest Natural Gas Company	NWN	3.76%	0.70	12.00%	8.24%	9.57%	10.18%
ONE Gas, Inc.	OGS	3.76%	0.79	12.00%	8.24%	10.25%	10.69%
Spire, Inc.	SR	3.76%	0.77	12.00%	8.24%	10.07%	10.56%
Eversource Energy	ES	3.76%	0.81	12.00%	8.24%	10.42%	10.82%
American States Water Company	AWR	3.76%	0.66	12.00%	8.24%	9.21%	9.91%
California Water Service Group	CWT	3.76%	0.70	12.00%	8.24%	9.51%	10.13%
Middlesex Water Company	MSEX	3.76%	0.77	12.00%	8.24%	10.13%	10.60%
SJW Group	SJW	3.76%	0.81	12.00%	8.24%	10.40%	10.80%
Essential Utilities, Inc.	WTRG	3.76%	0.86	12.00%	8.24%	10.82%	11.12%
Mean						10.09%	10.56%
Median						10.13%	10.60%

Notes:
[1] Blue Chip Financial Forecasts, Vol. 42, No. 5, May 2, 2023, at 2
[2] Source: Bloomberg Professional
[3] Source: Exhibit AEB-6
[4] Equals [3] - [1]
[5] Equals [1] + [2] x [4]
[6] Equals [1] + 0.25 x ([4]) + 0.75 x ([2] x [4])

CAPITAL ASSET PRICING MODEL -- LONG-TERM PROJECTED RISK-FREE RATE & BLOOMBERG BETA

$$K = Rf + \beta\ (Rm - Rf)$$
$$K = Rf + 0.25 \times (Rm - Rf) + 0.75 \times \beta \times (Rm - Rf)$$

		[1]	[2]	[3]	[4]	[5]	[6]
Company	Ticker	Projected 30-year U.S. Treasury bond yield (2024 - 2028)	Beta (β)	Market Return (Rm)	Market Risk Premium (Rm − Rf)	CAPM ROE	ECAPM ROE
Atmos Energy Corporation	ATO	3.90%	0.76	12.00%	8.10%	10.06%	10.55%
NiSource Inc.	NI	3.90%	0.82	12.00%	8.10%	10.55%	10.91%
Northwest Natural Gas Company	NWN	3.90%	0.70	12.00%	8.10%	9.61%	10.21%
ONE Gas, Inc.	OGS	3.90%	0.79	12.00%	8.10%	10.28%	10.71%
Spire, Inc.	SR	3.90%	0.77	12.00%	8.10%	10.11%	10.58%
Eversource Energy	ES	3.90%	0.81	12.00%	8.10%	10.45%	10.84%
American States Water Company	AWR	3.90%	0.66	12.00%	8.10%	9.26%	9.94%
California Water Service Group	CWT	3.90%	0.70	12.00%	8.10%	9.55%	10.17%
Middlesex Water Company	MSEX	3.90%	0.77	12.00%	8.10%	10.16%	10.62%
SJW Group	SJW	3.90%	0.81	12.00%	8.10%	10.43%	10.82%
Essential Utilities, Inc.	WTRG	3.90%	0.86	12.00%	8.10%	10.84%	11.13%
Mean						10.12%	10.59%
Median						10.16%	10.62%

Notes:
[1] Source: Blue Chip Financial Forecasts, Vol. 41, No. 12, December 2, 2022, at 14
[2] Source: Bloomberg Professional
[3] Source: Exhibit AEB-6
[4] Equals [3] - [1]
[5] Equals [1] + [2] x [4]
[6] Equals [1] + 0.25 x ([4]) + 0.75 x ([2] x [4])

CAPITAL ASSET PRICING MODEL -- CURRENT RISK-FREE RATE & VALUE LINE LT AVERAGE BETA

$$K = Rf + \beta\ (Rm - Rf)$$
$$K = Rf + 0.25 \times (Rm - Rf) + 0.75 \times \beta \times (Rm - Rf)$$

		[1]	[2]	[3]	[4]	[5]	[6]
Company	Ticker	Current 30-day average of 30-year U.S. Treasury bond yield	Beta (β)	Market Return (Rm)	Market Risk Premium (Rm − Rf)	CAPM ROE	ECAPM ROE
Atmos Energy Corporation	ATO	3.69%	0.74	12.00%	8.31%	9.84%	10.38%
NiSource Inc.	NI	3.69%	0.74	12.00%	8.31%	9.82%	10.37%
Northwest Natural Gas Company	NWN	3.69%	0.70	12.00%	8.31%	9.51%	10.13%
ONE Gas, Inc.	OGS	3.69%	0.73	12.00%	8.31%	9.75%	10.31%
Spire, Inc.	SR	3.69%	0.73	12.00%	8.31%	9.76%	10.32%
Eversource Energy	ES	3.69%	0.74	12.00%	8.31%	9.87%	10.41%
American States Water Company	AWR	3.69%	0.69	12.00%	8.31%	9.43%	10.07%
California Water Service Group	CWT	3.69%	0.71	12.00%	8.31%	9.55%	10.16%
Middlesex Water Company	MSEX	3.69%	0.74	12.00%	8.31%	9.80%	10.35%
SJW Group	SJW	3.69%	0.76	12.00%	8.31%	9.97%	10.48%
Essential Utilities, Inc.	WTRG	3.69%	0.77	12.00%	8.31%	10.09%	10.57%
Mean						9.76%	10.32%
Median						9.80%	10.35%

Notes:
[1] Source: Bloomberg Professional 30-day average as of April 30, 2023
[2] Source: Exhibit AEB-5
[3] Source: Exhibit AEB-6
[4] Equals [3] - [1]
[5] Equals [1] + [2] x [4]
[6] Equals [1] + 0.25 x ([4]) + 0.75 x ([2] x [4])

CAPITAL ASSET PRICING MODEL -- NEAR-TERM PROJECTED RISK-FREE RATE & VALUE LINE LT AVERAGE BETA

$$K = Rf + \beta\ (Rm - Rf)$$
$$K = Rf + 0.25 \times (Rm - Rf) + 0.75 \times \beta \times (Rm - Rf)$$

		[1]	[2]	[3]	[4]	[5]	[6]
Company	Ticker	Near-term projected 30-year U.S. Treasury bond yield (Q3 2023 - Q3 2024)	Beta (β)	Market Return (Rm)	Market Risk Premium (Rm − Rf)	CAPM ROE	ECAPM ROE
Atmos Energy Corporation	ATO	3.76%	0.74	12.00%	8.24%	9.86%	10.40%
NiSource Inc.	NI	3.76%	0.74	12.00%	8.24%	9.84%	10.38%
Northwest Natural Gas Company	NWN	3.76%	0.70	12.00%	8.24%	9.53%	10.15%
ONE Gas, Inc.	OGS	3.76%	0.73	12.00%	8.24%	9.77%	10.33%
Spire, Inc.	SR	3.76%	0.73	12.00%	8.24%	9.78%	10.33%
Eversource Energy	ES	3.76%	0.74	12.00%	8.24%	9.89%	10.42%
American States Water Company	AWR	3.76%	0.69	12.00%	8.24%	9.45%	10.09%
California Water Service Group	CWT	3.76%	0.71	12.00%	8.24%	9.57%	10.18%
Middlesex Water Company	MSEX	3.76%	0.74	12.00%	8.24%	9.82%	10.37%
SJW Group	SJW	3.76%	0.76	12.00%	8.24%	9.98%	10.49%
Essential Utilities, Inc.	WTRG	3.76%	0.77	12.00%	8.24%	10.11%	10.58%
Mean						9.78%	10.34%
Median						9.82%	10.37%

Notes:
[1] Blue Chip Financial Forecasts, Vol. 42, No. 5, May 2, 2023, at 2
[2] Source: Exhibit AEB-5
[3] Source: Exhibit AEB-6
[4] Equals [3] - [1]
[5] Equals [1] + [2] x [4]
[6] Equals [1] + 0.25 x ([4]) + 0.75 x ([2] x [4])

CAPITAL ASSET PRICING MODEL -- LONG-TERM PROJECTED RISK-FREE RATE & VALUE LINE LT AVERAGE BETA

$$K = Rf + \beta\ (Rm - Rf)$$
$$K = Rf + 0.25 \times (Rm - Rf) + 0.75 \times \beta \times (Rm - Rf)$$

		[1]	[2]	[3]	[4]	[5]	[6]
Company	Ticker	Projected 30-year U.S. Treasury bond yield (2024 - 2028)	Beta (β)	Market Return (Rm)	Market Risk Premium (Rm − Rf)	CAPM ROE	ECAPM ROE
Atmos Energy Corporation	ATO	3.90%	0.74	12.00%	8.10%	9.90%	10.42%
NiSource Inc.	NI	3.90%	0.74	12.00%	8.10%	9.88%	10.41%
Northwest Natural Gas Company	NWN	3.90%	0.70	12.00%	8.10%	9.57%	10.18%
ONE Gas, Inc.	OGS	3.90%	0.73	12.00%	8.10%	9.80%	10.35%
Spire, Inc.	SR	3.90%	0.73	12.00%	8.10%	9.82%	10.36%
Eversource Energy	ES	3.90%	0.74	12.00%	8.10%	9.93%	10.45%
American States Water Company	AWR	3.90%	0.69	12.00%	8.10%	9.49%	10.12%
California Water Service Group	CWT	3.90%	0.71	12.00%	8.10%	9.61%	10.21%
Middlesex Water Company	MSEX	3.90%	0.74	12.00%	8.10%	9.86%	10.39%
SJW Group	SJW	3.90%	0.76	12.00%	8.10%	10.02%	10.51%
Essential Utilities, Inc.	WTRG	3.90%	0.77	12.00%	8.10%	10.14%	10.61%
Mean						9.82%	10.37%
Median						9.86%	10.39%

Notes:
[1] Source: Blue Chip Financial Forecasts, Vol. 41, No. 12, December 2, 2022, at 14
[2] Source: Exhibit AEB-5
[3] Source: Exhibit AEB-6
[4] Equals [3] - [1]
[5] Equals [1] + [2] x [4]
[6] Equals [1] + 0.25 x ([4]) + 0.75 x ([2] x [4])

HISTORICAL BETA - 2013 - 2022

		[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]
Company	Ticker	12/31/2013	12/31/2014	12/31/2015	12/31/2016	12/31/2017	12/31/2018	12/31/2019	12/31/2020	12/31/2021	12/31/2022	Average
Atmos Energy Corporation	ATO	0.80	0.80	0.80	0.70	0.70	0.60	0.60	0.80	0.80	0.80	0.74
NiSource Inc.	NI	0.85	0.85	NMF	NMF	0.60	0.50	0.55	0.85	0.85	0.85	0.74
Northwest Natural Gas Company	NWN	0.65	0.70	0.65	0.65	0.70	0.60	0.60	0.80	0.85	0.80	0.70
ONE Gas, Inc.	OGS				0.70	0.70	0.65	0.65	0.80	0.80	0.80	0.73
Spire, Inc.	SR	0.65	0.70	0.70	0.70	0.70	0.65	0.65	0.85	0.85	0.85	0.73
Eversource Energy	ES			0.75	0.70	0.65	0.60	0.55	0.90	0.90	0.90	0.74
American States Water Company	AWR	0.65	0.70	0.70	0.75	0.80	0.70	0.65	0.65	0.65	0.65	0.69
California Water Service Group	CWT	0.60	0.70	0.75	0.75	0.80	0.70	0.70	0.65	0.70	0.70	0.71
Middlesex Water Company	MSEX	0.75	0.70	0.70	0.75	0.80	0.75	0.75	0.75	0.70	0.70	0.74
SJW Group	SJW	0.85	0.85	0.75	0.75	0.70	0.60	0.60	0.85	0.80	0.80	0.76
Essential Utilities, Inc.	WTRG	0.60	0.70	0.75	0.70	0.75	0.70	0.65	0.95	0.95	0.95	0.77
Mean		0.71	0.74	0.73	0.72	0.72	0.64	0.63	0.80	0.80	0.80	0.73

Notes:
[1] Value Line, dated December 26, 2013.
[2] Value Line, dated December 31, 2014.
[3] Value Line, dated December 30, 2015.
[4] Value Line, dated December 29, 2016.
[5] Value Line, dated December 28, 2017.
[6] Value Line, dated December 27, 2018.
[7] Value Line, dated December 26, 2019.
[8] Value Line, dated December 30, 2020.
[9] Value Line, dated December 29, 2021.
[10] Value Line, dated December 30, 2022.
[11] Average ([1] - [10])

MARKET RISK PREMIUM DERIVED FROM ANALYSTS' LONG-TERM GROWTH ESTIMATES

[1] Estimated Weighted Average Dividend Yield	1.73%
[2] Estimated Weighted Average Long-Term Growth Rate	10.19%
[3] S&P 500 Estimated Required Market Return	12.00%

STANDARD AND POOR'S 500 INDEX

		[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]
Name	Ticker	Shares Outst'g	Price	Market Capitalization	Weight in Index	Estimated Dividend Yield	Cap-Weighted Dividend Yield	Value Line Long-Term Growth Est.	Cap-Weighted Long-Term Growth Est.
LyondellBasell Industries NV	LYB	325.274	94.61	30,774.17	0.11%	5.03%	0.01%	3.00%	0.00%
American Express Co	AXP	743.241	161.34	119,914.50	0.41%	1.49%	0.01%	10.00%	0.04%
Verizon Communications Inc	VZ	4203.991	38.83	163,240.97	0.56%	6.72%	0.04%	2.50%	0.01%
Broadcom Inc	AVGO	416.924	626.5	261,202.89		2.94%		30.00%	
Boeing Co/The	BA	601.594	206.78	124,397.61					
Caterpillar Inc	CAT	516.345	218.8	112,976.29	0.39%	2.19%	0.01%	10.50%	0.04%
JPMorgan Chase & Co	JPM	2931.461	138.24	405,245.17	1.39%	2.89%	0.04%	5.00%	0.07%
Chevron Corp	CVX	1894.643	168.58	319,398.92		3.58%		45.00%	
Coca-Cola Co/The	KO	4324.578	64.15	277,421.68	0.95%	2.87%	0.03%	8.00%	0.08%
AbbVie Inc	ABBV	1769.4	151.12	267,391.73	0.92%	3.92%	0.04%	2.00%	0.02%
Walt Disney Co/The	DIS	1826.825	102.5	187,249.56				65.00%	
FleetCor Technologies Inc	FLT	73.828	213.92	15,793.29	0.05%			10.50%	0.01%
Extra Space Storage Inc	EXR	135.007	152.04	20,526.46	0.07%	4.26%	0.00%	6.50%	0.00%
Exxon Mobil Corp	XOM	4059.294	118.34	480,376.85		3.08%			
Phillips 66	PSX	460.913	99	45,630.39		4.24%			
General Electric Co	GE	1088.96	98.97	107,774.37		0.32%		21.00%	
HP Inc	HPQ	985.328	29.71	29,274.09	0.10%	3.53%	0.00%	12.50%	0.01%
Home Depot Inc/The	HD	1012.669	300.54	304,347.54	1.05%	2.78%	0.03%	9.00%	0.09%
Monolithic Power Systems Inc	MPWR	47.305	461.97	21,853.49		0.87%		21.00%	
International Business Machines Corp	IBM	908.045	126.41	114,785.97	0.39%	5.25%	0.02%	3.00%	0.01%
Johnson & Johnson	JNJ	2598.734	163.7	425,412.76	1.46%	2.91%	0.04%	8.00%	0.12%
McDonald's Corp	MCD	730.032	295.75	215,906.96	0.74%	2.06%	0.02%	9.00%	0.07%
Merck & Co Inc	MRK	2537.694	115.47	293,027.53	1.01%	2.53%	0.03%	8.50%	0.09%
3M Co	MMM	551.672	106.22	58,598.60	0.20%	5.65%	0.01%	4.50%	0.01%
American Water Works Co Inc	AWK	194.644	148.25	28,855.97	0.10%	1.91%	0.00%	3.00%	0.00%
Bank of America Corp	BAC	7972.4	29.28	233,431.87	0.80%	3.01%	0.02%	8.50%	0.07%
Pfizer Inc	PFE	5644.402	38.89	219,510.79	0.76%	4.22%	0.03%	2.00%	0.02%
Procter & Gamble Co/The	PG	2356.969	156.38	368,582.81	1.27%	2.41%	0.03%	5.50%	0.07%
AT&T Inc	T	7149	17.67	126,322.83	0.43%	6.28%	0.03%	1.00%	0.00%
Travelers Cos Inc/The	TRV	230.977	181.14	41,839.17	0.14%	2.21%	0.00%	7.50%	0.01%
Raytheon Technologies Corp	RTX	1461.142	99.9	145,968.09	0.50%	2.36%	0.01%	14.00%	0.07%
Analog Devices Inc	ADI	505.852	179.88	90,992.66	0.31%	1.91%	0.01%	11.50%	0.04%
Walmart Inc	WMT	2697.347	150.97	407,218.48	1.40%	1.51%	0.02%	6.50%	0.09%
Cisco Systems Inc	CSCO	4095.823	47.25	193,527.64	0.67%	3.30%	0.02%	8.50%	0.06%
Intel Corp	INTC	4171	31.06	129,551.26		1.61%			
General Motors Co	GM	1390.123	33.04	45,929.66	0.16%	1.09%	0.00%	8.50%	0.01%
Microsoft Corp	MSFT	7435.488	307.26	2,284,628.04	7.86%	0.89%	0.07%	15.00%	1.18%
Dollar General Corp	DG	219.108	221.46	48,523.66	0.17%	1.07%	0.00%	7.00%	0.01%
Cigna Group/The	CI	297.033	253.29	75,235.49	0.26%	1.94%	0.01%	10.00%	0.03%
Kinder Morgan Inc	KMI	2241.214	17.15	38,436.82	0.13%	6.59%	0.01%	18.50%	0.02%
Citigroup Inc	C	1946.8	47.07	91,635.88	0.32%	4.33%	0.01%	3.50%	0.01%
American International Group Inc	AIG	733.668	53.04	38,913.75	0.13%	2.41%	0.00%	6.50%	0.01%
Altria Group Inc	MO	1785.04	47.51	84,807.25	0.29%	7.91%	0.02%	6.00%	0.02%
HCA Healthcare Inc	HCA	275.19	287.33	79,070.34	0.27%	0.84%	0.00%	12.50%	0.03%
International Paper Co	IP	347.057	33.11	11,491.06	0.04%	5.59%	0.00%	9.50%	0.00%
Hewlett Packard Enterprise Co	HPE	1295.869	14.32	18,556.84	0.06%	3.35%	0.00%	7.50%	0.00%
Abbott Laboratories	ABT	1737.946	110.47	191,990.89	0.66%	1.85%	0.01%	6.50%	0.04%
Aflac Inc	AFL	605.952	69.85	42,325.75	0.15%	2.41%	0.00%	8.00%	0.01%
Air Products and Chemicals Inc	APD	222.083	294.36	65,372.35	0.22%	2.38%	0.01%	10.50%	0.02%
Royal Caribbean Cruises Ltd	RCL	255.603	65.43	16,724.10					
Hess Corp	HES	307.051	145.06	44,540.82		1.21%			
Archer-Daniels-Midland Co	ADM	544.635	78.08	42,525.10	0.15%	2.31%	0.00%	7.50%	0.01%
Automatic Data Processing Inc	ADP	413.5	220	90,970.00	0.31%	2.27%	0.01%	10.00%	0.03%
Verisk Analytics Inc	VRSK	144.457	194.11	28,040.55	0.10%	0.70%	0.00%	13.00%	0.01%
AutoZone Inc	AZO	18.398	2663.31	48,999.58	0.17%			13.00%	0.02%
Avery Dennison Corp	AVY	81.109	174.48	14,151.90	0.05%	1.86%	0.00%	9.50%	0.00%
Enphase Energy Inc	ENPH	137.044	164.2	22,502.62				24.50%	
MSCI Inc	MSCI	80.063	482.45	38,626.39	0.13%	1.14%	0.00%	12.50%	0.02%
Ball Corp	BALL	314.395	53.18	16,719.53		1.50%		21.50%	
Ceridian HCM Holding Inc	CDAY	152.697	63.48	9,693.21					
Carrier Global Corp	CARR	834.838	41.82	34,912.93	0.12%	1.77%	0.00%	13.00%	0.02%
Bank of New York Mellon Corp/The	BK	789.134	42.59	33,609.22	0.12%	3.47%	0.00%	6.00%	0.01%
Otis Worldwide Corp	OTIS	413.291	85.3	35,253.72	0.12%	1.59%	0.00%	10.00%	0.01%
Baxter International Inc	BAX	505.85	47.68	24,118.93	0.08%	2.43%	0.00%	7.00%	0.01%
Becton Dickinson & Co	BDX	283.902	264.31	75,038.14	0.26%	1.38%	0.00%	4.50%	0.01%
Berkshire Hathaway Inc	BRK/B	1298.19	328.55	426,520.32	1.47%			6.00%	0.09%
Best Buy Co Inc	BBY	218.046	74.52	16,248.79	0.06%	4.94%	0.00%	3.00%	0.00%
Boston Scientific Corp	BSX	1437.328	52.12	74,913.54	0.26%			15.50%	0.04%
Bristol-Myers Squibb Co	BMY	2100.847	66.77	140,273.55		3.41%			

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Brown-Forman Corp	BF/B	310.001	65.09	20,177.97	0.07%	1.26%	0.00%	12.50%	0.01%
Coterra Energy Inc	CTRA	765.504	25.6	19,596.90		8.91%			
Campbell Soup Co	CPB	299.476	54.3	16,261.55	0.06%	2.73%	0.00%	5.00%	0.00%
Hilton Worldwide Holdings Inc	HLT	264.627	144.02	38,111.58		0.42%			
Carnival Corp	CCL	1116.014	9.21	10,278.49					
Qorvo Inc	QRVO	99.889	92.08	9,197.78	0.03%			14.50%	0.00%
UDR Inc	UDR	329.173	41.33	13,604.72	0.05%	4.06%	0.00%	17.00%	0.01%
Clorox Co/The	CLX	123.525	165.62	20,458.21	0.07%	2.85%	0.00%	7.00%	0.00%
Paycom Software Inc	PAYC	60.306	290.37	17,511.05				21.00%	
CMS Energy Corp	CMS	291.656	62.26	18,158.50	0.06%	3.13%	0.00%	6.50%	0.00%
Newell Brands Inc	NWL	414.1	12.15	5,031.32		7.57%			
Colgate-Palmolive Co	CL	829.568	79.8	66,199.53	0.23%	2.41%	0.01%	6.00%	0.01%
EPAM Systems Inc	EPAM	57.857	282.44	16,341.13				20.50%	
Comerica Inc	CMA	131.67	43.37	5,710.53	0.02%	6.55%	0.00%	8.50%	0.00%
Conagra Brands Inc	CAG	476.907	37.96	18,103.39	0.06%	3.48%	0.00%	4.00%	0.00%
Consolidated Edison Inc	ED	346.438	98.47	34,113.75	0.12%	3.29%	0.00%	4.50%	0.01%
Corning Inc	GLW	850.13	33.22	28,241.32	0.10%	3.37%	0.00%	17.50%	0.02%
Cummins Inc	CMI	141.54	235.04	33,267.56	0.11%	2.67%	0.00%	8.50%	0.01%
Caesars Entertainment Inc	CZR	215.195	45.29	9,746.18					
Danaher Corp	DHR	737.899	236.91	174,815.65	0.60%	0.46%	0.00%	16.00%	0.10%
Target Corp	TGT	460.364	157.75	72,622.42	0.25%	2.74%	0.01%	11.00%	0.03%
Deere & Co	DE	296.322	378.02	112,015.64	0.39%	1.32%	0.01%	12.50%	0.05%
Dominion Energy Inc	D	835.251	57.14	47,726.24	0.16%	4.67%	0.01%	4.00%	0.01%
Dover Corp	DOV	139.851	146.16	20,440.62	0.07%	1.38%	0.00%	9.00%	0.01%
Alliant Energy Corp	LNT	251.138	55.14	13,847.75	0.05%	3.28%	0.00%	6.00%	0.00%
Steel Dynamics Inc	STLD	171.578	103.95	17,835.53	0.06%	1.64%	0.00%	2.00%	0.00%
Duke Energy Corp	DUK	770.648	98.88	76,201.67	0.26%	4.07%	0.01%	5.00%	0.01%
Regency Centers Corp	REG	171.308	61.43	10,523.45	0.04%	4.23%	0.00%	10.50%	0.00%
Eaton Corp PLC	ETN	398	167.12	66,513.76	0.23%	2.06%	0.00%	12.00%	0.03%
Ecolab Inc	ECL	284.669	167.84	47,778.84	0.16%	1.26%	0.00%	6.00%	0.01%
PerkinElmer Inc	PKI	126.412	130.49	16,495.50	0.06%	0.21%	0.00%	4.00%	0.00%
Emerson Electric Co	EMR	571.4	83.26	47,574.76	0.16%	2.50%	0.00%	6.50%	0.01%
EOG Resources Inc	EOG	587.724	119.47	70,215.39		2.76%		26.00%	
Aon PLC	AON	204.246	325.18	66,416.71	0.23%	0.76%	0.00%	7.50%	0.02%
Entergy Corp	ETR	212.091	106.4984	22,587.35	0.08%	4.02%	0.00%	0.50%	0.00%
Equifax Inc	EFX	122.644	208.38	25,556.56	0.09%	0.75%	0.00%	7.00%	0.01%
EQT Corp	EQT	361.643	34.84	12,599.64		1.72%			
IQVIA Holdings Inc	IQV	185.549	188.23	34,925.89	0.12%			14.50%	0.02%
Gartner Inc	IT	79.061	302.46	23,912.79	0.08%			17.50%	0.01%
FedEx Corp	FDX	251.352	227.78	57,252.96	0.20%	2.21%	0.00%	9.00%	0.02%
FMC Corp	FMC	125.142	123.58	15,465.05	0.05%	1.88%	0.00%	10.50%	0.01%
Brown & Brown Inc	BRO	283.644	64.39	18,263.84	0.06%	0.71%	0.00%	8.00%	0.01%
Ford Motor Co	F	3929.108	11.88	46,677.80		5.05%		27.50%	
NextEra Energy Inc	NEE	2023.422	76.63	155,054.83	0.53%	2.44%	0.01%	10.00%	0.05%
Franklin Resources Inc	BEN	500.358	26.88	13,449.62	0.05%	4.46%	0.00%	2.00%	0.00%
Garmin Ltd	GRMN	191.359	98.17	18,785.71	0.06%			5.00%	0.00%
Freeport-McMoRan Inc	FCX	1433.255	37.91	54,334.70	0.19%	1.58%	0.00%	18.50%	0.03%
Dexcom Inc	DXCM	387.636	121.34	47,035.75					
General Dynamics Corp	GD	274.336	218.34	59,898.52	0.21%	2.42%	0.00%	9.50%	0.02%
General Mills Inc	GIS	587.354	88.63	52,057.19	0.18%	2.44%	0.00%	4.50%	0.01%
Genuine Parts Co	GPC	140.516	168.31	23,650.25	0.08%	2.26%	0.00%	10.50%	0.01%
Atmos Energy Corp	ATO	143.163	114.14	16,340.62	0.06%	2.59%	0.00%	7.00%	0.00%
WW Grainger Inc	GWW	50.167	695.57	34,894.66	0.12%	1.07%	0.00%	9.00%	0.01%
Halliburton Co	HAL	902.195	32.75	29,546.89		1.95%		30.00%	
L3Harris Technologies Inc	LHX	189.453	195.15	36,971.75	0.13%	2.34%	0.00%	17.00%	0.02%
Healthpeak Properties Inc	PEAK	546.996	21.97	12,017.50	0.04%	5.46%	0.00%	14.50%	0.01%
Insulet Corp	PODD	69.694	318.04	22,165.48					
Catalent Inc	CTLT	180.09	50.12	9,026.11				21.00%	
Fortive Corp	FTV	353.55	63.09	22,305.47	0.08%	0.44%	0.00%	12.00%	0.01%
Hershey Co/The	HSY	147.285	273.06	40,217.64	0.14%	1.52%	0.00%	8.50%	0.01%
Synchrony Financial	SYF	428.571	29.28	12,548.56	0.04%	3.14%	0.00%	9.50%	0.00%
Hormel Foods Corp	HRL	546.533	40.44	22,101.79	0.08%	2.72%	0.00%	7.50%	0.01%
Arthur J Gallagher & Co	AJG	214.2	208.06	44,566.45	0.15%	1.06%	0.00%	18.50%	0.03%
Mondelez International Inc	MDLZ	1361.853	76.72	104,481.36	0.36%	2.01%	0.01%	10.00%	0.04%
CenterPoint Energy Inc	CNP	629.432	30.47	19,178.79	0.07%	2.49%	0.00%	6.50%	0.00%
Humana Inc	HUM	124.945	530.49	66,282.07	0.23%	0.67%	0.00%	12.50%	0.03%
Willis Towers Watson PLC	WTW	106.413	231.6	24,645.25	0.08%	1.45%	0.00%	8.50%	0.01%
Illinois Tool Works Inc	ITW	304.821	241.94	73,748.39	0.25%	2.17%	0.01%	11.00%	0.03%
CDW Corp/DE	CDW	135.136	169.59	22,917.71	0.08%	1.39%	0.00%	8.50%	0.01%
Trane Technologies PLC	TT	228.05	185.81	42,373.97		1.61%			
Interpublic Group of Cos Inc/The	IPG	386.033	35.73	13,792.96	0.05%	3.47%	0.00%	10.00%	0.00%
International Flavors & Fragrances Inc	IFF	255.067	96.96	24,731.30	0.09%	3.34%	0.00%	6.00%	0.01%
Generac Holdings Inc	GNRC	61.887	102.22	6,326.09	0.02%			19.00%	0.00%
NXP Semiconductors NV	NXPI	259.735	163.74	42,529.01	0.15%	2.48%	0.00%	11.00%	0.02%
Kellogg Co	K	342.668	69.77	23,907.95	0.08%	3.38%	0.00%	3.50%	0.00%
Broadridge Financial Solutions Inc	BR	117.693	145.41	17,113.74	0.06%	1.99%	0.00%	8.50%	0.01%
Kimberly-Clark Corp	KMB	337.381	144.89	48,883.13	0.17%	3.26%	0.01%	7.00%	0.01%
Kimco Realty Corp	KIM	619.892	19.19	11,895.73	0.04%	4.79%	0.00%	11.00%	0.00%
Oracle Corp	ORCL	2699.802	94.72	255,725.25	0.88%	1.69%	0.01%	10.00%	0.09%
Kroger Co/The	KR	717.468	48.63	34,890.47	0.12%	2.14%	0.00%	6.00%	0.01%

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Lennar Corp	LEN	253.773	112.81	28,628.13	0.10%	1.33%	0.00%	8.50%	0.01%
Eli Lilly & Co	LLY	949.273	395.86	375,779.21	1.29%	1.14%	0.01%	11.50%	0.15%
Bath & Body Works Inc	BBWI	228.951	35.1	8,036.18		2.28%		26.50%	
Charter Communications Inc	CHTR	150.575	368.7	55,517.00	0.19%			15.50%	0.03%
Lincoln National Corp	LNC	169.538	21.73	3,684.06		8.28%		30.50%	
Loews Corp	L	230.876	57.57	13,291.53	0.05%	0.43%	0.00%	18.50%	0.01%
Lowe's Cos Inc	LOW	596.356	207.83	123,940.67	0.43%	2.02%	0.01%	11.00%	0.05%
IDEX Corp	IEX	75.576	206.32	15,592.84	0.05%	1.16%	0.00%	8.00%	0.00%
Marsh & McLennan Cos Inc	MMC	494.721	180.19	89,143.78	0.31%	1.31%	0.00%	11.00%	0.03%
Masco Corp	MAS	225.089	53.51	12,044.51	0.04%	2.13%	0.00%	8.00%	0.00%
S&P Global Inc	SPGI	320.8	362.58	116,315.66	0.40%	0.99%	0.00%	6.50%	0.03%
Medtronic PLC	MDT	1330.424	90.95	121,002.06	0.42%	2.99%	0.01%	7.50%	0.03%
Viatris Inc	VTRS	1196.814	9.33	11,166.27		5.14%			
CVS Health Corp	CVS	1279.829	73.31	93,824.26	0.32%	3.30%	0.01%	5.00%	0.02%
DuPont de Nemours Inc	DD	459.016	69.72	32,002.60	0.11%	2.07%	0.00%	10.00%	0.01%
Micron Technology Inc	MU	1094.394	64.36	70,435.20	0.24%	0.71%	0.00%	9.50%	0.02%
Motorola Solutions Inc	MSI	167.467	291.4	48,799.88	0.17%	1.21%	0.00%	10.50%	0.02%
Cboe Global Markets Inc	CBOE	105.743	139.7	14,772.30	0.05%	1.43%	0.00%	12.50%	0.01%
Laboratory Corp of America Holdings	LH	88.501	226.71	20,064.06	0.07%	1.27%	0.00%	1.50%	0.00%
Newmont Corp	NEM	794.712	47.4	37,669.35	0.13%	3.38%	0.00%	8.00%	0.01%
NIKE Inc	NKE	1232.092	126.72	156,130.70		1.07%		23.00%	
NiSource Inc	NI	412.508	28.46	11,739.98	0.04%	3.51%	0.00%	9.50%	0.00%
Norfolk Southern Corp	NSC	227.64	203.03	46,217.75	0.16%	2.66%	0.00%	10.00%	0.02%
Principal Financial Group Inc	PFG	242.98	74.69	18,148.18	0.06%	3.43%	0.00%	6.50%	0.00%
Eversource Energy	ES	348.673	77.61	27,060.51	0.09%	3.48%	0.00%	6.50%	0.01%
Northrop Grumman Corp	NOC	151.859	461.27	70,048.00	0.24%	1.50%	0.00%	9.50%	0.02%
Wells Fargo & Co	WFC	3763.2	39.75	149,587.20	0.51%	3.02%	0.02%	12.00%	0.06%
Nucor Corp	NUE	251.929	148.18	37,330.84	0.13%	1.38%	0.00%	9.50%	0.01%
Occidental Petroleum Corp	OXY	898.115	61.53	55,261.02		1.17%			
Omnicom Group Inc	OMC	199.515	90.57	18,070.07	0.06%	3.09%	0.00%	6.50%	0.00%
ONEOK Inc	OKE	447.44	65.41	29,267.05	0.10%	5.84%	0.01%	11.50%	0.01%
Raymond James Financial Inc	RJF	211.6	90.53	19,156.15	0.07%	1.86%	0.00%	15.00%	0.01%
PG&E Corp	PCG	1995.761	17.11	34,147.47	0.12%			7.50%	0.01%
Parker-Hannifin Corp	PH	128.266	324.88	41,671.06	0.14%	1.82%	0.00%	14.50%	0.02%
Rollins Inc	ROL	492.787	42.25	20,820.25	0.07%	1.23%	0.00%	10.50%	0.01%
PPL Corp	PPL	737.056	28.72	21,168.25	0.07%	3.34%	0.00%	3.50%	0.00%
ConocoPhillips	COP	1217.383	102.89	125,256.54	0.43%	0.58%	0.00%	20.00%	0.09%
PulteGroup Inc	PHM	223.224	67.15	14,989.49	0.05%	0.95%	0.00%	7.00%	0.00%
Pinnacle West Capital Corp	PNW	113.251	78.46	8,885.67	0.03%	4.41%	0.00%	2.50%	0.00%
PNC Financial Services Group Inc/The	PNC	399	130.25	51,969.75	0.18%	4.61%	0.01%	12.00%	0.02%
PPG Industries Inc	PPG	235.358	140.26	33,011.31	0.11%	1.77%	0.00%	4.00%	0.00%
Progressive Corp/The	PGR	585.366	136.4	79,843.92	0.27%	0.29%	0.00%	6.50%	0.02%
Public Service Enterprise Group Inc	PEG	498.77	63.2	31,522.26	0.11%	3.61%	0.00%	4.50%	0.00%
Robert Half International Inc	RHI	107.837	73	7,872.10	0.03%	2.63%	0.00%	9.50%	0.00%
Edison International	EIX	382.627	73.6	28,161.35	0.10%	4.01%	0.00%	10.00%	0.01%
Schlumberger NV	SLB	1425.331	49.35	70,340.08		2.03%		26.50%	
Charles Schwab Corp/The	SCHW	1791.448	52.24	93,585.24	0.32%	1.91%	0.01%	9.00%	0.03%
Sherwin-Williams Co/The	SHW	257.89	237.54	61,259.19	0.21%	1.02%	0.00%	7.00%	0.01%
West Pharmaceutical Services Inc	WST	74.243	361.24	26,819.54	0.09%	0.21%	0.00%	17.00%	0.02%
J M Smucker Co/The	SJM	106.636	154.41	16,465.66	0.06%	2.64%	0.00%	4.50%	0.00%
Snap-on Inc	SNA	52.932	259.41	13,731.09	0.05%	2.50%	0.00%	6.00%	0.00%
AMETEK Inc	AME	230.094	137.93	31,736.87	0.11%	0.73%	0.00%	10.00%	0.01%
Southern Co/The	SO	1091.515	73.55	80,280.93	0.28%	3.81%	0.01%	6.50%	0.02%
Truist Financial Corp	TFC	1331.918	32.58	43,393.89	0.15%	6.38%	0.01%	5.50%	0.01%
Southwest Airlines Co	LUV	595.073	30.29	18,024.76		2.38%			
W R Berkley Corp	WRB	262.537	58.92	15,468.68	0.05%	0.68%	0.00%	17.50%	0.01%
Stanley Black & Decker Inc	SWK	153.055	86.34	13,214.77	0.05%	3.71%	0.00%	1.00%	0.00%
Public Storage	PSA	175.795	294.83	51,829.64	0.18%	4.07%	0.01%	7.50%	0.01%
Arista Networks Inc	ANET	306.395	160.16	49,072.22	0.17%			12.00%	0.02%
Sysco Corp	SYY	507.604	76.74	38,953.53		2.61%		22.00%	
Corteva Inc	CTVA	712.605	61.12	43,554.42	0.15%	0.98%	0.00%	15.50%	0.02%
Texas Instruments Inc	TXN	907.654	167.2	151,759.75	0.52%	2.97%	0.02%	4.50%	0.02%
Textron Inc	TXT	201.68	66.94	13,500.46	0.05%	0.12%	0.00%	16.00%	0.01%
Thermo Fisher Scientific Inc	TMO	385.698	554.9	214,023.82	0.74%	0.25%	0.00%	11.00%	0.08%
TJX Cos Inc/The	TJX	1151.493	78.82	90,760.68	0.31%	1.69%	0.01%	17.00%	0.05%
Globe Life Inc	GL	96.521	108.52	10,474.46	0.04%	0.83%	0.00%	8.50%	0.00%
Johnson Controls International plc	JCI	687.214	59.84	41,122.89	0.14%	2.41%	0.00%	11.50%	0.02%
Ulta Beauty Inc	ULTA	50.195	551.43	27,679.03	0.10%			13.50%	0.01%
Union Pacific Corp	UNP	609.695	195.7	119,317.31	0.41%	2.66%	0.01%	9.50%	0.04%
Keysight Technologies Inc	KEYS	178.139	144.64	25,766.02	0.09%			13.00%	0.01%
UnitedHealth Group Inc	UNH	932.847	492.09	459,044.68	1.58%	1.34%	0.02%	12.00%	0.19%
Marathon Oil Corp	MRO	622.875	24.16	15,048.66		1.66%		24.00%	
Bio-Rad Laboratories Inc	BIO	24.522	450.79	11,054.27	0.04%			11.50%	0.00%
Ventas Inc	VTR	400.053	48.05	19,222.55		3.75%		23.50%	
VF Corp	VFC	388.657	23.51	9,137.33	0.03%	5.10%	0.00%	9.00%	0.00%
Vulcan Materials Co	VMC	133.057	175.12	23,300.94	0.08%	0.98%	0.00%	9.00%	0.01%
Weyerhaeuser Co	WY	732.507	29.91	21,909.28	0.08%	2.54%	0.00%	5.00%	0.00%
Whirlpool Corp	WHR	54.758	139.59	7,643.67	0.03%	5.01%	0.00%	6.00%	0.00%
Williams Cos Inc/The	WMB	1218.812	30.26	36,881.25	0.13%	5.92%	0.01%	11.00%	0.01%
Constellation Energy Corp	CEG	326.664	77.4	25,283.79		1.46%			

STANDARD AND POOR'S 500 INDEX

		[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]
Name	Ticker	Shares Outst'g	Price	Market Capitalization	Weight in Index	Estimated Dividend Yield	Cap-Weighted Dividend Yield	Value Line Long-Term Growth Est.	Cap-Weighted Long-Term Growth Est.
WEC Energy Group Inc	WEC	315.435	96.17	30,335.38	0.10%	3.24%	0.00%	6.00%	0.01%
Adobe Inc	ADBE	458.7	377.56	173,186.77	0.60%			13.00%	0.08%
AES Corp/The	AES	669.031	23.66	15,829.27	0.05%	2.80%	0.00%	14.00%	0.01%
Amgen Inc	AMGN	534.327	239.74	128,099.55	0.44%	3.55%	0.02%	5.50%	0.02%
Apple Inc	AAPL	15821.95	169.68	2,684,667.80	9.24%	0.54%	0.05%	10.50%	0.97%
Autodesk Inc	ADSK	214.783	194.79	41,837.58	0.14%			14.00%	0.02%
Cintas Corp	CTAS	101.702	455.77	46,352.72	0.16%	1.01%	0.00%	14.00%	0.02%
Comcast Corp	CMCSA	4159.383	41.37	172,073.67	0.59%	2.80%	0.02%	8.50%	0.05%
Molson Coors Beverage Co	TAP	200.353	59.48	11,917.00		2.76%		50.00%	
KLA Corp	KLAC	137.199	386.54	53,032.90	0.18%	1.35%	0.00%	20.00%	0.04%
Marriott International Inc/MD	MAR	308.884	169.34	52,306.42	0.18%	0.94%	0.00%	17.50%	0.03%
McCormick & Co Inc/MD	MKC	250.838	87.85	22,036.12	0.08%	1.78%	0.00%	4.50%	0.00%
PACCAR Inc	PCAR	522.6	74.69	39,032.99	0.13%	1.34%	0.00%	5.00%	0.01%
Costco Wholesale Corp	COST	443.483	503.22	223,169.52	0.77%	0.81%	0.01%	10.50%	0.08%
Stryker Corp	SYK	378.831	299.65	113,516.71	0.39%	1.00%	0.00%	6.50%	0.03%
Tyson Foods Inc	TSN	285.616	62.49	17,848.14	0.06%	3.07%	0.00%	6.00%	0.00%
Lamb Weston Holdings Inc	LW	145.704	111.81	16,291.16	0.06%	1.00%	0.00%	15.50%	0.01%
Applied Materials Inc	AMAT	845.118	113.03	95,523.69	0.33%	1.13%	0.00%	10.50%	0.03%
American Airlines Group Inc	AAL	652.863	13.64	8,905.05					
Cardinal Health Inc	CAH	257.639	82.1	21,152.16	0.07%	2.42%	0.00%	5.00%	0.00%
Cincinnati Financial Corp	CINF	157.213	106.44	16,733.75	0.06%	2.82%	0.00%	9.00%	0.01%
Paramount Global	PARA	609.812	23.33	14,226.91	0.05%	4.11%	0.00%	1.50%	0.00%
DR Horton Inc	DHI	341.071	109.5668	37,370.06	0.13%	0.91%	0.00%	1.00%	0.00%
Electronic Arts Inc	EA	274.228	127.28	34,903.74	0.12%	0.60%	0.00%	13.00%	0.02%
Fair Isaac Corp	FICO	24.993	727.95	18,193.65	0.06%			16.00%	0.01%
Expeditors International of Washington Inc	EXPD	154.398	113.84	17,576.67	0.06%	1.18%	0.00%	10.00%	0.01%
Fastenal Co	FAST	570.961	53.84	30,740.54	0.11%	2.60%	0.00%	6.50%	0.01%
M&T Bank Corp	MTB	165.865	125.8	20,865.82	0.07%	4.13%	0.00%	9.00%	0.01%
Xcel Energy Inc	XEL	550.356	69.91	38,475.39	0.13%	2.98%	0.00%	6.00%	0.01%
Fiserv Inc	FISV	617.31	122.12	75,385.90	0.26%			11.00%	0.03%
Fifth Third Bancorp	FITB	680.537	26.2	17,830.07	0.06%	5.04%	0.00%	10.00%	0.01%
Gilead Sciences Inc	GILD	1248	82.21	102,598.08	0.35%	3.65%	0.01%	12.00%	0.04%
Hasbro Inc	HAS	138.22	59.22	8,185.39	0.03%	4.73%	0.00%	6.50%	0.00%
Huntington Bancshares Inc/OH	HBAN	1443.615	11.2	16,168.49	0.06%	5.54%	0.00%	12.50%	0.01%
Welltower Inc	WELL	496.295	79.22	39,316.49	0.14%	3.08%	0.00%	12.00%	0.02%
Biogen Inc	BIIB	144.742	304.23	44,034.86				-10.50%	
Northern Trust Corp	NTRS	208.342	78.16	16,284.01	0.06%	3.84%	0.00%	8.00%	0.00%
Packaging Corp of America	PKG	89.884	135.26	12,157.71	0.04%	3.70%	0.00%	11.00%	0.00%
Paychex Inc	PAYX	360.509	109.86	39,605.52	0.14%	3.24%	0.00%	10.50%	0.01%
QUALCOMM Inc	QCOM	1115	116.8	130,232.00	0.45%	2.74%	0.01%	9.50%	0.04%
Roper Technologies Inc	ROP	106.243	454.78	48,317.19	0.17%	0.60%	0.00%	7.00%	0.01%
Ross Stores Inc	ROST	342.052	106.73	36,507.21	0.13%	1.26%	0.00%	14.00%	0.02%
IDEXX Laboratories Inc	IDXX	82.973	492.16	40,835.99	0.14%			11.50%	0.02%
Starbucks Corp	SBUX	1149.3	114.29	131,353.50	0.45%	1.85%	0.01%	16.00%	0.07%
KeyCorp	KEY	935.229	11.26	10,530.68	0.04%	7.28%	0.00%	7.50%	0.00%
Fox Corp	FOXA	296.917	33.26	9,875.46	0.03%	1.50%	0.00%	8.50%	0.00%
Fox Corp	FOX	237.644	30.54	7,257.65		1.64%			
State Street Corp	STT	334.259	72.26	24,153.56	0.08%	3.49%	0.00%	8.50%	0.01%
Norwegian Cruise Line Holdings Ltd	NCLH	421.93	13.35	5,632.77					
US Bancorp	USB	1533	34.28	52,551.24	0.18%	5.60%	0.01%	7.00%	0.01%
A O Smith Corp	AOS	124.538	68.29	8,504.70	0.03%	1.76%	0.00%	11.00%	0.00%
Gen Digital Inc	GEN	639.129	17.67	11,293.41	0.04%	2.83%	0.00%	10.50%	0.00%
T Rowe Price Group Inc	TROW	224.514	112.33	25,219.66	0.09%	4.34%	0.00%	3.00%	0.00%
Waste Management Inc	WM	406.817	166.05	67,551.96	0.23%	1.69%	0.00%	6.50%	0.02%
Constellation Brands Inc	STZ	183.232	228.576	41,882.44	0.14%	1.56%	0.00%	5.50%	0.01%
DENTSPLY SIRONA Inc	XRAY	215.362	41.93	9,030.13	0.03%	1.34%	0.00%	12.00%	0.00%
Zions Bancorp NA	ZION	148.1	27.86	4,126.07	0.01%	5.89%	0.00%	6.50%	0.00%
Alaska Air Group Inc	ALK	127.243	43.46	5,529.98					
Invesco Ltd	IVZ	458.2	17.13	7,848.97	0.03%	4.67%	0.00%	6.50%	0.00%
Intuit Inc	INTU	280.546	443.95	124,548.40	0.43%	0.70%	0.00%	16.50%	0.07%
Morgan Stanley	MS	1672.367	89.97	150,462.86	0.52%	3.45%	0.02%	7.50%	0.04%
Microchip Technology Inc	MCHP	547.796	72.99	39,983.63	0.14%	1.96%	0.00%	10.00%	0.01%
Chubb Ltd	CB	414.147	201.56	83,475.47	0.29%	1.65%	0.00%	14.50%	0.04%
Hologic Inc	HOLX	246.551	86.01	21,205.85				25.00%	
Citizens Financial Group Inc	CFG	484.309	30.4891	14,766.15	0.05%	5.51%	0.00%	8.00%	0.00%
O'Reilly Automotive Inc	ORLY	61.039	917.31	55,991.69	0.19%			12.00%	0.02%
Allstate Corp/The	ALL	263.167	115.76	30,464.21	0.10%	3.08%	0.00%	2.50%	0.00%
Equity Residential	EQR	378.898	63.25	23,965.30		4.19%		-5.00%	
BorgWarner Inc	BWA	233.785	48.13	11,252.07	0.04%	1.41%	0.00%	9.50%	0.00%
Keurig Dr Pepper Inc	KDP	1403.776	32.7	45,903.48	0.16%	2.45%	0.00%	12.50%	0.02%
Organon & Co	OGN	254.383	24.63	6,265.45		4.55%			
Host Hotels & Resorts Inc	HST	713.479	16.17	11,536.96		2.97%		51.00%	
Incyte Corp	INCY	222.965	74.41	16,590.83				27.00%	
Simon Property Group Inc	SPG	326.732	113.32	37,025.27	0.13%	6.35%	0.01%	3.50%	0.00%
Eastman Chemical Co	EMN	119.152	84.27	10,040.94	0.03%	3.75%	0.00%	7.00%	0.00%
AvalonBay Communities Inc	AVB	140.01	180.37	25,253.60	0.09%	3.66%	0.00%	7.00%	0.01%
Prudential Financial Inc	PRU	366.974	87	31,926.74	0.11%	5.75%	0.01%	3.00%	0.00%
United Parcel Service Inc	UPS	723.299	179.81	130,056.39	0.45%	3.60%	0.02%	7.50%	0.03%
Walgreens Boots Alliance Inc	WBA	862.796	35.25	30,413.56	0.10%	5.45%	0.01%	2.50%	0.00%
STERIS PLC	STE	99.284	188.55	18,720.00	0.06%	1.00%	0.00%	10.00%	0.01%

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Name	Ticker	[4] Shares Outst'g	[5] Price	[6] Market Capitalization	[7] Weight in Index	[8] Estimated Dividend Yield	[9] Cap-Weighted Dividend Yield	[10] Value Line Long-Term Growth Est.	[11] Cap-Weighted Long-Term Growth Est.
McKesson Corp	MCK	136.939	364.24	49,878.66	0.17%	0.59%	0.00%	10.00%	0.02%
Lockheed Martin Corp	LMT	253.253	464.45	117,623.36	0.40%	2.58%	0.01%	7.00%	0.03%
AmerisourceBergen Corp	ABC	202.258	166.85	33,746.75	0.12%	1.16%	0.00%	8.50%	0.01%
Capital One Financial Corp	COF	381.08	97.3	37,079.08		2.47%			
Waters Corp	WAT	59.02	300.36	17,727.25	0.06%			6.00%	0.00%
Nordson Corp	NDSN	57.261	216.31	12,386.13	0.04%	1.20%	0.00%	10.50%	0.00%
Dollar Tree Inc	DLTR	221.228	153.71	34,004.96	0.12%			10.00%	0.01%
Darden Restaurants Inc	DRI	120.929	151.93	18,372.74	0.06%	3.19%	0.00%	17.50%	0.01%
Evergy Inc	EVRG	229.583	62.11	14,259.40	0.05%	3.94%	0.00%	7.50%	0.00%
Match Group Inc	MTCH	279.324	36.9	10,307.06				21.00%	
Domino's Pizza Inc	DPZ	35.339	317.47	11,219.07	0.04%	1.52%	0.00%	13.00%	0.01%
NVR Inc	NVR	3.242	5840	18,933.28	0.07%			5.50%	0.00%
NetApp Inc	NTAP	213.905	62.89	13,452.49	0.05%	3.18%	0.00%	8.50%	0.00%
DXC Technology Co	DXC	227.682	23.85	5,430.22	0.02%			12.00%	0.00%
Old Dominion Freight Line Inc	ODFL	110.026	320.39	35,251.23	0.12%	0.50%	0.00%	12.50%	0.02%
DaVita Inc	DVA	90.4	90.36	8,168.54	0.03%			7.50%	0.00%
Hartford Financial Services Group Inc/The	HIG	310.235	70.99	22,023.58	0.08%	2.39%	0.00%	6.50%	0.00%
Iron Mountain Inc	IRM	291.574	55.24	16,106.55	0.06%	4.48%	0.00%	10.00%	0.01%
Estee Lauder Cos Inc/The	EL	231.678	246.72	57,159.60	0.20%	1.07%	0.00%	14.00%	0.03%
Cadence Design Systems Inc	CDNS	272.684	209.45	57,113.66	0.20%			12.00%	0.02%
Tyler Technologies Inc	TYL	41.925	379.03	15,890.83	0.05%			12.00%	0.01%
Universal Health Services Inc	UHS	62.79	150.35	9,440.48	0.03%	0.53%	0.00%	5.50%	0.00%
Skyworks Solutions Inc	SWKS	159.153	105.9	16,854.30	0.06%	2.34%	0.00%	9.00%	0.01%
Quest Diagnostics Inc	DGX	112.009	138.81	15,547.97	0.05%	2.05%	0.00%	5.00%	0.00%
Activision Blizzard Inc	ATVI	784.274	77.71	60,945.93	0.21%			11.50%	0.02%
Rockwell Automation Inc	ROK	114.875	283.41	32,556.72	0.11%	1.67%	0.00%	9.50%	0.01%
Kraft Heinz Co/The	KHC	1226.999	39.27	48,184.25	0.17%	4.07%	0.01%	6.00%	0.01%
American Tower Corp	AMT	466.043	204.39	95,254.53	0.33%	3.05%	0.01%	6.00%	0.02%
Regeneron Pharmaceuticals Inc	REGN	107.892	801.79	86,506.73	0.30%			5.00%	0.01%
Amazon.com Inc	AMZN	10260.35	105.45	1,081,954.33				26.50%	
Jack Henry & Associates Inc	JKHY	72.991	163.34	11,922.35	0.04%	1.27%	0.00%	8.50%	0.00%
Ralph Lauren Corp	RL	41.098	114.79	4,717.64	0.02%	2.61%	0.00%	12.00%	0.00%
Boston Properties Inc	BXP	156.83	53.36	8,368.45		7.35%		-1.00%	
Amphenol Corp	APH	595.319	75.47	44,928.72	0.15%	1.11%	0.00%	12.50%	0.02%
Howmet Aerospace Inc	HWM	411.804	44.29	18,238.80	0.06%	0.36%	0.00%	14.00%	0.01%
Pioneer Natural Resources Co	PXD	233.736	217.55	50,849.27		6.14%		21.00%	
Valero Energy Corp	VLO	361.517	114.67	41,455.15		3.56%		29.50%	
Synopsys Inc	SNPS	152.302	371.32	56,552.78	0.19%			12.50%	0.02%
Etsy Inc	ETSY	123.329	101.03	12,459.93				24.50%	
CH Robinson Worldwide Inc	CHRW	116.439	100.87	11,745.20	0.04%	2.42%	0.00%	8.50%	0.00%
Accenture PLC	ACN	662.596	280.29	185,719.03	0.64%	1.60%	0.01%	12.50%	0.08%
TransDigm Group Inc	TDG	54.598	765	41,767.47	0.14%			20.00%	0.03%
Yum! Brands Inc	YUM	280.108	140.58	39,377.58	0.14%	1.72%	0.00%	10.50%	0.01%
Prologis Inc	PLD	923.45	125.25	115,662.11	0.40%	2.78%	0.01%	2.50%	0.01%
FirstEnergy Corp	FE	572.837	39.8	22,798.91	0.08%	3.92%	0.00%	3.00%	0.00%
VeriSign Inc	VRSN	104.096	221.8	23,088.49	0.08%			11.00%	0.01%
Quanta Services Inc	PWR	144.001	169.64	24,428.33	0.08%	0.19%	0.00%	15.50%	0.01%
Henry Schein Inc	HSIC	131.195	80.81	10,601.87	0.04%			6.00%	0.00%
Ameren Corp	AEE	262.475	88.97	23,352.40	0.08%	2.83%	0.00%	6.50%	0.01%
ANSYS Inc	ANSS	87.086	313.92	27,338.04	0.09%			8.50%	0.01%
FactSet Research Systems Inc	FDS	38.319	411.69	15,775.55	0.05%	0.86%	0.00%	10.50%	0.01%
NVIDIA Corp	NVDA	2470	277.49	685,400.30		0.06%		23.00%	
Sealed Air Corp	SEE	144.385	47.99	6,929.04	0.02%	1.67%	0.00%	9.00%	0.00%
Cognizant Technology Solutions Corp	CTSH	507.466	59.71	30,300.79	0.10%	1.94%	0.00%	8.00%	0.01%
Intuitive Surgical Inc	ISRG	350.398	301.22	105,546.89	0.36%			10.00%	0.04%
Take-Two Interactive Software Inc	TTWO	168.675	124.29	20,964.62	0.07%			2.50%	0.00%
Republic Services Inc	RSG	316.282	144.62	45,740.70	0.16%	1.37%	0.00%	12.50%	0.02%
eBay Inc	EBAY	534.503	46.43	24,816.97	0.09%	2.15%	0.00%	12.50%	0.01%
Goldman Sachs Group Inc/The	GS	333.795	343.44	114,638.55	0.39%	2.91%	0.01%	5.00%	0.02%
SBA Communications Corp	SBAC	108.322	260.89	28,260.13		1.30%		35.50%	
Sempra Energy	SRE	314.65	155.49	48,924.93	0.17%	3.06%	0.01%	6.00%	0.01%
Moody's Corp	MCO	183.5	313.12	57,457.52	0.20%	0.98%	0.00%	4.00%	0.01%
ON Semiconductor Corp	ON	431.573	71.96	31,055.99	0.11%			18.50%	0.02%
Booking Holdings Inc	BKNG	37.212	2686.31	99,962.97				22.00%	
F5 Inc	FFIV	60.465	134.36	8,124.08	0.03%			10.00%	0.00%
Akamai Technologies Inc	AKAM	156.304	81.97	12,812.24	0.04%			5.00%	0.00%
Charles River Laboratories International Inc	CRL	50.986	190.12	9,693.46	0.03%			12.00%	0.00%
MarketAxess Holdings Inc	MKTX	37.669	318.37	11,992.68	0.04%	0.90%	0.00%	10.50%	0.00%
Devon Energy Corp	DVN	643.844	53.43	34,400.58		6.66%		27.50%	
Bio-Techne Corp	TECH	157.275	79.88	12,563.13	0.04%	0.40%	0.00%	13.00%	0.01%
Alphabet Inc	GOOGL	5941	107.34	637,706.94					
Teleflex Inc	TFX	46.966	272.52	12,799.17	0.04%	0.50%	0.00%	10.00%	0.00%
Bunge Ltd	BG	149.926	93.6	14,033.07	0.05%	2.67%	0.00%	1.50%	0.00%
Netflix Inc	NFLX	444.541	329.93	146,667.41	0.50%			14.50%	0.07%
Allegion plc	ALLE	87.947	110.48	9,716.38	0.03%	1.63%	0.00%	11.00%	0.00%
Agilent Technologies Inc	A	295.702	135.43	40,046.92	0.14%	0.66%	0.00%	12.00%	0.02%
Warner Bros Discovery Inc	WBD	2435.6	13.61	33,148.52					
Elevance Health Inc	ELV	237.056	468.65	111,096.29	0.38%	1.26%	0.00%	12.50%	0.05%
Trimble Inc	TRMB	246.952	47.1	11,631.44	0.04%			7.00%	0.00%
CME Group Inc	CME	359.74	185.77	66,828.90	0.23%	2.37%	0.01%	8.50%	0.02%

STANDARD AND POOR'S 500 INDEX

Name	Ticker	[4] Shares Outst'g	[5] Price	[6] Market Capitalization	[7] Weight in Index	[8] Estimated Dividend Yield	[9] Cap-Weighted Dividend Yield	[10] Value Line Long-Term Growth Est.	[11] Cap-Weighted Long-Term Growth Est.
Juniper Networks Inc	JNPR	321.592	30.15	9,696.00	0.03%	2.92%	0.00%	11.00%	0.00%
BlackRock Inc	BLK	149.905	671.2	100,616.24	0.35%	2.98%	0.01%	7.50%	0.03%
DTE Energy Co	DTE	206.108	112.41	23,168.60	0.08%	3.39%	0.00%	4.50%	0.00%
Nasdaq Inc	NDAQ	489.003	55.37	27,076.10	0.09%	1.59%	0.00%	7.50%	0.01%
Celanese Corp	CE	110.825	106.24	11,774.05	0.04%	2.64%	0.00%	6.50%	0.00%
Philip Morris International Inc	PM	1552.197	99.97	155,173.13	0.53%	5.08%	0.03%	5.00%	0.03%
Salesforce Inc	CRM	1000	198.37	198,370.00	0.68%			15.50%	0.11%
Ingersoll Rand Inc	IR	404.678	57.02	23,074.74		0.14%			
Huntington Ingalls Industries Inc	HII	39.926	201.66	8,051.48	0.03%	2.46%	0.00%	10.00%	0.00%
MetLife Inc	MET	774.362	61.33	47,491.62	0.16%	3.39%	0.01%	7.50%	0.01%
Tapestry Inc	TPR	236.076	40.81	9,634.26	0.03%	2.94%	0.00%	12.00%	0.00%
CSX Corp	CSX	2033.055	30.64	62,292.81	0.21%	1.44%	0.00%	10.50%	0.02%
Edwards Lifesciences Corp	EW	606.218	87.98	53,335.06	0.18%			11.00%	0.02%
Ameriprise Financial Inc	AMP	105.148	305.12	32,082.76	0.11%	1.77%	0.00%	13.50%	0.01%
Zebra Technologies Corp	ZBRA	51.405	288.03	14,806.18	0.05%			11.50%	0.01%
Zimmer Biomet Holdings Inc	ZBH	210.064	138.44	29,081.26	0.10%	0.69%	0.00%	4.50%	0.00%
CBRE Group Inc	CBRE	310.832	76.66	23,828.38	0.08%			8.50%	0.01%
Camden Property Trust	CPT	106.762	110.05	11,749.16		3.63%		-4.00%	
Mastercard Inc	MA	940.404	380.03	357,381.73	1.23%	0.60%	0.01%	18.50%	0.23%
CarMax Inc	KMX	158.091	70.03	11,071.11				-3.50%	
Intercontinental Exchange Inc	ICE	559.715	108.93	60,969.75	0.21%	1.54%	0.00%	7.00%	0.01%
Fidelity National Information Services Inc	FIS	592.432	58.72	34,787.61		3.54%		52.00%	
Chipotle Mexican Grill Inc	CMG	27.59	2067.62	57,045.64	0.20%			20.00%	0.04%
Wynn Resorts Ltd	WYNN	113.682	114.28	12,991.58				27.00%	
Live Nation Entertainment Inc	LYV	231.591	67.78	15,697.24					
Assurant Inc	AIZ	52.921	123.13	6,516.16	0.02%	2.27%	0.00%	15.50%	0.00%
NRG Energy Inc	NRG	232.27	34.17	7,936.67		4.42%		-2.50%	
Regions Financial Corp	RF	934.562	18.26	17,065.10	0.06%	4.38%	0.00%	11.50%	0.01%
Monster Beverage Corp	MNST	1046.64	56	58,611.84	0.20%			11.00%	0.02%
Mosaic Co/The	MOS	332.099	42.85	14,230.44	0.05%	1.87%	0.00%	7.50%	0.00%
Baker Hughes Co	BKR	1012.362	29.24	29,601.46		2.60%			
Expedia Group Inc	EXPE	147.825	93.96	13,889.64					
CF Industries Holdings Inc	CF	195.768	71.58	14,013.07	0.05%	2.24%	0.00%	11.00%	0.01%
Leidos Holdings Inc	LDOS	137.193	93.26	12,794.62	0.04%	1.54%	0.00%	8.00%	0.00%
APA Corp	APA	311.047	36.85	11,462.08		2.71%		21.00%	
Alphabet Inc	GOOG	5874	108.22	635,684.28	2.19%			18.50%	0.40%
First Solar Inc	FSLR	106.826	182.58	19,504.29				24.50%	
TE Connectivity Ltd	TEL	315.115	122.37	38,560.62	0.13%	1.93%	0.00%	10.50%	0.01%
Cooper Cos Inc/The	COO	49.456	381.45	18,864.99	0.06%	0.02%	0.00%	12.00%	0.01%
Discover Financial Services	DFS	253.946	103.47	26,275.79	0.09%	2.71%	0.00%	8.50%	0.01%
Linde PLC	LIN	490.252	369.45	181,123.60	0.62%	1.38%	0.01%	10.00%	0.06%
Visa Inc	V	1618.223	232.73	376,609.04	1.30%	0.77%	0.01%	13.50%	0.17%
Mid-America Apartment Communities Inc	MAA	116.66	153.8	17,942.31		3.64%		-12.50%	
Xylem Inc/NY	XYL	180.278	103.84	18,720.07	0.06%	1.27%	0.00%	6.00%	0.00%
Marathon Petroleum Corp	MPC	441.626	122	53,878.37		2.46%			
Tractor Supply Co	TSCO	109.568	238.4	26,121.01	0.09%	1.73%	0.00%	13.50%	0.01%
Advanced Micro Devices Inc	AMD	1609.406	89.37	143,832.61				25.50%	
ResMed Inc	RMD	146.931	240.96	35,404.49	0.12%	0.73%	0.00%	8.50%	0.01%
Mettler-Toledo International Inc	MTD	22.07	1491.5	32,917.41	0.11%			13.50%	0.02%
Jacobs Solutions Inc	J	126.714	115.46	14,630.40	0.05%	0.90%	0.00%	12.00%	0.01%
Copart Inc	CPRT	476.593	79.05	37,674.68	0.13%			7.00%	0.01%
VICI Properties Inc	VICI	1004.205	33.94	34,082.72	0.12%	4.60%	0.01%	7.00%	0.01%
Albemarle Corp	ALB	117.299	185.46	21,754.27		0.86%		21.50%	
Fortinet Inc	FTNT	784.374	63.05	49,454.78				24.00%	
Moderna Inc	MRNA	385.678	132.89	51,252.75				-2.50%	
Essex Property Trust Inc	ESS	64.182	219.73	14,102.71		4.21%		-3.00%	
CoStar Group Inc	CSGP	408.539	76.95	31,437.08	0.11%			13.00%	0.01%
Realty Income Corp	O	660.521	62.84	41,507.14	0.14%	4.87%	0.01%	5.50%	0.01%
Westrock Co	WRK	254.652	29.93	7,621.73	0.03%	3.68%	0.00%	10.00%	0.00%
Westinghouse Air Brake Technologies Corp	WAB	179.87	97.67	17,567.90	0.06%	0.70%	0.00%	9.50%	0.01%
Pool Corp	POOL	39.038	351.32	13,714.83	0.05%	1.14%	0.00%	14.00%	0.01%
Western Digital Corp	WDC	319.322	34.44	10,997.45	0.04%			4.00%	0.00%
PepsiCo Inc	PEP	1377.693	190.89	262,987.82	0.90%	2.41%	0.02%	5.50%	0.05%
Diamondback Energy Inc	FANG	181.605	142.2	25,824.23		8.30%			
ServiceNow Inc	NOW	203.74	459.42	93,602.23				45.50%	
Church & Dwight Co Inc	CHD	244.264	97.12	23,722.92	0.08%	1.12%	0.00%	6.00%	0.00%
Federal Realty Investment Trust	FRT	81.353	98.89	8,045.00	0.03%	4.37%	0.00%	2.50%	0.00%
MGM Resorts International	MGM	372.892	44.92	16,750.31				25.00%	
American Electric Power Co Inc	AEP	514.407	92.42	47,541.49	0.16%	3.59%	0.01%	6.00%	0.01%
SolarEdge Technologies Inc	SEDG	56.343	285.63	16,093.25				27.00%	
Invitation Homes Inc	INVH	611.861	33.37	20,417.80		3.12%			
PTC Inc	PTC	118.263	125.79	14,876.30				29.00%	
JB Hunt Transport Services Inc	JBHT	103.648	175.29	18,168.46	0.06%	0.96%	0.00%	10.00%	0.01%
Lam Research Corp	LRCX	134.34	524.08	70,404.91	0.24%	1.32%	0.00%	14.00%	0.03%
Mohawk Industries Inc	MHK	63.68	105.9	6,743.71	0.02%			10.00%	0.00%
GE HealthCare Technologies Inc	GEHC	454.677	81.34	36,983.43		0.15%			
Pentair PLC	PNR	164.95	58.08	9,580.30	0.03%	1.52%	0.00%	12.00%	0.00%
Vertex Pharmaceuticals Inc	VRTX	257.589	340.73	87,768.30	0.30%			13.50%	0.04%
Amcor PLC	AMCR	1485.78	10.97	16,299.01	0.06%	4.47%	0.00%	14.50%	0.01%
Meta Platforms Inc	META	2212.153	240.32	531,624.61	1.83%			11.00%	0.20%

STANDARD AND POOR'S 500 INDEX

Name	Ticker	[4] Shares Outst'g	[5] Price	[6] Market Capitalization	[7] Weight in Index	[8] Estimated Dividend Yield	[9] Cap-Weighted Dividend Yield	[10] Value Line Long-Term Growth Est.	[11] Cap-Weighted Long-Term Growth Est.
T-Mobile US Inc	TMUS	1199.892	143.9	172,664.46	0.59%			16.00%	0.10%
United Rentals Inc	URI	68.731	361.11	24,819.45	0.09%	1.64%	0.00%	18.50%	0.02%
Honeywell International Inc	HON	665.677	199.84	133,028.89	0.46%	2.06%	0.01%	12.00%	0.05%
Alexandria Real Estate Equities Inc	ARE	173.014	124.18	21,484.88	0.07%	3.90%	0.00%	11.00%	0.01%
Delta Air Lines Inc	DAL	642.717	34.31	22,051.62					
Seagate Technology Holdings PLC	STX	207.082	58.77	12,170.21	0.04%	4.76%	0.00%	12.00%	0.01%
United Airlines Holdings Inc	UAL	326.729	43.8	14,310.73					
News Corp	NWS	193.243	17.75	3,430.06		1.13%			
Centene Corp	CNC	548.769	68.93	37,826.65	0.13%			9.00%	0.01%
Martin Marietta Materials Inc	MLM	61.997	363.2	22,517.31	0.08%	0.73%	0.00%	4.50%	0.00%
Teradyne Inc	TER	156.048	91.38	14,259.67	0.05%	0.48%	0.00%	19.00%	0.01%
PayPal Holdings Inc	PYPL	1122.806	76	85,333.26	0.29%			12.00%	0.04%
Tesla Inc	TSLA	3169.504	164.31	520,781.20				21.50%	
Arch Capital Group Ltd	ACGL	372.2	75.07	27,941.05				21.50%	
DISH Network Corp	DISH	292.717	7.51	2,198.30				-4.00%	
Dow Inc	DOW	707.989	54.4	38,514.60	0.13%	5.15%	0.01%	8.50%	0.01%
Everest Re Group Ltd	RE	49.008	378	18,525.02	0.06%	1.75%	0.00%	9.50%	0.01%
Teledyne Technologies Inc	TDY	47.046	414.4	19,495.86	0.07%			9.50%	0.01%
News Corp	NWSA	382.363	17.61	6,733.41		1.14%			
Exelon Corp	EXC	994.299	42.44	42,198.05		3.39%			
Global Payments Inc	GPN	263.784	112.71	29,731.09	0.10%	0.89%	0.00%	17.00%	0.02%
Crown Castle Inc	CCI	434	123.09	53,421.06	0.18%	5.09%	0.01%	13.50%	0.02%
Aptiv PLC	APTV	270.95	102.86	27,869.92				30.00%	
Advance Auto Parts Inc	AAP	59.434	125.53	7,460.75	0.03%	4.78%	0.00%	3.50%	0.00%
Align Technology Inc	ALGN	76.739	325.3	24,963.20	0.09%			17.00%	0.01%
Illumina Inc	ILMN	158.032	205.56	32,485.06	0.11%			6.50%	0.01%
Targa Resources Corp	TRGP	226.276	75.53	17,090.63		2.65%			
LKQ Corp	LKQ	267.29	57.73	15,430.65	0.05%	1.91%	0.00%	13.00%	0.01%
Zoetis Inc	ZTS	462.945	175.78	81,376.47	0.28%	0.85%	0.00%	9.00%	0.03%
Equinix Inc	EQIX	93.515	724.08	67,712.34	0.23%	1.88%	0.00%	15.00%	0.03%
Digital Realty Trust Inc	DLR	291.299	99.15	28,882.30		4.92%		-1.00%	
Molina Healthcare Inc	MOH	58.3	297.89	17,366.99	0.06%			12.50%	0.01%
Las Vegas Sands Corp	LVS	764.271	63.85	48,798.70					

Notes:
[1] Equals sum of Col. [9]
[2] Equals sum of Col. [11]
[3] Equals ([1] x (1 + (0.5 x [2]))) + [2]
[4] Source: Bloomberg Professional as of April 30, 2023
[5] Source: Bloomberg Professional as of April 30, 2023
[6] Equals [4] x [5]
[7] Equals weight in S&P 500 based on market capitalization [6] if Growth Rate >0% and ≤20%
[8] Source: Bloomberg Professional, as of April 30, 2023
[9] Equals [7] x [8]
[10] Source: Value Line, as of April 30, 2023
[11] Equals [7] x [10]

FLOTATION COST ADJUSTMENT

Company	Ticker	Date [i]	[1] Shares Issued (000)	[2] Offering Price	[3] Under-writing Discount [ii]	[4] Offering Expense ($000)	[5] Net Proceeds Per Share	[6] Total Flotation Costs ($000)	[7] Gross Equity Issue Before Costs ($000)	[8] Net Proceeds ($000)	[9] Flotation Cost Percentage
American Water Works Company	AWK	2/28/2023	12,650	135.50	2.033	700	133.41	26,411	1,714,075	1,687,664	1.54% [iii]

[i] Offering Completion Date
[ii] Underwriting discount is calculated as the market price minus the offering price when not explicitly given in the prospectus.
[iii] American Water Works Company: AWK Prospectus 424B7 02.28.2023

The flotation cost adjustment is derived by dividing the dividend yield by 1 − F (where F = flotation costs expressed in percentage terms), or by 0.9846, and adding that result to the constant growth rate to determine the cost of equity. Using the formulas shown previously in my testimony, the Constant Growth DCF calculation is modified as follows to accommodate an adjustment for flotation costs:

$$k = \frac{D \times (1 + 0.5g)}{P \times (1 - F)} + g$$

Company	Ticker	[10] Annualized Dividend	[11] Stock Price	[12] Dividend Yield	[13] Expected Dividend Yield	[14] Expected Dividend Yield Adjusted for Flotation Costs	[15] Value Line Earnings Growth	[16] Yahoo! Finance Earnings Growth	[17] Zacks Earnings Growth	[18] Average Earnings Growth	[19] Cost of Equity: Mean Growth Rate	[20] Cost of Equity Adjusted for Flotation Costs	
Atmos Energy Corporation	ATO	$ 2.96	$ 113.21	2.61%	2.71%	2.75%	7.00%	7.80%	7.50%	7.43%	10.15%	10.19%	
NiSource Inc.	NI	$ 1.00	$ 27.74	3.61%	3.74%	3.80%	9.50%	6.70%	6.90%	7.70%	11.44%	11.50%	
Northwest Natural Gas Company	NWN	$ 1.94	$ 46.87	4.14%	4.23%	4.29%	6.50%	2.80%	3.70%	4.33%	8.56%	8.63%	
ONE Gas, Inc.	OGS	$ 2.60	$ 79.34	3.28%	3.36%	3.42%	6.00%	5.00%	5.00%	5.33%	8.70%	8.75%	
Spire, Inc.	SR	$ 2.88	$ 69.52	4.14%	4.27%	4.34%	8.00%	n/a	4.20%	6.10%	10.37%	10.44%	
Eversource Energy	ES	$ 2.70	$ 77.89	3.47%	3.58%	3.63%	6.50%	6.70%	6.30%	6.50%	10.08%	10.13%	
American States Water Company	AWR	$ 1.59	$ 89.39	1.78%	1.83%	1.86%	6.50%	4.40%	n/a	5.45%	7.28%	7.31%	
California Water Service Group	CWT	$ 1.04	$ 57.99	1.79%	1.87%	1.90%	6.50%	11.70%	n/a	9.10%	10.97%	11.00%	
Middlesex Water Company	MSEX	$ 1.25	$ 77.63	1.61%	1.64%	1.67%	5.00%	2.70%	n/a	3.85%	5.49%	5.52%	
SJW Group	SJW	$ 1.52	$ 77.25	1.97%	2.05%	2.08%	6.00%	9.80%	n/a	7.90%	9.95%	9.98%	
Essential Utilities, Inc.	WTRG	$ 1.15	$ 43.14	2.66%	2.75%	2.79%	7.50%	6.60%	6.00%	6.70%	9.45%	9.49%	
Mean											9.31%	9.36%	
Median											9.95%	9.98%	
Flotation Cost Adjustment (Mean)												0.05%	[21]
Flotation Cost Adjustment (Median)												0.03%	[22]

Notes:
[1] - [4] See Notes [i] to [iii] above
[5] Equals [8]/[1]
[6] Equals [4] + ([1] x [3])
[7] Equals [1] x [2]
[8] Equals [7] - [6]
[9] Equals [6] / [7]
[10] Bloomberg Professional
[11] Bloomberg Professional, equals 30-day average as of April 30 2023
[12] Equals [10] / [11]
[13] Equals [12] x (1 + 0.5 x [18])
[14] Equals [13] / (1 − Flotation Cost)
[15] Value Line
[16] Yahoo! Finance
[17] Zacks Investment Research
[18] Equals Average of [15], [16], [17]
[19] Equals [13] + [18]
[20] Equals [14] + [18]
[21] Equals [20] (Mean) − [19] (Mean)
[22] Equals [20] (Median) − [19] (Median)

COMPARISON OF KYAWC AND PROXY GROUP COMPANIES
CAPITAL COST RECOVERY MECHANISMS

Company	Ticker	State	Utility Type	Infrastructure Cost Recovery Mechanism	Future Test Year	Revenue Stabilization or Decoupling	Citations
American States Water Co							Infrastructure Cost Recovery: 2022 10-K, p. 28 and p. 54.
	AWR	California	Water	Yes	Fully Forecast	Full	Revenue Stabilization or Decoupling: 2022 10-K, p. 29 and p. 43
	AWR	California	Electric	Yes	Fully Forecast	Full	Test Year: S&P Cap IQ Pro, Rate Case History and Commission Profiles
Atmos Energy Corporation							
	ATO	Colorado	Gas	Yes	Historical	No	Infrastructure Cost Recovery: 2022 10-K, p. 9
	ATO	Kansas	Gas	Yes	Historical	Partial	Revenue Stabilization or Decoupling: 2022 10-K, p.9, S&P Global Market
	ATO	Kentucky	Gas	Yes	Fully Forecast	Partial	Intelligence, Regulatory Focus: Adjustment Clauses, dated 7/18/22, Company Tariffs
	ATO	Louisiana	Gas	No	Historical	FRP	(CO and VA).
	ATO	Mississippi	Gas	Yes	Historical	FRP	Test Year: S&P Cap IQ Pro, Rate Case History and Commission Profiles; Company
	ATO	Tennessee	Gas	No	Historical	FRP	Tariffs (LA, MS, TN); 2022 10-K, p. 10
	ATO	Texas	Gas	Yes	Historical	FRP	
	ATO	Virginia	Gas	Yes	Historical	Partial	
California Water Service Group							
	CWT	California	Water	Yes	Fully Forecast	Full	Infrastructure Cost Recovery and Revenue Stabilization or Decoupling: 2022 10-K,
	CWT	Hawaii	Water	No	Fully Forecast	No	p.9 (California Water); Tariffs (HI, WA, NM)
	CWT	New Mexico	Water	No	Historical	No	Test Year: S&P Cap IQ Pro, Rate Case History and Commission Profiles
	CWT	Washington	Water	Yes	Historical	No	
Essential Utilities, Inc.							
	WTRG	Pennsylvania	Water	Yes	Fully Forecast	No	Infrastructure Cost Recovery: 2022 10-K, p. 9; S&P Global Market Intelligence,
	WTRG	Pennsylvania	Gas	Yes	Fully Forecast	No	Regulatory Focus: Adjustment Clauses, dated 7/18/22
	WTRG	Ohio	Water	Yes	Partially Forecast	No	Revenue Stabilization or Decoupling: 2022 10-K, p. 11
	WTRG	Illinois	Water	Yes	Fully Forecast	Full	Test Year: S&P Cap IQ Pro, Rate Case History and Commission Profiles
	WTRG	Texas	Water	Yes	Historical	No	
	WTRG	New Jersey	Water	Yes	Partially Forecast	No	
	WTRG	North Carolina	Water	Yes	Historical	No	
	WTRG	Indiana	Water	Yes	Fully Forecast	No	
	WTRG	Virginia	Water	Yes	Historical	No	
	WTRG	Kentucky	Gas	Yes	Fully Forecast	Partial	
	WTRG	West Virginia	Gas	No	Historical	No	
Eversource Energy							
	ES	Connecticut	Electric	Yes	Fully Forecast	Full	Infrastructure Cost Recovery: 2022 10-K, p. 11 (water); S&P Global Market
	ES	Connecticut	Gas	Yes	Fully Forecast	Full	Intelligence, Regulatory Focus: Adjustment Clauses, dated 7/18/22 (electric and
	ES	Connecticut	Water	Yes	Fully Forecast	Full	natural gas)
	ES	Massachusetts	Electric	Yes	Historical	Full	Revenue Stabilization or Decoupling: 2022 10-K, p. 11 (water); S&P Global Market
	ES	Massachusetts	Gas	Yes	Historical	Full	Intelligence, Regulatory Focus: Adjustment Clauses, dated 7/18/22 (electric and
	ES	Massachusetts	Water	Yes	Historical	No	natural gas)
	ES	New Hampshire	Electric	Yes	Historical	Partial	Test Year: S&P Cap IQ Pro, Rate Case History
	ES	New Hampshire	Water	Yes	Historical	No	
Middlesex Water Company							
	MSEX	New Jersey	Water	Yes	Partially Forecast	No	Infrastructure Cost Recovery/ Revenue Decoupling: Tariffs (NJ, DE, PA)
	MSEX	Delaware	Water	Yes	Historical	No	Test Year: S&P Cap IQ Pro, Rate Case History
	MSEX	Pennsylvania	Water	No	Fully Forecast	No	
NiSource Inc.							
	NI	Indiana	Electric	Yes	Fully Forecast	Partial	Infrastructure Cost Recovery and Revenue Stabilization or Decoupling: S&P Global
	NI	Indiana	Gas	Yes	Fully Forecast	No	Market Intelligence, Regulatory Focus: Adjustment Clauses, dated 7/18/22
	NI	Kentucky	Gas	Yes	Fully Forecast	Partial	Test Year: S&P Cap IQ Pro, Rate Case History
	NI	Maryland	Gas	Yes	Partially Forecast	Partial	
	NI	Ohio	Gas	Yes	Partially Forecast	SFV	
	NI	Pennsylvania	Gas	Yes	Fully Forecast	Partial	
	NI	Virginia	Gas	Yes	Historical	Partial	
Northwest Natural Gas Company							Infrastructure Cost Recovery and Revenue Stabilization or Decoupling: S&P Global
	NWN	Oregon	Gas	Yes	Fully Forecast	Partial	Market Intelligence, Regulatory Focus: Adjustment Clauses, dated 7/18/22
	NWN	Washington	Gas	No	Historical	No	Test Year: S&P Cap IQ Pro, Rate Case History
ONE Gas, Inc.							Infrastructure Cost Recovery and Revenue Stabilization or Decoupling: S&P Global
	OGS	Kansas	Gas	Yes	Historical	Partial	Market Intelligence, Regulatory Focus: Adjustment Clauses, dated 7/18/22; 2022 10-
	OGS	Oklahoma	Gas	No	Historical	FRP	K, p. 7.
	OGS	Texas	Gas	Yes	Historical	FRP	Test Year: S&P Cap IQ Pro, Rate Case History
SJW Group							
	SJW	California	Water	Yes	Fully Forecast	No	Infrastructure Cost Recovery: 2022 10-K, pp. 5-8

COMPARISON OF KYAWC AND PROXY GROUP COMPANIES
CAPITAL COST RECOVERY MECHANISMS

Company	Ticker	State	Utility Type	Infrastructure Cost Recovery Mechanism	Future Test Year	Revenue Stabilization or Decoupling	Citations
	SJW	Connecticut	Water	Yes	Fully Forecast	Full	Revenue Stabilization or Decoupling: 2022 10-K, p. 60.
	SJW	Maine	Water	Yes	Historical	No	Test Year: S&P Cap IQ Pro, Rate Case History and Commission Profiles
	SJW	Texas	Water	No	Historical	No	
Spire, Inc.							Infrastructure Cost Recovery and Revenue Stabilization or Decoupling: S&P Global Market Intelligence, Regulatory Focus: Adjustment Clauses, dated 7/18/22, Company Tariffs (AL and MS)
	SR	Alabama (AL)	Gas	No	Fully Forecast	FRP	
	SR	Alabama (Gulf)	Gas	No	Fully Forecast	FRP	
	SR	Mississippi	Gas	No	Historical	FRP	Test Year: S&P Cap IQ Pro, Rate Case History; 2022 10-K, pgs. 117-121
	SR	Missouri	Gas	Yes	Partially Forecast	Partial	

Proxy Group Totals	Yes	44	Historical	27	Full	10
	No	12	Fully Forecast	23	Partial	13
			Partially Forecast	6	FRP	9
					SFV	1
					No	23
	CCRM	78.57%	FTY	51.79%		58.93%
KYAWC (Kentucky, Water)		Yes		Fully Forecast	No	

CAPITAL STRUCTURE ANALYSIS

COMMON EQUITY RATIO [1]

Proxy Group Company	Ticker	2021	2020	2019	3-yr Avg.
American States Water Company	AWR	59.69%	56.76%	55.40%	57.28%
Atmos Energy Corporation	ATO	59.88%	58.31%	57.85%	58.68%
California Water Service Group	CWT	49.24%	45.08%	43.23%	45.85%
Essential Utilities, Inc.	WTRG	53.56%	52.53%	52.80%	52.96%
Eversource Energy	ES	53.48%	54.23%	53.55%	53.76%
Middlesex Water Company	MSEX	57.39%	59.10%	61.98%	59.49%
NiSource Inc.	NI	54.85%	54.43%	54.33%	54.54%
Northwest Natural Gas Company	NWN	44.08%	41.92%	45.77%	43.92%
One Gas Inc.	OGS	61.09%	60.04%	63.28%	61.47%
SJW Corporation	SJW	50.91%	51.52%	50.40%	50.94%
Spire Inc.	SR	49.12%	52.78%	53.20%	51.70%

Proxy Group					
MEAN		53.94%	53.34%	53.80%	53.69%
LOW		44.08%	41.92%	43.23%	43.92%
HIGH		61.09%	60.04%	63.28%	61.47%

COMMON EQUITY RATIO - UTILITY OPERATING COMPANIES

Company Name	Ticker	2021	2020	2019	3-yr Avg.
Golden State Water / Bear Valley	AWR	59.69%	56.76%	55.40%	57.28%
Atmos Energy Corporation	ATO	59.88%	58.31%	57.85%	58.68%
California Water Service	CWT	48.51%	43.98%	42.87%	45.12%
New Mexico Water Service Water Division	CWT	69.19%	67.06%	65.26%	67.17%
New Mexico Water Service Sewer Division	CWT	62.89%	59.47%	56.79%	59.72%
Washington Water Service	CWT	65.96%	71.93%	52.53%	63.47%
Hawaii Water Service Kaanapali Division	CWT	51.93%	48.93%	49.76%	50.20%
Hawaii Water Service Pukalani Division	CWT	65.58%	64.56%	65.06%	65.07%
Aqua Pennsylvania Water	WTRG	53.84%	50.48%	50.65%	51.66%
Aqua Pennsylvania Wastewater	WTRG	98.06%	97.07%	95.39%	96.84%
Peoples Natural Gas Company	WTRG	53.44%	54.18%	53.54%	53.72%
Peoples Gas Company	WTRG	54.83%	51.71%	56.80%	54.45%
Aqua Ohio Water	WTRG	51.61%	64.62%	61.27%	59.17%
Aqua Ohio Wastewater	WTRG	73.67%	72.82%	60.35%	68.95%
Aqua Illinois	WTRG	57.99%	54.57%	57.96%	56.84%
Aqua Texas	WTRG	49.82%	50.06%	48.84%	49.57%
Aqua New Jersey, Inc. Water	WTRG	53.19%	50.28%	59.64%	54.37%
Aqua New Jersey, Inc. Wastewater	WTRG	79.06%	74.37%	55.16%	69.53%
Aqua North Carolina	WTRG	48.75%	50.62%	50.65%	50.01%
Aqua Virginia	WTRG	48.83%	55.23%	49.44%	51.17%
Delta Gas	WTRG	49.69%	49.16%	57.95%	52.27%
Peoples Gas of WV	WTRG	39.38%	46.47%	48.10%	44.65%
Connecticut Light and Power Company	ES	54.86%	55.42%	54.10%	54.79%
Yankee Gas Company	ES	61.16%	55.83%	54.90%	57.29%
Aquarion Water Company CT	ES	56.14%	56.27%	56.52%	56.31%
NSTAR Electric Company	ES	54.13%	53.68%	54.92%	54.24%
NSTAR Gas Company	ES	47.85%	48.33%	52.36%	49.51%
Aquarion Water Company MA	ES	68.10%	68.63%	53.79%	63.51%
Eversource Gas of MA	ES	47.20%	68.01%		57.60%
Public Service Company of NH	ES	47.48%	47.96%	47.33%	47.59%
Aquarion Water Company NH	ES		54.30%	52.36%	53.33%
Middlesex Water Company	MSEX	57.46%	59.03%	61.95%	59.48%
Pinelands Water	MSEX	51.34%	67.73%	64.30%	61.12%
Pinelands WW	MSEX	51.48%	72.23%	68.74%	64.15%
Northern Indiana Public Service Company LLC	NI	58.59%	58.01%	56.43%	57.68%
Columbia Gas of Kentucky, Inc.	NI	53.87%	54.68%	54.23%	54.26%
Columbia Gas of Maryland, Inc.	NI	55.26%	54.95%	52.38%	54.20%
Columbia Gas of Ohio, Inc.	NI	50.79%	50.45%	53.00%	51.41%
Columbia Gas of Pennsylvania, Inc.	NI	56.05%	55.68%	55.59%	55.77%
Columbia Gas of Virginia, Inc.	NI	44.52%	43.69%	42.53%	43.58%
Northwest Natural Gas Company	NWN	44.08%	41.92%	45.77%	43.92%
Kansas Gas Service Company, Inc.	OGS	61.37%	60.33%	63.55%	61.75%
Oklahoma Natural Gas Company	OGS	60.99%	59.85%	63.10%	61.31%
Texas Gas Service Company, Inc.	OGS	60.98%	59.99%	63.23%	61.40%
San Jose Water	SJW	50.22%	49.84%	48.29%	49.45%
CT Water	SJW	50.95%	53.94%	53.05%	52.65%
Maine Water Co.	SJW	49.13%	49.71%	50.29%	49.71%
Canyon Lake Water Service Company	SJW	59.53%	58.08%	63.61%	60.41%
Spire Alabama Inc.	SR	56.81%	58.95%	60.54%	58.77%
Spire Gulf Inc.	SR	41.14%	39.49%	37.18%	39.27%
Spire Mississippi Inc.	SR	39.18%	38.74%	45.95%	41.29%
Spire Missouri Inc.	SR	46.20%	50.65%	50.45%	49.10%

Notes:

[1] Ratios are weighted by actual common capital, preferred equity, long-term debt and short-term debt of Operating Subsidiaries.

[2] Natural Gas and Water operating subsidiaries where data was unable to be obtained for 2021, 2020 and 2019 were removed from the analysis.

CAPITAL STRUCTURE ANALYSIS

LONG-TERM DEBT RATIO [1]

Proxy Group Company	Ticker	2021	2020	2019	3-yr Avg.
American States Water Company	AWR	40.31%	43.24%	28.62%	37.39%
Atmos Energy Corporation	ATO	40.12%	41.69%	41.16%	40.99%
California Water Service Group	CWT	50.69%	41.23%	49.27%	47.06%
Essential Utilities, Inc.	WTRG	43.70%	42.36%	44.35%	43.47%
Eversource Energy	ES	43.56%	42.65%	44.19%	43.47%
Middlesex Water Company	MSEX	39.54%	40.36%	36.46%	38.79%
NiSource Inc.	NI	45.15%	45.57%	45.67%	45.46%
Northwest Natural Gas Company	NWN	44.85%	46.45%	47.27%	46.19%
One Gas Inc.	OGS	38.91%	39.96%	36.72%	38.53%
SJW Corporation	SJW	46.89%	39.25%	43.16%	43.10%
Spire Inc.	SR	39.38%	37.20%	34.23%	36.94%
Proxy Group					
MEAN		43.01%	41.81%	41.01%	41.94%
LOW		38.91%	37.20%	28.62%	36.94%
HIGH		50.69%	46.45%	49.27%	47.06%

LONG-TERM DEBT RATIO - UTILITY OPERATING COMPANIES

Company Name	Ticker	2021	2020	2019	3-yr Avg.
Golden State Water / Bear Valley	AWR	40.31%	43.24%	28.62%	37.39%
Atmos Energy Corporation	ATO	40.12%	41.69%	41.16%	40.99%
California Water Service	CWT	51.41%	41.68%	49.41%	47.50%
New Mexico Water Service Water Division	CWT	30.81%	32.94%	34.74%	32.83%
New Mexico Water Service Sewer Division	CWT	37.11%	40.53%	43.21%	40.28%
Washington Water Service	CWT	34.04%	28.07%	47.47%	36.53%
Hawaii Water Service Kaanapali Division	CWT	48.07%	51.07%	50.24%	49.80%
Hawaii Water Service Pukalani Division	CWT	34.42%	35.44%	34.94%	34.93%
Aqua Pennsylvania Water	WTRG	45.28%	48.22%	48.61%	47.37%
Aqua Pennsylvania Wastewater	WTRG	1.94%	2.93%	4.61%	3.16%
Peoples Natural Gas Company	WTRG	39.09%	33.95%	40.86%	37.97%
Peoples Gas Company	WTRG	43.12%	13.26%	22.13%	26.17%
Aqua Ohio Water	WTRG	48.39%	35.38%	38.73%	40.83%
Aqua Ohio Wastewater	WTRG	26.33%	27.18%	39.65%	31.05%
Aqua Illinois	WTRG	42.01%	45.43%	42.04%	43.16%
Aqua Texas	WTRG	49.99%	49.72%	50.91%	50.20%
Aqua New Jersey, Inc. Water	WTRG	46.81%	49.72%	40.36%	45.63%
Aqua New Jersey, Inc. Wastewater	WTRG	0.00%	0.00%	0.00%	0.00%
Aqua North Carolina	WTRG	51.25%	49.38%	49.35%	49.99%
Aqua Virginia	WTRG	51.17%	44.77%	50.56%	48.83%
Delta Gas	WTRG	41.51%	37.19%	38.32%	39.00%
Peoples Gas of WV	WTRG	43.11%	49.45%	51.90%	48.15%
Connecticut Light and Power Company	ES	43.93%	43.30%	43.68%	43.64%
Yankee Gas Company	ES	37.77%	34.27%	35.35%	35.79%
Aquarion Water Company CT	ES	41.40%	39.49%	43.33%	41.41%
NSTAR Electric Company	ES	43.63%	43.49%	44.37%	43.83%
NSTAR Gas Company	ES	38.19%	38.69%	41.93%	39.60%
Aquarion Water Company MA	ES	11.42%	2.83%	30.67%	14.97%
Eversource Gas of MA	ES	43.14%	31.06%		37.10%
Public Service Company of NH	ES	49.23%	50.60%	51.75%	50.53%
Aquarion Water Company NH	ES		38.03%	43.85%	40.94%
Middlesex Water Company	MSEX	40.01%	40.62%	36.70%	39.11%
Pinelands Water	MSEX	0.00%	0.00%	0.00%	0.00%
Pinelands WW	MSEX	0.00%	0.00%	0.00%	0.00%
Northern Indiana Public Service Company LLC	NI	41.41%	41.99%	43.57%	42.32%
Columbia Gas of Kentucky, Inc.	NI	46.13%	45.32%	45.77%	45.74%
Columbia Gas of Maryland, Inc.	NI	44.74%	45.05%	47.62%	45.80%
Columbia Gas of Ohio, Inc.	NI	49.21%	49.55%	47.00%	48.59%
Columbia Gas of Pennsylvania, Inc.	NI	43.95%	44.32%	44.41%	44.23%
Columbia Gas of Virginia, Inc.	NI	55.48%	56.31%	57.47%	56.42%
Northwest Natural Gas Company	NWN	44.85%	46.45%	47.27%	46.19%
Kansas Gas Service Company, Inc.	OGS	38.63%	39.67%	36.45%	38.25%
Oklahoma Natural Gas Company	OGS	39.01%	40.15%	36.90%	38.69%
Texas Gas Service Company, Inc.	OGS	39.02%	40.01%	36.77%	38.60%
San Jose Water	SJW	49.72%	42.42%	45.54%	45.90%
CT Water	SJW	45.81%	37.30%	40.71%	41.28%
Maine Water Co.	SJW	36.18%	32.93%	42.47%	37.19%
Canyon Lake Water Service Company	SJW	40.28%	20.35%	24.88%	28.51%
Spire Alabama Inc.	SR	40.03%	32.66%	30.07%	34.25%
Spire Gulf Inc.	SR	42.00%	57.90%	62.82%	54.24%
Spire Mississippi Inc.	SR	0.00%	0.00%	0.00%	0.00%
Spire Missouri Inc.	SR	39.42%	38.72%	34.99%	37.71%

Notes:

[1] Ratios are weighted by actual common capital, preferred equity, long-term debt and short-term debt of Operating Subsidiaries.

[2] Natural Gas and Water operating subsidiaries where data was unable to be obtained for 2021, 2020 and 2019 were removed from the analysis.

CAPITAL STRUCTURE ANALYSIS

PREFERRED EQUITY RATIO [1]

Proxy Group Company	Ticker	2021	2020	2019	3-yr Avg.
American States Water Company	AWR	0.00%	0.00%	0.00%	0.00%
Atmos Energy Corporation	ATO	0.00%	0.00%	0.00%	0.00%
California Water Service Group	CWT	0.00%	0.00%	0.00%	0.00%
Essential Utilities, Inc.	WTRG	0.00%	0.00%	0.00%	0.00%
Eversource Energy	ES	0.57%	0.61%	0.71%	0.63%
Middlesex Water Company	MSEX	0.32%	0.35%	0.40%	0.36%
NiSource Inc.	NI	0.00%	0.00%	0.00%	0.00%
Northwest Natural Gas Company	NWN	0.00%	0.00%	0.00%	0.00%
One Gas Inc.	OGS	0.00%	0.00%	0.00%	0.00%
SJW Corporation	SJW	0.00%	0.00%	0.00%	0.00%
Spire Inc.	SR	0.00%	0.00%	0.00%	0.00%
Proxy Group					
MEAN		0.08%	0.09%	0.10%	0.09%
LOW		0.00%	0.00%	0.00%	0.00%
HIGH		0.57%	0.61%	0.71%	0.63%

PREFERRED EQUITY RATIO - UTILITY OPERATING COMPANIES

Company Name	Ticker	2021	2020	2019	3-yr Avg.
Golden State Water / Bear Valley	AWR	0.00%	0.00%	0.00%	0.00%
Atmos Energy Corporation	ATO	0.00%	0.00%	0.00%	0.00%
California Water Service	CWT	0.00%	0.00%	0.00%	0.00%
New Mexico Water Service Water Division	CWT	0.00%	0.00%	0.00%	0.00%
New Mexico Water Service Sewer Division	CWT	0.00%	0.00%	0.00%	0.00%
Washington Water Service	CWT	0.00%	0.00%	0.00%	0.00%
Hawaii Water Service Kaanapali Division	CWT	0.00%	0.00%	0.00%	0.00%
Hawaii Water Service Pukalani Division	CWT	0.00%	0.00%	0.00%	0.00%
Aqua Pennsylvania Water	WTRG	0.00%	0.00%	0.00%	0.00%
Aqua Pennsylvania Wastewater	WTRG	0.00%	0.00%	0.00%	0.00%
Peoples Natural Gas Company	WTRG	0.00%	0.00%	0.00%	0.00%
Peoples Gas Company	WTRG	0.00%	0.00%	0.00%	0.00%
Aqua Ohio Water	WTRG	0.00%	0.00%	0.00%	0.00%
Aqua Ohio Wastewater	WTRG	0.00%	0.00%	0.00%	0.00%
Aqua Illinois	WTRG	0.00%	0.00%	0.00%	0.00%
Aqua Texas	WTRG	0.00%	0.00%	0.00%	0.00%
Aqua New Jersey, Inc. Water	WTRG	0.00%	0.00%	0.00%	0.00%
Aqua New Jersey, Inc. Wastewater	WTRG	0.00%	0.00%	0.00%	0.00%
Aqua North Carolina	WTRG	0.00%	0.00%	0.00%	0.00%
Aqua Virginia	WTRG	0.00%	0.00%	0.00%	0.00%
Delta Gas	WTRG	0.00%	0.00%	0.00%	0.00%
Peoples Gas of WV	WTRG	0.00%	0.00%	0.00%	0.00%
Connecticut Light and Power Company	ES	1.20%	1.28%	1.43%	1.30%
Yankee Gas Company	ES	0.00%	0.00%	0.00%	0.00%
Aquarion Water Company CT	ES	0.00%	0.00%	0.00%	0.00%
NSTAR Electric Company	ES	0.47%	0.51%	0.57%	0.52%
NSTAR Gas Company	ES	0.00%	0.00%	0.00%	0.00%
Aquarion Water Company MA	ES	0.00%	0.00%	0.00%	0.00%
Eversource Gas of MA	ES	0.00%	0.00%		0.00%
Public Service Company of NH	ES	0.00%	0.00%	0.00%	0.00%
Aquarion Water Company NH	ES		0.01%	0.01%	0.01%
Middlesex Water Company	MSEX	0.33%	0.36%	0.40%	0.36%
Pinelands Water	MSEX	0.00%	0.00%	0.00%	0.00%
Pinelands WW	MSEX	0.00%	0.00%	0.00%	0.00%
Northern Indiana Public Service Company LLC	NI	0.00%	0.00%	0.00%	0.00%
Columbia Gas of Kentucky, Inc.	NI	0.00%	0.00%	0.00%	0.00%
Columbia Gas of Maryland, Inc.	NI	0.00%	0.00%	0.00%	0.00%
Columbia Gas of Ohio, Inc.	NI	0.00%	0.00%	0.00%	0.00%
Columbia Gas of Pennsylvania, Inc.	NI	0.00%	0.00%	0.00%	0.00%
Columbia Gas of Virginia, Inc.	NI	0.00%	0.00%	0.00%	0.00%
Northwest Natural Gas Company	NWN	0.00%	0.00%	0.00%	0.00%
Kansas Gas Service Company, Inc.	OGS	0.00%	0.00%	0.00%	0.00%
Oklahoma Natural Gas Company	OGS	0.00%	0.00%	0.00%	0.00%
Texas Gas Service Company, Inc.	OGS	0.00%	0.00%	0.00%	0.00%
San Jose Water	SJW	0.00%	0.00%	0.00%	0.00%
CT Water	SJW	0.00%	0.00%	0.00%	0.00%
Maine Water Co.	SJW	0.00%	0.00%	0.00%	0.00%
Canyon Lake Water Service Company	SJW	0.00%	0.00%	0.00%	0.00%
Spire Alabama Inc.	SR	0.00%	0.00%	0.00%	0.00%
Spire Gulf Inc.	SR	0.00%	0.00%	0.00%	0.00%
Spire Mississippi Inc.	SR	0.00%	0.00%	0.00%	0.00%
Spire Missouri Inc.	SR	0.00%	0.00%	0.00%	0.00%

Notes:

[1] Ratios are weighted by actual common capital, preferred equity, long-term debt and short-term debt of Operating Subsidiaries.

[2] Natural Gas and Water operating subsidiaries where data was unable to be obtained for 2021, 2020 and 2019 were removed from the analysis.

CAPITAL STRUCTURE ANALYSIS

SHORT-TERM DEBT RATIO [1]

Proxy Group Company	Ticker	2021	2020	2019	3-yr Avg.
American States Water Company	AWR	0.00%	0.00%	15.98%	5.33%
Atmos Energy Corporation	ATO	0.00%	0.00%	0.99%	0.33%
California Water Service Group	CWT	0.07%	13.69%	7.49%	7.09%
Essential Utilities, Inc.	WTRG	2.74%	5.12%	2.85%	3.57%
Eversource Energy	ES	2.40%	2.51%	1.55%	2.15%
Middlesex Water Company	MSEX	2.75%	0.19%	1.17%	1.37%
NiSource Inc.	NI	0.00%	0.00%	0.00%	0.00%
Northwest Natural Gas Company	NWN	11.07%	11.63%	6.96%	9.89%
One Gas Inc.	OGS	0.00%	0.00%	0.00%	0.00%
SJW Corporation	SJW	2.20%	9.23%	6.44%	5.96%
Spire Inc.	SR	11.50%	10.02%	12.57%	11.36%
Proxy Group					
MEAN		2.97%	4.76%	5.09%	4.28%
LOW		0.00%	0.00%	0.00%	0.00%
HIGH		11.50%	13.69%	15.98%	11.36%

SHORT-TERM DEBT RATIO - UTILITY OPERATING COMPANIES

Company Name	Ticker	2021	2020	2019	3-yr Avg.
Golden State Water / Bear Valley	AWR	0.00%	0.00%	15.98%	5.33%
Atmos Energy Corporation	ATO	0.00%	0.00%	0.99%	0.33%
California Water Service	CWT	0.07%	14.34%	7.72%	7.38%
New Mexico Water Service Water Division	CWT	0.00%	0.00%	0.00%	0.00%
New Mexico Water Service Sewer Division	CWT	0.00%	0.00%	0.00%	0.00%
Washington Water Service	CWT	0.00%	0.00%	0.00%	0.00%
Hawaii Water Service Kaanapali Division	CWT	0.00%	0.00%	0.00%	0.00%
Hawaii Water Service Pukalani Division	CWT	0.00%	0.00%	0.00%	0.00%
Aqua Pennsylvania Water	WTRG	0.87%	1.30%	0.73%	0.97%
Aqua Pennsylvania Wastewater	WTRG	0.00%	0.00%	0.00%	0.00%
Peoples Natural Gas Company	WTRG	7.47%	11.87%	5.60%	8.31%
Peoples Gas Company	WTRG	2.05%	35.02%	21.07%	19.38%
Aqua Ohio Water	WTRG	0.00%	0.00%	0.00%	0.00%
Aqua Ohio Wastewater	WTRG	0.00%	0.00%	0.00%	0.00%
Aqua Illinois	WTRG	0.00%	0.00%	0.00%	0.00%
Aqua Texas	WTRG	0.20%	0.22%	0.26%	0.22%
Aqua New Jersey, Inc. Water	WTRG	0.00%	0.00%	0.00%	0.00%
Aqua New Jersey, Inc. Wastewater	WTRG	20.94%	25.63%	44.84%	30.47%
Aqua North Carolina	WTRG	0.00%	0.00%	0.00%	0.00%
Aqua Virginia	WTRG	0.00%	0.00%	0.00%	0.00%
Delta Gas	WTRG	8.80%	13.65%	3.73%	8.73%
Peoples Gas of WV	WTRG	17.51%	4.08%	0.00%	7.20%
Connecticut Light and Power Company	ES	0.00%	0.00%	0.79%	0.26%
Yankee Gas Company	ES	1.07%	9.91%	9.76%	6.91%
Aquarion Water Company CT	ES	2.46%	4.24%	0.15%	2.28%
NSTAR Electric Company	ES	1.77%	2.32%	0.14%	1.41%
NSTAR Gas Company	ES	13.96%	12.98%	5.71%	10.88%
Aquarion Water Company MA	ES	20.47%	28.54%	15.54%	21.52%
Eversource Gas of MA	ES	9.66%	0.93%		5.29%
Public Service Company of NH	ES	3.30%	1.44%	0.92%	1.88%
Aquarion Water Company NH	ES		7.66%	3.79%	5.72%
Middlesex Water Company	MSEX	2.20%	0.00%	0.96%	1.05%
Pinelands Water	MSEX	48.66%	32.27%	35.70%	38.88%
Pinelands WW	MSEX	48.52%	27.77%	31.26%	35.85%
Northern Indiana Public Service Company LLC	NI	0.00%	0.00%	0.00%	0.00%
Columbia Gas of Kentucky, Inc.	NI	0.00%	0.00%	0.00%	0.00%
Columbia Gas of Maryland, Inc.	NI	0.00%	0.00%	0.00%	0.00%
Columbia Gas of Ohio, Inc.	NI	0.00%	0.00%	0.00%	0.00%
Columbia Gas of Pennsylvania, Inc.	NI	0.00%	0.00%	0.00%	0.00%
Columbia Gas of Virginia, Inc.	NI	0.00%	0.00%	0.00%	0.00%
Northwest Natural Gas Company	NWN	11.07%	11.63%	6.96%	9.89%
Kansas Gas Service Company, Inc.	OGS	0.00%	0.00%	0.00%	0.00%
Oklahoma Natural Gas Company	OGS	0.00%	0.00%	0.00%	0.00%
Texas Gas Service Company, Inc.	OGS	0.00%	0.00%	0.00%	0.00%
San Jose Water	SJW	0.05%	7.74%	6.17%	4.65%
CT Water	SJW	3.24%	8.76%	6.23%	6.08%
Maine Water Co.	SJW	14.68%	17.36%	7.23%	13.09%
Canyon Lake Water Service Company	SJW	0.19%	21.56%	11.51%	11.09%
Spire Alabama Inc.	SR	3.16%	8.40%	9.39%	6.98%
Spire Gulf Inc.	SR	16.86%	2.61%	0.00%	6.49%
Spire Mississippi Inc.	SR	60.82%	61.26%	54.05%	58.71%
Spire Missouri Inc.	SR	14.38%	10.63%	14.56%	13.19%

Notes:

[1] Ratios are weighted by actual common capital, preferred equity, long-term debt and short-term debt of Operating Subsidiaries.

[2] Natural Gas and Water operating subsidiaries where data was unable to be obtained for 2021, 2020 and 2019 were removed from the analysis.

COMMONWEALTH OF KENTUCKY
BEFORE THE PUBLIC SERVICE COMMISSION

IN THE MATTER OF:

ELECTRONIC APPLICATION OF KENTUCKY-	**)**	
AMERICAN WATER COMPANY FOR AN	**)**	
ADJUSTMENT OF RATES, A CERTIFICATE	**)**	
OF PUBLIC CONVENIENCE AND NECESSITY	**)**	**CASE NO. 2023-00191**
FOR INSTALLATION OF ADVANCED METERING	**)**	
INFRASTRUCTURE, APPROVAL OF CERTAIN	**)**	
REGULATORY AND ACCOUNTING	**)**	
TREATMENTS, AND TARIFF REVISIONS	**)**	

DIRECT TESTIMONY OF KRISTA E. CITRON, PE, MBA

June 30, 2023

INTRODUCTION

Q. Please state your name, position, and business address.

A. My name is Krista Citron. I am the Senior Project Engineer for Kentucky-American Water Company ("KAWC" or "the Company"). My business address is 2300 Richmond Road, Lexington, Kentucky 40502.

Q. Have you previously filed testimony at the Kentucky Public Service Commission ("Commission")?

A. Yes. I filed written testimony before the Kentucky Public Service Commission (the "Commission") in Case No. 2021-00090, Case No. 2021-00376, Case No. 2022-00032, Case No. 2022-00328, and Case No. 2023-00030. I also provided hearing testimony at the Commission in the June 2, 2021 hearing for Case No. 2021-00090.

Q. Please state your educational and professional background.

A. I earned my Bachelor of Science in Civil Engineering from Vanderbilt University in Nashville, Tennessee in 2007 and my Master of Science, also in Civil Engineering, from the University of Kentucky in Lexington, Kentucky in 2008. I obtained a Master of Business Administration from Western Kentucky University in 2022. I am a registered Professional Engineer in the states of Kentucky and Tennessee.

I have been employed as an engineer by KAWC since 2017. Prior to that, I worked at CDP Engineers in Lexington, Kentucky for 8 years as a Project Engineer, overseeing municipal water, wastewater, and stormwater improvement projects. I also worked with CDP's transportation group on roadway design projects and served as a construction inspector for municipal utility projects. I am an active member of the Kentucky Society of Professional Engineers (KSPE) and the KY/TN section of the American Water Works Association (AWWA).

Q. What is the purpose of your direct testimony?

A. The purpose of my testimony is to describe the current status of the Qualified Infrastructure Program Rider ("QIP Rider") approved by this Commission in KAWC's last rate case (Case No. 2018-00358), support the need for the proposed expansion of the QIP Rider, and discuss the many efforts the Company undertakes to manage costs associated with the QIP. As set forth below, KAWC seeks to expand QIP from the current annual replacement of 10-13 miles of cast iron main to 27-34 miles of any type of main.

QUALIFIED INFRASTRUCTURE PROGRAM

Q. What is the critical infrastructure issue facing KAWC?

A. Utilities, customers, and regulators across the country are facing the reality of infrastructure nearing the end of its useful life, especially buried pipes. Over the past 25 years, several studies have been published[1] that have documented the pending financial investments that the water and wastewater industries face based on the anticipated service life of the original mains. The preeminent reports are, "Dawn of the Replacement Era," and "Buried No Longer: Confronting America's Infrastructure Challenge," both published by AWWA.[2] In addition, the Kentucky Section of the American Society of Civil Engineers ("ASCE") issued a 2019 Report Card for Kentucky's Infrastructure that explains that Kentucky has an estimated funding need of $8.2 billion to address drinking water infrastructure, which represents a 32 percent increase over its 2011 evaluation.[3] The report goes on to note that investment for transmission and distribution facilities represents the largest infrastructure

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[1]E.g., Studies by American Water Works Association, the Water Research Foundation ("WRF"), the American Society of Civil Engineers, and the US Environmental Protection Agency.

[2] AWWA, 2001. *Dawn of the Replacement Era: Reinvesting in Drinking Water Infrastructure*. AWWA, Denver. www.scribd.com/document/39675402/AWWA-Dawn-of-the-Replacement-Era.

[3] 2019 Report Card for Kentucky's Infrastructure, p. 35 available at https://infrastructurereportcard.org/wp-content/uploads/2021/07/2019-ASCE-KY-Infrastructure-Report-updated.pdf.

investment need ($6.3 billion).[4] Like other water utilities in the state, KAWC must find a way to address these needs as cost effectively as possible for its customers.

Q. Why is infrastructure replacement such an important issue?

A. In the summary of the "Buried No Longer" study, AWWA indicates that "the United States is reaching a crossroads and faces a difficult choice. We can incur the haphazard and growing costs of living with aging and failing drinking water infrastructure. Or, we can carefully prioritize and undertake drinking water infrastructure renewal investments to help ensure that our water utilities can continue to reliably and cost-effectively support the public health, safety, and economic vitality of our communities."[5] The Qualified Infrastructure Program ("QIP") approved in Case No. 2018-00358 supports the careful prioritization and undertaking that AWWA recommends. Despite the recognition of this issue decades ago, the challenges associated with aging infrastructure persist throughout the water utility industry. This is evidenced by the ongoing persistence of main breaks identified in the 2021 ASCE Infrastructure Report Card, noting that "a 27% increase in water main break rates between 2012 and 2018, reaching an estimated 250,000 to 300,000 breaks per year; this is equivalent to a water main break every two minutes."[6]

Q. What asset categories are included in the Company's QIP?

A. As originally proposed, the Company's QIP included replacement of certain water distribution system assets, which currently includes approximately 2,352 miles of pipe of various materials ranging in sizes from 1.5 to 42 inches and 17,815 main line valves. The

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[4] *Id.*

[5] AWWA, 2012. *Buried No Longer: Confronting America's Water Infrastructure Challenge*. AWWA, Denver.

[6] https://infrastructurereportcard.org/wp-content/uploads/2017/01/Drinking-Water-2021.pdf.

Company's QIP proposal also included replacement of distribution system structures and improvements, supply mains, power generation equipment, pumping equipment, transmission and distribution mains, services, meter and meter installations and hydrants. Finally, the Company's proposed QIP included replacement of aging treatment plant items or facilities, such as pumping equipment, generators, water quality sampling equipment, Supervisory Control and Data Acquisition ("SCADA") equipment, and treatment equipment. Inclusion of these items would allow the installation of newer, more efficient infrastructure to continue to provide high-quality water service and ultimately lead to a more efficient operation of the system that benefits customer.

Q. Please describe eligible Distribution Infrastructure.

A. Eligible distribution infrastructure includes distribution and transmission system structures and improvements, mains and valves installed as replacements for existing facilities; hydrants, distribution tanks; services, meters and meter installations; and power generation and pumping equipment installed as replacements for existing facilities; and unreimbursed funds related to capital projects to relocate facilities required by governmental infrastructure projects.

Q. Please describe eligible Water Treatment Infrastructure.

A. Eligible water treatment infrastructure includes source of supply and water treatment structures, pipe and equipment including sampling equipment, SCADA equipment, and power generation and pumping equipment installed as replacements for existing facilities.

Q. Are projects encompassing all of the categories of QIP eligible Utility Plant included in the QIP?

A. Not at this time.

Q. Why are certain projects not included?

A. The Commission's June 17, 2020 Order in Case No. 2020-00027 states that only projects that "are reasonably related or incidental to replacing aging mains"[7] should be included in QIP Rider filings. Replacing hydrants, valves, and service lines that are **incidental** to the main replacements as part of the Budget Line B projects was also approved by the Commission. The Commission also said the following related to future QIP Applications:

> For all future QIP applications after QIP 2, the Commission finds that the amount of main replacement included in QIP projects should be consistent with the amount proposed and approved in Case No. 2018-00358, and should be based on a 25-year replacement cycle. The Commission further finds that, based on the 25-year replacement cycle, Kentucky-American should limit future QIP scheduled main replacement to 10-13 miles of main replaced each year.[8]

Therefore, QIP projects since that time have complied with this requirement.

Q. Is the Company seeking to expand the current scope of the QIP?

A. Yes. While the existing scope of the QIP has allowed the Company to accelerate some replacement of its aging infrastructure, it is not sufficient to address the pace at which the Company's aging infrastructure should be replaced to best serve the long-term interest of our customers. As the Company continues to face challenges associated with its aging infrastructure well beyond which can be addressed by the annual replacement of 10-13 miles of cast iron main, the Company is seeking to expand the current scope of the infrastructure deemed eligible for QIP cost recovery to 27-34 miles of main of any material type, as prioritized through the Company's comprehensive pipe prioritization models

[7] Case No. 2020-00027, June 17, 2020 Order, p. 16.
[8] Case No. 2021-00090, June 21, 2021 Order, p. 12.

further discussed below. This proposed expansion is consistent with a recommended rate of replacement.

Q. You note a recommended replacement rate. What is the basis of that recommendation?

A. Earlier in 2023, KAWC contracted Stantec Consulting Services Inc. ("Stantec") to review the current state of KAWC's distribution system, analyze the replacement needs over 30-, 50-, and 80-year time periods, and recommend an annual replacement program that encompasses the entire KAWC distribution system. Stantec's report is attached hereto as KAW_DT_Citron_Exhibit_1 ("Stantec Report").

Stantec utilized available GIS data from KAWC to assess the target replacement year for each pipe based on its material and recorded installation date. The AWWA "Buried No Longer" Report includes Average Expected Life of Pipe Material (below) that was used as the basis for projection calculations in this assessment.

Table 4 – Average Expected Life of Pipe Material						
Material Types						
Cast Iron Unlined	Cast Iron Lined	Asbestos Cement	PVC	Ductile Iron	Galvanized	Concrete
110 yrs	100 yrs	90 yrs	55 yrs	80 yrs	70 yrs	105 yrs

The Stantec Report demonstrates that nearly 250 miles of pipes of various materials will have already reached or exceeded their useful life in or before the year 2025, leading to a large volume of replacements due at once. These replacements will need to be distributed over several years in addition to the replacements of other pipes that reach the end of *their* useful lives during that same time.

Based on the current mix of pipe age and material within KAWC's system, the anticipated rate of replacement needs over the 30-, 50-, and 80-year planning horizons are over twice the current QIP program rate. KAWC replaces approximately 0.5 percent of its system annually through the QIP at present; in order to replace the entirety of the system in keeping with the pipe's life expectancy, the recommended rate is to replace 29 miles of main annually, which is within the range of 27-34 miles of main to be replaced annually over the next 30 and 50 years, respectively. This would be a replacement rate of 1.1 to 1.4 percent annually.

KAWC uses its pipeline prioritization model and other factors (such as other utility or paving coordination) to select projects that will constitute the work performed under the QIP Rider. It is important to note that KAWC's distribution system is not static, and adjustments will likely occur as actual system conditions evolve.

Q. Does KAWC control when, and which, mains in the distribution system are replaced?

A. Not always. While KAWC can target segments of its distribution system for replacement due to the age of the facilities or the type of material involved, replacements are often driven by unscheduled main breaks, infrastructure relocation, and municipal paving programs.

Q. Please explain what you mean by "infrastructure relocation."

A. Most of KAWC's buried infrastructure is located within public rights-of-way. The governmental entities in control of these rights-of-way, such as the Kentucky Transportation Cabinet, various municipal governments, county highway departments, etc.

require the Company to relocate its water infrastructure to accommodate projects such as road widening, sewer installation, storm drainage improvements, streetscapes, etc.

Q. In addition to infrastructure relocations, you also mentioned that KAWC cannot always predict when main breaks will occur. What is the cost of responding reactively to main breaks?

A. KAWC analyzed main break history from January 2012 to December 2022 and during this period, KAWC experienced 3,128 documented main breaks. Based on the current five year average, the cost for KAWC to repair a main break is over $1,000 per linear foot compared to $331 per linear foot for a planned main replacement project.

Although most of these breaks are minor, serious ruptures can and do occur. With serious breaks the impact can be catastrophic due to flooding of streets and sidewalks, and in some instances flooding of local businesses and basements of local residents. In rare instances, the loss of water can undermine pavement or building foundations that can lead to the failure of pavements or the loss of a building that can result in significant property damage. Failure of the water distribution system can result in delay of emergency response, and damage to other surrounding essential infrastructure.[9]

The loss of water through leaking pipe as the infrastructure ages affects the entire community, most of the time with no one knowing it is occurring. This loss of water typically manifests itself in an increase in "non-revenue water." A high level of non-

[9] *"Failure to Act: Closing the Infrastructure Investment Gap for America's Economic Future"* (2016), available at https://www.infrastructurereportcard.org/wp-content/uploads/2016/05/2016-FTA-Report-Close-the-Gap.pdf (available as of June 26, 2023).

revenue water affects the financial viability of water utilities through lost revenues and increased operational costs. Over time the ability to manage non-revenue water is reduced without a systematic approach for replacing aging infrastructure.

Q. What is the current status of the QIP Rider?

A. Since the QIP began in 2020, the Company has replaced 34.5 miles of the system's aging water mains—primarily cast iron and galvanized steel mains. The current rate of 10-13 miles replaced per year represents an average replacement rate of 0.5 percent of the total system per year. Even at this accelerated replacement rate, it still would take nearly 204.5 years to replace the entire distribution system. This is not the optimal level of infrastructure investment because our pipes will not last – they may only last 60 to 100 years depending on the type of pipe material, soil conditions, and other factors. To close this gap, we would need to further accelerate the rate of investment to replace our water infrastructure.

QIP Year 4 (Case No. 2023-00030) was projected to begin on July 1, 2023 and will replace approximately 13.3 miles of cast iron, galvanized steel, and asbestos cement water main.

Q. What consequences may result from maintaining KAWC's current rate of pipe replacement?

A. Buried pipes are a critical part of the infrastructure used by water utilities to deliver reliable service to customers. In fact, for many water utilities, buried pipes are the largest infrastructure category as a percentage of total infrastructure on an asset cost basis. This is because pipes are required to extend along every block of every street in every neighborhood throughout the service area to provide water service to each address served.

KAWC will always make the needed investments to maintain or replace infrastructure. In other words, we continue to make necessary investments for adequate sources of supply, treatment, pumping, transmission and distribution facilities, as well as to comply with applicable laws and regulations. But the necessary rate of ongoing infrastructure investment to provide safe and adequate service is not the same as the rate of infrastructure investment that best serves the long-term interests of our customers.

To the extent that pipe replacement is deferred into the future, service quality will suffer from an increasing number of pipe breaks and the resulting service disruptions, health risks from potential drinking water contamination, property damage, and opportunity costs related to community health and economic development. Deferral of pipe replacements year by year has a cumulative effect on the future cost to customers for replacing these pipes, leaving future customers with much larger bills. The phrase "tidal wave" has been used in AWWA studies on this subject to describe the significant and dramatic increase in replacement costs that will result tomorrow from deferring pipeline replacements today.

Q. How is KAWC proposing to identify which water mains to replace each year?

A. KAWC has utilized a pipeline prioritization model (PPM) to help determine which mains should be replaced each year. The model identifies eight criteria that are crucial in determining if a main is providing reliable service, as well as an indicator for the condition of the main. These criteria are: low pressure; number of breaks/leaks; fire flow; age; material type; size of main; water quality; and customer impact. Due to the interrelationships of the eight criteria, the Company established relative weights for each criterion to ensure that the targeted drivers for the main are given greater consideration. Age, material type, low pressure, number of breaks and water quality are the primary criteria used to determine main replacement. There are also external drivers that influence the main replacement program, such as roadway paving schedules, coordination with other utilities, or construction fatigue. Combining the prioritization model results with external drivers allows KAWC to maintain an adaptable replacement program which allows for the efficient use of available resources. For QIP Year 3, for example, projects were selected using an additional factor which is the pavement condition rating from the City of Lexington ("LFUCG"). Using Geographical Information Systems ("GIS"), the prioritization model ranking and the pavement condition rating were overlaid on a map of KAWC's infrastructure, and projects were selected from among the streets that both ranked higher on the prioritization model and were rated as having poor pavement conditions. The goal of this additional step is to identify segments of KAWC's mains that are located within roadways that are likely to be paved in the near future. This was done intentionally to better coordinate paving restoration requirements with LFUCG, and to select streets that would be good candidates for paving cost sharing between KAWC and LFUCG or other utilities.

Advances in technology have allowed the Company to enhance the prioritization model with a map-based program. The underlying factors remain unchanged. However, the enhanced model allows for data to be pulled automatically from sources such as GIS (for pipe characteristics) or MapCall (for main breaks) rather than relying on a manual update. This enhanced model also examines the potential *likelihood* of each pipe failing (main break or leak, age, etc.) and the potential *consequence* on customers and communities should such a failure occur. In doing so, we use risk modeling tools and historical operating data. Risk modeling tools assist us in identifying pipes that are at or beyond the end of their service life. Figures 1-4 below provide an example of what the outputs of this enhanced model look like.

Q. Can you describe what factors are assessed for Likelihood of Failure ("LOF") and Consequence of Failure ("COF")?

A. The PPM tool evaluates the potential LOF and potential COF for each pipe in a water system and calculates its potential risk score which is the product of LOF and COF. Potential risk scores can then be used, along with other local factors (such as a municipality's road pavement schedule, lead service line replacement, etc.), to develop prioritized pipe renewal / replacement programs. The LOF is evaluated using performance related data such as main breaks, loading (such as pipe working pressure and buried depth), and pipe cohorts (categorized by pipe material, diameter, and installation year). Statistical models are fitted using pipe failure data to calculate the survival probability of pipes in different cohorts. The COF is assessed in three categories: social, economic, and environmental impacts. For social impact, results from hydraulic modeling are used to determine the number of customers impacted and the gallons of water that would not be delivered if a pipe were to fail. In addition, disruption to traffic (railroads, highways, etc.) and the difficulty in pipe repair (e.g., pipes crossing large rivers, levees, etc.) are considered. Environmental impacts are evaluated based on a pipeline's proximity to water bodies or rivers.

It is important to consider how the COF and LOF are assessed. For instance, using a COF-only method of pipeline selection, it is unlikely that most of the aging small-diameter mains in the system will ever be prioritized since the consequence of their failure is limited in number of customers or potential for flooding, etc. However, leaking small-diameter mains can have a cumulative significant impact on NRW. Small-diameter cast iron and galvanized mains have been the focus of the QIP to date because of their propensity to leak or break. However, in reviewing the LOF-only method of pipeline selection, it is evident that while cast iron and galvanized mains comprise most of the top priorities, they do not account for *all* the highest LOF mains. The Company's system has aging plastic, asbestos cement, and other material types that also rise to the top of the list when likelihood of failure is assessed. As previously mentioned, the cost to repair an unscheduled main break – of any material type – far outweighs the cost of planned replacements. It is prudent for KAWC to expand the QIP to consider additional material types when reviewing and planning for upcoming main replacement projects. In Figures 1-4 below, the different pipe materials other than cast iron are present in both the LOF and COF/LOF views.

Figure 1 – KAWC LOF (50 miles)

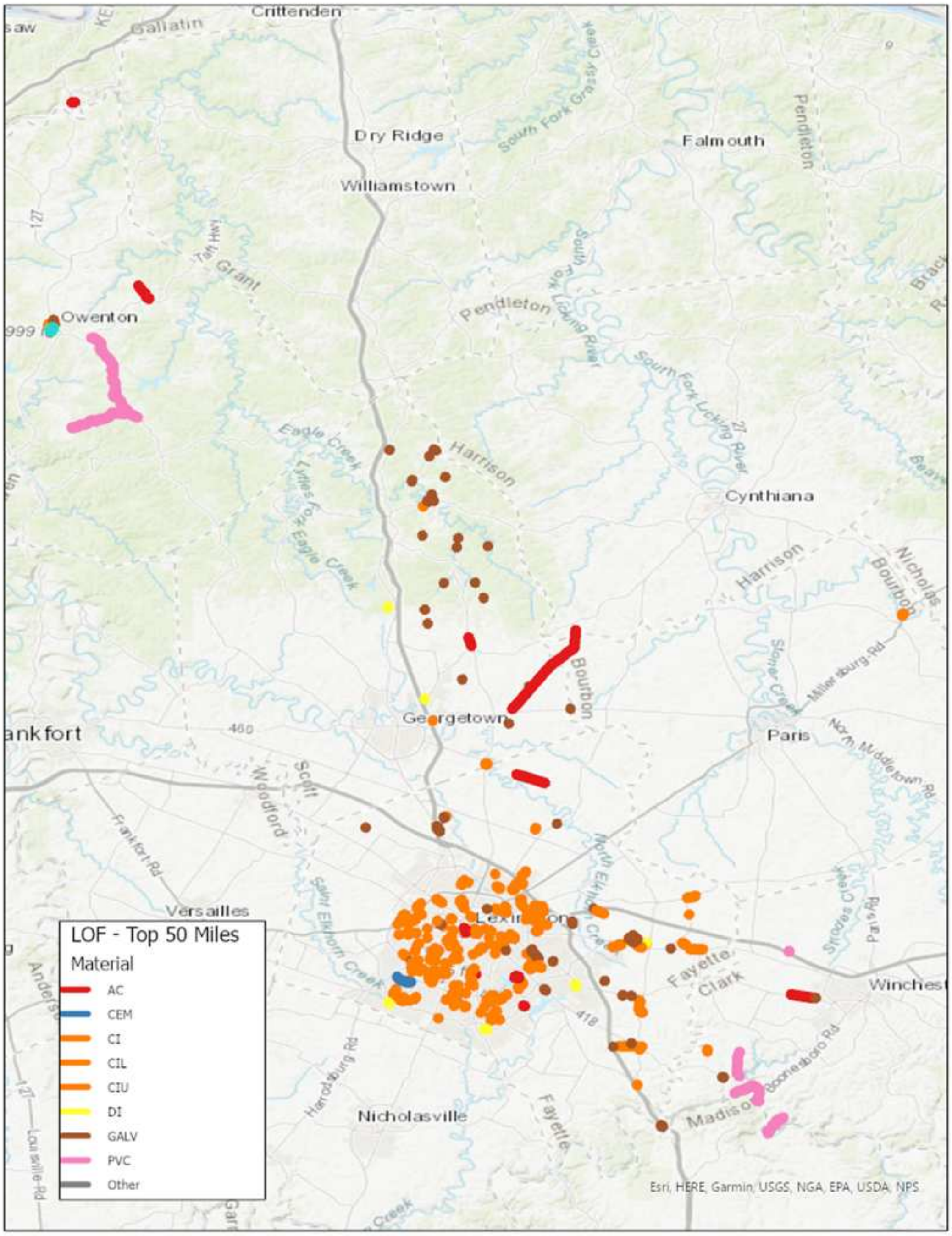


Figure 2 – Lexington LOF (50 miles)

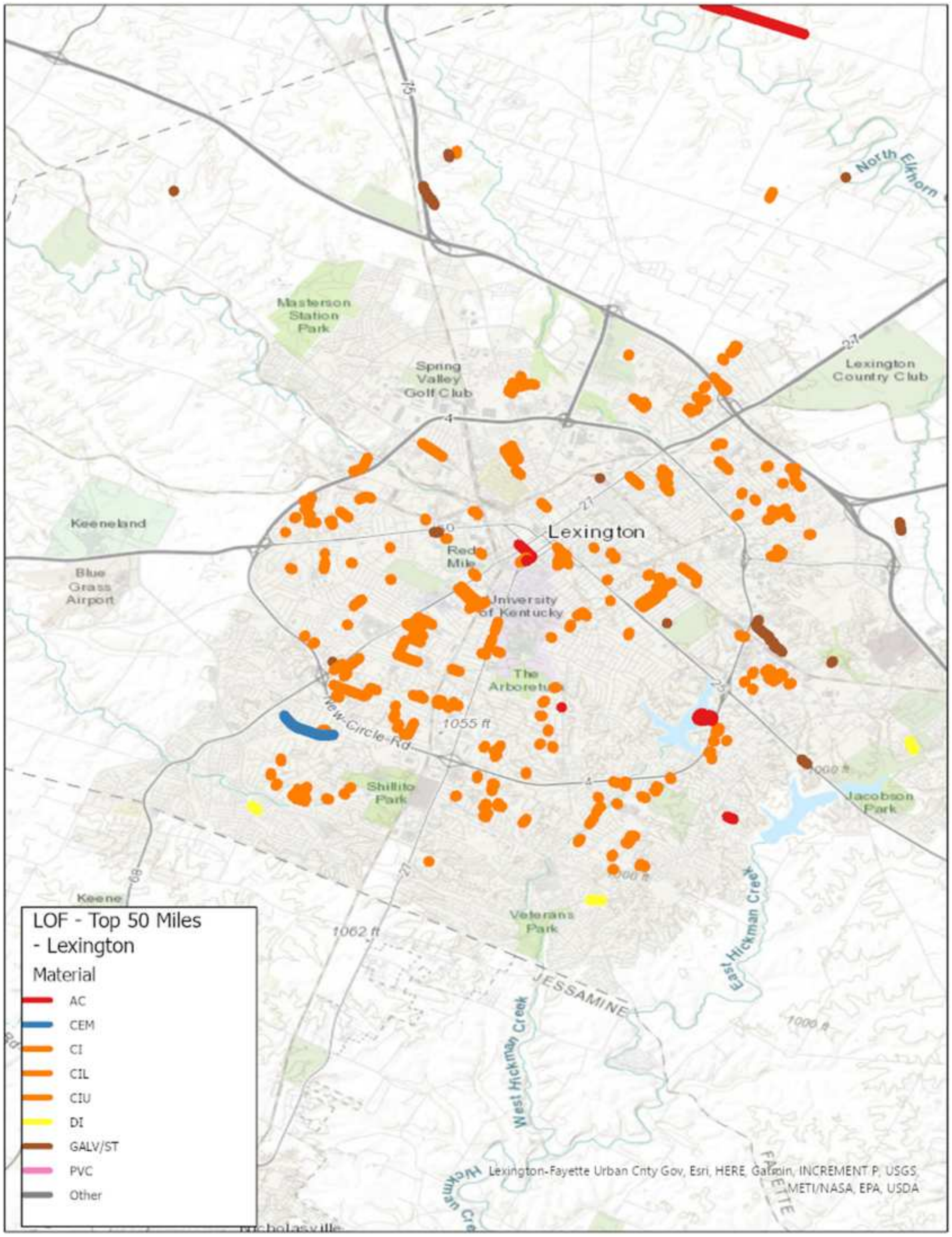


Figure 3 – KAWC COF/LOF (50 miles)

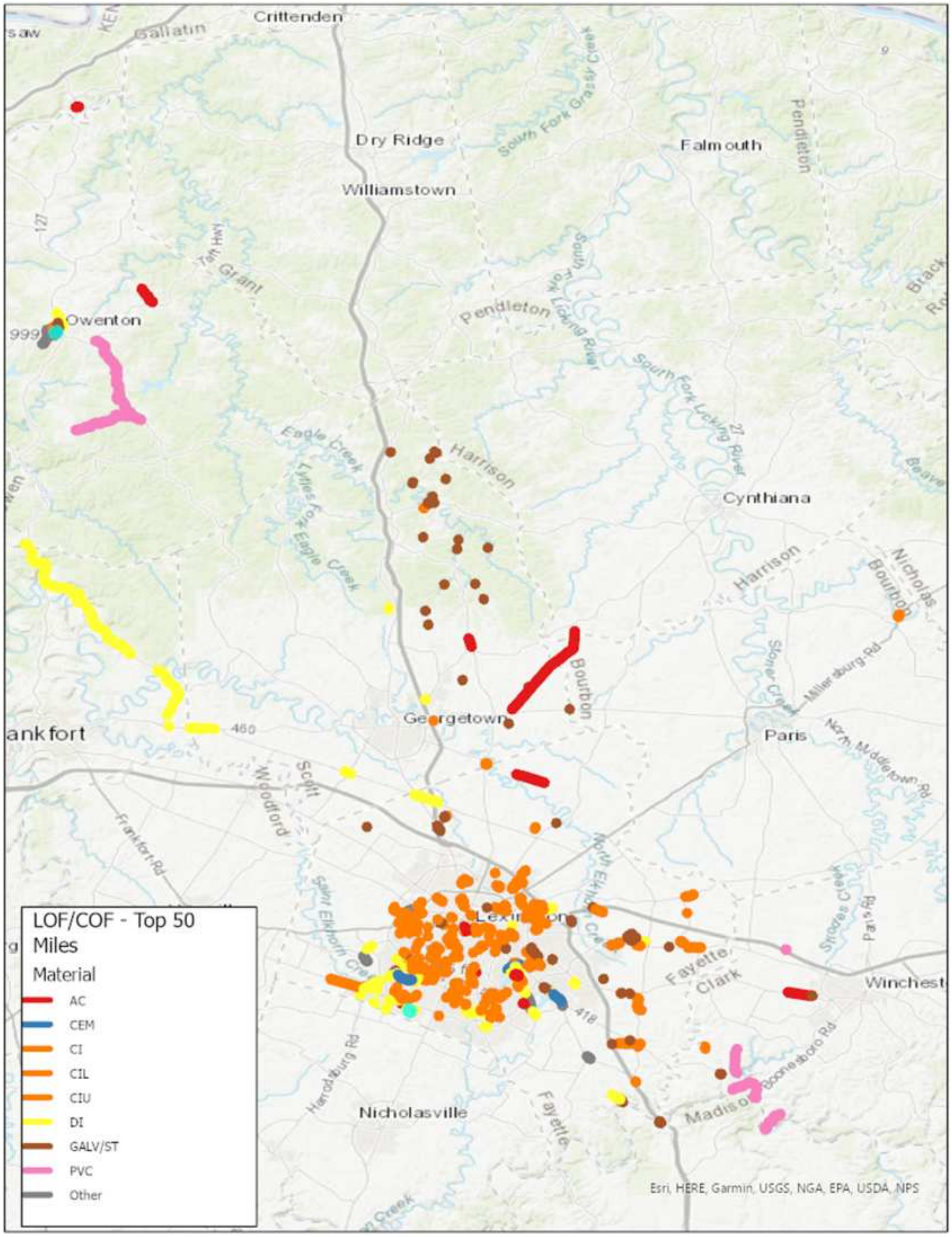
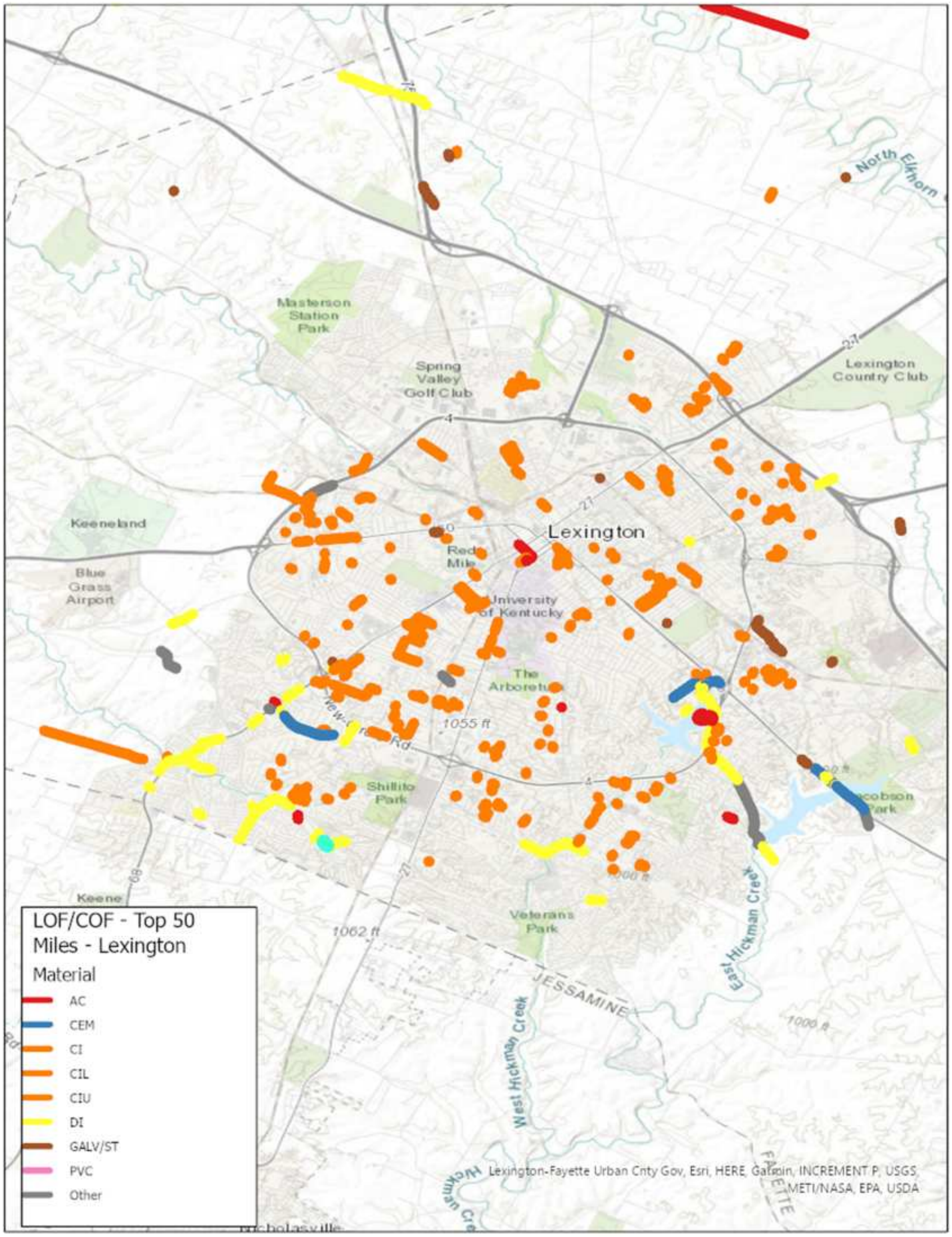


Figure 4 – Lexington COF/LOF (50 miles)



Q. What steps has KAWC taken to control the cost-per-foot of main replaced?

A. For QIP projects, KAWC has continued grouping projects in geographical proximity for design and construction efficiency, when appropriate. Bundling projects for design and construction allows the firms to focus their efforts and equipment in a concentrated area.

KAWC continues to utilize national contracts that leverage the size and breadth of American Water, which affords the Company increased purchasing power that it could not obtain on its own, and provides access to discounts on equipment and supplies needed for utility operations, including piping, fittings, and service line materials. In addition, we can leverage our scale to have among the shortest delivery lead times in the industry. Because of the supply chain challenges facing KAWC and the construction industry in general, KAWC has proactively sought out and secured the materials needed for QIP projects on the most economical terms available at the time to ensure that materials would be available when projects were ready to begin construction, and to mitigate cost increases. This proactive approach also helps ensure KAWC can complete all proposed QIP projects in a timely manner and according to the proposed schedule at a lower cost than an unplanned replacement.

KAWC has also expanded our list of bidders for QIP projects. Over the past two years, we have proactively sought out additional contractors and have added four contractors to the pre-qualified list. KAWC works with the American Water Works Service Company, Inc. ("Service Company") Supply Chain group to contact firms that perform work for other American Water subsidiaries to gauge their interest in working for KAWC, and we have reached out to bidders for other utilities in surrounding areas such as Louisville and Knoxville.

Regarding utility coordination with external entities, KAWC has continued to engage with other utilities to determine if there are opportunities to coordinate our construction. The project maps for each QIP year are distributed to other utilities for their review. In several cases, KAWC has learned of a planned replacement project for another utility and we have been able to successfully work around each other's schedules.

KAWC has continued to work with LFUCG to identify ways to improve coordination on pavement restoration. These efforts are explained in more detail below.

Q. Has the recent inflation trend affected the cost of KAWC's QIP projects, and, if so, what steps has the Company taken to mitigate those effects?

A. KAWC has been subject to rising costs in several areas. The cost of materials has been impacted not just by inflation, but also by shortages and shipping delays. The average cost-per-foot of project design work performed by consultants as well as of construction work performed by contractors have also risen year over year. KAWC has worked to minimize these effects by bundling projects on adjacent streets or in the same geographical areas. This allows design firms to provide better pricing for tasks that can be performed concurrently—such as survey work—instead of providing a separate price for each individual street. The same process applies to construction contractors as well. By bundling projects in the same vicinity, contractors can mobilize equipment to one primary location instead of several different locations, ultimately reducing the overall costs.

Q. Have KAWC's QIP projects been affected by the current global supply chain challenges, and, if so, what steps has the Company taken to mitigate those effects?

A. Yes, global supply chain and transportation issues continue to be challenging. KAWC experienced a significant increase in delivery lead times and pricing increases in 2021, a trend that has continued to the present day. KAWC has worked diligently with supply chain and vendors on reducing material lead times, accepting partial deliveries, working with alternative suppliers, and placing material orders for QIP work sufficiently in advance. The Service Company supply chain group has diligently worked with vendors and suppliers to obtain favorable commitments for materials cost and delivery, helping to ensure that the cost effects to KAWC are mitigated.

Q. Part of KAWC's cost-per-foot is the cost of pavement restoration that must be performed after the Company replaces a main in a public road. What specifically has KAWC done to control and mitigate its pavement restoration costs in QIP projects and what is KAWC going to continue to do to control those costs?

A. The paving restoration requirements on public roadways within Lexington are outlined in LFUCG's Chapter 17C of the Code of Ordinances and in the Standard Drawings, of which 200, 201-1, 201-2, 201-4, 300, 301, 302, 303, 304, 307-1, 307-2 primarily relate to 17C. While general details and guidance are outlined in these documents, the restoration requirement is ultimately determined post construction, immediately prior to paving, based on the judgment of the LFUCG representative maintain the performance of the pavement post construction. KAWC has taken the following actions to reduce paving costs through process improvements and identifying opportunities for efficiencies that will meet LFUCG's goal of maintaining safe and quality roadways, while minimizing impacts to customers associated with paving costs. KAWC recognizes that beneficial partnerships with LFUCG and coordination with other utilities through effective communication, planning, performance, and continuous process improvement is critical to reducing paving costs. When a coordination opportunity arises, we have realized a significant quantifiable reduction in paving costs due to the cost-sharing that occurs. Throughout the implementation of QIP, KAWC continues to engage LFUCG at multiple levels of business and government to advocate for judicious paving requirements and to find opportunities for efficiencies towards the mitigation of paving costs to KAWC customers through the following activities:

- LFUCG Utility Coordination Committee Meetings ("UCCM"): KAWC staff attends every UCCM meeting. The Company advocated for the pre-existing LFUCG pavement rating to be considered as part of the post-construction restoration requirements in an effort to align the paving restoration to the 5-foot trench width detail in the LFUCG Standard Details (for roadways over a certain paving rating). The paving condition rating is a factor KAWC has considered during the planning process. In part due to KAWC's feedback, future UCCM meetings are more project- and coordination-focused between utilities and LFUCG in executing and planning the replacement program projects, with the goal to mitigate paving costs and construction disruptions, while still maintaining safe, quality roadways for the community.
- Weekly Paving Meeting: During the months that the asphalt plants are open and operating, LFUCG and LFUCG's designated paving contractor host weekly meetings to review what streets will be paved that week. KAWC staff regularly attends these meetings and shares information within KAWC and from KAWC back to LFUCG and the paving contractor. The content of these meetings is focused on near-term paving, not long-term planning.
- Utilization of Pavement Rating in Project Planning: As previously discussed, KAWC previously utilized the pavement rating from LFUCG in conjunction with the pipeline prioritization model in order to select streets that were both highly ranked in the model and

likely to need new pavement within the next few years. This allows KAWC to be as cost-efficient as possible with the selection of the project list regarding final pavement and restoration requirements. Furthermore, KAWC has engaged several relevant departments within LFUCG earlier in our planning process. The group includes Streets & Roads, Engineering, and Water Quality. At the time the initial list of projects is identified, the list is shared with this group from LFUCG and they have the opportunity to provide any comments, feedback, or coordination suggestions. This step has already provided multiple benefits by allowing us to accelerate or delay proposed projects based on upcoming LFUCG work, and it has been the primary means by which we have identified streets that are eligible for paving sharing with LFUCG.

- Utility Partnering Opportunities: Once QIP projects have been identified in the planning phase, the maps and locations are shared with other utilities, such as Columbia Gas. Columbia Gas does the same, sharing their planned projects with KAWC. This allows KAWC to determine if other utilities have upcoming projects in the same vicinity. In several cases, we have been able to coordinate our construction schedules in these areas to minimize the disruption to residents. This information-sharing has also helped highlight some streets that may need to be moved up or down on the priority ranking based on other utilities' planned work. Additionally, KAWC and other utilities regularly share construction plans on shared streets so that all parties can ensure, where possible, that their intended route does not create new points of conflict.
- QIP Project Walkthroughs and Reviews: For every QIP main replacement project, the site is walked and reviewed by LFUCG's inspector along with the KAWC construction representative and contractor. The final paving and restoration requirements are defined

during this site walkthrough. KAWC requested a pre-construction walkthrough to establish an anticipated restoration scope, but because the 17-C ordinance is performance-based and relies heavily on the actual disturbance areas post construction, a determination of this nature was deemed premature. To help KAWC, our design firms, and our contractors better anticipate and estimate the disturbance limits of the QIP projects, LFUCG's Municipal Senior Engineer for the Division of Engineering has provided training on the 17-C ordinance and associated design documents and paving policies to all involved. KAWC has implemented this training as an annual requirement for our design firms and contractors that work on QIP projects.

KAWC advocated for further review of the final paving and restoration limits on QIP jobs, and in one instance the second review resulted in a reduced scope of paving restoration required by LFUCG.

- Construction Project Manager: KAWC has established a Construction Project Manager, a role that is the first point of contact for all construction-related issues. This role holds regular meetings with our contractors to relay information and maintain contractor accountability, interfaces with LFUCG and other utilities, and is heavily involved in communications with customers.
- KAWC Paving Contractors: Beginning in QIP Year 2, KAWC piloted the use of a third-party paving contractor for all final restoration and paving activities. Historically, the selected construction contractor would sub-contract the final paving and restoration work or perform it themselves, leading to multiple points of contact and inconsistencies in results. Having one dedicated paving firm has benefitted KAWC and LFUCG with a single point of contact for any paving and restoration concerns, and provided consistency in

process and paving performance. Due to the scope of QIP and the capacity of the contracted paving company, a second paving and restoration contractor was brought on to provide supplemental assistance when needed.

Q. Do you have a recommendation for the Commission?

A. Yes. I recommend the Commission approve KAWC's requested expansion of its QIP so that KAWC can replace 27-34 miles of any type of pipe material annually. KAWC does not make this request lightly and understands the cost impact it will have on customers. However, as described above and in KAWC's annual QIP filings, KAWC has worked very hard to mitigate the cost impact on customers of replacing mains. Indeed, the QIP program and the proposed expansion of it will, over the long run, actually save customers money through timely and proactive replacement of this critical infrastructure.

Q. Does this conclude your testimony?

A. Yes, it does.

VERIFICATION

COMMONWEALTH OF KENTUCKY)
) SS:
COUNTY OF FAYETTE)

The undersigned, Krista Citron, being duly sworn, deposes and says that she is the Senior Project Engineer for Kentucky-American Water Company, that she has personal knowledge of the matters set forth in the foregoing testimony, and that the answers contained therein are true and correct to the best of her information, knowledge and belief.

Krista Citron
Krista Citron

Subscribed and sworn to before me, a Notary Public in and before said County and State, this 20th day of June, 2023.

Molly McCleese Van Over
Notary Public

My Commission Expires:

July 31, 2025

Notary ID: KYNP26988

Stantec

Memo

To:	Krista Citron KY American Water 2300 Richmond Road, Lexington, KY 40502	From:	Brendan O'Bryan Stantec Lexington, KY
Project/File:	175584013	Date:	June 22, 2023

Reference: Water Main Replacement Projections

1 Background

In May 2021, Stantec was contracted by Kentucky American Water (KAW) to support its ongoing Qualified Infrastructure Program (QIP). This program proposes to replace approximately 10-13 miles of aging water main per year, focusing primarily on small-diameter (< 8-inch), cast iron pipes. The program is currently in its fourth year with approximately forty-seven (47) projects currently planned for construction.

Representatives from KAW and Stantec met to discuss KAW's general approach to identifying water mains to be replaced as part of the QIP program. The team reviewed the testimony of Brent O'Neill to the Public Service Commission on November 28, 2018 and the attached Replacement Program Report that has served as the overall guidance document for the QIP program. This report, dated 2018, has been regularly relied upon by the PSC to evaluate the program and make determinations about which projects are qualified. KAW has identified a need to update this document to (1) reflect the current distribution system and (2) incorporate new information available from other resources, such as an American Water proprietary prioritization model, to guide the program moving forward.

As a first step towards updating the Replacement Program Report, Stantec performed an initial assessment of the program's current replacement rate (miles per year) by forecasting the target replacement year for each pipe based on its material and recorded installation date. The goal was to confirm if the current replacement rate over multiple time periods was sufficient to replace all the water mains expected to reach the end of their useful life within that same period. This memo summarizes the data sources, key assumptions, and results of that annual replacement analysis.

2 Data Sources

Table 1: Data Sources

Document/File	Description	Date
DatarequestRawData.xls	GIS attribute data for all water mains in KY American distribution system, including Northern Division, Central Division, Rockcastle and Millersburg. Dataset included Installation Year, Material, Lengths (ft), Diameter and others similar information.	3/7/2023
Brent O'Neill testimony to the Public Service Commission	Replacement Program Report within this testimony provided a general overview of the program. Included table of Average Expected Life of Pipe Material (Table 4). Values in this table were used as basis for projection calculations.	11/28/2018

3 Calculation & Assumptions

Using the data provided, Stantec performed the following calculation on each pipe feature in the dataset to estimate the expected year of replacement.

$$Installation\ Year + Average\ Expected\ Life\ of\ Pipe\ Material = Target\ Replacement\ Year$$

Before completing this calculation, several data anomalies had to be corrected. Below is a summary of those corrections and the assumptions used:

1. Material
    a. Multiple material types were assigned within the provided dataset that needed to be condensed into the seven (7) categories defined in Table 4 of the Replacement Program Report.
    b. All materials listed as N/A, Unknown, Other, NULL, Brass, or Copper were replaced with "OTHER" and assigned an Average Expected Life of 70 years.
2. Life Cycle Status
    a. All features listed as "Retired In Place" were removed from the dataset.
3. Install Date

a. Several features listed with install year of “1212.” These values were replaced with “2012.”

b. Approximately 178.5 miles of main were provided with a “NULL” Install Date. These features were assigned a random value between 1900 and 1970,

4. Length

a. 14 Features were provided with “NULL” length values. These features were removed from the dataset.

After completing the above corrections and calculations, pipe lengths were summed based on Target Replacement Year and material and were used to create a distribution over three different time periods forecasting the lengths of pipe to be replaced each year. The total length pipe to be replaced within a given time period was the divided by the number of years to estimate the required replacement rate.

$$\frac{Total\ Length\ of\ Pipe\ to\ Be\ Replaced\ within\ a\ Time\ Period}{Number\ of\ Years\ in\ that\ Time\ Period} = Required\ Replacement\ Rate$$

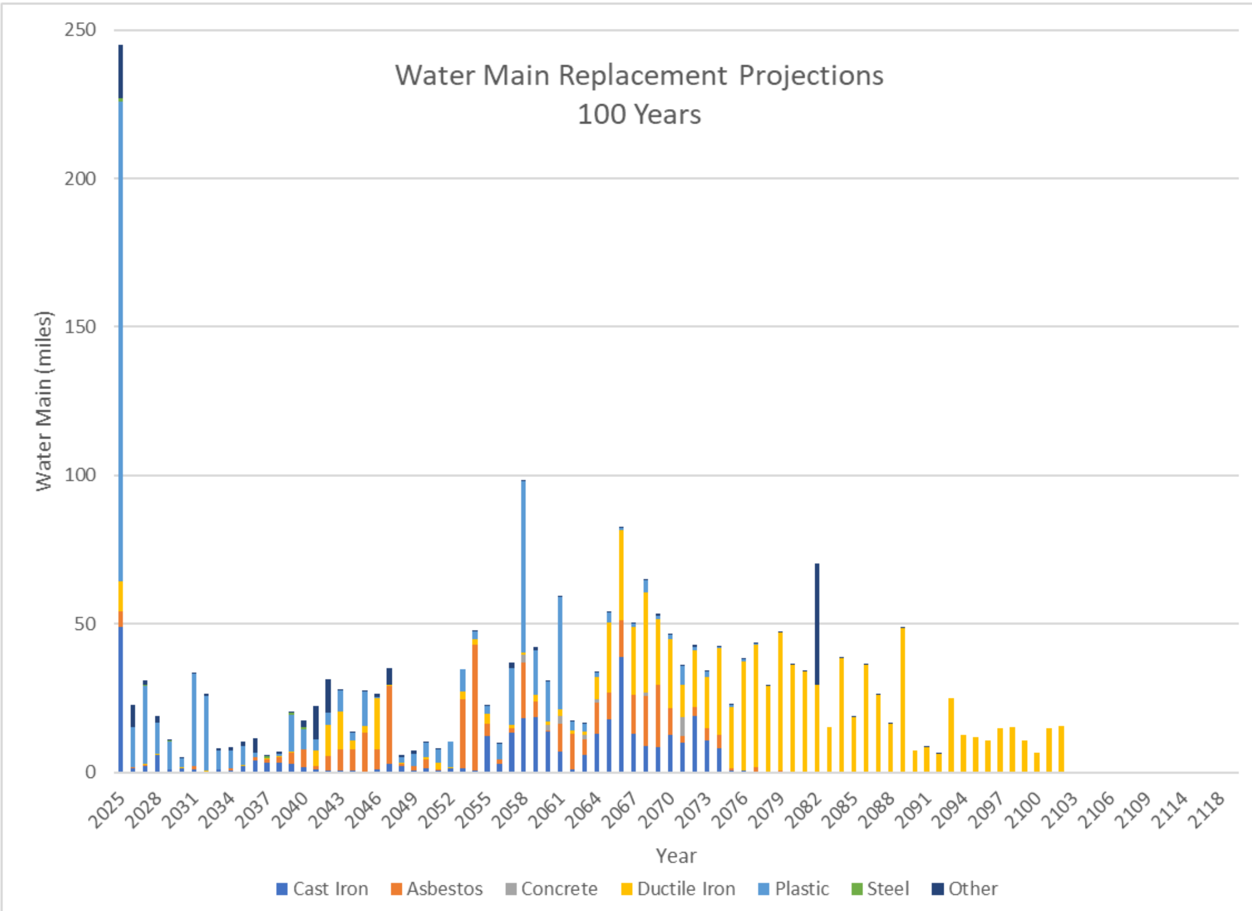
4 Results

Below is a table that summarizes the results for each time period evaluated, followed by graphical time distribution. Eighty (80) years is the anticipated planning horizon for target replacement because most of the new pipe currently being installed by the QIP program is ductile iron pipe with an estimated useful life of 80 years. Therefore, the recommended replacement volume is about 29 miles per year. Several pipes have reached or exceeded their useful life on or before the year 2025; there is a large volume of projected replacements (nearly 250 miles) in 2025.

Table 2: Results

Planning Period		**Total**	**Average Per Year**
Years	**-**	**Miles**	**Miles**
30	2025 - 2055	812	27
50	2025 - 2075	1,689	34
80	2025 - 2105	2,352	29

Reference: Water Main Replacement Projections



5 Conclusions

Based on the current mix of pipe age and material within Kentucky American's distribution system(s), the anticipated rate of replacement over the next 30-80 years is approximately double the current program rate. It is understood that there a variety of factors that determine replacement prioritization and schedule, including water quality, customer service, and Right-of-Way coordination, but based solely on age and material, KAW should expect to have more mains reach the of their useful than are currently being replaced.

We sincerely appreciate the opportunity to continue to support KAW and its ongoing efforts to improve customer service and system reliability. Please feel free to contact me with any questions, concerns or comments moving forward.

Reference: Water Main Replacement Projections

Respectfully,

STANTEC CONSULTING SERVICES INC.

Brendan O'Bryan
Senior Project Engineer
Phone: (859) 422-3069
brendan.obryan@stantec.com

Attachment: [Attachment]

COMMONWEALTH OF KENTUCKY
BEFORE THE PUBLIC SERVICE COMMISSION

IN THE MATTER OF:

ELECTRONIC APPLICATION OF KENTUCKY-	**)**	
AMERICAN WATER COMPANY FOR AN	**)**	
ADJUSTMENT OF RATES, A CERTIFICATE	**)**	
OF PUBLIC CONVENIENCE AND NECESSITY	**)**	**CASE NO. 2023-00191**
FOR INSTALLATION OF ADVANCED METERING	**)**	
INFRASTRUCTURE, APPROVAL OF CERTAIN	**)**	
REGULATORY AND ACCOUNTING	**)**	
TREATMENTS, AND TARIFF REVISIONS	**)**	

DIRECT TESTIMONY OF NICHOLAS FURIA

June 30, 2023

Q. Please state your name and business address.

A. My name is Nicholas Furia and my business address is 1 Water Street, Camden, NJ 08102.

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

A. I am employed by American Water Works Service Company, Inc ("Service Company" or "AWWSC") as the Assistant Treasurer. The Service Company is a subsidiary of American Water Works Company, Inc. ("American Water") that provides support services to American Water's subsidiaries, including Kentucky-American Water Company ("Kentucky-American," "KAWC" or the "Company").

Q. Have you previously filed testimony before this or any other commission?

A. I have provided written testimony before the Indiana Utility Regulatory Commission.

Q. Please summarize your educational and professional qualifications.

A. I hold a Master of Science in Finance from Penn State University and Bachelor of Science in Business Administration Accounting from Drexel University, with 20 years of Accounting and Finance experience in multiple industries. Since 2014, I have been employed by Service Company in multiple finance roles and most recently as the Assistant Treasurer since July 2021. Prior to Service Company I held multiple accounting and finance roles in multiple industries including Commercial Real Estate and Equipment Leasing. I started my career in public accounting and I am a licensed Certified Public Accountant in the state of Pennsylvania.

Q. What are your current employment responsibilities?

A. I am responsible for oversight and support of the treasury function and the day-to-day activities of the treasury department, including the planning, analysis and execution of all activity, including debt and equity financings for American Water Works Company, Inc. ("American Water") and its subsidiaries. I also serve as the Assistant Treasurer for Kentucky-American responsible for supporting KAWC's management and finance teams in the execution of KAWC's financing plans and overall capital structure management.

Q. What is the purpose of your direct testimony in this proceeding?

A. The purpose of my direct testimony is to present the recommended capital structure to be used for computing Kentucky-American's weighted average cost of capital ("WACC"). The WACC is used as the authorized overall rate of return on rate base in this case. The Company's WACC reflects, among other things, the rate of return on common equity recommendation presented in the Direct Testimony of KAWC witness Ann E. Bulkley.

Q. Did you prepare, or cause to be prepared under your direction and supervision, the schedules that you are sponsoring?

A. Yes, I did.

Q. Please identify the exhibit you will be sponsoring and for which you will be providing testimony.

A. I am sponsoring Exhibit 37 - J. This exhibit presents the Company's proposed capital structure and WACC.

Q. What were the sources of the data used to prepare Exhibit 37 - J?

A. The information contained in Exhibit 37 - J was prepared from the financial and operational records of the Company, and the officers and associates of Kentucky-American with knowledge of the facts based on their job responsibilities and activities.

Q. What forecast period has the Company proposed in this case?

A. The Company's proposed forecasted test year is the twelve months ending January 31, 2025.

CAPITAL STRUCTURE & OVERALL COST OF CAPITAL

Q. What is the purpose of determining the Company's capital structure?

A. As noted previously, the capital structure is used to compute the Company's WACC in this proceeding. The WACC is the overall rate of return that is applied to the Company's rate base.

Q. What capital structure do you sponsor for computing the Company's WACC for ratemaking purposes?

A. I sponsor the projected capital structure for the thirteen-month average of the forecasted test-year ending January 31, 2025. The capital structure proposed by the Company is included in the filing documents on Schedules J-1 thru J-5 of Exhibit 37. Exhibit 37 indicates the thirteen-month average capital structure and WACC on which the Company based its revenue requirement in this case. The proposed capital structure is comprised of 0.96% short-term debt, 46.21% long-term debt (47.17% total debt), 0.38% preferred stock, and 52.45% common equity.

Q. In what manner does the Company currently obtain its long-term and short-term debt?

A. The Company utilizes the services of American Water Capital Corp. ("AWCC") to meet its long-term ("LT") and short-term ("ST") debt requirements. AWCC is an American Water subsidiary, and an affiliate of KAWC, established for the purpose of providing financial services to American Water, its water utility subsidiaries, and Service Company, including the issuance of debt securities in a consolidated, cost-effective manner.

Q. Has the Commission approved the Company obtaining its debt through AWCC?

A. Yes, it has. By Order entered July 21, 2000 in Case No. 2000-00189, the Commission authorized the Company to enter into a Financial Services Agreement with AWCC which enables the Company to periodically issue debt securities in the form of notes or debentures for the purpose of replacing ST debt or refinancing maturities of existing long-term debt. In Case No. 2006-00418, the Commission reaffirmed the Company's authorization to use AWCC for the attainment of its debt financing. In its Order in Case No. 2009-00156, the Commission again authorized the Company's use of AWCC as a source for its LT and ST debt funding. The Commission again reaffirmed the Company's authorization and participation in the AWCC borrowing program in Case Nos. 2011-00115, 2012-00393, 2015-00400, 2019-00083, and most recently, in its Order in Case No. 2021-00019.

Q. What factors require the Company to seek additional capital?

A. The Company's ongoing investments in capital improvements to meet the new and changing regulations in the water industry, replace aged treatment and distribution facilities, and continue to provide quality, reliable water service to its customers have driven, and will continue to drive, the need for new capital. The Company's proposed capital structure in this proceeding reflects two new LT debt financings, the first in the amount of $53 million, scheduled for fourth quarter 2023 and the second in the amount of $20 million, scheduled for second quarter 2024. The Company's requested capital structure also reflects two equity infusions totaling $20.5 million through the forecasted test year ending January 31, 2025. It is important that the Company maintain a strong financial position to allow it to continue to attract capital at a reasonable cost, which will assist the Company in its effort to provide safe, reliable and affordable water service to its customers.

Q. What is the level of short-term debt included in the Company's forecasted test year capital structure?

A. The Company uses ST debt to temporarily finance capital improvements. This type of financing is used to bridge the gap between the placement of permanent financings, such as LT debt and common equity. The capital structure used to set rates in this proceeding should reflect the capital component mix that will be in place to finance the rate base upon which rates will be set, since the capital structure is used to calculate the overall rate of return that is applied to rate base. The level of ST debt in the Company's proposed capital structure in this case is the thirteen month average balance for the forecasted test-year ending January 31, 2025. That level of ST debt is reflective of the level that will be utilized to fund the investments under construction but not yet placed into service and other cash requirements during the forecasted test-year.

Q. Please explain the new LT debt financing included in this filing.

A. As described above, the Company's proposed capital structure includes $53 million of new LT debt to be placed in fourth quarter 2023. The Company has modeled the issuance as evenly divided ten- and thirty-year taxable bonds issued through AWCC.[1] The Company stays abreast of the capital markets and will adjust these plans to efficiently execute on its financing needs based on the current market conditions. The assumed interest rates on these ten- and thirty-year issuances are 4.95% and 5.56%. The Company has also forecast an issuance in second quarter 2024 of $20 million. This amount will also be split between ten-

[1] AWCC continues to evaluate a variety of debt instruments.

and thirty-year taxable bonds with assumed interest rates of 4.596% and 5.303%. Issuance costs are projected to be 1% of the principal for the new bonds. In addition, the long-term debt carrying value was adjusted to reflect the amortization of debt expense that will occur through the end of the forecasted test year.

Q. What weighted average cost of capital is the Company requesting in this case?

A. The overall WACC is calculated by summing the component costs of the capital structure, with each component weighted by its respective proportion to total capitalization. Based on the projected capital component balances, the 10.75% return on equity recommended by Company witness Ann Bulkley and the component costs I have described above, the overall weighted average cost of capital being requested is 7.87%, as shown on Exhibit 37. The Company's complete capital structure and cost of capital presentation is shown on Schedules J-1 through J-5 to Exhibit 37.

Q. Do customers benefit from the Company's efforts to maintain a reasonable capital structure and cost of capital?

A. Yes. Customers benefit from a utility that is well run, generates predictable financial results and maintains an appropriate capital structure. There is a direct link between a utility delivering predictable financial results and maintaining solid credit ratings. Ratings agencies consider an entity's financial results both as a qualitative and a quantitative measure in establishing a company's credit rating. Positive, growing and predictable earnings per share and other financial measurement results contribute to a company's ability to access capital at a reasonable cost. Companies with poor financial results or with capital structures that are outside reasonable levels will need to pay more to access capital.

The Company's customers benefit from our financial performance which helps us maintain strong credit ratings and enabling access to capital markets on good terms.

Q. Does this conclude your direct testimony?

A. Yes, it does.

VERIFICATION

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

The undersigned, Nicholas Furia, being duly sworn, deposes and says that he is the Senior Director, Assistant Treasurer for American Water Works Service Company, Inc., that he has personal knowledge of the matters set forth in the accompanying testimony for which he is identified as the responsible witness, and that the answers contained therein are true and correct to the best of his information, knowledge and belief.

Nicholas Furia

Subscribed and sworn to before me, a Notary Public in and before said County and State, this 21 day of June, 2023.

Meresa M. Yager
Notary Public

My Commission Expires:
Oct. 2, 2024

MERESAANN M YAGER
Notary Public - State of New Jersey
My Commission Expires Oct 2, 2024

KENTUCKY-AMERICAN WATER COMPANY, INC.
CASE NO. 2023-00191

PREPARED DIRECT TESTIMONY OF

LARRY E. KENNEDY

Q1. Please state your name and business address.

A1. My name is Larry E Kennedy. My business address is 200 Rivercrest Drive SE, Suite 277, Calgary, Alberta, T2C 2X5.

Q2. By whom are you employed?

A2. I am employed by Concentric Energy Advisors., Inc.

Q3. What is your position with Concentric Energy Advisors, Inc. ("Concentric")?

A3. I am employed by Concentric as a Senior Vice President.

Q4. On whose behalf are you submitting this Direct Testimony?

A4. I am submitting this Direct Testimony before the Public Service Commission of Kentucky ("Commission") on behalf of Kentucky-American Water Company ("KAWC" or the "Company").

Q5. Please describe your education and experience.

A5. I am a Certified Depreciation Professional, with over 40 years of regulatory plant accounting and depreciation experience, and 22 years of depreciation and plant accounting consulting to the regulated utility industry. I have advised numerous energy and utility clients on a wide range of accounting, property tax and utility depreciation matters. Many of these assignments have included the determination of appropriate annual depreciation accrual rates. I have included my resume and a summary of testimony that I have filed in other proceedings as Exhibit LEK-2.

Q6. Please describe Concentric's activities in energy and utility engagements.

A6. Concentric provides financial and economic advisory services to many and various energy and utility clients across North America. Our regulatory, economic, and market analysis services include utility ratemaking and regulatory advisory services; energy market assessments; market entry and exit analysis; corporate and business unit strategy development; demand forecasting; resource planning; and energy contract negotiations. Our financial advisory activities include buy and sell-side merger, acquisition and divestiture assignments; due diligence and valuation assignments; project and corporate finance services; and transaction support services. In addition, we provide litigation support services on a wide range of financial and economic issues on behalf of clients throughout North America.

Q7. Have you testified before any regulatory authorities?

A7. Yes. A list of proceedings in which I have provided testimony is provided in Exhibit No. LEK-2.

I. PURPOSE AND OVERVIEW OF DIRECT TESTIMONY

Q8. What is the purpose of your Direct Testimony?

A8. The purpose of my Direct Testimony is to set forth the results of my full and comprehensive depreciation study of the distribution and general plant in service of the Company, as of December 31, 2022. My detailed report, including my analyses and recommendations, is provided in Exhibit No. LEK-1, titled "Calculated Annual Depreciation Rates Application to Plant in Service as of December 31, 2022". The detailed depreciation study report was prepared by me or under my direction.

Q9. Please provide a brief overview of the analyses that led to your depreciation recommendations.

A9. In preparing the depreciation study report, I analyzed the historic plant account data of KAWC to prepare an analysis of the Company's past retirement experience. I met with the Company's management and operations representatives to determine the extent to which the historic indications would be reflective of the future retirement patterns. I also reviewed the average service life and net salvage indications of many North American based water utilities to test the results of my analysis against the water industry peers.

Q10. How is the remainder of your Direct Testimony organized?

A10. Section II provides the scope of my study and a summary of my analyses and conclusions. This section also includes a discussion of the major causes of changes in the depreciation accrual rate and amounts as compared to the last study. Section III provides a background on utility depreciation, depreciation methods and procedures. Section IV provides concluding comments.

II. SCOPE OF THE DEPRECIATION STUDY

Q11. Please outline the Scope of the Depreciation Study.

A11. My depreciation study report sets forth the results of the depreciation study for the water assets of KAWC, to determine the annual depreciation accrual rates and amounts for book purposes applicable to the original cost of investment, as of December 31, 2022. The rates and amounts are based on the Straight-Line Method, incorporating the Average Life Group Procedure applied on a Remaining Life

Basis. This study also describes the concepts, methods and judgments which underlie the recommended annual depreciation accrual rates related to the KAWC water assets in service, as of December 31, 2022.

Q12. Please outline the information included in your depreciation study report.

A12. The depreciation study report is presented in nine (9) sections outlined as follows:

- Section 1 Study Highlights, presents a summary of the depreciation study and results.
- Section 2 Introduction, contains statements with respect to the plan and the basis of the study.
- Section 3 Development of Depreciation Parameters, presents descriptions of the methods used and factors considered in the service life study.
- Section 4 Calculation of Annual and Accrued Depreciation presents the methods and procedures used in the calculation of depreciation.
- Section 5 Results of Study, presents summaries by depreciable group of annual and accrued depreciation.
- Section 6 Retirement Rate Analysis
- Section 7 Net Salvage Calculations
- Section 8 Detailed Depreciation Calculations
- Section 9 Estimation of Survivor Curves, is an overview of Iowa curves and the Retirement Rate Analysis.

Q13. Was the depreciation study prepared using generally accepted standard methods and practices?

A13. Yes. Previous depreciation studies completed for KAWC utilized a widely accepted method for the study of the Company's historic data, known as the Retirement Rate Analysis Method. The Retirement Rate Analysis Method is generally accepted as the correct method to use when aged data is available for review. The aged data used in the last study, through December 31, 2016, was available to be incorporated into our database.

Additional reliable aged data, for the period January 1, 2017 through to December 31, 2022, was provided by the Company and incorporated in our database. Given the availability of reliable aged data, I prepared the historic study of mortality history using the retirement rate method. A detailed discussion of the retirement rate analysis is presented in Section 9 of my depreciation study report.

Additionally, the service life study included:

- a review of KAWC company practice and outlook, as they relate to plant operation and retirement;
- consideration of current practice in the water system industry, including knowledge of service life estimates used for other regulated water system companies; and
- informed professional judgment which incorporated analyses of all of the above factors.

My study of the net salvage percentages was based on detailed study prepared under the standard approach, which has commonly become known as the "Traditional Method". Within this method, the net salvage transactions (gross salvage proceeds, re-use salvage and costs of removal or retirement) are compared to the original cost of the item being retired. The analysis is prepared on an actual transaction year basis, for as many years as reliable data is available. The analysis then includes a series of 3-year rolling average bands, 5-year rolling average bands, and life to date bands covering all years of transactional data.

As described in later sections of this evidence, the depreciation accrual rates presented herein are based on generally accepted methods and procedures for calculating depreciation.

Q14. Please provide a summary of the results of the depreciation study.

A14. This study results in a depreciation rate related to Structures and Improvements of 2.31%, Purification, Transmission, and Distribution of 3.07%, and a depreciation rate related to general plant of 9.36%.

Q15. How do the above depreciation rates compare to the currently approved depreciation rates?

A15. The following chart outlines the proposed changes by functional group:

Functional Group	Currently Used	Proposed
Structures and Improvements	2.64 %	2.31%
Collection, Transmission and Distribution	2.12%	3.05%
General Plant	9.26%	9.36%
Total	2.61%	3.29 %

Q16. Please outline the reasons for the change in the composite depreciation rate.

A16. The depreciation study report is presented in nine (9) sections outlined as follows:

Depreciation rates are composed of the return of initial investment and the return of future net salvage. One significant cause of the change in depreciation rates is the change in average service life of many accounts. The following is a summary of the proposed average service life estimates compared to the currently used estimates, demonstrating the shortening of the average service life in 15 accounts, and the lengthening of the average service lives in 14 accounts.

Account	Account Description	Currently Approved	Recommended
304.100	Supply	50-S0.5	45-R2.5
304.200	Pumping	60-R1.5	65-R1.5
304.300	Treatment	60-R1.5	65-R1.5
304.400	Transmission and Distribution	40-R2.5	40-R3
304.500	General	N/A	25-R2
304.600	Office Buildings	60-R2	60-R2
304.700	Store, Shop and Garage	55-R2	55-R3
304.800	Miscellaneous	25-S0.5	25-S0.5
305.000	Collecting and Impounding Reservoirs	70-R3	75-R2
306.000	Lake, River and Other Intakes	50-S1	55-S1.5
309.000	Supply Mains	70-R3	80-R3
310.000	Power Generation Equipment	35-R3	35-R4
311.200	Electric	43-S0.5	40-S0.5
311.300	Diesel	43-S0.5	40-S0.5
311.400	Hydraulic	43-S0.5	40-S0.5
311.520	SOS and Pumping	43-S0.5	40-S0.5
311.530	Water Treatment	N/A	40-S0.5
311.540	Transmission and Distribution	43-S0.5	40-S0.5
320.100	Water Treatment Equipment - Non-Media	55-R3	50-R2
320.200	Water Treatment Equipment - Filter Media	10-S3	10-S3
330.000	Dist Reservoirs & Standpipes	55-R4	60-R4
330.100	Elevated Tanks & Standpipes	55-R4	60-R4
330.200	Ground Level Tanks	55-R4	60-R4
330.400	Clearwell	55-R4	60-R4
331.001	TD Mains	85-R3	90-R4
333.000	Services	52-R3	55-R4
334.100	Meters	40-R0.5	10-R3
334.110	Meters Bronze Case	40-R0.5	10-R3
334.120	Meters Plastic Case	40-R0.5	10-R3
334.130	Meters Other	40-R0.5	10-R3
334.131	Meter Reading Units	N/A	10-R3
334.200	Meter Installations	40-R0.5	60-R3
334.300	Meter Vaults	40-R0.5	60-S0.5
335.000	Hydrants	70-R4	65-R4
339.600	Other P/E-CPS	10-SQ	10-SQ
340.100	Office Furniture & Equip	20-SQ	20-SQ
340.200	Comp & Periph Equip	N/A	10-SQ

Account	Account Description	Currently Approved	Recommended
340.210	Mainframe	5-SQ	5-SQ
340.220	Personal Computers	5-SQ	5-SQ
340.230	Other	5-SQ	5-SQ
340.300	Computer Software	5-SQ	5-SQ
340.315	Computer Software Spec Depr Rat	N/A	10-SQ
340.325	Computer Software Customized	N/A	15-SQ
340.330	Computer Software Other	N/A	15-SQ
340.500	Other Office Equipment	15-SQ	15-SQ
341.100	Light Duty Trucks	10-L2.5	5-L2.5
341.200	Heavy Duty Trucks	11-L2	15-L2
341.300	Autos	10-S2.5	5-S2.5
341.400	Other	9-L2.5	5-L2.5
342.000	Stores Equipment	25-SQ	25-SQ
343.000	Tools, Shop, and Garage Equipment	20-SQ	20-SQ
344.000	Laboratory Equipment	15-SQ	15-SQ
345.000	Power Operated Equipment	23-S1.5	5-SQ
346.100	Communication Equipment - Non-Telephone	15-SQ	15-SQ
346.190	Remote Control and Instrumentation	15-SQ	15-SQ
346.200	Communication Equipment - Telephone	15-SQ	15-SQ
347.000	Miscellaneous Equipment	20-SQ	20-SQ
348.000	Other Tangible Property	20-SQ	20-SQ

The specific reasons for the average service life changes for each of the large accounts are discussed in Section 3.6 of my report. Additionally, the results of the statistical mortality study are presented for each account, in Section 6 of my report.

Q17. Are the average service life changes, as noted above, typical for utility assets?

A17. The depreciation study report is presented in nine (9) sections outlined as follows:

Yes. In a number of recent depreciation studies that I have completed, I have noted that the average service life of many asset classes is lengthening throughout North America. While there are a number of factors causing this lengthening of life estimates, the most prevalent reason is the increased focus of utilities in maintaining and life extending the infrastructure. Likewise, I have noted that the life of water line assets has also benefited from enhanced technology and the pro-active maintenance programs undertaken by water utilities.

At the same time that there has been a trend towards lengthening average service lives for some asset classes, it has been common throughout North America for there to be a shortening in other asset classes. The quickening pace of technological change in some industries results in a trend towards average service life decreases. For example, the pace of technological change in metering assets has resulted in the life of metering classes to be shortened industry wide. The move from analogue meters to digital meters using first generation communication technology, and now to modern two-way communication technology has resulted in meters having a significantly shorter life now than they did historically.

As such, the average service life changes observed in this study are consistent with my observations in a number of other water utilities. Again, although my Direct Testimony does not discuss the changes in depreciation rates in detail, my exhibit does so and explains fully the assumptions behind the changes in those rates.

III. DEPRECIATION METHODS AND PROCEDURES

Q18. How is depreciation defined for a rate regulated utility?

A18. Depreciation defined – "Depreciation, as applied to depreciable water plant, means the loss in service value not restored by current maintenance, incurred in connection with the consumption or prospective retirement of water plant in the course of service from causes which are known to be in current operation and against which the utility is not protected by insurance. Among the causes to be given consideration are wear and tear, decay, action of the elements, inadequacy, obsolescence, changes in the art, changes in demand and requirements of public authorities".[1] When considering the action of the elements, my average service life recommendations have considered large catastrophic events that have occurred and impacted the life estimates of utility assets across North America through our use of peer analysis. The average service life of utilities has been influenced by events including forest fires, earthquakes, tornadoes, ice storms, wind storms, large scale flooding, fires, actions of third parties and other natural forces of nature. These forces of retirement should be included in the determination of the average service life.

Depreciation, as used in accounting, is a method of distributing fixed capital costs, less net salvage, over a period of time by allocating annual amounts to expense. Each annual amount of such depreciation expense is part of that year's total cost of providing water system utility service. Normally, the period of time over which the fixed capital cost is allocated to the cost of service is equal to the period of time over which an item renders service, that is, the item's service life. The most prevalent method of allocation is to distribute an equal amount of cost to each year of service life. This method is known as the Straight-Line Method of depreciation, which was adopted for use in my study.

1 Federal Energy Regulatory Commission, Part 101, Uniform System of Accounts Prescribed for Public Utilities and Licensees Subject to the Provisions of the Federal Power Act, Definitions

Q19. Please outline the depreciation methods and procedures used in your depreciation study.

A19. The calculation of annual and accrued depreciation, based on the Straight-Line Method, requires the estimation of survivor curves and the selection of group depreciation procedures, as discussed below.

Depreciation Grouping Procedures - When more than a single item of property is under consideration, a group procedure for depreciation is appropriate because normally all of the items within a group do not have identical service lives but have lives that are dispersed over a range of time. There are two primary group procedures, namely, the Average Life Group and Equal Life Group procedures.

In the Average Life Group Procedure, the rate of annual depreciation is based on the average service life of the group. This rate is applied to the surviving balances of the group's cost. A characteristic of this procedure is that the cost of plant retired prior to average life is not fully recouped at the time of retirement, whereas the cost of plant retired subsequent to the average life is more than fully recouped. Over the entire life cycle, the portion of cost not recouped prior to average life is balanced by the cost recouped subsequent to average life.

In the Equal Life Group Procedure, also known as the Unit Summation Procedure, the property group is subdivided according to service life. That is, each equal life group includes that portion of the property which experiences the life of that specific group. The relative size of each equal life group is determined from the property's life dispersion curve. The calculated depreciation for the property group is the summation of the calculated depreciation based on the service life of each equal life unit. In the determination of the depreciation rates in this study, the use of the Average Service Life Procedure has been continued.

Amortization accounting is used for certain general plant accounts because of the disproportionate plant accounting effort required in these accounts. Many regulated utilities in North America have received approval to adopt amortization accounting for these accounts. This study calculates the annual and accrued depreciation using the Straight-Line Method and Average Life Group Procedure for most accounts. For certain general plant accounts, the annual and accrued depreciation are based on amortization accounting. Both types of calculations were based on original cost, attained ages and estimates of service lives. Variances between the calculated accrued depreciation and the book accumulated depreciation are amortized over the composite remaining life of each account within the remaining life calculations. Amortization accounting has been continued in this study in a manner largely consistent with the prior study.

A detailed account by account analysis of the factors considered in the selection of my recommended average service life estimates is provided in Section 3.6 of my depreciation study report.

Q20. Please outline any changes that you made in the depreciation method, grouping procedures or remaining life calculations as compared to previous depreciation studies.

A20. The depreciation rates calculated in this study were calculated on the same manner as used in the prior full depreciation study – i.e. using the Straight-Line Method, the Average Life Group Procedure was applied on a remaining life basis. Further, the underlying calculations related to the annual accrual amounts for all accounts have not changed in this depreciation study. However, the calculation of the composite remaining life for the account as a whole has been slightly modified in this depreciation study. This does not impact the annual depreciation accrual amount or rate calculations.

The previous depreciation study calculated the composite remaining life by dividing the sum of all annual accrual amounts by the net book value for the account as a whole. As such, the composite remaining life was an output of the depreciation calculations not an input into the depreciation formula. This depreciation study calculates the remaining life of the account through the weighted average original cost amount.

The differences in the remaining life can be seen in a simple example. The former method calculates the composite remaining life in the following manner:

	Original Cost	**Accumulated Depreciation**	**Net Book Value**	**Remaining Life**	**Annual Accrual**
2018	754,230	67,652	686,578	35.60	19,285
2019	453,225	31,683	421,542	36.57	11,526
2020	282,392	14,127	268,266	37.55	7,145
2021	53,523	1,609	51,914	38.53	1,348
2022	30,991	311	30,680	39.51	777
Total	1,574,363	115,382	1,458,980		40,081

The previous depreciation study would have calculated the remaining life to be equal to $1,458,980/$40,081 = 36.40 years.

The current depreciation study requires a more detailed calculation for the remaining life. The original cost for each vintage is multiplied by remaining life for that vintage. This number is then summed and divided by the total original cost for the account as a whole. In the above example, the remaining life calculations are as follows:

	Original Cost	Accumulated Depreciation	Net Book Value	Remaining Life	Annual Accrual	Weighted Remaining Life
2018	754,230	67,652	686,578	35.60	19,285	26,850,597
2019	453,225	31,683	421,542	36.57	11,526	16,574,461
2020	282,392	14,127	268,266	37.55	7,145	10,603,850
2021	53,523	1,609	51,914	38.53	1,348	2,062,272
2022	30,991	311	30,680	39.51	777	1,224,468
Total	1,574,363	115,382	1,458,980		40,081	57,315,648

The Concentric model calculates the remaining life to be $57,315,648/$1,574,363 = 36.41 years. As in the example, the difference in composite remaining life is generally very small between the two methods and there is no difference in the underlying annual accrual calculation. Both methods use the same depreciation formulas to calculate the annual accrual amount.

Q21. Was there any change to the remaining life by vintage as used in the depreciation study?

A21. Yes. The previous depreciation study utilized a minimum remaining life of one year for all vintage accrual calculations. I recommend the use of a three year minimum remaining life for this study to ensure there is no over-recovery related to vintages at the very end of their life.

IV. CONCLUDING REMARKS

Q22. What is your conclusion with respect to American Water's proposed Depreciation expense?

A22. My conclusion is that KAWC's requested depreciation rates, resulting in a composite depreciation rate of 3.29%, reasonably reflect the annual consumption of the undepreciated service value of the utility plant in service. The use of the depreciation rates as presented in my report, by account, will provide for an appropriate amount of depreciation expense in the Company's revenue requirement. Therefore, I recommend that the proposed depreciation rates set forth in the depreciation study that I prepared for this proceeding, be adopted by the Commission for regulatory purposes as well as by the Company for financial reporting purposes.

Q23. Does this conclude your Direct Testimony?

A23. Yes, it does.

VERIFICATION

COMMONWEALTH OF MASSACHUSETTES)
) SS:
COUNTY OF MIDDLESEX)

The undersigned, Larry Kennedy, being duly sworn, deposes and says that he is the Senior Vice President, for Concentric Energy Advisors, that he has personal knowledge of the matters set forth in the accompanying testimony for which he is identified as the responsible witness, and that the answers contained therein are true and correct to the best of his information, knowledge, and belief.

Larry Kennedy
Larry Kennedy

Subscribed and sworn to before me, a Notary Public in and ~~before said County and State,~~ for the Province of Alberta this 23rd day of June, 2023.

Notary Public

RUCHELLE RUMAILA VERON
Barrister & Solicitor
and Notary Public in and
for the Province of Alberta

My Commission Expires:
No Expiry - LSA Member

Exhibit LEK-1

2022 DEPRECIATION STUDY

Prepared for Kentucky – American Water Company

Prepared June, 2023

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SECTION 1

1 STUDY HIGHLIGHTS

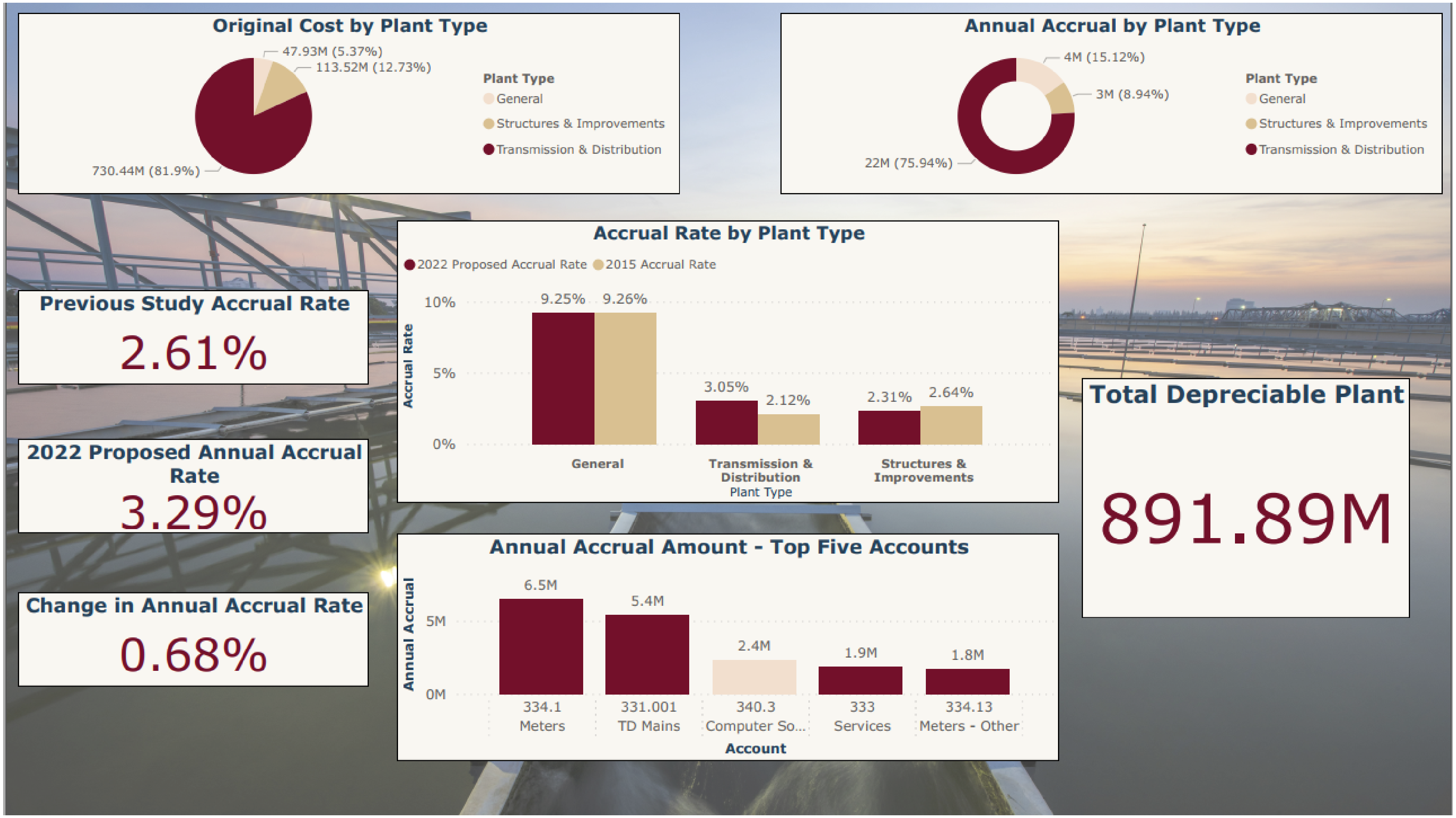
Pursuant to Kentucky American Water's ("KAWC" or the "Company") request, Concentric Advisors, ULC ("Concentric") conducted a depreciation study related to the Company's Water Treatment, Collection, and General Plant accounts. The purpose of the study is to determine the annual depreciation accrual rates and amounts applicable to the original cost of water utility plant, as of December 31, 2022.

The depreciation rates are based on the Straight-Line method using the Average Life Group procedure and were applied on a Remaining Life basis. The calculations were based on attained ages, estimated average service life and forecasting net salvage characteristics for each depreciable group of assets.

Concentric recommends the calculated annual depreciation accrual rates set forth herein apply specifically to Water Treatment, Collection, and General Plant assets in service, as of December 31, 2022, summarized in Table 1 on pages 5-2. Supporting data and calculations are also provided within this report.

Concentric's study results in an annual depreciation expense accrual of $29 million when applied to depreciable plant balances of $891 million, as of December 31, 2022. The report study results are summarized at an aggregate functional group level as follows:

1.1 Executive Summary (Power BI)



SECTION 2

2 BASIS OF THE STUDY

2.1 Scope

This study sets forth the results of the depreciation study for the water utility plant assets of KAWC, to determine the annual depreciation accrual rates and amounts for book purposes applicable to the original cost of investment as of December 31, 2022. The rates and amounts are based on the Straight-Line Method, incorporating the ALG Procedure applied on a Remaining Life Basis. This study also describes the concepts, methods and judgments which underlie the recommended annual depreciation accrual rates related to the KAWC assets in service, as of December 31, 2022.

The service life estimates resulting from the study were based on:

- informed professional judgment which incorporated analyses of historical plant retirement data recorded through December 31, 2022;
- a review of KAWC company practice and outlook, as they relate to plant operation and retirement; and
- consideration of current practice in the Water system industry, including knowledge of service life estimates used for other Water system companies.

The depreciation accrual rates presented herein are based on generally-accepted methods and procedures for calculating depreciation. The estimated survivor curves used in this study are based on studies incorporating actual data through 2021 for most accounts.

2.2 Plan of Study

The report is presented in the following order:

SECTION 1	Study Highlights presents a brief summary of the depreciation study and results
SECTION 2	Basis of the Update contains statements with respect to the plan and the basis of the study
SECTION 3	Development of the Required Depreciation Rates presents descriptions of the methods used and factors considered in the service life study
SECTION 4	Calculation of Annual and Accrued Depreciation presents the methods and procedures used in the calculation of depreciation
SECTION 5	Results of Study presents summaries by depreciable group of annual and accrued depreciation in Table 1
SECTION 6	Presents the results of the Retirement Rate Analysis
SECTION 7	Presents the results of the Net Salvage Study
SECTION 8	Presents the results of the Detailed Depreciation Calculations
SECTION 9	Estimation of Survivor Curves is an overview of Iowa curves and the Retirement Rate Analysis

2.3 Depreciation

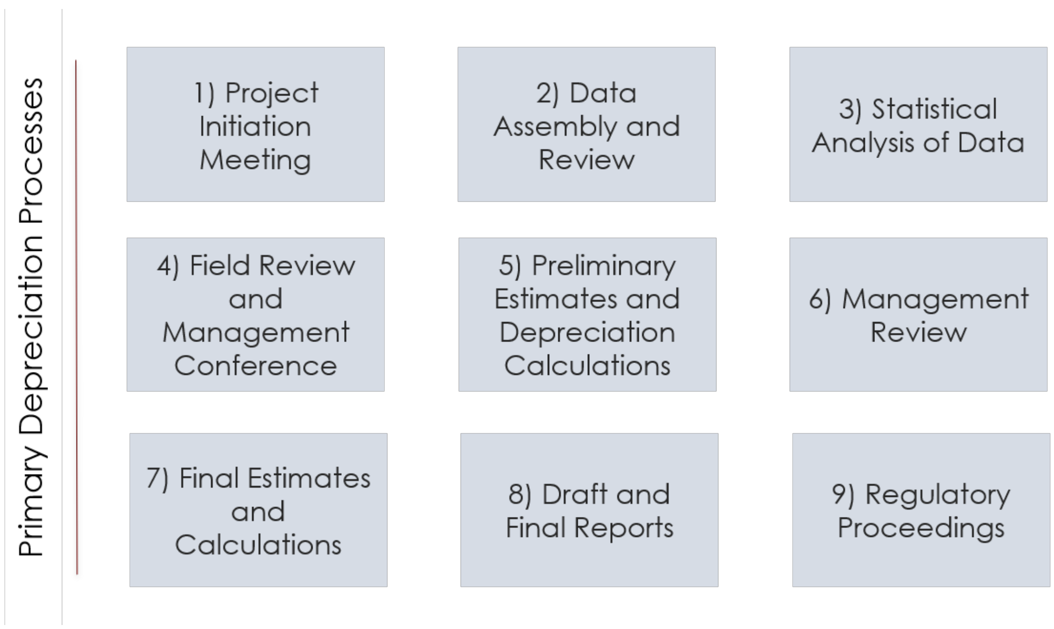
A full and comprehensive depreciation study includes the following components:

1. supported recommendations regarding Average Service Life estimates for each account;
2. supported recommendations regarding estimated Net Salvage requirements for each account;
3. selection of an appropriate grouping procedure;
4. detailed calculation of the depreciation rate utilizing the estimated Average Service Life and Net Salvage requirements; and
5. a document explaining the procedures followed and justifying the results in a format suitable for submission to senior management and regulatory authorities.

A diagram of the nine primary processes followed by Concentric in the development of the depreciation study is provided below. Each of the steps is undertaken by Concentric using proprietary software.

For most accounts, the annual and accrued depreciation were calculated by the Straight-Line Method using the ALG Procedure. For certain general plant accounts, the annual and accrued depreciation are based on amortization accounting. Both types of calculations were based on original cost, attained ages and an estimate of service lives.

Consistent with the current KAWC practice, amortization accounting continues to be recommended for certain general plant accounts because of the disproportionate plant accounting effort required in these accounts. Many regulated utilities in North America have received approval to adopt amortization accounting for these accounts.



2.4 Information Provided by KAWC

KAWC has provided Concentric with the required information, as of December 31, 2022 for all accounts being studied. This information has been compiled from the plant accounting records and includes the following:

- current balances by vintage year for each account (aged balances). The balances provide the amount of investment sorted by installation year currently in operation. This file is only inclusive of current plant in service and does not include any retirement information;
- detailed retirement transactions for all accounts. The transactions include information regarding the transaction year of the retirement, the installation year of the asset being retired, and the original cost of the asset being retired; and
- detailed cost of removal and gross salvage transactions for all accounts requiring the recovery of net salvage. The transactions include information regarding the transaction year of the retirement, the costs associated with the retirement, and any gross salvage proceeds from the sale or reuse of the property; and
- Accumulated Depreciation balances as of December 31, 2022 for accounts studied.

2.5 Data Reconciliation

The above data was reviewed and reconciled to Company control schedules to ensure accuracy and reasonableness in use of the calculations developed in this study. These checks include:

- that the surviving investment by account equals (or can be reconciled to) the Company's gross plant in service and accumulated depreciation ledger balances;
- that the surviving investment in each vintage is not negative. In other words, this check confirms that the sum of retirements from any given vintage have not exceeded the amount of plant additions to the vintage; and
- that any adjusting transactions are properly accounted for within the databases.

SECTION 3

3 DEVELOPMENT OF THE REQUIRED DEPRECIATION RATES

3.1 Depreciation

The development of the depreciation calculations requires the input of an Average Service Life, a retirement dispersion curve ("Survivor Curve" or "Iowa curve"), Net Salvage estimates, and Life Span dates for a number of accounts. (the "depreciation parameters"). Additionally, to complete the depreciation calculations, the calculation methods must be established. Specifically, the selection of the depreciation method must establish three types of additional input:

1. the choice of a depreciation method;
2. a basis upon which to apply the method, and
3. in the case of group assets, a procedure to use in grouping the assets.

In this study, the depreciation rates for KAWC have been calculated in accordance with the Straight-Line method, the ALG procedure and applied using the Remaining Life technique, with any accumulated depreciation variances trued-up over the composite remaining life of each account.

Depreciation, as applied to depreciable plant, means the loss in service value not restored by current maintenance, incurred in connection with the consumption or prospective retirement of water plant in the course of service from causes which are known to be in current operation and against which the utility is not protected by insurance. Among the causes to be given consideration are wear and tear, decay, action of the elements, inadequacy, obsolescence, changes in the art and changes in demand and requirements of public authorities.[1]

When considering the action of the elements, the average service life and net salvage calculations have considered large catastrophic events that have occurred and impacted the life estimates of utilities across North America. The average service life of utilities has been influenced by events including:

- forest fires;
- earthquakes;
- tornadoes;
- ice storms;
- wind-storms;
- large scale flooding;
- fires;
- lightning;
- intentional actions of third parties;
- hoar frost; and
- other natural forces of nature.

[1] The National Association of Railroad and Utilities Commissioners, Uniform System of Accounts for Gas Utilities.

Depreciation, as used in accounting, is a method of distributing fixed capital costs, less net salvage, over a time period by allocating annual amounts to expense. Each annual amount of such depreciation expense is part of that year's total cost of providing water utility service. Normally, the time over which the fixed capital cost is allocated to the cost of service, is equal to the time over which an item renders service - that is the item's service life. The most prevalent method of allocation is to distribute an equal amount of cost to each year of service life. This method is known as the Straight-Line method of depreciation.

The calculation of annual and accrued depreciation based on the Straight-Line method when applied to utility group accounts requires the estimation of survivor curves and is described in the following sections of this study. The development of the proposed depreciation rates also requires the selection of group depreciation procedures, as discussed below.

3.1.1 Study Depreciation Methods and Procedures

When more than a single item of property is under consideration, a group procedure for depreciation is appropriate because normally all of the items within a group do not have identical service lives but have lives that are dispersed over a range of time. There are two primary group procedures, namely, the Average Life Group (ALG) and Equal Life Group (ELG) procedures.

In the ALG Procedure, the rate of annual depreciation is based on the average service life of the group. This rate is applied to the surviving balances of the group's cost. A characteristic of this procedure is that the cost of plant retired prior to average life is not fully recouped at the time of retirement, whereas the cost of plant retired subsequent to the average life is more than fully recouped. Over the entire life cycle, the portion of cost not recouped prior to average life is balanced by the cost recouped subsequent to average life.

In the Equal Life Group Procedure, also known as the Unit Summation Procedure, the property group is subdivided according to service life. That is, each equal life group includes that portion of the property which experiences the life of that specific group. The relative size of each equal life group is determined from the property's life dispersion curve. The calculated depreciation for the property group is the summation of the calculated depreciation based on the service life of each equal life unit.

For most accounts, the annual and accrued depreciation were calculated by the Straight-Line Method using the ALG Procedure. For certain Transmission & Distribution and General plant accounts, the annual and accrued depreciation are based on amortization accounting. Both types of calculations were based on original cost, attained ages and an estimate of service lives.

While the Equal Life Group Procedure provides an enhanced matching of depreciation expense to the consumption of service value, the Straight-Line Method, Average Life Group Procedure is a commonly used depreciation calculation that has been widely accepted in jurisdictions throughout North America including KAWC in prior studies. Concentric recommends its continued use.

Amortization accounting is used for certain transmission and compression plant accounts because of the disproportionate plant accounting effort required in these accounts. Many regulated utilities in North America have received approval to adopt amortization accounting for these accounts. This study calculates the annual and accrued depreciation using the Straight-Line Method and ALG

Procedure for most accounts. For certain general plant accounts, the annual and accrued depreciation are based on amortization accounting. Both types of calculations were based on original cost, attained ages and estimates of service lives.

Continued monitoring and maintenance of the accumulated depreciation reserve at the account level is recommended. Concentric has determined an amortization amount to correct the present variance with the calculated accrued depreciation (theoretical reserve) over the composite remaining life of each account.

3.1.2 Changes Since Last KAWC Full Depreciation Study

The depreciation rates calculated in this study were calculated using the same depreciation procedure and technique as used in the prior full depreciation study – i.e. using the straight-line method, the ALG Procedure applied on a remaining life basis. The vintaged remaining life approach weighs the calculations of remaining life on an allocation of the actual book accumulated depreciation account by the Calculated Accumulated Depreciation (CAD) factor determined for each vintage of plant in service. This method is described as a CAD weighted calculation in the textbook Depreciation Systems by Frank K. Wolf and W. Chester Fitch, published by the Iowa State University in 1994 under the title "Adjustments" within the Broad Group Model. Concentric notes that this does not represent a change from the currently approved remaining life calculations in use by KAWC.

When depreciation rates are calculated utilizing a remaining life technique, the depreciation rate is established by dividing the undepreciated value of each group of assets (after consideration to the net salvage requirements) by the composite remaining life of the group of assets. This calculation is made for each vintage surviving investment as of the date of the study (December 31, 2022), and then composited into a calculation for the account or group as a whole. This calculation requires two estimates:

1. The actual booked accumulated depreciation for each vintage within each account.

   KAWC does not track the booked accumulated depreciation reserve by vintage within each account. Rather the depreciation expense is calculated at an account level and booked to accumulated depreciation at the same account level. Concentric notes that this is the practice employed by virtually all regulated utilities. As such, the accumulated depreciation by account is allocated within the account to each vintage, on the basis of the calculated accumulated depreciation by vintage. The calculated accumulated depreciation is a function of the estimated survivor curve, the average service life estimate, the net salvage estimates and the achieved age of each vintage.

2. The estimated remaining life of each vintage with each account. The estimated remaining life of each vintage is a direct function of the achieved age of each vintage, the estimated survivor curve and the average service life estimate. For the purposes of this depreciation study, Concentric recommends the use of a minimum remaining life for each vintage of three years. All vintages with remaining lives of less than 3 years according to the Iowa curve selected are assigned a remaining life of three years for the purposes of depreciation calculations.

Once the above two estimates are determined (the allocated booked reserve by vintage and the average remaining life of each vintage), an annual accrual requirement for each vintage is determined by dividing the net book value for each vintage (considering the estimated future salvage requirements) by the average remaining life of the vintage. The annual requirement for each vintage is summed at the account level and divided into the sum of the accounts original cost surviving as of December 31, 2022.

This process results in each vintage's calculated net book value to be depreciated over an appropriate remaining life. This vintage weighting on CAD approach to the remaining life calculations is widely considered to be the most accurate. Concentric agrees and views this methodology as the correct and most appropriate calculation.

The use of a minimum remaining life of three years represents a small change in the depreciation methodology from the currently approved depreciation study. The previous depreciation study utilized a minimum remaining life of one year. Concentric recommends the change to three years to avoid any over recovery in the oldest vintages in circumstances where the next depreciation study will not be completed for a number of years.

3.1.3 Survivor Curves

The use of an average service life or a property group implies that the various units in the group have different lives. Thus, the average life may be obtained by determining the separate lives of each of the units, or by constructing a survivor curve plotting the number of units which survive at successive ages using the retirement rate method of analysis.

The range of survivor characteristics usually experienced by utility and industrial properties is encompassed by a system of generalized survivor curves known as the Iowa type curves. The Iowa curves *"…were sorted into three groups according to whether the mode was to the left, approximately coincident with, or to the right of the average-life ordinate. The curves in each of these three groups were then sub-classified in accordance with the height of the mode, taking also into consideration the distance of the mode to the left or right of the average life."* [2] The Iowa curves are described as L-type (i.e. left-moded), R-type (i.e. right-moded), and S-type (i.e. symmetrical). Further development resulted in the introduction of O-type (i.e. origin-moded curves) where the greatest frequency of retirement occurs at the origin, or immediately after age zero. Individual type curves are further depicted with numerical subscripts which represent the relative heights of the modes of the frequency curves within each family.

The program that is used by Concentric for statistical smooth curve fitting utilizes an internal "goodness-of-fit" criterion known as the Residual Measure. This Residual Measure is based on a least squares solution of the differences between the stub curve (or original data points) and smooth survivor curve which also requires a balancing of the differences above and below the stub curve.

The criterion of goodness-of-fit is the mean square of the differences between the points on the stub and fitted smooth survivor curves. The residual measure, or standard error of estimate, shown in the

[2] Robley Winfrey, Statistical Analyses of Industrial Property Retirements, Bulletin 125 revised (Engineering Research Institute, Iowa State University, 1935) 65

output format is the square root of this mean square. As such, the lower the Residual Measure the better the statistical fit between the analyzed Iowa curve and the observed data points. Concentric follows the widely used practice of fitting Iowa curves up to one percent of the maximum exposures. This standard practice is utilized to minimize the influence of typically small retirements applied to similarly small exposures which may unduly affect the Iowa curve fitting process. However, Concentric will recognize the observed data points beyond the one percent of maximum exposures if it is determined that the additional data is a valid consideration for life recommendation.

A discussion of the general concept of survivor curves and retirement rate method is presented in Section 9.

3.1.4 Survivor Curve and Net Salvage Judgments

The service life and net salvage estimates used in the depreciation and amortization calculations were based on informed professional judgment which incorporated a review of management's plans, policies and outlook, a general knowledge of the gas utility industry, and comparisons of the service life and net salvage estimates from Concentric's studies of other gas utilities. The use of survivor curves, to reflect the expected dispersion of retirement, provides a consistent method of estimating depreciation for gas plant. Iowa type survivor curves were used to depict the estimated survivor curves for the plant accounts not subject to amortization accounting.

The procedure for estimating service lives consisted of compiling historical data for the plant accounts or depreciable groups, analyzing this history through the use of widely accepted techniques, and forecasting the survivor characteristics for each depreciable group on the basis of interpretations of the historical data and the probable future. The forecasting of a probable future included management and operational staff interviews. The combination of the historical experience and the probable future yielded estimated survivor curves from which the average service lives were derived.

The resultant depreciation rates are summarized in the applicable tables of this study (Section 5). The depreciation rates should be reviewed periodically to reflect the changes that result from plant and reserve account activity. A depreciation reserve deficiency or surplus will develop if future capital expenditures vary significantly from those anticipated in this study.

The estimates of net salvage for the mass property accounts were based mostly in part on historical data related to actual retirement activity for the years 1999 through 2022, for most accounts. Gross salvage and cost of removal as recorded to the depreciation reserve account and related to experienced retirements were used. Percentages of the cost of plant retired were calculated for each component of net salvage on an annual, three-year, five-year, and on a cumulative moving average basis.

The following discussion, dealing with a number of accounts which comprise the majority of the investment analyzed, presents an overview of the factors considered by Concentric in the determination of the average service life and net salvage estimates. The survivor curve estimates for the remainder of the accounts not discussed in the following sections were based on similar considerations.

ACCOUNT 304.10 – STRUCTURES AND IMPROVEMENTS – SOURCE OF SUPPLY

Investment $	Investment %	Previously Approved Curves	Concentric Recommended Curves	Previously Approved Salvage	Concentric Recommended Salvage
$25,467,744	2.86%	50-S0.5	45-R2.5	-10%	-15%

The investment in Structures and Improvements – Source of Supply is approximately $25.5 million representing 2.9 percent of the total depreciable plant studied. The current approved life parameter for this account is an Iowa 50-S0.5. The retirements, additions and other plant transactions, for the period 1962 through 2022, were analyzed by the retirement rate method. Retirements of $831,779 were recorded for the period 2003 through 2022. The currently approved life parameter is an Iowa 50-S0.5 with a related Residual Measure of 2.8597. Discussions with KAWC operational and SMEs indicated that the Iowa 45-R2.5 with a Residual Measure of 2.8891 depicted on page 6-2 of this report is more indicative of the activity of this account. Peer comparison of American water utilities produced a range from 45 to 65 years. Based on the above discussion and considerations, and on Concentric's experience, the Iowa 45-R2.5 is a reasonable expectation for the investment in this account. As such, Concentric recommends the Iowa 45-R2.5 to represent the future expectations for the investment in this account.

The first year of recorded net salvage activity for this account is 2003. The currently approved net salvage is negative 10 percent. For the period 2003 to 2022, this account has shown a wide range in historical net salvage activity. The range has been from negative 78 percent to negative 359 percent. A three-year band analysis from 2005 forward produced a range from positive 59 percent to over negative 500 percent. A five-year band analysis ranges from zero percent to negative 443 percent. A peer comparison of American utilities indicated a range from negative 10 percent to negative 30 percent. Based on historical indications and conversations with company personnel, Concentric views that a step change increase to negative 15 percent better represents the net salvage expectation for the investment in this account. Concentric understands that this salvage percentage will need to be increased further in future studies.

ACCOUNT 304.20 – STRUCTURES AND IMPROVEMENTS – POWER AND PUMPING &
ACCOUNT 304.30 – STRUCTURES AND IMPROVEMENTS – WATER TREATMENT

Investment $	Investment %	Previously Approved Curves	Concentric Recommended Curves	Previously Approved Salvage	Concentric Recommended Salvage
$64,539,858	7.24%	60-R1.5	65-R1.5	-15%	-15%

The investment in Structures and Improvements – Power and Pumping is approximately $9.7 million representing 1.1 percent of the total depreciable plant studied. The current approved life parameter for this account is an Iowa 60-R1.5. The investment in Structures and Improvements – Water Treatment is approximately $54.8 million representing 6.2 percent of the total depreciable plant studied. The currently approved life parameter for this account is an Iowa 60-R1.5. As in previous depreciation studies, these accounts were combined for the purposes of the actuarial analysis in account 304.230. The retirements, additions and other plant transactions, for the period 1925 through 2022, were analyzed by the retirement rate method. Retirements of $6,050,104 were recorded for the period 1999 through 2022. The currently approved Iowa 60-R1.5 has a related Residual Measure of 1.3532. The proposed 65-R1.5 has a residual measure of 1.7353 as depicted on page 6-5 of this report. Discussions with KAWC operational staff indicated that the 65-R1.5 is more indicative of the investment in this account moving forward. Peer comparison of American water utilities produced a range from 50 to 80 years. Based on the above discussion and considerations, and on Concentric's experience, the Iowa 65-R1.5 is a more representative expectation for the investment in this account. As such, Concentric recommends the Iowa 55-R1.5 to represent the future expectations for the investment in this account.

As in previous depreciation studies, the net salvage calculations for account 304.2 was combined with the analysis for account 304.3. The first year of recorded net salvage activity for these accounts is 1999. The currently approved net salvage percentage is negative 15 percent. For the period 1999 to 2022, the net salvage ranged from zero percent to over negative 1,000 percent with a cumulative value of negative 47 percent. A three-year band analysis from 2001 forward produced a range from zero percent to over negative 500 percent. A five-year band analysis indicates a range from zero percent to negative 427 percent. A peer comparison of American utilities indicated a range from negative 10 percent to negative 25 percent. Based on historical indications, the review of peer water utilities, and conversations with company personnel, Concentric views that negative 15 percent still best represents the net salvage expectation for the investment in these accounts.

ACCOUNT 309.00 – SUPPLY MAINS

Investment $	Investment %	Previously Approved Curves	Concentric Recommended Curves	Previously Approved Salvage	Concentric Recommended Salvage
$18,567,234	2.08%	70-R3	80-R3	-10%	-10%

The investment in Supply Mains is approximately $18.5 million representing 2.1 percent of the total depreciable plant studied. The current approved life parameter for this account is an Iowa 70-R3. The retirements, additions and other plant transactions, for the period 1934 through 2022, were analyzed by the retirement rate method. Retirements of $28,223 were recorded for the period 2000 through 2022. The currently approved life parameter has a related Residual Measure of 3.0741. Discussions with KAWC operational and SMEs indicated that the Iowa 80-R3 with a Residual Measure of 2.0794 depicted on page 6-34 of this report is more indicative of the activity of this account moving forward. Peer comparison of American water utilities produced a range from 70 to 82 years. Based on the above discussion and considerations, and on Concentric's experience, the Iowa 80-R3 is a reasonable expectation for the investment in this account. As such, Concentric recommends the Iowa 80-R3 to represent the future expectations for the investment in this account.

The first year of recorded net salvage activity for this account is 2000. The currently approved net salvage is negative 10 percent. For the period 2000 to 2022, this account has shown a wide range in historical net salvage activity. The range has been from negative 23 percent to over negative 1,000 percent. A three-year band analysis from 2002 forward produced a range from positive seven percent to over negative 1000 percent. A five-year band analysis ranges from positive 7 percent to over negative 1000 percent. A peer comparison of American utilities indicated a range from negative 10 percent to negative 100 percent. Based on historical indications and conversations with company personnel, Concentric views that negative 10 percent still best represents the net salvage expectation for the investment in this account.

ACCOUNT 311.20 – PUMPING EQUIPMENT – ELECTRIC

Investment $	Investment %	Previously Approved Curves	Concentric Recommended Curves	Previously Approved Salvage	Concentric Recommended Salvage
$21,764,805	2.44%	43-S0.5	40-S0.5	-15%	-20%

The investment in Electric Pumping Equipment is approximately $21.7 million representing 2.4 percent of the total depreciable plant studied. The current approved life parameter for this account is an Iowa 43-S0.5. This account was combined with all other Pumping Equipment accounts for the purposes of actuarial analysis, as was done in the previous study. The retirements, additions and other plant transactions, for the period 1934 through 2022, were analyzed by the retirement rate method. Retirements of $7,652,691 were recorded for the period 1999 through 2022. The currently approved Iowa 43-S0.5 has a related Residual Measure of 1.0604. The proposed Iowa 40-S0.5 has a better mathematical and visual fit with a Residual Measure of 0.8723, as depicted on page 6-5 of this report. Discussions with KAWC operational staff indicated the Iowa 40-S0.5 is a good fit for this account moving forward. Peer comparison of American water utilities produced a range from 40 to 55 years. Therefore, based on the above discussion and on Concentric's experience, Concentric recommends the Iowa 40-S0.5 to represent the investment in this account.

The first year of recorded net salvage activity for this account is 1999. The net salvage analysis has been completed on all Pumping Equipment accounts combined to align with the Actuarial Analysis. The currently approved net salvage is negative 15 percent. For the period 1999 to 2022, this account has shown a wide range in historical net salvage activity. The range has been from positive 227 percent to negative 232 percent. A three-year band analysis from 2001 forward produced a range from positive nine percent to negative 258 percent. A five-year band analysis ranges from positive 35 percent to negative 101 percent. A peer comparison of American utilities indicated a range from negative 10 percent to negative 15 percent. Based on historical indications and the review of American water utilities, Concentric views that a move to negative 20 percent is more indicative of the net salvage expectation for the investment in this account.

ACCOUNT 320.10 – WATER TREATMENT EQUIPMENT – NON-MEDIA

Investment $	Investment %	Previously Approved Curves	Concentric Recommended Curves	Previously Approved Salvage	Concentric Recommended Salvage
$70,780,487	7.94%	55-R3	50-R2	-15%	-15%

The investment in Water Treatment Equipment – Non-Media is approximately $70.8 million representing approximately 8.0 percent of the total depreciable plant studied. The current approved life parameter for this account is an Iowa 55-R3. The retirements, additions and other plant transactions, for the period 1898 through 2022, were analyzed by the retirement rate method.

Retirements of $17,132,436 were recorded for the period 1999 through 2022. The currently approved Iowa 55-R3 has a related Residual Measure of 1.8946. The proposed Iowa 50-R2 has a better mathematical and visual fit with a Residual Measure of 1.2926 as depicted on page 6-45. Discussions with KAWC operational staff indicate the Iowa 50-R2 is a more appropriate fit for this account going forward. Peer comparison of American utilities produced a range from 30 to 55 years. Based on the above comments and Concentric's experience, the Iowa 50-R2 is recommended for this account moving forward.

The first year of recorded net salvage activity for this account is 1999. The currently approved net salvage is negative 15 percent. For the period 1999 to 2022, the net salvage ranged from zero percent to negative 224 percent with a cumulative value of negative 18 percent. A three-year band analysis shows a range between negative two percent and negative 157 percent. A five-year band analysis shows a range between negative three percent and negative 96 percent. A peer comparison of American utilities indicated a range from negative 10 percent to negative 30 percent. Based on historical indications, the review of American water utilities and conversations with company personnel about these assets, Concentric views that negative 15 percent still best represents the net salvage expectation for the investment in this account.

ACCOUNT 331.001 – TD MAINS

Investment $	Investment %	Previously Approved Curves	Concentric Recommended Curves	Previously Approved Salvage	Concentric Recommended Salvage
$398,094,728	44.64%	85-R3	90-R4	-25%	-20%

The investment in TD Mains is approximately $398 million representing 44.6 percent of the total depreciable plant studied. The current approved life parameter for this account is an Iowa 85-R3. The retirements, additions and other plant transactions, for the period 1906 through 2022, were analyzed by the retirement rate method. Retirements of $6,779,701 were recorded for the period 1999 through 2022. The currently approved Iowa 85-R3 has a related Residual Measure of 1.2261. The proposed Iowa 90-R4 presents a Residual Measure of 1.2406 as depicted on page 6-55. Discussions with KAWC operational staff indicate the Iowa 90-R4 is more indicative of the investment in this account based on what they are seeing in the retirement trends. Peer comparison of American utilities produced a range from 70 to 105 years. Based on the above comments and Concentric's experience, the Iowa 90-R4 is recommended to represent this account moving forward.

The first year of recorded net salvage activity for this account is 1999. The currently approved net salvage is negative 25 percent. For the period 1999 to 2022, this account has shown a small range in historical net salvage activity. The range has been from negative 18 percent to negative 148 percent. A three-year band analysis from 2001 forward produced a range from negative three percent to negative 450 percent. A five-year band analysis ranges from negative 10 percent to negative 295 percent. A peer comparison of American utilities indicated a range from negative 10 percent to negative 75 percent. Based on historical indications and the review of American water utilities, Concentric views that negative 20 percent is an appropriate representation of the net salvage expectation for the investment in this account.

ACCOUNT 333.00 - SERVICES

Investment $	Investment %	Previously Approved Curves	Concentric Recommended Curves	Previously Approved Salvage	Concentric Recommended Salvage
$63,714,885	7.14%	52-R3	55-R5	-75%	-65%

The investment in Services is approximately $63.7 million representing 7.1 percent of the total depreciable plant studied. The current approved life parameter for this account is an Iowa 52-R3. The retirements, additions and other plant transactions, for the period 1934 through 2022, were analyzed by the retirement rate method. Retirements of $4,555,362 were recorded for the period 1999 through 2022. The currently approved Iowa 52-R3 has a related Residual Measure of 0.6097. The proposed Iowa 55-R4 has a better mathematical and visual fit to the data with a Residual Measure of 0.5234 as depicted on page 6-60. Discussions with KAWC operational staff indicate the Iowa 55-R4 is a better fit for this account moving forward. Peer comparison of American utilities produced a range from 52 to 75 years. Based on the above comments and Concentric's experience, the Iowa 55-R4 is recommended for this account.

The first year of recorded net salvage activity for this account is 1999. The currently approved net salvage is negative 75 percent. For the period 1999 to 2022, this account has shown a wide range in historical net salvage activity. The range has been from negative 58 percent to negative 301 percent. A three-year band analysis from 2001 forward produced a range from negative 17 percent to over negative 1,000 percent. A five-year band analysis ranges from negative 23 percent to negative 422 percent. A peer comparison of American utilities indicated a range from negative 75 percent to negative 150 percent. Based on historical indications, the review of American water utilities, and conversations with company personnel, Concentric views a slight change to negative 65 percent best represents the net salvage expectation for the investment in this account.

ACCOUNT 334.100 – METERS

Investment $	Investment %	Previously Approved Curves	Concentric Recommends Curves	Previously Approved Salvage	Concentric Recommends Salvage
$27,125,504	3.04%	40-R0.5	10-R3	-20%	-15%

The investment in Meters is approximately $27 million representing 3 percent of the total depreciable plant studied. The current approved life parameter for this account is an Iowa 40-R0.5. The retirements, additions and other plant transactions, for the period 1934 through 2022, were analyzed by the retirement rate method. Retirements of $2,761,993 were recorded for the period 2005 through 2022, resulting in actual observed data points as depicted on page 6-64 of this report.

Previous depreciation studies considered all metering assets, including meter vaults and meter installations, within a single account for the purposes of the Actuarial Analysis. Concentric recommends setting the depreciation parameters for metering accounts independently in order to ensure that the depreciation parameters are consistent with the expected lives of the assets.

The assets included in Account 334.100 are related to meters installed throughout the KAWC service area. In the last ten years, these meters have migrated to an Advanced Metering Infrastructure ("AMI") system. Kentucky requires many water meters to be replaced at 10 years in order to ensure accuracy. Furthermore, historically many meters have been replaced prior to eight years due to problems with the meters. As such, Concentric recommends a useful life of 10 years to be in compliance with the Kentucky standards. Based on the above, Concentric recommends the Iowa 10-R3 be used for the assets within this account.

The first year of recorded net salvage activity for this account is 2005. The currently approved net salvage is negative 20 percent. For the period 2005 to 2022, the net salvage ranged from zero percent to over negative 1,000 percent with a cumulative value of negative 44 percent. A three-year band analysis from 2007 forward produces a range from positive 17 percent to over negative 1,000 percent. The most recent five-year band indicates negative 484 percent. A peer comparison of American utilities indicated a range from negative 10 percent to negative 20 percent. Based on historical indications and the review of American water utilities, Concentric views that negative 15 percent better represents the net salvage expectation for the equipment in this account.

ACCOUNT 334.11 – METERS – BRONZE CASE

Investment $	Investment %	Previously Approved Curves	Concentric Recommends Curves	Previously Approved Salvage	Concentric Recommends Salvage
$2,428,792	0.27%	40-R0.5	10-R3	-20%	-15%

The investment in Meters – Bronze Case is approximately $2 million representing 0.3 percent of the total depreciable plant studied. The current approved life parameter for this account is an Iowa 40-R0.5. The retirements, additions and other plant transactions, for the period 1934 through 2022, were analyzed by the retirement rate method. Retirements of $27,732 were recorded for the period 2002 through 2022, resulting in actual observed data points as depicted on page 6-68 of this report.

Previous depreciation studies considered all metering assets, including meter vaults and meter installations, within a single account for the purposes of the Actuarial Analysis. Concentric recommends setting the depreciation parameters for metering accounts independently in order to ensure that the depreciation parameters are consistent with the expected lives of the assets.

The assets included in Account 334.110 are related to meters installed throughout the KAWC service area. In the last ten years, these meters have migrated to an Advanced Metering Infrastructure ("AMI") system. Kentucky requires many water meters to be replaced at 10 years in order to ensure accuracy. Furthermore, historically many meters have been replaced prior to eight years due to problems with the meters. As such, Concentric recommends a useful life of 10 years to be in compliance with the Kentucky standards. Based on the above, Concentric recommends the Iowa 10-R3 be used for the assets within this account.

The first year of recorded net salvage activity for this account is 2002. The currently approved net salvage is negative 20 percent. For the period 2002 to 2022, there is very sparse data for net salvage. The historical band ranges from zero percent to negative 80 percent. A peer comparison of American utilities indicated a range from negative 10 percent to negative 20 percent. Based on historical indications and the review of American water utilities, Concentric views that negative 15 percent better represents the net salvage expectation for the equipment in this account.

ACCOUNT 334.12 – METERS – PLASTIC CASE

Investment $	Investment %	Previously Approved Curves	Concentric Recommends Curves	Previously Approved Salvage	Concentric Recommends Salvage
$476,069	0.05%	40-R0.5	10-R3	-20%	-15%

The investment in Meters – Plastic Case is approximately $476 thousand representing 0.1 percent of the total depreciable plant studied. The current approved life parameter for this account is an Iowa 40-R0.5 with a residual measure of 2.4337. The proposed Iowa 10-R3 has a better mathematical fit to the data with a residual measure of 2.1009. The retirements, additions and other plant transactions, for the period 1972 through 2022, were analyzed by the retirement rate method. Retirements of $1,149,763 were recorded for the period 1999 through 2022, resulting in actual observed data points as depicted on page 6-72 of this report.

Previous depreciation studies considered all metering assets, including meter vaults and meter installations, within a single account for the purposes of the Actuarial Analysis. Concentric recommends setting the depreciation parameters for metering accounts independently in order to ensure that the depreciation parameters are consistent with the expected lives of the assets.

The assets included in Account 334.120 are related to meters installed throughout the KAWC service area. In the last ten years, these meters have migrated to an Advanced Metering Infrastructure ("AMI") system. Kentucky requires many water meters to be replaced at 10 years in order to ensure accuracy. Furthermore, historically many meters have been replaced prior to eight years due to problems with the meters. As such, Concentric recommends a useful life of 10 years to be in compliance with the Kentucky standards. Based on the above, Concentric recommends the Iowa 10-R3 be used for the assets within this account.

The first year of recorded net salvage activity for this account is 1999. The currently approved net salvage is negative 20 percent. For the period 1999 to 2022, the net salvage ranged from positive 367 percent to negative 261 percent with a cumulative value of positive three percent. A three-year band analysis ranges from values of positive 17 percent to over negative 1,000 percent. A five-year band analysis indicates values ranging from positive 17 percent to over negative 1,000 percent. A peer comparison of American utilities indicated a range from negative 10 percent to negative 20 percent. Based on historical indications and the review of American water utilities, Concentric views that negative 15 percent better represents the net salvage expectation for the equipment in this account.

ACCOUNT 334.13 – METERS – OTHER

Investment $	Investment %	Previously Approved Curves	Concentric Recommends Curves	Previously Approved Salvage	Concentric Recommends Salvage
$6,675,822	0.75%	40-R0.5	10-R3	-20%	-15%

The investment in Meters – Other is approximately $6.7 million representing 0.8 percent of the total depreciable plant studied. The current approved life parameter for this account is an Iowa 40-R0.5. The retirements, additions and other plant transactions, for the period 1934 through 2022, were analyzed by the retirement rate method. Retirements of $767,093 were recorded for the period 1999 through 2022, resulting in actual observed data points as depicted on page 6-75 of this report.

Previous depreciation studies considered all metering assets, including meter vaults and meter installations, within a single account for the purposes of the Actuarial Analysis. Concentric recommends setting the depreciation parameters for metering accounts independently in order to ensure that the depreciation parameters are consistent with the expected lives of the assets.

The assets included in Account 334.130 are related to meters installed throughout the KAWC service area. In the last ten years, these meters have migrated to an Advanced Metering Infrastructure (“AMI”) system. Kentucky requires many water meters to be replaced at 10 years in order to ensure accuracy. Furthermore, historically many meters have been replaced prior to eight years due to problems with the meters. As such, Concentric recommends a useful life of 10 years to be in compliance with the Kentucky standards. Based on the above, Concentric recommends the Iowa 10-R3 be used for the assets within this account.

The first year of recorded net salvage activity for this account is 1999. The currently approved net salvage is negative 20 percent. For the period 1999 to 2022, the net salvage ranged from positive six percent to over negative 1,000 percent with a cumulative value of negative two percent. A three-year band analysis ranges from values of positive six percent to over negative 1,000 percent. A five-year band analysis indicates values ranging from positive six percent to over negative 1,000 percent. A peer comparison of American utilities indicated a range from negative 10 percent to negative 20 percent. Based on historical indications and the review of American water utilities, Concentric views that negative 15 percent better represents the net salvage expectation for the equipment in this account.

ACCOUNT 334.131 – METER READING UNITS

Investment $	Investment %	Previously Approved Curves	Concentric Recommends Curves	Previously Approved Salvage	Concentric Recommends Salvage
$727,628	0.08%	40-R0.5	10-R3	N/A	0%

The investment in Meters is approximately $727 thousand representing 0.1 percent of the total depreciable plant studied. The current approved life parameter for this account is an Iowa 40-R0.5. The retirements, additions and other plant transactions, for the period 1934 through 2022, were analyzed by the retirement rate method. There were no retirements recorded through 2022, resulting in actual observed data points as depicted on page 6-79 of this report.

Previous depreciation studies considered all metering assets, including meter vaults and meter installations, within a single account for the purposes of the Actuarial Analysis. Concentric recommends setting the depreciation parameters for metering accounts independently in order to ensure that the depreciation parameters are consistent with the expected lives of the assets.

The assets included in Account 334.131 are related to meter reading units in service throughout the KAWC service area. In the last ten years, these meters have migrated to an Advanced Metering Infrastructure ("AMI") system. Kentucky requires many water meters to be replaced at 10 years in order to ensure accuracy. Furthermore, historically many meters have been replaced prior to eight years due to problems with the meters. As such, Concentric recommends a useful life of 10 years to be in compliance with the Kentucky standards. Based on the above, Concentric recommends the Iowa 10-R3 be used for the assets within this account.

ACCOUNT 334.20 – METER INSTALLATIONS

Investment $	Investment %	Previously Approved Curves	Concentric Recommended Curves	Previously Approved Salvage	Concentric Recommended Salvage
$31,548,029	3.54%	40-R0.5	60-R3	-20%	-20%

The investment in Meter Installations is approximately $31.5 million representing 3.5 percent of the total depreciable plant studied. The current approved life parameter for this account is an Iowa 40-R0.5 with a residual measure of 3.8386. The proposed Iowa 60-R3 has a better mathematical and visual fit with a residual measure of 1.9167. The retirements, additions and other plant transactions, for the period 1934 through 2022, were analyzed by the retirement rate method. Retirements of $1,541,427 were recorded for the period 1999 through 2022, resulting in actual observed data points as depicted on page 6-81 of this report. Based on conversations with KAWC personnel, the observed history of this account, and Concentric's experience, Concentric recommends the Iowa 60-R3 to best represent the investment in this account moving forward.

Previous depreciation studies considered all metering assets, including meter vaults and meter installations, within a single account for the purposes of the Actuarial Analysis. Concentric recommends setting the depreciation parameters for metering accounts independently in order to ensure that the depreciation parameters are consistent with the expected lives of the assets.

The assets in Account 334.20 – Meter Installations relate to long lived meter setters (also known as meter pits) that contain the meter assets underground. These assets protect the meter but do not have any water running through them. As such, the accuracy and testing required for meters are not required for these assets. Furthermore, meters can be replaced without disturbing the meter pit. Based on the above, it is clear that a life substantially longer than meters is required for these assets. Concentric recommends that the Iowa 60-R3 be used for the assets within this account.

The first year of recorded net salvage activity for this account is 1999. The currently approved net salvage is negative 20 percent. For the period 1999 to 2022, the net salvage ranged from positive 27 percent to over negative 1,000 percent with a cumulative value of negative 57 percent. A three-year band analysis ranges from values of zero percent to negative 1,000 percent. A five-year band analysis indicates values ranging from zero percent to over negative 1,000 percent. A peer comparison of American utilities indicated a range from negative 10 percent to negative 50 percent. Based on historical indications and the review of American water utilities, Concentric views that negative 20 percent still best represents the net salvage expectation for the equipment in this account.

ACCOUNT 334.30 – METER VAULTS

Investment $	Investment %	Previously Approved Curves	Concentric Recommended Curves	Previously Approved Salvage	Concentric Recommended Salvage
$3,656,371	0.41%	40-R0.5	60-S0.5	-20%	-20%

The investment Meter Vaults is approximately $3.7 million representing 0.4 percent of the total depreciable plant studied. The current approved life parameter for this account is an Iowa 40-R0.5. The retirements, additions and other plant transactions, for the period 1982 through 2022, were analyzed by the retirement rate method. Retirements of $132,243 were recorded for the period 2011 through 2022, resulting in actual observed data points as depicted on page 6-85 of this report. The current Iowa 40-R0.5 has a related Residual Measure of 0.5487, and the proposed Iowa 60-S0.5 has a Residual Measure of 1.1844.

Previous depreciation studies considered all metering assets, including meter vaults and meter installations, within a single account for the purposes of the Actuarial Analysis. Concentric recommends setting the depreciation parameters for metering accounts independently in order to ensure that the depreciation parameters are consistent with the expected lives of the assets.

The assets in Account 334.30 – Meter Installations relate to long lived meter vaults (also known as meter pits) that contain the meter assets underground. These assets protect the meter but do not have any water running through them. As such, the accuracy and testing required for meters are not required for these assets. Furthermore, meters can be replaced without disturbing the meter pit. Based on the above, it is clear that a life substantially longer than meters is required for these assets. Concentric recommends that the Iowa 60-R3 be used for the assets within this account.

The first year of recorded net salvage activity for this account is 2011. The currently approved net salvage is negative 20 percent. For the period 2011 to 2022, this account has shown a wide range in historical net salvage activity. The range has been from negative 22 percent to negative 247 percent. A three-year band analysis from 2013 forward produced a range from zero percent to over negative 500 percent. A five-year band analysis ranges from negative 22 percent to negative 483 percent. A peer comparison of American utilities indicated a range from negative 20 percent to negative 30 percent. Based on historical indications and the review of American water utilities, Concentric views that negative 20 percent still best represents the net salvage expectation for the investment in this account.

ACCOUNT 335.00 – FIRE HYDRANTS

Investment $	Investment %	Previously Approved Curves	Concentric Recommended Curves	Previously Approved Salvage	Concentric Recommended Salvage
$32,146,686	3.60%	70-R4	65-R4	-40%	-40%

The investment in Fire Hydrants is approximately $32 million representing 3.6 percent of the total depreciable plant studied. The current approved life parameter for this account is an Iowa 70-R4. The retirements, additions and other plant transactions, for the period 1934 through 2022, were analyzed by the retirement rate method. Retirements of $1,402,210 were recorded for the period 1999 through 2022, resulting in actual observed data points as depicted on page 6-88 of this report. The current Iowa 70-R4 has a related Residual Measure of 2.1955, which does not fit the historical data as well as the Iowa 65-R4 with a Residual Measure of 1.5099. A Peer comparison of American water utilities produced a range from 60 to 70 years. Based on the above discussion and Concentric's experience, the Iowa 65-R4 is recommended to best represent the investment in this account moving forward.

The first year of recorded net salvage activity for this account is 1999. The currently approved net salvage is negative 40 percent. For the period 1999 to 2022, the historical net salvage activity ranged from negative 11 percent to negative 100 percent. A three-year band analysis from 2001 forward produced a range from negative two percent to negative 383 percent. A five-year band analysis ranges from negative six percent to negative 277 percent. A peer comparison of American utilities indicated a range from negative 40 percent to negative 50 percent. Based on historical indications, the review of American water utilities, and conversations with company personnel, Concentric views that keeping the salvage at negative 40 percent best represents the net salvage expectation for the investment in this account.

OTHER ACCOUNTS

The above analysis provides consideration relating to over 86 percent of the depreciable plant. Many of the accounts related to the remaining 14 percent of the depreciable plant studied as of December 31, 2022, are subjected to amortization accounting. This is proposed for a number of accounts that represent numerous units of property, but very small portions of depreciable water plant in service.

4 CALCULATION OF ANNUAL AND ACCRUED DEPRECIATION

4.1 Calculation of Annual and Accrued Amortization

Amortization is the gradual extinguishment of an amount in an account by distributing such amount over a fixed period, over the life of the asset or liability to which it applies, or over the period during which it is anticipated the benefit will be realized. Normally, the distribution of the amount is in equal amounts to each year of the amortization period.

The calculation of annual and accrued amortization requires the selection of an amortization period. The amortization periods used in this report were based on judgment which incorporated a consideration of the period during which the assets will render most of their service, the amortization period and service lives used by other utilities, and the service life estimates previously used for the asset under depreciation accounting.

Amortization accounting is proposed for a number of accounts that represent numerous units of property, but a very small portion of depreciable water plant in service. The accounts and their amortization periods are as follows:

Account	Title	Amortization Period-Years
339.60	Other P/E-CPS	10
340.10	Office Furniture	20
340.20	Computer & Periphery Equipment	10
340.21	Mainframe	5
340.22	Personal Computers	5
340.23	Other Equipment	5
340.30	Computer Software	5
340.315	Computer Software Spec Depr Rate	10
340.325	Computer Software Customized	15
340.33	Computer Software Other	15
340.50	Other Office Equipment	15
342.00	Stores Equipment	25
343.00	Tools, Shop and Garage Equipment	20
344.00	Laboratory Equipment	10
346.10	Communication Equipment – Non-Telephone	15

Account	Title	Amortization Period-Years
346.19	Remote Control and Instrumentation	15
346.20	Communication Equipment – Telephone	15
347.00	Miscellaneous Equipment	20
348.00	Other Tangible Property	20

For the purpose of calculating annual amortization amounts, as of December 31, 2022, the book depreciation reserve for each plant account or subaccount is assigned or allocated to vintages. The book reserve assigned to vintages with an age greater than the amortization period is equal to the vintage's original cost. The remaining book reserve is allocated among vintages with an age less than the amortization period in proportion to the calculated accrued amortization. The calculated accrued amortization is equal to the original cost multiplied by the ratio of the vintage's age to its amortization period. The annual amortization amount is determined by dividing the future amortizations (original cost less allocated book reserve) by the remaining period of amortization for the vintage.

4.2 Monitoring of Book Accumulated Depreciation

The calculated accrued depreciation or amortization represents that portion of the depreciable cost which will not be allocated to expense through future depreciation accruals, if current forecasts of service life characteristics materialize and are used as a basis for depreciation accounting. Thus, the calculated accrued depreciation provides a measure of the book accumulated depreciation. The use of this measure is recommended in the amortization of book accumulated depreciation variances to insure complete recovery of capital over the life of the property.

The composite remaining life for use in the calculation of depreciation accruals is derived by developing the composite sum of the individual remaining lives in accordance with the following equation:

$$Composite\ Remaining\ Life = \frac{\sum(\frac{Book\ Cost}{Life}\ x\ Remaining\ Life)}{\sum\frac{Book\ Cost}{Life}} \qquad (1)$$

The book costs and lives of the several vintages, which are summed in the foregoing equation, are defined by the estimated future survivor curve. In as much as book cost divided by life equals the whole life annual accrual, the foregoing equation reduces to the following form:

$$Composite\ Remaining\ Life = \frac{\sum Whole\ Life\ Future\ Accruals}{\sum Whole\ Life\ Annual\ Accrual} \qquad (2)$$

or

$$Composite\ Remaining\ Life = \frac{\sum \quad BookCost - Calc, Reserve}{\sum Whole\ Life\ Annual\ Accrual} \qquad (3)$$

SECTION 5

5 RESULTS OF THE STUDY

5.1 Qualification of Results

The calculated annual and accrued depreciation are the principal results of the update. Continued surveillance and periodic revisions are normally required to maintain continued use of appropriate annual depreciation accrual rates. An assumption that accrual rates can remain unchanged over a long period of time implies a disregard for the inherent variability in service lives and salvage, and for the change of the composition of property in service. The annual accrual rates and the accrued depreciation were calculated in accordance with the Straight-line method, using the ALG procedure based on estimates which reflect considerations of current historical evidence and expected future conditions.

5.2 Description of Detailed Tabulations

The following tables provides summaries by account of the original cost of investment, calculated and booked accumulated depreciation amounts, the required amount of annual depreciation expense, the required depreciation rate to be applied against the original cost of the account and the estimated composite remaining life of the surviving plant in service.

The detailed calculations of annual depreciation applicable to depreciable assets, as of December 31, 2022, are presented in account sequence starting in Section 5 – Page 5-2. The tables indicate the estimated average survivor curves used in the calculations. The tables set forth (for each installation year) the original cost, calculated accrued depreciation and the calculated annual accrual.

KENTUCKY - AMERICAN WATER COMPANY

TOTAL SYSTEM
TABLE 1 SUMMARY OF SERVICE LIFE AND NET SALVAGE ESTIMATES AND CALCULATED ANNUAL AND ACCRUED DEPRECIATION RELATED TO THE RECOVERY OF AVERAGE ORIGINAL COST IN WATER PLANT
BASED ON ORIGINAL COSTS AS OF DECEMBER 31, 2022

TOTAL LIFE AND NET SALVAGE

ACCOUNT	DESCRIPTION	Truncation Date	Estimated Survivor Curve	Investment Percentage	Net Salvage Percent	Surviving Original Cost as of 12/31/2022	Booked Reserve	Future Accruals	Annual Accrual Amount	Annual Accrual Rate	Composite Remaining Life
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
STRUCTURES AND IMPROVEMENTS											
304.100	Supply		45-R2.5	2.86%	-15%	$25,467,744	$4,717,053	$24,570,853	$690,508	2.71%	35.7
304.200	Pumping		65-R1.5	1.09%	-15%	$9,695,868	$3,489,639	$7,660,610	$151,206	1.56%	49.7
304.300	Treatment		65-R1.5	6.16%	-15%	$54,843,989	$8,936,044	$54,134,544	$953,089	1.74%	56.7
304.400	Transmission and Distribution		40-R3	0.62%	-5%	$5,479,277	-$145,529	$5,898,770	$167,744	3.06%	36.6
304.500	General		25-R2	1.07%	-5%	$9,570,767	$1,817,313	$8,231,993	$461,328	4.82%	18.1
304.600	Office Buildings		60-R2	0.63%	-15%	$5,594,695	$2,294,281	$4,139,619	$102,918	1.84%	39.9
304.700	Store, Shop and Garage		55-R3	0.19%	0%	$1,681,682	$547,045	$1,134,637	$32,024	1.90%	35.6
304.800	Miscellaneous		25-S0.5	0.13%	0%	$1,182,482	$390,853	$791,629	$65,618	5.55%	12.9
TOTAL STRUCTURES AND IMPROVEMENTS						**$113,516,506**	**$22,046,698**	**$106,562,654**	**$2,624,435**	**2.31%**	
305.000	Collecting and Impounding Reservoirs		75-R2	0.09%	0%	$819,260	$332,925	$486,335	$10,728	1.31%	45.2
306.000	Lake, River and Other Intakes		55-S1.5	0.19%	-10%	$1,680,525	$649,489	$1,199,088	$29,547	1.76%	39.6
309.000	Supply Mains		80-R3	2.08%	-10%	$18,567,234	$5,870,114	$14,553,843	$230,594	1.24%	61.6
310.000	Power Generation Equipment		35-R4	0.64%	-5%	$5,678,375	$1,542,584	$4,419,710	$183,442	3.23%	24.6
PUMPING EQUIPMENT											
311.200	Electric		40-S0.5	2.44%	-20%	$21,764,805	$3,025,410	$23,092,356	$799,426	3.67%	30.4
311.300	Diesel		40-S0.5	0.04%	-20%	$349,964	$159,488	$260,469	$14,622	4.18%	18.9
311.400	Hydraulic		40-S0.5	0.00%	-20%	$1,015	$4,098	-$2,880	$0	0.00%	26.7
311.520	SOS and Pumping		40-S0.5	1.94%	-20%	$17,284,728	$3,964,891	$16,776,782	$542,302	3.14%	31.0
311.530	Water Treatment		40-S0.5	0.30%	-20%	$2,676,856	$110,334	$3,101,894	$84,465	3.16%	36.7
311.540	Transmission and Distribution		40-S0.5	0.26%	-20%	$2,320,748	-$1,757	$2,786,655	$79,504	3.43%	35.1
TOTAL PUMPING EQUIPMENT						**$44,398,115**	**$7,262,462**	**$46,018,156**	**$1,520,319**	**3.42%**	
PURIFICATION SYSTEM											
320.100	Water Treatment Equipment - Non-Media		50-R2	7.95%	-15%	$70,780,487	$13,555,741	$67,841,819	$1,734,874	2.45%	40.0
320.200	Water Treatment Equipment - Filter Media		10-S3	0.09%	-10%	$806,774	$622,386	$265,065	$78,760	9.76%	3.3
TOTAL PURIFICATION SYSTEM						**$71,587,262**	**$14,178,128**	**$68,106,884**	**$1,813,635**	**2.53%**	
330.000	Dist Reservoirs & Standpipes		60-R4	0.20%	-15%	$1,777,826	$454,017	$1,590,483	$37,831	2.13%	42.1
330.100	Elevated Tanks & Standpipes		60-R4	1.60%	-15%	$14,209,580	$5,921,206	$10,419,811	$262,826	1.85%	39.2
330.200	Ground Level Tanks		60-R4	0.33%	-15%	$2,912,613	$566,484	$2,783,022	$57,849	1.99%	48.1
330.400	Clearwell		60-R4	0.12%	-15%	$1,096,316	$284,313	$976,450	$20,538	1.87%	47.5
TOTAL ACCOUNT 330						**$19,996,335**	**$7,226,020**	**$15,769,766**	**$379,044**	**1.90%**	
331.001	TD Mains		90-R4	44.69%	-20%	$398,094,728	$78,809,643	$398,904,031	$5,424,097	1.36%	73.9
TOTAL MAINS						**$398,094,728**	**$78,809,643**	**$398,904,031**	**$5,424,097**	**1.36%**	
333.000	Services		55-R4	7.15%	-65%	$63,714,885	$32,499,686	$72,629,874	$1,886,111	2.96%	38.4
METERS											
334.100	Meters		10-R3	3.05%	-15%	$27,125,504	$3,506,116	$27,688,214	$6,520,637	24.04%	5.1
334.110	Meters Bronze Case		10-R3	0.27%	-15%	$2,428,792	$955,952	$1,837,159	$582,972	24.00%	3.2
334.120	Meters Plastic Case		10-R3	0.05%	-15%	$476,069	-$365,031	$912,511	$282,625	59.37%	3.7
334.130	Meters Other		10-R3	0.75%	-15%	$6,675,822	$2,298,558	$5,378,638	$1,759,460	26.36%	3.1
334.131	Meter Reading Units		10-R3	0.08%	-15%	$727,628	$211,295	$625,477	$151,523	20.82%	4.7
TOTAL METERS						**$37,433,816**	**$6,606,890**	**$36,441,998**	**$9,297,216**	**24.84%**	
334.200	Meter Installations		60-R3	3.54%	-20%	$31,548,029	$11,955,688	$25,901,947	$568,127	1.80%	44.0
334.300	Meter Vaults		60-S0.5	0.41%	-20%	$3,656,371	-$36,739	$4,424,384	$79,250	2.17%	56.1
335.000	Hydrants		65-R4	3.61%	-40%	$32,146,686	$5,626,185	$39,379,176	$764,930	2.38%	53.2
339.600	Other P/E-CPS		10-SQ	0.11%	0%	$970,385	$479,155	$491,230	$95,448	9.84%	4.9
OFFICE FURNITURE AND EQUIPMENT											
340.100	Office Furniture & Equip		20-SQ	0.06%	0%	$557,267	$206,023	$351,244	$34,685	6.22%	10.9
340.200	Comp & Periph Equip		10-SQ	0.00%	0%	$35,493	$23,662	$11,831	$1,820	5.13%	6.5
340.210	Mainframe		5-SQ	0.00%	0%	$9,824	$347	$9,477	$3,159	32.16%	3.0
340.220	Personal Computers		5-SQ	0.05%	0%	$414,258	-$69,674	$483,932	$138,331	33.39%	3.7

KENTUCKY - AMERICAN WATER COMPANY

TOTAL SYSTEM
TABLE 1 SUMMARY OF SERVICE LIFE AND NET SALVAGE ESTIMATES AND CALCULATED ANNUAL AND ACCRUED DEPRECIATION RELATED TO THE RECOVERY OF AVERAGE ORIGINAL COST IN WATER PLANT
BASED ON ORIGINAL COSTS AS OF DECEMBER 31, 2022

TOTAL LIFE AND NET SALVAGE

ACCOUNT	DESCRIPTION	Truncation Date	Estimated Survivor Curve	Investment Percentage	Net Salvage Percent	Surviving Original Cost as of 12/31/2022	Booked Reserve	Future Accruals	Annual Accrual Amount	Annual Accrual Rate	Composite Remaining Life
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
340.230	Other		5-SQ	0.10%	0%	$905,695	$366,210	$539,485	$153,559	16.95%	3.4
340.300	Computer Software		5-SQ	1.54%	0%	$13,685,313	$5,497,027	$8,188,286	$2,353,894	17.20%	3.4
340.315	Computer Software Spec Depr Rat		10-SQ	0.76%	0%	$6,790,117	$6,086,656	$703,461	$234,487	3.45%	3.0
340.325	Computer Software Customized		15-SQ	0.21%	0%	$1,853,514	$1,766,959	$86,555	$7,527	0.41%	11.1
340.330	Computer Software Other		15-SQ	0.02%	0%	$192,916	$69,132	$123,785	$10,443	5.41%	11.8
340.500	Other Office Equipment		15-SQ	0.01%	0%	$44,539	$11,560	$32,979	$2,579	5.79%	12.8
TOTAL OFFICE FURNITURE AND EQUIPMENT						**$24,488,937**	**$13,957,903**	**$10,531,034**	**$2,940,484**	**12.01%**	
TRANSPORTATION EQUIPMENT											
341.100	Light Duty Trucks		5-L2.5	0.56%	25%	$4,952,111	$2,625,179	$1,088,905	$350,516	7.08%	3.1
341.200	Heavy Duty Trucks		15-L2	0.34%	15%	$2,984,415	$1,451,659	$1,085,094	$118,131	3.96%	8.7
341.300	Autos		5-S2.5	0.02%	20%	$148,138	$69,113	$49,397	$10,977	7.41%	3.5
341.400	Other		5-L2.5	0.17%	25%	$1,490,074	$1,179,351	-$61,795	$0	0.00%	1.0
TOTAL TRANSPORTATION EQUIPMENT						**$9,574,738**	**$5,325,301**	**$2,223,396**	**$479,624**	**5.01%**	
OTHER GENERAL PLANT											
342.000	Stores Equipment		25-SQ	0.01%	0%	$76,931	$16,355	$60,576	$3,730	4.85%	16.6
343.000	Tools, Shop, and Garage Equipment		20-SQ	0.31%	0%	$2,774,065	$1,083,759	$1,690,306	$159,400	5.75%	11.3
344.000	Laboratory Equipment		10-SQ	0.06%	0%	$552,659	-$224,806	$797,466	$159,762	28.91%	5.8
345.000	Power Operated Equipment		25-R2.5	0.16%	10%	$1,441,279	$1,068,812	$228,339	$15,498	1.08%	10.9
346.100	Communication Equipment - Non-Telephone		15-SQ	0.15%	0%	$1,341,086	$251,412	$1,089,673	$96,534	7.20%	11.7
346.190	Remote Control and Instrumentation		15-SQ	0.40%	0%	$3,597,237	$2,036,952	$1,560,284	$332,103	9.23%	5.0
346.200	Communication Equipment - Telephone		15-SQ	0.02%	0%	$182,811	$103,218	$79,594	$12,623	6.91%	6.2
347.000	Miscellaneous Equipment		20-SQ	0.32%	0%	$2,859,551	$871,129	$1,988,422	$192,198	6.72%	12.2
348.000	Other Tangible Property		20-SQ	0.00%	0%	$12,907	$12,907	$0	$0	0.00%	16.5
TOTAL OTHER GENERAL PLANT						**$12,838,526**	**$5,444,545**	**$7,494,660**	**$971,848**	**7.57%**	
Total Depreciable Plant						**$890,710,712**			**$29,298,878**	**3.2894%**	
Non Depreciable Plant											
301.000	Organization					$37,450					
302.000	Franchises and Consents					$70,261					
303.200	Land and Land Rights - Source of Supply					$1,119,836					
303.300	Land and Land Rights - Pumping					$277,216					
303.400	Land and Land Rights - Water Treatment					$800,183					
303.500	Land and Land Rights - Transmission and Distribution					$7,549,865					
Total Non Depreciable Plant						**$9,854,811**					
TOTAL PLANT						**$900,565,524**					

SECTION 6

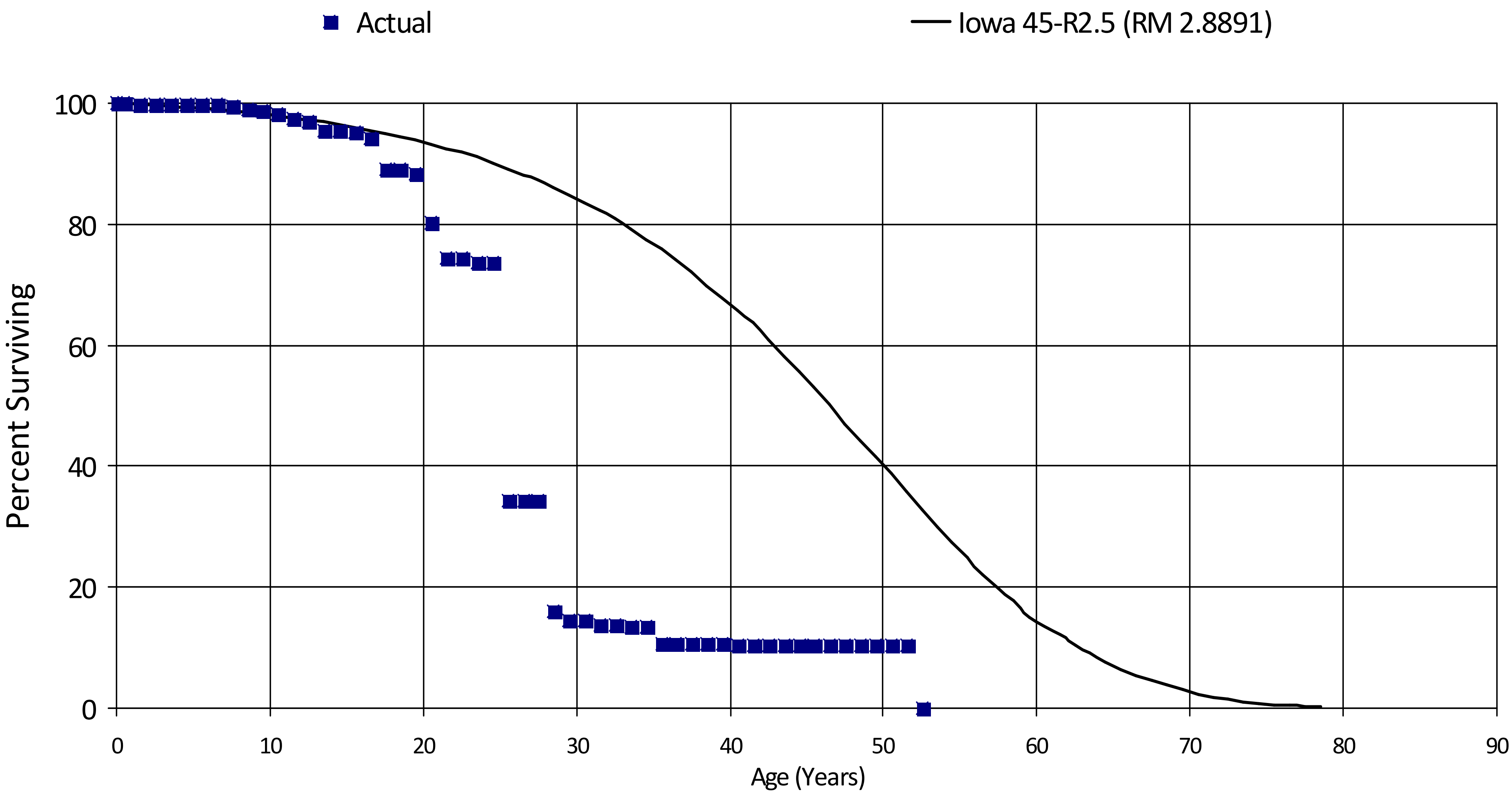
6 RETIREMENT RATE ANALYSIS

Kentucky - American Water Company

Account 304.100 - Structures & Improvements - Supply

Placement Band - 1962 - 2022 Experience Band - 2003 - 2022

Actual and Smooth Survivor Curves



Kentucky - American Water Company

Account 304.100 - Structures & Improvements - Supply

Placement Band - 1962 - 2022   Experience Band - 2003 - 2022

RETIREMENT RATE ANALYSIS

Age at Begin of Interval	Exposures at Beginning of Age Interval	Retirements During Age Interval	Retmt Ratio	Survivor Ratio	% Surviving
0	26,299,522	20,742	0.00079	0.99921	100.00
0.5	25,347,002	26,173	0.00103	0.99897	99.92
1.5	24,212,365	2,236	0.00009	0.99991	99.82
2.5	21,149,780	500	0.00002	0.99998	99.81
3.5	20,714,850	0	0.00000	1.00000	99.81
4.5	20,448,316	6,432	0.00031	0.99969	99.81
5.5	20,319,171	30,634	0.00151	0.99849	99.78
6.5	20,003,526	45,434	0.00227	0.99773	99.63
7.5	19,864,430	71,338	0.00359	0.99641	99.40
8.5	18,247,211	61,979	0.00340	0.99660	99.04
9.5	18,022,128	70,865	0.00393	0.99607	98.70
10.5	17,244,892	164,494	0.00954	0.99046	98.31
11.5	17,080,398	92,561	0.00542	0.99458	97.37
12.5	2,599,428	38,882	0.01496	0.98504	96.84
13.5	2,560,546	1,775	0.00069	0.99931	95.39
14.5	2,499,792	6,882	0.00275	0.99725	95.32
15.5	2,492,910	23,024	0.00924	0.99076	95.06
16.5	813,838	42,938	0.05276	0.94724	94.18
17.5	770,900	1,362	0.00177	0.99823	89.21
18.5	727,348	5,082	0.00699	0.99301	89.05
19.5	317,968	29,233	0.09194	0.90806	88.43
20.5	89,258	6,593	0.07386	0.92614	80.30
21.5	82,665	0	0.00000	1.00000	74.37
22.5	82,665	788	0.00953	0.99047	74.37
23.5	81,877	0	0.00000	1.00000	73.66
24.5	81,877	43,783	0.53474	0.46526	73.66
25.5	38,094	0	0.00000	1.00000	34.27
26.5	38,094	0	0.00000	1.00000	34.27

Kentucky - American Water Company

Account 304.100 - Structures & Improvements - Supply

Placement Band - 1962 - 2022   Experience Band - 2003 - 2022

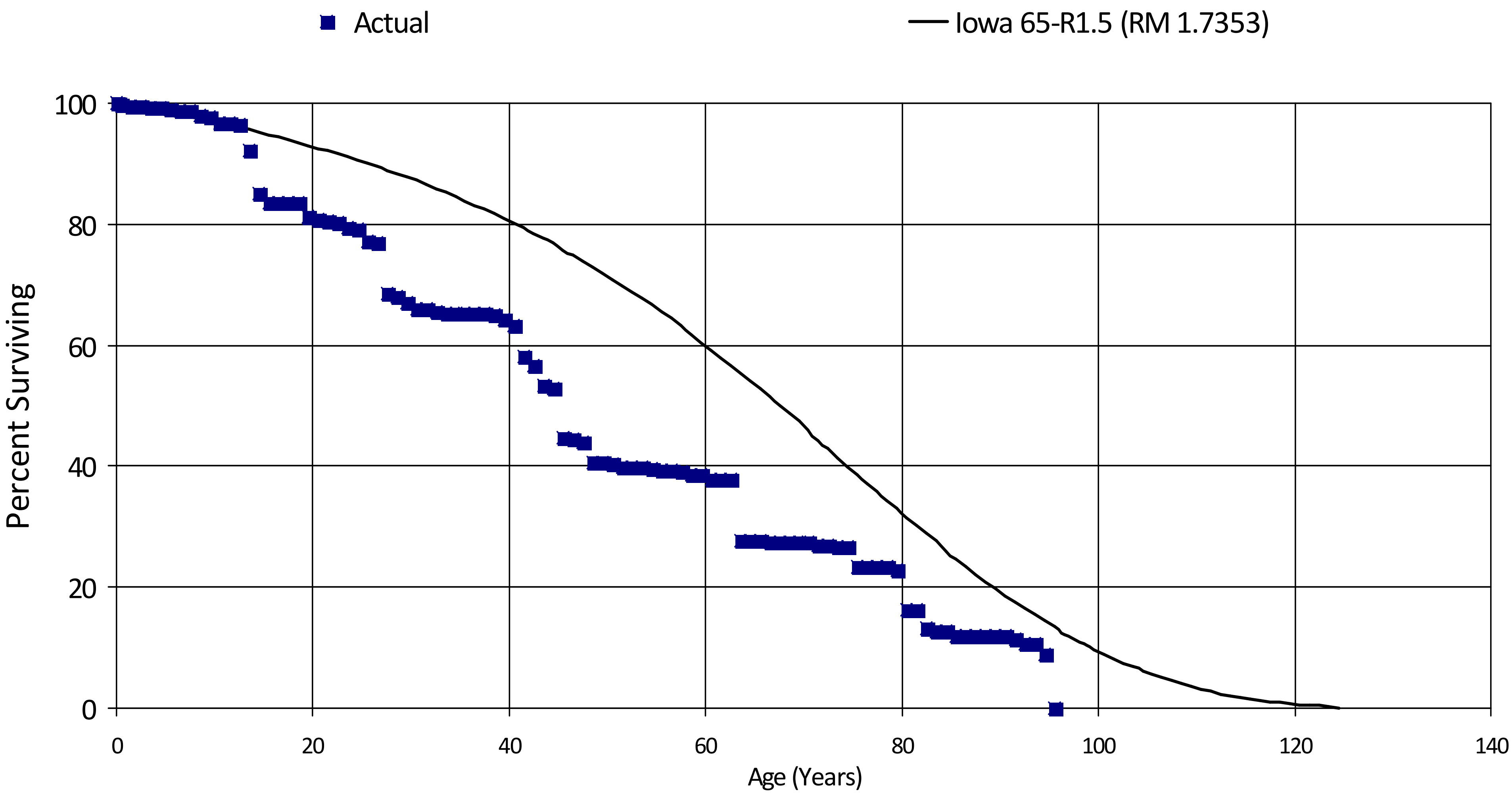
27.5	38,094	20,311	0.53318	0.46682	34.27
28.5	17,783	1,569	0.08823	0.91177	16.00
29.5	16,214	0	0.00000	1.00000	14.59
30.5	16,214	1,016	0.06266	0.93734	14.59
31.5	15,158	92	0.00607	0.99393	13.68
32.5	15,066	34	0.00226	0.99774	13.60
33.5	15,032	0	0.00000	1.00000	13.57
34.5	15,032	3,160	0.21022	0.78978	13.57
35.5	11,872	34	0.00286	0.99714	10.72
36.5	11,838	0	0.00000	1.00000	10.69
37.5	11,838	134	0.01132	0.98868	10.69
38.5	11,698	0	0.00000	1.00000	10.57
39.5	11,698	222	0.01898	0.98102	10.57
40.5	11,477	0	0.00000	1.00000	10.37
41.5	11,477	0	0.00000	1.00000	10.37
42.5	11,477	0	0.00000	1.00000	10.37
43.5	11,477	0	0.00000	1.00000	10.37
44.5	11,477	0	0.00000	1.00000	10.37
45.5	11,477	0	0.00000	1.00000	10.37
46.5	11,477	0	0.00000	1.00000	10.37
47.5	11,477	0	0.00000	1.00000	10.37
48.5	11,477	0	0.00000	1.00000	10.37
49.5	11,477	0	0.00000	1.00000	10.37
50.5	11,477	0	0.00000	1.00000	10.37
51.5	11,477	11,477	1.00004	-0.00004	10.37
52.5	0	0	0.00000	0.00000	0.00
	Totals:	831,779			

Kentucky - American Water Company

Account 304.230 - Structures & Improvements - Pumping & Treatment

Placement Band - 1925 - 2022   Experience Band - 1999 - 2022

Actual and Smooth Survivor Curves



Kentucky - American Water Company

Account 304.230 - Structures & Improvements - Pumping & Treatment

Placement Band - 1925 - 2022   Experience Band - 1999 - 2022

RETIREMENT RATE ANALYSIS

Age at Begin of Interval	Exposures at Beginning of Age Interval	Retirements During Age Interval	Retmt Ratio	Survivor Ratio	% Surviving
0	70,589,730	113,998	0.00161	0.99839	100.00
0.5	70,421,828	288,859	0.00410	0.99590	99.84
1.5	70,033,806	17,195	0.00025	0.99975	99.43
2.5	60,698,542	100,086	0.00165	0.99835	99.41
3.5	53,349,477	55,420	0.00104	0.99896	99.25
4.5	52,797,412	128,503	0.00243	0.99757	99.15
5.5	52,133,320	99,552	0.00191	0.99809	98.91
6.5	48,650,732	35,010	0.00072	0.99928	98.72
7.5	48,580,763	293,345	0.00604	0.99396	98.65
8.5	42,577,889	91,630	0.00215	0.99785	98.05
9.5	42,431,543	464,245	0.01094	0.98906	97.84
10.5	41,942,365	34,648	0.00083	0.99917	96.77
11.5	41,831,529	118,741	0.00284	0.99716	96.69
12.5	14,114,047	621,104	0.04401	0.95599	96.42
13.5	13,459,502	1,051,320	0.07811	0.92189	92.18
14.5	12,249,193	204,322	0.01668	0.98332	84.98
15.5	11,614,490	6,142	0.00053	0.99947	83.56
16.5	11,477,929	10,793	0.00094	0.99906	83.52
17.5	11,435,916	0	0.00000	1.00000	83.44
18.5	11,435,916	304,817	0.02665	0.97335	83.44
19.5	11,123,691	74,602	0.00671	0.99329	81.22
20.5	11,037,438	48,276	0.00437	0.99563	80.68
21.5	10,889,290	7,243	0.00067	0.99933	80.33
22.5	10,713,568	98,564	0.00920	0.99080	80.28
23.5	9,697,465	37,600	0.00388	0.99612	79.54
24.5	9,637,992	242,073	0.02512	0.97488	79.23
25.5	8,848,542	31,581	0.00357	0.99643	77.24
26.5	6,507,755	718,437	0.11040	0.88960	76.96

Kentucky - American Water Company

Account 304.230 - Structures & Improvements - Pumping & Treatment

Placement Band - 1925 - 2022 Experience Band - 1999 - 2022

27.5	5,747,147	44,047	0.00766	0.99234	68.46
28.5	5,692,711	89,057	0.01564	0.98436	67.94
29.5	5,420,543	64,330	0.01187	0.98813	66.88
30.5	3,472,523	0	0.00000	1.00000	66.09
31.5	3,444,344	32,606	0.00947	0.99053	66.09
32.5	3,383,223	6,688	0.00198	0.99802	65.46
33.5	2,934,320	3,450	0.00118	0.99882	65.33
34.5	1,424,670	0	0.00000	1.00000	65.25
35.5	1,139,723	1,962	0.00172	0.99828	65.25
36.5	1,137,761	0	0.00000	1.00000	65.14
37.5	1,137,761	1,539	0.00135	0.99865	65.14
38.5	1,128,722	12,658	0.01121	0.98879	65.05
39.5	1,114,788	19,861	0.01782	0.98218	64.32
40.5	942,041	76,064	0.08074	0.91926	63.17
41.5	865,977	21,237	0.02452	0.97548	58.07
42.5	844,740	48,895	0.05788	0.94212	56.65
43.5	795,846	8,310	0.01044	0.98956	53.37
44.5	781,373	120,060	0.15365	0.84635	52.81
45.5	658,678	2,304	0.00350	0.99650	44.70
46.5	655,260	9,858	0.01504	0.98496	44.54
47.5	632,558	46,986	0.07428	0.92572	43.87
48.5	578,045	258	0.00045	0.99955	40.61
49.5	574,118	3,264	0.00569	0.99431	40.59
50.5	511,914	5,476	0.01070	0.98930	40.36
51.5	428,648	0	0.00000	1.00000	39.93
52.5	345,060	975	0.00283	0.99717	39.93
53.5	344,085	1,322	0.00384	0.99616	39.82
54.5	342,763	3,356	0.00979	0.99021	39.67
55.5	273,651	403	0.00147	0.99853	39.28
56.5	265,194	542	0.00204	0.99796	39.22
57.5	264,652	3,194	0.01207	0.98793	39.14

Kentucky - American Water Company

Account 304.230 - Structures & Improvements - Pumping & Treatment

Placement Band - 1925 - 2022   Experience Band - 1999 - 2022

58.5	261,458	0	0.00000	1.00000	38.67
59.5	261,458	4,970	0.01901	0.98099	38.67
60.5	252,271	0	0.00000	1.00000	37.93
61.5	252,271	1,011	0.00401	0.99599	37.93
62.5	251,260	67,921	0.27032	0.72968	37.78
63.5	125,033	39	0.00031	0.99969	27.57
64.5	101,243	0	0.00000	1.00000	27.56
65.5	77,034	108	0.00140	0.99860	27.56
66.5	76,926	0	0.00000	1.00000	27.52
67.5	71,644	457	0.00638	0.99362	27.52
68.5	71,187	0	0.00000	1.00000	27.34
69.5	71,187	0	0.00000	1.00000	27.34
70.5	71,187	1,117	0.01569	0.98431	27.34
71.5	61,370	103	0.00168	0.99832	26.91
72.5	61,267	631	0.01030	0.98970	26.86
73.5	60,636	0	0.00000	1.00000	26.58
74.5	58,470	6,915	0.11827	0.88173	26.58
75.5	51,555	0	0.00000	1.00000	23.44
76.5	51,555	0	0.00000	1.00000	23.44
77.5	51,555	0	0.00000	1.00000	23.44
78.5	51,555	1,067	0.02070	0.97930	23.44
79.5	50,488	14,714	0.29144	0.70856	22.95
80.5	35,774	0	0.00000	1.00000	16.26
81.5	35,404	6,781	0.19153	0.80847	16.26
82.5	28,623	869	0.03036	0.96964	13.15
83.5	27,754	0	0.00000	1.00000	12.75
84.5	26,877	1,852	0.06891	0.93109	12.75
85.5	25,025	0	0.00000	1.00000	11.87
86.5	25,025	0	0.00000	1.00000	11.87
87.5	25,025	10	0.00040	0.99960	11.87
88.5	14,731	49	0.00333	0.99667	11.87

Kentucky - American Water Company

Account 304.230 - Structures & Improvements - Pumping & Treatment

Placement Band - 1925 - 2022   Experience Band - 1999 - 2022

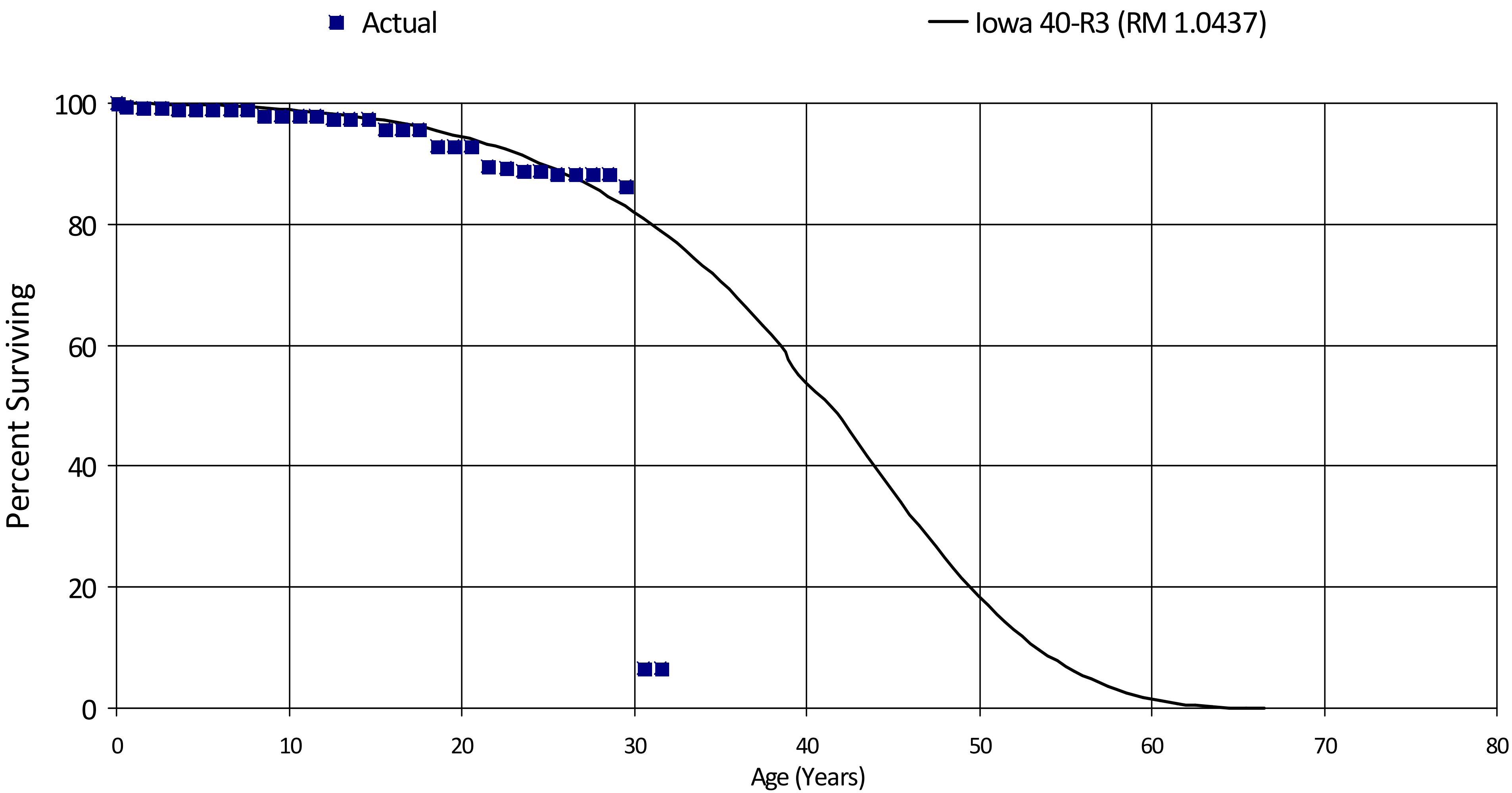
89.5	14,682	0	0.00000	1.00000	11.83
90.5	14,682	553	0.03767	0.96233	11.83
91.5	14,129	837	0.05924	0.94076	11.38
92.5	13,292	0	0.00000	1.00000	10.71
93.5	13,292	2,172	0.16341	0.83659	10.71
94.5	11,120	11,120	1.00003	-0.00003	8.96
95.5	0	0	0.00000	0.00000	0.00
	Totals:	6,050,104			

Kentucky - American Water Company

Account 304.400 - Structures & Improvements - Transmission & Distribution

Placement Band - 1982 - 2022 Experience Band - 2006 - 2022

Actual and Smooth Survivor Curves



Kentucky - American Water Company

Account 304.400 - Structures & Improvements - Transmission & Distribution

Placement Band - 1982 - 2022   Experience Band - 2006 - 2022

RETIREMENT RATE ANALYSIS

Age at Begin of Interval	Exposures at Beginning of Age Interval	Retirements During Age Interval	Retmt Ratio	Survivor Ratio	% Surviving
0	6,030,331	30,602	0.00507	0.99493	100.00
0.5	5,999,728	9,133	0.00152	0.99848	99.49
1.5	1,625,745	0	0.00000	1.00000	99.34
2.5	1,625,745	6,233	0.00383	0.99617	99.34
3.5	1,619,512	0	0.00000	1.00000	98.96
4.5	1,366,073	0	0.00000	1.00000	98.96
5.5	1,316,447	0	0.00000	1.00000	98.96
6.5	1,312,080	53	0.00004	0.99996	98.96
7.5	1,289,135	11,337	0.00879	0.99121	98.96
8.5	925,046	2,300	0.00249	0.99751	98.09
9.5	922,746	0	0.00000	1.00000	97.85
10.5	922,746	0	0.00000	1.00000	97.85
11.5	918,241	4,670	0.00509	0.99491	97.85
12.5	888,055	0	0.00000	1.00000	97.35
13.5	795,867	0	0.00000	1.00000	97.35
14.5	770,480	14,070	0.01826	0.98174	97.35
15.5	756,409	0	0.00000	1.00000	95.57
16.5	682,562	0	0.00000	1.00000	95.57
17.5	682,562	18,863	0.02764	0.97236	95.57
18.5	663,699	0	0.00000	1.00000	92.93
19.5	663,699	0	0.00000	1.00000	92.93
20.5	663,699	23,555	0.03549	0.96451	92.93
21.5	640,144	2,103	0.00329	0.99671	89.63
22.5	631,865	3,468	0.00549	0.99451	89.34
23.5	600,155	0	0.00000	1.00000	88.85
24.5	461,050	2,915	0.00632	0.99368	88.85
25.5	458,109	0	0.00000	1.00000	88.29
26.5	453,797	0	0.00000	1.00000	88.29

Kentucky - American Water Company

Account 304.400 - Structures & Improvements - Transmission & Distribution

Placement Band - 1982 - 2022   Experience Band - 2006 - 2022

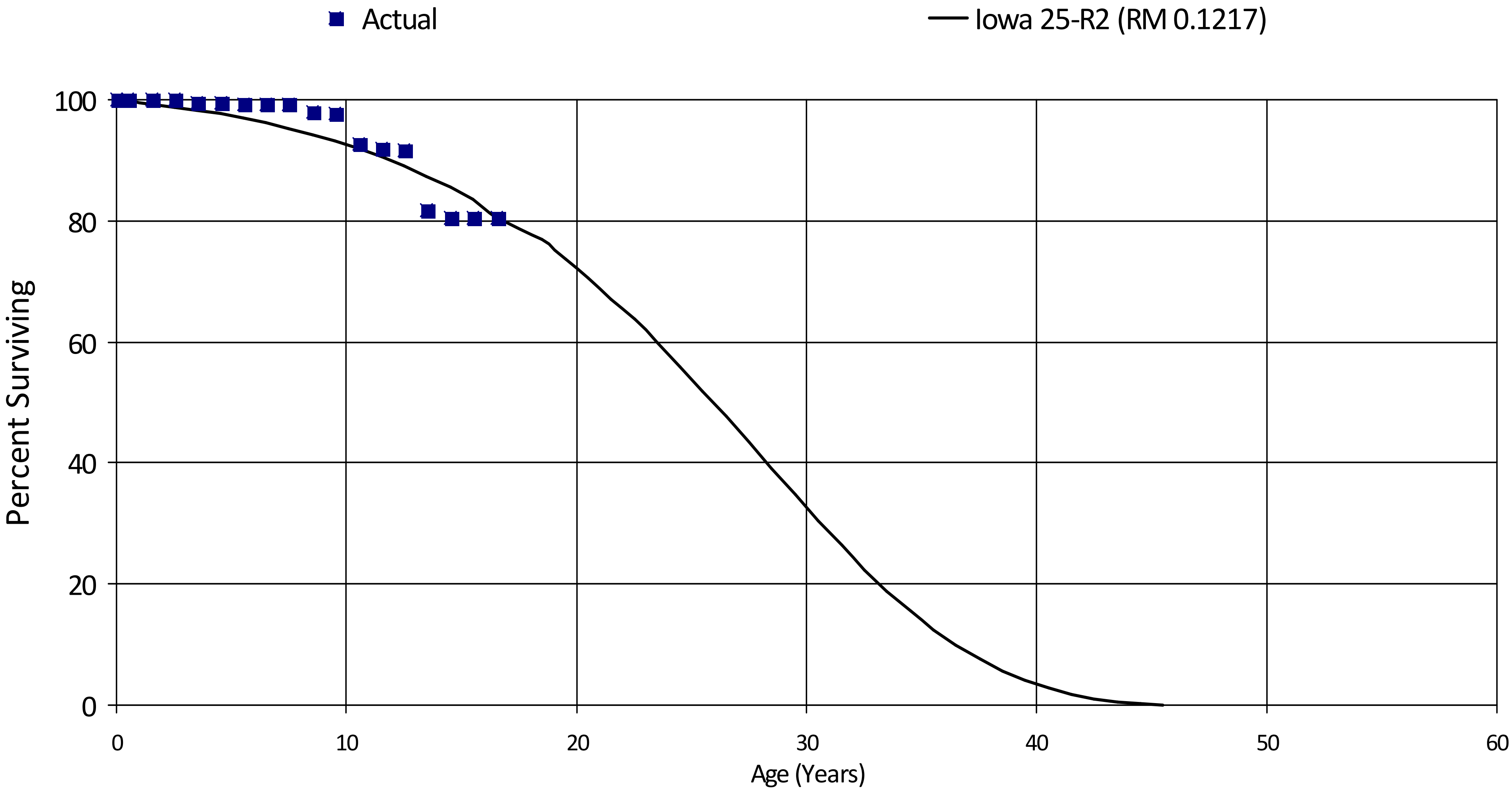
27.5	453,797	344	0.00076	0.99924	88.29
28.5	453,453	10,249	0.02260	0.97740	88.22
29.5	443,204	409,738	0.92449	0.07551	86.23
30.5	30,224	0	0.00000	1.00000	6.51
31.5	1,420	1,420	1.00000		6.51
	Totals:	551,053			

Kentucky - American Water Company

Account 304.500 - Structures & Improvements - General

Placement Band - 2005 - 2022   Experience Band - 2013 - 2022

Actual and Smooth Survivor Curves



Kentucky - American Water Company

Account 304.500 - Structures & Improvements - General

Placement Band - 2005 - 2022   Experience Band - 2013 - 2022

RETIREMENT RATE ANALYSIS

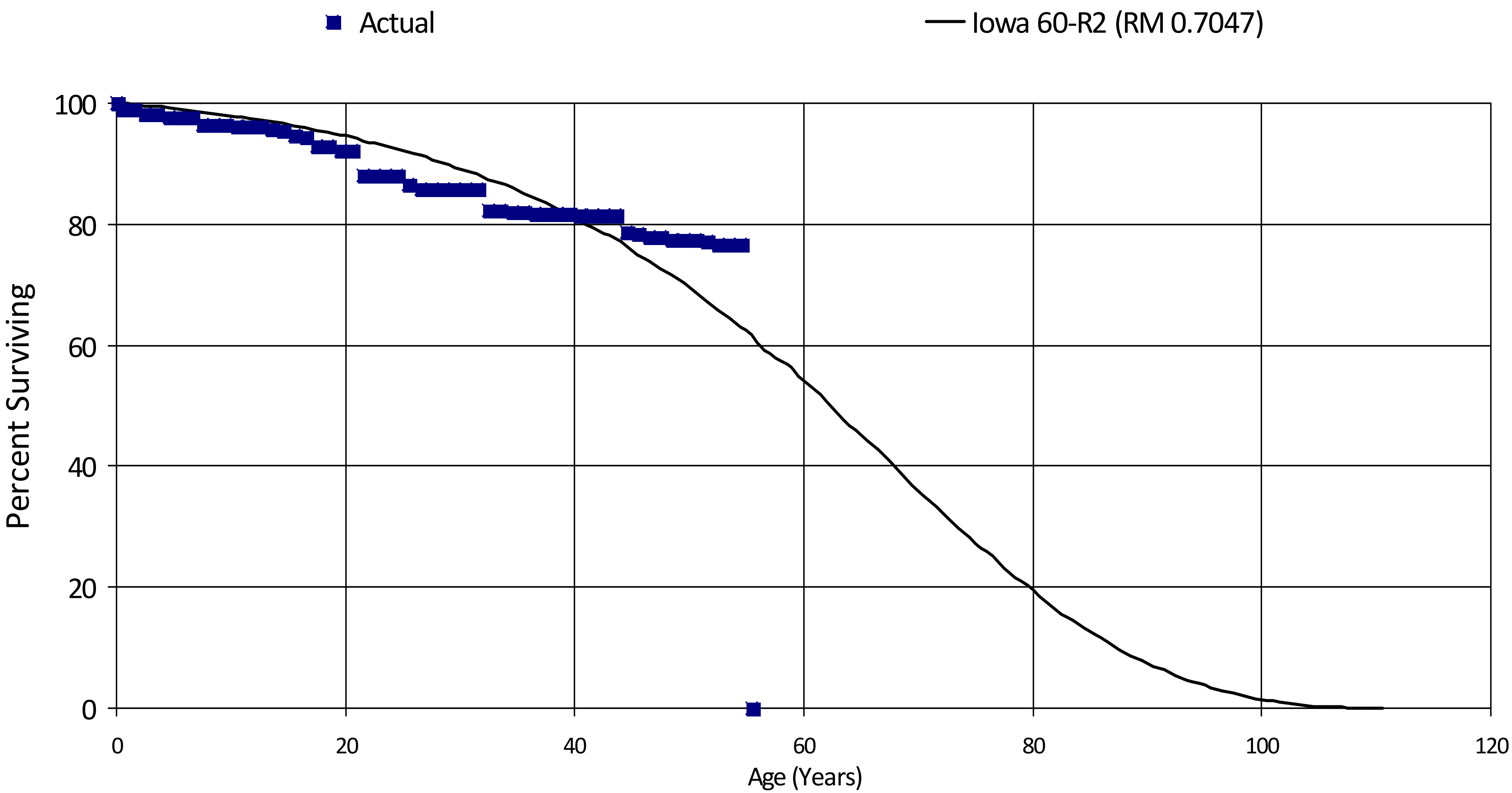
Age at Begin of Interval	Exposures at Beginning of Age Interval	Retirements During Age Interval	Retmt Ratio	Survivor Ratio	% Surviving
0	9,970,324	1,802	0.00018	0.99982	100.00
0.5	9,380,768	0	0.00000	1.00000	99.98
1.5	9,329,051	4,361	0.00047	0.99953	99.98
2.5	9,225,841	45,187	0.00490	0.99510	99.93
3.5	8,764,256	0	0.00000	1.00000	99.44
4.5	8,426,483	17,053	0.00202	0.99798	99.44
5.5	7,663,383	0	0.00000	1.00000	99.24
6.5	4,822,367	500	0.00010	0.99990	99.24
7.5	4,683,355	64,719	0.01382	0.98618	99.23
8.5	4,028,271	5,912	0.00147	0.99853	97.86
9.5	3,854,639	195,874	0.05082	0.94918	97.72
10.5	3,601,614	30,558	0.00848	0.99152	92.75
11.5	2,927,461	11,213	0.00383	0.99617	91.96
12.5	184,856	20,000	0.10819	0.89181	91.61
13.5	143,449	2,375	0.01656	0.98344	81.70
14.5	31,352	2	0.00006	0.99994	80.35
15.5	1	0	0.00000	1.00000	80.35
16.5	1	0	0.00000	1.00000	80.35
	Totals:	399,556			

Kentucky - American Water Company

Account 304.600 - Structures & Improvements - Offices

Placement Band - 1965 - 2022   Experience Band - 1999 - 2022

Actual and Smooth Survivor Curves



Kentucky - American Water Company

Account 304.600 - Structures & Improvements - Offices

Placement Band - 1965 - 2022   Experience Band - 1999 - 2022

RETIREMENT RATE ANALYSIS

Age at Begin of Interval	Exposures at Beginning of Age Interval	Retirements During Age Interval	Retmt Ratio	Survivor Ratio	% Surviving
0	6,341,647	57,459	0.00906	0.99094	100.00
0.5	6,277,623	778	0.00012	0.99988	99.09
1.5	6,266,836	46,016	0.00734	0.99266	99.08
2.5	6,055,799	1,901	0.00031	0.99969	98.35
3.5	6,053,898	33,675	0.00556	0.99444	98.32
4.5	6,020,223	7,808	0.00130	0.99870	97.77
5.5	6,012,415	0	0.00000	1.00000	97.64
6.5	5,997,356	69,618	0.01161	0.98839	97.64
7.5	5,896,878	1	0.00000	1.00000	96.51
8.5	5,702,497	4,129	0.00072	0.99928	96.51
9.5	5,692,119	10,570	0.00186	0.99814	96.44
10.5	5,681,549	3,018	0.00053	0.99947	96.26
11.5	5,678,530	0	0.00000	1.00000	96.21
12.5	5,678,530	31,563	0.00556	0.99444	96.21
13.5	5,646,967	7,683	0.00136	0.99864	95.68
14.5	3,941,231	36,721	0.00932	0.99068	95.55
15.5	3,904,510	14,508	0.00372	0.99628	94.66
16.5	3,832,206	62,282	0.01625	0.98375	94.31
17.5	3,746,045	0	0.00000	1.00000	92.78
18.5	3,746,045	23,771	0.00635	0.99365	92.78
19.5	3,722,274	1,733	0.00047	0.99953	92.19
20.5	3,720,541	167,972	0.04515	0.95485	92.15
21.5	3,552,569	0	0.00000	1.00000	87.99
22.5	3,552,569	0	0.00000	1.00000	87.99
23.5	3,552,569	0	0.00000	1.00000	87.99
24.5	3,326,446	50,046	0.01504	0.98496	87.99
25.5	1,184,632	10,641	0.00898	0.99102	86.67
26.5	1,166,535	10	0.00001	0.99999	85.89

Kentucky - American Water Company

Account 304.600 - Structures & Improvements - Offices

Placement Band - 1965 - 2022 Experience Band - 1999 - 2022

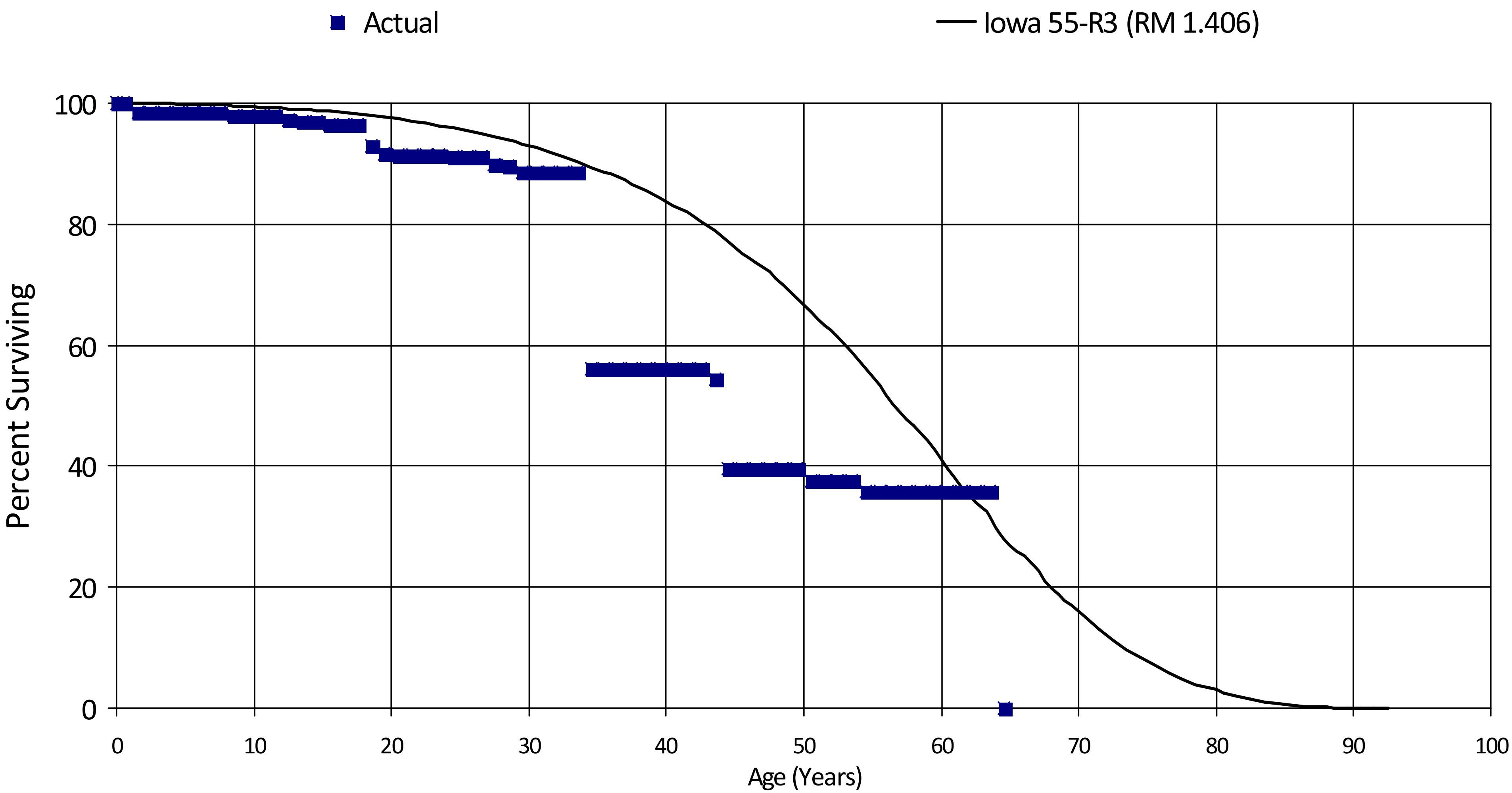
27.5	1,140,478	0	0.00000	1.00000	85.89
28.5	1,132,710	596	0.00053	0.99947	85.89
29.5	1,132,114	0	0.00000	1.00000	85.84
30.5	1,116,007	1,518	0.00136	0.99864	85.84
31.5	1,113,389	44,672	0.04012	0.95988	85.72
32.5	1,050,647	1,155	0.00110	0.99890	82.28
33.5	1,004,691	3,614	0.00360	0.99640	82.19
34.5	955,442	0	0.00000	1.00000	81.89
35.5	819,627	2,077	0.00253	0.99747	81.89
36.5	793,424	0	0.00000	1.00000	81.68
37.5	793,424	0	0.00000	1.00000	81.68
38.5	791,538	0	0.00000	1.00000	81.68
39.5	791,538	2,177	0.00275	0.99725	81.68
40.5	716,561	0	0.00000	1.00000	81.46
41.5	716,561	0	0.00000	1.00000	81.46
42.5	716,561	0	0.00000	1.00000	81.46
43.5	711,463	24,635	0.03463	0.96537	81.46
44.5	686,828	1,219	0.00177	0.99823	78.64
45.5	680,663	4,715	0.00693	0.99307	78.50
46.5	675,949	365	0.00054	0.99946	77.96
47.5	675,584	5,009	0.00741	0.99259	77.92
48.5	670,575	212	0.00032	0.99968	77.34
49.5	670,362	121	0.00018	0.99982	77.32
50.5	650,731	1,762	0.00271	0.99729	77.31
51.5	648,212	4,053	0.00625	0.99375	77.10
52.5	7,142	0	0.00000	1.00000	76.62
53.5	7,142	0	0.00000	1.00000	76.62
54.5	7,142	7,142	0.99999	0.00001	76.62
55.5	0	0	0.00000	0.00000	0.00
	Totals:	746,945			

Kentucky - American Water Company

Account 304.700 - Structures & Improvements - Stores, Shop, & Garage

Placement Band - 1957 - 2022 Experience Band - 2008 - 2022

Actual and Smooth Survivor Curves



Kentucky - American Water Company

Account 304.700 - Structures & Improvements - Stores, Shop, & Garage

Placement Band - 1957 - 2022   Experience Band - 2008 - 2022

RETIREMENT RATE ANALYSIS

Age at Begin of Interval	Exposures at Beginning of Age Interval	Retirements During Age Interval	Retmt Ratio	Survivor Ratio	% Surviving
0	1,872,141	0	0.00000	1.00000	100.00
0.5	1,865,563	29,115	0.01561	0.98439	100.00
1.5	1,836,448	0	0.00000	1.00000	98.44
2.5	1,836,448	0	0.00000	1.00000	98.44
3.5	1,836,448	0	0.00000	1.00000	98.44
4.5	1,836,448	0	0.00000	1.00000	98.44
5.5	1,833,464	0	0.00000	1.00000	98.44
6.5	1,808,939	0	0.00000	1.00000	98.44
7.5	1,799,874	7,226	0.00401	0.99599	98.44
8.5	1,789,335	0	0.00000	1.00000	98.05
9.5	1,789,335	0	0.00000	1.00000	98.05
10.5	1,789,335	0	0.00000	1.00000	98.05
11.5	1,781,786	15,694	0.00881	0.99119	98.05
12.5	1,766,092	3,588	0.00203	0.99797	97.19
13.5	963,148	0	0.00000	1.00000	96.99
14.5	963,148	6,124	0.00636	0.99364	96.99
15.5	957,024	0	0.00000	1.00000	96.37
16.5	957,024	0	0.00000	1.00000	96.37
17.5	957,024	35,665	0.03727	0.96273	96.37
18.5	921,359	11,661	0.01266	0.98734	92.78
19.5	909,698	3,500	0.00385	0.99615	91.61
20.5	901,402	0	0.00000	1.00000	91.26
21.5	901,402	0	0.00000	1.00000	91.26
22.5	901,402	0	0.00000	1.00000	91.26
23.5	830,769	1,930	0.00232	0.99768	91.26
24.5	828,839	0	0.00000	1.00000	91.05
25.5	828,839	0	0.00000	1.00000	91.05
26.5	681,585	9,119	0.01338	0.98662	91.05

Kentucky - American Water Company

Account 304.700 - Structures & Improvements - Stores, Shop, & Garage

Placement Band - 1957 - 2022   Experience Band - 2008 - 2022

27.5	672,466	911	0.00135	0.99865	89.83
28.5	671,555	7,905	0.01177	0.98823	89.71
29.5	117,548	0	0.00000	1.00000	88.65
30.5	117,548	0	0.00000	1.00000	88.65
31.5	117,548	0	0.00000	1.00000	88.65
32.5	99,635	0	0.00000	1.00000	88.65
33.5	99,635	36,495	0.36629	0.63371	88.65
34.5	21,525	0	0.00000	1.00000	56.18
35.5	21,525	0	0.00000	1.00000	56.18
36.5	21,525	0	0.00000	1.00000	56.18
37.5	21,525	0	0.00000	1.00000	56.18
38.5	21,525	0	0.00000	1.00000	56.18
39.5	21,525	0	0.00000	1.00000	56.18
40.5	21,525	0	0.00000	1.00000	56.18
41.5	21,525	0	0.00000	1.00000	56.18
42.5	21,525	724	0.03363	0.96637	56.18
43.5	20,801	5,650	0.27162	0.72838	54.29
44.5	15,151	0	0.00000	1.00000	39.54
45.5	15,151	0	0.00000	1.00000	39.54
46.5	15,151	0	0.00000	1.00000	39.54
47.5	15,151	0	0.00000	1.00000	39.54
48.5	15,151	0	0.00000	1.00000	39.54
49.5	15,151	749	0.04943	0.95057	39.54
50.5	14,402	0	0.00000	1.00000	37.59
51.5	14,402	0	0.00000	1.00000	37.59
52.5	14,402	0	0.00000	1.00000	37.59
53.5	14,402	708	0.04916	0.95084	37.59
54.5	13,694	0	0.00000	1.00000	35.74
55.5	13,694	0	0.00000	1.00000	35.74
56.5	13,694	0	0.00000	1.00000	35.74
57.5	13,694	0	0.00000	1.00000	35.74

Kentucky - American Water Company

Account 304.700 - Structures & Improvements - Stores, Shop, & Garage

Placement Band - 1957 - 2022 Experience Band - 2008 - 2022

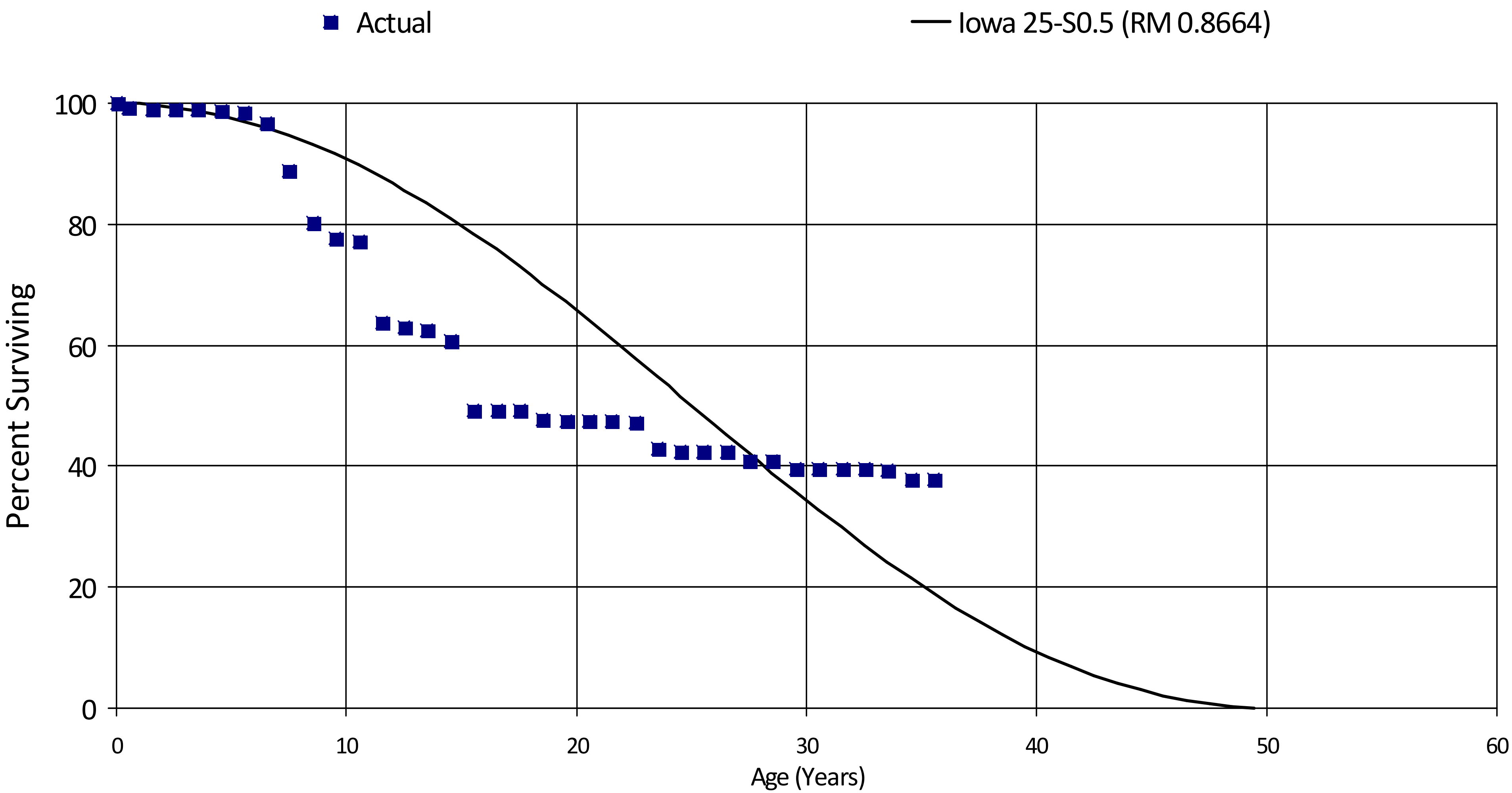
58.5	13,694	0	0.00000	1.00000	35.74
59.5	13,694	0	0.00000	1.00000	35.74
60.5	13,694	0	0.00000	1.00000	35.74
61.5	13,694	0	0.00000	1.00000	35.74
62.5	13,694	0	0.00000	1.00000	35.74
63.5	13,694	13,694	0.99997	0.00003	35.74
64.5	0	0	0.00000	0.00000	0.00
	Totals:	190,458			

Kentucky - American Water Company

Account 304.800 - Structures & Improvements - Miscellaneous

Placement Band - 1934 - 2022   Experience Band - 2001 - 2022

Actual and Smooth Survivor Curves



Kentucky - American Water Company

Account 304.800 - Structures & Improvements - Miscellaneous

Placement Band - 1934 - 2022   Experience Band - 2001 - 2022

RETIREMENT RATE ANALYSIS

Age at Begin of Interval	Exposures at Beginning of Age Interval	Retirements During Age Interval	Retmt Ratio	Survivor Ratio	% Surviving
0	2,352,674	20,629	0.00877	0.99123	100.00
0.5	2,332,045	5,551	0.00238	0.99762	99.12
1.5	2,326,494	0	0.00000	1.00000	98.88
2.5	2,213,219	0	0.00000	1.00000	98.88
3.5	2,198,747	721	0.00033	0.99967	98.88
4.5	2,198,026	7,539	0.00343	0.99657	98.85
5.5	2,190,488	38,751	0.01769	0.98231	98.51
6.5	2,151,737	174,877	0.08127	0.91873	96.77
7.5	1,976,860	192,971	0.09761	0.90239	88.91
8.5	1,783,889	56,599	0.03173	0.96827	80.23
9.5	1,727,290	11,471	0.00664	0.99336	77.68
10.5	1,591,773	278,463	0.17494	0.82506	77.16
11.5	1,311,435	13,491	0.01029	0.98971	63.66
12.5	1,297,943	9,215	0.00710	0.99290	63.00
13.5	1,288,728	39,256	0.03046	0.96954	62.55
14.5	1,249,472	233,737	0.18707	0.81293	60.64
15.5	937,184	0	0.00000	1.00000	49.30
16.5	756,325	2,273	0.00301	0.99699	49.30
17.5	623,350	18,121	0.02907	0.97093	49.15
18.5	605,230	1,893	0.00313	0.99687	47.72
19.5	288,554	0	0.00000	1.00000	47.57
20.5	267,024	0	0.00000	1.00000	47.57
21.5	247,983	1,400	0.00565	0.99435	47.57
22.5	237,539	21,751	0.09157	0.90843	47.30
23.5	215,788	3,117	0.01444	0.98556	42.97
24.5	177,676	0	0.00000	1.00000	42.35
25.5	177,144	0	0.00000	1.00000	42.35
26.5	177,144	5,932	0.03349	0.96651	42.35

Kentucky - American Water Company

Account 304.800 - Structures & Improvements - Miscellaneous

Placement Band - 1934 - 2022   Experience Band - 2001 - 2022

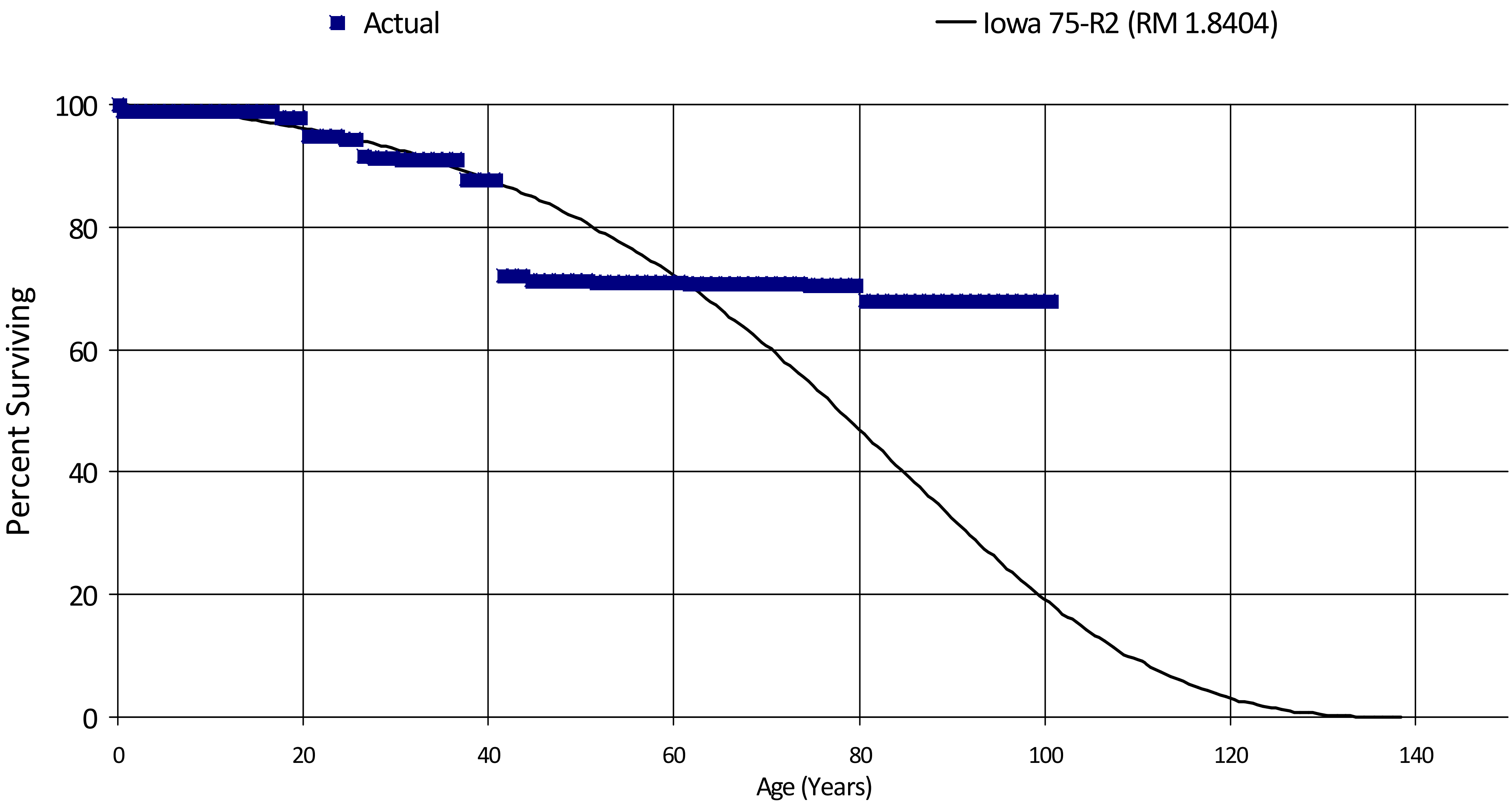
27.5	171,211	0	0.00000	1.00000	40.93
28.5	168,066	6,000	0.03570	0.96430	40.93
29.5	162,066	0	0.00000	1.00000	39.47
30.5	156,952	0	0.00000	1.00000	39.47
31.5	150,430	0	0.00000	1.00000	39.47
32.5	136,555	614	0.00450	0.99550	39.47
33.5	70,471	2,765	0.03924	0.96076	39.29
34.5	67,706	0	0.00000	1.00000	37.75
35.5	43,920	1,266	0.02883	0.97117	37.75
	Totals:	1,148,403			

Kentucky - American Water Company

Account 305.000 - Collecting & Impounding Reservoirs

Placement Band - 1913 - 2022   Experience Band - 2008 - 2022

Actual and Smooth Survivor Curves



Kentucky - American Water Company

Account 305.000 - Collecting & Impounding Reservoirs

Placement Band - 1913 - 2022   Experience Band - 2008 - 2022

RETIREMENT RATE ANALYSIS

Age at Begin of Interval	Exposures at Beginning of Age Interval	Retirements During Age Interval	Retmt Ratio	Survivor Ratio	% Surviving
0	1,016,553	11,467	0.01128	0.98872	100.00
0.5	1,005,086	0	0.00000	1.00000	98.87
1.5	1,005,086	0	0.00000	1.00000	98.87
2.5	1,005,086	0	0.00000	1.00000	98.87
3.5	1,005,086	0	0.00000	1.00000	98.87
4.5	1,005,086	0	0.00000	1.00000	98.87
5.5	1,005,086	0	0.00000	1.00000	98.87
6.5	1,005,086	0	0.00000	1.00000	98.87
7.5	1,005,086	0	0.00000	1.00000	98.87
8.5	1,005,086	0	0.00000	1.00000	98.87
9.5	1,005,086	0	0.00000	1.00000	98.87
10.5	1,005,086	0	0.00000	1.00000	98.87
11.5	1,005,086	0	0.00000	1.00000	98.87
12.5	1,005,086	0	0.00000	1.00000	98.87
13.5	1,005,086	0	0.00000	1.00000	98.87
14.5	1,005,086	0	0.00000	1.00000	98.87
15.5	1,005,086	0	0.00000	1.00000	98.87
16.5	1,005,086	9,156	0.00911	0.99089	98.87
17.5	992,647	660	0.00066	0.99934	97.97
18.5	991,987	0	0.00000	1.00000	97.91
19.5	991,987	30,591	0.03084	0.96916	97.91
20.5	961,396	0	0.00000	1.00000	94.89
21.5	961,396	0	0.00000	1.00000	94.89
22.5	961,396	0	0.00000	1.00000	94.89
23.5	961,396	3,536	0.00368	0.99632	94.89
24.5	957,861	0	0.00000	1.00000	94.54
25.5	957,861	30,591	0.03194	0.96806	94.54
26.5	925,677	1,000	0.00108	0.99892	91.52

Kentucky - American Water Company

Account 305.000 - Collecting & Impounding Reservoirs

Placement Band - 1913 - 2022 Experience Band - 2008 - 2022

27.5	924,677	0	0.00000	1.00000	91.42
28.5	924,677	0	0.00000	1.00000	91.42
29.5	921,091	2,685	0.00292	0.99708	91.42
30.5	909,254	0	0.00000	1.00000	91.15
31.5	895,241	0	0.00000	1.00000	91.15
32.5	895,241	0	0.00000	1.00000	91.15
33.5	892,957	0	0.00000	1.00000	91.15
34.5	136,417	0	0.00000	1.00000	91.15
35.5	136,417	0	0.00000	1.00000	91.15
36.5	136,417	5,152	0.03777	0.96223	91.15
37.5	131,265	0	0.00000	1.00000	87.71
38.5	131,265	0	0.00000	1.00000	87.71
39.5	131,265	0	0.00000	1.00000	87.71
40.5	131,265	23,441	0.17858	0.82142	87.71
41.5	107,825	0	0.00000	1.00000	72.05
42.5	107,825	110	0.00102	0.99898	72.05
43.5	107,715	1,000	0.00928	0.99072	71.98
44.5	106,715	0	0.00000	1.00000	71.31
45.5	106,715	0	0.00000	1.00000	71.31
46.5	106,715	0	0.00000	1.00000	71.31
47.5	106,715	0	0.00000	1.00000	71.31
48.5	106,715	0	0.00000	1.00000	71.31
49.5	106,715	0	0.00000	1.00000	71.31
50.5	102,758	392	0.00381	0.99619	71.31
51.5	102,367	0	0.00000	1.00000	71.04
52.5	102,367	0	0.00000	1.00000	71.04
53.5	102,367	0	0.00000	1.00000	71.04
54.5	102,367	0	0.00000	1.00000	71.04
55.5	102,367	0	0.00000	1.00000	71.04
56.5	102,367	0	0.00000	1.00000	71.04
57.5	102,367	0	0.00000	1.00000	71.04

Kentucky - American Water Company

Account 305.000 - Collecting & Impounding Reservoirs

Placement Band - 1913 - 2022   Experience Band - 2008 - 2022

58.5	102,367	0	0.00000	1.00000	71.04
59.5	102,367	0	0.00000	1.00000	71.04
60.5	102,367	182	0.00178	0.99822	71.04
61.5	102,185	0	0.00000	1.00000	70.91
62.5	102,185	0	0.00000	1.00000	70.91
63.5	102,185	0	0.00000	1.00000	70.91
64.5	102,185	0	0.00000	1.00000	70.91
65.5	102,185	0	0.00000	1.00000	70.91
66.5	102,185	0	0.00000	1.00000	70.91
67.5	102,185	0	0.00000	1.00000	70.91
68.5	102,185	0	0.00000	1.00000	70.91
69.5	102,185	0	0.00000	1.00000	70.91
70.5	102,185	0	0.00000	1.00000	70.91
71.5	102,185	0	0.00000	1.00000	70.91
72.5	102,185	0	0.00000	1.00000	70.91
73.5	102,185	540	0.00528	0.99472	70.91
74.5	101,644	0	0.00000	1.00000	70.54
75.5	101,644	0	0.00000	1.00000	70.54
76.5	101,644	0	0.00000	1.00000	70.54
77.5	101,644	0	0.00000	1.00000	70.54
78.5	101,644	0	0.00000	1.00000	70.54
79.5	101,644	3,576	0.03518	0.96482	70.54
80.5	98,069	0	0.00000	1.00000	68.06
81.5	98,069	0	0.00000	1.00000	68.06
82.5	98,069	0	0.00000	1.00000	68.06
83.5	98,069	0	0.00000	1.00000	68.06
84.5	98,069	0	0.00000	1.00000	68.06
85.5	98,069	0	0.00000	1.00000	68.06
86.5	98,069	0	0.00000	1.00000	68.06
87.5	98,069	0	0.00000	1.00000	68.06
88.5	73,214	0	0.00000	1.00000	68.06

Kentucky - American Water Company

Account 305.000 - Collecting & Impounding Reservoirs

Placement Band - 1913 - 2022 Experience Band - 2008 - 2022

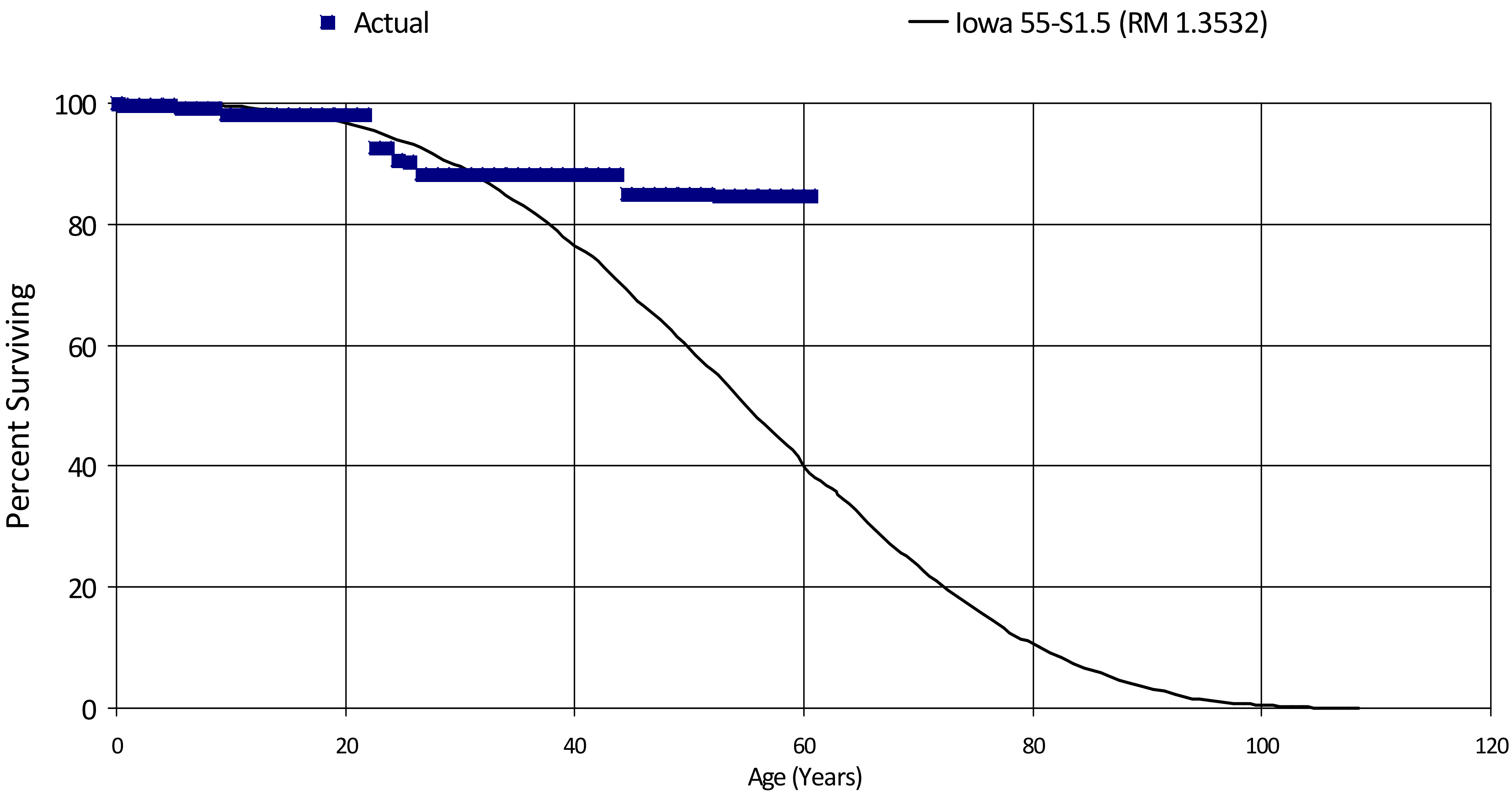
89.5	73,214	0	0.00000	1.00000	68.06
90.5	73,214	0	0.00000	1.00000	68.06
91.5	73,214	0	0.00000	1.00000	68.06
92.5	73,214	0	0.00000	1.00000	68.06
93.5	73,214	0	0.00000	1.00000	68.06
94.5	73,214	0	0.00000	1.00000	68.06
95.5	73,214	0	0.00000	1.00000	68.06
96.5	73,214	0	0.00000	1.00000	68.06
97.5	73,214	0	0.00000	1.00000	68.06
98.5	73,214	0	0.00000	1.00000	68.06
99.5	73,214	0	0.00000	1.00000	68.06
100.5	73,214	73,214	1.00000		68.06
	Totals:	197,293			

Kentucky - American Water Company

Account 306.000 - Lake, River, & Other Intakes

Placement Band - 1961 - 2022   Experience Band - 2002 - 2022

Actual and Smooth Survivor Curves



Kentucky - American Water Company

Account 306.000 - Lake, River, & Other Intakes

Placement Band - 1961 - 2022   Experience Band - 2002 - 2022

RETIREMENT RATE ANALYSIS

Age at Begin of Interval	Exposures at Beginning of Age Interval	Retirements During Age Interval	Retmt Ratio	Survivor Ratio	% Surviving
0	1,744,011	3,666	0.00210	0.99790	100.00
0.5	1,740,345	0	0.00000	1.00000	99.79
1.5	1,740,345	0	0.00000	1.00000	99.79
2.5	1,740,345	0	0.00000	1.00000	99.79
3.5	1,740,345	2,379	0.00137	0.99863	99.79
4.5	1,737,966	5,189	0.00299	0.99701	99.65
5.5	1,732,777	0	0.00000	1.00000	99.35
6.5	1,682,034	0	0.00000	1.00000	99.35
7.5	1,682,034	0	0.00000	1.00000	99.35
8.5	1,682,034	20,500	0.01219	0.98781	99.35
9.5	1,612,372	0	0.00000	1.00000	98.14
10.5	1,354,781	0	0.00000	1.00000	98.14
11.5	1,354,781	0	0.00000	1.00000	98.14
12.5	534,719	0	0.00000	1.00000	98.14
13.5	534,719	0	0.00000	1.00000	98.14
14.5	534,719	0	0.00000	1.00000	98.14
15.5	532,341	0	0.00000	1.00000	98.14
16.5	532,341	0	0.00000	1.00000	98.14
17.5	532,341	0	0.00000	1.00000	98.14
18.5	532,341	0	0.00000	1.00000	98.14
19.5	532,341	0	0.00000	1.00000	98.14
20.5	287,047	0	0.00000	1.00000	98.14
21.5	287,047	16,301	0.05679	0.94321	98.14
22.5	270,746	0	0.00000	1.00000	92.57
23.5	270,746	5,779	0.02134	0.97866	92.57
24.5	264,966	1,000	0.00377	0.99623	90.59
25.5	260,600	5,598	0.02148	0.97852	90.25
26.5	255,002	0	0.00000	1.00000	88.31

Kentucky - American Water Company

Account 306.000 - Lake, River, & Other Intakes

Placement Band - 1961 - 2022 Experience Band - 2002 - 2022

27.5	255,002	0	0.00000	1.00000	88.31
28.5	254,833	0	0.00000	1.00000	88.31
29.5	247,848	0	0.00000	1.00000	88.31
30.5	241,848	0	0.00000	1.00000	88.31
31.5	77,727	0	0.00000	1.00000	88.31
32.5	77,727	0	0.00000	1.00000	88.31
33.5	77,727	0	0.00000	1.00000	88.31
34.5	77,727	0	0.00000	1.00000	88.31
35.5	77,727	0	0.00000	1.00000	88.31
36.5	77,727	0	0.00000	1.00000	88.31
37.5	77,727	0	0.00000	1.00000	88.31
38.5	77,727	0	0.00000	1.00000	88.31
39.5	77,727	0	0.00000	1.00000	88.31
40.5	77,727	0	0.00000	1.00000	88.31
41.5	77,727	50	0.00064	0.99936	88.31
42.5	77,677	0	0.00000	1.00000	88.25
43.5	77,677	2,857	0.03678	0.96322	88.25
44.5	74,820	0	0.00000	1.00000	85.00
45.5	74,820	0	0.00000	1.00000	85.00
46.5	74,820	0	0.00000	1.00000	85.00
47.5	74,820	0	0.00000	1.00000	85.00
48.5	74,820	0	0.00000	1.00000	85.00
49.5	74,820	0	0.00000	1.00000	85.00
50.5	74,820	0	0.00000	1.00000	85.00
51.5	51,722	166	0.00321	0.99679	85.00
52.5	19,981	0	0.00000	1.00000	84.73
53.5	19,981	0	0.00000	1.00000	84.73
54.5	19,981	0	0.00000	1.00000	84.73
55.5	19,981	0	0.00000	1.00000	84.73
56.5	449	0	0.00000	1.00000	84.73
57.5	449	0	0.00000	1.00000	84.73

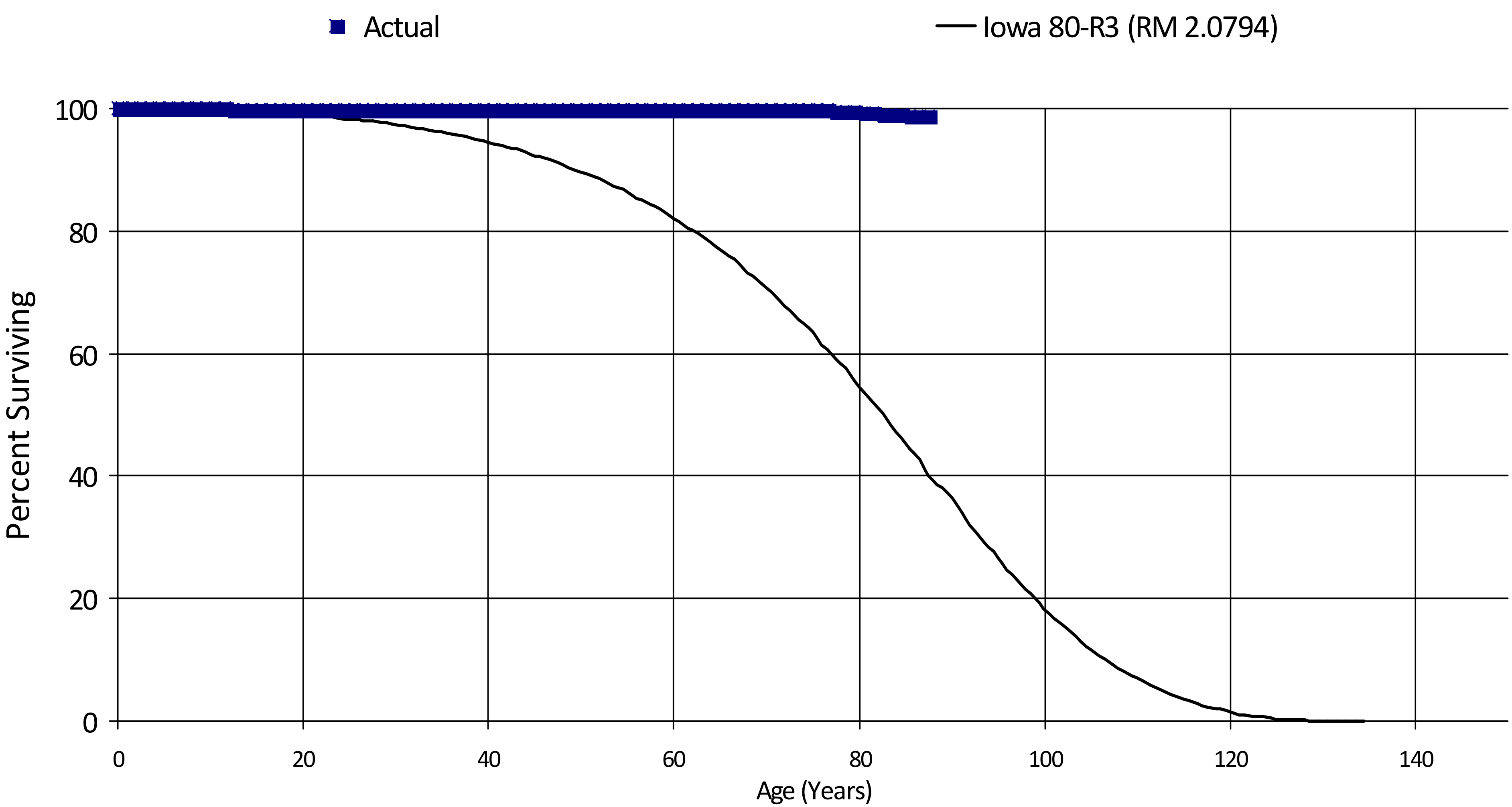
58.5	449	0	0.00000	1.00000	84.73
59.5	449	0	0.00000	1.00000	84.73
60.5	449	0	0.00000	1.00000	84.73
	Totals:	63,485			

Kentucky - American Water Company

Account 309.000 - Supply Mains

Placement Band - 1934 - 2022   Experience Band - 2000 - 2022

Actual and Smooth Survivor Curves



Kentucky - American Water Company

Account 309.000 - Supply Mains

Placement Band - 1934 - 2022   Experience Band - 2000 - 2022

RETIREMENT RATE ANALYSIS

Age at Begin of Interval	Exposures at Beginning of Age Interval	Retirements During Age Interval	Retmt Ratio	Survivor Ratio	% Surviving
0	18,595,459	388	0.00002	0.99998	100.00
0.5	18,595,071	24	0.00000	1.00000	100.00
1.5	18,595,047	0	0.00000	1.00000	100.00
2.5	18,595,047	49	0.00000	1.00000	100.00
3.5	18,587,554	0	0.00000	1.00000	100.00
4.5	18,587,554	0	0.00000	1.00000	100.00
5.5	18,587,554	0	0.00000	1.00000	100.00
6.5	18,587,554	0	0.00000	1.00000	100.00
7.5	18,587,554	0	0.00000	1.00000	100.00
8.5	18,587,554	0	0.00000	1.00000	100.00
9.5	18,538,342	0	0.00000	1.00000	100.00
10.5	18,535,757	10,000	0.00054	0.99946	100.00
11.5	18,525,757	14,520	0.00078	0.99922	99.95
12.5	5,133,447	0	0.00000	1.00000	99.87
13.5	5,133,447	0	0.00000	1.00000	99.87
14.5	5,127,993	0	0.00000	1.00000	99.87
15.5	5,085,814	0	0.00000	1.00000	99.87
16.5	5,085,814	0	0.00000	1.00000	99.87
17.5	5,085,814	0	0.00000	1.00000	99.87
18.5	5,085,814	0	0.00000	1.00000	99.87
19.5	5,085,814	0	0.00000	1.00000	99.87
20.5	5,085,814	0	0.00000	1.00000	99.87
21.5	5,085,814	0	0.00000	1.00000	99.87
22.5	5,060,552	0	0.00000	1.00000	99.87
23.5	5,060,552	0	0.00000	1.00000	99.87
24.5	5,060,552	0	0.00000	1.00000	99.87
25.5	5,060,552	0	0.00000	1.00000	99.87
26.5	5,060,552	0	0.00000	1.00000	99.87

Kentucky - American Water Company

Account 309.000 - Supply Mains

Placement Band - 1934 - 2022   Experience Band - 2000 - 2022

27.5	5,060,552	0	0.00000	1.00000	99.87
28.5	5,031,220	0	0.00000	1.00000	99.87
29.5	5,025,745	0	0.00000	1.00000	99.87
30.5	3,260,194	0	0.00000	1.00000	99.87
31.5	3,250,864	0	0.00000	1.00000	99.87
32.5	3,250,864	0	0.00000	1.00000	99.87
33.5	1,274,635	0	0.00000	1.00000	99.87
34.5	1,174,444	0	0.00000	1.00000	99.87
35.5	1,078,374	0	0.00000	1.00000	99.87
36.5	1,078,374	0	0.00000	1.00000	99.87
37.5	1,078,374	0	0.00000	1.00000	99.87
38.5	1,064,211	0	0.00000	1.00000	99.87
39.5	1,063,852	0	0.00000	1.00000	99.87
40.5	1,010,701	0	0.00000	1.00000	99.87
41.5	1,008,330	0	0.00000	1.00000	99.87
42.5	1,004,832	0	0.00000	1.00000	99.87
43.5	1,004,832	0	0.00000	1.00000	99.87
44.5	1,004,832	0	0.00000	1.00000	99.87
45.5	1,004,832	207	0.00021	0.99979	99.87
46.5	876,840	0	0.00000	1.00000	99.85
47.5	876,840	0	0.00000	1.00000	99.85
48.5	876,840	0	0.00000	1.00000	99.85
49.5	876,840	0	0.00000	1.00000	99.85
50.5	866,167	0	0.00000	1.00000	99.85
51.5	866,167	262	0.00030	0.99970	99.85
52.5	862,678	0	0.00000	1.00000	99.82
53.5	862,678	0	0.00000	1.00000	99.82
54.5	856,956	0	0.00000	1.00000	99.82
55.5	854,343	0	0.00000	1.00000	99.82
56.5	854,343	0	0.00000	1.00000	99.82
57.5	413,852	0	0.00000	1.00000	99.82

Kentucky - American Water Company

Account 309.000 - Supply Mains

Placement Band - 1934 - 2022 Experience Band - 2000 - 2022

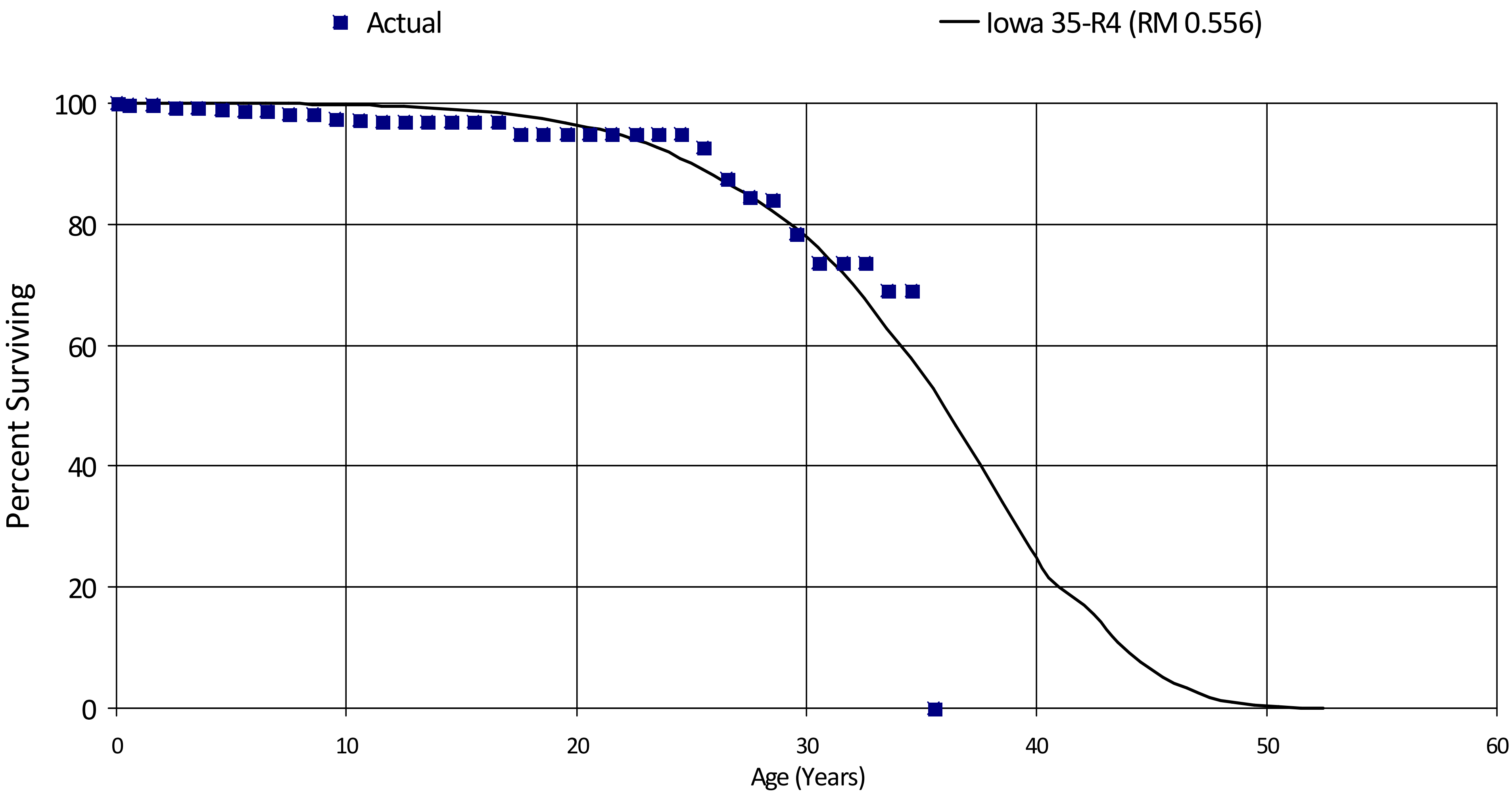
58.5	397,449	0	0.00000	1.00000	99.82
59.5	397,449	0	0.00000	1.00000	99.82
60.5	397,449	266	0.00067	0.99933	99.82
61.5	397,182	0	0.00000	1.00000	99.75
62.5	397,182	0	0.00000	1.00000	99.75
63.5	287,452	0	0.00000	1.00000	99.75
64.5	287,452	0	0.00000	1.00000	99.75
65.5	287,452	0	0.00000	1.00000	99.75
66.5	227,569	0	0.00000	1.00000	99.75
67.5	227,569	0	0.00000	1.00000	99.75
68.5	227,569	0	0.00000	1.00000	99.75
69.5	225,940	0	0.00000	1.00000	99.75
70.5	225,940	0	0.00000	1.00000	99.75
71.5	225,722	14	0.00006	0.99994	99.75
72.5	225,707	0	0.00000	1.00000	99.74
73.5	225,707	0	0.00000	1.00000	99.74
74.5	225,707	0	0.00000	1.00000	99.74
75.5	225,707	1	0.00000	1.00000	99.74
76.5	225,706	391	0.00173	0.99827	99.74
77.5	225,315	21	0.00009	0.99991	99.57
78.5	225,252	305	0.00135	0.99865	99.56
79.5	224,947	489	0.00217	0.99783	99.43
80.5	224,458	0	0.00000	1.00000	99.21
81.5	224,025	736	0.00329	0.99671	99.21
82.5	222,785	0	0.00000	1.00000	98.88
83.5	222,785	0	0.00000	1.00000	98.88
84.5	222,785	550	0.00247	0.99753	98.88
85.5	222,235	0	0.00000	1.00000	98.64
86.5	222,235	0	0.00000	1.00000	98.64
87.5	222,235	0	0.00000	1.00000	98.64
	Totals:	28,223			

Kentucky - American Water Company

Account 310.000 - Power Generation Equipment

Placement Band - 1981 - 2022 Experience Band - 2002 - 2022

Actual and Smooth Survivor Curves



Kentucky - American Water Company

Account 310.000 - Power Generation Equipment

Placement Band - 1981 - 2022   Experience Band - 2002 - 2022

RETIREMENT RATE ANALYSIS

Age at Begin of Interval	Exposures at Beginning of Age Interval	Retirements During Age Interval	Retmt Ratio	Survivor Ratio	% Surviving
0	5,955,828	14,501	0.00243	0.99757	100.00
0.5	5,941,327	6,276	0.00106	0.99894	99.76
1.5	5,935,050	20,233	0.00341	0.99659	99.65
2.5	5,914,817	0	0.00000	1.00000	99.31
3.5	5,914,817	24,605	0.00416	0.99584	99.31
4.5	5,890,213	9,442	0.00160	0.99840	98.90
5.5	5,729,237	912	0.00016	0.99984	98.74
6.5	3,110,017	13,686	0.00440	0.99560	98.72
7.5	3,069,632	0	0.00000	1.00000	98.29
8.5	2,800,616	25,312	0.00904	0.99096	98.29
9.5	2,705,906	7,941	0.00293	0.99707	97.40
10.5	2,677,864	1,325	0.00049	0.99951	97.11
11.5	2,639,750	0	0.00000	1.00000	97.06
12.5	884,675	0	0.00000	1.00000	97.06
13.5	852,615	0	0.00000	1.00000	97.06
14.5	719,416	0	0.00000	1.00000	97.06
15.5	548,687	0	0.00000	1.00000	97.06
16.5	548,687	12,786	0.02330	0.97670	97.06
17.5	535,901	0	0.00000	1.00000	94.80
18.5	535,901	0	0.00000	1.00000	94.80
19.5	535,901	0	0.00000	1.00000	94.80
20.5	535,901	0	0.00000	1.00000	94.80
21.5	535,901	0	0.00000	1.00000	94.80
22.5	535,901	0	0.00000	1.00000	94.80
23.5	535,901	0	0.00000	1.00000	94.80
24.5	535,901	11,986	0.02237	0.97763	94.80
25.5	523,916	28,935	0.05523	0.94477	92.68
26.5	285,829	10,000	0.03499	0.96501	87.56

Kentucky - American Water Company

Account 310.000 - Power Generation Equipment

Placement Band - 1981 - 2022   Experience Band - 2002 - 2022

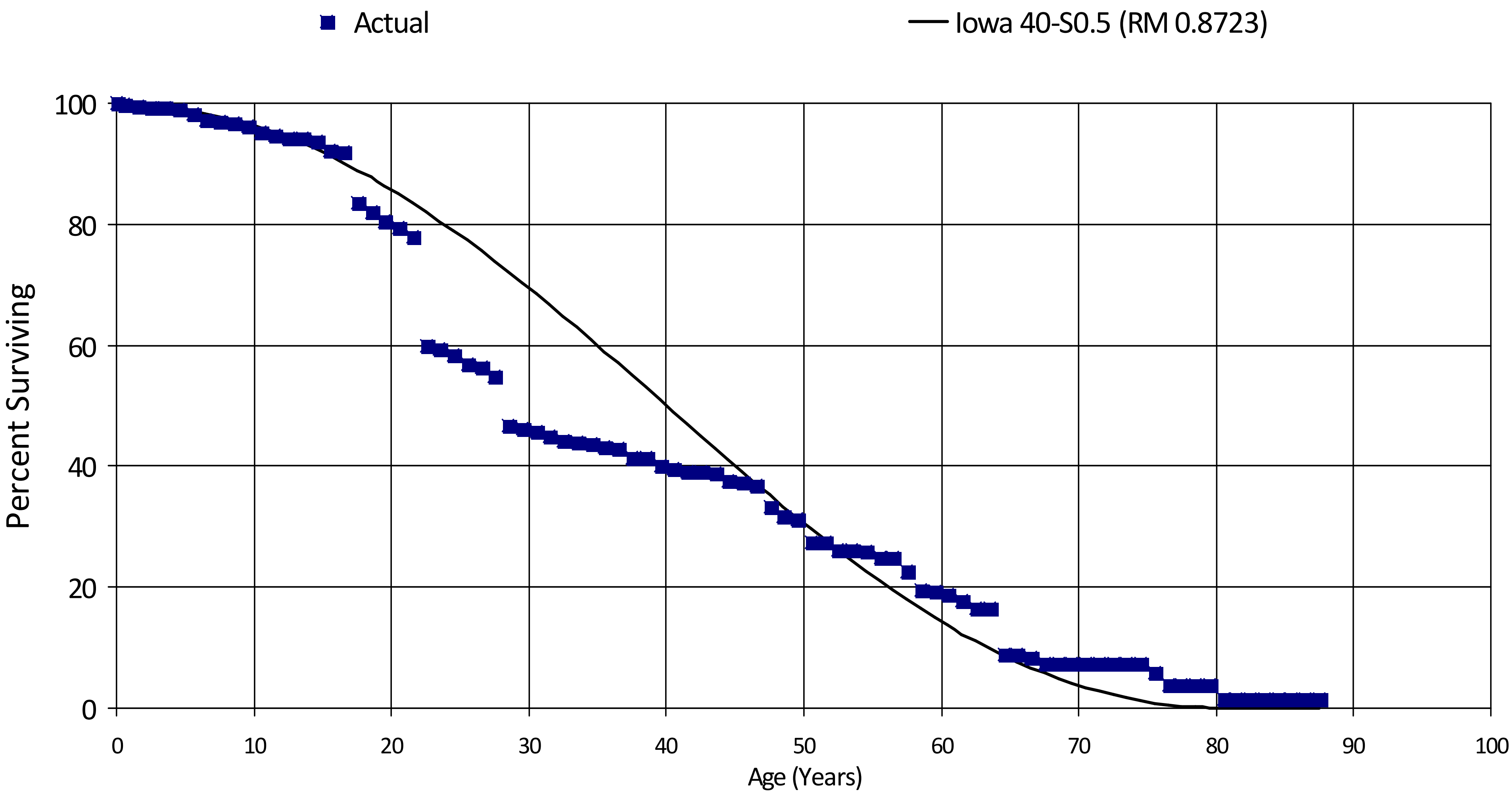
27.5	275,829	2,000	0.00725	0.99275	84.50
28.5	273,829	17,524	0.06400	0.93600	83.89
29.5	256,306	15,869	0.06191	0.93809	78.52
30.5	240,437	0	0.00000	1.00000	73.66
31.5	240,437	0	0.00000	1.00000	73.66
32.5	240,437	15,511	0.06451	0.93549	73.66
33.5	179,726	0	0.00000	1.00000	68.91
34.5	38,610	38,610	1.00001	-0.00001	68.91
35.5	0	0	0.00000	0.00000	0.00
	Totals:	277,454			

Kentucky - American Water Company

Account 311.000 - Pumping Equipment

Placement Band - 1934 - 2022   Experience Band - 1999 - 2022

Actual and Smooth Survivor Curves



Kentucky - American Water Company

Account 311.000 - Pumping Equipment

Placement Band - 1934 - 2022   Experience Band - 1999 - 2022

RETIREMENT RATE ANALYSIS

Age at Begin of Interval	Exposures at Beginning of Age Interval	Retirements During Age Interval	Retmt Ratio	Survivor Ratio	% Surviving
0	52,050,803	155,093	0.00298	0.99702	100.00
0.5	51,207,123	77,427	0.00151	0.99849	99.70
1.5	50,893,339	144,672	0.00284	0.99716	99.55
2.5	49,010,327	8,758	0.00018	0.99982	99.27
3.5	46,451,928	147,127	0.00317	0.99683	99.25
4.5	41,215,292	332,901	0.00808	0.99192	98.94
5.5	37,958,023	357,908	0.00943	0.99057	98.14
6.5	31,802,451	101,269	0.00318	0.99682	97.21
7.5	30,958,451	90,052	0.00291	0.99709	96.90
8.5	28,625,541	129,210	0.00451	0.99549	96.62
9.5	25,074,193	268,575	0.01071	0.98929	96.18
10.5	24,521,639	109,615	0.00447	0.99553	95.15
11.5	24,090,723	111,112	0.00461	0.99539	94.72
12.5	17,770,623	32,224	0.00181	0.99819	94.28
13.5	14,222,552	50,839	0.00357	0.99643	94.11
14.5	10,382,588	183,914	0.01771	0.98229	93.77
15.5	9,650,295	17,161	0.00178	0.99822	92.11
16.5	9,502,189	869,648	0.09152	0.90848	91.95
17.5	8,631,925	170,986	0.01981	0.98019	83.53
18.5	8,460,698	152,708	0.01805	0.98195	81.88
19.5	8,269,252	109,392	0.01323	0.98677	80.40
20.5	8,158,964	154,045	0.01888	0.98112	79.34
21.5	8,004,919	1,838,373	0.22966	0.77034	77.84
22.5	6,096,673	51,128	0.00839	0.99161	59.96
23.5	5,811,140	116,511	0.02005	0.97995	59.46
24.5	5,417,195	124,726	0.02302	0.97698	58.27
25.5	5,292,469	60,805	0.01149	0.98851	56.93
26.5	5,231,665	130,405	0.02493	0.97507	56.28

Kentucky - American Water Company

Account 311.000 - Pumping Equipment

Placement Band - 1934 - 2022   Experience Band - 1999 - 2022

27.5	5,101,259	751,591	0.14733	0.85267	54.88
28.5	4,349,668	50,159	0.01153	0.98847	46.79
29.5	4,270,760	62,303	0.01459	0.98541	46.25
30.5	2,666,649	41,104	0.01541	0.98459	45.58
31.5	2,619,387	36,720	0.01402	0.98598	44.88
32.5	2,529,750	17,625	0.00697	0.99303	44.25
33.5	2,195,602	15,549	0.00708	0.99292	43.94
34.5	1,679,114	18,388	0.01095	0.98905	43.63
35.5	1,188,714	7,226	0.00608	0.99392	43.15
36.5	1,176,374	40,413	0.03435	0.96565	42.89
37.5	1,078,257	0	0.00000	1.00000	41.42
38.5	1,070,911	33,030	0.03084	0.96916	41.42
39.5	1,037,881	15,947	0.01536	0.98464	40.14
40.5	1,021,934	14,390	0.01408	0.98592	39.52
41.5	761,092	0	0.00000	1.00000	38.96
42.5	761,092	4,114	0.00541	0.99459	38.96
43.5	755,721	23,515	0.03112	0.96888	38.75
44.5	732,207	3,613	0.00493	0.99507	37.54
45.5	728,593	10,961	0.01504	0.98496	37.35
46.5	575,419	55,663	0.09673	0.90327	36.79
47.5	519,756	22,319	0.04294	0.95706	33.23
48.5	493,209	8,702	0.01764	0.98236	31.80
49.5	484,508	57,873	0.11945	0.88055	31.24
50.5	425,631	2,477	0.00582	0.99418	27.51
51.5	423,155	18,407	0.04350	0.95650	27.35
52.5	334,536	285	0.00085	0.99915	26.16
53.5	334,251	2,147	0.00642	0.99358	26.14
54.5	332,104	14,274	0.04298	0.95702	25.97
55.5	317,831	0	0.00000	1.00000	24.85
56.5	317,831	29,999	0.09439	0.90561	24.85
57.5	265,175	33,797	0.12745	0.87255	22.50

Kentucky - American Water Company

Account 311.000 - Pumping Equipment

Placement Band - 1934 - 2022   Experience Band - 1999 - 2022

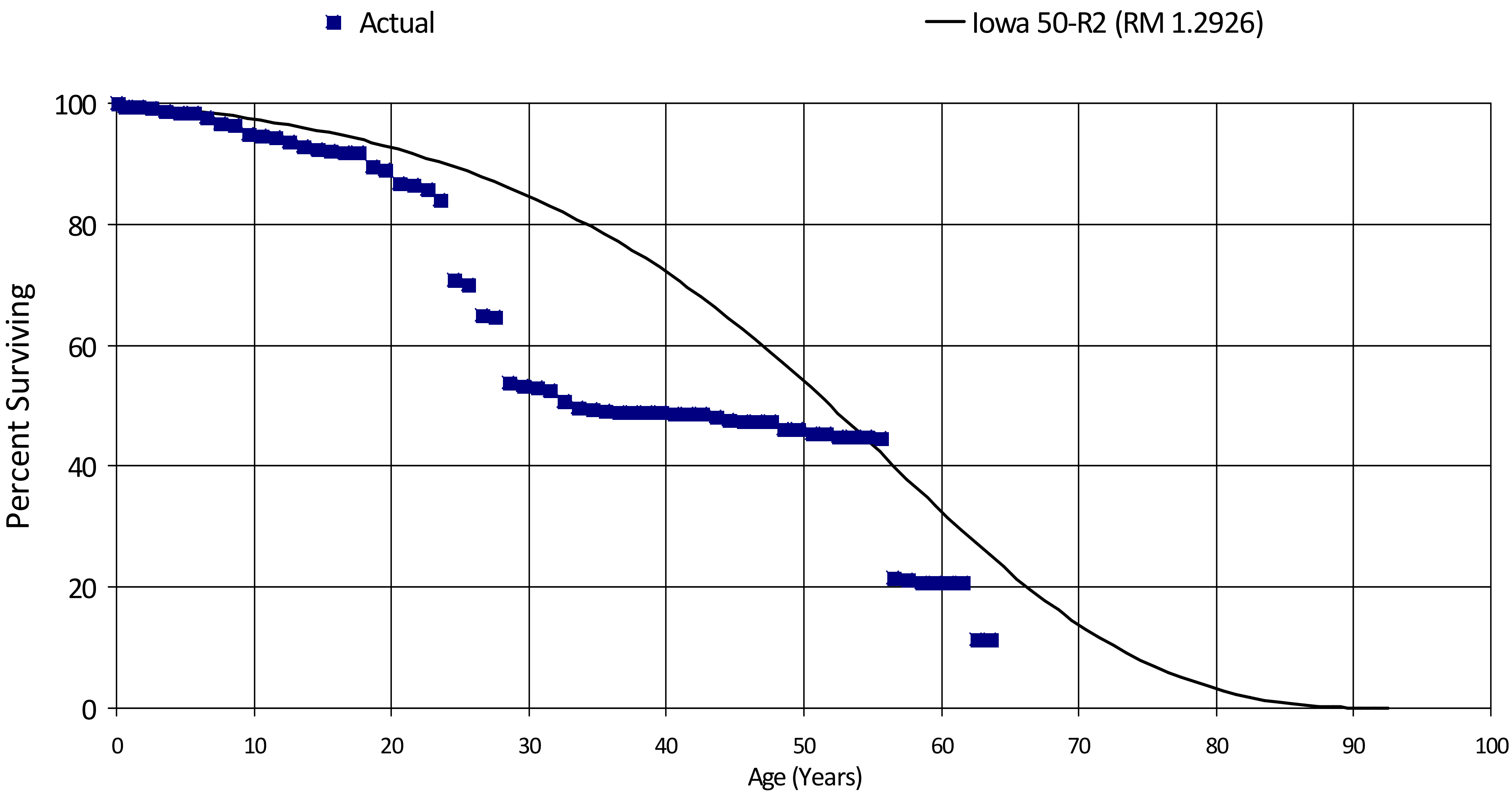
58.5	231,377	4,968	0.02147	0.97853	19.63
59.5	226,410	5,889	0.02601	0.97399	19.21
60.5	220,520	10,996	0.04986	0.95014	18.71
61.5	209,525	16,216	0.07739	0.92261	17.78
62.5	193,309	0	0.00000	1.00000	16.40
63.5	174,443	80,087	0.45910	0.54090	16.40
64.5	94,356	0	0.00000	1.00000	8.87
65.5	94,356	5,091	0.05396	0.94604	8.87
66.5	89,265	10,172	0.11395	0.88605	8.39
67.5	55,216	0	0.00000	1.00000	7.43
68.5	55,003	223	0.00405	0.99595	7.43
69.5	54,781	0	0.00000	1.00000	7.40
70.5	54,781	0	0.00000	1.00000	7.40
71.5	54,781	0	0.00000	1.00000	7.40
72.5	54,315	14	0.00026	0.99974	7.40
73.5	38,310	0	0.00000	1.00000	7.40
74.5	38,310	8,687	0.22676	0.77324	7.40
75.5	29,340	10,288	0.35065	0.64935	5.72
76.5	19,051	0	0.00000	1.00000	3.71
77.5	19,051	0	0.00000	1.00000	3.71
78.5	19,051	0	0.00000	1.00000	3.71
79.5	19,051	10,809	0.56736	0.43264	3.71
80.5	8,242	0	0.00000	1.00000	1.61
81.5	8,242	0	0.00000	1.00000	1.61
82.5	5,904	0	0.00000	1.00000	1.61
83.5	5,904	42	0.00711	0.99289	1.61
84.5	5,862	0	0.00000	1.00000	1.60
85.5	5,862	34	0.00580	0.99420	1.60
86.5	5,828	0	0.00000	1.00000	1.59
87.5	5,828	0	0.00000	1.00000	1.59
	Totals:	7,652,691			

Kentucky - American Water Company

Account 320.100 - Water Treatment Equipment - Non-Media

Placement Band - 1898 - 2022 Experience Band - 1999 - 2022

Actual and Smooth Survivor Curves



Kentucky - American Water Company

Account 320.100 - Water Treatment Equipment - Non-Media

Placement Band - 1898 - 2022   Experience Band - 1999 - 2022

RETIREMENT RATE ANALYSIS

Age at Begin of Interval	Exposures at Beginning of Age Interval	Retirements During Age Interval	Retmt Ratio	Survivor Ratio	% Surviving
0	87,946,292	452,430	0.00514	0.99486	100.00
0.5	87,294,831	26,597	0.00030	0.99970	99.49
1.5	87,096,284	194,365	0.00223	0.99777	99.46
2.5	78,622,704	389,777	0.00496	0.99504	99.24
3.5	65,738,891	225,714	0.00343	0.99657	98.75
4.5	64,331,216	33,036	0.00051	0.99949	98.41
5.5	60,710,624	366,437	0.00604	0.99396	98.36
6.5	48,566,860	498,933	0.01027	0.98973	97.77
7.5	47,661,000	152,403	0.00320	0.99680	96.77
8.5	46,600,236	706,826	0.01517	0.98483	96.46
9.5	44,483,150	113,226	0.00255	0.99745	95.00
10.5	44,258,149	151,279	0.00342	0.99658	94.76
11.5	43,578,357	398,703	0.00915	0.99085	94.44
12.5	29,031,199	234,233	0.00807	0.99193	93.58
13.5	28,558,977	94,130	0.00330	0.99670	92.82
14.5	26,968,512	111,630	0.00414	0.99586	92.51
15.5	25,075,258	36,154	0.00144	0.99856	92.13
16.5	25,010,376	52,395	0.00209	0.99791	92.00
17.5	24,957,981	579,288	0.02321	0.97679	91.81
18.5	24,378,693	188,347	0.00773	0.99227	89.68
19.5	24,189,030	613,567	0.02537	0.97463	88.99
20.5	22,541,425	15,793	0.00070	0.99930	86.73
21.5	22,523,222	258,589	0.01148	0.98852	86.67
22.5	21,802,521	421,037	0.01931	0.98069	85.68
23.5	20,459,652	3,232,449	0.15799	0.84201	84.03
24.5	17,132,462	175,137	0.01022	0.98978	70.75
25.5	16,204,075	1,178,637	0.07274	0.92726	70.03
26.5	15,013,775	53,852	0.00359	0.99641	64.94

Kentucky - American Water Company

Account 320.100 - Water Treatment Equipment - Non-Media

Placement Band - 1898 - 2022   Experience Band - 1999 - 2022

27.5	14,959,475	2,531,587	0.16923	0.83077	64.71
28.5	12,423,710	97,287	0.00783	0.99217	53.76
29.5	11,692,988	61,802	0.00529	0.99471	53.34
30.5	11,576,001	117,474	0.01015	0.98985	53.06
31.5	11,226,942	385,535	0.03434	0.96566	52.52
32.5	10,840,772	201,058	0.01855	0.98145	50.72
33.5	10,627,775	80,000	0.00753	0.99247	49.78
34.5	6,655,308	6,182	0.00093	0.99907	49.41
35.5	6,421,328	49,372	0.00769	0.99231	49.36
36.5	6,371,956	5,576	0.00088	0.99912	48.98
37.5	6,366,380	7,876	0.00124	0.99876	48.94
38.5	6,354,504	0	0.00000	1.00000	48.88
39.5	6,354,504	5,771	0.00091	0.99909	48.88
40.5	6,265,849	11,201	0.00179	0.99821	48.84
41.5	5,180,254	2,151	0.00042	0.99958	48.75
42.5	5,178,104	43,504	0.00840	0.99160	48.73
43.5	5,128,401	76,496	0.01492	0.98508	48.32
44.5	5,051,158	5,013	0.00099	0.99901	47.60
45.5	4,609,335	3,725	0.00081	0.99919	47.55
46.5	4,605,610	0	0.00000	1.00000	47.51
47.5	4,605,610	121,947	0.02648	0.97352	47.51
48.5	4,483,369	6,313	0.00141	0.99859	46.25
49.5	4,477,056	70,345	0.01571	0.98429	46.18
50.5	4,395,381	190	0.00004	0.99996	45.45
51.5	4,395,191	46,773	0.01064	0.98936	45.45
52.5	3,680,680	477	0.00013	0.99987	44.97
53.5	3,680,203	7,735	0.00210	0.99790	44.96
54.5	3,672,469	7,954	0.00217	0.99783	44.87
55.5	3,664,515	1,888,484	0.51534	0.48466	44.77
56.5	714,226	10,000	0.01400	0.98600	21.70
57.5	704,226	17,663	0.02508	0.97492	21.40

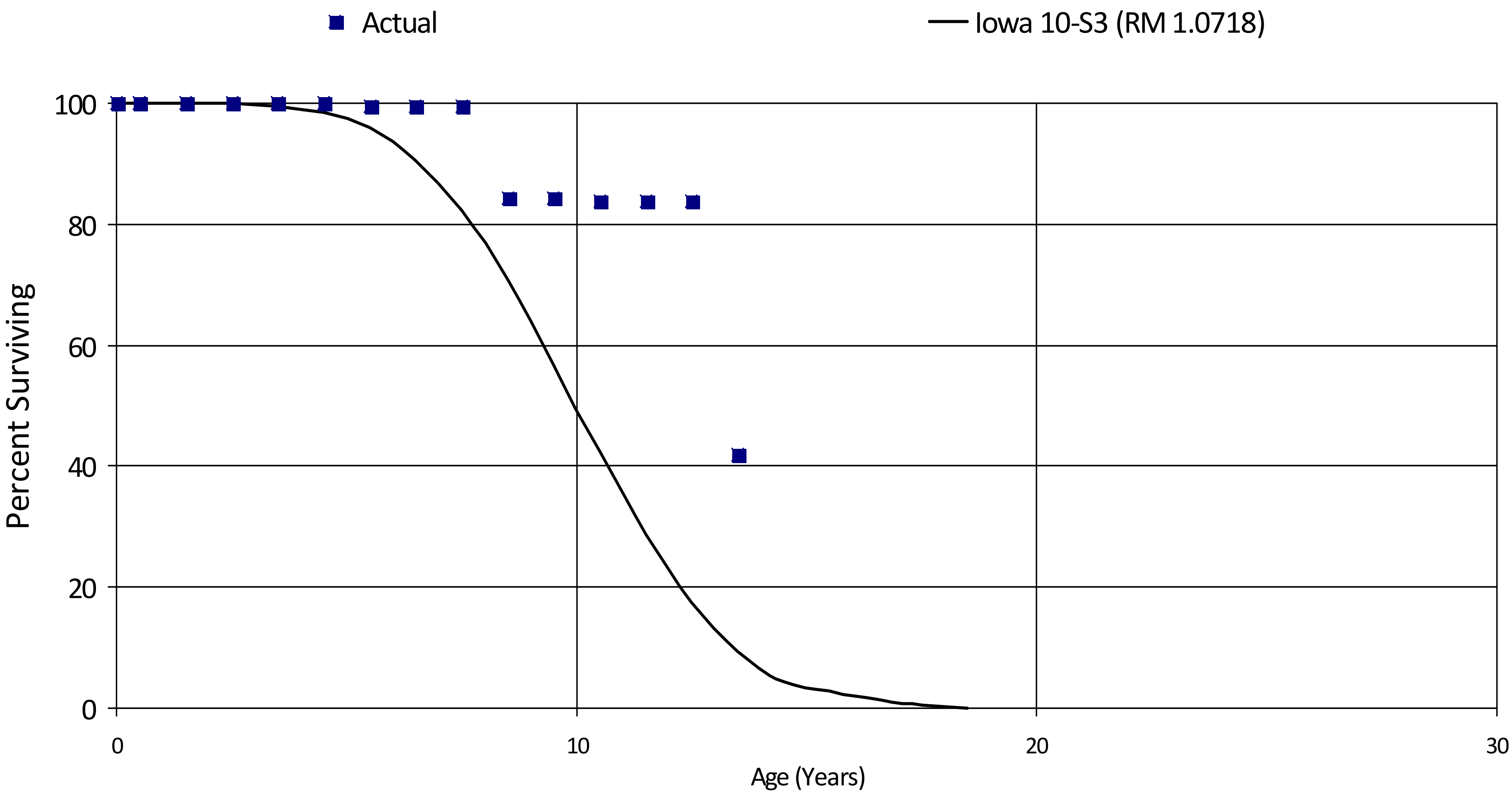
58.5	686,563	2,648	0.00386	0.99614	20.86
59.5	683,915	0	0.00000	1.00000	20.78
60.5	679,695	0	0.00000	1.00000	20.78
61.5	679,695	305,102	0.44888	0.55112	20.78
62.5	366,780	0	0.00000	1.00000	11.45
63.5	133,224	231	0.00173	0.99827	11.45
	Totals:	17,132,436			

Kentucky - American Water Company

Account 320.200 - Water Treatment Equipment - Filter Media

Placement Band - 2007 - 2022 Experience Band - 2016 - 2022

Actual and Smooth Survivor Curves



Kentucky - American Water Company

Account 320.200 - Water Treatment Equipment - Filter Media

Placement Band - 2007 - 2022   Experience Band - 2016 - 2022

RETIREMENT RATE ANALYSIS

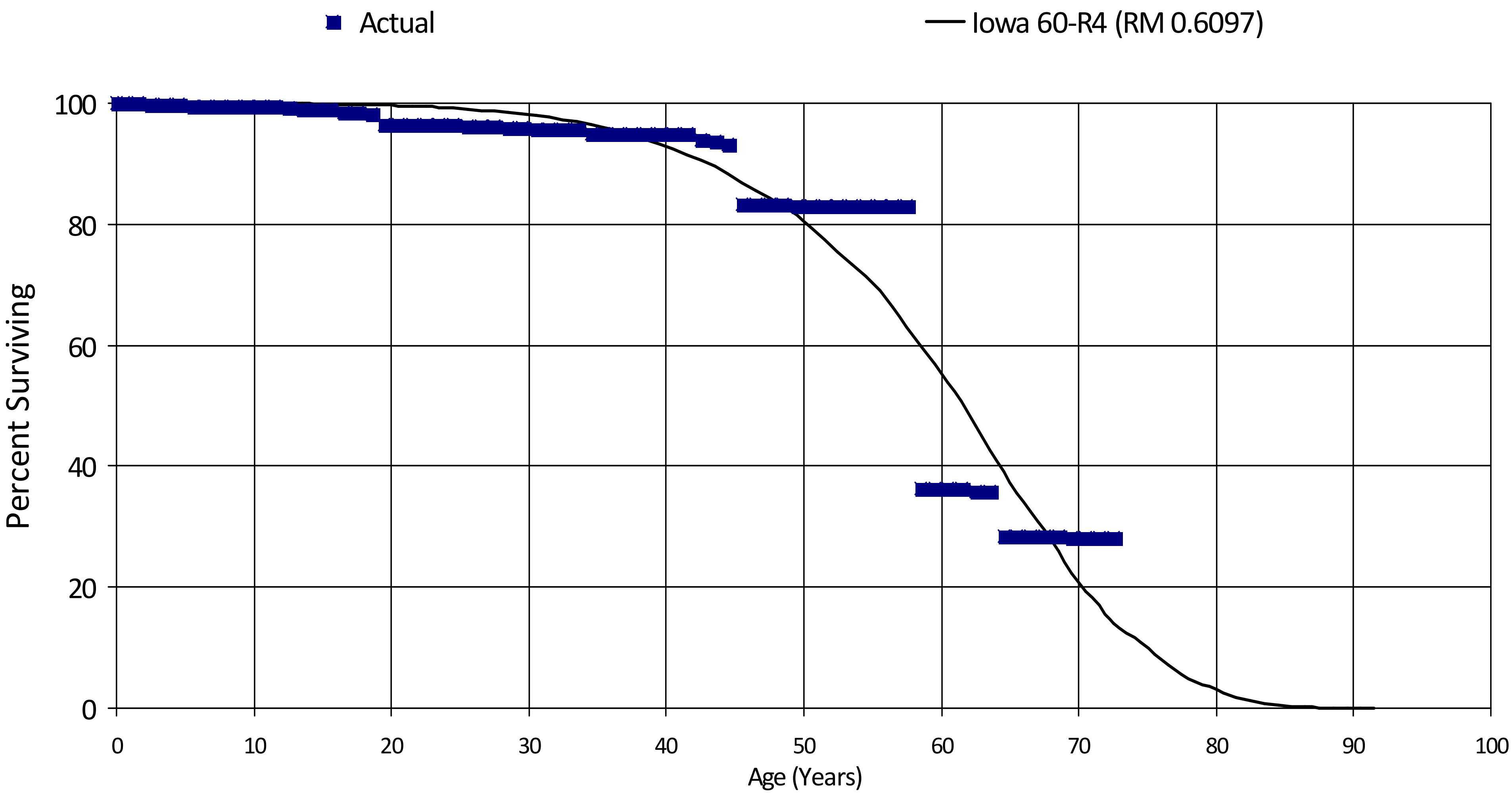
Age at Begin of Interval	Exposures at Beginning of Age Interval	Retirements During Age Interval	Retmt Ratio	Survivor Ratio	% Surviving
0	956,818	0	0.00000	1.00000	100.00
0.5	956,818	0	0.00000	1.00000	100.00
1.5	956,818	0	0.00000	1.00000	100.00
2.5	950,765	0	0.00000	1.00000	100.00
3.5	950,765	0	0.00000	1.00000	100.00
4.5	950,765	5,000	0.00526	0.99474	100.00
5.5	929,790	0	0.00000	1.00000	99.47
6.5	737,340	0	0.00000	1.00000	99.47
7.5	737,340	112,481	0.15255	0.84745	99.47
8.5	624,859	0	0.00000	1.00000	84.30
9.5	624,859	4,595	0.00735	0.99265	84.30
10.5	620,264	0	0.00000	1.00000	83.68
11.5	456,944	0	0.00000	1.00000	83.68
12.5	56,088	27,968	0.49864	0.50136	83.68
13.5	0	0	0.00000	0.00000	41.95
	Totals:	150,044			

Kentucky - American Water Company

Account 330.000 - Distribution Reservoirs & Standpipes

Placement Band - 1949 - 2022   Experience Band - 2000 - 2022

Actual and Smooth Survivor Curves



Kentucky - American Water Company

Account 330.000 - Distribution Reservoirs & Standpipes

Placement Band - 1949 - 2022 Experience Band - 2000 - 2022

RETIREMENT RATE ANALYSIS

Age at Begin of Interval	Exposures at Beginning of Age Interval	Retirements During Age Interval	Retmt Ratio	Survivor Ratio	% Surviving
0	20,790,423	20,015	0.00096	0.99904	100.00
0.5	20,770,408	0	0.00000	1.00000	99.90
1.5	20,770,408	29,652	0.00143	0.99857	99.90
2.5	20,740,756	4,223	0.00020	0.99980	99.76
3.5	20,729,873	5,938	0.00029	0.99971	99.74
4.5	20,723,935	30,837	0.00149	0.99851	99.71
5.5	20,693,098	23,378	0.00113	0.99887	99.56
6.5	20,426,313	3,731	0.00018	0.99982	99.45
7.5	20,394,512	2,000	0.00010	0.99990	99.43
8.5	16,588,412	0	0.00000	1.00000	99.42
9.5	16,014,537	0	0.00000	1.00000	99.42
10.5	15,872,956	1,128	0.00007	0.99993	99.42
11.5	15,871,828	31,064	0.00196	0.99804	99.41
12.5	12,562,686	19,691	0.00157	0.99843	99.22
13.5	12,448,629	0	0.00000	1.00000	99.06
14.5	12,436,912	19,918	0.00160	0.99840	99.06
15.5	12,307,796	55,801	0.00453	0.99547	98.90
16.5	12,082,952	0	0.00000	1.00000	98.45
17.5	8,749,759	18,447	0.00211	0.99789	98.45
18.5	7,074,603	123,581	0.01747	0.98253	98.24
19.5	6,951,022	4,601	0.00066	0.99934	96.52
20.5	6,946,421	517	0.00007	0.99993	96.46
21.5	6,069,368	2,044	0.00034	0.99966	96.45
22.5	6,039,023	0	0.00000	1.00000	96.42
23.5	5,253,598	3,632	0.00069	0.99931	96.42
24.5	5,249,966	2,141	0.00041	0.99959	96.35
25.5	5,247,825	0	0.00000	1.00000	96.31
26.5	3,864,260	3,375	0.00087	0.99913	96.31

Kentucky - American Water Company

Account 330.000 - Distribution Reservoirs & Standpipes

Placement Band - 1949 - 2022   Experience Band - 2000 - 2022

27.5	3,860,885	7,785	0.00202	0.99798	96.23
28.5	3,826,480	4,817	0.00126	0.99874	96.04
29.5	3,821,663	5,606	0.00147	0.99853	95.92
30.5	3,812,353	0	0.00000	1.00000	95.78
31.5	3,796,641	5,335	0.00141	0.99859	95.78
32.5	3,140,869	0	0.00000	1.00000	95.64
33.5	2,070,360	15,622	0.00755	0.99245	95.64
34.5	2,046,983	0	0.00000	1.00000	94.92
35.5	1,279,270	0	0.00000	1.00000	94.92
36.5	1,279,270	0	0.00000	1.00000	94.92
37.5	1,262,023	1,060	0.00084	0.99916	94.92
38.5	1,260,963	0	0.00000	1.00000	94.84
39.5	1,260,963	450	0.00036	0.99964	94.84
40.5	1,037,013	0	0.00000	1.00000	94.81
41.5	1,037,013	9,093	0.00877	0.99123	94.81
42.5	1,025,435	3,196	0.00312	0.99688	93.98
43.5	1,022,238	4,693	0.00459	0.99541	93.69
44.5	1,017,545	108,806	0.10693	0.89307	93.26
45.5	903,712	0	0.00000	1.00000	83.29
46.5	898,523	0	0.00000	1.00000	83.29
47.5	897,964	746	0.00083	0.99917	83.29
48.5	877,496	1,169	0.00133	0.99867	83.22
49.5	876,328	0	0.00000	1.00000	83.11
50.5	876,328	0	0.00000	1.00000	83.11
51.5	876,328	0	0.00000	1.00000	83.11
52.5	875,745	58	0.00007	0.99993	83.11
53.5	875,687	0	0.00000	1.00000	83.10
54.5	702,153	0	0.00000	1.00000	83.10
55.5	702,153	0	0.00000	1.00000	83.10
56.5	701,430	0	0.00000	1.00000	83.10
57.5	333,759	187,467	0.56168	0.43832	83.10

Kentucky - American Water Company

Account 330.000 - Distribution Reservoirs & Standpipes

Placement Band - 1949 - 2022 Experience Band - 2000 - 2022

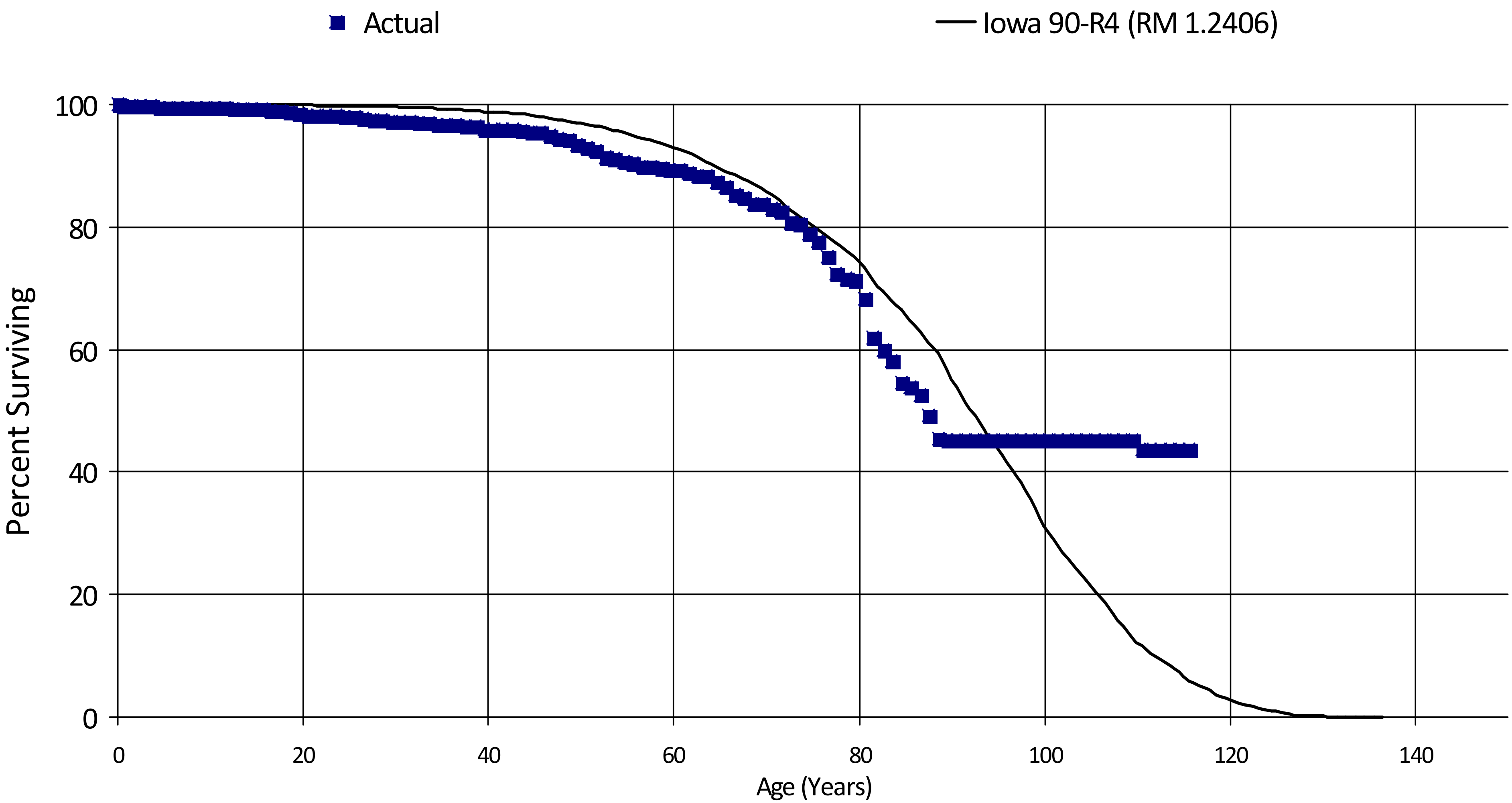
58.5	146,292	137	0.00094	0.99906	36.42
59.5	146,155	433	0.00296	0.99704	36.39
60.5	145,722	31	0.00021	0.99979	36.28
61.5	145,691	2,231	0.01531	0.98469	36.27
62.5	143,461	0	0.00000	1.00000	35.71
63.5	143,461	29,394	0.20489	0.79511	35.71
64.5	114,067	0	0.00000	1.00000	28.39
65.5	114,067	0	0.00000	1.00000	28.39
66.5	114,067	0	0.00000	1.00000	28.39
67.5	114,067	0	0.00000	1.00000	28.39
68.5	29,896	247	0.00826	0.99174	28.39
69.5	29,618	0	0.00000	1.00000	28.16
70.5	29,618	0	0.00000	1.00000	28.16
71.5	29,618	0	0.00000	1.00000	28.16
72.5	29,618	0	0.00000	1.00000	28.16
	Totals:	794,090			

Kentucky - American Water Company

Account 331.001 - T&D Mains

Placement Band - 1906 - 2022   Experience Band - 1999 - 2022

Actual and Smooth Survivor Curves



Kentucky - American Water Company

Account 331.001 - T&D Mains

Placement Band - 1906 - 2022   Experience Band - 1999 - 2022

RETIREMENT RATE ANALYSIS

Age at Begin of Interval	Exposures at Beginning of Age Interval	Retirements During Age Interval	Retmt Ratio	Survivor Ratio	% Surviving
0	404,874,429	811,331	0.00200	0.99800	100.00
0.5	374,553,095	230,325	0.00061	0.99939	99.80
1.5	353,341,663	172,483	0.00049	0.99951	99.74
2.5	341,635,248	144,082	0.00042	0.99958	99.69
3.5	332,050,607	130,238	0.00039	0.99961	99.65
4.5	321,320,600	187,365	0.00058	0.99942	99.61
5.5	308,694,192	110,718	0.00036	0.99964	99.55
6.5	293,255,052	77,043	0.00026	0.99974	99.51
7.5	285,971,265	73,474	0.00026	0.99974	99.48
8.5	267,226,515	90,623	0.00034	0.99966	99.45
9.5	262,505,030	29,609	0.00011	0.99989	99.42
10.5	258,676,760	44,546	0.00017	0.99983	99.41
11.5	254,739,701	67,543	0.00027	0.99973	99.39
12.5	179,340,221	106,911	0.00060	0.99940	99.36
13.5	175,680,441	120,762	0.00069	0.99931	99.30
14.5	166,283,836	146,706	0.00088	0.99912	99.23
15.5	133,723,015	81,270	0.00061	0.99939	99.14
16.5	118,321,433	41,612	0.00035	0.99965	99.08
17.5	117,705,455	445,207	0.00378	0.99622	99.05
18.5	117,190,872	242,045	0.00207	0.99793	98.68
19.5	116,948,066	154,947	0.00132	0.99868	98.48
20.5	116,602,393	165,372	0.00142	0.99858	98.35
21.5	111,381,094	60,545	0.00054	0.99946	98.21
22.5	103,885,242	34,647	0.00033	0.99967	98.16
23.5	95,419,834	94,730	0.00099	0.99901	98.13
24.5	90,130,215	23,048	0.00026	0.99974	98.03
25.5	83,883,616	305,016	0.00364	0.99636	98.00
26.5	78,040,068	208,400	0.00267	0.99733	97.64

Kentucky - American Water Company

Account 331.001 - T&D Mains

Placement Band - 1906 - 2022   Experience Band - 1999 - 2022

27.5	73,826,217	27,392	0.00037	0.99963	97.38
28.5	67,270,463	9,078	0.00013	0.99987	97.34
29.5	64,041,396	88,495	0.00138	0.99862	97.33
30.5	60,255,290	43,782	0.00073	0.99927	97.20
31.5	58,298,369	52,849	0.00091	0.99909	97.13
32.5	54,593,492	107,713	0.00197	0.99803	97.04
33.5	51,231,186	16,689	0.00033	0.99967	96.85
34.5	45,900,780	14,356	0.00031	0.99969	96.82
35.5	37,676,079	80,748	0.00214	0.99786	96.79
36.5	35,835,549	38,542	0.00108	0.99892	96.58
37.5	30,674,109	19,590	0.00064	0.99936	96.48
38.5	28,859,571	129,683	0.00449	0.99551	96.42
39.5	28,179,518	14,577	0.00052	0.99948	95.99
40.5	27,751,899	16,529	0.00060	0.99940	95.94
41.5	27,237,122	14,453	0.00053	0.99947	95.88
42.5	25,974,998	30,635	0.00118	0.99882	95.83
43.5	24,493,181	51,088	0.00209	0.99791	95.72
44.5	23,333,922	45,711	0.00196	0.99804	95.52
45.5	22,011,995	101,278	0.00460	0.99540	95.33
46.5	21,143,445	114,740	0.00543	0.99457	94.89
47.5	20,365,158	70,779	0.00348	0.99652	94.37
48.5	17,239,986	109,859	0.00637	0.99363	94.04
49.5	16,287,231	85,651	0.00526	0.99474	93.44
50.5	14,694,349	80,810	0.00550	0.99450	92.95
51.5	14,087,342	148,926	0.01057	0.98943	92.44
52.5	13,502,350	67,709	0.00501	0.99499	91.46
53.5	12,765,276	40,610	0.00318	0.99682	91.00
54.5	12,198,710	64,415	0.00528	0.99472	90.71
55.5	11,451,830	34,021	0.00297	0.99703	90.23
56.5	7,276,309	11,906	0.00164	0.99836	89.96
57.5	6,787,064	12,339	0.00182	0.99818	89.81

Kentucky - American Water Company

Account 331.001 - T&D Mains

Placement Band - 1906 - 2022   Experience Band - 1999 - 2022

58.5	6,370,976	16,464	0.00258	0.99742	89.65
59.5	6,070,231	7,748	0.00128	0.99872	89.42
60.5	5,737,823	28,334	0.00494	0.99506	89.31
61.5	5,466,880	28,878	0.00528	0.99472	88.87
62.5	5,024,361	7,423	0.00148	0.99852	88.40
63.5	4,556,064	47,174	0.01035	0.98965	88.27
64.5	3,869,618	36,686	0.00948	0.99052	87.36
65.5	3,442,102	51,911	0.01508	0.98492	86.53
66.5	2,354,117	14,876	0.00632	0.99368	85.23
67.5	1,834,021	17,598	0.00960	0.99040	84.69
68.5	1,673,629	4,747	0.00284	0.99716	83.88
69.5	1,368,707	9,239	0.00675	0.99325	83.64
70.5	1,213,147	10,248	0.00845	0.99155	83.08
71.5	1,168,697	22,927	0.01962	0.98038	82.38
72.5	1,043,035	3,487	0.00334	0.99666	80.76
73.5	955,530	17,961	0.01880	0.98120	80.49
74.5	833,058	14,849	0.01782	0.98218	78.98
75.5	784,372	23,621	0.03011	0.96989	77.57
76.5	753,033	29,602	0.03931	0.96069	75.23
77.5	719,035	6,784	0.00943	0.99057	72.27
78.5	711,986	2,674	0.00376	0.99624	71.59
79.5	707,301	29,685	0.04197	0.95803	71.32
80.5	675,961	63,111	0.09336	0.90664	68.33
81.5	602,367	20,293	0.03369	0.96631	61.95
82.5	570,640	16,277	0.02852	0.97148	59.86
83.5	539,224	32,220	0.05975	0.94025	58.15
84.5	491,863	8,668	0.01762	0.98238	54.68
85.5	431,204	8,518	0.01975	0.98025	53.72
86.5	398,441	25,831	0.06483	0.93517	52.66
87.5	331,601	26,070	0.07862	0.92138	49.25
88.5	44,132	241	0.00546	0.99454	45.38

Kentucky - American Water Company

Account 331.001 - T&D Mains

Placement Band - 1906 - 2022   Experience Band - 1999 - 2022

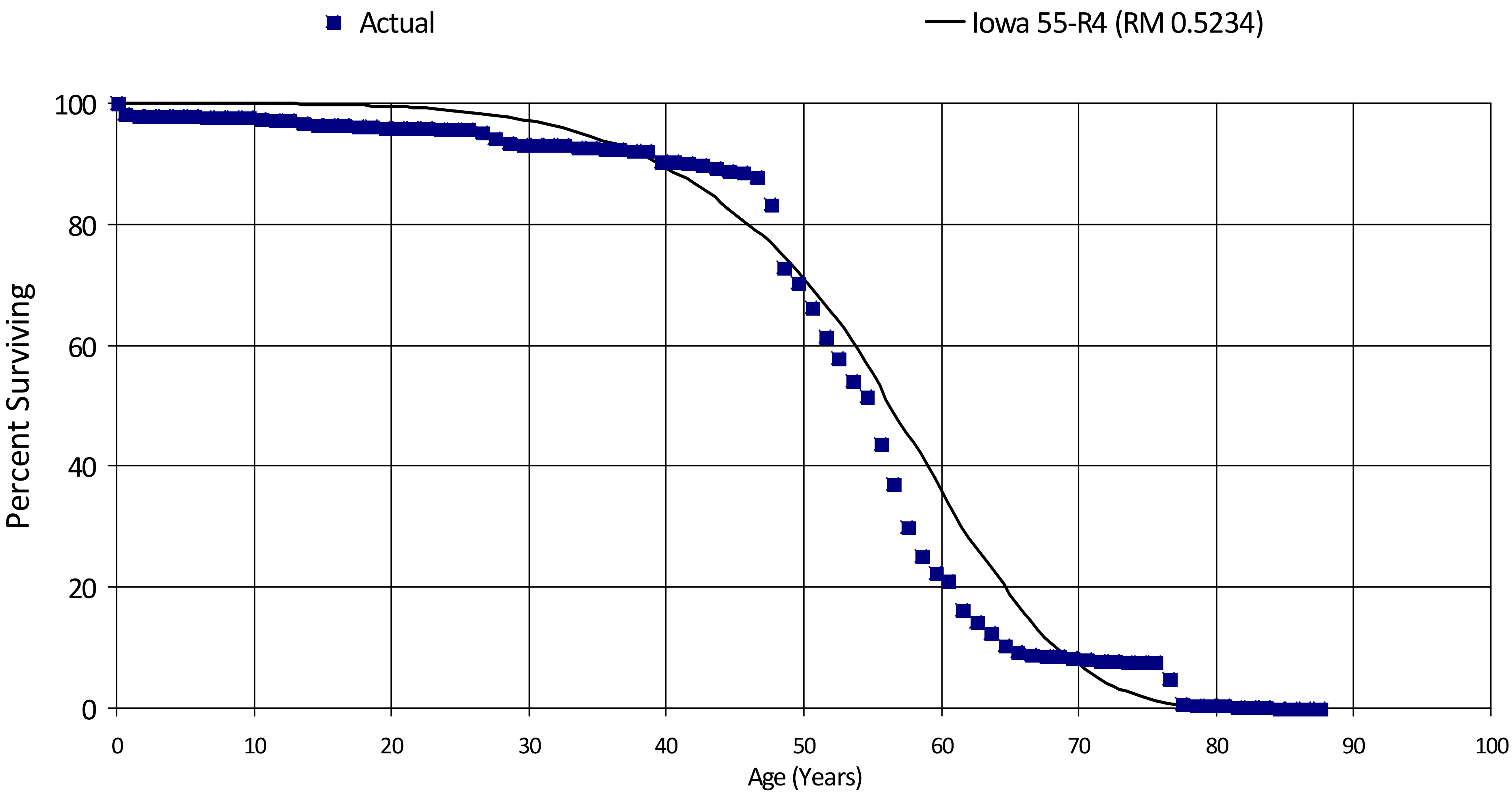
89.5	30	0	0.00000	1.00000	45.13
90.5	30	0	0.00000	1.00000	45.13
91.5	30	0	0.00000	1.00000	45.13
92.5	30	0	0.00000	1.00000	45.13
93.5	30	0	0.00000	1.00000	45.13
94.5	30	0	0.00000	1.00000	45.13
95.5	30	0	0.00000	1.00000	45.13
96.5	30	0	0.00000	1.00000	45.13
97.5	30	0	0.00000	1.00000	45.13
98.5	30	0	0.00000	1.00000	45.13
99.5	30	0	0.00000	1.00000	45.13
100.5	30	0	0.00000	1.00000	45.13
101.5	30	0	0.00000	1.00000	45.13
102.5	30	0	0.00000	1.00000	45.13
103.5	30	0	0.00000	1.00000	45.13
104.5	30	0	0.00000	1.00000	45.13
105.5	30	0	0.00000	1.00000	45.13
106.5	30	0	0.00000	1.00000	45.13
107.5	30	0	0.00000	1.00000	45.13
108.5	30	0	0.00000	1.00000	45.13
109.5	30	1	0.03333	0.96667	45.13
110.5	29	0	0.00000	1.00000	43.63
111.5	29	0	0.00000	1.00000	43.63
112.5	29	0	0.00000	1.00000	43.63
113.5	29	0	0.00000	1.00000	43.63
114.5	29	0	0.00000	1.00000	43.63
115.5	29	4	0.13784	0.86216	43.63
	Totals:	6,779,701			

Kentucky - American Water Company

Account 333.000 - Services

Placement Band - 1934 - 2022 Experience Band - 1999 - 2022

Actual and Smooth Survivor Curves



Kentucky - American Water Company

Account 333.000 - Services

Placement Band - 1934 - 2022   Experience Band - 1999 - 2022

RETIREMENT RATE ANALYSIS

Age at Begin of Interval	Exposures at Beginning of Age Interval	Retirements During Age Interval	Retmt Ratio	Survivor Ratio	% Surviving
0	68,270,249	1,271,510	0.01862	0.98138	100.00
0.5	64,128,436	33,978	0.00053	0.99947	98.14
1.5	60,519,698	20,920	0.00035	0.99965	98.09
2.5	59,246,273	27,783	0.00047	0.99953	98.06
3.5	56,659,691	23,797	0.00042	0.99958	98.01
4.5	54,206,473	36,415	0.00067	0.99933	97.97
5.5	52,934,169	33,257	0.00063	0.99937	97.90
6.5	51,764,061	50,402	0.00097	0.99903	97.84
7.5	50,786,645	34,275	0.00067	0.99933	97.75
8.5	49,931,960	31,002	0.00062	0.99938	97.68
9.5	48,820,185	58,577	0.00120	0.99880	97.62
10.5	46,441,821	85,007	0.00183	0.99817	97.50
11.5	44,682,959	62,107	0.00139	0.99861	97.32
12.5	42,766,761	181,861	0.00425	0.99575	97.18
13.5	38,788,298	89,713	0.00231	0.99769	96.77
14.5	36,164,922	42,908	0.00119	0.99881	96.55
15.5	34,972,003	38,976	0.00111	0.99889	96.44
16.5	30,031,672	51,982	0.00173	0.99827	96.33
17.5	29,979,690	12,053	0.00040	0.99960	96.16
18.5	29,888,555	54,306	0.00182	0.99818	96.12
19.5	29,795,177	8,234	0.00028	0.99972	95.95
20.5	29,773,322	15,708	0.00053	0.99947	95.92
21.5	20,556,218	6,100	0.00030	0.99970	95.87
22.5	18,616,020	9,010	0.00048	0.99952	95.84
23.5	16,941,372	25,807	0.00152	0.99848	95.79
24.5	15,475,320	9,765	0.00063	0.99937	95.64
25.5	14,489,988	76,511	0.00528	0.99472	95.58
26.5	13,371,581	143,700	0.01075	0.98925	95.08

Kentucky - American Water Company

Account 333.000 - Services

Placement Band - 1934 - 2022   Experience Band - 1999 - 2022

27.5	12,278,870	89,440	0.00728	0.99272	94.06
28.5	11,329,256	17,840	0.00157	0.99843	93.38
29.5	10,539,012	3,222	0.00031	0.99969	93.23
30.5	9,606,879	8,116	0.00084	0.99916	93.20
31.5	8,854,626	2,672	0.00030	0.99970	93.12
32.5	8,096,482	39,450	0.00487	0.99513	93.09
33.5	7,266,337	1,201	0.00017	0.99983	92.64
34.5	6,635,167	11,014	0.00166	0.99834	92.62
35.5	5,979,176	10,226	0.00171	0.99829	92.47
36.5	5,411,068	10,354	0.00191	0.99809	92.31
37.5	4,940,765	5,612	0.00114	0.99886	92.13
38.5	4,602,684	82,656	0.01796	0.98204	92.02
39.5	4,275,015	4,864	0.00114	0.99886	90.37
40.5	4,000,627	11,335	0.00283	0.99717	90.27
41.5	3,824,459	7,813	0.00204	0.99796	90.01
42.5	3,524,260	19,325	0.00548	0.99452	89.83
43.5	3,182,221	14,478	0.00455	0.99545	89.34
44.5	2,871,946	9,117	0.00317	0.99683	88.93
45.5	2,568,607	21,403	0.00833	0.99167	88.65
46.5	2,347,852	126,631	0.05393	0.94607	87.91
47.5	2,148,976	263,994	0.12285	0.87715	83.17
48.5	1,789,742	63,078	0.03524	0.96476	72.95
49.5	1,689,309	96,738	0.05726	0.94274	70.38
50.5	1,483,377	110,768	0.07467	0.92533	66.35
51.5	1,332,729	75,180	0.05641	0.94359	61.40
52.5	1,196,017	79,367	0.06636	0.93364	57.94
53.5	1,033,912	47,000	0.04546	0.95454	54.10
54.5	922,408	144,624	0.15679	0.84321	51.64
55.5	763,491	113,992	0.14930	0.85070	43.54
56.5	617,420	117,754	0.19072	0.80928	37.04
57.5	487,231	79,567	0.16330	0.83670	29.98

Kentucky - American Water Company

Account 333.000 - Services

Placement Band - 1934 - 2022   Experience Band - 1999 - 2022

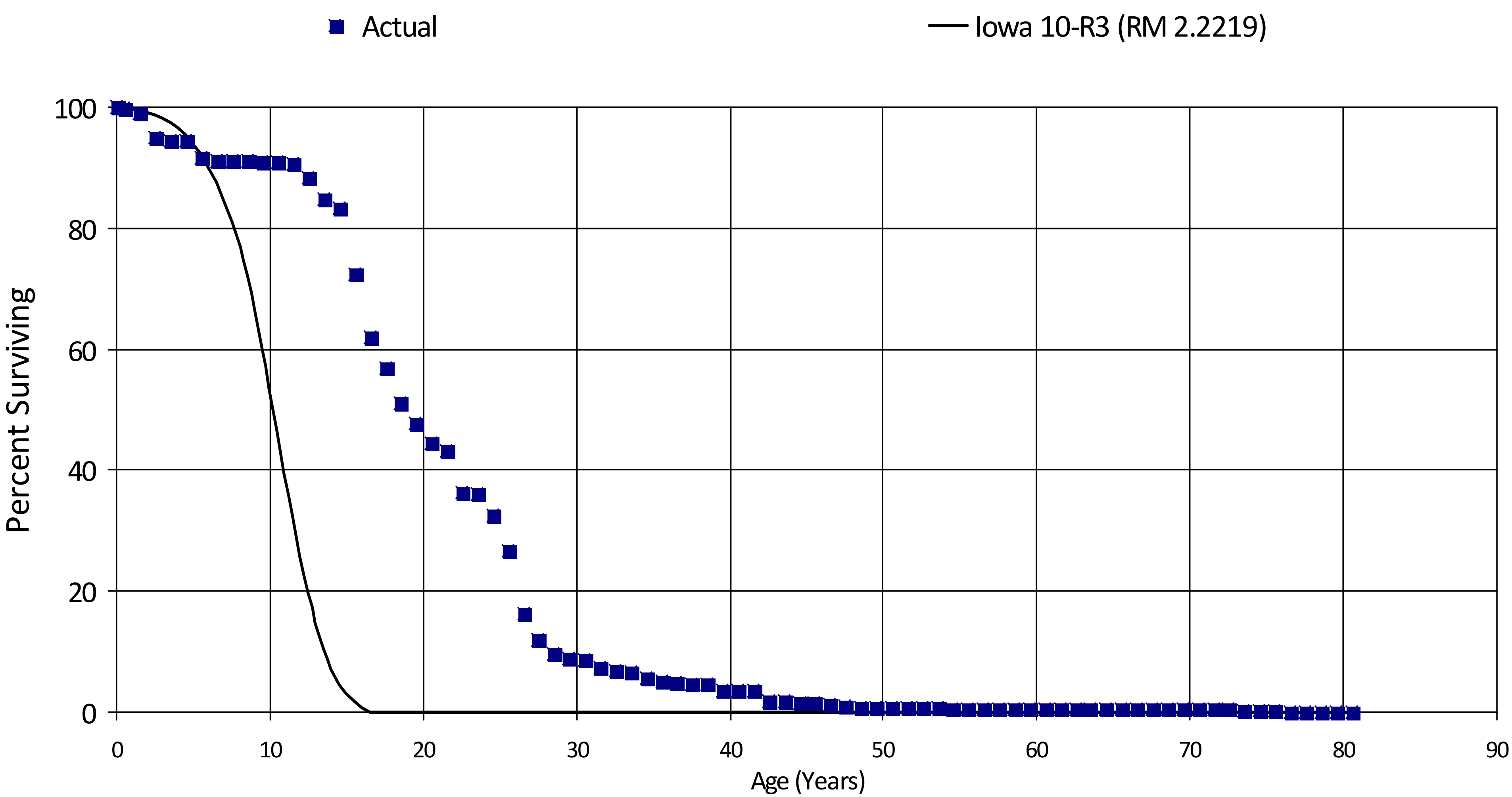
58.5	402,821	42,473	0.10544	0.89456	25.08
59.5	352,665	22,136	0.06277	0.93723	22.44
60.5	289,901	66,502	0.22940	0.77060	21.03
61.5	218,135	26,566	0.12179	0.87821	16.21
62.5	184,574	24,371	0.13204	0.86796	14.24
63.5	159,342	24,493	0.15371	0.84629	12.36
64.5	130,952	12,641	0.09653	0.90347	10.46
65.5	115,977	6,478	0.05586	0.94414	9.45
66.5	108,441	2,470	0.02278	0.97722	8.92
67.5	105,135	826	0.00786	0.99214	8.72
68.5	104,309	2,596	0.02489	0.97511	8.65
69.5	101,222	2,349	0.02321	0.97679	8.43
70.5	98,874	3,258	0.03295	0.96705	8.23
71.5	95,616	723	0.00756	0.99244	7.96
72.5	94,893	3,345	0.03525	0.96475	7.90
73.5	91,547	567	0.00619	0.99381	7.62
74.5	90,981	210	0.00231	0.99769	7.57
75.5	90,771	32,156	0.35426	0.64574	7.55
76.5	58,333	49,860	0.85474	0.14526	4.88
77.5	8,474	2,728	0.32194	0.67806	0.71
78.5	5,745	2	0.00035	0.99965	0.48
79.5	5,743	228	0.03970	0.96030	0.48
80.5	4,711	3,358	0.71274	0.28726	0.46
81.5	1,283	0	0.00000	1.00000	0.13
82.5	1,123	12	0.01068	0.98932	0.13
83.5	1,030	298	0.28931	0.71069	0.13
84.5	732	217	0.29637	0.70363	0.09
85.5	515	4	0.00777	0.99223	0.06
86.5	511	0	0.00000	1.00000	0.06
87.5	511	0	0.00000	1.00000	0.06
	Totals:	4,555,362			

Kentucky - American Water Company

Account 334.100 - Meters

Placement Band - 1934 - 2022   Experience Band - 2005 - 2022

Actual and Smooth Survivor Curves



Kentucky - American Water Company

Account 334.100 - Meters

Placement Band - 1934 - 2022   Experience Band - 2005 - 2022

RETIREMENT RATE ANALYSIS

Age at Begin of Interval	Exposures at Beginning of Age Interval	Retirements During Age Interval	Retmt Ratio	Survivor Ratio	% Surviving
0	29,887,497	106,534	0.00356	0.99644	100.00
0.5	26,248,655	178,664	0.00681	0.99319	99.64
1.5	24,706,702	1,009,616	0.04086	0.95914	98.96
2.5	23,007,960	146,397	0.00636	0.99364	94.92
3.5	19,548,393	4,666	0.00024	0.99976	94.32
4.5	15,797,160	450,645	0.02853	0.97147	94.30
5.5	15,311,918	72,863	0.00476	0.99524	91.61
6.5	15,181,939	1,158	0.00008	0.99992	91.17
7.5	14,971,972	26,340	0.00176	0.99824	91.16
8.5	14,618,281	12,413	0.00085	0.99915	91.00
9.5	12,673,043	9,291	0.00073	0.99927	90.92
10.5	10,181,522	34,018	0.00334	0.99666	90.85
11.5	4,837,455	118,862	0.02457	0.97543	90.55
12.5	2,456,868	98,349	0.04003	0.95997	88.33
13.5	1,889,863	36,191	0.01915	0.98085	84.79
14.5	560,584	72,737	0.12975	0.87025	83.17
15.5	487,847	69,821	0.14312	0.85688	72.38
16.5	403,512	33,316	0.08257	0.91743	62.02
17.5	370,197	38,399	0.10373	0.89627	56.90
18.5	331,798	20,802	0.06269	0.93731	51.00
19.5	281,085	19,808	0.07047	0.92953	47.80
20.5	204,654	5,331	0.02605	0.97395	44.43
21.5	199,323	32,212	0.16161	0.83839	43.27
22.5	167,111	857	0.00513	0.99487	36.28
23.5	166,253	16,454	0.09897	0.90103	36.09
24.5	149,800	27,025	0.18041	0.81959	32.52
25.5	122,775	47,898	0.39013	0.60987	26.65
26.5	74,877	20,140	0.26897	0.73103	16.25

Kentucky - American Water Company

Account 334.100 - Meters

Placement Band - 1934 - 2022 Experience Band - 2005 - 2022

27.5	54,737	9,769	0.17847	0.82153	11.88
28.5	44,968	3,565	0.07928	0.92072	9.76
29.5	41,403	1,563	0.03775	0.96225	8.99
30.5	39,841	5,414	0.13589	0.86411	8.65
31.5	34,427	3,110	0.09034	0.90966	7.47
32.5	31,317	407	0.01300	0.98700	6.80
33.5	30,910	5,665	0.18327	0.81673	6.71
34.5	23,148	1,466	0.06333	0.93667	5.48
35.5	21,682	1,770	0.08163	0.91837	5.13
36.5	18,456	66	0.00358	0.99642	4.71
37.5	18,390	0	0.00000	1.00000	4.69
38.5	18,390	3,996	0.21729	0.78271	4.69
39.5	14,394	503	0.03494	0.96506	3.67
40.5	13,891	47	0.00338	0.99662	3.54
41.5	13,844	6,567	0.47436	0.52564	3.53
42.5	7,277	0	0.00000	1.00000	1.86
43.5	7,277	1,452	0.19953	0.80047	1.86
44.5	5,825	60	0.01030	0.98970	1.49
45.5	5,765	874	0.15160	0.84840	1.47
46.5	4,891	1,131	0.23122	0.76878	1.25
47.5	3,761	870	0.23132	0.76868	0.96
48.5	2,891	184	0.06364	0.93636	0.74
49.5	2,708	0	0.00000	1.00000	0.69
50.5	2,708	0	0.00000	1.00000	0.69
51.5	2,708	0	0.00000	1.00000	0.69
52.5	2,708	0	0.00000	1.00000	0.69
53.5	2,708	685	0.25299	0.74701	0.69
54.5	2,023	0	0.00000	1.00000	0.52
55.5	2,023	0	0.00000	1.00000	0.52
56.5	2,023	0	0.00000	1.00000	0.52
57.5	2,023	0	0.00000	1.00000	0.52

Kentucky - American Water Company

Account 334.100 - Meters

Placement Band - 1934 - 2022   Experience Band - 2005 - 2022

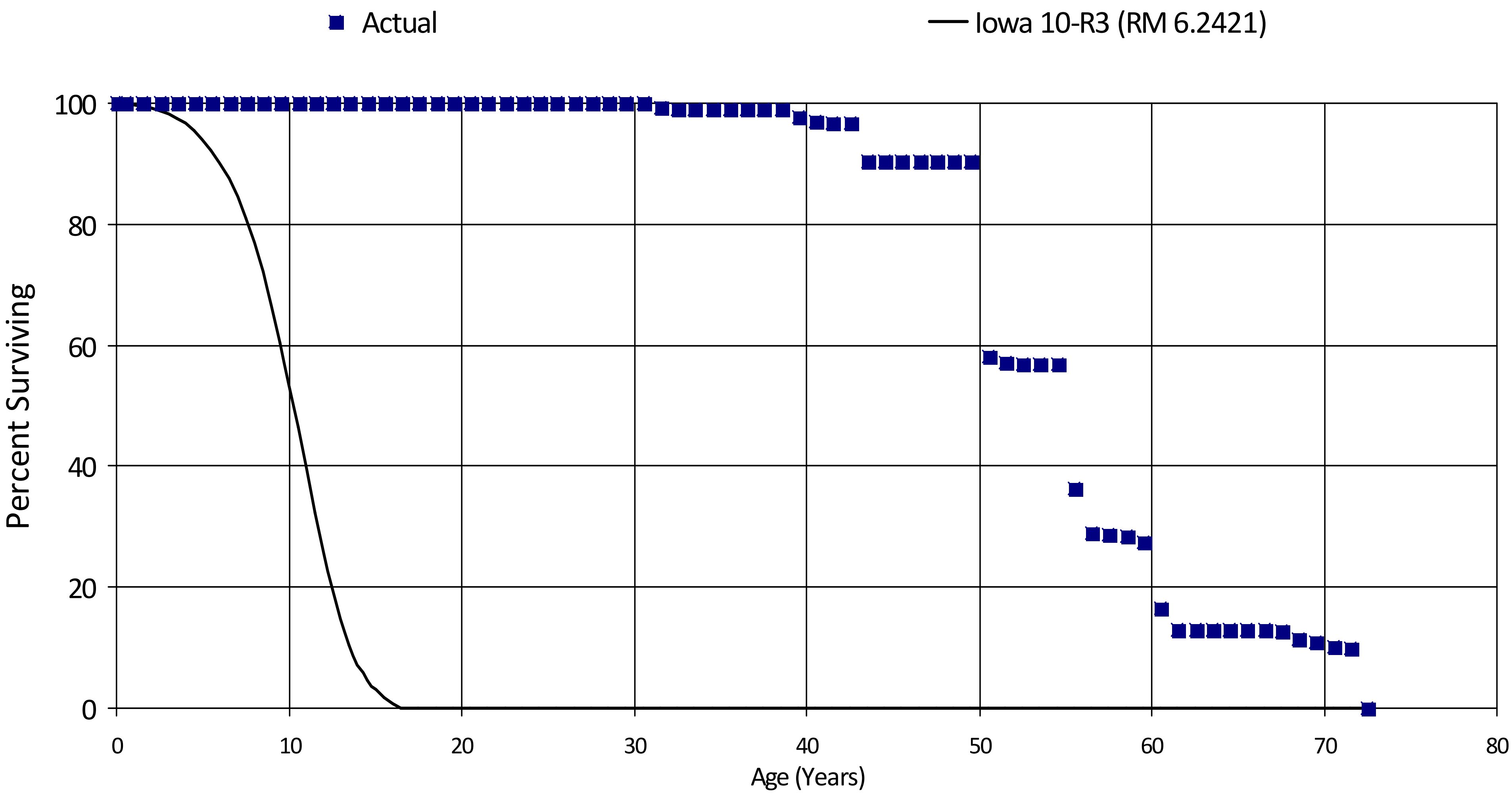
58.5	2,023	152	0.07514	0.92486	0.52
59.5	1,871	0	0.00000	1.00000	0.48
60.5	1,871	0	0.00000	1.00000	0.48
61.5	1,871	0	0.00000	1.00000	0.48
62.5	1,871	0	0.00000	1.00000	0.48
63.5	1,871	0	0.00000	1.00000	0.48
64.5	1,871	0	0.00000	1.00000	0.48
65.5	1,871	0	0.00000	1.00000	0.48
66.5	1,871	0	0.00000	1.00000	0.48
67.5	1,871	0	0.00000	1.00000	0.48
68.5	1,871	137	0.07322	0.92678	0.48
69.5	1,734	0	0.00000	1.00000	0.44
70.5	1,734	76	0.04383	0.95617	0.44
71.5	1,658	0	0.00000	1.00000	0.42
72.5	1,658	709	0.42767	0.57233	0.42
73.5	949	8	0.00843	0.99157	0.24
74.5	941	186	0.19772	0.80228	0.24
75.5	755	629	0.83334	0.16666	0.19
76.5	125	32	0.25524	0.74476	0.03
77.5	94	46	0.49072	0.50928	0.02
78.5	47	0	0.00000	1.00000	0.01
79.5	47	47	0.99073	0.00927	0.01
80.5	0	0	0.00000	0.00000	0.00
	Totals:	2,761,993			

Kentucky - American Water Company

Account 334.110 - Meters - Bronze Case

Placement Band - 1934 - 2022   Experience Band - 2002 - 2022

Actual and Smooth Survivor Curves



Kentucky - American Water Company

Account 334.110 - Meters - Bronze Case

Placement Band - 1934 - 2022   Experience Band - 2002 - 2022

RETIREMENT RATE ANALYSIS

Age at Begin of Interval	Exposures at Beginning of Age Interval	Retirements During Age Interval	Retmt Ratio	Survivor Ratio	% Surviving
0	2,456,523	0	0.00000	1.00000	100.00
0.5	2,456,523	0	0.00000	1.00000	100.00
1.5	2,456,523	0	0.00000	1.00000	100.00
2.5	2,456,523	0	0.00000	1.00000	100.00
3.5	2,296,766	0	0.00000	1.00000	100.00
4.5	2,296,766	0	0.00000	1.00000	100.00
5.5	2,296,766	0	0.00000	1.00000	100.00
6.5	2,296,766	0	0.00000	1.00000	100.00
7.5	2,296,766	1	0.00000	1.00000	100.00
8.5	2,296,766	0	0.00000	1.00000	100.00
9.5	2,296,766	0	0.00000	1.00000	100.00
10.5	2,296,766	0	0.00000	1.00000	100.00
11.5	2,296,766	0	0.00000	1.00000	100.00
12.5	2,296,766	0	0.00000	1.00000	100.00
13.5	2,033,021	0	0.00000	1.00000	100.00
14.5	66,031	0	0.00000	1.00000	100.00
15.5	65,592	0	0.00000	1.00000	100.00
16.5	27,730	0	0.00000	1.00000	100.00
17.5	27,730	0	0.00000	1.00000	100.00
18.5	27,730	0	0.00000	1.00000	100.00
19.5	27,730	0	0.00000	1.00000	100.00
20.5	27,730	0	0.00000	1.00000	100.00
21.5	27,730	0	0.00000	1.00000	100.00
22.5	27,730	0	0.00000	1.00000	100.00
23.5	27,730	0	0.00000	1.00000	100.00
24.5	27,730	0	0.00000	1.00000	100.00
25.5	27,730	0	0.00000	1.00000	100.00
26.5	27,730	0	0.00000	1.00000	100.00

Kentucky - American Water Company

Account 334.110 - Meters - Bronze Case

Placement Band - 1934 - 2022   Experience Band - 2002 - 2022

27.5	27,730	0	0.00000	1.00000	100.00
28.5	27,730	0	0.00000	1.00000	100.00
29.5	27,730	0	0.00000	1.00000	100.00
30.5	27,730	226	0.00815	0.99185	100.00
31.5	27,504	25	0.00091	0.99909	99.18
32.5	27,479	0	0.00000	1.00000	99.09
33.5	27,479	0	0.00000	1.00000	99.09
34.5	27,479	0	0.00000	1.00000	99.09
35.5	27,479	0	0.00000	1.00000	99.09
36.5	27,479	0	0.00000	1.00000	99.09
37.5	27,479	0	0.00000	1.00000	99.09
38.5	27,479	395	0.01437	0.98563	99.09
39.5	27,084	231	0.00853	0.99147	97.67
40.5	26,853	33	0.00123	0.99877	96.84
41.5	26,820	0	0.00000	1.00000	96.72
42.5	26,820	1,779	0.06633	0.93367	96.72
43.5	25,041	0	0.00000	1.00000	90.30
44.5	25,041	0	0.00000	1.00000	90.30
45.5	25,041	0	0.00000	1.00000	90.30
46.5	25,041	15	0.00060	0.99940	90.30
47.5	25,026	0	0.00000	1.00000	90.25
48.5	25,026	0	0.00000	1.00000	90.25
49.5	25,026	8,937	0.35710	0.64290	90.25
50.5	16,089	244	0.01517	0.98483	58.02
51.5	15,845	51	0.00322	0.99678	57.14
52.5	15,794	22	0.00139	0.99861	56.96
53.5	15,772	0	0.00000	1.00000	56.88
54.5	15,772	5,680	0.36013	0.63987	56.88
55.5	10,092	2,074	0.20551	0.79449	36.40
56.5	8,018	76	0.00948	0.99052	28.92
57.5	7,941	55	0.00693	0.99307	28.65

Kentucky - American Water Company

Account 334.110 - Meters - Bronze Case

Placement Band - 1934 - 2022 Experience Band - 2002 - 2022

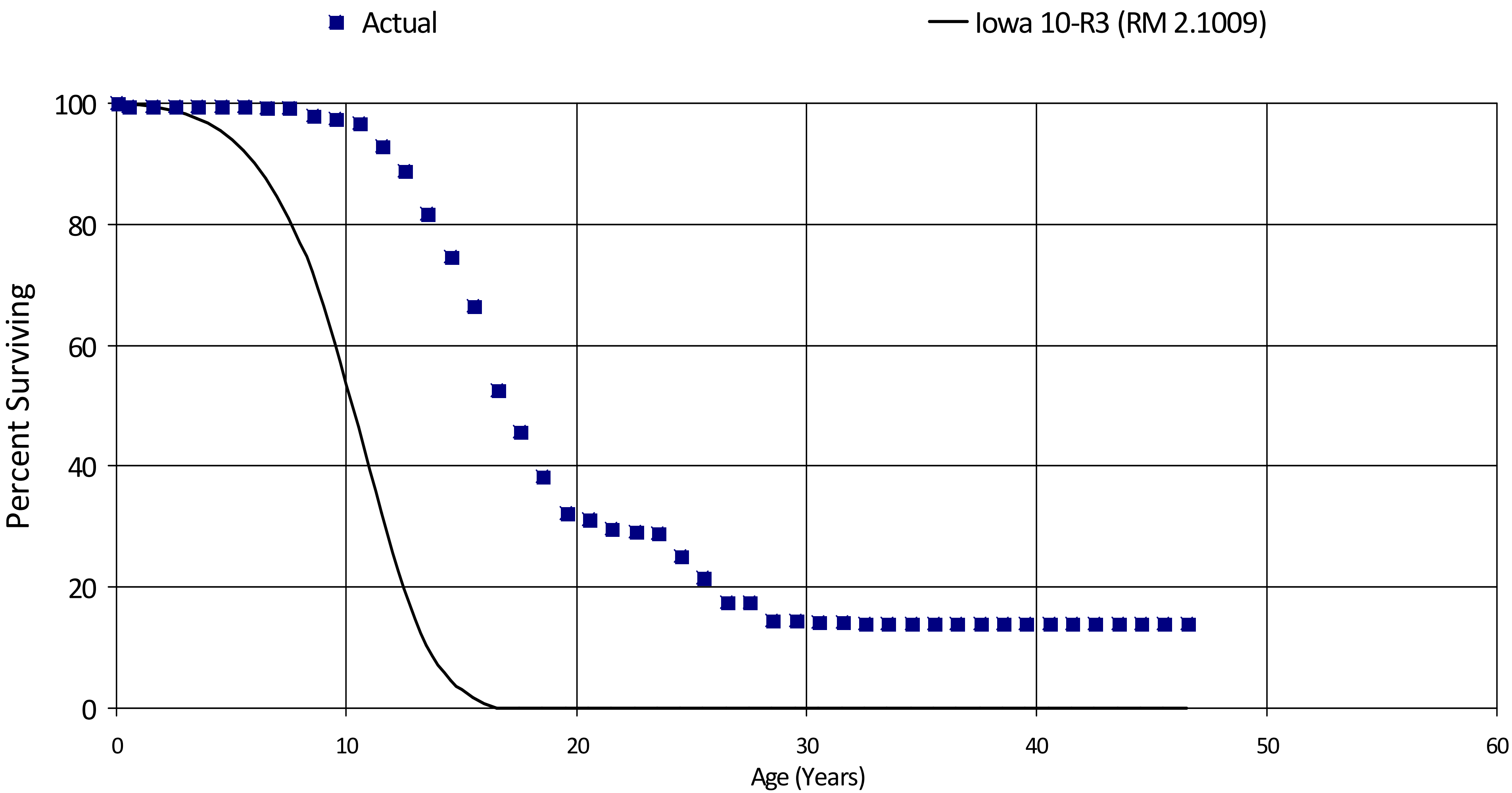
58.5	7,887	273	0.03461	0.96539	28.45
59.5	7,614	3,031	0.39809	0.60191	27.47
60.5	4,583	960	0.20947	0.79053	16.53
61.5	3,623	54	0.01490	0.98510	13.07
62.5	3,569	0	0.00000	1.00000	12.88
63.5	3,569	0	0.00000	1.00000	12.88
64.5	3,569	0	0.00000	1.00000	12.88
65.5	3,569	8	0.00224	0.99776	12.88
66.5	3,561	11	0.00309	0.99691	12.85
67.5	3,550	356	0.10029	0.89971	12.81
68.5	3,194	167	0.05229	0.94771	11.53
69.5	3,027	212	0.07003	0.92997	10.93
70.5	2,815	95	0.03374	0.96626	10.16
71.5	2,721	2,721	1.00004	-0.00004	9.82
72.5	0	0	0.00000	0.00000	0.00
	Totals:	27,732			

Kentucky - American Water Company

Account 334.120 - Meters - Plastic Case

Placement Band - 1972 - 2022   Experience Band - 1999 - 2022

Actual and Smooth Survivor Curves



Kentucky - American Water Company

Account 334.120 - Meters - Plastic Case

Placement Band - 1972 - 2022   Experience Band - 1999 - 2022

RETIREMENT RATE ANALYSIS

Age at Begin of Interval	Exposures at Beginning of Age Interval	Retirements During Age Interval	Retmt Ratio	Survivor Ratio	% Surviving
0	1,625,831	8,627	0.00531	0.99469	100.00
0.5	1,617,204	0	0.00000	1.00000	99.47
1.5	1,608,934	0	0.00000	1.00000	99.47
2.5	1,608,281	0	0.00000	1.00000	99.47
3.5	1,536,246	375	0.00024	0.99976	99.47
4.5	1,535,871	587	0.00038	0.99962	99.45
5.5	1,535,284	748	0.00049	0.99951	99.41
6.5	1,534,536	2,260	0.00147	0.99853	99.36
7.5	1,532,276	19,380	0.01265	0.98735	99.21
8.5	1,496,693	8,883	0.00594	0.99406	97.95
9.5	1,481,994	11,607	0.00783	0.99217	97.37
10.5	1,470,388	56,364	0.03833	0.96167	96.61
11.5	1,414,024	60,384	0.04270	0.95730	92.91
12.5	1,353,640	108,398	0.08008	0.91992	88.94
13.5	1,245,242	109,772	0.08815	0.91185	81.82
14.5	1,135,470	121,602	0.10709	0.89291	74.61
15.5	1,009,703	212,627	0.21058	0.78942	66.62
16.5	797,076	104,084	0.13058	0.86942	52.59
17.5	692,992	110,545	0.15952	0.84048	45.72
18.5	582,447	92,128	0.15817	0.84183	38.43
19.5	490,319	18,292	0.03731	0.96269	32.35
20.5	472,027	20,838	0.04415	0.95585	31.14
21.5	168,806	3,401	0.02015	0.97985	29.77
22.5	165,405	1,583	0.00957	0.99043	29.17
23.5	163,822	20,941	0.12783	0.87217	28.89
24.5	142,881	20,411	0.14285	0.85715	25.20
25.5	113,206	21,354	0.18863	0.81137	21.60
26.5	91,852	125	0.00136	0.99864	17.53

Kentucky - American Water Company

Account 334.120 - Meters - Plastic Case

Placement Band - 1972 - 2022   Experience Band - 1999 - 2022

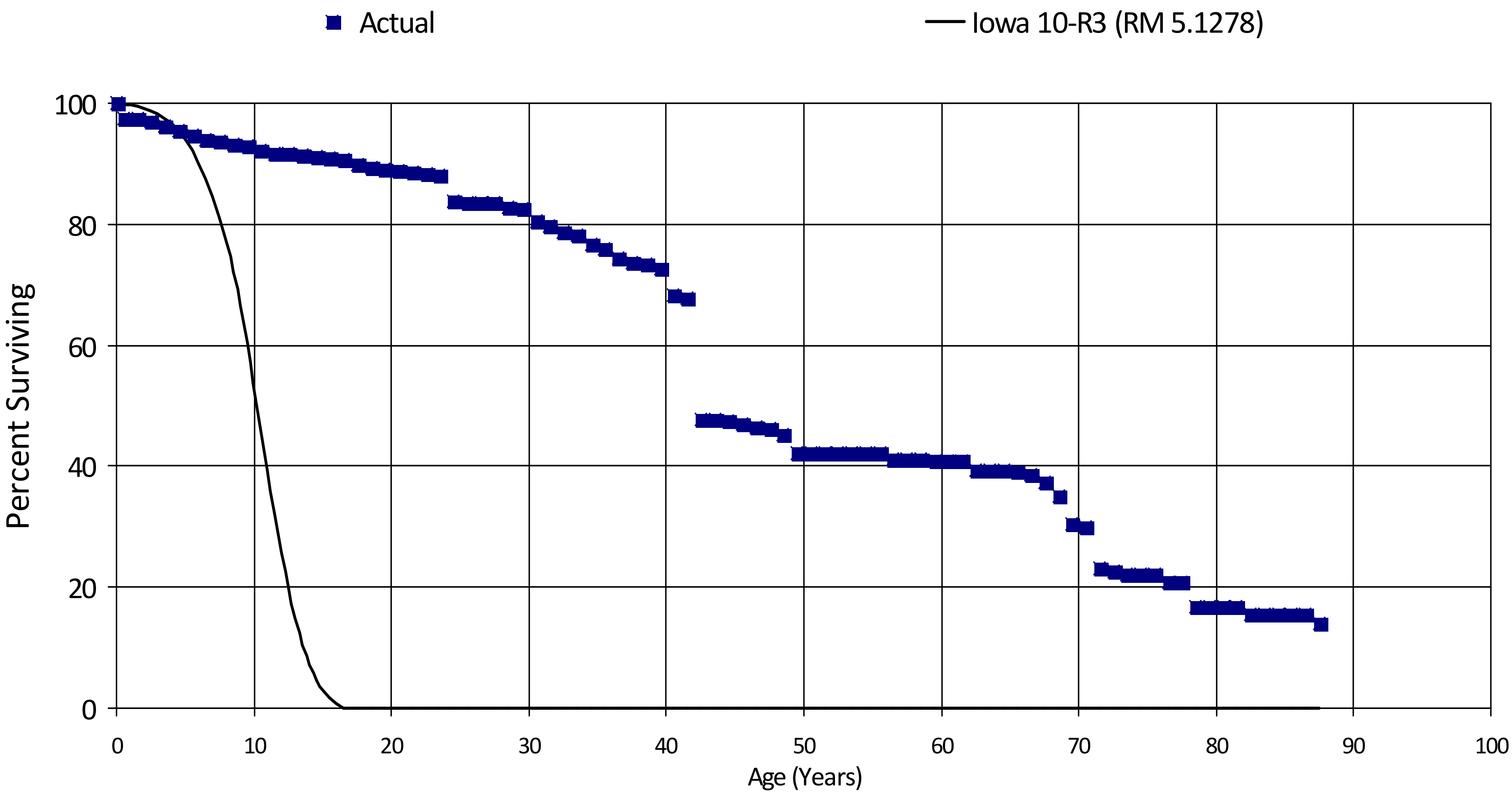
27.5	79,793	14,030	0.17583	0.82417	17.51
28.5	20,459	59	0.00288	0.99712	14.43
29.5	13,790	117	0.00848	0.99152	14.39
30.5	11,792	143	0.01213	0.98787	14.27
31.5	11,649	31	0.00266	0.99734	14.10
32.5	11,618	0	0.00000	1.00000	14.06
33.5	8,265	67	0.00811	0.99189	14.06
34.5	6,487	0	0.00000	1.00000	13.95
35.5	5,550	0	0.00000	1.00000	13.95
36.5	4,496	0	0.00000	1.00000	13.95
37.5	1,320	0	0.00000	1.00000	13.95
38.5	1,282	0	0.00000	1.00000	13.95
39.5	1,173	0	0.00000	1.00000	13.95
40.5	1,173	0	0.00000	1.00000	13.95
41.5	708	0	0.00000	1.00000	13.95
42.5	708	0	0.00000	1.00000	13.95
43.5	601	0	0.00000	1.00000	13.95
44.5	601	0	0.00000	1.00000	13.95
45.5	304	0	0.00000	1.00000	13.95
46.5	0	0	0.00000	0.00000	13.95
	Totals:	1,149,763			

Kentucky - American Water Company

Account 334.130 - Meters - Other

Placement Band - 1934 - 2022   Experience Band - 1999 - 2022

Actual and Smooth Survivor Curves



Kentucky - American Water Company

Account 334.130 - Meters - Other

Placement Band - 1934 - 2022   Experience Band - 1999 - 2022

RETIREMENT RATE ANALYSIS

Age at Begin of Interval	Exposures at Beginning of Age Interval	Retirements During Age Interval	Retmt Ratio	Survivor Ratio	% Surviving
0	7,442,913	195,128	0.02622	0.97378	100.00
0.5	7,247,786	2,910	0.00040	0.99960	97.38
1.5	7,244,876	30,867	0.00426	0.99574	97.34
2.5	7,214,009	51,498	0.00714	0.99286	96.93
3.5	6,985,463	64,449	0.00923	0.99077	96.24
4.5	6,921,014	47,152	0.00681	0.99319	95.35
5.5	6,873,862	51,500	0.00749	0.99251	94.70
6.5	6,822,362	33,290	0.00488	0.99512	93.99
7.5	6,789,073	25,520	0.00376	0.99624	93.53
8.5	6,763,552	30,040	0.00444	0.99556	93.18
9.5	6,733,512	41,747	0.00620	0.99380	92.77
10.5	6,691,765	32,166	0.00481	0.99519	92.19
11.5	6,659,599	10,588	0.00159	0.99841	91.75
12.5	6,649,011	15,337	0.00231	0.99769	91.60
13.5	6,486,248	20,955	0.00323	0.99677	91.39
14.5	6,445,290	9,987	0.00155	0.99845	91.09
15.5	6,367,779	17,591	0.00276	0.99724	90.95
16.5	1,030,448	10,217	0.00992	0.99008	90.70
17.5	1,020,231	6,387	0.00626	0.99374	89.80
18.5	995,793	2,627	0.00264	0.99736	89.24
19.5	942,658	2,074	0.00220	0.99780	89.00
20.5	940,583	2,022	0.00215	0.99785	88.80
21.5	938,561	3,702	0.00394	0.99606	88.61
22.5	636,191	924	0.00145	0.99855	88.26
23.5	532,466	27,029	0.05076	0.94924	88.13
24.5	333,179	443	0.00133	0.99867	83.66
25.5	206,250	149	0.00072	0.99928	83.55
26.5	114,391	0	0.00000	1.00000	83.49

Kentucky - American Water Company

Account 334.130 - Meters - Other

Placement Band - 1934 - 2022   Experience Band - 1999 - 2022

27.5	105,365	969	0.00920	0.99080	83.49
28.5	94,387	321	0.00340	0.99660	82.72
29.5	85,483	2,140	0.02503	0.97497	82.44
30.5	73,824	568	0.00769	0.99231	80.38
31.5	73,256	921	0.01257	0.98743	79.76
32.5	69,755	586	0.00840	0.99160	78.76
33.5	64,922	1,211	0.01865	0.98135	78.10
34.5	61,530	701	0.01139	0.98861	76.64
35.5	60,672	1,049	0.01729	0.98271	75.77
36.5	52,932	654	0.01236	0.98764	74.46
37.5	45,716	138	0.00302	0.99698	73.54
38.5	45,578	390	0.00856	0.99144	73.32
39.5	44,811	2,667	0.05952	0.94048	72.69
40.5	42,145	406	0.00963	0.99037	68.36
41.5	41,178	12,229	0.29698	0.70302	67.70
42.5	27,219	0	0.00000	1.00000	47.59
43.5	27,219	124	0.00456	0.99544	47.59
44.5	25,607	227	0.00886	0.99114	47.37
45.5	24,785	315	0.01271	0.98729	46.95
46.5	24,470	98	0.00400	0.99600	46.35
47.5	24,372	460	0.01887	0.98113	46.16
48.5	23,912	1,639	0.06854	0.93146	45.29
49.5	22,273	0	0.00000	1.00000	42.19
50.5	22,273	0	0.00000	1.00000	42.19
51.5	21,156	30	0.00142	0.99858	42.19
52.5	21,126	0	0.00000	1.00000	42.13
53.5	21,126	0	0.00000	1.00000	42.13
54.5	21,126	0	0.00000	1.00000	42.13
55.5	17,744	474	0.02671	0.97329	42.13
56.5	14,581	0	0.00000	1.00000	41.00
57.5	11,952	0	0.00000	1.00000	41.00

Kentucky - American Water Company

Account 334.130 - Meters - Other

Placement Band - 1934 - 2022   Experience Band - 1999 - 2022

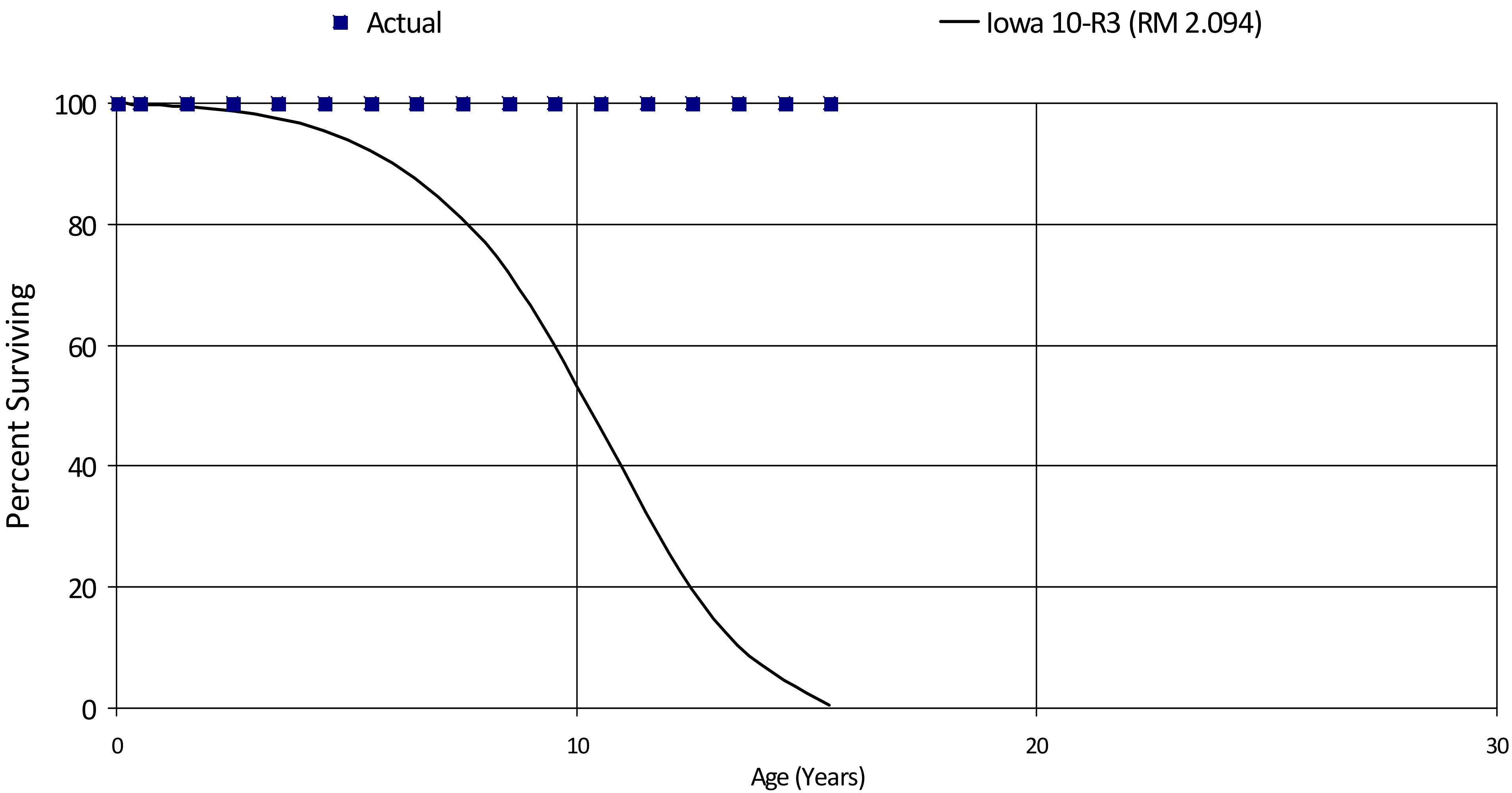
58.5	11,398	25	0.00219	0.99781	41.00
59.5	9,758	0	0.00000	1.00000	40.91
60.5	9,424	0	0.00000	1.00000	40.91
61.5	8,642	330	0.03819	0.96181	40.91
62.5	7,180	0	0.00000	1.00000	39.35
63.5	6,351	3	0.00047	0.99953	39.35
64.5	6,253	31	0.00496	0.99504	39.33
65.5	5,656	96	0.01697	0.98303	39.13
66.5	4,646	144	0.03099	0.96901	38.47
67.5	4,503	258	0.05730	0.94270	37.28
68.5	3,678	495	0.13460	0.86540	35.14
69.5	2,654	43	0.01620	0.98380	30.41
70.5	2,553	590	0.23106	0.76894	29.92
71.5	1,529	36	0.02354	0.97646	23.01
72.5	1,430	22	0.01538	0.98462	22.47
73.5	1,409	0	0.00000	1.00000	22.12
74.5	1,409	0	0.00000	1.00000	22.12
75.5	1,409	76	0.05394	0.94606	22.12
76.5	1,242	0	0.00000	1.00000	20.93
77.5	1,242	246	0.19801	0.80199	20.93
78.5	997	0	0.00000	1.00000	16.79
79.5	997	0	0.00000	1.00000	16.79
80.5	997	0	0.00000	1.00000	16.79
81.5	723	51	0.07058	0.92942	16.79
82.5	672	0	0.00000	1.00000	15.60
83.5	602	0	0.00000	1.00000	15.60
84.5	602	0	0.00000	1.00000	15.60
85.5	483	0	0.00000	1.00000	15.60
86.5	299	31	0.10371	0.89629	15.60
87.5	221	0	0.00000	1.00000	13.98
	Totals:	767,093			

Kentucky - American Water Company

Account 334.131 - Meter Reading Units

Placement Band - 2006 - 2022 Experience Band - 2022 - 2022

Actual and Smooth Survivor Curves



Kentucky - American Water Company

Account 334.131 - Meter Reading Units

Placement Band - 2006 - 2022   Experience Band - 2022 - 2022

RETIREMENT RATE ANALYSIS

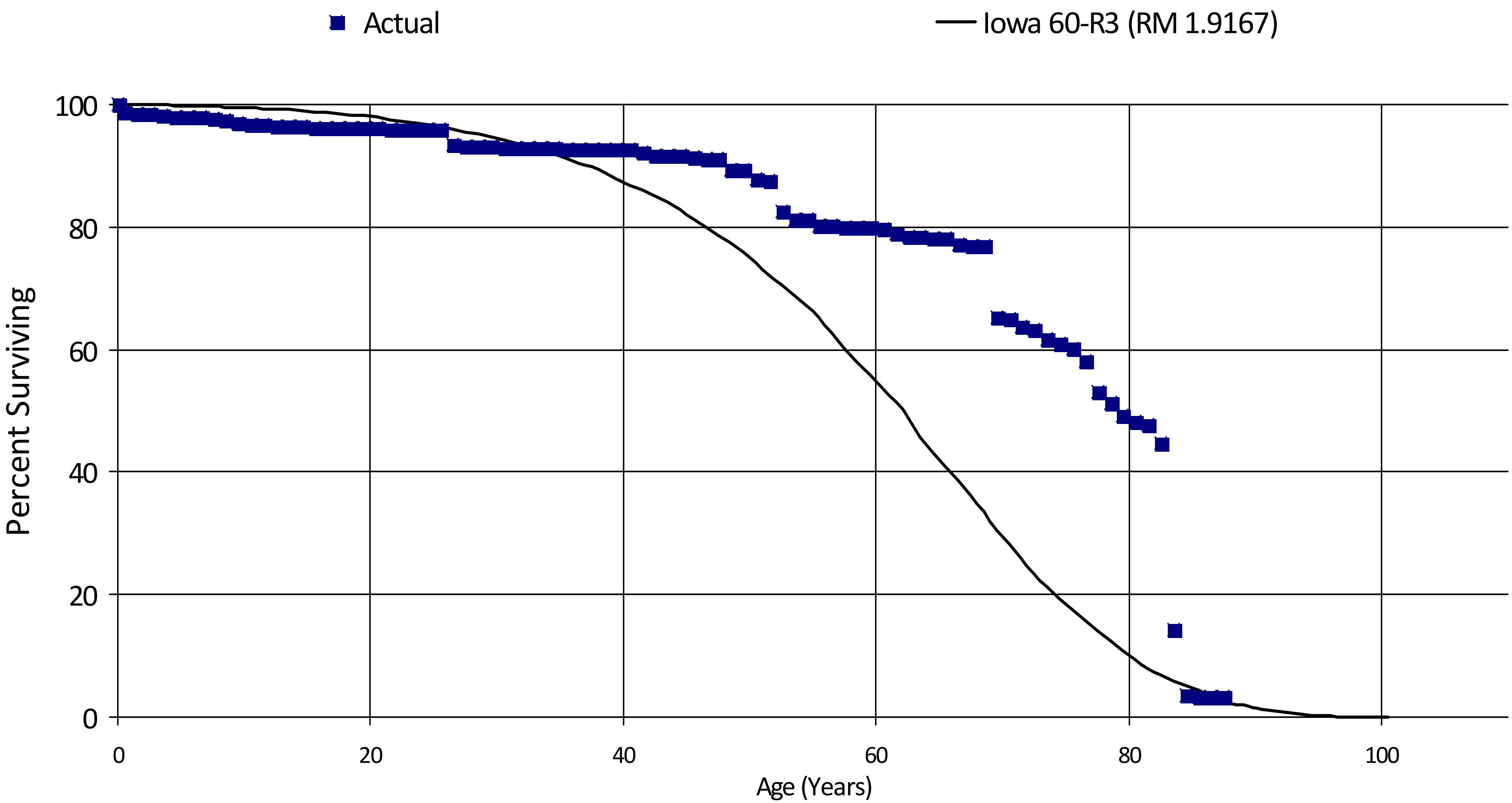
Age at Begin of Interval	Exposures at Beginning of Age Interval	Retirements During Age Interval	Retmt Ratio	Survivor Ratio	% Surviving
0	727,628	0	0.00000	1.00000	100.00
0.5	727,628	0	0.00000	1.00000	100.00
1.5	727,628	0	0.00000	1.00000	100.00
2.5	475,697	0	0.00000	1.00000	100.00
3.5	453,158	0	0.00000	1.00000	100.00
4.5	453,158	0	0.00000	1.00000	100.00
5.5	453,158	0	0.00000	1.00000	100.00
6.5	453,158	0	0.00000	1.00000	100.00
7.5	452,944	0	0.00000	1.00000	100.00
8.5	325,200	0	0.00000	1.00000	100.00
9.5	324,511	0	0.00000	1.00000	100.00
10.5	293,684	0	0.00000	1.00000	100.00
11.5	276,501	0	0.00000	1.00000	100.00
12.5	276,501	0	0.00000	1.00000	100.00
13.5	276,501	0	0.00000	1.00000	100.00
14.5	270,918	0	0.00000	1.00000	100.00
15.5	270,918	0	0.00000	1.00000	100.00
	Totals:	0			

Kentucky - American Water Company

Account 334.200 - Meter Installations

Placement Band - 1934 - 2022   Experience Band - 1999 - 2022

Actual and Smooth Survivor Curves



Kentucky - American Water Company

Account 334.200 - Meter Installations

Placement Band - 1934 - 2022   Experience Band - 1999 - 2022

RETIREMENT RATE ANALYSIS

Age at Begin of Interval	Exposures at Beginning of Age Interval	Retirements During Age Interval	Retmt Ratio	Survivor Ratio	% Surviving
0	33,089,456	435,450	0.01316	0.98684	100.00
0.5	31,257,071	24,191	0.00077	0.99923	98.68
1.5	30,400,541	42,754	0.00141	0.99859	98.60
2.5	29,837,428	73,505	0.00246	0.99754	98.46
3.5	29,347,694	53,903	0.00184	0.99816	98.22
4.5	28,735,144	38,250	0.00133	0.99867	98.04
5.5	26,358,662	6,895	0.00026	0.99974	97.91
6.5	24,318,103	31,561	0.00130	0.99870	97.88
7.5	23,009,660	82,516	0.00359	0.99641	97.75
8.5	21,872,003	91,384	0.00418	0.99582	97.40
9.5	18,478,242	41,881	0.00227	0.99773	96.99
10.5	17,794,243	20,999	0.00118	0.99882	96.77
11.5	17,316,254	17,814	0.00103	0.99897	96.66
12.5	16,431,836	27,189	0.00165	0.99835	96.56
13.5	15,375,350	11,884	0.00077	0.99923	96.40
14.5	15,233,751	7,878	0.00052	0.99948	96.33
15.5	15,062,051	8,741	0.00058	0.99942	96.28
16.5	10,785,143	1,744	0.00016	0.99984	96.22
17.5	10,783,400	4,370	0.00041	0.99959	96.20
18.5	10,779,029	4,834	0.00045	0.99955	96.16
19.5	10,774,196	4,233	0.00039	0.99961	96.12
20.5	10,752,888	7,174	0.00067	0.99933	96.08
21.5	10,737,636	6,039	0.00056	0.99944	96.02
22.5	10,190,910	3,702	0.00036	0.99964	95.97
23.5	9,431,238	6,069	0.00064	0.99936	95.94
24.5	8,905,875	4,672	0.00052	0.99948	95.88
25.5	8,206,821	214,256	0.02611	0.97389	95.83
26.5	7,502,483	10,336	0.00138	0.99862	93.33

27.5	7,144,175	1,969	0.00028	0.99972	93.20
28.5	6,713,141	678	0.00010	0.99990	93.17
29.5	6,222,301	10,743	0.00173	0.99827	93.16
30.5	5,904,835	1,401	0.00024	0.99976	93.00
31.5	5,495,049	4,710	0.00086	0.99914	92.98
32.5	5,136,854	1,903	0.00037	0.99963	92.90
33.5	4,622,876	4,261	0.00092	0.99908	92.87
34.5	4,237,134	2,826	0.00067	0.99933	92.78
35.5	3,795,437	788	0.00021	0.99979	92.72
36.5	3,428,021	377	0.00011	0.99989	92.70
37.5	3,043,213	3,299	0.00108	0.99892	92.69
38.5	2,767,264	740	0.00027	0.99973	92.59
39.5	2,582,926	1,166	0.00045	0.99955	92.57
40.5	2,381,347	11,000	0.00462	0.99538	92.53
41.5	2,200,643	11,540	0.00524	0.99476	92.10
42.5	1,987,199	1,478	0.00074	0.99926	91.62
43.5	1,786,107	474	0.00027	0.99973	91.55
44.5	1,584,875	4,328	0.00273	0.99727	91.53
45.5	1,429,843	3,133	0.00219	0.99781	91.28
46.5	1,327,685	282	0.00021	0.99979	91.08
47.5	1,239,709	23,968	0.01933	0.98067	91.06
48.5	1,080,985	830	0.00077	0.99923	89.30
49.5	1,013,012	15,151	0.01496	0.98504	89.23
50.5	917,832	3,248	0.00354	0.99646	87.90
51.5	861,756	50,824	0.05898	0.94102	87.59
52.5	761,057	10,647	0.01399	0.98601	82.42
53.5	707,867	1,154	0.00163	0.99837	81.27
54.5	650,385	7,159	0.01101	0.98899	81.14
55.5	584,219	842	0.00144	0.99856	80.25
56.5	513,535	1,251	0.00244	0.99756	80.13
57.5	486,391	88	0.00018	0.99982	79.93

Kentucky - American Water Company

Account 334.200 - Meter Installations

Placement Band - 1934 - 2022   Experience Band - 1999 - 2022

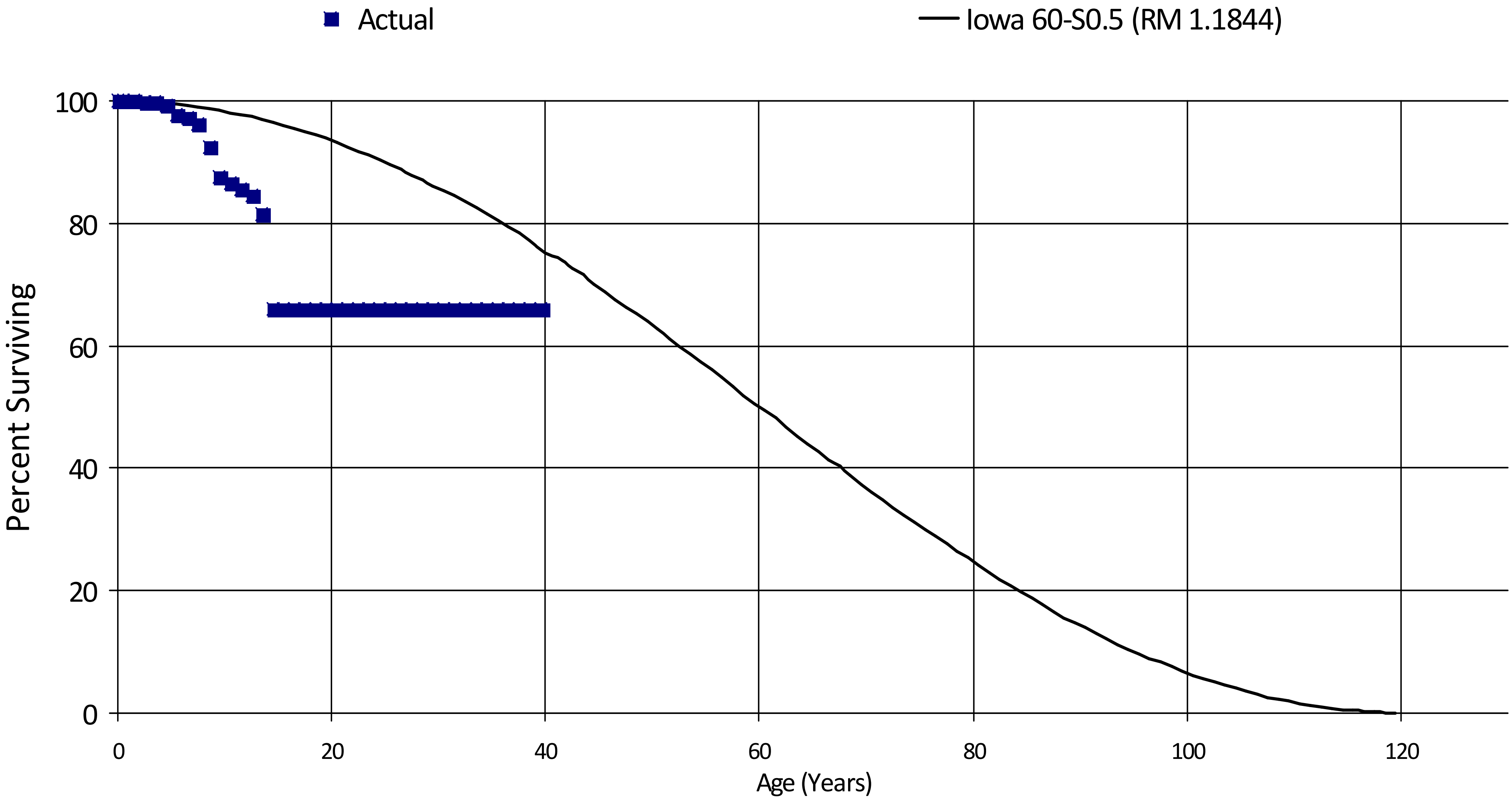
58.5	437,306	292	0.00067	0.99933	79.92
59.5	385,931	918	0.00238	0.99762	79.87
60.5	354,939	3,884	0.01094	0.98906	79.68
61.5	317,139	1,035	0.00326	0.99674	78.81
62.5	283,950	224	0.00079	0.99921	78.55
63.5	268,164	784	0.00292	0.99708	78.49
64.5	244,338	637	0.00261	0.99739	78.26
65.5	210,687	2,330	0.01106	0.98894	78.06
66.5	185,702	678	0.00365	0.99635	77.20
67.5	161,539	242	0.00150	0.99850	76.92
68.5	141,034	21,432	0.15196	0.84804	76.80
69.5	100,044	114	0.00114	0.99886	65.13
70.5	85,238	1,913	0.02244	0.97756	65.06
71.5	74,340	427	0.00574	0.99426	63.60
72.5	72,013	1,875	0.02604	0.97396	63.23
73.5	52,107	647	0.01242	0.98758	61.58
74.5	47,674	590	0.01238	0.98762	60.82
75.5	42,423	1,427	0.03364	0.96636	60.07
76.5	40,845	3,438	0.08417	0.91583	58.05
77.5	37,127	1,378	0.03712	0.96288	53.16
78.5	35,749	1,320	0.03692	0.96308	51.19
79.5	34,429	686	0.01992	0.98008	49.30
80.5	32,802	393	0.01198	0.98802	48.32
81.5	32,062	2,107	0.06572	0.93428	47.74
82.5	29,419	20,097	0.68312	0.31688	44.60
83.5	7,874	5,893	0.74839	0.25161	14.13
84.5	1,982	91	0.04592	0.95408	3.56
85.5	1,891	26	0.01375	0.98625	3.40
86.5	1,804	27	0.01497	0.98503	3.35
87.5	785	40	0.05099	0.94901	3.30
	Totals:	1,541,427			

Kentucky - American Water Company

Account 334.300 - Meter Vaults

Placement Band - 1982 - 2022   Experience Band - 2011 - 2022

Actual and Smooth Survivor Curves



Kentucky - American Water Company

Account 334.300 - Meter Vaults

Placement Band - 1982 - 2022   Experience Band - 2011 - 2022

RETIREMENT RATE ANALYSIS

Age at Begin of Interval	Exposures at Beginning of Age Interval	Retirements During Age Interval	Retmt Ratio	Survivor Ratio	% Surviving
0	3,788,615	159	0.00004	0.99996	100.00
0.5	3,034,732	2,470	0.00081	0.99919	100.00
1.5	2,237,299	1,543	0.00069	0.99931	99.92
2.5	1,733,972	3,337	0.00192	0.99808	99.85
3.5	1,498,349	7,387	0.00493	0.99507	99.66
4.5	1,317,285	18,240	0.01385	0.98615	99.17
5.5	1,138,316	6,041	0.00531	0.99469	97.80
6.5	1,070,607	11,504	0.01075	0.98925	97.28
7.5	864,216	33,461	0.03872	0.96128	96.23
8.5	640,983	33,399	0.05211	0.94789	92.50
9.5	485,810	5,673	0.01168	0.98832	87.68
10.5	278,514	3,352	0.01204	0.98796	86.66
11.5	48,766	561	0.01150	0.98850	85.62
12.5	45,108	1,668	0.03698	0.96302	84.64
13.5	18,060	3,448	0.19092	0.80908	81.51
14.5	14,500	0	0.00000	1.00000	65.95
15.5	14,500	0	0.00000	1.00000	65.95
16.5	14,500	0	0.00000	1.00000	65.95
17.5	14,500	0	0.00000	1.00000	65.95
18.5	14,500	0	0.00000	1.00000	65.95
19.5	14,500	0	0.00000	1.00000	65.95
20.5	14,500	0	0.00000	1.00000	65.95
21.5	14,500	0	0.00000	1.00000	65.95
22.5	14,500	0	0.00000	1.00000	65.95
23.5	14,500	0	0.00000	1.00000	65.95
24.5	14,500	0	0.00000	1.00000	65.95
25.5	14,500	0	0.00000	1.00000	65.95
26.5	2,000	0	0.00000	1.00000	65.95

Kentucky - American Water Company

Account 334.300 - Meter Vaults

Placement Band - 1982 - 2022   Experience Band - 2011 - 2022

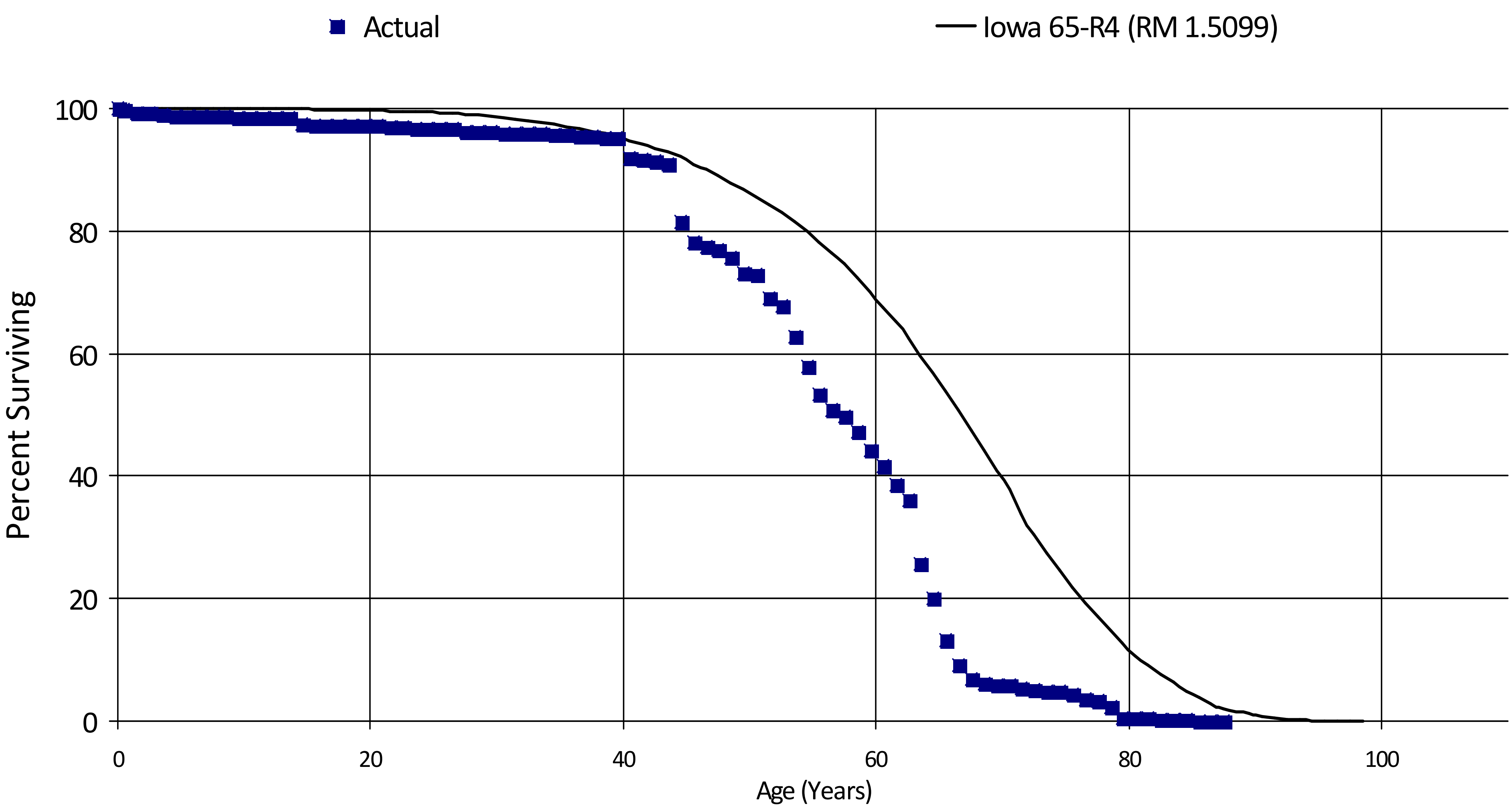
27.5	2,000	0	0.00000	1.00000	65.95
28.5	2,000	0	0.00000	1.00000	65.95
29.5	2,000	0	0.00000	1.00000	65.95
30.5	2,000	0	0.00000	1.00000	65.95
31.5	2,000	0	0.00000	1.00000	65.95
32.5	2,000	0	0.00000	1.00000	65.95
33.5	2,000	0	0.00000	1.00000	65.95
34.5	2,000	0	0.00000	1.00000	65.95
35.5	2,000	0	0.00000	1.00000	65.95
36.5	2,000	0	0.00000	1.00000	65.95
37.5	2,000	0	0.00000	1.00000	65.95
38.5	2,000	0	0.00000	1.00000	65.95
39.5	2,000	0	0.00000	1.00000	65.95
	Totals:	132,243			

Kentucky - American Water Company

Account 335.000 - Hydrants

Placement Band - 1934 - 2022   Experience Band - 1999 - 2022

Actual and Smooth Survivor Curves



Kentucky - American Water Company

Account 335.000 - Hydrants

Placement Band - 1934 - 2022   Experience Band - 1999 - 2022

RETIREMENT RATE ANALYSIS

Age at Begin of Interval	Exposures at Beginning of Age Interval	Retirements During Age Interval	Retmt Ratio	Survivor Ratio	% Surviving
0	33,548,894	104,652	0.00312	0.99688	100.00
0.5	30,368,184	101,916	0.00336	0.99664	99.69
1.5	27,197,404	39,638	0.00146	0.99854	99.36
2.5	25,554,891	30,942	0.00121	0.99879	99.21
3.5	23,790,333	67,487	0.00284	0.99716	99.09
4.5	22,738,906	14,977	0.00066	0.99934	98.81
5.5	21,475,927	3,629	0.00017	0.99983	98.74
6.5	19,168,627	9,640	0.00050	0.99950	98.72
7.5	17,030,396	10,508	0.00062	0.99938	98.67
8.5	14,914,283	1,687	0.00011	0.99989	98.61
9.5	13,752,028	3,149	0.00023	0.99977	98.60
10.5	13,118,963	1,321	0.00010	0.99990	98.58
11.5	12,630,697	79	0.00001	0.99999	98.57
12.5	11,933,836	11,496	0.00096	0.99904	98.57
13.5	11,456,605	124,455	0.01086	0.98914	98.48
14.5	10,826,707	12,003	0.00111	0.99889	97.41
15.5	10,270,727	734	0.00007	0.99993	97.30
16.5	6,577,496	974	0.00015	0.99985	97.29
17.5	6,575,142	2,563	0.00039	0.99961	97.28
18.5	6,570,975	6,324	0.00096	0.99904	97.24
19.5	6,564,652	2,486	0.00038	0.99962	97.15
20.5	6,549,837	9,773	0.00149	0.99851	97.11
21.5	6,537,874	6,611	0.00101	0.99899	96.97
22.5	6,276,436	3,544	0.00056	0.99944	96.87
23.5	5,907,594	9,618	0.00163	0.99837	96.82
24.5	5,627,186	1,651	0.00029	0.99971	96.66
25.5	5,371,357	1,587	0.00030	0.99970	96.63
26.5	5,043,163	18,545	0.00368	0.99632	96.60

Kentucky - American Water Company

Account 335.000 - Hydrants

Placement Band - 1934 - 2022 Experience Band - 1999 - 2022

27.5	4,808,582	157	0.00003	0.99997	96.24
28.5	4,547,142	6,763	0.00149	0.99851	96.24
29.5	4,318,336	1,646	0.00038	0.99962	96.10
30.5	3,986,240	2,160	0.00054	0.99946	96.06
31.5	3,782,161	1,246	0.00033	0.99967	96.01
32.5	3,438,536	4,921	0.00143	0.99857	95.98
33.5	3,210,972	4,213	0.00131	0.99869	95.84
34.5	2,975,998	2,963	0.00100	0.99900	95.71
35.5	2,751,985	2,050	0.00074	0.99926	95.61
36.5	2,640,300	3,500	0.00133	0.99867	95.54
37.5	2,473,569	4,767	0.00193	0.99807	95.41
38.5	2,310,548	3,118	0.00135	0.99865	95.23
39.5	2,247,181	75,174	0.03345	0.96655	95.10
40.5	2,093,370	4,019	0.00192	0.99808	91.92
41.5	2,014,972	6,672	0.00331	0.99669	91.74
42.5	1,881,117	12,666	0.00673	0.99327	91.44
43.5	1,719,531	178,650	0.10389	0.89611	90.82
44.5	1,487,345	59,784	0.04020	0.95980	81.38
45.5	1,327,553	10,957	0.00825	0.99175	78.11
46.5	1,281,420	9,432	0.00736	0.99264	77.47
47.5	1,183,913	19,457	0.01643	0.98357	76.90
48.5	984,974	31,690	0.03217	0.96783	75.64
49.5	827,500	5,592	0.00676	0.99324	73.21
50.5	789,008	41,299	0.05234	0.94766	72.72
51.5	703,654	12,754	0.01813	0.98187	68.91
52.5	646,268	48,391	0.07488	0.92512	67.66
53.5	543,523	40,261	0.07407	0.92593	62.59
54.5	480,449	38,840	0.08084	0.91916	57.95
55.5	414,207	20,226	0.04883	0.95117	53.27
56.5	306,703	6,091	0.01986	0.98014	50.67
57.5	280,491	14,440	0.05148	0.94852	49.66

Kentucky - American Water Company

Account 335.000 - Hydrants

Placement Band - 1934 - 2022 Experience Band - 1999 - 2022

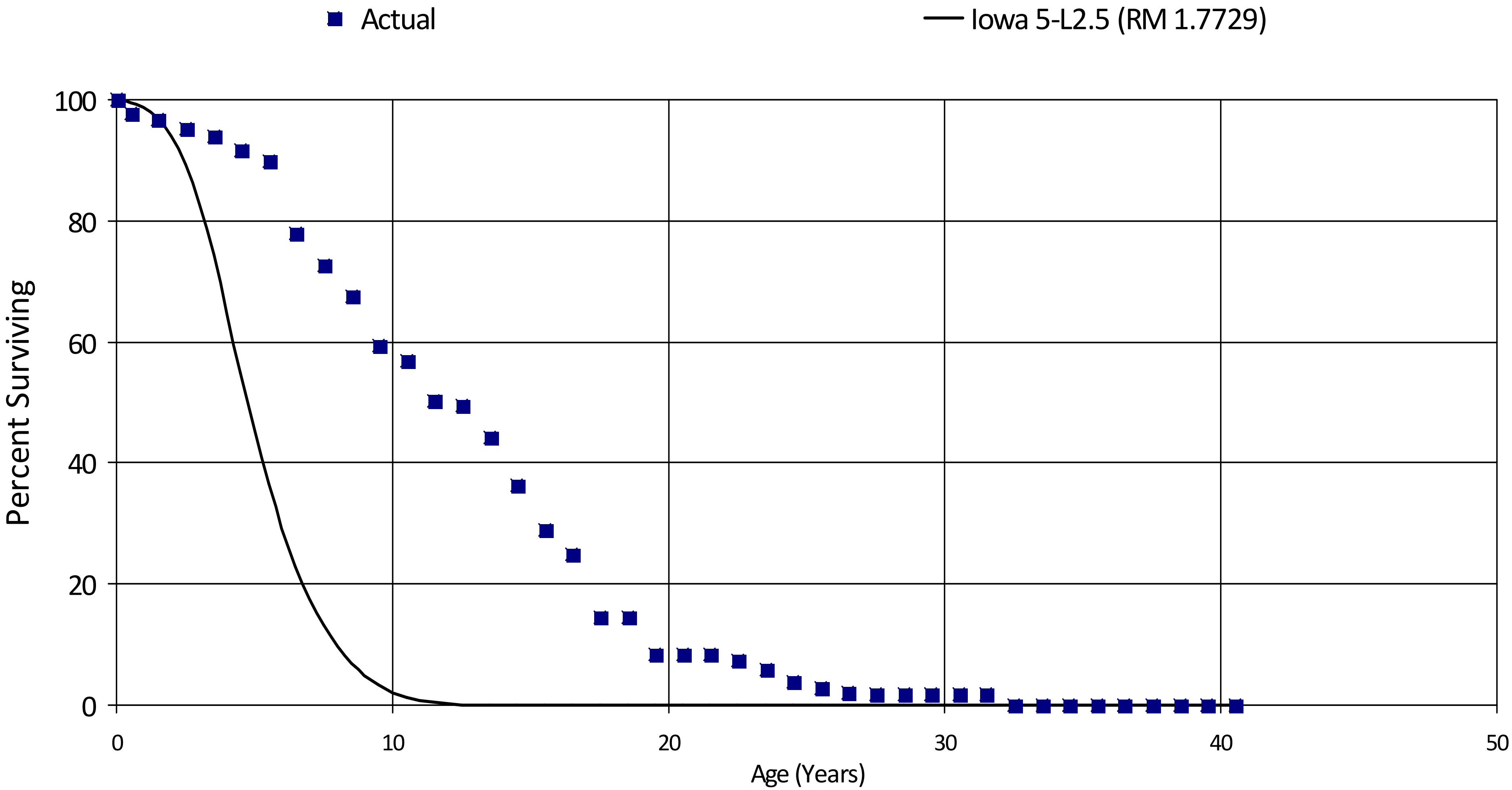
58.5	224,080	13,640	0.06087	0.93913	47.10
59.5	185,208	11,336	0.06121	0.93879	44.23
60.5	150,880	10,339	0.06852	0.93148	41.52
61.5	114,466	7,571	0.06614	0.93386	38.68
62.5	93,084	26,928	0.28929	0.71071	36.12
63.5	62,664	13,913	0.22202	0.77798	25.67
64.5	47,704	15,912	0.33356	0.66644	19.97
65.5	30,703	9,350	0.30453	0.69547	13.31
66.5	20,424	5,576	0.27301	0.72699	9.26
67.5	13,696	1,343	0.09806	0.90194	6.73
68.5	12,017	442	0.03678	0.96322	6.07
69.5	10,947	0	0.00000	1.00000	5.85
70.5	10,674	1,155	0.10821	0.89179	5.85
71.5	9,427	436	0.04625	0.95375	5.22
72.5	8,921	271	0.03038	0.96962	4.98
73.5	8,527	216	0.02533	0.97467	4.83
74.5	8,119	551	0.06786	0.93214	4.71
75.5	7,569	1,410	0.18630	0.81370	4.39
76.5	6,158	365	0.05927	0.94073	3.57
77.5	5,794	1,997	0.34469	0.65531	3.36
78.5	3,796	2,871	0.75627	0.24373	2.20
79.5	925	171	0.18485	0.81515	0.54
80.5	755	78	0.10338	0.89662	0.44
81.5	666	21	0.03152	0.96848	0.39
82.5	645	125	0.19368	0.80632	0.38
83.5	435	31	0.07128	0.92872	0.31
84.5	404	256	0.63369	0.36631	0.29
85.5	132	0	0.00000	1.00000	0.11
86.5	132	0	0.00000	1.00000	0.11
87.5	132	18	0.13627	0.86373	0.11
	Totals:	1,402,210			

Kentucky - American Water Company

Account 341.100 - Transportation Equipment - Light Duty Trucks

Placement Band - 1974 - 2022 Experience Band - 1999 - 2022

Actual and Smooth Survivor Curves



Kentucky - American Water Company

Account 341.100 - Transportation Equipment - Light Duty Trucks

Placement Band - 1974 - 2022   Experience Band - 1999 - 2022

RETIREMENT RATE ANALYSIS

Age at Begin of Interval	Exposures at Beginning of Age Interval	Retirements During Age Interval	Retmt Ratio	Survivor Ratio	% Surviving
0	7,914,493	179,829	0.02272	0.97728	100.00
0.5	7,621,027	86,679	0.01137	0.98863	97.73
1.5	7,389,261	100,747	0.01363	0.98637	96.62
2.5	6,913,440	94,444	0.01366	0.98634	95.30
3.5	5,736,093	146,808	0.02559	0.97441	94.00
4.5	5,187,531	102,459	0.01975	0.98025	91.59
5.5	4,638,513	607,545	0.13098	0.86902	89.78
6.5	3,341,876	235,499	0.07047	0.92953	78.02
7.5	2,909,781	205,750	0.07071	0.92929	72.52
8.5	2,510,268	297,171	0.11838	0.88162	67.39
9.5	2,213,097	98,199	0.04437	0.95563	59.41
10.5	1,588,719	180,282	0.11348	0.88652	56.77
11.5	1,287,938	21,101	0.01638	0.98362	50.33
12.5	673,267	74,038	0.10997	0.89003	49.51
13.5	558,601	99,099	0.17741	0.82259	44.07
14.5	459,502	94,237	0.20508	0.79492	36.25
15.5	340,249	47,108	0.13845	0.86155	28.82
16.5	293,141	121,308	0.41382	0.58618	24.83
17.5	171,833	0	0.00000	1.00000	14.55
18.5	171,833	73,037	0.42505	0.57495	14.55
19.5	98,796	0	0.00000	1.00000	8.37
20.5	98,796	0	0.00000	1.00000	8.37
21.5	97,044	12,573	0.12956	0.87044	8.37
22.5	84,471	16,288	0.19282	0.80718	7.29
23.5	68,183	24,313	0.35659	0.64341	5.88
24.5	43,870	12,473	0.28432	0.71568	3.78
25.5	31,397	8,945	0.28490	0.71510	2.71
26.5	22,452	1,567	0.06979	0.93021	1.94

Kentucky - American Water Company

Account 341.100 - Transportation Equipment - Light Duty Trucks

Placement Band - 1974 - 2022   Experience Band - 1999 - 2022

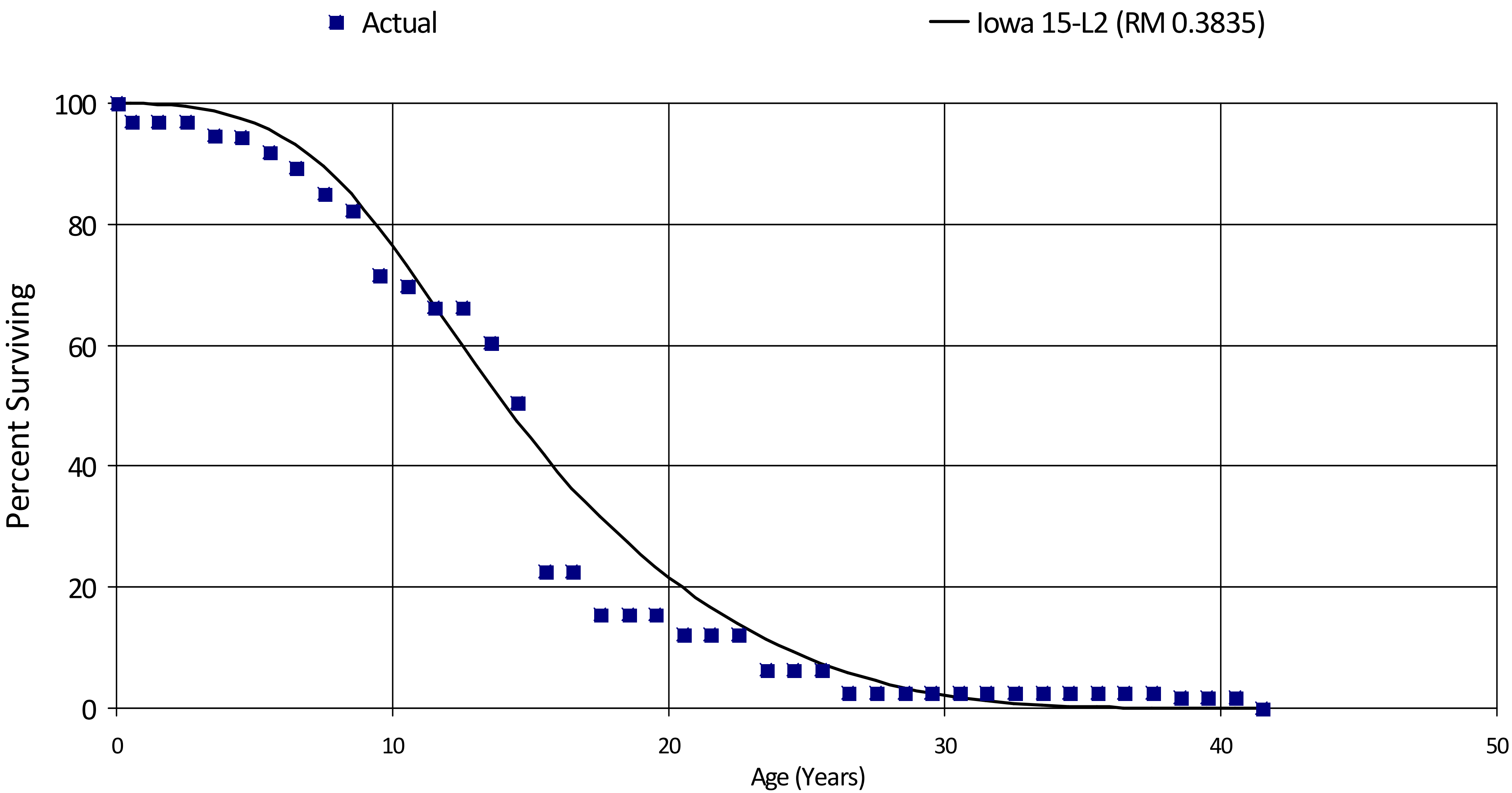
27.5	20,885	0	0.00000	1.00000	1.80
28.5	20,885	0	0.00000	1.00000	1.80
29.5	20,885	0	0.00000	1.00000	1.80
30.5	20,885	0	0.00000	1.00000	1.80
31.5	20,885	20,146	0.96463	0.03537	1.80
32.5	739	0	0.00000	1.00000	0.06
33.5	739	0	0.00000	1.00000	0.06
34.5	739	0	0.00000	1.00000	0.06
35.5	739	0	0.00000	1.00000	0.06
36.5	739	0	0.00000	1.00000	0.06
37.5	739	0	0.00000	1.00000	0.06
38.5	739	0	0.00000	1.00000	0.06
39.5	739	739	1.00050	-0.00050	0.06
40.5	0	0	0.00000	0.00000	0.00
	Totals:	2,962,384			

Kentucky - American Water Company

Account 341.200 - Transportation Equipment - Heavy Duty Trucks

Placement Band - 1979 - 2022   Experience Band - 2000 - 2022

Actual and Smooth Survivor Curves



Kentucky - American Water Company

Account 341.200 - Transportation Equipment - Heavy Duty Trucks

Placement Band - 1979 - 2022 Experience Band - 2000 - 2022

RETIREMENT RATE ANALYSIS

Age at Begin of Interval	Exposures at Beginning of Age Interval	Retirements During Age Interval	Retmt Ratio	Survivor Ratio	% Surviving
0	4,400,125	128,413	0.02918	0.97082	100.00
0.5	4,065,316	0	0.00000	1.00000	97.08
1.5	3,765,291	0	0.00000	1.00000	97.08
2.5	3,765,291	89,605	0.02380	0.97620	97.08
3.5	3,675,686	18,235	0.00496	0.99504	94.77
4.5	3,657,451	94,729	0.02590	0.97410	94.30
5.5	3,445,162	93,433	0.02712	0.97288	91.86
6.5	3,351,729	163,503	0.04878	0.95122	89.37
7.5	2,734,186	90,929	0.03326	0.96674	85.01
8.5	2,115,511	273,294	0.12919	0.87081	82.18
9.5	1,386,257	34,764	0.02508	0.97492	71.56
10.5	1,051,484	53,489	0.05087	0.94913	69.77
11.5	784,848	0	0.00000	1.00000	66.22
12.5	522,551	46,467	0.08892	0.91108	66.22
13.5	476,084	77,181	0.16212	0.83788	60.33
14.5	251,668	139,791	0.55546	0.44454	50.55
15.5	111,877	0	0.00000	1.00000	22.47
16.5	111,877	34,320	0.30677	0.69323	22.47
17.5	77,557	0	0.00000	1.00000	15.58
18.5	77,557	0	0.00000	1.00000	15.58
19.5	77,557	16,692	0.21522	0.78478	15.58
20.5	60,865	0	0.00000	1.00000	12.23
21.5	60,865	0	0.00000	1.00000	12.23
22.5	60,865	28,900	0.47482	0.52518	12.23
23.5	31,964	0	0.00000	1.00000	6.42
24.5	31,964	0	0.00000	1.00000	6.42
25.5	31,964	19,540	0.61131	0.38869	6.42
26.5	12,424	0	0.00000	1.00000	2.50

Kentucky - American Water Company

Account 341.200 - Transportation Equipment - Heavy Duty Trucks

Placement Band - 1979 - 2022   Experience Band - 2000 - 2022

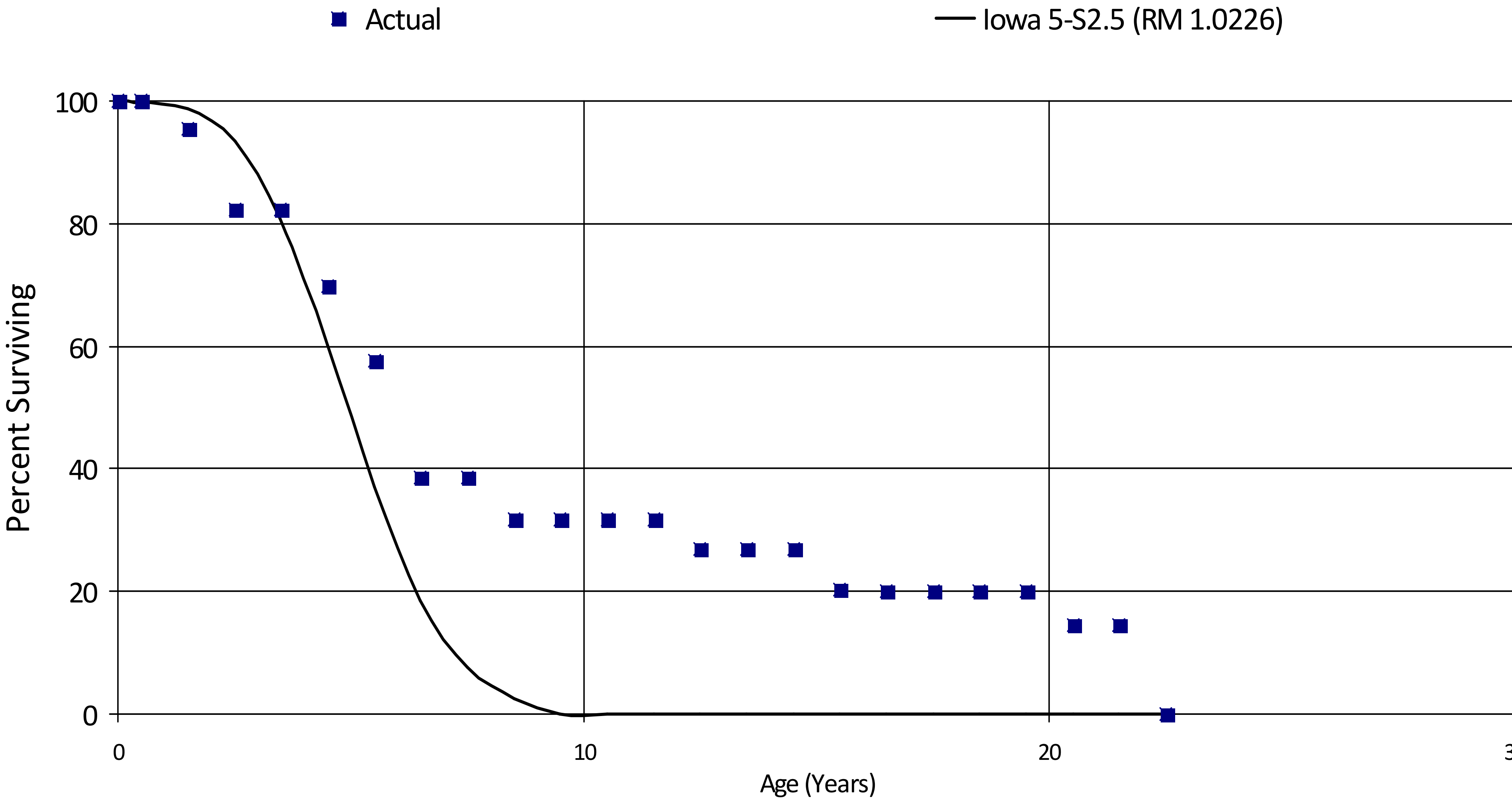
27.5	12,424	0	0.00000	1.00000	2.50
28.5	12,424	0	0.00000	1.00000	2.50
29.5	12,424	0	0.00000	1.00000	2.50
30.5	12,424	0	0.00000	1.00000	2.50
31.5	12,424	0	0.00000	1.00000	2.50
32.5	12,424	0	0.00000	1.00000	2.50
33.5	12,424	0	0.00000	1.00000	2.50
34.5	12,424	0	0.00000	1.00000	2.50
35.5	12,424	0	0.00000	1.00000	2.50
36.5	12,424	0	0.00000	1.00000	2.50
37.5	12,424	3,976	0.32003	0.67997	2.50
38.5	8,448	0	0.00000	1.00000	1.70
39.5	8,448	0	0.00000	1.00000	1.70
40.5	8,448	8,448	0.99998	0.00002	1.70
41.5	0	0	0.00000	0.00000	0.00
	Totals:	1,415,709			

Kentucky - American Water Company

Account 341.300 - Transporation Equipment - Autos

Placement Band - 1990 - 2022   Experience Band - 1999 - 2022

Actual and Smooth Survivor Curves



Kentucky - American Water Company

Account 341.300 - Transporation Equipment - Autos

Placement Band - 1990 - 2022   Experience Band - 1999 - 2022

RETIREMENT RATE ANALYSIS

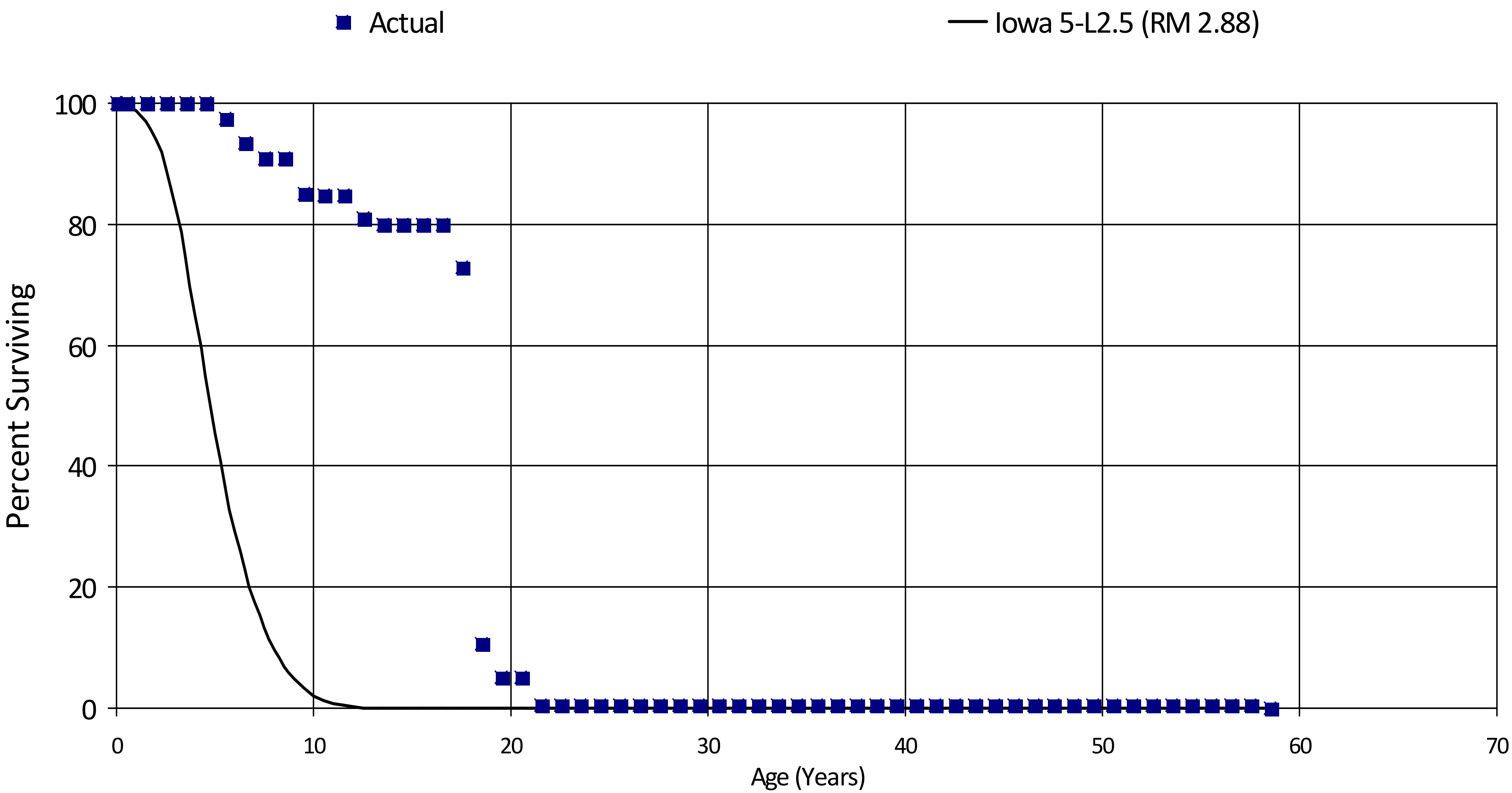
Age at Begin of Interval	Exposures at Beginning of Age Interval	Retirements During Age Interval	Retmt Ratio	Survivor Ratio	% Surviving
0	476,626	0	0.00000	1.00000	100.00
0.5	360,482	16,133	0.04475	0.95525	100.00
1.5	344,349	47,981	0.13934	0.86066	95.52
2.5	296,368	0	0.00000	1.00000	82.21
3.5	296,368	45,176	0.15243	0.84757	82.21
4.5	251,192	43,686	0.17391	0.82609	69.68
5.5	207,507	68,776	0.33144	0.66856	57.56
6.5	138,731	0	0.00000	1.00000	38.48
7.5	138,731	24,679	0.17789	0.82211	38.48
8.5	114,052	0	0.00000	1.00000	31.63
9.5	114,052	0	0.00000	1.00000	31.63
10.5	114,052	0	0.00000	1.00000	31.63
11.5	114,052	16,926	0.14841	0.85159	31.63
12.5	97,126	0	0.00000	1.00000	26.94
13.5	97,126	0	0.00000	1.00000	26.94
14.5	83,974	20,493	0.24404	0.75596	26.94
15.5	46,909	734	0.01565	0.98435	20.37
16.5	46,175	62	0.00134	0.99866	20.05
17.5	46,114	0	0.00000	1.00000	20.02
18.5	46,114	0	0.00000	1.00000	20.02
19.5	46,114	12,899	0.27972	0.72028	20.02
20.5	33,215	0	0.00000	1.00000	14.42
21.5	33,215	33,215	1.00001	-0.00001	14.42
22.5	0	0	0.00000	0.00000	0.00
	Totals:	330,760			

Kentucky - American Water Company

Account 341.400 - Transporation Equipment - Other

Placement Band - 1956 - 2022   Experience Band - 2007 - 2022

Actual and Smooth Survivor Curves



Kentucky - American Water Company

Account 341.400 - Transporation Equipment - Other

Placement Band - 1956 - 2022   Experience Band - 2007 - 2022

RETIREMENT RATE ANALYSIS

Age at Begin of Interval	Exposures at Beginning of Age Interval	Retirements During Age Interval	Retmt Ratio	Survivor Ratio	% Surviving
0	1,740,625	972	0.00056	0.99944	100.00
0.5	1,739,654	0	0.00000	1.00000	99.94
1.5	1,739,654	0	0.00000	1.00000	99.94
2.5	1,739,654	0	0.00000	1.00000	99.94
3.5	1,689,975	0	0.00000	1.00000	99.94
4.5	1,545,929	39,251	0.02539	0.97461	99.94
5.5	1,493,050	61,456	0.04116	0.95884	97.40
6.5	1,276,229	34,081	0.02670	0.97330	93.39
7.5	1,000,967	0	0.00000	1.00000	90.90
8.5	901,414	59,337	0.06583	0.93417	90.90
9.5	689,844	560	0.00081	0.99919	84.92
10.5	401,716	0	0.00000	1.00000	84.85
11.5	363,612	16,104	0.04429	0.95571	84.85
12.5	242,808	3,384	0.01394	0.98606	81.09
13.5	225,216	0	0.00000	1.00000	79.96
14.5	127,597	0	0.00000	1.00000	79.96
15.5	35,407	0	0.00000	1.00000	79.96
16.5	35,407	3,134	0.08851	0.91149	79.96
17.5	32,273	27,590	0.85490	0.14510	72.88
18.5	4,682	2,425	0.51791	0.48209	10.57
19.5	2,258	0	0.00000	1.00000	5.10
20.5	2,258	2,038	0.90273	0.09727	5.10
21.5	220	0	0.00000	1.00000	0.50
22.5	220	0	0.00000	1.00000	0.50
23.5	220	0	0.00000	1.00000	0.50
24.5	220	0	0.00000	1.00000	0.50
25.5	220	0	0.00000	1.00000	0.50
26.5	220	0	0.00000	1.00000	0.50

Kentucky - American Water Company

Account 341.400 - Transporation Equipment - Other

Placement Band - 1956 - 2022   Experience Band - 2007 - 2022

27.5	220	0	0.00000	1.00000	0.50
28.5	220	0	0.00000	1.00000	0.50
29.5	220	0	0.00000	1.00000	0.50
30.5	220	0	0.00000	1.00000	0.50
31.5	220	0	0.00000	1.00000	0.50
32.5	220	0	0.00000	1.00000	0.50
33.5	220	0	0.00000	1.00000	0.50
34.5	220	0	0.00000	1.00000	0.50
35.5	220	0	0.00000	1.00000	0.50
36.5	220	0	0.00000	1.00000	0.50
37.5	220	0	0.00000	1.00000	0.50
38.5	220	0	0.00000	1.00000	0.50
39.5	220	0	0.00000	1.00000	0.50
40.5	220	0	0.00000	1.00000	0.50
41.5	220	0	0.00000	1.00000	0.50
42.5	220	0	0.00000	1.00000	0.50
43.5	220	0	0.00000	1.00000	0.50
44.5	220	0	0.00000	1.00000	0.50
45.5	220	0	0.00000	1.00000	0.50
46.5	220	0	0.00000	1.00000	0.50
47.5	220	0	0.00000	1.00000	0.50
48.5	220	0	0.00000	1.00000	0.50
49.5	220	0	0.00000	1.00000	0.50
50.5	220	0	0.00000	1.00000	0.50
51.5	220	0	0.00000	1.00000	0.50
52.5	220	0	0.00000	1.00000	0.50
53.5	220	0	0.00000	1.00000	0.50
54.5	220	0	0.00000	1.00000	0.50
55.5	220	0	0.00000	1.00000	0.50
56.5	220	0	0.00000	1.00000	0.50
57.5	220	220	0.99955	0.00045	0.50

Kentucky - American Water Company

Account 341.400 - Transporation Equipment - Other

Placement Band - 1956 - 2022   Experience Band - 2007 - 2022

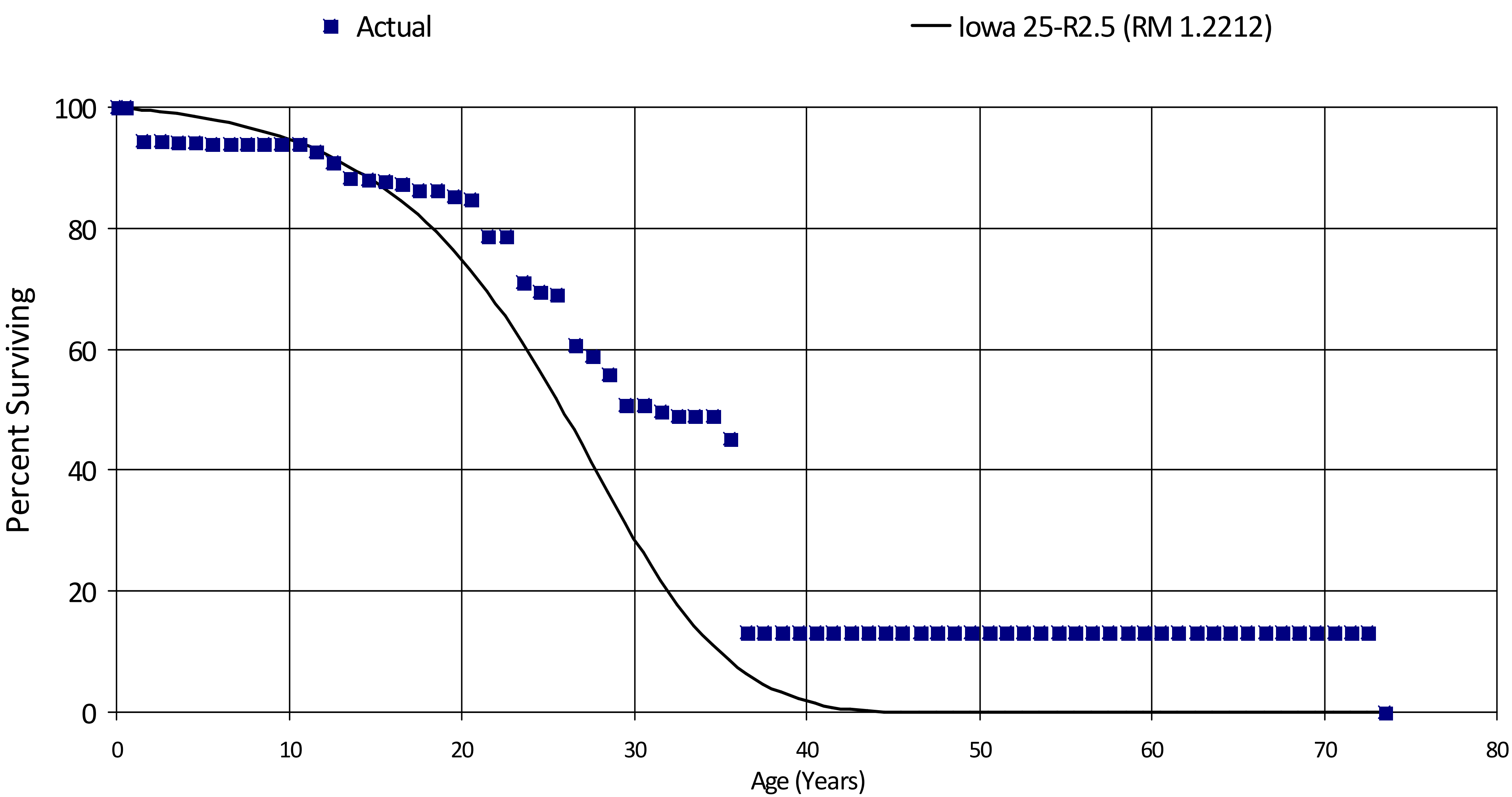
58.5	0	0	0.00000	0.00000	0.00
	Totals:	250,552			

Kentucky - American Water Company

Account 345.000 - Power Operated Equipment

Placement Band - 1941 - 2022   Experience Band - 2009 - 2022

Actual and Smooth Survivor Curves



Kentucky - American Water Company

Account 345.000 - Power Operated Equipment

Placement Band - 1941 - 2022   Experience Band - 2009 - 2022

RETIREMENT RATE ANALYSIS

Age at Begin of Interval	Exposures at Beginning of Age Interval	Retirements During Age Interval	Retmt Ratio	Survivor Ratio	% Surviving
0	1,811,988	0	0.00000	1.00000	100.00
0.5	1,801,663	99,826	0.05541	0.94459	100.00
1.5	1,631,108	0	0.00000	1.00000	94.46
2.5	1,612,331	5,061	0.00314	0.99686	94.46
3.5	1,607,269	0	0.00000	1.00000	94.16
4.5	1,606,643	4,157	0.00259	0.99741	94.16
5.5	1,567,983	0	0.00000	1.00000	93.92
6.5	1,567,983	0	0.00000	1.00000	93.92
7.5	1,557,569	0	0.00000	1.00000	93.92
8.5	1,518,109	779	0.00051	0.99949	93.92
9.5	1,517,330	0	0.00000	1.00000	93.87
10.5	1,508,949	21,317	0.01413	0.98587	93.87
11.5	1,487,633	27,605	0.01856	0.98144	92.54
12.5	1,460,028	41,274	0.02827	0.97173	90.82
13.5	1,418,753	4,807	0.00339	0.99661	88.25
14.5	1,386,860	2,620	0.00189	0.99811	87.95
15.5	1,384,240	8,499	0.00614	0.99386	87.78
16.5	1,375,741	13,407	0.00975	0.99025	87.24
17.5	371,513	0	0.00000	1.00000	86.39
18.5	371,513	5,286	0.01423	0.98577	86.39
19.5	361,353	1,717	0.00475	0.99525	85.16
20.5	359,636	25,862	0.07191	0.92809	84.76
21.5	333,774	0	0.00000	1.00000	78.66
22.5	333,774	31,843	0.09540	0.90460	78.66
23.5	273,897	6,421	0.02344	0.97656	71.16
24.5	267,476	1,582	0.00591	0.99409	69.49
25.5	199,743	24,678	0.12355	0.87645	69.08
26.5	175,065	4,500	0.02570	0.97430	60.55

Kentucky - American Water Company

Account 345.000 - Power Operated Equipment

Placement Band - 1941 - 2022   Experience Band - 2009 - 2022

27.5	116,587	6,092	0.05225	0.94775	58.99
28.5	110,495	10,178	0.09211	0.90789	55.91
29.5	100,317	0	0.00000	1.00000	50.76
30.5	100,317	1,947	0.01941	0.98059	50.76
31.5	96,900	1,286	0.01327	0.98673	49.77
32.5	75,234	0	0.00000	1.00000	49.11
33.5	74,532	0	0.00000	1.00000	49.11
34.5	19,966	1,617	0.08099	0.91901	49.11
35.5	18,349	12,962	0.70641	0.29359	45.13
36.5	5,387	0	0.00000	1.00000	13.25
37.5	5,387	0	0.00000	1.00000	13.25
38.5	5,387	0	0.00000	1.00000	13.25
39.5	5,387	0	0.00000	1.00000	13.25
40.5	5,387	0	0.00000	1.00000	13.25
41.5	5,387	0	0.00000	1.00000	13.25
42.5	5,387	0	0.00000	1.00000	13.25
43.5	5,387	0	0.00000	1.00000	13.25
44.5	5,387	0	0.00000	1.00000	13.25
45.5	5,387	0	0.00000	1.00000	13.25
46.5	5,387	0	0.00000	1.00000	13.25
47.5	5,387	0	0.00000	1.00000	13.25
48.5	5,387	0	0.00000	1.00000	13.25
49.5	5,387	0	0.00000	1.00000	13.25
50.5	5,387	0	0.00000	1.00000	13.25
51.5	5,387	0	0.00000	1.00000	13.25
52.5	5,387	0	0.00000	1.00000	13.25
53.5	5,387	0	0.00000	1.00000	13.25
54.5	5,387	0	0.00000	1.00000	13.25
55.5	5,387	0	0.00000	1.00000	13.25
56.5	5,387	0	0.00000	1.00000	13.25
57.5	5,387	0	0.00000	1.00000	13.25

Kentucky - American Water Company

Account 345.000 - Power Operated Equipment

Placement Band - 1941 - 2022   Experience Band - 2009 - 2022

58.5	5,387	0	0.00000	1.00000	13.25
59.5	5,387	0	0.00000	1.00000	13.25
60.5	5,387	0	0.00000	1.00000	13.25
61.5	5,387	0	0.00000	1.00000	13.25
62.5	5,387	0	0.00000	1.00000	13.25
63.5	5,387	0	0.00000	1.00000	13.25
64.5	5,387	0	0.00000	1.00000	13.25
65.5	5,387	0	0.00000	1.00000	13.25
66.5	5,387	0	0.00000	1.00000	13.25
67.5	5,387	0	0.00000	1.00000	13.25
68.5	5,387	0	0.00000	1.00000	13.25
69.5	5,387	0	0.00000	1.00000	13.25
70.5	5,387	0	0.00000	1.00000	13.25
71.5	5,387	0	0.00000	1.00000	13.25
72.5	5,387	5,387	1.00004	-0.00004	13.25
73.5	0	0	0.00000	0.00000	0.00
	Totals:	370,710			

SECTION 7

7 NET SALVAGE STUDY

Kentucky - American Water Company
ACCOUNT 304.1 - SUPPLY
SUMMARY OF BOOK SALVAGE

Year	Regular Retirements	Cost of Removal Amount	Cost of Removal Percent	Gross Salvage Amount	Gross Salvage Percent	Net Salvage Amount	Net Salvage Percent	3-Year Amount	3-Year Percent	5-Year Amount	5-Year Percent	Historical Amount	Historical Percent
2003	24,347	87,305	359		0	(87,305)	-359					-87,305	-359
2004	38,923	115,482	297		0	(115,482)	-297					-101,394	-321
2005			0		0	0	0	-67,596	-321			-101,394	-321
2006	1,100		0		0	0	0	-38,494	-289			-101,394	-315
2007			0		0	0	0	0	0	-40,557	-315	-101,394	-315
2008	11,676		0		0	0	0	0	0	-23,096	-223	-101,394	-267
2009	6,621		0		0	0	0	0	0	0	0	-101,394	-245
2010			0		0	0	0	0	0	0	0	-101,394	-245
2011			0		0	0	0	0	0	0	0	-101,394	-245
2012	6,593	595	9		0	(595)	-9	-198	-9	-119	-2	-67,794	-228
2013	6,377	86,112	1,350		0	(86,112)	-1,350	-28,902	-669	-17,341	-443	-72,374	-303
2014	168,547	32,857	19		0	(32,857)	-19	-39,855	-66	-23,913	-66	-64,470	-122
2015	1,507.85	6,796	451	(56,146)	(3,724)	49,350	3,273	-23,206	-39	-14,043	-38	-45,500	-103
2016	11,983	15,488	129		0	(15,488)	-129	335	1	-17,140	-44	-41,213	-104
2017	1,391	25,032	1,799		0	(25,032)	-1,799	2,943	59	-22,028	-58	-39,190	-112
2018	7,301	18,994	260		0	(18,994)	-260	-19,838	-288	-8,604	-23	-36,946	-116
2019	74,531	70,910	95		0	(70,910)	-95	-38,312	-138	-16,215	-84	-40,343	-112
2020	175,495	40,463	23		0	(40,463)	-23	-43,455	-51	-34,177	-63	-40,353	-83
2021	182,493	115,634	63		0	(115,634)	-63	-75,669	-52	-54,206	-61	-46,627	-78
2022	112,891	140,754	125		0	(140,754)	-125	-98,950	-63	-77,351	-70	-53,867	-84
TOTAL	**831,778**	**756,421**	**90.94**	**-56,146**	**(6.75)**	**-700,275**	**(84.19)**						

Kentucky - American Water Company
ACCOUNTS 304.2 and 304.3 - STRUCTURES AND IMPROVEMENTS
SUMMARY OF BOOK SALVAGE

Year	Regular Retirements	Cost of Removal Amount	Cost of Removal Percent	Gross Salvage Amount	Gross Salvage Percent	Net Salvage Amount	Net Salvage Percent	3-Year Amount	3-Year Percent	5-Year Amount	5-Year Percent	Historical Amount	Historical Percent
1999	17,195	7,900	46		0	(7,900)	-46					-7,900	-46
2000	92,575	38,325	41		0	(38,325)	-41					-23,113	-42
2001	35,834	5,500	15		0	(5,500)	-15	-17,242	-36			-17,242	-36
2002	17,127	70,552	412		0	(70,552)	-412	-38,126	-79			-30,569	-75
2003	105	1,378	1,312		0	(1,378)	-1,312	-25,810	-146	-24,731	-76	-24,731	-76
2004	200		0		0	0	0	-23,977	-413	-23,151	-79	-24,731	-76
2005	5,347	5,943	111		0	(5,943)	-111	-2,440	-130	-16,675	-142	-21,600	-77
2006	24,500	(25)	(0)		0	25	0	-1,973	-20	-15,570	-165	-18,510	-67
2007	5,990		0		0	0	0	-1,973	-17	-1,459	-20	-18,510	-65
2008	391,632		0		0	0	0	8	0	-1,184	-1	-18,510	-22
2009	91,226	347	0	(1)	(0)	(346)	0	-115	0	-1,253	-1	-16,240	-19
2010	8,373	73	1		0	(73)	-1	-140	0	-79	0	-14,444	-19
2011	92,732	7,321	8		0	(7,321)	-8	-2,580	-4	-1,548	-1	-13,731	-18
2012	164,608	24,151	15		0	(24,151)	-15	-10,515	-12	-6,378	-4	-14,679	-17
2013	59,921	9,912	17		0	(9,912)	-17	-13,795	-13	-8,361	-10	-14,281	-17
2014	1,493,901	11,574	1		0	(11,574)	-1	-15,212	-3	-10,606	-3	-14,073	-7
2015	74,021	4,700	6		0	(4,700)	-6	-8,729	-2	-11,532	-3	-13,404	-7
2016	194,981	39,519	20		0	(39,519)	-20	-18,598	-3	-17,971	-5	-15,145	-8
2017	184,457	201,500	109		0	(201,500)	-109	-81,906	-54	-53,441	-13	-26,792	-15
2018	59,148	45,612	77		0	(45,612)	-77	-95,544	-65	-60,581	-15	-27,899	-16
2019	94,758	2,300,852	2,428		0	(2,300,852)	-2,428	-849,321	-753	-518,436	-427	-154,174	-89
2020	2,872,053	15,219	1		0	(15,219)	-1	-787,227	-78	-520,540	-76	-146,861	-47
2021	60,080	70,268	117		0	(70,268)	-117	-795,446	-79	-526,690	-81	-143,031	-47
2022	9,109	1,170	13		0	(1,170)	-13	-28,886	-3	-486,624	-79	-136,276	-47
TOTAL	**6,049,872**	**2,861,791**	**47.30**	**-1**	**(0.00)**	**-2,861,790**	**(47.30)**						

Kentucky - American Water Company
ACCOUNT 304.4 - TRANSMISSION AND DISTRIBUTION
SUMMARY OF BOOK SALVAGE

Year	Regular Retirements	Cost of Removal Amount	Cost of Removal Percent	Gross Salvage Amount	Gross Salvage Percent	Net Salvage Amount	Net Salvage Percent	3-Year Amount	3-Year Percent	5-Year Amount	5-Year Percent	Historical Amount	Historical Percent
2006	2,300		0		0	0	0						0
2007			0		0	0	0						0
2008	39,028		0		0	0	0	0	0				0
2009	708	1,556	220		0	(1,556)	-220	-519	-4			-1,556	-4
2010			0		0	0	0	-519	-4	-311	-4	-1,556	-4
2011			0		0	0	0	-519	-220	-311	-4	-1,556	-4
2012			0		0	0	0	0	0	-311	-4	-1,556	-4
2013	53		0		0	0	0	0	0	-311	-204	-1,556	-4
2014	22,657	110	0		0	(110)	0	-37	0	-22	0	-833	-3
2015			0		0	0	0	-37	0	-22	0	-833	-3
2016		169	0		0	(169)	0	-93	-1	-56	-1	-612	-3
2017	2,301	19,552	850		0	(19,552)	-850	-6,574	-857	-3,966	-79	-5,347	-32
2018	4,670	310	7		0	(310)	-7	-6,677	-287	-4,028	-68	-4,339	-30
2019	344	6,785	1,972	(4,000)	(1,162)	(2,785)	-809	-7,549	-310	-4,563	-312	-4,080	-34
2020	64,237		0		0	0	0	-1,032	-4	-4,563	-32	-4,080	-18
2021	2,915	499,978	17,153		0	(499,978)	-17,153	-167,588	-745	-104,525	-702	-74,923	-377
2022	411,841		0		0	0	0	-166,659	-104	-100,615	-104	-74,923	-95
TOTAL	**551,054**	**528,461**	**95.90**	**-4,000**	**(0.73)**	**-524,461**	**(95.17)**						

Kentucky - American Water Company
ACCOUNT 304.5 - GENERAL
SUMMARY OF BOOK SALVAGE

Year	Regular Retirements	Cost of Removal Amount	Cost of Removal Percent	Gross Salvage Amount	Gross Salvage Percent	Net Salvage Amount	Net Salvage Percent	3-Year Amount	3-Year Percent	5-Year Amount	5-Year Percent	Historical Amount	Historical Percent
2013	57,041		0		0	0	0						0
2014			0		0	0	0						0
2015	2,302	347	15		0	(347)	-15	-116	-1			-347	-1
2016	9,503	15,840	167		0	(15,840)	-167	-5,396	-137			-8,094	-24
2017	4,115	7	0		0	(7)	0	-5,398	-22	-3,239	-22	-5,398	-22
2018		756	0		0	(756)	0	-5,535	-122	-3,390	-106	-4,238	-23
2019	13,588	6,560	48		0	(6,560)	-48	-2,441	-41	-4,702	-27	-4,702	-27
2020	2	602	28,283		0	(602)	-28,283	-2,640	-58	-4,753	-87	-4,019	-28
2021	32,357	3,754	12		0	(3,754)	-12	-3,639	-24	-2,336	-23	-3,981	-23
2022	9,561	23,699	248		0	(23,699)	-248	-9,352	-67	-7,074	-64	-6,446	-40
TOTAL	**128,468**	**51,567**	**40.14**	**0**	**0.00**	**-51,567**	**(40.14)**						

Kentucky - American Water Company
ACCOUNT 304.6 - OFFICE BUILDINGS
SUMMARY OF BOOK SALVAGE

Year	Regular Retirements	Cost of Removal Amount	Cost of Removal Percent	Gross Salvage Amount	Gross Salvage Percent	Net Salvage Amount	Net Salvage Percent	3-Year Amount	3-Year Percent	5-Year Amount	5-Year Percent	Historical Amount	Historical Percent
1999	46,016		0		0	0	0						0
2000	1,901	551	29		0	(551)	-29					-551	-1
2001			0		0	0	0	-184	-1			-551	-1
2002			0		0	0	0	-184	-29			-551	-1
2003	33,675		0		0	0	0	0	0	-110	-1	-551	-1
2004			0		0	0	0	0	0	-110	-2	-551	-1
2005			0		0	0	0	0	0	0	0	-551	-1
2006			0		0	0	0	0	0	0	0	-551	-1
2007	6,099		0		0	0	0	0	0	0	0	-551	-1
2008	40,837		0		0	0	0	0	0	0	0	-551	0
2009	13,217	2,605	20		0	(2,605)	-20	-868	-4	-521	-4	-1,578	-2
2010	2,337		0	(417)	(18)	417	18	-729	-4	-438	-4	-913	-2
2011	969	1,019	105		0	(1,019)	-105	-1,069	-19	-641	-5	-940	-3
2012	4,057	2,618	65		0	(2,618)	-65	-1,073	-44	-1,165	-9	-1,275	-4
2013	22,641	27,982	124		0	(27,982)	-124	-10,540	-114	-6,761	-78	-5,726	-20
2014	72,299	21,600	30		0	(21,600)	-30	-17,400	-53	-10,560	-52	-7,994	-23
2015	83,186	7,305	9		0	(7,305)	-9	-18,962	-32	-12,105	-33	-7,908	-19
2016	7,422	1,905	26		0	(1,905)	-26	-10,270	-19	-12,282	-32	-7,241	-19
2017	11,611	122	1		0	(122)	-1	-3,111	-9	-11,783	-30	-6,529	-19
2018			0		0	0	0	-676	-11	-6,186	-18	-6,529	-19
2019	9,884		0		0	0	0	-41	-1	-1,866	-8	-6,529	-18
2020	356,592		0		0	0	0	0	0	-405	-1	-6,529	-9
2021	17,741	3,571	20		0	(3,571)	-20	-1,190	-1	-738	-1	-6,260	-9
2022	16,469	(1,648)	(10)		0	1,648	10	-641	0	-385	0	-5,601	-9
TOTAL	**746,953**	**67,630**	**9.05**	**-417**	**(0.06)**	**-67,213**	**(9.00)**						

Kentucky - American Water Company
ACCOUNT 306 - LAKE, RIVER, AND OTHER INTAKES
SUMMARY OF BOOK SALVAGE

Year	Regular Retirements	Cost of Removal Amount	Cost of Removal Percent	Gross Salvage Amount	Gross Salvage Percent	Net Salvage Amount	Net Salvage Percent	3-Year Amount	3-Year Percent	5-Year Amount	5-Year Percent	Historical Amount	Historical Percent
2002	5,189	99,254	1,913		0	(99,254)	-1,913					-99,254	-1,913
2003			0		0	0	0					-99,254	-1,913
2004			0		0	0	0	-33,085	-1,913			-99,254	-1,913
2005			0		0	0	0	0	0			-99,254	-1,913
2006	20,500	72,600	354		0	(72,600)	-354	-24,200	-354	-34,371	-669	-85,927	-669
2007	3,666		0		0	0	0	-24,200	-300	-14,520	-300	-85,927	-585
2008			0		0	0	0	-24,200	-300	-14,520	-300	-85,927	-585
2009			0		0	0	0	0	0	-14,520	-300	-85,927	-585
2010			0		0	0	0	0	0	-14,520	-300	-85,927	-585
2011	7,977	35,837	449		0	(35,837)	-449	-11,946	-449	-7,167	-308	-69,230	-556
2012			0		0	0	0	-11,946	-449	-7,167	-449	-69,230	-556
2013		1,065	0		0	(1,065)	0	-12,301	-463	-7,380	-463	-52,189	-559
2014	25,154	347	1		0	(347)	-1	-471	-6	-7,450	-112	-41,821	-335
2015			0		0	0	0	-471	-6	-7,450	-112	-41,821	-335
2016	1,000	596	60		0	(596)	-60	-314	-4	-402	-8	-34,950	-330
2017			0		0	0	0	-199	-60	-402	-8	-34,950	-330
2018			0		0	0	0	-199	-60	-189	-4	-34,950	-330
2019			0		0	0	0	0	0	-119	-60	-34,950	-330
2020			0		0	0	0	0	0	-119	-60	-34,950	-330
2021			0		0	0	0	0	0	0	0	-34,950	-330
2022			0		0	0	0	0	0	0	0	-34,950	-330
TOTAL	**63,486**	**209,699**	**330.31**	**0**	**0.00**	**-209,699**	**(330.31)**						

Kentucky - American Water Company
ACCOUNT 309 - SUPPLY MAINS
SUMMARY OF BOOK SALVAGE

Year	Regular Retirements	Cost of Removal Amount	Cost of Removal Percent	Gross Salvage Amount	Gross Salvage Percent	Net Salvage Amount	Net Salvage Percent	3-Year Amount	3-Year Percent	5-Year Amount	5-Year Percent	Historical Amount	Historical Percent
2000	49	3,000	6,122		0	(3,000)	-6,122					-3,000	-6,122
2001			0		0	0	0					-3,000	-6,122
2002			0		0	0	0	-1,000	-6,122			-3,000	-6,122
2003			0		0	0	0	0	0			-3,000	-6,122
2004			0		0	0	0	0	0	-600	-6,122	-3,000	-6,122
2005			0		0	0	0	0	0	0	0	-3,000	-6,122
2006			0		0	0	0	0	0	0	0	-3,000	-6,122
2007			0		0	0	0	0	0	0	0	-3,000	-6,122
2008	412		0		0	0	0	0	0	0	0	-3,000	-651
2009		32	0	(62)	0	30	0	10	7	6	7	-1,485	-644
2010	1		0		0	0	0	10	7	6	7	-1,485	-643
2011	391	1,177	301		0	(1,177)	-301	-382	-293	-229	-143	-1,382	-486
2012	21		0		0	0	0	-392	-285	-229	-139	-1,382	-474
2013	305	879	288		0	(879)	-288	-685	-287	-405	-282	-1,257	-426
2014	15,497	1	0		0	(1)	0	-293	-6	-411	-13	-1,005	-30
2015	0		0		0	0	0	-293	-6	-411	-13	-1,005	-30
2016	736	1	0		0	(1)	0	-1	0	-176	-5	-838	-29
2017			0		0	0	0	0	0	-176	-5	-838	-29
2018	10,000	1,192	12		0	(1,192)	-12	-398	-11	-239	-5	-889	-23
2019	812	977	120		0	(977)	-120	-723	-20	-434	-19	-900	-25
2020			0		0	0	0	-723	-20	-434	-19	-900	-25
2021			0		0	0	0	-326	-120	-434	-20	-900	-25
2022			0		0	0	0	0	0	-434	-20	-900	-25
TOTAL	**28,225**	**7,259**	**25.72**	**-62**	**(0.22)**	**-7,197**	**(25.50)**						

Kentucky - American Water Company
ACCOUNT 310 - POWER GENERATION EQUIPMENT
SUMMARY OF BOOK SALVAGE

Year	Regular Retirements	Cost of Removal Amount	Cost of Removal Percent	Gross Salvage Amount	Gross Salvage Percent	Net Salvage Amount	Net Salvage Percent	3-Year Amount	3-Year Percent	5-Year Amount	5-Year Percent	Historical Amount	Historical Percent
2002	9,442	29	0		0	(29)	0					-29	0
2003	27		0		0	0	0					-29	0
2004			0		0	0	0	-10	0			-29	0
2005			0		0	0	0	0	0			-29	0
2006			0		0	0	0	0	0	-6	0	-29	0
2007			0		0	0	0	0	0	0	0	-29	0
2008		53,899	0		0	(53,899)	0	-17,966	0	-10,780	0	-26,964	-570
2009	14,501		0		0	0	0	-17,966	-372	-10,780	-372	-26,964	-225
2010	16,447		0		0	0	0	-17,966	-174	-10,780	-174	-26,964	-133
2011	14,473		0		0	0	0	0	0	-10,780	-119	-26,964	-98
2012	7,941	633	8		0	(633)	-8	-211	-2	-10,906	-102	-18,187	-87
2013		693	0		0	(693)	0	-442	-6	-265	-2	-13,814	-88
2014	79,936	24,119	30		0	(24,119)	-30	-8,482	-29	-5,089	-21	-15,875	-56
2015	8,675	7,107	82		0	(7,107)	-82	-10,640	-36	-6,510	-29	-14,413	-57
2016	80,620	2,755	3		0	(2,755)	-3	-11,327	-20	-7,061	-20	-12,748	-38
2017	31,209	28,690	92		0	(28,690)	-92	-12,850	-32	-12,673	-32	-14,741	-45
2018	1,396		0		0	0	0	-10,482	-28	-12,534	-31	-14,741	-45
2019			0		0	0	0	-9,563	-88	-7,710	-32	-14,741	-45
2020	12,786		0		0	0	0	0	0	-6,289	-25	-14,741	-43
2021			0		0	0	0	0	0	-5,738	-63	-14,741	-43
2022			0		0	0	0	0	0	0	0	-14,741	-43
TOTAL	**277,453**	**117,924**	**42.50**	**0**	**0.00**	**-117,924**	**(42.50)**						

Kentucky - American Water Company
ACCOUNTS 311.2 - 311.54 - PUMPING EQUIPMENT
SUMMARY OF BOOK SALVAGE

Year	Regular Retirements	Cost of Removal Amount	Cost of Removal Percent	Gross Salvage Amount	Gross Salvage Percent	Net Salvage Amount	Net Salvage Percent	3-Year Amount	3-Year Percent	5-Year Amount	5-Year Percent	Historical Amount	Historical Percent
1999	51,242	18,591	36		0	(18,591)	-36					-18,591	-36
2000	6,563	265	4		0	(265)	-4					-9,428	-33
2001	56,925		0		0	0	0	-6,285	-16			-9,428	-16
2002	(266,319)	5,905	(2)	(3,459)	1	(2,446)	1	-904	1			-7,101	14
2003	56,495	11,758	21	(133)	(0)	(11,625)	-21	-4,690	9	-6,585	35	-8,232	35
2004			0	(1,829)	0	1,829	0	-4,081	6	-2,501	9	-6,220	33
2005			0	(5,191)	0	5,191	0	-1,535	-8	-1,410	5	-4,318	27
2006	10,400	21,530	207	12,361	119	(33,891)	-326	-8,957	-258	-8,188	21	-8,543	71
2007	58,389		0		0	0	0	-9,567	-42	-7,699	-31	-8,543	227
2008	124,691	168,362	135		0	(168,362)	-135	-67,418	-105	-39,047	-101	-28,520	-232
2009	4,190		0		0	0	0	-56,121	-90	-39,412	-100	-28,520	-222
2010	20,504	1,045	5		0	(1,045)	-5	-56,469	-113	-40,660	-93	-25,467	-186
2011	280,818	107,712	38		0	(107,712)	-38	-36,252	-36	-55,424	-57	-33,692	-83
2012	160,429	8,365	5		0	(8,365)	-5	-39,041	-25	-57,097	-48	-31,389	-61
2013	80,256	17,956	22		0	(17,956)	-22	-44,678	-26	-27,016	-25	-30,270	-56
2014	3,925,971	74,635	2		0	(74,635)	-2	-33,652	-2	-41,943	-5	-33,683	-10
2015	403,773	202,424	50	(4,014)	(1)	(198,410)	-49	-97,000	-7	-81,416	-8	-45,449	-13
2016	547,499	32,788	6		0	(32,788)	-6	-101,944	-6	-66,431	-6	-44,605	-12
2017	114,164	395,287	346		0	(395,287)	-346	-208,828	-59	-143,815	-14	-66,522	-19
2018	162,421	30,904	19		0	(30,904)	-19	-152,993	-56	-146,405	-14	-64,427	-19
2019	371,870	873,537	235		0	(873,537)	-235	-433,242	-200	-306,185	-96	-109,378	-32
2020	1,300,386	53,802	4		0	(53,802)	-4	-319,414	-52	-277,263	-56	-106,453	-27
2021	62,693	16,498	26		0	(16,498)	-26	-314,612	-54	-274,005	-68	-101,955	-27
2022	119,328	94,647	79		0	(94,647)	-79	-54,982	-11	-213,878	-53	-101,607	-28
TOTAL	**7,652,688**	**2,136,010**	**27.91**	**-2,265**	**(0.03)**	**-2,133,745**	**(27.88)**						

Kentucky - American Water Company
ACCOUNT 320.1 - WATER TREATMENT EQUIPMENT - NON-MEDIA
SUMMARY OF BOOK SALVAGE

Year	Regular Retirements	Cost of Removal Amount	Cost of Removal Percent	Gross Salvage Amount	Gross Salvage Percent	Net Salvage Amount	Net Salvage Percent	3-Year Amount	3-Year Percent	5-Year Amount	5-Year Percent	Historical Amount	Historical Percent
1999	84,970	2,423	3		0	(2,423)	-3					-2,423	-3
2000	298,470	25,131	8		0	(25,131)	-8					-13,777	-7
2001	26,267	3,765	14		0	(3,765)	-14	-10,440	-8			-10,440	-8
2002	15,797	2,234	14		0	(2,234)	-14	-10,377	-9			-8,388	-8
2003	36,944	10,965	30		0	(10,965)	-30	-5,655	-21	-8,904	-10	-8,904	-10
2004			0		0	0	0	-4,400	-25	-8,419	-11	-8,904	-10
2005	22,500		0		0	0	0	-3,655	-18	-3,393	-17	-8,904	-9
2006	122,300	4,797	4		0	(4,797)	-4	-1,599	-3	-3,599	-9	-8,219	-8
2007	231,024	4,933	2		0	(4,933)	-2	-3,243	-3	-4,139	-5	-7,750	-6
2008	174,737	110,000	63		0	(110,000)	-63	-39,910	-23	-23,946	-22	-20,531	-16
2009	61,811		0		0	0	0	-38,311	-25	-23,946	-20	-20,531	-15
2010	44,346	1,032	2		0	(1,032)	-2	-37,011	-40	-24,152	-19	-18,364	-15
2011	168,236	5,507	3		0	(5,507)	-3	-2,180	-2	-24,294	-18	-17,079	-13
2012	842,303	36,360	4		0	(36,360)	-4	-14,300	-4	-30,580	-12	-18,832	-10
2013	52,913	37,195	70		0	(37,195)	-70	-26,354	-7	-16,019	-7	-20,362	-11
2014	8,586,141	185,731	2		0	(185,731)	-2	-86,429	-3	-53,165	-3	-33,083	-4
2015	121,186	59,331	49		0	(59,331)	-49	-94,086	-3	-64,825	-3	-34,957	-4
2016	663,573	38,793	6		0	(38,793)	-6	-94,619	-3	-71,482	-3	-35,213	-5
2017	198,352	444,083	224		0	(444,083)	-224	-180,736	-55	-153,027	-8	-60,768	-8
2018	198,973	77,796	39	(872)	(0)	(76,924)	-39	-186,600	-53	-160,973	-8	-61,718	-9
2019	683,573	1,176,378	172		0	(1,176,378)	-172	-565,795	-157	-359,102	-96	-123,644	-18
2020	3,945,344	45,993	1		0	(45,993)	-1	-433,098	-27	-356,434	-31	-119,557	-14
2021	371,830	726,266	195		0	(726,266)	-195	-649,546	-39	-493,929	-46	-149,892	-18
2022	214,215	65,691	31		0	(65,691)	-31	-279,317	-18	-418,250	-39	-145,883	-18
TOTAL	**17,165,804**	**3,064,405**	**17.85**	**-872**	**(0.01)**	**-3,063,533**	**(17.85)**						

Kentucky - American Water Company
ACCOUNT 320.2 - WATER TREATMENT EQUIPMENT - FILTER MEDIA
SUMMARY OF BOOK SALVAGE

Year	Regular Retirements	Cost of Removal Amount	Cost of Removal Percent	Gross Salvage Amount	Gross Salvage Percent	Net Salvage Amount	Net Salvage Percent	3-Year Amount	3-Year Percent	5-Year Amount	5-Year Percent	Historical Amount	Historical Percent
1999			0		0	0	0						0
2000			0		0	0	0						0
2001			0		0	0	0	0	0				0
2002			0		0	0	0	0	0				0
2003			0		0	0	0	0	0	0	0		0
2004			0		0	0	0	0	0	0	0		0
2005			0		0	0	0	0	0	0	0		0
2006			0		0	0	0	0	0	0	0		0
2007			0		0	0	0	0	0	0	0		0
2008			0		0	0	0	0	0	0	0		0
2009			0		0	0	0	0	0	0	0		0
2010			0		0	0	0	0	0	0	0		0
2011			0		0	0	0	0	0	0	0		0
2012			0		0	0	0	0	0	0	0		0
2013			0		0	0	0	0	0	0	0		0
2014			0		0	0	0	0	0	0	0		0
2015			0		0	0	0	0	0	0	0		0
2016	5,000	1,042	21		0	(1,042)	-21	-347	-21	-208	-21	-1,042	-21
2017	112,481	183,619	163		0	(183,619)	-163	-61,554	-157	-36,932	-157	-92,330	-157
2018			0		0	0	0	-61,554	-157	-36,932	-157	-92,330	-157
2019			0		0	0	0	-61,206	-163	-36,932	-157	-92,330	-157
2020	32,563	668	2		0	(668)	-2	-223	-2	-37,066	-124	-61,776	-124
2021			0		0	0	0	-223	-2	-36,857	-127	-61,776	-124
2022			0		0	0	0	-223	-2	-134	-2	-61,776	-124
TOTAL	**150,044**	**185,328**	**123.52**	**0**	**0.00**	**-185,328**	**(123.52)**						

Kentucky - American Water Company

ACCOUNTS 330.0 - 330.4 - DISTRIBUTION RESERVOIRS AND STANDPIPES

SUMMARY OF BOOK SALVAGE

Year	Regular Retirements	Cost of Removal Amount	Cost of Removal Percent	Gross Salvage Amount	Gross Salvage Percent	Net Salvage Amount	Net Salvage Percent	3-Year Amount	3-Year Percent	5-Year Amount	5-Year Percent	Historical Amount	Historical Percent
2000	4,223	712	17		0	(712)	-17					-712	-17
2001	5,938		0		0	0	0					-712	-7
2002		3,550	0		0	(3,550)	0	-1,421	-42			-2,131	-42
2003	29,652	16,831	57		0	(16,831)	-57	-6,794	-57			-7,031	-53
2004	200	67	34		0	(67)	-34	-6,816	-68	-4,232	-53	-5,290	-53
2005	2,000		0		0	0	0	-5,633	-53	-4,090	-54	-5,290	-50
2006			0		0	0	0	-22	-3	-4,090	-64	-5,290	-50
2007			0		0	0	0	0	0	-3,380	-53	-5,290	-50
2008	10,495	(99)	(1)		0	99	1	33	1	6	0	-4,212	-40
2009	9,520		0		0	0	0	33	0	20	0	-4,212	-34
2010	433		0		0	0	0	33	0	20	0	-4,212	-34
2011	24,996	6,582	26		0	(6,582)	-26	-2,194	-19	-1,297	-14	-4,607	-32
2012	20,762	4,706	23		0	(4,706)	-23	-3,763	-24	-2,238	-17	-4,621	-30
2013			0		0	0	0	-3,763	-25	-2,258	-20	-4,621	-30
2014	338,000		0		0	0	0	-1,569	-1	-2,258	-3	-4,621	-7
2015	1,250	252	20		0	(252)	-20	-84	0	-2,308	-3	-4,075	-7
2016	3,550	1,970	55		0	(1,970)	-55	-740	-1	-1,385	-2	-3,841	-8
2017	184,170	245,498	133		0	(245,498)	-133	-82,573	-131	-49,544	-47	-28,007	-44
2018	8,475	24,878	294	(137,092)	(1,618)	112,214	1,324	-45,085	-69	-27,101	-25	-15,260	-26
2019	526	7,509	1,428		0	(7,509)	-1,428	-46,931	-73	-28,603	-72	-14,614	-27
2020	149,897		0		0	0	0	34,902	66	-28,553	-41	-14,614	-22
2021			0		0	0	0	-2,503	-5	-28,159	-41	-14,614	-22
2022		34,984.92	0		0	(34,985)	0	-11,662	-23	13,944	44	-16,181	-26
TOTAL	**794,087**	**347,441**	**43.75**	**-137,092**	**(17.26)**	**-210,349**	**(26.49)**						

Kentucky - American Water Company
ACCOUNT 331.01 - MAINS - TRANSMISSION AND DISTRIBUTION
SUMMARY OF BOOK SALVAGE

Year	Regular Retirements	Cost of Removal Amount	Cost of Removal Percent	Gross Salvage Amount	Gross Salvage Percent	Net Salvage Amount	Net Salvage Percent	3-Year Amount	3-Year Percent	5-Year Amount	5-Year Percent	Historical Amount	Historical Percent
1999	235,231	60,239	26	(3,289)	(1)	(56,950)	-24					-56,950	-24
2000	294,500	55,808	19	(500)	(0)	(55,308)	-19					-56,129	-21
2001	74,947	22,269	30		0	(22,269)	-30	-44,842	-22			-44,842	-22
2002	426,067	75,242	18		0	(75,242)	-18	-50,940	-19			-52,442	-20
2003	48,141	57,712	120		0	(57,712)	-120	-51,741	-28	-53,496	-25	-53,496	-25
2004	123,602	43,334	35		0	(43,334)	-35	-58,763	-29	-50,773	-26	-51,803	-26
2005	254,241	58,110	23		0	(58,110)	-23	-53,052	-37	-51,333	-28	-52,704	-25
2006	31,765	426	1	(6,217)	(20)	5,791	18	-31,884	-23	-45,721	-26	-45,392	-24
2007	213,458	1,414	1		0	(1,414)	-1	-17,911	-11	-30,956	-23	-40,505	-21
2008	428,665	26,733	6		0	(26,733)	-6	-7,452	-3	-24,760	-12	-39,128	-18
2009	73,678	24,456	33	(3,376)	(5)	(21,080)	-29	-16,409	-7	-20,309	-10	-37,487	-19
2010	97,670	69,246	71	(306)	(0)	(68,940)	-71	-38,918	-19	-22,475	-13	-40,108	-21
2011	154,083	53,430	35		0	(53,430)	-35	-47,817	-44	-34,319	-18	-41,133	-22
2012	174,408	77,094	44		0	(77,094)	-44	-66,488	-47	-49,455	-27	-43,702	-23
2013	41,835	142,137	340	(1,422)	(3)	(140,715)	-336	-90,413	-73	-72,252	-67	-50,169	-28
2014	87,202	170,711	196	(4,031)	(5)	(166,680)	-191	-128,163	-127	-101,372	-91	-57,451	-33
2015	339,588	142,928	42	(4,535)	(1)	(138,394)	-41	-148,596	-95	-115,263	-72	-62,213	-34
2016	769,639	583,156	76	(7,458)	(1)	(575,699)	-75	-293,591	-74	-219,716	-78	-90,740	-42
2017	243,770	505,803	207	(4,622)	(2)	(501,181)	-206	-405,091	-90	-304,534	-103	-112,342	-52
2018	591,434	358,969	61	(2,337)	(0)	(356,632)	-60	-477,837	-89	-347,717	-86	-124,556	-53
2019	679,767	1,227,685	181	(2,920)	(0)	(1,224,764)	-180	-694,192	-137	-559,334	-107	-176,947	-69
2020	1,509,376	807,559	54	(8,307)	(1)	(799,251)	-53	-793,549	-86	-691,505	-91	-205,234	-66
2021	(596,068)	1,969,584	(330)	(7,485)	1	(1,962,099)	329	-1,328,705	-250	-968,785	-199	-281,619	-103
2022	483,127	3,529,391	731	(507)	(0)	(3,528,883)	-730	-2,096,744	-450	-1,574,326	-295	-416,922	-148
TOTAL	**6,780,125**	**10,063,436**	**148.43**	**-57,313**	**(0.85)**	**-10,006,123**	**(147.58)**						

Kentucky - American Water Company
ACCOUNT 333 - SERVICES
SUMMARY OF BOOK SALVAGE

Year	Regular Retirements	Cost of Removal Amount	Cost of Removal Percent	Gross Salvage Amount	Gross Salvage Percent	Net Salvage Amount	Net Salvage Percent	3-Year Amount	3-Year Percent	5-Year Amount	5-Year Percent	Historical Amount	Historical Percent
1999	62,418	54,393	87		0	(54,393)	-87					-54,393	-87
2000	67,606	97,070	144		0	(97,070)	-144					-75,732	-116
2001	34,642	232,835	672		0	(232,835)	-672	-128,099	-233			-128,099	-233
2002	79,096	178,730	226		0	(178,730)	-226	-169,545	-280			-140,757	-231
2003	40,216	116,666	290		0	(116,666)	-290	-176,077	-343	-135,939	-239	-135,939	-239
2004	2,817	122,957	4,365		0	(122,957)	-4,365	-139,451	-343	-149,652	-333	-133,775	-280
2005	15,153	74,724	493		0	(74,724)	-493	-104,782	-540	-145,182	-422	-125,339	-291
2006	3,882	42,824	1,103		0	(42,824)	-1,103	-80,168	-1,101	-107,180	-380	-115,025	-301
2007	295,572	12,130	4		0	(12,130)	-4	-43,226	-41	-73,860	-103	-103,592	-155
2008	570,463	94,867	17		0	(94,867)	-17	-49,940	-17	-69,500	-39	-102,720	-88
2009	6,555	63,971	976	(7,267)	(111)	(56,704)	-865	-54,567	-19	-56,250	-32	-98,536	-92
2010	92,478	73,276	79	(8,284)	(9)	(64,992)	-70	-72,188	-32	-54,303	-28	-95,741	-90
2011	298,419	72,559	24	(6,652)	(2)	(65,907)	-22	-62,534	-47	-58,920	-23	-93,446	-77
2012	303,411	183,802	61	(7,277)	(2)	(176,525)	-58	-102,475	-44	-91,799	-36	-99,380	-74
2013	262,026	14,364	5	(4,393)	(2)	(9,971)	-4	-84,134	-29	-74,820	-39	-93,420	-66
2014	222,876	81,713	37	(238)	(0)	(81,475)	-37	-89,324	-34	-79,774	-34	-92,673	-63
2015	208,541	110,707	53	(602)	(0)	(110,105)	-53	-67,184	-29	-88,797	-34	-93,699	-62
2016	89,343	48,295	54	(70)	(0)	(48,225)	-54	-79,935	-46	-85,260	-39	-91,172	-62
2017	85,794	86,665	101		0	(86,665)	-101	-81,665	-64	-67,288	-39	-90,935	-63
2018	42,318	266,123	629		0	(266,123)	-629	-133,671	-184	-118,518	-91	-99,694	-72
2019	612,868	265,330	43	(1,507)	(0)	(263,823)	-43	-205,537	-83	-154,988	-75	-107,510	-66
2020	231,169	93,048	40	(2,078)	(1)	(90,970)	-39	-206,972	-70	-151,161	-71	-106,758	-65
2021	140,565	128,239	91	(133)	(0)	(128,106)	-91	-160,966	-49	-167,137	-75	-107,686	-66
2022	787,131	163,874	21	(41)	(0)	(163,833)	-21	-127,636	-33	-182,571	-50	-110,026	-58
TOTAL	**4,555,361**	**2,679,161**	**58.81**	**-38,542**	**(0.85)**	**-2,640,619**	**(57.97)**						

Kentucky - American Water Company
ACCOUNT 334.1 - METERS
SUMMARY OF BOOK SALVAGE

Year	Regular Retirements	Cost of Removal Amount	Cost of Removal Percent	Gross Salvage Amount	Gross Salvage Percent	Net Salvage Amount	Net Salvage Percent	3-Year Amount	3-Year Percent	5-Year Amount	5-Year Percent	Historical Amount	Historical Percent
2005	17,385		0		0	0	0						0
2006			0		0	0	0						0
2007			0		0	0	0	0	0				0
2008			0		0	0	0	0	0				0
2009		1,164	0	(35,820)	0	34,656	0	11,552	0	6,931	199	34,656	199
2010	201,717		0		0	0	0	11,552	17	6,931	17	34,656	16
2011	2,102,887		0		0	0	0	11,552	2	6,931	2	34,656	1
2012	83,515		0		0	0	0	0	0	6,931	1	34,656	1
2013	88,889		0		0	0	0	0	0	6,931	1	34,656	1
2014	241		0		0	0	0	0	0	0	0	34,656	1
2015	187	3,567	1,904		0	(3,567)	-1,904	-1,189	-4	-713	0	15,544	1
2016	347	15,511	4,465		0	(15,511)	-4,465	-6,359	-2,459	-3,816	-11	5,193	1
2017		519	0		0	(519)	0	-6,533	-3,665	-3,920	-22	3,765	1
2018	22,499	335,696	1,492		0	(335,696)	-1,492	-117,242	-1,540	-71,059	-1,526	-64,127	-13
2019	90,612	422,078	466	(23,128)	(26)	(398,950)	-440	-245,055	-650	-150,849	-664	-119,931	-28
2020	147,057	12,048	8		0	(12,048)	-8	-248,898	-287	-152,545	-293	-104,519	-27
2021	112,836	23,672	21	(231)	(0)	(23,440)	-21	-144,813	-124	-154,131	-207	-94,384	-26
2022	(119,491)	468,628	(392)	(11,011)	9	(457,617)	383	-164,368	-351	-245,550	-484	-134,744	-44
TOTAL	**2,748,683**	**1,282,884**	**46.67**	**-70,191**	**(2.55)**	**-1,212,693**	**(44.12)**						

Kentucky - American Water Company
ACCOUNT 334.11 - METERS - BRONZE CASE
SUMMARY OF BOOK SALVAGE

Year	Regular Retirements	Cost of Removal Amount	Cost of Removal Percent	Gross Salvage Amount	Gross Salvage Percent	Net Salvage Amount	Net Salvage Percent	3-Year Amount	3-Year Percent	5-Year Amount	5-Year Percent	Historical Amount	Historical Percent
2002	1,267		0		0	0	0						0
2003	550		0		0	0	0						0
2004	386		0		0	0	0	0	0				0
2005	5,451		0		0	0	0	0	0				0
2006	20,076		0		0	0	0	0	0	0	0		0
2007			0		0	0	0	0	0	0	0		0
2008			0		0	0	0	0	0	0	0		0
2009			0		0	0	0	0	0	0	0		0
2010			0		0	0	0	0	0	0	0		0
2011			0		0	0	0	0	0	0	0		0
2012			0		0	0	0	0	0	0	0		0
2013			0		0	0	0	0	0	0	0		0
2014			0		0	0	0	0	0	0	0		0
2015			0		0	0	0	0	0	0	0		0
2016	44		0		0	0	0	0	0	0	0		0
2017			0		0	0	0	0	0	0	0		0
2018			0		0	0	0	0	0	0	0		0
2019		22,075	0		0	(22,075)	0	-7,358	0	-4,415	-50,470	-22,075	-79
2020		(0)	0		0	0	0	-7,358	0	-4,415	-50,470	-11,038	-79
2021			0		0	0	0	-7,358	0	-4,415	0	-11,038	-79
2022	(43)		0		0	0	0	0	0	-4,415	51,065	-11,038	-80
TOTAL	**27,731**	**22,075**	**79.61**	**0**	**0.00**	**-22,075**	**(79.61)**						

Kentucky - American Water Company

ACCOUNT 334.12 - METERS - PLASTIC CASE

SUMMARY OF BOOK SALVAGE

Year	Regular Retirements	Cost of Removal Amount	Cost of Removal Percent	Gross Salvage Amount	Gross Salvage Percent	Net Salvage Amount	Net Salvage Percent	3-Year Amount	3-Year Percent	5-Year Amount	5-Year Percent	Historical Amount	Historical Percent
1999	35,543		0		0	0	0						0
2000	19,870		0		0	0	0						0
2001	9,679		0		0	0	0	0	0				0
2002	40,801		0		0	0	0	0	0				0
2003	157,987		0		0	0	0	0	0	0	0		0
2004	27,257		0		0	0	0	0	0	0	0		0
2005	46,500		0		0	0	0	0	0	0	0		0
2006	71,744		0		0	0	0	0	0	0	0		0
2007			0		0	0	0	0	0	0	0		0
2008	517,756		0		0	0	0	0	0	0	0		0
2009	219,418	27,630	13	(65,401)	(30)	37,771	17	12,590	5	7,554	4	37,771	3
2010			0		0	0	0	12,590	5	7,554	5	37,771	3
2011			0		0	0	0	12,590	17	7,554	5	37,771	3
2012			0		0	0	0	0	0	7,554	5	37,771	3
2013			0		0	0	0	0	0	7,554	17	37,771	3
2014			0		0	0	0	0	0	0	0	37,771	3
2015	1,428	3,727	261		0	(3,727)	-261	-1,242	-261	-745	-261	17,022	3
2016			0		0	0	0	-1,242	-261	-745	-261	17,022	3
2017			0		0	0	0	-1,242	-261	-745	-261	17,022	3
2018			0		0	0	0	0	0	-745	-261	17,022	3
2019	1,719	4,052	236	(4,066)	(236)	14	1	5	1	-743	-118	11,353	3
2020	1,071	913	85		0	(913)	-85	-300	-32	-180	-32	8,286	3
2021	(1,013)	3,713	(367)		0	(3,713)	367	-1,537	-259	-922	-259	5,886	3
2022		0	0		0	(0)	0	-1,542	-7,869	-922	-259	4,905	3
TOTAL	**1,149,761**	**40,035**	**3.48**	**-69,466**	**(6.04)**	**29,432**	**2.56**						

Kentucky - American Water Company
ACCOUNT 334.13 - METERS - OTHER
SUMMARY OF BOOK SALVAGE

Year	Regular Retirements	Cost of Removal Amount	Cost of Removal Percent	Gross Salvage Amount	Gross Salvage Percent	Net Salvage Amount	Net Salvage Percent	3-Year Amount	3-Year Percent	5-Year Amount	5-Year Percent	Historical Amount	Historical Percent
1999	33,632		0		0	0	0						0
2000	33,099		0		0	0	0						0
2001	31,358		0		0	0	0	0	0				0
2002	39,220		0		0	0	0	0	0				0
2003	225,736		0		0	0	0	0	0	0	0		0
2004	56,147		0		0	0	0	0	0	0	0		0
2005	47,175		0		0	0	0	0	0	0	0		0
2006	92,883		0		0	0	0	0	0	0	0		0
2007			0		0	0	0	0	0	0	0		0
2008	79,827		0		0	0	0	0	0	0	0		0
2009	115,301	6,225	5	(12,830)	(11)	6,605	6	2,202	3	1,321	2	6,605	1
2010			0		0	0	0	2,202	3	1,321	2	6,605	1
2011			0		0	0	0	2,202	6	1,321	3	6,605	1
2012			0		0	0	0	0	0	1,321	3	6,605	1
2013			0		0	0	0	0	0	1,321	6	6,605	1
2014			0		0	0	0	0	0	0	0	6,605	1
2015	119	168	142		0	(168)	-142	-56	-142	-34	-142	3,218	1
2016			0		0	0	0	-56	-142	-34	-142	3,218	1
2017	3		0		0	0	0	-56	-138	-34	-138	3,218	1
2018	4	1,610	44,478		0	(1,610)	-44,478	-537	-23,539	-356	-1,415	1,609	1
2019	18	4,028	22,758		0	(4,028)	-22,758	-1,879	-22,976	-1,161	-4,050	200	0
2020			0		0	0	0	-1,879	-26,446	-1,128	-22,976	200	0
2021		0	0		0	(0)	0	-1,343	-22,758	-1,128	-22,976	160	0
2022		19,054	0	(14)	0	(19,040)	0	-6,347	0	-4,936	-115,751	-3,040	-2
TOTAL	**754,521**	**31,085**	**4.12**	**-12,844**	**(1.70)**	**-18,241**	**(2.42)**						

Kentucky - American Water Company
ACCOUNT 334.2 - METER INSTALLATIONS
SUMMARY OF BOOK SALVAGE

Year	Regular Retirements	Cost of Removal Amount	Cost of Removal Percent	Gross Salvage Amount	Gross Salvage Percent	Net Salvage Amount	Net Salvage Percent	3-Year Amount	3-Year Percent	5-Year Amount	5-Year Percent	Historical Amount	Historical Percent
1999	20,848		0		0	0	0						0
2000	31,912		0		0	0	0						0
2001	18,429		0		0	0	0	0	0				0
2002	26,956		0		0	0	0	0	0				0
2003	193,755		0		0	0	0	0	0	0	0		0
2004	471		0		0	0	0	0	0	0	0		0
2005			0		0	0	0	0	0	0	0		0
2006			0		0	0	0	0	0	0	0		0
2007	409,921	15,138	4	(1,869)	(0)	(13,269)	-3	-4,423	-3	-2,654	-2	-13,269	-2
2008	12,761	(3,486)	(27)		0	3,486	27	-3,261	-2	-1,957	-2	-4,891	-1
2009	11,123	28,585	257	(1,113)	(10)	(27,472)	-247	-12,418	-9	-7,451	-9	-12,418	-5
2010	6,862		0		0	0	0	-7,995	-78	-7,451	-8	-12,418	-5
2011	6,734		0		0	0	0	-9,157	-111	-7,451	-8	-12,418	-5
2012	23,808		0		0	0	0	0	0	-4,797	-39	-12,418	-5
2013	2,467		0		0	0	0	0	0	-5,494	-54	-12,418	-5
2014	24,937		0		0	0	0	0	0	0	0	-12,418	-5
2015	12,237	182,532	1,492	(7,427)	(61)	(175,105)	-1,431	-58,368	-442	-35,021	-250	-53,090	-26
2016	13,311	59,442	447	(13,028)	(98)	(46,414)	-349	-73,839	-439	-44,304	-289	-51,755	-32
2017	126,479	89,137	70	(7,901)	(6)	(81,237)	-64	-100,918	-199	-60,551	-169	-56,668	-36
2018	298,519	40,949	14		0	(40,949)	-14	-56,200	-38	-68,741	-72	-54,423	-31
2019	203,158	75,734	37	(11,551)	(6)	(64,182)	-32	-62,122	-30	-81,577	-62	-55,643	-31
2020	123,335	149,384	121	(8,406)	(7)	(140,978)	-114	-82,036	-39	-74,752	-49	-65,124	-37
2021	(88,164)	246,943	(280)	(11,738)	13	(235,205)	267	-146,788	-185	-112,510	-85	-82,132	-56
2022	61,571	59,733	97	(2,603)	(4)	(57,130)	-93	-144,438	-448	-107,689	-90	-79,859	-57
TOTAL	**1,541,428**	**944,090**	**61.25**	**-65,636**	**(4.26)**	**-878,454**	**(56.99)**						

Kentucky - American Water Company
ACCOUNT 334.3 - METER VAULTS
SUMMARY OF BOOK SALVAGE

Year	Regular Retirements	Cost of Removal Amount	Cost of Removal Percent	Gross Salvage Amount	Gross Salvage Percent	Net Salvage Amount	Net Salvage Percent	3-Year Amount	3-Year Percent	5-Year Amount	5-Year Percent	Historical Amount	Historical Percent
2011	643		0		0	0	0						0
2012	909		0		0	0	0						0
2013	1,319		0		0	0	0	0	0				0
2014	15,247		0		0	0	0	0	0				0
2015	3,513	4,769	136		0	(4,769)	-136	-1,590	-24	-954	-22	-4,769	-22
2016	5,928	11,634	196		0	(11,634)	-196	-5,468	-66	-3,281	-61	-8,202	-60
2017	46,684	30,580	66	(54)	(0)	(30,526)	-65	-15,643	-84	-9,386	-65	-15,643	-63
2018	23,207	31,793	137		0	(31,793)	-137	-24,651	-98	-15,745	-83	-19,681	-81
2019	8,948	7,186	80		0	(7,186)	-80	-23,169	-88	-17,182	-97	-17,182	-81
2020	3,370	91,992	2,730	(9,026)	(268)	(82,966)	-2,462	-40,649	-343	-32,821	-186	-28,146	-154
2021	9,209	73,174	795	(14,898)	(162)	(58,276)	-633	-49,476	-690	-42,150	-231	-32,450	-191
2022	13,269	99,884	753	(123)	(1)	(99,760)	-752	-80,334	-932	-55,996	-483	-40,864	-247
TOTAL	**132,244**	**351,013**	**265.43**	**-24,101**	**(18.22)**	**-326,911**	**(247.20)**						

Kentucky - American Water Company
ACCOUNT 335 - FIRE HYDRANTS
SUMMARY OF BOOK SALVAGE

Year	Regular Retirements	Cost of Removal Amount	Cost of Removal Percent	Gross Salvage Amount	Gross Salvage Percent	Net Salvage Amount	Net Salvage Percent	3-Year Amount	3-Year Percent	5-Year Amount	5-Year Percent	Historical Amount	Historical Percent
1999	6,437	1,831	28	(685)	(11)	(1,146)	-18					-1,146	-18
2000	8,303	2,385	29	(263)	(3)	(2,122)	-26					-1,634	-22
2001	11,529	5,833	51		0	(5,833)	-51	-3,034	-35			-3,034	-35
2002	19,766	846	4		0	(846)	-4	-2,934	-22			-2,487	-22
2003	4,262		0		0	0	0	-2,226	-19	-1,989	-20	-2,487	-20
2004	10,660		0		0	0	0	-282	-2	-1,760	-16	-2,487	-16
2005	13,469	2,091	16		0	(2,091)	-16	-697	-7	-1,754	-15	-2,408	-16
2006	17,275	898	5		0	(898)	-5	-996	-7	-767	-6	-2,156	-14
2007	1,716	16	1		0	(16)	-1	-1,002	-9	-601	-6	-1,850	-14
2008	35,914	1,770	5		0	(1,770)	-5	-895	-5	-955	-6	-1,840	-11
2009	12,061	7,453	62		0	(7,453)	-62	-3,080	-19	-2,446	-15	-2,464	-16
2010	5,633	25,354	450		0	(25,354)	-450	-11,526	-64	-7,098	-49	-4,753	-32
2011	9,422	38,057	404		0	(38,057)	-404	-23,621	-261	-14,530	-112	-7,781	-55
2012	11,285	37,368	331		0	(37,368)	-331	-33,593	-383	-22,000	-148	-10,246	-73
2013	5,864	11,977	204	(28)	(0)	(11,949)	-204	-29,125	-329	-24,036	-272	-10,377	-78
2014	23,546	43,146	183	(1,499)	(6)	(41,647)	-177	-30,321	-224	-30,875	-277	-12,611	-90
2015	25,761	35,534	138	(1,529)	(6)	(34,005)	-132	-29,200	-159	-32,605	-215	-14,037	-94
2016	58,725	37,528	64	(221)	(0)	(37,307)	-64	-37,653	-105	-32,455	-130	-15,491	-88
2017	55,571	39,384	71	(484)	(1)	(38,900)	-70	-36,738	-79	-32,762	-97	-16,868	-85
2018	306,156	244,789	80		0	(244,789)	-80	-106,999	-76	-79,330	-84	-29,531	-83
2019	416,188	317,124	76	(0)	(0)	(317,124)	-76	-200,271	-77	-134,425	-78	-44,667	-80
2020	393,434	138,102	35		0	(138,102)	-35	-233,338	-63	-155,244	-63	-49,339	-68
2021	(250,490)	210,191	(84)	(0)	0	(210,191)	84	-221,806	-119	-189,821	-103	-56,999	-100
2022	199,720	(9,507)	(5)	(27)	(0)	9,535	5	-112,919	-99	-180,134	-85	-53,974	-85
TOTAL	**1,402,208**	**1,192,170**	**85.02**	**-4,736**	**(0.34)**	**-1,187,434**	**(84.68)**						

Kentucky - American Water Company
ACCOUNT 341.1 - TRANSPORTATION EQUIPMENT - LIGHT TRUCKS
SUMMARY OF BOOK SALVAGE

Year	Regular Retirements	Cost of Removal Amount	Cost of Removal Percent	Gross Salvage Amount	Gross Salvage Percent	Net Salvage Amount	Net Salvage Percent	3-Year Amount	3-Year Percent	5-Year Amount	5-Year Percent	Historical Amount	Historical Percent
1999	44,574	2,850	6	(11,675)	(26)	8,825	20					8,825	20
2000	94,444	5,440	6	(16,729)	(18)	11,289	12					10,057	14
2001	90,536		0		0	0	0	6,705	9			10,057	9
2002		7,629	0	(30,000)	0	22,371	0	11,220	18			14,162	19
2003	52,861	1,010	2	(13,321)	(25)	12,311	23	11,561	24	10,959	19	13,699	19
2004	27,211		0		0	0	0	11,561	43	9,194	17	13,699	18
2005	18,273		0		0	0	0	4,104	13	6,936	18	13,699	17
2006	197,839	(11,832)	(6)		0	11,832	6	3,944	5	9,303	16	13,326	13
2007	54,895		0		0	0	0	3,944	4	4,829	7	13,326	11
2008	130,678		0	(26,576)	(20)	26,576	20	12,803	10	7,682	9	15,534	13
2009	75,134		0	(10,582)	(14)	10,582	14	12,386	14	9,798	10	14,827	13
2010	65,599		0	(7,123)	(11)	7,123	11	14,760	16	11,223	11	13,864	13
2011			0		0	0	0	5,902	13	8,856	14	13,864	13
2012	854,991		0	(127,917)	(15)	127,917	15	45,013	15	34,440	15	26,536	14
2013	44,078	(156)	(0)	(49,340)	(112)	49,496	112	59,138	20	39,024	19	28,832	16
2014	799,297		0	(33,914)	(4)	33,914	4	70,442	12	43,690	12	29,294	13
2015	48,442		0	(12,000)	(25)	12,000	25	31,803	11	44,665	13	27,853	13
2016	128,191		0	(56,700)	(44)	56,700	44	34,205	11	56,005	15	30,072	14
2017	80,817		0	(209,851)	(260)	209,851	260	92,850	108	72,392	33	42,913	21
2018	154,521		0	(65,252)	(42)	65,252	42	110,601	91	75,543	31	44,403	22
2019			0		0	0	0	91,701	117	68,761	83	44,403	22
2020			0		0	0	0	21,751	42	66,361	91	44,403	22
2021			0		0	0	0	0	0	55,021	117	44,403	22
2022			0	(42,128)	0	42,128	0	14,043	0	21,476	69	44,260	24
TOTAL	**2,962,382**	**4,941**	**0.17**	**-713,108**	**(24.07)**	**708,167**	**23.91**						

Kentucky - American Water Company
ACCOUNT 341.2 - TRANSPORTATION EQUIPMENT - HEAVY TRUCKS
SUMMARY OF BOOK SALVAGE

Year	Regular Retirements	Cost of Removal Amount	Cost of Removal Percent	Gross Salvage Amount	Gross Salvage Percent	Net Salvage Amount	Net Salvage Percent	3-Year Amount	3-Year Percent	5-Year Amount	5-Year Percent	Historical Amount	Historical Percent
2000	89,605	5,830	7	(19,045)	(21)	13,215	15					13,215	15
2001	18,235		0		0	0	0					13,215	12
2002		3,340	0	(6,102)	0	2,762	0	5,326	15			7,989	15
2003			0		0	0	0	921	15			7,989	15
2004			0		0	0	0	921	0	3,195	15	7,989	15
2005			0		0	0	0	0	0	552	15	7,989	15
2006	47,659	(1,060)	(2)		0	1,060	2	353	2	764	8	5,679	11
2007	65,892		0		0	0	0	353	1	212	1	5,679	8
2008			0	(8,613)	0	8,613	0	3,224	9	1,935	9	6,413	12
2009	62,521		0	(3,870)	(6)	3,870	6	4,161	10	2,709	8	5,904	10
2010			0	(4,275)	0	4,275	0	5,586	27	3,564	10	5,633	12
2011	33,692		0	(1,799)	(5)	1,799	5	3,315	10	3,711	11	5,085	11
2012	108,574		0	(9,111)	(8)	9,111	8	5,062	11	5,534	14	5,588	10
2013	105,115		0	(40,334)	(38)	40,334	38	17,081	21	11,878	19	9,449	16
2014	635,200		0	(78,640)	(12)	78,640	12	42,695	15	26,832	15	16,368	14
2015	16,322		0		0	0	0	39,658	16	25,977	14	16,368	14
2016	67,513		0	(3,407)	(5)	3,407	5	27,349	11	26,298	14	15,190	13
2017	4,076		0		0	0	0	1,136	4	24,476	15	15,190	13
2018	152,858		0	(28,004)	(18)	28,004	18	10,470	14	22,010	13	16,257	14
2019			0		0	0	0	9,335	18	6,282	13	16,257	14
2020	8,448		0		0	0	0	9,335	17	6,282	13	16,257	14
2021			0		0	0	0	0	0	5,601	17	16,257	14
2022			0	(15,020)	0	15,020	0	5,007	178	8,605	27	16,162	15
TOTAL	**1,415,709**	**8,110**	**0.57**	**-218,220**	**(15.41)**	**210,110**	**14.84**						

Kentucky - American Water Company
ACCOUNT 341.3 - TRANSPORTATION EQUIPMENT - AUTOS
SUMMARY OF BOOK SALVAGE

Year	Regular Retirements	Cost of Removal Amount	Cost of Removal Percent	Gross Salvage Amount	Gross Salvage Percent	Net Salvage Amount	Net Salvage Percent	3-Year Amount	3-Year Percent	5-Year Amount	5-Year Percent	Historical Amount	Historical Percent
1999	32,082		0	(5,300)	(17)	5,300	17					5,300	17
2000			0		0	0	0					5,300	17
2001			0		0	0	0	1,767	17			5,300	17
2002	12,116	700	6		0	(700)	-6	-233	-6			2,300	10
2003	2,900		0		0	0	0	-233	-5	920	10	2,300	10
2004			0		0	0	0	-233	-5	-140	-5	2,300	10
2005			0		0	0	0	0	0	-140	-5	2,300	10
2006			0		0	0	0	0	0	-140	-5	2,300	10
2007			0		0	0	0	0	0	0	0	2,300	10
2008	61,308		0	(7,589)	(12)	7,589	12	2,530	12	1,518	12	4,063	11
2009	15,899		0	(125)	(1)	125	1	2,571	10	1,543	10	3,079	10
2010			0		0	0	0	2,571	10	1,543	10	3,079	10
2011	16,926		0	(10,107)	(60)	10,107	60	3,411	31	3,564	19	4,484	16
2012	91,285		0	(2,070)	(2)	2,070	2	4,059	11	3,978	11	4,082	11
2013	39,466	(310)	(1)	(26,608)	(67)	26,918	68	13,032	26	7,844	24	7,344	19
2014	27,206		0	(8,900)	(33)	8,900	33	12,629	24	9,599	27	7,539	20
2015			0		0	0	0	11,939	54	9,599	27	7,539	20
2016	31,569		0		0	0	0	2,967	15	7,578	20	7,539	18
2017			0		0	0	0	0	0	7,164	36	7,539	18
2018			0	(28,300)	0	28,300	0	9,433	90	7,440	63	9,845	27
2019			0		0	0	0	9,433	0	5,660	90	9,845	27
2020			0		0	0	0	9,433	0	5,660	90	9,845	27
2021			0		0	0	0	0	0	5,660	0	9,845	27
2022			0		0	0	0	0	0	5,660	0	9,845	27
TOTAL	**330,757**	**390**	**0.12**	**-88,999**	**(26.91)**	**88,609**	**26.79**						

Kentucky - American Water Company
ACCOUNT 341.4 - TRANSPORTATION EQUIPMENT - OTHER
SUMMARY OF BOOK SALVAGE

Year	Regular Retirements	Cost of Removal Amount	Cost of Removal Percent	Gross Salvage Amount	Gross Salvage Percent	Net Salvage Amount	Net Salvage Percent	3-Year Amount	3-Year Percent	5-Year Amount	5-Year Percent	Historical Amount	Historical Percent
2007	972		0		0	0	0						0
2008			0	(82)	0	82	0					82	8
2009			0	(25)	0	25	0	36	11			54	11
2010	588		0	(8,055)	(1,370)	8,055	1,370	2,721	1,388			2,721	523
2011			0		0	0	0	2,693	1,374	1,632	523	2,721	523
2012	48,421		0	(7,800)	(16)	7,800	16	5,285	32	3,192	33	3,991	32
2013	132,669	1,648	1	(56,050)	(42)	54,402	41	20,734	34	14,056	39	14,073	39
2014	58,959		0	(32,264)	(55)	32,264	55	31,489	39	20,504	43	17,105	42
2015		0	0		0	(0)	0	28,889	45	18,893	39	14,661	42
2016	6,546		0		0	0	0	10,755	49	18,893	38	14,661	41
2017	560		0	(555)	(99)	555	99	185	8	17,444	44	12,898	41
2018			0		0	0	0	185	8	6,564	50	12,898	41
2019			0		0	0	0	185	99	111	8	12,898	41
2020	1,836		0		0	0	0	0	0	111	6	12,898	41
2021			0		0	0	0	0	0	111	23	12,898	41
2022			0		0	0	0	0	0	0	0	12,898	41
TOTAL	**250,551**	**1,648**	**0.66**	**-104,831**	**(41.84)**	**103,183**	**41.18**						

Kentucky - American Water Company
ACCOUNT 345 - POWER OPERATED EQUIPMENT
SUMMARY OF BOOK SALVAGE

Year	Regular Retirements	Cost of Removal Amount	Cost of Removal Percent	Gross Salvage Amount	Gross Salvage Percent	Net Salvage Amount	Net Salvage Percent	3-Year Amount	3-Year Percent	5-Year Amount	5-Year Percent	Historical Amount	Historical Percent
2009	99,826		0	(8,510)	(9)	8,510	9					8,510	9
2010	23,436		0		0	0	0					8,510	7
2011	27,605		0		0	0	0	2,837	6			8,510	6
2012	2,620	525	20		0	(525)	-20	-175	-1			3,993	5
2013			0		0	0	0	-175	-2	1,597	5	3,993	5
2014	153,356	632	0		0	(632)	0	-386	-1	-231	-1	2,451	2
2015			0	(3,076)	0	3,076	0	815	2	384	1	2,607	3
2016	20,996		0		0	0	0	815	1	384	1	2,607	3
2017			0	(4,335)	0	4,335	0	2,470	35	1,356	4	2,953	5
2018			0		0	0	0	1,445	21	1,356	4	2,953	5
2019			0		0	0	0	1,445	0	1,482	35	2,953	5
2020	21,081	1,568	7		0	(1,568)	-7	-523	-7	553	7	2,199	4
2021		3,378	0		0	(3,378)	0	-1,649	-23	-122	-3	1,403	3
2022	21,789	332	2		0	(332)	-2	-1,759	-12	-1,056	-12	1,186	3
TOTAL	**370,709**	**6,435**	**1.74**	**-15,921**	**(4.29)**	**9,486**	**2.56**						

SECTION 8

8 DETAILED DEPRECIATION CALCULATIONS

Kentucky - American Water Company

Account #: 304.100 - Structures & Improvements - Supply

CALCULATED ANNUAL ACCRUAL AND ACCRUED DEPRECIATION

BASED ON ORIGINAL COST AS OF December 31, 2022

ALG - Remaining Life
Survivor Curve: R2.5
ASL: 45
Net Salvage: -15%
Truncation Year:

Year	Original Cost	Calculated Accumulated Depreciation	Allocated Actual Booked Amount	Accumulated Depreciation Factor	Net Book Value	ALG Remaining Life	Annual Accrual	Average Age
1984	6.36	5	4	0.5360	3	14.14	0	38.5
1991	39.99	27	21	0.4584	25	18.58	1	31.5
2002	199,476.16	92,676	72,336	0.3153	157,062	26.82	5,856	20.5
2003	404,298.72	179,443	140,061	0.3012	324,883	27.63	11,757	19.5
2004	42,189.32	17,840	13,924	0.2870	34,593	28.45	1,216	18.5
2006	1,656,048.41	629,557	491,386	0.2580	1,413,069	30.12	46,908	16.5
2008	58,979.41	19,852	15,495	0.2285	52,331	31.83	1,644	14.5
2010	14,388,408.94	4,204,460	3,281,696	0.1983	13,264,974	33.57	395,195	12.5
2012	706,370.32	174,521	136,219	0.1677	676,107	35.33	19,136	10.5
2013	163,104.43	36,573	28,547	0.1522	159,024	36.23	4,390	9.5
2014	1,545,881.13	311,075	242,802	0.1366	1,534,961	37.13	41,345	8.5
2015	93,662.22	16,678	13,017	0.1209	94,694	38.03	2,490	7.5
2016	285,010.40	44,104	34,425	0.1050	293,337	38.94	7,532	6.5
2017	122,713.51	16,111	12,575	0.0891	128,546	39.86	3,225	5.5
2018	266,533.69	28,704	22,404	0.0731	284,109	40.79	6,966	4.5
2019	434,429.72	36,477	28,472	0.0570	471,123	41.71	11,294	3.5
2020	3,060,348.65	183,979	143,600	0.0408	3,375,801	42.65	79,156	2.5
2021	1,108,464.33	40,076	31,280	0.0245	1,243,454	43.59	28,529	1.5
2022	931,778.07	11,260	8,788	0.0082	1,062,756	44.53	23,868	0.5
TOTAL	25,467,743.78	6,043,418	4,717,053		24,570,852		690,508	

COMPOSITE ANNUAL ACCRUAL RATE	2.71%
THEORETICAL ACCUMULATED DEPRECIATION FACTOR	0.19
COMPOSITE AVERAGE AGE (YEARS)	10.16
DIRECTED WEIGHTED ALG COMPOSITE REMAINING LIFE (YEARS)	35.71

Kentucky - American Water Company

Account #: 304.200 - Structures & Improvements - Pumping

CALCULATED ANNUAL ACCRUAL AND ACCRUED DEPRECIATION

BASED ON ORIGINAL COST AS OF December 31, 2022

ALG - Remaining Life
Survivor Curve: R1.5
ASL: 65
Net Salvage: -15%
Truncation Year:

Year	Original Cost	Calculated Accumulated Depreciation	Allocated Actual Booked Amount	Accumulated Depreciation Factor	Net Book Value	ALG Remaining Life	Annual Accrual	Average Age
1934	10,283.77	9,667	11,826	1.0000	0	11.87	0	88.5
1948	2,166.09	1,848	2,455	0.9855	36	16.78	2	74.5
1951	8,700.53	7,234	9,611	0.9606	394	18.00	22	71.5
1955	5,281.79	4,230	5,619	0.9251	455	19.74	23	67.5
1957	24,208.77	18,994	25,235	0.9064	2,605	20.65	126	65.5
1958	23,751.19	18,438	24,495	0.8968	2,818	21.12	133	64.5
1959	51,381.05	39,452	52,414	0.8870	6,674	21.60	309	63.5
1962	4,217.13	3,128	4,155	0.8568	695	23.08	30	60.5
1966	8,053.51	5,675	7,540	0.8141	1,722	25.17	68	56.5
1967	65,756.77	45,707	60,724	0.8030	14,897	25.71	579	55.5
1970	69,922.36	46,535	61,824	0.7688	18,587	27.38	679	52.5
1971	23,550.63	15,435	20,506	0.7572	6,577	27.96	235	51.5
1972	55,567.95	35,849	47,627	0.7453	16,276	28.54	570	50.5
1973	3,602.44	2,287	3,038	0.7333	1,105	29.12	38	49.5
1974	2,872.93	1,793	2,383	0.7212	921	29.72	31	48.5
1975	12,121.04	7,438	9,881	0.7089	4,058	30.32	134	47.5
1978	6,162.43	3,580	4,756	0.6711	2,331	32.16	72	44.5
1987	264,561.62	126,136	167,577	0.5508	136,669	38.05	3,592	35.5
1988	14,014.08	6,512	8,652	0.5368	7,465	38.74	193	34.5
1989	416,036.69	188,246	250,093	0.5227	228,350	39.43	5,792	33.5
1991	26,254.00	11,231	14,921	0.4942	15,271	40.82	374	31.5
1992	1,875,689.30	779,021	1,034,963	0.4798	1,122,080	41.53	27,022	30.5
1993	21,577.08	8,690	11,545	0.4653	13,268	42.24	314	29.5
1997	802.79	282	375	0.4063	548	45.12	12	25.5
1998	21,873.51	7,409	9,843	0.3913	15,312	45.86	334	24.5
1999	778,890.09	253,655	336,992	0.3762	558,732	46.59	11,992	23.5
2006	9,354.00	2,174	2,888	0.2685	7,869	51.86	152	16.5
2007	170,042.12	37,211	49,436	0.2528	146,112	52.63	2,776	15.5

Kentucky - American Water Company

Account #: 304.200 - Structures & Improvements - Pumping

CALCULATED ANNUAL ACCRUAL AND ACCRUED DEPRECIATION

BASED ON ORIGINAL COST AS OF December 31, 2022

ALG - Remaining Life
Survivor Curve: R1.5
ASL: 65
Net Salvage: -15%
Truncation Year:

Year	Original Cost	Calculated Accumulated Depreciation	Allocated Actual Booked Amount	Accumulated Depreciation Factor	Net Book Value	ALG Remaining Life	Annual Accrual	Average Age
2008	100,990.47	20,721	27,529	0.2370	88,610	53.40	1,659	14.5
2010	4,552,377.38	808,906	1,074,667	0.2053	4,160,567	54.96	75,706	12.5
2011	18,733.60	3,069	4,078	0.1893	17,466	55.74	313	11.5
2013	52,732.79	7,170	9,525	0.1571	51,117	57.32	892	9.5
2014	699,722.81	85,319	113,350	0.1409	691,331	58.11	11,897	8.5
2015	7,528.64	812	1,079	0.1246	7,579	58.91	129	7.5
2016	39,193.67	3,671	4,878	0.1082	40,195	59.71	673	6.5
2017	39,418.03	3,131	4,160	0.0918	41,170	60.51	680	5.5
2018	50,059.81	3,262	4,333	0.0753	53,235	61.32	868	4.5
2019	21,742.09	1,105	1,467	0.0587	23,536	62.13	379	3.5
2021	96,254.67	2,109	2,802	0.0253	107,891	63.76	1,692	1.5
2022	40,418.66	298	396	0.0085	46,085	64.58	714	0.5
TOTAL	9,695,868.28	2,627,430	3,489,639		7,660,610		151,206	

COMPOSITE ANNUAL ACCRUAL RATE	1.56%
THEORETICAL ACCUMULATED DEPRECIATION FACTOR	0.36
COMPOSITE AVERAGE AGE (YEARS)	19.78
DIRECTED WEIGHTED ALG COMPOSITE REMAINING LIFE (YEARS)	49.68

Kentucky - American Water Company

Account #: 304.300 - Structures & Improvements - Treatment

CALCULATED ANNUAL ACCRUAL AND ACCRUED DEPRECIATION

BASED ON ORIGINAL COST AS OF December 31, 2022

ALG - Remaining Life
Survivor Curve: R1.5
ASL: 65
Net Salvage: -15%
Truncation Year:

Year	Original Cost	Calculated Accumulated Depreciation	Allocated Actual Booked Amount	Accumulated Depreciation Factor	Net Book Value	ALG Remaining Life	Annual Accrual	Average Age
1925	232.33	229	255	0.9531	13	9.18	1	97.5
1938	876.34	804	892	0.8852	116	13.16	9	84.5
1941	369.39	332	369	0.8678	56	14.18	4	81.5
1959	6,925.11	5,317	5,902	0.7411	2,062	21.60	95	63.5
1970	13,665.34	9,095	10,094	0.6423	5,621	27.38	205	52.5
1971	54,239.73	35,549	39,457	0.6326	22,919	27.96	820	51.5
1972	3,371.98	2,175	2,415	0.6227	1,463	28.54	51	50.5
1973	66.17	42	47	0.6127	29	29.12	1	49.5
1974	4,654.28	2,905	3,225	0.6025	2,128	29.72	72	48.5
1975	723.00	444	492	0.5922	339	30.32	11	47.5
1976	1,114.00	672	745	0.5818	536	30.93	17	46.5
1977	2,634.51	1,560	1,731	0.5713	1,299	31.54	41	45.5
1982	152,885.57	81,907	90,912	0.5171	84,906	34.72	2,446	40.5
1983	1,276.58	669	743	0.5059	725	35.37	21	39.5
1984	7,500.00	3,844	4,266	0.4946	4,359	36.03	121	38.5
1987	20,385.23	9,719	10,788	0.4602	12,655	38.05	333	35.5
1988	1,492,186.09	693,386	769,617	0.4485	946,397	38.74	24,432	34.5
1989	26,178.51	11,845	13,147	0.4367	16,958	39.43	430	33.5
1990	28,515.04	12,552	13,932	0.4249	18,860	40.12	470	32.5
1991	1,925.00	824	914	0.4129	1,300	40.82	32	31.5
1992	8,000.00	3,323	3,688	0.4009	5,512	41.53	133	30.5
1993	161,534.80	65,059	72,212	0.3887	113,553	42.24	2,689	29.5
1994	10,388.09	4,053	4,498	0.3765	7,448	42.95	173	28.5
1995	42,170.57	15,914	17,664	0.3642	30,832	43.67	706	27.5
1996	2,309,207.01	841,854	934,408	0.3519	1,721,180	44.39	38,770	26.5
1997	546,573.87	192,215	213,347	0.3394	415,213	45.12	9,202	25.5
1999	138,649.18	45,153	50,117	0.3143	109,330	46.59	2,346	23.5
2000	168,478.81	52,657	58,446	0.3017	135,304	47.33	2,858	22.5

Kentucky - American Water Company

Account #: 304.300 - Structures & Improvements - Treatment

CALCULATED ANNUAL ACCRUAL AND ACCRUED DEPRECIATION

BASED ON ORIGINAL COST AS OF December 31, 2022

ALG - Remaining Life
Survivor Curve: R1.5
ASL: 65
Net Salvage: -15%
Truncation Year:

Year	Original Cost	Calculated Accumulated Depreciation	Allocated Actual Booked Amount	Accumulated Depreciation Factor	Net Book Value	ALG Remaining Life	Annual Accrual	Average Age
2001	99,872.41	29,898	33,185	0.2889	81,668	48.08	1,699	21.5
2002	11,650.51	3,333	3,700	0.2761	9,698	48.83	199	20.5
2003	7,407.94	2,021	2,243	0.2633	6,276	49.58	127	19.5
2005	31,219.61	7,678	8,522	0.2374	27,380	51.10	536	17.5
2006	121,065.14	28,138	31,231	0.2243	107,994	51.86	2,082	16.5
2007	260,339.27	56,971	63,234	0.2112	236,156	52.63	4,487	15.5
2008	57,998.81	11,900	13,209	0.1980	53,490	53.40	1,002	14.5
2009	33,441.24	6,403	7,107	0.1848	31,351	54.18	579	13.5
2010	23,046,363.26	4,095,078	4,545,293	0.1715	21,958,025	54.96	399,551	12.5
2011	57,455.23	9,414	10,449	0.1581	55,625	55.74	998	11.5
2012	24,932.42	3,738	4,149	0.1447	24,523	56.53	434	10.5
2013	1,983.30	270	299	0.1312	1,981	57.32	35	9.5
2014	5,009,806.59	610,860	678,018	0.1177	5,083,259	58.11	87,479	8.5
2015	27,430.21	2,958	3,283	0.1041	28,262	58.91	480	7.5
2016	3,343,842.71	313,228	347,665	0.0904	3,497,754	59.71	58,584	6.5
2017	496,170.25	39,417	43,751	0.0767	526,845	60.51	8,707	5.5
2018	446,584.92	29,098	32,298	0.0629	481,275	61.32	7,849	4.5
2019	7,227,236.46	367,164	407,530	0.0490	7,903,792	62.13	127,217	3.5
2020	9,318,068.75	339,094	376,374	0.0351	10,339,405	62.94	164,266	2.5
2021	2,908.98	64	71	0.0211	3,275	63.76	51	1.5
2022	13,484.73	99	110	0.0071	15,397	64.58	238	0.5

Kentucky - American Water Company

Account #: 304.300 - Structures & Improvements - Treatment

CALCULATED ANNUAL ACCRUAL AND ACCRUED DEPRECIATION

BASED ON ORIGINAL COST AS OF December 31, 2022

ALG - Remaining Life
Survivor Curve: R1.5
ASL: 65
Net Salvage: -15%
Truncation Year:

Year	Original Cost	Calculated Accumulated Depreciation	Allocated Actual Booked Amount	Accumulated Depreciation Factor	Net Book Value	ALG Remaining Life	Annual Accrual	Average Age
TOTAL	54,843,989.27	8,050,921	8,936,044		54,134,544		953,089	

COMPOSITE ANNUAL ACCRUAL RATE	1.74%
THEORETICAL ACCUMULATED DEPRECIATION FACTOR	0.16
COMPOSITE AVERAGE AGE (YEARS)	10.42
DIRECTED WEIGHTED ALG COMPOSITE REMAINING LIFE (YEARS)	56.70

Kentucky - American Water Company

Account #: 304.400 - Structures & Improvements - T&D

CALCULATED ANNUAL ACCRUAL AND ACCRUED DEPRECIATION

BASED ON ORIGINAL COST AS OF December 31, 2022

ALG - Remaining Life
Survivor Curve: R3
ASL: 40
Net Salvage: -5%
Truncation Year:

Year	Original Cost	Calculated Accumulated Depreciation	Allocated Actual Booked Amount	Accumulated Depreciation Factor	Net Book Value	ALG Remaining Life	Annual Accrual	Average Age
1991	28,804.37	20,494	-6,071	-0.2007	36,316	12.90	2,816	31.5
1992	3,241.57	2,250	-666	-0.1958	4,070	13.56	300	30.5
1996	4,311.28	2,671	-791	-0.1748	5,318	16.40	324	26.5
1997	26.54	16	-5	-0.1694	33	17.15	2	25.5
1998	139,105.41	80,647	-23,892	-0.1636	169,953	17.91	9,487	24.5
1999	28,241.70	15,797	-4,680	-0.1578	34,334	18.69	1,837	23.5
2000	6,176.47	3,327	-986	-0.1520	7,471	19.48	383	22.5
2006	73,847.79	30,057	-8,905	-0.1148	86,445	24.49	3,529	16.5
2008	25,387.15	9,158	-2,713	-0.1018	29,370	26.26	1,119	14.5
2009	92,187.89	31,085	-9,209	-0.0951	106,007	27.15	3,904	13.5
2010	25,516.58	7,997	-2,369	-0.0884	29,161	28.06	1,039	12.5
2011	4,504.67	1,303	-386	-0.0816	5,116	28.98	177	11.5
2014	352,752.28	76,162	-22,564	-0.0609	392,953	31.77	12,367	8.5
2015	22,892.11	4,373	-1,296	-0.0539	25,332	32.72	774	7.5
2016	4,367.21	725	-215	-0.0468	4,800	33.68	143	6.5
2017	49,625.80	6,987	-2,070	-0.0397	54,177	34.64	1,564	5.5
2018	253,438.83	29,259	-8,668	-0.0326	274,779	35.60	7,718	4.5
2021	4,364,849.75	168,916	-50,043	-0.0109	4,633,135	38.53	120,261	1.5
TOTAL	5,479,277.40	491,223	-145,529		5,898,770		167,744	

COMPOSITE ANNUAL ACCRUAL RATE	3.06%
THEORETICAL ACCUMULATED DEPRECIATION FACTOR	-0.03
COMPOSITE AVERAGE AGE (YEARS)	3.59
DIRECTED WEIGHTED ALG COMPOSITE REMAINING LIFE (YEARS)	36.58

Kentucky - American Water Company

Account #: 304.500 - Structures & Improvements - General

CALCULATED ANNUAL ACCRUAL AND ACCRUED DEPRECIATION

BASED ON ORIGINAL COST AS OF December 31, 2022

ALG - Remaining Life
Survivor Curve: R2
ASL: 25
Net Salvage: -5%
Truncation Year:

Year	Original Cost	Calculated Accumulated Depreciation	Allocated Actual Booked Amount	Accumulated Depreciation Factor	Net Book Value	ALG Remaining Life	Annual Accrual	Average Age
2005	0.52	0	0	0.3663	0	11.14	0	17.5
2007	31,349.70	16,493	10,740	0.3263	22,177	12.47	1,778	15.5
2008	109,721.69	54,520	35,504	0.3082	79,704	13.17	6,052	14.5
2009	21,407.09	9,995	6,509	0.2896	15,968	13.88	1,150	13.5
2010	2,731,392.26	1,191,433	775,879	0.2705	2,092,083	14.61	143,153	12.5
2011	643,595.11	260,506	169,645	0.2510	506,129	15.36	32,945	11.5
2012	57,151.00	21,297	13,869	0.2311	46,140	16.13	2,861	10.5
2013	167,718.84	57,001	37,120	0.2108	138,985	16.91	8,220	9.5
2014	590,365.20	180,910	117,811	0.1901	502,072	17.70	28,359	8.5
2015	138,512.01	37,731	24,571	0.1689	120,867	18.51	6,528	7.5
2016	2,841,016.36	675,526	439,913	0.1475	2,543,155	19.34	131,506	6.5
2017	746,046.06	151,138	98,423	0.1256	684,925	20.18	33,947	5.5
2018	337,773.15	56,358	36,701	0.1035	317,961	21.03	15,121	4.5
2019	416,398.11	54,382	35,414	0.0810	401,804	21.89	18,355	3.5
2020	98,849.33	9,277	6,042	0.0582	97,750	22.77	4,294	2.5
2021	51,716.66	2,929	1,908	0.0351	52,395	23.65	2,215	1.5
2022	587,754.37	11,154	7,264	0.0118	609,878	24.55	24,844	0.5
TOTAL	9,570,767.46	2,790,651	1,817,313		8,231,993		461,328	

COMPOSITE ANNUAL ACCRUAL RATE	4.82%
THEORETICAL ACCUMULATED DEPRECIATION FACTOR	0.19
COMPOSITE AVERAGE AGE (YEARS)	8.18
DIRECTED WEIGHTED ALG COMPOSITE REMAINING LIFE (YEARS)	18.06

Kentucky - American Water Company

Account #: 304.600 - Structures & Improvements - Offices

CALCULATED ANNUAL ACCRUAL AND ACCRUED DEPRECIATION

BASED ON ORIGINAL COST AS OF December 31, 2022

ALG - Remaining Life
Survivor Curve: R2
ASL: 60
Net Salvage: -15%
Truncation Year:

Year	Original Cost	Calculated Accumulated Depreciation	Allocated Actual Booked Amount	Accumulated Depreciation Factor	Net Book Value	ALG Remaining Life	Annual Accrual	Average Age
1970	637,016.69	482,927	514,342	0.7021	218,227	20.45	10,673	52.5
1971	756.95	566	603	0.6923	268	21.00	13	51.5
1972	19,510.13	14,372	15,307	0.6823	7,129	21.57	331	50.5
1977	4,946.00	3,363	3,582	0.6297	2,106	24.53	86	45.5
1979	5,098.00	3,344	3,562	0.6075	2,301	25.78	89	43.5
1982	72,800.40	45,049	47,979	0.5731	35,741	27.71	1,290	40.5
1984	1,886.00	1,119	1,192	0.5494	977	29.05	34	38.5
1986	24,125.00	13,679	14,569	0.5251	13,175	30.42	433	36.5
1987	135,815.04	75,200	80,091	0.5128	76,096	31.11	2,446	35.5
1988	45,634.12	24,652	26,256	0.5003	26,224	31.82	824	34.5
1989	44,800.88	23,592	25,126	0.4877	26,395	32.53	812	33.5
1990	18,070.07	9,267	9,870	0.4749	10,911	33.24	328	32.5
1991	1,100.00	549	585	0.4621	681	33.97	20	31.5
1992	16,106.41	7,809	8,317	0.4490	10,205	34.70	294	30.5
1994	7,768.27	3,545	3,776	0.4226	5,158	36.19	143	28.5
1995	26,046.75	11,510	12,259	0.4093	17,695	36.94	479	27.5
1996	7,455.45	3,186	3,393	0.3958	5,181	37.70	137	26.5
1997	2,091,767.73	863,076	919,221	0.3821	1,486,312	38.47	38,633	25.5
1998	226,122.80	89,945	95,796	0.3684	164,245	39.25	4,185	24.5
2005	23,878.25	6,937	7,388	0.2691	20,072	44.84	448	17.5
2006	57,796.03	15,879	16,912	0.2544	49,554	45.67	1,085	16.5
2008	1,698,053.43	412,376	439,201	0.2249	1,513,560	47.33	31,979	14.5
2013	6,248.83	1,008	1,074	0.1494	6,113	51.58	118	9.5
2014	194,379.25	28,130	29,960	0.1340	193,576	52.45	3,691	8.5
2015	30,859.52	3,951	4,208	0.1186	31,281	53.32	587	7.5
2016	15,059.54	1,675	1,784	0.1030	15,534	54.20	287	6.5
2020	165,020.59	7,128	7,592	0.0400	182,182	57.75	3,155	2.5
2021	10,008.14	260	277	0.0241	11,233	58.64	192	1.5

Kentucky - American Water Company

Account #: 304.600 - Structures & Improvements - Offices

CALCULATED ANNUAL ACCRUAL AND ACCRUED DEPRECIATION

BASED ON ORIGINAL COST AS OF December 31, 2022

ALG - Remaining Life
Survivor Curve: R2
ASL: 60
Net Salvage: -15%
Truncation Year:

Year	Original Cost	Calculated Accumulated Depreciation	Allocated Actual Booked Amount	Accumulated Depreciation Factor	Net Book Value	ALG Remaining Life	Annual Accrual	Average Age
2022	6,565.18	57	61	0.0080	7,489	59.55	126	0.5
TOTAL	5,594,695.45	2,154,150	2,294,281		4,139,619		102,918	

COMPOSITE ANNUAL ACCRUAL RATE	1.84%
THEORETICAL ACCUMULATED DEPRECIATION FACTOR	0.41
COMPOSITE AVERAGE AGE (YEARS)	24.36
DIRECTED WEIGHTED ALG COMPOSITE REMAINING LIFE (YEARS)	39.91

Kentucky - American Water Company

Account #: 304.700 - Structures & Improvements - Stores, Shop & Garage

CALCULATED ANNUAL ACCRUAL AND ACCRUED DEPRECIATION

BASED ON ORIGINAL COST AS OF December 31, 2022

ALG - Remaining Life
Survivor Curve: R3
ASL: 55
Net Salvage: 0%
Truncation Year:

Year	Original Cost	Calculated Accumulated Depreciation	Allocated Actual Booked Amount	Accumulated Depreciation Factor	Net Book Value	ALG Remaining Life	Annual Accrual	Average Age
1988	41,614.47	23,449	21,633	0.5198	19,982	24.01	832	34.5
1990	17,912.83	9,590	8,848	0.4939	9,065	25.55	355	32.5
1993	546,102.20	268,631	247,822	0.4538	298,281	27.95	10,674	29.5
1996	147,253.93	65,808	60,710	0.4123	86,544	30.42	2,845	26.5
1999	70,632.43	28,285	26,094	0.3694	44,539	32.98	1,351	23.5
2002	4,796.09	1,691	1,560	0.3253	3,236	35.60	91	20.5
2009	799,355.85	189,111	174,462	0.2183	624,894	41.99	14,883	13.5
2011	7,549.73	1,528	1,410	0.1867	6,140	43.87	140	11.5
2014	3,312.34	498	460	0.1388	2,853	46.72	61	8.5
2015	9,065.45	1,206	1,112	0.1227	7,953	47.69	167	7.5
2016	24,525.08	2,831	2,612	0.1065	21,913	48.65	450	6.5
2017	2,984.03	292	269	0.0903	2,715	49.62	55	5.5
2022	6,577.32	59	54	0.0083	6,523	54.51	120	0.5
TOTAL	1,681,681.75	592,979	547,045		1,134,637		32,024	

COMPOSITE ANNUAL ACCRUAL RATE	1.90%
THEORETICAL ACCUMULATED DEPRECIATION FACTOR	0.33
COMPOSITE AVERAGE AGE (YEARS)	20.78
DIRECTED WEIGHTED ALG COMPOSITE REMAINING LIFE (YEARS)	35.61

Kentucky - American Water Company

Account #: 304.800 - Structures & Improvements - Miscellaneous

CALCULATED ANNUAL ACCRUAL AND ACCRUED DEPRECIATION

BASED ON ORIGINAL COST AS OF December 31, 2022

ALG - Remaining Life
Survivor Curve: S0.5
ASL: 25
Net Salvage: 0%
Truncation Year:

Year	Original Cost	Calculated Accumulated Depreciation	Allocated Actual Booked Amount	Accumulated Depreciation Factor	Net Book Value	ALG Remaining Life	Annual Accrual	Average Age
1985	20,864.76	17,295	11,808	0.5659	9,057	4.28	2,117	37.5
1987	23,786.05	19,056	13,010	0.5470	10,776	4.97	2,168	35.5
1989	65,469.45	50,589	34,539	0.5276	30,931	5.68	5,443	33.5
1990	13,875.00	10,520	7,182	0.5176	6,693	6.05	1,107	32.5
1991	6,522.00	4,849	3,310	0.5076	3,212	6.41	501	31.5
1992	5,113.58	3,725	2,543	0.4973	2,571	6.79	379	30.5
1994	3,145.91	2,194	1,498	0.4762	1,648	7.56	218	28.5
1997	532.14	345	236	0.4430	296	8.78	34	25.5
1998	34,995.42	22,116	15,099	0.4315	19,896	9.20	2,162	24.5
2000	9,043.98	5,398	3,685	0.4075	5,359	10.08	532	22.5
2001	19,040.39	11,017	7,521	0.3950	11,519	10.54	1,093	21.5
2002	21,530.03	12,054	8,230	0.3822	13,300	11.00	1,209	20.5
2003	314,782.79	170,178	116,186	0.3691	198,597	11.48	17,293	19.5
2005	130,702.15	65,408	44,656	0.3417	86,046	12.49	6,890	17.5
2006	180,858.20	86,708	59,198	0.3273	121,660	13.01	9,348	16.5
2007	78,551.61	35,957	24,549	0.3125	54,003	13.56	3,984	15.5
2011	1,875.00	682	465	0.2482	1,410	15.91	89	11.5
2012	124,046.63	41,913	28,616	0.2307	95,431	16.55	5,765	10.5
2019	14,472.01	1,861	1,271	0.0878	13,201	21.79	606	3.5
2020	113,275.01	10,621	7,251	0.0640	106,024	22.66	4,680	2.5
TOTAL	1,182,482.11	572,484	390,853		791,629		65,618	

COMPOSITE ANNUAL ACCRUAL RATE 5.55%

THEORETICAL ACCUMULATED DEPRECIATION FACTOR 0.33

COMPOSITE AVERAGE AGE (YEARS) 17.70

DIRECTED WEIGHTED ALG COMPOSITE REMAINING LIFE (YEARS) 12.90

Kentucky - American Water Company

Account #: 305.000 - Collecting & Impounding Reservoirs

CALCULATED ANNUAL ACCRUAL AND ACCRUED DEPRECIATION

BASED ON ORIGINAL COST AS OF December 31, 2022

ALG - Remaining Life
Survivor Curve: R2
ASL: 75
Net Salvage: 0%
Truncation Year:

Year	Original Cost	Calculated Accumulated Depreciation	Allocated Actual Booked Amount	Accumulated Depreciation Factor	Net Book Value	ALG Remaining Life	Annual Accrual	Average Age
1934	24,854.61	19,873	20,357	0.8191	4,497	15.03	299	88.5
1972	3,956.11	2,124	2,176	0.5501	1,780	34.73	51	50.5
1988	756,540.13	291,674	298,780	0.3949	457,760	46.08	9,933	34.5
1989	2,284.00	857	878	0.3845	1,406	46.84	30	33.5
1991	14,013.00	4,974	5,095	0.3636	8,918	48.38	184	31.5
1992	9,151.62	3,154	3,230	0.3530	5,921	49.16	120	30.5
1993	3,586.34	1,198	1,228	0.3423	2,359	49.94	47	29.5
1996	1,591.87	482	493	0.3099	1,099	52.31	21	26.5
2005	3,282.30	670	687	0.2092	2,596	59.69	43	17.5
TOTAL	819,259.98	325,006	332,925		486,335		10,728	

COMPOSITE ANNUAL ACCRUAL RATE	1.31%
THEORETICAL ACCUMULATED DEPRECIATION FACTOR	0.41
COMPOSITE AVERAGE AGE (YEARS)	36.01
DIRECTED WEIGHTED ALG COMPOSITE REMAINING LIFE (YEARS)	45.25

Kentucky - American Water Company

Account #: 306.000 - Lake, River & Other Intakes

CALCULATED ANNUAL ACCRUAL AND ACCRUED DEPRECIATION

BASED ON ORIGINAL COST AS OF December 31, 2022

ALG - Remaining Life
Survivor Curve: S1.5
ASL: 55
Net Salvage: -10%
Truncation Year:

Year	Original Cost	Calculated Accumulated Depreciation	Allocated Actual Booked Amount	Accumulated Depreciation Factor	Net Book Value	ALG Remaining Life	Annual Accrual	Average Age
1961	449.15	374	470	0.9523	24	13.38	2	61.5
1966	19,532.24	15,542	19,556	0.9102	1,929	15.22	127	56.5
1970	31,574.52	24,111	30,339	0.8735	4,393	16.82	261	52.5
1971	23,098.06	17,443	21,949	0.8639	3,459	17.24	201	51.5
1991	164,120.57	89,014	112,008	0.6204	68,525	27.88	2,458	31.5
1992	6,000.00	3,175	3,995	0.6053	2,605	28.54	91	30.5
1993	6,985.00	3,601	4,532	0.5898	3,152	29.22	108	29.5
1994	169.67	85	107	0.5740	80	29.91	3	28.5
1997	3,365.94	1,544	1,942	0.5246	1,760	32.07	55	25.5
2002	245,293.78	93,417	117,548	0.4356	152,275	35.96	4,235	20.5
2007	2,378.59	704	886	0.3387	1,730	40.19	43	15.5
2010	820,061.67	198,621	249,927	0.2771	652,141	42.89	15,205	12.5
2012	257,591.23	52,840	66,490	0.2347	216,861	44.74	4,847	10.5
2013	49,161.46	9,158	11,524	0.2131	42,554	45.69	931	9.5
2016	50,743.32	6,530	8,216	0.1472	47,602	48.57	980	6.5
TOTAL	1,680,525.20	516,159	649,489		1,199,088		29,547	

COMPOSITE ANNUAL ACCRUAL RATE	1.76%
THEORETICAL ACCUMULATED DEPRECIATION FACTOR	0.39
COMPOSITE AVERAGE AGE (YEARS)	16.93
DIRECTED WEIGHTED ALG COMPOSITE REMAINING LIFE (YEARS)	39.64

Kentucky - American Water Company

Account #: 309.000 - Supply Mains

CALCULATED ANNUAL ACCRUAL AND ACCRUED DEPRECIATION

BASED ON ORIGINAL COST AS OF December 31, 2022

ALG - Remaining Life
Survivor Curve: R3
ASL: 80
Net Salvage: -10%
Truncation Year:

Year	Original Cost	Calculated Accumulated Depreciation	Allocated Actual Booked Amount	Accumulated Depreciation Factor	Net Book Value	ALG Remaining Life	Annual Accrual	Average Age
1934	222,234.89	206,040	244,458	1.0000	0	12.57	0	88.5
1940	503.19	450	554	1.0000	0	15.01	0	82.5
1941	433.53	385	477	1.0000	0	15.45	0	81.5
1944	41.85	36	45	0.9875	1	16.86	0	78.5
1951	218.11	178	223	0.9296	17	20.56	1	71.5
1953	1,629.41	1,306	1,634	0.9115	159	21.72	7	69.5
1956	59,882.73	46,484	58,162	0.8830	7,709	23.55	327	66.5
1959	109,730.59	82,289	102,962	0.8530	17,741	25.46	697	63.5
1964	16,403.53	11,539	14,438	0.8002	3,606	28.84	125	58.5
1965	440,490.69	305,616	382,398	0.7892	102,142	29.54	3,458	57.5
1967	2,613.29	1,762	2,204	0.7668	670	30.97	22	55.5
1968	5,722.03	3,800	4,755	0.7555	1,539	31.70	49	54.5
1970	3,226.09	2,077	2,599	0.7324	950	33.17	29	52.5
1972	10,673.26	6,651	8,322	0.7089	3,418	34.68	99	50.5
1976	127,784.70	74,192	92,831	0.6604	47,732	37.77	1,264	46.5
1980	3,498.25	1,877	2,348	0.6103	1,500	40.98	37	42.5
1981	2,370.70	1,245	1,558	0.5975	1,050	41.80	25	41.5
1982	53,151.82	27,318	34,182	0.5846	24,285	42.62	570	40.5
1983	358.65	180	226	0.5717	169	43.45	4	39.5
1984	14,163.31	6,955	8,703	0.5586	6,877	44.29	155	38.5
1987	96,069.30	43,816	54,825	0.5188	50,852	46.83	1,086	35.5
1988	100,191.76	44,513	55,696	0.5054	54,515	47.69	1,143	34.5
1989	1,976,228.33	854,488	1,069,166	0.4918	1,104,685	48.55	22,752	33.5
1991	9,330.23	3,810	4,767	0.4645	5,496	50.30	109	31.5
1992	1,765,551.22	699,586	875,347	0.4507	1,066,760	51.18	20,842	30.5
1993	5,475.01	2,103	2,631	0.4368	3,392	52.07	65	29.5
1994	29,331.77	10,905	13,645	0.4229	18,620	52.96	352	28.5
2000	25,261.98	7,498	9,381	0.3376	18,407	58.41	315	22.5

Kentucky - American Water Company

Account #: 309.000 - Supply Mains

CALCULATED ANNUAL ACCRUAL AND ACCRUED DEPRECIATION

BASED ON ORIGINAL COST AS OF December 31, 2022

ALG - Remaining Life
Survivor Curve: R3
ASL: 80
Net Salvage: -10%
Truncation Year:

Year	Original Cost	Calculated Accumulated Depreciation	Allocated Actual Booked Amount	Accumulated Depreciation Factor	Net Book Value	ALG Remaining Life	Annual Accrual	Average Age
2007	42,178.70	8,717	10,907	0.2351	35,490	64.97	546	15.5
2008	5,454.04	1,056	1,321	0.2202	4,678	65.92	71	14.5
2010	13,377,790.18	2,238,265	2,800,595	0.1903	11,914,974	67.83	175,655	12.5
2012	2,585.07	364	456	0.1602	2,388	69.75	34	10.5
2013	49,211.71	6,279	7,857	0.1451	46,276	70.72	654	9.5
2019	7,444.15	352	440	0.0538	7,748	76.56	101	3.5
TOTAL	18,567,234.07	4,702,134	5,870,114		14,553,843		230,594	

COMPOSITE ANNUAL ACCRUAL RATE	1.24%
THEORETICAL ACCUMULATED DEPRECIATION FACTOR	0.32
COMPOSITE AVERAGE AGE (YEARS)	19.63
DIRECTED WEIGHTED ALG COMPOSITE REMAINING LIFE (YEARS)	61.58

Kentucky - American Water Company

Account #: 310.000 - Power Generation Equipment

CALCULATED ANNUAL ACCRUAL AND ACCRUED DEPRECIATION

BASED ON ORIGINAL COST AS OF December 31, 2022

ALG - Remaining Life
Survivor Curve: R4
ASL: 35
Net Salvage: -5%
Truncation Year:

Year	Original Cost	Calculated Accumulated Depreciation	Allocated Actual Booked Amount	Accumulated Depreciation Factor	Net Book Value	ALG Remaining Life	Annual Accrual	Average Age
1988	141,116.13	125,443	109,641	0.7400	38,531	5.37	7,177	34.5
1989	45,199.86	39,487	34,513	0.7272	12,947	5.88	2,202	33.5
1996	209,151.84	154,001	134,601	0.6129	85,009	10.46	8,130	26.5
2007	170,728.73	78,000	68,174	0.3803	111,091	19.77	5,619	15.5
2008	133,198.85	57,086	49,895	0.3567	89,964	20.71	4,343	14.5
2009	32,060.10	12,823	11,208	0.3329	22,455	21.67	1,036	13.5
2010	1,755,075.06	651,357	569,305	0.3089	1,273,524	22.63	56,278	12.5
2011	36,789.08	12,584	10,998	0.2847	27,630	23.60	1,171	11.5
2012	20,101.38	6,287	5,495	0.2604	15,611	24.57	635	10.5
2013	69,396.79	19,664	17,187	0.2359	55,680	25.55	2,179	9.5
2014	269,015.90	68,275	59,675	0.2113	222,792	26.54	8,395	8.5
2015	26,699.50	5,984	5,230	0.1866	22,804	27.53	828	7.5
2016	2,618,308.70	508,981	444,864	0.1618	2,304,360	28.52	80,797	6.5
2017	151,533.54	24,940	21,798	0.1370	137,312	29.51	4,652	5.5
TOTAL	5,678,375.46	1,764,912	1,542,584		4,419,710		183,442	

COMPOSITE ANNUAL ACCRUAL RATE	3.23%
THEORETICAL ACCUMULATED DEPRECIATION FACTOR	0.27
COMPOSITE AVERAGE AGE (YEARS)	10.66
DIRECTED WEIGHTED ALG COMPOSITE REMAINING LIFE (YEARS)	24.64

Kentucky - American Water Company

Account #: 311.200 - Pumping Equipment - Electric

CALCULATED ANNUAL ACCRUAL AND ACCRUED DEPRECIATION

BASED ON ORIGINAL COST AS OF December 31, 2022

ALG - Remaining Life
Survivor Curve: S0.5
ASL: 40
Net Salvage: -20%
Truncation Year:

Year	Original Cost	Calculated Accumulated Depreciation	Allocated Actual Booked Amount	Accumulated Depreciation Factor	Net Book Value	ALG Remaining Life	Annual Accrual	Average Age
1934	5,827.95	6,994	3,373	0.4823	3,621	3.00	1,207	89.5
1940	2,338.33	2,806	1,353	0.4823	1,453	3.00	484	83.5
1947	282.63	325	157	0.4627	182	3.00	61	75.5
1949	15,991.09	18,087	8,723	0.4546	10,466	3.00	3,489	73.5
1950	465.46	522	252	0.4505	307	3.00	102	72.5
1954	212.25	229	111	0.4345	144	3.97	36	68.5
1955	23,877.32	25,572	12,333	0.4304	16,320	4.30	3,795	67.5
1959	18,866.00	19,446	9,379	0.4143	13,260	5.64	2,351	63.5
1970	70,211.93	64,281	31,003	0.3680	53,252	9.48	5,617	52.5
1974	4,227.52	3,682	1,776	0.3500	3,297	10.97	301	48.5
1976	142,214.10	120,570	58,151	0.3407	112,506	11.74	9,583	46.5
1979	1,256.95	1,021	492	0.3264	1,016	12.93	79	43.5
1981	151,435.32	119,268	57,523	0.3165	124,200	13.75	9,033	41.5
1984	7,346.21	5,505	2,655	0.3012	6,160	15.02	410	38.5
1985	57,704.18	42,490	20,493	0.2959	48,752	15.46	3,153	37.5
1986	5,114.00	3,698	1,783	0.2906	4,353	15.90	274	36.5
1987	371,765.61	263,778	127,220	0.2852	318,899	16.35	19,505	35.5
1988	499,829.62	347,782	167,735	0.2797	432,061	16.81	25,703	34.5
1989	316,522.51	215,820	104,089	0.2740	275,738	17.27	15,966	33.5
1990	52,917.53	35,331	17,040	0.2683	46,461	17.74	2,619	32.5
1991	6,158.00	4,023	1,940	0.2625	5,450	18.23	299	31.5
1992	1,541,808.27	984,480	474,813	0.2566	1,375,357	18.72	73,470	30.5
1993	28,748.56	17,927	8,646	0.2506	25,852	19.21	1,346	29.5
1998	277,433.61	151,034	72,843	0.2188	260,077	21.85	11,903	24.5
1999	234,405.06	123,674	59,648	0.2121	221,638	22.41	9,890	23.5
2000	69,872.51	35,668	17,203	0.2052	66,644	22.98	2,900	22.5
2002	896.22	426	205	0.1910	870	24.16	36	20.5
2003	38,738.20	17,698	8,535	0.1836	37,950	24.77	1,532	19.5

Kentucky - American Water Company

Account #: 311.200 - Pumping Equipment - Electric

CALCULATED ANNUAL ACCRUAL AND ACCRUED DEPRECIATION

BASED ON ORIGINAL COST AS OF December 31, 2022

ALG - Remaining Life
Survivor Curve: S0.5
ASL: 40
Net Salvage: -20%
Truncation Year:

Year	Original Cost	Calculated Accumulated Depreciation	Allocated Actual Booked Amount	Accumulated Depreciation Factor	Net Book Value	ALG Remaining Life	Annual Accrual	Average Age
2004	240.99	106	51	0.1761	238	25.39	9	18.5
2005	615.71	258	124	0.1685	614	26.03	24	17.5
2008	5,842.76	2,099	1,012	0.1444	5,999	28.03	214	14.5
2010	5,506,121.57	1,744,947	841,585	0.1274	5,765,761	29.44	195,848	12.5
2011	82,535.98	24,348	11,743	0.1186	87,300	30.17	2,894	11.5
2012	74,828.57	20,395	9,836	0.1095	79,958	30.91	2,587	10.5
2013	2,340,760.96	584,154	281,736	0.1003	2,527,177	31.68	79,772	9.5
2014	868,207.44	196,214	94,634	0.0908	947,215	32.47	29,172	8.5
2015	120,302.68	24,284	11,712	0.0811	132,651	33.27	3,987	7.5
2016	1,641,126.88	290,674	140,192	0.0712	1,829,161	34.10	53,641	6.5
2017	671,082.17	101,843	49,119	0.0610	756,180	34.94	21,642	5.5
2018	3,531,194.93	444,089	214,183	0.0505	4,023,251	35.81	112,350	4.5
2019	1,106,426.69	109,650	52,884	0.0398	1,274,828	36.70	34,736	3.5
2020	1,123,828.53	80,641	38,893	0.0288	1,309,701	37.61	34,823	2.5
2021	209,219.46	9,138	4,407	0.0176	246,656	38.54	6,400	1.5
2022	536,002.36	7,931	3,825	0.0059	639,378	39.51	16,183	0.5
TOTAL	21,764,804.62	6,272,905	3,025,410		23,092,356		799,426	

COMPOSITE ANNUAL ACCRUAL RATE	3.67%
THEORETICAL ACCUMULATED DEPRECIATION FACTOR	0.14
COMPOSITE AVERAGE AGE (YEARS)	12.33
DIRECTED WEIGHTED ALG COMPOSITE REMAINING LIFE (YEARS)	30.40

Kentucky - American Water Company

Account #: 311.300 - Pumping Equipment - Diesel

CALCULATED ANNUAL ACCRUAL AND ACCRUED DEPRECIATION

BASED ON ORIGINAL COST AS OF December 31, 2022

ALG - Remaining Life
Survivor Curve: S0.5
ASL: 40
Net Salvage: -20%
Truncation Year:

Year	Original Cost	Calculated Accumulated Depreciation	Allocated Actual Booked Amount	Accumulated Depreciation Factor	Net Book Value	ALG Remaining Life	Annual Accrual	Average Age
1965	22,657.13	21,955	15,808	0.5814	11,380	7.70	1,478	57.5
1972	1,003.12	896	645	0.5361	558	10.22	55	50.5
1981	95,017.92	74,834	53,882	0.4726	60,139	13.75	4,375	41.5
1987	100,246.21	71,128	51,213	0.4257	69,082	16.35	4,225	35.5
1988	1,109.18	772	556	0.4175	775	16.81	46	34.5
2006	129,930.05	51,920	37,383	0.2398	118,533	26.68	4,443	16.5
TOTAL	349,963.61	221,505	159,488		260,468		14,622	

COMPOSITE ANNUAL ACCRUAL RATE 4.18%

THEORETICAL ACCUMULATED DEPRECIATION FACTOR 0.46

COMPOSITE AVERAGE AGE (YEARS) 31.54

DIRECTED WEIGHTED ALG COMPOSITE REMAINING LIFE (YEARS) 18.90

Kentucky - American Water Company

Account #: 311.400 - Pumping Equipment - Hydraulic

CALCULATED ANNUAL ACCRUAL AND ACCRUED DEPRECIATION

BASED ON ORIGINAL COST AS OF December 31, 2022

ALG - Remaining Life
Survivor Curve: S0.5
ASL: 40
Net Salvage: -20%
Truncation Year:

Year	Original Cost	Calculated Accumulated Depreciation	Allocated Actual Booked Amount	Accumulated Depreciation Factor	Net Book Value	ALG Remaining Life	Annual Accrual	Average Age
2006	1,015.16	406	1,218	1.0000	0	26.68	0	16.5
TOTAL	1,015.16	406	1,218		0		0	

COMPOSITE ANNUAL ACCRUAL RATE	0.00%
THEORETICAL ACCUMULATED DEPRECIATION FACTOR	1.20
COMPOSITE AVERAGE AGE (YEARS)	16.50
DIRECTED WEIGHTED ALG COMPOSITE REMAINING LIFE (YEARS)	26.68

Kentucky - American Water Company

Account #: 311.520 - Pumping Equipment - SOS & Pumping

CALCULATED ANNUAL ACCRUAL AND ACCRUED DEPRECIATION

BASED ON ORIGINAL COST AS OF December 31, 2022

ALG - Remaining Life
Survivor Curve: S0.5
ASL: 40
Net Salvage: -20%
Truncation Year:

Year	Original Cost	Calculated Accumulated Depreciation	Allocated Actual Booked Amount	Accumulated Depreciation Factor	Net Book Value	ALG Remaining Life	Annual Accrual	Average Age
2007	513,279.07	194,861	165,208	0.2682	450,727	27.35	16,483	15.5
2008	3,783,282.13	1,359,015	1,152,208	0.2538	3,387,730	28.03	120,878	14.5
2009	3,515,846.82	1,189,452	1,008,448	0.2390	3,210,568	28.72	111,777	13.5
2010	702,866.78	222,746	188,850	0.2239	654,591	29.44	22,238	12.5
2011	238,765.58	70,435	59,716	0.2084	226,802	30.17	7,518	11.5
2012	191,866.24	52,293	44,336	0.1926	185,904	30.91	6,013	10.5
2013	1,081,377.06	269,865	228,799	0.1763	1,068,854	31.68	33,738	9.5
2014	1,374,649.99	310,670	263,394	0.1597	1,386,186	32.47	42,696	8.5
2015	499,853.97	100,900	85,546	0.1426	514,279	33.27	15,457	7.5
2016	3,712,474.35	657,548	557,486	0.1251	3,897,483	34.10	114,309	6.5
2017	1,509,433.09	229,071	194,212	0.1072	1,617,108	34.94	46,281	5.5
2018	139,718.27	17,571	14,897	0.0889	152,765	35.81	4,266	4.5
2019	21,314.17	2,112	1,791	0.0700	23,786	36.70	648	3.5
TOTAL	17,284,727.52	4,676,540	3,964,891		16,776,782		542,302	

COMPOSITE ANNUAL ACCRUAL RATE	3.14%
THEORETICAL ACCUMULATED DEPRECIATION FACTOR	0.23
COMPOSITE AVERAGE AGE (YEARS)	10.57
DIRECTED WEIGHTED ALG COMPOSITE REMAINING LIFE (YEARS)	30.98

Kentucky - American Water Company

Account #: 311.530 - Pumping Equipment - Water Treatment

CALCULATED ANNUAL ACCRUAL AND ACCRUED DEPRECIATION

BASED ON ORIGINAL COST AS OF December 31, 2022

ALG - Remaining Life
Survivor Curve: S0.5
ASL: 40
Net Salvage: -20%
Truncation Year:

Year	Original Cost	Calculated Accumulated Depreciation	Allocated Actual Booked Amount	Accumulated Depreciation Factor	Net Book Value	ALG Remaining Life	Annual Accrual	Average Age
2018	605,807.17	76,187	32,024	0.0441	694,945	35.81	19,408	4.5
2019	1,421,901.22	140,915	59,231	0.0347	1,647,051	36.70	44,883	3.5
2020	614,510.88	44,095	18,534	0.0251	718,879	37.61	19,115	2.5
2021	27,138.16	1,185	498	0.0153	32,068	38.54	832	1.5
2022	7,499.00	111	47	0.0052	8,952	39.51	227	0.5
TOTAL	2,676,856.43	262,493	110,334		3,101,894		84,465	

COMPOSITE ANNUAL ACCRUAL RATE	3.16%
THEORETICAL ACCUMULATED DEPRECIATION FACTOR	0.04
COMPOSITE AVERAGE AGE (YEARS)	3.47
DIRECTED WEIGHTED ALG COMPOSITE REMAINING LIFE (YEARS)	36.73

Kentucky - American Water Company

Account #: 311.540 - Pumping Equipment - T&D

CALCULATED ANNUAL ACCRUAL AND ACCRUED DEPRECIATION

BASED ON ORIGINAL COST AS OF December 31, 2022

ALG - Remaining Life
Survivor Curve: S0.5
ASL: 40
Net Salvage: -20%
Truncation Year:

Year	Original Cost	Calculated Accumulated Depreciation	Allocated Actual Booked Amount	Accumulated Depreciation Factor	Net Book Value	ALG Remaining Life	Annual Accrual	Average Age
2007	35,100.14	13,325	-69	-0.0016	42,189	27.35	1,543	15.5
2012	17,283.69	4,711	-24	-0.0012	20,765	30.91	672	10.5
2015	122,575.56	24,743	-128	-0.0009	147,219	33.27	4,425	7.5
2016	444,062.86	78,652	-408	-0.0008	533,283	34.10	15,641	6.5
2017	743,852.14	112,887	-586	-0.0007	893,208	34.94	25,563	5.5
2018	812,788.24	102,218	-530	-0.0005	975,876	35.81	27,253	4.5
2022	145,085.39	2,147	-11	-0.0001	174,114	39.51	4,407	0.5
TOTAL	2,320,748.02	338,682	-1,757		2,786,655		79,504	

COMPOSITE ANNUAL ACCRUAL RATE	3.43%
THEORETICAL ACCUMULATED DEPRECIATION FACTOR	0.00
COMPOSITE AVERAGE AGE (YEARS)	5.32
DIRECTED WEIGHTED ALG COMPOSITE REMAINING LIFE (YEARS)	35.14

Kentucky - American Water Company

Account #: 320.100 - Water Treatment Equipment - Non-Media

CALCULATED ANNUAL ACCRUAL AND ACCRUED DEPRECIATION

BASED ON ORIGINAL COST AS OF December 31, 2022

ALG - Remaining Life
Survivor Curve: R2
ASL: 50
Net Salvage: -15%
Truncation Year:

Year	Original Cost	Calculated Accumulated Depreciation	Allocated Actual Booked Amount	Accumulated Depreciation Factor	Net Book Value	ALG Remaining Life	Annual Accrual	Average Age
1900	8,975.48	10,322	8,586	0.8318	1,736	3.00	579	123.5
1934	799.75	898	747	0.8123	173	3.00	58	88.5
1936	342.12	380	316	0.8037	77	3.00	26	86.5
1938	138.71	152	127	0.7948	33	3.00	11	84.5
1948	3,147.72	3,252	2,705	0.7474	915	5.07	180	74.5
1950	9,495.15	9,684	8,055	0.7377	2,865	5.66	506	72.5
1953	22,789.91	22,777	18,946	0.7229	7,263	6.55	1,109	69.5
1958	53,933.14	51,970	43,228	0.6970	18,795	8.10	2,320	64.5
1959	233,556.24	223,282	185,723	0.6915	82,867	8.43	9,830	63.5
1960	7,813.41	7,409	6,163	0.6859	2,823	8.77	322	62.5
1962	4,219.69	3,933	3,272	0.6742	1,581	9.47	167	60.5
1966	1,061,804.67	952,667	792,417	0.6489	428,659	10.99	39,004	56.5
1970	667,737.81	573,127	476,720	0.6208	291,179	12.68	22,964	52.5
1972	11,330.58	9,487	7,891	0.6056	5,139	13.60	378	50.5
1974	293.75	239	199	0.5896	139	14.56	10	48.5
1977	436,810.02	340,637	283,337	0.5640	218,994	16.09	13,611	45.5
1978	747.80	574	477	0.5551	383	16.63	23	44.5
1979	6,198.57	4,680	3,892	0.5460	3,236	17.18	188	43.5
1981	1,074,394.08	783,227	651,478	0.5273	584,075	18.30	31,917	41.5
1982	82,883.48	59,313	49,336	0.5176	45,980	18.89	2,434	40.5
1984	4,000.00	2,752	2,289	0.4977	2,311	20.08	115	38.5
1987	227,797.50	146,923	122,209	0.4665	139,759	21.96	6,364	35.5
1988	3,892,466.82	2,452,673	2,040,103	0.4558	2,436,234	22.60	107,798	34.5
1989	11,939.22	7,343	6,108	0.4448	7,623	23.26	328	33.5
1990	634.52	381	317	0.4337	413	23.93	17	32.5
1991	231,585.65	135,275	112,520	0.4225	153,803	24.60	6,252	31.5
1992	55,184.95	31,364	26,088	0.4111	37,374	25.29	1,478	30.5
1993	633,434.95	349,881	291,027	0.3995	437,424	25.98	16,837	29.5

Kentucky - American Water Company

Account #: 320.100 - Water Treatment Equipment - Non-Media

CALCULATED ANNUAL ACCRUAL AND ACCRUED DEPRECIATION

BASED ON ORIGINAL COST AS OF December 31, 2022

ALG - Remaining Life
Survivor Curve: R2
ASL: 50
Net Salvage: -15%
Truncation Year:

Year	Original Cost	Calculated Accumulated Depreciation	Allocated Actual Booked Amount	Accumulated Depreciation Factor	Net Book Value	ALG Remaining Life	Annual Accrual	Average Age
1994	4,177.83	2,240	1,863	0.3878	2,941	26.69	110	28.5
1995	448.70	233	194	0.3759	322	27.40	12	27.5
1996	11,662.75	5,868	4,881	0.3639	8,532	28.13	303	26.5
1997	753,250.18	366,291	304,677	0.3517	561,561	28.86	19,458	25.5
1998	94,740.35	44,458	36,979	0.3394	71,972	29.60	2,431	24.5
1999	921,832.62	416,707	346,612	0.3270	713,496	30.35	23,509	23.5
2000	462,111.15	200,850	167,064	0.3144	364,364	31.10	11,716	22.5
2001	2,410.09	1,005	836	0.3016	1,936	31.87	61	21.5
2002	1,034,038.75	412,855	343,408	0.2888	845,737	32.64	25,911	20.5
2003	1,315.82	502	417	0.2758	1,096	33.42	33	19.5
2006	28,728.75	9,377	7,800	0.2361	25,238	35.81	705	16.5
2007	1,781,623.80	548,304	456,072	0.2226	1,592,795	36.62	43,495	15.5
2008	1,496,335.08	432,368	359,638	0.2090	1,361,147	37.44	36,355	14.5
2009	237,989.08	64,254	53,446	0.1953	220,242	38.26	5,756	13.5
2010	14,148,454.52	3,549,388	2,952,337	0.1815	13,318,385	39.09	340,711	12.5
2011	528,512.99	122,401	101,811	0.1675	505,979	39.93	12,672	11.5
2012	111,775.29	23,716	19,726	0.1535	108,815	40.78	2,668	10.5
2013	1,410,260.55	271,618	225,929	0.1393	1,395,871	41.63	33,530	9.5
2014	908,360.21	157,045	130,628	0.1250	913,986	42.48	21,516	8.5
2015	406,926.86	62,274	51,799	0.1107	416,167	43.35	9,600	7.5
2016	11,777,326.95	1,566,902	1,303,330	0.0962	12,240,596	44.22	276,811	6.5
2017	3,587,556.16	405,106	336,962	0.0817	3,788,728	45.09	84,026	5.5
2018	1,181,960.90	109,527	91,103	0.0670	1,268,152	45.97	27,587	4.5
2019	12,494,036.71	903,115	751,200	0.0523	13,616,942	46.86	290,588	3.5
2020	8,279,215.14	428,686	356,576	0.0375	9,164,522	47.75	191,927	2.5
2021	171,949.58	5,357	4,456	0.0225	193,286	48.65	3,973	1.5
2022	199,030.67	2,072	1,724	0.0075	227,162	49.55	4,585	0.5

Kentucky - American Water Company

Account #: 320.100 - Water Treatment Equipment - Non-Media

CALCULATED ANNUAL ACCRUAL AND ACCRUED DEPRECIATION

BASED ON ORIGINAL COST AS OF December 31, 2022

ALG - Remaining Life
Survivor Curve: R2
ASL: 50
Net Salvage: -15%
Truncation Year:

Year	Original Cost	Calculated Accumulated Depreciation	Allocated Actual Booked Amount	Accumulated Depreciation Factor	Net Book Value	ALG Remaining Life	Annual Accrual	Average Age
TOTAL	70,780,487.17	16,297,116	13,555,741		67,841,819		1,734,874	

COMPOSITE ANNUAL ACCRUAL RATE	2.45%
THEORETICAL ACCUMULATED DEPRECIATION FACTOR	0.19
COMPOSITE AVERAGE AGE (YEARS)	12.15
DIRECTED WEIGHTED ALG COMPOSITE REMAINING LIFE (YEARS)	39.99

Kentucky - American Water Company

Account #: 320.200 - Water Treatment Equipment - Filter Media

CALCULATED ANNUAL ACCRUAL AND ACCRUED DEPRECIATION

BASED ON ORIGINAL COST AS OF December 31, 2022

ALG - Remaining Life
Survivor Curve: S3
ASL: 10
Net Salvage: -10%
Truncation Year:

Year	Original Cost	Calculated Accumulated Depreciation	Allocated Actual Booked Amount	Accumulated Depreciation Factor	Net Book Value	ALG Remaining Life	Annual Accrual	Average Age
2009	28,120.15	27,703	24,420	0.7895	6,512	3.00	2,171	13.5
2010	400,855.20	385,476	339,797	0.7706	101,144	3.00	33,715	12.5
2011	163,320.47	152,452	134,387	0.7480	45,266	3.00	15,089	11.5
2016	192,449.84	129,399	114,065	0.5388	97,630	3.89	25,098	6.5
2017	15,975.79	9,361	8,251	0.4695	9,322	4.67	1,996	5.5
2020	6,052.91	1,664	1,466	0.2202	5,192	7.50	692	2.5
TOTAL	806,774.36	706,055	622,386		265,065		78,760	

COMPOSITE ANNUAL ACCRUAL RATE	9.76%
THEORETICAL ACCUMULATED DEPRECIATION FACTOR	0.77
COMPOSITE AVERAGE AGE (YEARS)	10.69
DIRECTED WEIGHTED ALG COMPOSITE REMAINING LIFE (YEARS)	3.28

Kentucky - American Water Company

Account #: 330.000 - Distribution Reservoirs & Standpipes

CALCULATED ANNUAL ACCRUAL AND ACCRUED DEPRECIATION

BASED ON ORIGINAL COST AS OF December 31, 2022

ALG - Remaining Life
Survivor Curve: R4
ASL: 60
Net Salvage: -15%
Truncation Year:

Year	Original Cost	Calculated Accumulated Depreciation	Allocated Actual Booked Amount	Accumulated Depreciation Factor	Net Book Value	ALG Remaining Life	Annual Accrual	Average Age
2004	1,656,707.98	583,060	433,063	0.2273	1,472,152	41.64	35,356	18.5
2008	11,716.56	3,241	2,407	0.1787	11,067	45.57	243	14.5
2010	102,741.97	24,525	18,216	0.1542	99,938	47.55	2,102	12.5
2019	6,659.68	446	331	0.0433	7,327	56.50	130	3.5
TOTAL	1,777,826.19	611,272	454,017		1,590,483		37,831	

COMPOSITE ANNUAL ACCRUAL RATE	2.13%
THEORETICAL ACCUMULATED DEPRECIATION FACTOR	0.26
COMPOSITE AVERAGE AGE (YEARS)	18.07
DIRECTED WEIGHTED ALG COMPOSITE REMAINING LIFE (YEARS)	42.06

Kentucky - American Water Company

Account #: 330.100 - Elevated Tanks & Standpipes

CALCULATED ANNUAL ACCRUAL AND ACCRUED DEPRECIATION

BASED ON ORIGINAL COST AS OF December 31, 2022

ALG - Remaining Life
Survivor Curve: R4
ASL: 60
Net Salvage: -15%
Truncation Year:

Year	Original Cost	Calculated Accumulated Depreciation	Allocated Actual Booked Amount	Accumulated Depreciation Factor	Net Book Value	ALG Remaining Life	Annual Accrual	Average Age
1949	29,618.47	31,675	33,047	0.9702	1,014	4.20	241	73.5
1953	31.05	33	34	0.9508	2	5.32	0	69.5
1954	84,170.71	87,727	91,527	0.9456	5,269	5.62	937	68.5
1965	367,671.17	352,118	367,372	0.8689	55,450	10.03	5,527	57.5
1966	723.36	685	715	0.8593	117	10.58	11	56.5
1968	173,533.59	160,480	167,432	0.8390	32,132	11.75	2,734	54.5
1970	582.65	525	547	0.8170	123	13.01	9	52.5
1974	19,721.60	16,739	17,464	0.7700	5,216	15.72	332	48.5
1975	559.58	467	488	0.7577	156	16.42	9	47.5
1976	5,189.13	4,263	4,447	0.7453	1,520	17.14	89	46.5
1977	5,027.00	4,059	4,235	0.7326	1,546	17.87	87	45.5
1980	2,486.15	1,900	1,982	0.6932	877	20.13	44	42.5
1982	223,500.00	164,040	171,146	0.6659	85,879	21.71	3,956	40.5
1985	17,247.00	11,848	12,362	0.6233	7,472	24.16	309	37.5
1987	767,712.54	502,498	524,266	0.5938	358,604	25.85	13,872	35.5
1988	7,755.79	4,948	5,162	0.5788	3,757	26.71	141	34.5
1989	1,070,509.38	665,054	693,863	0.5636	537,222	27.59	19,474	33.5
1990	650,436.57	393,065	410,092	0.5482	337,910	28.47	11,869	32.5
1991	15,711.58	9,226	9,625	0.5327	8,443	29.36	288	31.5
1992	3,704.09	2,111	2,202	0.5170	2,057	30.27	68	30.5
1994	26,620.29	14,236	14,853	0.4852	15,761	32.10	491	28.5
1996	1,383,565.06	690,538	720,451	0.4528	870,649	33.96	25,637	26.5
1999	785,425.59	349,225	364,353	0.4034	538,887	36.80	14,643	23.5
2000	28,301.04	12,064	12,586	0.3867	19,960	37.76	529	22.5
2001	876,535.70	357,450	372,935	0.3700	635,081	38.72	16,400	21.5
2005	3,333,193.00	1,110,571	1,158,679	0.3023	2,674,493	42.62	62,757	17.5
2006	169,043.00	53,143	55,445	0.2852	138,954	43.60	3,187	16.5
2009	85,427.55	22,013	22,966	0.2338	75,275	46.56	1,617	13.5

Kentucky - American Water Company

Account #: 330.100 - Elevated Tanks & Standpipes

CALCULATED ANNUAL ACCRUAL AND ACCRUED DEPRECIATION

BASED ON ORIGINAL COST AS OF December 31, 2022

ALG - Remaining Life
Survivor Curve: R4
ASL: 60
Net Salvage: -15%
Truncation Year:

Year	Original Cost	Calculated Accumulated Depreciation	Allocated Actual Booked Amount	Accumulated Depreciation Factor	Net Book Value	ALG Remaining Life	Annual Accrual	Average Age
2014	3,804,100.02	618,360	645,146	0.1475	3,729,569	51.52	72,392	8.5
2015	28,070.07	4,027	4,201	0.1302	28,079	52.51	535	7.5
2016	243,407.43	30,271	31,582	0.1128	248,336	53.51	4,641	6.5
TOTAL	14,209,580.16	5,675,358	5,921,206		10,419,811		262,826	

COMPOSITE ANNUAL ACCRUAL RATE 1.85%

THEORETICAL ACCUMULATED DEPRECIATION FACTOR 0.42

COMPOSITE AVERAGE AGE (YEARS) 21.59

DIRECTED WEIGHTED ALG COMPOSITE REMAINING LIFE (YEARS) 39.16

Kentucky - American Water Company

Account #: 330.200 - Ground Level Tanks

CALCULATED ANNUAL ACCRUAL AND ACCRUED DEPRECIATION

BASED ON ORIGINAL COST AS OF December 31, 2022

ALG - Remaining Life
Survivor Curve: R4
ASL: 60
Net Salvage: -15%
Truncation Year:

Year	Original Cost	Calculated Accumulated Depreciation	Allocated Actual Booked Amount	Accumulated Depreciation Factor	Net Book Value	ALG Remaining Life	Annual Accrual	Average Age
2007	108,616.26	32,098	27,407	0.2194	97,502	44.58	2,187	15.5
2009	8,939.49	2,304	1,967	0.1913	8,314	46.56	179	13.5
2010	2,079,601.48	496,410	423,857	0.1772	1,967,685	47.55	41,385	12.5
2012	141,581.45	28,411	24,259	0.1490	138,560	49.53	2,797	10.5
2013	573,874.81	104,228	88,994	0.1348	570,962	50.52	11,301	9.5
TOTAL	2,912,613.49	663,451	566,484		2,783,022		57,849	

COMPOSITE ANNUAL ACCRUAL RATE	1.99%
THEORETICAL ACCUMULATED DEPRECIATION FACTOR	0.19
COMPOSITE AVERAGE AGE (YEARS)	11.93
DIRECTED WEIGHTED ALG COMPOSITE REMAINING LIFE (YEARS)	48.12

Kentucky - American Water Company

Account #: 330.400 - Clearwell

CALCULATED ANNUAL ACCRUAL AND ACCRUED DEPRECIATION

BASED ON ORIGINAL COST AS OF December 31, 2022

ALG - Remaining Life
Survivor Curve: R4
ASL: 60
Net Salvage: -15%
Truncation Year:

Year	Original Cost	Calculated Accumulated Depreciation	Allocated Actual Booked Amount	Accumulated Depreciation Factor	Net Book Value	ALG Remaining Life	Annual Accrual	Average Age
2007	581.91	172	187	0.2793	482	44.58	11	15.5
2010	1,095,733.70	261,556	284,126	0.2255	975,968	47.55	20,527	12.5
TOTAL	1,096,315.61	261,728	284,313		976,450		20,538	

COMPOSITE ANNUAL ACCRUAL RATE	1.87%
THEORETICAL ACCUMULATED DEPRECIATION FACTOR	0.26
COMPOSITE AVERAGE AGE (YEARS)	12.50
DIRECTED WEIGHTED ALG COMPOSITE REMAINING LIFE (YEARS)	47.54

Kentucky - American Water Company

Account #: 331.001 - TD Mains

CALCULATED ANNUAL ACCRUAL AND ACCRUED DEPRECIATION

BASED ON ORIGINAL COST AS OF December 31, 2022

ALG - Remaining Life
Survivor Curve: R4
ASL: 90
Net Salvage: -20%
Truncation Year:

Year	Original Cost	Calculated Accumulated Depreciation	Allocated Actual Booked Amount	Accumulated Depreciation Factor	Net Book Value	ALG Remaining Life	Annual Accrual	Average Age
1906	25.20	29	26	0.8750	4	4.65	1	116.5
1933	43,861.44	44,791	41,329	0.7852	11,304	13.41	843	89.5
1934	261,398.70	265,255	244,756	0.7803	68,922	13.89	4,961	88.5
1935	41,009.24	41,340	38,146	0.7751	11,065	14.39	769	87.5
1936	24,245.43	24,273	22,398	0.7698	6,697	14.91	449	86.5
1937	51,991.79	51,680	47,686	0.7643	14,704	15.45	952	85.5
1938	15,140.57	14,937	13,783	0.7586	4,386	16.01	274	84.5
1939	15,138.25	14,819	13,674	0.7527	4,492	16.58	271	83.5
1940	11,433.41	11,102	10,244	0.7467	3,476	17.17	202	82.5
1941	10,483.17	10,095	9,315	0.7405	3,265	17.78	184	81.5
1942	1,655.71	1,581	1,459	0.7341	528	18.40	29	80.5
1943	2,011.30	1,903	1,756	0.7276	657	19.03	35	79.5
1944	265.36	249	230	0.7210	89	19.68	5	78.5
1945	4,396.19	4,083	3,768	0.7142	1,508	20.34	74	77.5
1946	7,717.33	7,100	6,551	0.7074	2,710	21.00	129	76.5
1947	33,837.28	30,824	28,442	0.7005	12,162	21.68	561	75.5
1948	104,510.22	94,252	86,968	0.6935	38,444	22.36	1,719	74.5
1949	84,017.53	74,997	69,201	0.6864	31,620	23.05	1,372	73.5
1950	102,735.73	90,749	83,736	0.6792	39,547	23.75	1,665	72.5
1951	34,202.56	29,890	27,580	0.6720	13,463	24.46	550	71.5
1952	146,320.69	126,481	116,706	0.6647	58,879	25.17	2,339	70.5
1953	300,175.36	256,587	236,758	0.6573	123,453	25.89	4,768	69.5
1954	142,793.91	120,670	111,345	0.6498	60,008	26.62	2,254	68.5
1955	505,220.20	421,977	389,366	0.6422	216,898	27.36	7,928	67.5
1956	1,036,074.41	855,048	788,969	0.6346	454,321	28.10	16,166	66.5
1957	390,828.91	318,607	293,985	0.6268	175,010	28.86	6,064	65.5
1958	639,271.50	514,634	474,862	0.6190	292,263	29.62	9,866	64.5
1959	460,874.35	366,277	337,971	0.6111	215,078	30.39	7,076	63.5

Kentucky - American Water Company

Account #: 331.001 - TD Mains

CALCULATED ANNUAL ACCRUAL AND ACCRUED DEPRECIATION

BASED ON ORIGINAL COST AS OF December 31, 2022

ALG - Remaining Life
Survivor Curve: R4
ASL: 90
Net Salvage: -20%
Truncation Year:

Year	Original Cost	Calculated Accumulated Depreciation	Allocated Actual Booked Amount	Accumulated Depreciation Factor	Net Book Value	ALG Remaining Life	Annual Accrual	Average Age
1960	413,641.57	324,438	299,365	0.6031	197,005	31.17	6,320	62.5
1961	242,609.29	187,740	173,231	0.5950	117,900	31.96	3,689	61.5
1962	324,659.52	247,786	228,637	0.5869	160,955	32.76	4,913	60.5
1963	284,281.30	213,919	197,387	0.5786	143,750	33.56	4,283	59.5
1964	403,748.24	299,442	276,301	0.5703	208,197	34.38	6,056	58.5
1965	477,338.64	348,792	321,837	0.5619	250,970	35.20	7,130	57.5
1966	4,141,499.93	2,980,394	2,750,065	0.5534	2,219,735	36.03	61,613	56.5
1967	682,464.24	483,511	446,145	0.5448	372,812	36.86	10,113	55.5
1968	525,955.63	366,704	338,365	0.5361	292,782	37.71	7,764	54.5
1969	669,365.92	459,087	423,608	0.5274	379,631	38.56	9,845	53.5
1970	436,066.71	294,081	271,354	0.5186	251,926	39.42	6,391	52.5
1971	526,196.31	348,784	321,830	0.5097	309,606	40.29	7,685	51.5
1972	1,507,231.21	981,500	905,648	0.5007	903,029	41.16	21,939	50.5
1973	842,895.06	538,996	497,342	0.4917	514,132	42.04	12,229	49.5
1974	3,054,393.14	1,917,012	1,768,862	0.4826	1,896,409	42.93	44,176	48.5
1975	663,547.09	408,551	376,977	0.4734	419,279	43.82	9,568	47.5
1976	767,271.97	463,209	427,411	0.4642	493,315	44.72	11,031	46.5
1977	1,276,216.76	755,050	696,699	0.4549	834,761	45.63	18,295	45.5
1978	1,108,170.91	642,162	592,535	0.4456	737,270	46.54	15,842	44.5
1979	1,451,181.87	823,188	759,571	0.4362	981,847	47.46	20,690	43.5
1980	1,247,670.91	692,406	638,895	0.4267	858,310	48.38	17,742	42.5
1981	498,248.72	270,348	249,455	0.4172	348,443	49.31	7,067	41.5
1982	413,042.15	218,982	202,059	0.4077	293,591	50.24	5,844	40.5
1983	550,370.05	284,913	262,894	0.3981	397,550	51.17	7,769	39.5
1984	1,794,947.65	906,669	836,600	0.3884	1,317,337	52.12	25,277	38.5
1985	5,122,897.89	2,523,106	2,328,117	0.3787	3,819,360	53.06	71,980	37.5
1986	1,759,782.34	844,442	779,182	0.3690	1,332,556	54.01	24,672	36.5
1987	8,210,344.12	3,835,436	3,539,029	0.3592	6,313,384	54.96	114,864	35.5

Kentucky - American Water Company

Account #: 331.001 - TD Mains

CALCULATED ANNUAL ACCRUAL AND ACCRUED DEPRECIATION

BASED ON ORIGINAL COST AS OF December 31, 2022

ALG - Remaining Life
Survivor Curve: R4
ASL: 90
Net Salvage: -20%
Truncation Year:

Year	Original Cost	Calculated Accumulated Depreciation	Allocated Actual Booked Amount	Accumulated Depreciation Factor	Net Book Value	ALG Remaining Life	Annual Accrual	Average Age
1988	5,313,717.84	2,414,504	2,227,908	0.3494	4,148,553	55.92	74,186	34.5
1989	3,254,592.80	1,437,197	1,326,128	0.3396	2,579,383	56.88	45,347	33.5
1990	3,652,028.75	1,565,801	1,444,794	0.3297	2,937,641	57.84	50,786	32.5
1991	1,913,138.08	795,611	734,125	0.3198	1,561,641	58.81	26,554	31.5
1992	3,697,611.30	1,489,933	1,374,789	0.3098	3,062,345	59.78	51,228	30.5
1993	3,219,988.34	1,255,758	1,158,712	0.2999	2,705,274	60.75	44,531	29.5
1994	6,528,362.47	2,461,194	2,270,990	0.2899	5,563,045	61.72	90,126	28.5
1995	4,005,451.17	1,457,913	1,345,244	0.2799	3,461,298	62.70	55,203	27.5
1996	5,538,531.67	1,943,673	1,793,464	0.2698	4,852,774	63.68	76,206	26.5
1997	6,223,550.35	2,102,719	1,940,218	0.2598	5,528,042	64.66	85,494	25.5
1998	5,194,888.79	1,687,141	1,556,756	0.2497	4,677,110	65.64	71,251	24.5
1999	8,430,760.74	2,627,460	2,424,406	0.2396	7,692,507	66.63	115,458	23.5
2000	7,435,307.31	2,219,537	2,048,008	0.2295	6,874,361	67.61	101,674	22.5
2001	5,055,926.79	1,442,729	1,331,233	0.2194	4,735,879	68.60	69,038	21.5
2002	190,725.21	51,911	47,899	0.2093	180,971	69.59	2,601	20.5
2003	761.64	197	182	0.1991	732	70.58	10	19.5
2004	69,375.66	17,051	15,733	0.1890	67,517	71.57	943	18.5
2005	574,365.56	133,574	123,252	0.1788	565,987	72.56	7,800	17.5
2006	15,320,311.43	3,360,173	3,100,495	0.1686	15,283,879	73.55	207,801	16.5
2007	32,414,115.90	6,680,073	6,163,828	0.1585	32,733,111	74.54	439,114	15.5
2008	9,275,843.10	1,788,686	1,650,454	0.1483	9,480,558	75.54	125,508	14.5
2009	3,552,869.25	637,992	588,687	0.1381	3,674,756	76.53	48,016	13.5
2010	75,331,936.13	12,527,724	11,559,565	0.1279	78,838,758	77.53	1,016,914	12.5
2011	3,892,512.77	595,642	549,610	0.1177	4,121,406	78.52	52,486	11.5
2012	3,798,661.40	530,817	489,795	0.1074	4,068,599	79.52	51,165	10.5
2013	4,630,862.05	585,562	540,309	0.0972	5,016,726	80.52	62,307	9.5
2014	18,671,276.45	2,112,695	1,949,423	0.0870	20,456,109	81.51	250,953	8.5
2015	7,206,744.44	719,607	663,995	0.0768	7,984,098	82.51	96,764	7.5

Kentucky - American Water Company

Account #: 331.001 - TD Mains

CALCULATED ANNUAL ACCRUAL AND ACCRUED DEPRECIATION

BASED ON ORIGINAL COST AS OF December 31, 2022

ALG - Remaining Life
Survivor Curve: R4
ASL: 90
Net Salvage: -20%
Truncation Year:

Year	Original Cost	Calculated Accumulated Depreciation	Allocated Actual Booked Amount	Accumulated Depreciation Factor	Net Book Value	ALG Remaining Life	Annual Accrual	Average Age
2016	15,328,422.26	1,326,636	1,224,112	0.0665	17,169,995	83.51	205,607	6.5
2017	12,439,042.91	911,027	840,622	0.0563	14,086,230	84.51	166,687	5.5
2018	10,599,768.63	635,222	586,131	0.0461	12,133,591	85.51	141,904	4.5
2019	9,440,558.68	440,055	406,047	0.0358	10,922,623	86.50	126,267	3.5
2020	11,533,932.22	384,035	354,356	0.0256	13,486,362	87.50	154,125	2.5
2021	20,981,107.35	419,132	386,741	0.0154	24,790,588	88.50	280,114	1.5
2022	29,510,003.59	196,398	181,220	0.0051	35,230,784	89.50	393,636	0.5
TOTAL	398,094,727.91	85,410,262	78,809,643		398,904,030		5,424,097	

COMPOSITE ANNUAL ACCRUAL RATE	1.36%
THEORETICAL ACCUMULATED DEPRECIATION FACTOR	0.20
COMPOSITE AVERAGE AGE (YEARS)	16.32
DIRECTED WEIGHTED ALG COMPOSITE REMAINING LIFE (YEARS)	73.91

Kentucky - American Water Company

Account #: 333.000 - Services

CALCULATED ANNUAL ACCRUAL AND ACCRUED DEPRECIATION

BASED ON ORIGINAL COST AS OF December 31, 2022

ALG - Remaining Life
Survivor Curve: R4
ASL: 55
Net Salvage: -65%
Truncation Year:

Year	Original Cost	Calculated Accumulated Depreciation	Allocated Actual Booked Amount	Accumulated Depreciation Factor	Net Book Value	ALG Remaining Life	Annual Accrual	Average Age
1934	510.72	843	843	1.0000	0	3.00	0	89.5
1939	81.44	133	134	1.0000	0	3.00	0	83.5
1940	159.49	261	263	1.0000	0	3.00	0	82.5
1941	70.77	115	117	1.0000	0	3.00	0	81.5
1942	804.00	1,308	1,327	1.0000	0	3.00	0	80.5
1946	281.15	450	460	0.9920	4	3.00	1	76.5
1953	490.46	761	777	0.9605	32	3.29	10	69.5
1955	835.85	1,283	1,311	0.9507	68	3.82	18	67.5
1956	1,057.00	1,614	1,649	0.9456	95	4.09	23	66.5
1957	2,334.42	3,546	3,623	0.9405	229	4.37	52	65.5
1958	3,897.27	5,887	6,014	0.9353	416	4.65	89	64.5
1959	861.29	1,293	1,321	0.9299	100	4.94	20	63.5
1960	6,994.67	10,441	10,667	0.9243	874	5.24	167	62.5
1961	5,263.34	7,807	7,976	0.9185	708	5.56	127	61.5
1962	40,628.47	59,864	61,163	0.9124	5,874	5.88	998	60.5
1963	7,682.97	11,241	11,485	0.9060	1,192	6.23	191	59.5
1964	4,843.24	7,033	7,186	0.8992	805	6.59	122	58.5
1965	12,435.33	17,915	18,303	0.8920	2,215	6.98	317	57.5
1966	32,078.45	45,818	46,812	0.8844	6,118	7.39	828	56.5
1967	14,292.62	20,227	20,666	0.8763	2,917	7.83	373	55.5
1968	64,503.96	90,388	92,348	0.8677	14,083	8.29	1,699	54.5
1969	82,738.10	114,711	117,199	0.8585	19,319	8.79	2,199	53.5
1970	61,531.63	84,342	86,171	0.8487	15,356	9.31	1,649	52.5
1971	39,880.94	54,003	55,174	0.8385	10,630	9.86	1,078	51.5
1972	109,193.89	145,953	149,118	0.8277	31,052	10.45	2,973	50.5
1973	37,354.02	49,248	50,316	0.8164	11,318	11.05	1,024	49.5
1974	95,240.69	123,758	126,442	0.8046	30,705	11.69	2,628	48.5
1975	72,245.50	92,465	94,471	0.7925	24,734	12.34	2,005	47.5

Kentucky - American Water Company

Account #: 333.000 - Services

CALCULATED ANNUAL ACCRUAL AND ACCRUED DEPRECIATION

BASED ON ORIGINAL COST AS OF December 31, 2022

ALG - Remaining Life
Survivor Curve: R4
ASL: 55
Net Salvage: -65%
Truncation Year:

Year	Original Cost	Calculated Accumulated Depreciation	Allocated Actual Booked Amount	Accumulated Depreciation Factor	Net Book Value	ALG Remaining Life	Annual Accrual	Average Age
1976	199,351.71	251,154	256,601	0.7801	72,330	13.00	5,562	46.5
1977	294,222.76	364,669	372,577	0.7675	112,890	13.69	8,249	45.5
1978	295,796.55	360,471	368,289	0.7546	119,776	14.38	8,330	44.5
1979	322,714.27	386,443	394,824	0.7415	137,655	15.08	9,126	43.5
1980	292,385.41	343,819	351,275	0.7281	131,161	15.80	8,300	42.5
1981	164,833.30	190,209	194,334	0.7145	77,641	16.53	4,696	41.5
1982	269,523.82	304,990	311,605	0.7007	133,110	17.28	7,703	40.5
1983	245,011.96	271,675	277,567	0.6866	126,703	18.04	7,024	39.5
1984	332,469.71	360,945	368,773	0.6722	179,802	18.81	9,558	38.5
1985	459,948.33	488,480	499,073	0.6576	259,841	19.60	13,258	37.5
1986	557,881.87	579,090	591,648	0.6427	328,857	20.40	16,121	36.5
1987	644,977.27	653,750	667,927	0.6276	396,285	21.21	18,681	35.5
1988	629,969.17	622,913	636,422	0.6123	403,028	22.04	18,286	34.5
1989	790,694.37	761,926	778,449	0.5967	526,196	22.88	22,999	33.5
1990	755,472.61	708,672	724,041	0.5808	522,489	23.73	22,017	32.5
1991	744,136.27	678,741	693,461	0.5648	534,364	24.60	21,726	31.5
1992	928,911.28	822,876	840,721	0.5485	691,982	25.47	27,167	30.5
1993	772,404.39	663,693	678,086	0.5321	596,381	26.36	22,626	29.5
1994	860,174.12	715,969	731,496	0.5154	687,791	27.25	25,236	28.5
1995	949,010.57	764,105	780,676	0.4986	785,192	28.16	27,882	27.5
1996	1,041,896.35	810,254	827,826	0.4815	891,303	29.08	30,653	26.5
1997	975,567.84	731,609	747,475	0.4644	862,212	30.00	28,738	25.5
1998	1,440,245.34	1,039,789	1,062,339	0.4470	1,314,066	30.93	42,478	24.5
1999	1,665,637.64	1,155,542	1,180,602	0.4296	1,567,700	31.87	49,183	23.5
2000	1,934,097.32	1,286,854	1,314,761	0.4120	1,876,499	32.82	57,173	22.5
2001	9,201,395.89	5,859,041	5,986,104	0.3943	9,196,199	33.77	272,280	21.5
2002	13,621.18	8,281	8,461	0.3765	14,014	34.73	403	20.5
2003	39,072.44	22,625	23,116	0.3586	41,353	35.70	1,158	19.5

Kentucky - American Water Company

Account #: 333.000 - Services

CALCULATED ANNUAL ACCRUAL AND ACCRUED DEPRECIATION

BASED ON ORIGINAL COST AS OF December 31, 2022

ALG - Remaining Life
Survivor Curve: R4
ASL: 55
Net Salvage: -65%
Truncation Year:

Year	Original Cost	Calculated Accumulated Depreciation	Allocated Actual Booked Amount	Accumulated Depreciation Factor	Net Book Value	ALG Remaining Life	Annual Accrual	Average Age
2004	79,081.40	43,495	44,438	0.3406	86,046	36.67	2,347	18.5
2006	4,901,354.31	2,409,088	2,461,333	0.3043	5,625,902	38.62	145,688	16.5
2007	1,150,010.89	531,433	542,958	0.2861	1,354,560	39.60	34,209	15.5
2008	2,533,662.39	1,096,114	1,119,885	0.2679	3,060,658	40.58	75,424	14.5
2009	3,796,601.55	1,530,234	1,563,419	0.2496	4,700,973	41.56	113,100	13.5
2010	1,854,091.51	692,354	707,369	0.2312	2,351,882	42.55	55,270	12.5
2011	1,673,854.52	575,350	587,827	0.2128	2,174,033	43.54	49,929	11.5
2012	2,319,787.63	728,374	744,170	0.1944	3,083,479	44.53	69,239	10.5
2013	1,080,773.17	307,150	313,811	0.1760	1,469,465	45.53	32,277	9.5
2014	820,410.45	208,688	213,213	0.1575	1,140,464	46.52	24,515	8.5
2015	927,013.10	208,127	212,641	0.1390	1,316,931	47.52	27,715	7.5
2016	1,136,851.25	221,267	226,065	0.1205	1,649,739	48.51	34,007	6.5
2017	1,235,888.41	203,583	207,998	0.1020	1,831,218	49.51	36,987	5.5
2018	2,429,421.17	327,491	334,593	0.0835	3,673,952	50.51	72,742	4.5
2019	2,558,798.90	268,323	274,142	0.0649	3,947,876	51.50	76,651	3.5
2020	1,252,504.84	93,827	95,862	0.0464	1,970,771	52.50	37,536	2.5
2021	3,574,761.12	160,684	164,169	0.0278	5,734,187	53.50	107,178	1.5
2022	2,870,303.23	42,995	43,928	0.0093	4,692,073	54.50	86,092	0.5
TOTAL	63,714,885.26	31,809,870	32,499,686		72,629,874		1,886,110	

COMPOSITE ANNUAL ACCRUAL RATE	2.96%
THEORETICAL ACCUMULATED DEPRECIATION FACTOR	0.51
COMPOSITE AVERAGE AGE (YEARS)	17.11
DIRECTED WEIGHTED ALG COMPOSITE REMAINING LIFE (YEARS)	38.36

Kentucky - American Water Company

Account #: 334.100 - Meters

CALCULATED ANNUAL ACCRUAL AND ACCRUED DEPRECIATION

BASED ON ORIGINAL COST AS OF December 31, 2022

ALG - Remaining Life
Survivor Curve: R3
ASL: 10
Net Salvage: -15%
Truncation Year:

Year	Original Cost	Calculated Accumulated Depreciation	Allocated Actual Booked Amount	Accumulated Depreciation Factor	Net Book Value	ALG Remaining Life	Annual Accrual	Average Age
1986	1,456.34	1,675	332	0.1979	1,343	3.00	448	36.5
1988	2,096.79	2,411	477	0.1977	1,935	3.00	645	34.5
2002	56,623.00	65,116	12,871	0.1977	52,246	3.00	17,415	20.5
2003	29,910.50	34,397	6,799	0.1977	27,598	3.00	9,199	19.5
2006	14,513.75	15,856	3,134	0.1878	13,557	3.00	4,519	16.5
2008	1,293,087.40	1,384,353	273,628	0.1840	1,213,422	3.00	404,474	14.5
2009	468,655.96	489,562	96,766	0.1795	442,189	3.00	147,396	13.5
2010	2,261,724.27	2,298,315	454,280	0.1747	2,146,703	3.00	715,568	12.5
2011	5,310,049.34	5,218,338	1,031,446	0.1689	5,075,111	3.00	1,691,704	11.5
2012	2,482,230.07	2,334,730	461,478	0.1617	2,393,087	3.00	797,696	10.5
2013	1,932,824.26	1,715,546	339,091	0.1526	1,883,657	3.00	627,886	9.5
2014	327,351.57	269,577	53,284	0.1415	323,170	3.00	107,723	8.5
2015	208,809.43	156,504	30,934	0.1288	209,197	3.48	60,070	7.5
2016	57,115.56	38,109	7,533	0.1147	58,150	4.20	13,852	6.5
2017	34,596.67	19,997	3,953	0.0993	35,834	4.97	7,204	5.5
2018	3,746,567.82	1,808,636	357,491	0.0830	3,951,062	5.80	680,957	4.5
2019	3,313,169.36	1,265,981	250,231	0.0657	3,559,914	6.68	533,133	3.5
2020	689,125.79	190,799	37,713	0.0476	754,782	7.59	99,412	2.5
2021	1,363,288.86	229,009	45,265	0.0289	1,522,517	8.54	178,296	1.5
2022	3,532,307.73	199,395	39,412	0.0097	4,022,742	9.51	423,040	0.5
TOTAL	27,125,504.47	17,738,309	3,506,116		27,688,214		6,520,637	

COMPOSITE ANNUAL ACCRUAL RATE	24.04%
THEORETICAL ACCUMULATED DEPRECIATION FACTOR	0.13
COMPOSITE AVERAGE AGE (YEARS)	7.37
DIRECTED WEIGHTED ALG COMPOSITE REMAINING LIFE (YEARS)	5.09

Kentucky - American Water Company

Account #: 334.110 - Meters - Bronze Case

CALCULATED ANNUAL ACCRUAL AND ACCRUED DEPRECIATION

BASED ON ORIGINAL COST AS OF December 31, 2022

ALG - Remaining Life
Survivor Curve: R3
ASL: 10
Net Salvage: -15%
Truncation Year:

Year	Original Cost	Calculated Accumulated Depreciation	Allocated Actual Booked Amount	Accumulated Depreciation Factor	Net Book Value	ALG Remaining Life	Annual Accrual	Average Age
2006	37,862.01	41,364	15,917	0.3656	27,624	3.00	9,208	16.5
2007	438.29	478	184	0.3649	320	3.00	107	15.5
2008	1,966,990.53	2,105,821	810,341	0.3582	1,451,698	3.00	483,899	14.5
2009	263,744.72	275,510	106,019	0.3495	197,287	3.00	65,762	13.5
2019	159,756.32	61,044	23,490	0.1279	160,229	6.68	23,996	3.5
TOTAL	2,428,791.87	2,484,217	955,952		1,837,159		582,972	

COMPOSITE ANNUAL ACCRUAL RATE 24.00%

THEORETICAL ACCUMULATED DEPRECIATION FACTOR 0.39

COMPOSITE AVERAGE AGE (YEARS) 13.70

DIRECTED WEIGHTED ALG COMPOSITE REMAINING LIFE (YEARS) 3.24

Kentucky - American Water Company

Account #: 334.120 - Meters - Plastic Case

CALCULATED ANNUAL ACCRUAL AND ACCRUED DEPRECIATION

BASED ON ORIGINAL COST AS OF December 31, 2022

ALG - Remaining Life
Survivor Curve: R3
ASL: 10
Net Salvage: -15%
Truncation Year:

Year	Original Cost	Calculated Accumulated Depreciation	Allocated Actual Booked Amount	Accumulated Depreciation Factor	Net Book Value	ALG Remaining Life	Annual Accrual	Average Age
1976	303.88	349	-268	-0.7656	617	3.00	206	46.5
1977	296.96	342	-262	-0.7662	603	3.00	201	45.5
1979	106.98	123	-94	-0.7662	217	3.00	72	43.5
1981	465.52	535	-410	-0.7662	946	3.00	315	41.5
1983	108.98	125	-96	-0.7662	221	3.00	74	39.5
1984	38.00	44	-33	-0.7661	77	3.00	26	38.5
1985	3,175.62	3,652	-2,798	-0.7662	6,450	3.00	2,150	37.5
1986	1,053.79	1,212	-929	-0.7662	2,140	3.00	713	36.5
1987	937.01	1,078	-826	-0.7662	1,903	3.00	634	35.5
1988	1,711.33	1,968	-1,508	-0.7662	3,476	3.00	1,159	34.5
1989	3,353.34	3,856	-2,955	-0.7662	6,811	3.00	2,270	33.5
1992	1,881.27	2,163	-1,658	-0.7662	3,821	3.00	1,274	30.5
1993	6,609.64	7,601	-5,824	-0.7662	13,425	3.00	4,475	29.5
1994	45,303.92	52,100	-39,919	-0.7662	92,019	3.00	30,673	28.5
1995	11,934.36	13,725	-10,516	-0.7662	24,240	3.00	8,080	27.5
1997	9,263.92	10,654	-8,163	-0.7662	18,816	3.00	6,272	25.5
2001	282,382.96	324,740	-248,821	-0.7662	573,561	3.00	191,187	21.5
2007	4,165.32	4,542	-3,480	-0.7265	8,270	3.00	2,757	15.5
2013	5,815.36	5,162	-3,955	-0.5914	10,643	3.00	3,548	9.5
2014	16,203.31	13,344	-10,224	-0.5487	28,858	3.00	9,619	8.5
2019	72,034.73	27,525	-21,090	-0.2546	103,930	6.68	15,565	3.5
2020	653.38	181	-139	-0.1845	890	7.59	117	2.5
2021	8,269.77	1,389	-1,064	-0.1119	10,575	8.54	1,238	1.5

Kentucky - American Water Company

Account #: 334.120 - Meters - Plastic Case

CALCULATED ANNUAL ACCRUAL AND ACCRUED DEPRECIATION

BASED ON ORIGINAL COST AS OF December 31, 2022

ALG - Remaining Life
Survivor Curve: R3
ASL: 10
Net Salvage: -15%
Truncation Year:

Year	Original Cost	Calculated Accumulated Depreciation	Allocated Actual Booked Amount	Accumulated Depreciation Factor	Net Book Value	ALG Remaining Life	Annual Accrual	Average Age
TOTAL	476,069.35	476,409	-365,031		912,511		282,625	

COMPOSITE ANNUAL ACCRUAL RATE	59.37%
THEORETICAL ACCUMULATED DEPRECIATION FACTOR	-0.77
COMPOSITE AVERAGE AGE (YEARS)	19.16
DIRECTED WEIGHTED ALG COMPOSITE REMAINING LIFE (YEARS)	3.66

Kentucky - American Water Company

Account #: 334.130 - Meters - Other

CALCULATED ANNUAL ACCRUAL AND ACCRUED DEPRECIATION

BASED ON ORIGINAL COST AS OF December 31, 2022

ALG - Remaining Life
Survivor Curve: R3
ASL: 10
Net Salvage: -15%
Truncation Year:

Year	Original Cost	Calculated Accumulated Depreciation	Allocated Actual Booked Amount	Accumulated Depreciation Factor	Net Book Value	ALG Remaining Life	Annual Accrual	Average Age
1934	221.37	255	81	0.3186	173	3.00	58	88.5
1935	46.68	54	17	0.3185	37	3.00	12	87.5
1936	184.20	212	67	0.3186	144	3.00	48	86.5
1937	118.84	137	44	0.3186	93	3.00	31	85.5
1939	69.91	80	26	0.3187	55	3.00	18	83.5
1941	274.11	315	100	0.3186	215	3.00	72	81.5
1946	90.46	104	33	0.3187	71	3.00	24	76.5
1950	63.27	73	23	0.3186	50	3.00	17	72.5
1951	434.51	500	159	0.3186	340	3.00	113	71.5
1952	56.86	65	21	0.3186	45	3.00	15	70.5
1953	528.43	608	194	0.3186	414	3.00	138	69.5
1954	567.11	652	208	0.3186	444	3.00	148	68.5
1956	913.13	1,050	335	0.3186	716	3.00	239	66.5
1957	566.29	651	207	0.3186	444	3.00	148	65.5
1958	94.99	109	35	0.3187	74	3.00	25	64.5
1959	828.81	953	304	0.3186	649	3.00	216	63.5
1960	1,132.35	1,302	415	0.3186	887	3.00	296	62.5
1961	782.01	899	287	0.3186	613	3.00	204	61.5
1962	333.51	384	122	0.3186	261	3.00	87	60.5
1963	1,615.14	1,857	592	0.3186	1,266	3.00	422	59.5
1964	554.45	638	203	0.3186	434	3.00	145	58.5
1965	2,628.95	3,023	963	0.3186	2,060	3.00	687	57.5
1966	2,689.20	3,093	985	0.3186	2,107	3.00	702	56.5
1967	3,381.70	3,889	1,239	0.3186	2,650	3.00	883	55.5
1971	1,116.84	1,284	409	0.3186	875	3.00	292	51.5
1977	594.85	684	218	0.3186	466	3.00	155	45.5
1978	1,487.77	1,711	545	0.3186	1,166	3.00	389	44.5
1980	1,729.52	1,989	634	0.3186	1,355	3.00	452	42.5

Kentucky - American Water Company

Account #: 334.130 - Meters - Other

CALCULATED ANNUAL ACCRUAL AND ACCRUED DEPRECIATION

BASED ON ORIGINAL COST AS OF December 31, 2022

ALG - Remaining Life
Survivor Curve: R3
ASL: 10
Net Salvage: -15%
Truncation Year:

Year	Original Cost	Calculated Accumulated Depreciation	Allocated Actual Booked Amount	Accumulated Depreciation Factor	Net Book Value	ALG Remaining Life	Annual Accrual	Average Age
1981	560.70	645	205	0.3186	439	3.00	146	41.5
1983	376.27	433	138	0.3186	295	3.00	98	39.5
1985	6,562.14	7,546	2,404	0.3186	5,142	3.00	1,714	37.5
1986	6,691.30	7,695	2,452	0.3186	5,243	3.00	1,748	36.5
1987	157.20	181	58	0.3186	123	3.00	41	35.5
1988	2,180.02	2,507	799	0.3186	1,708	3.00	569	34.5
1989	4,247.33	4,884	1,556	0.3186	3,328	3.00	1,109	33.5
1990	2,580.38	2,967	945	0.3186	2,022	3.00	674	32.5
1992	9,519.28	10,947	3,488	0.3186	7,459	3.00	2,486	30.5
1993	8,582.94	9,870	3,145	0.3186	6,726	3.00	2,242	29.5
1994	10,008.78	11,510	3,667	0.3186	7,843	3.00	2,614	28.5
1995	9,026.06	10,380	3,307	0.3186	7,073	3.00	2,358	27.5
1996	91,710.15	105,467	33,603	0.3186	71,863	3.00	23,954	26.5
1997	126,486.24	145,459	46,346	0.3186	99,114	3.00	33,038	25.5
1998	172,258.15	198,097	63,117	0.3186	134,980	3.00	44,993	24.5
1999	102,800.26	118,220	37,667	0.3186	80,553	3.00	26,851	23.5
2000	298,668.92	343,469	109,435	0.3186	234,035	3.00	78,012	22.5
2003	50,508.48	58,085	18,507	0.3186	39,578	3.00	13,193	19.5
2004	18,050.92	20,759	6,614	0.3186	14,145	3.00	4,715	18.5
2006	5,319,740.33	5,811,816	1,851,734	0.3027	4,265,968	3.00	1,421,989	16.5
2007	67,524.64	73,633	23,461	0.3021	54,193	3.00	18,064	15.5
2008	20,002.65	21,414	6,823	0.2966	16,180	3.00	5,393	14.5
2009	147,426.61	154,003	49,068	0.2894	120,473	3.00	40,158	13.5
2019	177,047.35	67,651	21,555	0.1059	182,050	6.68	27,264	3.5

Kentucky - American Water Company

Account #: 334.130 - Meters - Other

CALCULATED ANNUAL ACCRUAL AND ACCRUED DEPRECIATION

BASED ON ORIGINAL COST AS OF December 31, 2022

ALG - Remaining Life
Survivor Curve: R3
ASL: 10
Net Salvage: -15%
Truncation Year:

Year	Original Cost	Calculated Accumulated Depreciation	Allocated Actual Booked Amount	Accumulated Depreciation Factor	Net Book Value	ALG Remaining Life	Annual Accrual	Average Age
TOTAL	6,675,822.36	7,214,211	2,298,558		5,378,638		1,759,459	

COMPOSITE ANNUAL ACCRUAL RATE	26.36%
THEORETICAL ACCUMULATED DEPRECIATION FACTOR	0.34
COMPOSITE AVERAGE AGE (YEARS)	17.27
DIRECTED WEIGHTED ALG COMPOSITE REMAINING LIFE (YEARS)	3.10

Kentucky - American Water Company

Account #: 334.131 - Meter Reading Units

CALCULATED ANNUAL ACCRUAL AND ACCRUED DEPRECIATION

BASED ON ORIGINAL COST AS OF December 31, 2022

ALG - Remaining Life
Survivor Curve: R3
ASL: 10
Net Salvage: -15%
Truncation Year:

Year	Original Cost	Calculated Accumulated Depreciation	Allocated Actual Booked Amount	Accumulated Depreciation Factor	Net Book Value	ALG Remaining Life	Annual Accrual	Average Age
2006	270,917.62	295,978	117,516	0.3772	194,039	3.00	64,680	16.5
2008	5,583.31	5,977	2,373	0.3696	4,048	3.00	1,349	14.5
2011	17,183.36	16,887	6,705	0.3393	13,056	3.00	4,352	11.5
2012	30,826.98	28,995	11,512	0.3247	23,939	3.00	7,980	10.5
2013	688.47	611	243	0.3064	549	3.00	183	9.5
2014	127,744.37	105,199	41,768	0.2843	105,138	3.00	35,046	8.5
2015	214.05	160	64	0.2588	182	3.48	52	7.5
2019	22,538.95	8,612	3,419	0.1319	22,500	6.68	3,370	3.5
2020	251,930.65	69,752	27,695	0.0956	262,026	7.59	34,511	2.5
TOTAL	727,627.76	532,171	211,295		625,477		151,523	

COMPOSITE ANNUAL ACCRUAL RATE	20.82%
THEORETICAL ACCUMULATED DEPRECIATION FACTOR	0.29
COMPOSITE AVERAGE AGE (YEARS)	9.45
DIRECTED WEIGHTED ALG COMPOSITE REMAINING LIFE (YEARS)	4.70

Kentucky - American Water Company

Account #: 334.200 - Meter Installations

CALCULATED ANNUAL ACCRUAL AND ACCRUED DEPRECIATION

BASED ON ORIGINAL COST AS OF December 31, 2022

ALG - Remaining Life
Survivor Curve: R3
ASL: 60
Net Salvage: -20%
Truncation Year:

Year	Original Cost	Calculated Accumulated Depreciation	Allocated Actual Booked Amount	Accumulated Depreciation Factor	Net Book Value	ALG Remaining Life	Annual Accrual	Average Age
1934	744.57	847	893	1.0000	0	3.15	0	88.5
1935	992.35	1,123	1,191	1.0000	0	3.41	0	87.5
1936	61.55	69	74	1.0000	0	3.66	0	86.5
1939	1,448.05	1,609	1,738	1.0000	0	4.43	0	83.5
1940	535.79	593	643	1.0000	0	4.69	0	82.5
1941	347.81	383	417	1.0000	0	4.95	0	81.5
1942	940.92	1,031	1,129	1.0000	0	5.20	0	80.5
1945	280.47	303	337	1.0000	0	5.99	0	77.5
1946	151.10	162	181	1.0000	0	6.26	0	76.5
1947	4,661.39	4,985	5,594	1.0000	0	6.53	0	75.5
1948	3,785.57	4,027	4,543	1.0000	0	6.81	0	74.5
1949	18,030.66	19,078	21,637	1.0000	0	7.09	0	73.5
1950	1,898.88	1,998	2,279	1.0000	0	7.39	0	72.5
1951	8,985.34	9,400	10,782	1.0000	0	7.69	0	71.5
1952	14,692.46	15,278	17,631	1.0000	0	8.01	0	70.5
1953	19,557.52	20,209	23,469	1.0000	0	8.33	0	69.5
1954	20,262.60	20,801	24,315	1.0000	0	8.67	0	68.5
1955	23,485.62	23,945	28,183	1.0000	0	9.02	0	67.5
1956	22,655.35	22,934	27,186	1.0000	0	9.39	0	66.5
1957	33,014.32	33,171	39,390	0.9943	228	9.76	23	65.5
1958	23,041.57	22,970	27,276	0.9865	374	10.16	37	64.5
1959	15,562.28	15,387	18,272	0.9784	403	10.56	38	63.5
1960	32,153.68	31,521	37,430	0.9701	1,155	10.98	105	62.5
1961	33,915.57	32,951	39,128	0.9614	1,571	11.42	138	61.5
1962	30,073.81	28,945	34,372	0.9524	1,717	11.88	145	60.5
1963	51,082.20	48,686	57,813	0.9431	3,485	12.35	282	59.5
1964	48,998.21	46,224	54,889	0.9335	3,909	12.83	305	58.5
1965	25,892.69	24,167	28,698	0.9236	2,374	13.33	178	57.5

Kentucky - American Water Company

Account #: 334.200 - Meter Installations

CALCULATED ANNUAL ACCRUAL AND ACCRUED DEPRECIATION

BASED ON ORIGINAL COST AS OF December 31, 2022

ALG - Remaining Life
Survivor Curve: R3
ASL: 60
Net Salvage: -20%
Truncation Year:

Year	Original Cost	Calculated Accumulated Depreciation	Allocated Actual Booked Amount	Accumulated Depreciation Factor	Net Book Value	ALG Remaining Life	Annual Accrual	Average Age
1966	69,841.88	64,465	76,550	0.9134	7,260	13.85	524	56.5
1967	59,006.87	53,834	63,927	0.9028	6,881	14.38	478	55.5
1968	56,327.53	50,773	60,291	0.8920	7,302	14.93	489	54.5
1969	42,542.88	37,868	44,967	0.8808	6,084	15.49	393	53.5
1970	49,874.98	43,817	52,031	0.8694	7,819	16.07	486	52.5
1971	52,828.42	45,785	54,369	0.8576	9,025	16.67	542	51.5
1972	80,028.66	68,387	81,208	0.8456	14,827	17.27	858	50.5
1973	67,141.80	56,540	67,140	0.8333	13,431	17.90	751	49.5
1974	134,756.14	111,768	132,721	0.8207	28,986	18.53	1,564	48.5
1975	87,694.99	71,598	85,021	0.8079	20,213	19.18	1,054	47.5
1976	99,024.44	79,539	94,451	0.7948	24,378	19.84	1,229	46.5
1977	150,703.81	119,022	141,336	0.7815	39,508	20.51	1,926	45.5
1978	200,757.84	155,804	185,014	0.7680	55,896	21.20	2,637	44.5
1979	199,613.81	152,135	180,656	0.7542	58,880	21.89	2,689	43.5
1980	201,904.28	151,025	179,338	0.7402	62,947	22.60	2,785	42.5
1981	169,704.75	124,501	147,842	0.7260	55,804	23.32	2,393	41.5
1982	200,412.55	144,106	171,122	0.7115	69,373	24.05	2,885	40.5
1983	183,597.83	129,302	153,543	0.6969	66,774	24.79	2,694	39.5
1984	272,649.01	187,933	223,166	0.6821	104,013	25.54	4,073	38.5
1985	384,431.99	259,147	307,730	0.6671	153,588	26.29	5,841	37.5
1986	366,628.21	241,513	286,791	0.6519	153,163	27.06	5,660	36.5
1987	438,871.25	282,276	335,196	0.6365	191,449	27.84	6,877	35.5
1988	381,481.31	239,359	284,233	0.6209	173,545	28.63	6,062	34.5
1989	512,074.49	313,153	371,861	0.6052	242,628	29.42	8,246	33.5
1990	353,485.91	210,482	249,943	0.5892	174,240	30.23	5,764	32.5
1991	408,384.36	236,529	280,873	0.5731	209,189	31.04	6,739	31.5
1992	306,722.19	172,610	204,971	0.5569	163,096	31.86	5,119	30.5
1993	490,162.24	267,708	317,897	0.5405	270,298	32.69	8,268	29.5

Kentucky - American Water Company

Account #: 334.200 - Meter Installations

CALCULATED ANNUAL ACCRUAL AND ACCRUED DEPRECIATION

BASED ON ORIGINAL COST AS OF December 31, 2022

ALG - Remaining Life
Survivor Curve: R3
ASL: 60
Net Salvage: -20%
Truncation Year:

Year	Original Cost	Calculated Accumulated Depreciation	Allocated Actual Booked Amount	Accumulated Depreciation Factor	Net Book Value	ALG Remaining Life	Annual Accrual	Average Age
1994	429,065.08	227,147	269,732	0.5239	245,146	33.53	7,311	28.5
1995	347,971.51	178,331	211,764	0.5071	205,802	34.38	5,987	27.5
1996	490,082.15	242,793	288,311	0.4902	299,787	35.23	8,510	26.5
1997	694,381.88	332,041	394,291	0.4732	438,967	36.09	12,163	25.5
1998	519,293.39	239,295	284,157	0.4560	338,995	36.96	9,172	24.5
1999	755,970.39	335,111	397,936	0.4387	509,228	37.84	13,459	23.5
2000	540,687.26	230,125	273,268	0.4212	375,556	38.72	9,699	22.5
2001	8,078.12	3,294	3,912	0.4036	5,782	39.61	146	21.5
2002	17,074.50	6,657	7,905	0.3858	12,584	40.51	311	20.5
2006	4,268,166.63	1,352,372	1,605,909	0.3135	3,515,891	44.16	79,622	16.5
2007	163,821.85	48,869	58,031	0.2952	138,556	45.08	3,073	15.5
2008	129,715.27	36,275	43,075	0.2767	112,583	46.02	2,447	14.5
2009	1,029,296.17	268,529	318,872	0.2582	916,283	46.96	19,514	13.5
2010	866,604.40	209,745	249,068	0.2395	790,858	47.90	16,511	12.5
2011	456,990.21	101,946	121,058	0.2208	427,330	48.85	8,749	11.5
2012	642,116.96	131,017	155,580	0.2019	614,961	49.80	12,349	10.5
2013	3,302,377.11	610,673	725,159	0.1830	3,237,693	50.75	63,792	9.5
2014	1,055,140.59	174,856	207,637	0.1640	1,058,531	51.71	20,469	8.5
2015	1,276,882.09	186,989	222,046	0.1449	1,310,213	52.68	24,872	7.5
2016	2,033,663.62	258,480	306,939	0.1258	2,133,458	53.64	39,770	6.5
2017	2,338,232.75	251,812	299,020	0.1066	2,506,859	54.62	45,900	5.5
2018	558,646.98	49,286	58,526	0.0873	611,850	55.59	11,007	4.5
2019	416,229.16	28,596	33,957	0.0680	465,518	56.56	8,230	3.5
2020	520,359.65	25,565	30,358	0.0486	594,074	57.54	10,324	2.5
2021	832,339.28	24,561	29,165	0.0292	969,642	58.52	16,568	1.5
2022	1,396,934.94	13,753	16,332	0.0097	1,659,990	59.51	27,895	0.5

Kentucky - American Water Company

Account #: 334.200 - Meter Installations

CALCULATED ANNUAL ACCRUAL AND ACCRUED DEPRECIATION

BASED ON ORIGINAL COST AS OF December 31, 2022

ALG - Remaining Life
Survivor Curve: R3
ASL: 60
Net Salvage: -20%
Truncation Year:

Year	Original Cost	Calculated Accumulated Depreciation	Allocated Actual Booked Amount	Accumulated Depreciation Factor	Net Book Value	ALG Remaining Life	Annual Accrual	Average Age
TOTAL	31,548,028.69	10,071,894	11,955,688		25,901,947		568,127	

COMPOSITE ANNUAL ACCRUAL RATE	1.80%
THEORETICAL ACCUMULATED DEPRECIATION FACTOR	0.38
COMPOSITE AVERAGE AGE (YEARS)	17.33
DIRECTED WEIGHTED ALG COMPOSITE REMAINING LIFE (YEARS)	44.04

Kentucky - American Water Company

Account #: 334.300 - Meter Vaults

CALCULATED ANNUAL ACCRUAL AND ACCRUED DEPRECIATION

BASED ON ORIGINAL COST AS OF December 31, 2022

ALG - Remaining Life
Survivor Curve: S0.5
ASL: 60
Net Salvage: -20%
Truncation Year:

Year	Original Cost	Calculated Accumulated Depreciation	Allocated Actual Booked Amount	Accumulated Depreciation Factor	Net Book Value	ALG Remaining Life	Annual Accrual	Average Age
1982	2,000.00	1,170	-151	-0.0627	2,551	30.75	83	40.5
1996	12,500.00	5,279	-680	-0.0453	15,680	38.88	403	26.5
2008	112.43	28	-4	-0.0272	139	47.33	3	14.5
2009	25,379.86	6,037	-777	-0.0255	31,233	48.11	649	13.5
2010	3,096.52	688	-88	-0.0238	3,804	48.90	78	12.5
2011	226,395.07	46,623	-6,001	-0.0221	277,675	49.70	5,587	11.5
2012	201,622.79	38,221	-4,920	-0.0203	246,867	50.52	4,886	10.5
2013	121,774.13	21,060	-2,711	-0.0185	148,840	51.35	2,898	9.5
2014	189,771.62	29,612	-3,811	-0.0167	231,537	52.20	4,436	8.5
2015	194,887.40	27,059	-3,483	-0.0149	237,348	53.06	4,473	7.5
2016	61,667.48	7,485	-963	-0.0130	74,964	53.93	1,390	6.5
2017	160,729.92	16,652	-2,143	-0.0111	195,019	54.82	3,557	5.5
2018	173,677.04	14,852	-1,912	-0.0092	210,324	55.72	3,774	4.5
2019	232,285.39	15,594	-2,007	-0.0072	280,750	56.64	4,956	3.5
2020	501,784.81	24,295	-3,127	-0.0052	605,269	57.58	10,512	2.5
2021	794,961.95	23,327	-3,002	-0.0031	956,957	58.53	16,349	1.5
2022	753,724.24	7,458	-960	-0.0011	905,429	59.51	15,216	0.5
TOTAL	3,656,370.65	285,439	-36,739		4,424,384		79,250	

COMPOSITE ANNUAL ACCRUAL RATE 2.17%

THEORETICAL ACCUMULATED DEPRECIATION FACTOR -0.01

COMPOSITE AVERAGE AGE (YEARS) 4.23

DIRECTED WEIGHTED ALG COMPOSITE REMAINING LIFE (YEARS) 56.10

Kentucky - American Water Company

Account #: 335.000 - Hydrants

CALCULATED ANNUAL ACCRUAL AND ACCRUED DEPRECIATION

BASED ON ORIGINAL COST AS OF December 31, 2022

ALG - Remaining Life
Survivor Curve: R4
ASL: 65
Net Salvage: -40%
Truncation Year:

Year	Original Cost	Calculated Accumulated Depreciation	Allocated Actual Booked Amount	Accumulated Depreciation Factor	Net Book Value	ALG Remaining Life	Annual Accrual	Average Age
1934	113.96	154	106	0.6621	54	3.00	18	88.5
1937	15.89	21	15	0.6545	8	3.03	3	85.5
1939	85.34	113	78	0.6491	42	3.53	12	83.5
1941	9.80	13	9	0.6436	5	4.05	1	81.5
1948	191.71	244	167	0.6230	101	6.00	17	74.5
1949	123.52	156	107	0.6198	66	6.31	10	73.5
1950	69.48	87	60	0.6165	37	6.62	6	72.5
1951	91.98	115	79	0.6130	50	6.95	7	71.5
1952	272.56	339	233	0.6094	149	7.29	20	70.5
1953	628.37	776	533	0.6056	347	7.65	45	69.5
1954	336.69	413	284	0.6016	188	8.03	23	68.5
1955	1,151.46	1,403	963	0.5974	649	8.43	77	67.5
1956	929.09	1,124	771	0.5930	529	8.85	60	66.5
1957	1,087.87	1,305	896	0.5883	627	9.29	68	65.5
1958	1,048.39	1,248	856	0.5834	611	9.75	63	64.5
1959	3,491.85	4,118	2,827	0.5782	2,062	10.24	201	63.5
1960	13,810.36	16,135	11,075	0.5728	8,260	10.76	768	62.5
1961	26,074.69	30,159	20,701	0.5671	15,803	11.30	1,399	61.5
1962	22,992.05	26,314	18,062	0.5611	14,127	11.86	1,191	60.5
1963	25,232.32	28,558	19,602	0.5549	15,723	12.45	1,263	59.5
1964	41,970.50	46,951	32,227	0.5485	26,531	13.06	2,031	58.5
1965	20,120.91	22,235	15,262	0.5418	12,907	13.69	943	57.5
1966	87,278.17	95,233	65,368	0.5350	56,821	14.34	3,962	56.5
1967	27,402.04	29,508	20,255	0.5280	18,108	15.00	1,207	55.5
1968	22,811.86	24,234	16,635	0.5209	15,302	15.68	976	54.5
1969	54,353.84	56,941	39,085	0.5136	37,010	16.36	2,262	53.5
1970	44,633.13	46,090	31,636	0.5063	30,850	17.06	1,809	52.5
1971	44,054.99	44,823	30,767	0.4988	30,910	17.76	1,740	51.5

Kentucky - American Water Company

Account #: 335.000 - Hydrants

CALCULATED ANNUAL ACCRUAL AND ACCRUED DEPRECIATION

BASED ON ORIGINAL COST AS OF December 31, 2022

ALG - Remaining Life
Survivor Curve: R4
ASL: 65
Net Salvage: -40%
Truncation Year:

Year	Original Cost	Calculated Accumulated Depreciation	Allocated Actual Booked Amount	Accumulated Depreciation Factor	Net Book Value	ALG Remaining Life	Annual Accrual	Average Age
1972	32,899.75	32,966	22,628	0.4913	23,432	18.48	1,268	50.5
1973	125,785.21	124,066	85,160	0.4836	90,939	19.21	4,735	49.5
1974	179,481.08	174,169	119,551	0.4758	131,723	19.95	6,604	48.5
1975	88,075.45	84,046	57,690	0.4679	65,616	20.70	3,171	47.5
1976	35,176.40	32,989	22,644	0.4598	26,603	21.46	1,240	46.5
1977	100,007.87	92,124	63,234	0.4516	76,777	22.23	3,453	45.5
1978	53,535.94	48,408	33,228	0.4433	41,723	23.02	1,813	44.5
1979	148,919.71	132,101	90,675	0.4349	117,813	23.81	4,947	43.5
1980	127,182.96	110,603	75,918	0.4264	102,138	24.62	4,148	42.5
1981	74,378.92	63,370	43,497	0.4177	60,633	25.44	2,383	41.5
1982	78,637.32	65,590	45,021	0.4089	65,071	26.27	2,477	40.5
1983	60,248.76	49,160	33,744	0.4001	50,604	27.12	1,866	39.5
1984	158,254.11	126,223	86,640	0.3911	134,915	27.97	4,824	38.5
1985	163,231.19	127,161	87,284	0.3819	141,240	28.83	4,899	37.5
1986	109,635.48	83,350	57,212	0.3727	96,278	29.70	3,241	36.5
1987	221,049.19	163,853	112,470	0.3634	196,999	30.58	6,441	35.5
1988	230,761.84	166,628	114,375	0.3540	208,692	31.47	6,630	34.5
1989	222,642.15	156,451	107,389	0.3445	204,310	32.37	6,311	33.5
1990	342,379.97	233,903	160,552	0.3350	318,780	33.28	9,578	32.5
1991	201,918.67	133,961	91,952	0.3253	190,734	34.20	5,577	31.5
1992	330,450.09	212,670	145,978	0.3155	316,652	35.12	9,016	30.5
1993	222,042.76	138,454	95,036	0.3057	215,824	36.05	5,987	29.5
1994	261,284.08	157,656	108,216	0.2958	257,582	36.99	6,964	28.5
1995	216,035.95	125,969	86,466	0.2859	215,984	37.93	5,695	27.5
1996	326,606.99	183,774	126,144	0.2759	331,106	38.88	8,517	26.5
1997	254,178.45	137,802	94,588	0.2658	261,262	39.83	6,560	25.5
1998	270,789.51	141,220	96,934	0.2557	282,171	40.79	6,918	24.5
1999	365,298.22	182,935	125,567	0.2455	385,850	41.75	9,242	23.5

Kentucky - American Water Company

Account #: 335.000 - Hydrants

CALCULATED ANNUAL ACCRUAL AND ACCRUED DEPRECIATION

BASED ON ORIGINAL COST AS OF December 31, 2022

ALG - Remaining Life
Survivor Curve: R4
ASL: 65
Net Salvage: -40%
Truncation Year:

Year	Original Cost	Calculated Accumulated Depreciation	Allocated Actual Booked Amount	Accumulated Depreciation Factor	Net Book Value	ALG Remaining Life	Annual Accrual	Average Age
2000	254,827.56	122,307	83,952	0.2353	272,806	42.72	6,386	22.5
2001	2,190.16	1,005	690	0.2251	2,376	43.69	54	21.5
2002	12,327.86	5,401	3,707	0.2148	13,552	44.66	303	20.5
2004	1,604.05	635	436	0.1941	1,810	46.62	39	18.5
2005	1,380.30	517	355	0.1837	1,577	47.60	33	17.5
2006	3,692,496.36	1,305,561	896,145	0.1734	4,273,350	48.58	87,958	16.5
2007	543,977.26	180,775	124,085	0.1629	637,483	49.57	12,860	15.5
2008	505,443.04	157,208	107,909	0.1525	599,711	50.56	11,862	14.5
2009	465,734.99	134,927	92,614	0.1420	559,415	51.55	10,852	13.5
2010	696,780.97	186,983	128,346	0.1316	847,147	52.54	16,124	12.5
2011	486,945.31	120,261	82,548	0.1211	599,175	53.53	11,193	11.5
2012	629,915.43	142,087	97,530	0.1106	784,352	54.53	14,385	10.5
2013	1,160,567.96	236,918	162,622	0.1001	1,462,173	55.52	26,335	9.5
2014	2,105,605.76	384,689	264,053	0.0896	2,683,795	56.52	47,486	8.5
2015	2,128,590.85	343,211	235,582	0.0791	2,744,445	57.51	47,718	7.5
2016	2,303,671.40	321,979	221,008	0.0685	3,004,132	58.51	51,343	6.5
2017	1,248,001.87	147,619	101,327	0.0580	1,645,876	59.51	27,658	5.5
2018	983,940.52	95,238	65,372	0.0475	1,312,145	60.51	21,686	4.5
2019	1,733,616.08	130,527	89,594	0.0369	2,337,468	61.50	38,005	3.5
2020	1,602,875.10	86,210	59,175	0.0264	2,184,850	62.50	34,956	2.5
2021	3,068,864.47	99,036	67,979	0.0158	4,228,431	63.50	66,588	1.5
2022	3,076,057.80	33,078	22,705	0.0053	4,283,776	64.50	66,414	0.5

Kentucky - American Water Company

Account #: 335.000 - Hydrants

CALCULATED ANNUAL ACCRUAL AND ACCRUED DEPRECIATION
BASED ON ORIGINAL COST AS OF December 31, 2022

ALG - Remaining Life
Survivor Curve: R4
ASL: 65
Net Salvage: -40%
Truncation Year:

Year	Original Cost	Calculated Accumulated Depreciation	Allocated Actual Booked Amount	Accumulated Depreciation Factor	Net Book Value	ALG Remaining Life	Annual Accrual	Average Age
TOTAL	32,146,685.94	8,196,587	5,626,185		39,379,175		764,925	

COMPOSITE ANNUAL ACCRUAL RATE	2.38%
THEORETICAL ACCUMULATED DEPRECIATION FACTOR	0.18
COMPOSITE AVERAGE AGE (YEARS)	12.11
DIRECTED WEIGHTED ALG COMPOSITE REMAINING LIFE (YEARS)	53.16

Kentucky - American Water Company

Account #: 339.600 - Other P/E - CPS

CALCULATED ANNUAL ACCRUAL AND ACCRUED DEPRECIATION

BASED ON ORIGINAL COST AS OF December 31, 2022

ALG - Remaining Life
Survivor Curve: SQ
ASL: 10
Net Salvage: 0%
Truncation Year:

Year	Original Cost	Calculated Accumulated Depreciation	Allocated Actual Booked Amount	Accumulated Depreciation Factor	Net Book Value	ALG Remaining Life	Annual Accrual	Average Age
2013	297,442.08	282,570	237,745	0.7993	59,697	3.00	19,899	9.5
2015	9,028.20	6,771	5,697	0.6310	3,331	3.00	1,110	7.5
2016	3,870.78	2,516	2,117	0.5469	1,754	3.50	501	6.5
2017	64,425.00	35,434	29,813	0.4628	34,612	4.50	7,692	5.5
2018	421,694.23	189,762	159,660	0.3786	262,034	5.50	47,643	4.5
2019	89,615.41	31,365	26,390	0.2945	63,226	6.50	9,727	3.5
2020	84,309.17	21,077	17,734	0.2103	66,575	7.50	8,877	2.5
TOTAL	970,384.87	569,496	479,155		491,230		95,449	

COMPOSITE ANNUAL ACCRUAL RATE	9.84%
THEORETICAL ACCUMULATED DEPRECIATION FACTOR	0.49
COMPOSITE AVERAGE AGE (YEARS)	5.87
DIRECTED WEIGHTED ALG COMPOSITE REMAINING LIFE (YEARS)	4.90

Kentucky - American Water Company

Account #: 340.100 - Office Furniture & Equipment

CALCULATED ANNUAL ACCRUAL AND ACCRUED DEPRECIATION

BASED ON ORIGINAL COST AS OF December 31, 2022

ALG - Remaining Life
Survivor Curve: SQ
ASL: 20
Net Salvage: 0%
Truncation Year:

Year	Original Cost	Calculated Accumulated Depreciation	Allocated Actual Booked Amount	Accumulated Depreciation Factor	Net Book Value	ALG Remaining Life	Annual Accrual	Average Age
2004	4,361.47	4,034	3,257	0.7467	1,105	3.00	368	18.5
2005	14,130.29	12,364	9,980	0.7063	4,150	3.00	1,383	17.5
2006	20,545.69	16,950	13,682	0.6659	6,863	3.50	1,961	16.5
2007	24,682.76	19,129	15,441	0.6256	9,242	4.50	2,054	15.5
2008	16,838.09	12,208	9,854	0.5852	6,984	5.50	1,270	14.5
2010	77,677.74	48,549	39,188	0.5045	38,489	7.50	5,132	12.5
2011	14,392.26	8,276	6,680	0.4641	7,712	8.50	907	11.5
2012	160,805.49	84,423	68,146	0.4238	92,659	9.50	9,754	10.5
2013	2,424.49	1,152	930	0.3834	1,495	10.50	142	9.5
2014	821.90	349	282	0.3431	540	11.50	47	8.5
2015	16,513.93	6,193	4,999	0.3027	11,515	12.50	921	7.5
2016	52,041.75	16,914	13,653	0.2623	38,389	13.50	2,844	6.5
2017	12,079.79	3,322	2,681	0.2220	9,398	14.50	648	5.5
2018	49,171.29	11,064	8,931	0.1816	40,241	15.50	2,596	4.5
2019	50,093.17	8,766	7,076	0.1413	43,017	16.50	2,607	3.5
2020	2,505.75	313	253	0.1009	2,253	17.50	129	2.5
2021	5,448.16	409	330	0.0605	5,118	18.50	277	1.5
2022	32,732.48	818	661	0.0202	32,072	19.50	1,645	0.5
TOTAL	557,266.50	255,231	206,023		351,243		34,685	

COMPOSITE ANNUAL ACCRUAL RATE	6.22%
THEORETICAL ACCUMULATED DEPRECIATION FACTOR	0.37
COMPOSITE AVERAGE AGE (YEARS)	9.16
DIRECTED WEIGHTED ALG COMPOSITE REMAINING LIFE (YEARS)	10.86

Kentucky - American Water Company

Account #: 340.200 - Computer & Peripheral - Equipment

CALCULATED ANNUAL ACCRUAL AND ACCRUED DEPRECIATION

BASED ON ORIGINAL COST AS OF December 31, 2022

ALG - Remaining Life
Survivor Curve: SQ
ASL: 10
Net Salvage: 0%
Truncation Year:

Year	Original Cost	Calculated Accumulated Depreciation	Allocated Actual Booked Amount	Accumulated Depreciation Factor	Net Book Value	ALG Remaining Life	Annual Accrual	Average Age
2019	35,492.98	12,423	23,662	0.6667	11,831	6.50	1,820	3.5
TOTAL	35,492.98	12,423	23,662		11,831		1,820	

COMPOSITE ANNUAL ACCRUAL RATE	5.13%
THEORETICAL ACCUMULATED DEPRECIATION FACTOR	0.67
COMPOSITE AVERAGE AGE (YEARS)	3.50
DIRECTED WEIGHTED ALG COMPOSITE REMAINING LIFE (YEARS)	6.50

Kentucky - American Water Company

Account #: 340.210 - Computer & Peripheral - Mainframe

CALCULATED ANNUAL ACCRUAL AND ACCRUED DEPRECIATION

BASED ON ORIGINAL COST AS OF December 31, 2022

ALG - Remaining Life
Survivor Curve: SQ
ASL: 5
Net Salvage: 0%
Truncation Year:

Year	Original Cost	Calculated Accumulated Depreciation	Allocated Actual Booked Amount	Accumulated Depreciation Factor	Net Book Value	ALG Remaining Life	Annual Accrual	Average Age
2018	9,823.67	8,841	347	0.0353	9,477	3.00	3,159	4.5
TOTAL	9,823.67	8,841	347		9,477		3,159	

COMPOSITE ANNUAL ACCRUAL RATE 32.16%

THEORETICAL ACCUMULATED DEPRECIATION FACTOR 0.04

COMPOSITE AVERAGE AGE (YEARS) 4.50

DIRECTED WEIGHTED ALG COMPOSITE REMAINING LIFE (YEARS) 3.00

Kentucky - American Water Company

Account #: 340.220 - Computer & Peripheral - Personal

CALCULATED ANNUAL ACCRUAL AND ACCRUED DEPRECIATION

BASED ON ORIGINAL COST AS OF December 31, 2022

ALG - Remaining Life
Survivor Curve: SQ
ASL: 5
Net Salvage: 0%
Truncation Year:

Year	Original Cost	Calculated Accumulated Depreciation	Allocated Actual Booked Amount	Accumulated Depreciation Factor	Net Book Value	ALG Remaining Life	Annual Accrual	Average Age
2018	60,858.54	54,773	-23,325	-0.3833	84,183	3.00	28,061	4.5
2019	60,499.12	42,349	-18,034	-0.2981	78,533	3.00	26,178	3.5
2020	71,979.55	35,990	-15,326	-0.2129	87,306	3.00	29,102	2.5
2021	42,047.31	12,614	-5,372	-0.1278	47,419	3.50	13,548	1.5
2022	178,873.14	17,887	-7,617	-0.0426	186,490	4.50	41,442	0.5
TOTAL	414,257.66	163,613	-69,674		483,932		138,331	

COMPOSITE ANNUAL ACCRUAL RATE	33.39%
THEORETICAL ACCUMULATED DEPRECIATION FACTOR	-0.17
COMPOSITE AVERAGE AGE (YEARS)	1.97
DIRECTED WEIGHTED ALG COMPOSITE REMAINING LIFE (YEARS)	3.70

Kentucky - American Water Company

Account #: 340.230 - Computer & Peripheral - Other

CALCULATED ANNUAL ACCRUAL AND ACCRUED DEPRECIATION

BASED ON ORIGINAL COST AS OF December 31, 2022

ALG - Remaining Life
Survivor Curve: SQ
ASL: 5
Net Salvage: 0%
Truncation Year:

Year	Original Cost	Calculated Accumulated Depreciation	Allocated Actual Booked Amount	Accumulated Depreciation Factor	Net Book Value	ALG Remaining Life	Annual Accrual	Average Age
2018	84,453.77	76,008	73,111	0.8657	11,343	3.00	3,781	4.5
2019	128,287.89	89,802	86,378	0.6733	41,910	3.00	13,970	3.5
2020	157,112.24	78,556	75,561	0.4809	81,551	3.00	27,184	2.5
2021	413,875.57	124,163	119,429	0.2886	294,447	3.50	84,128	1.5
2022	121,965.85	12,197	11,732	0.0962	110,234	4.50	24,497	0.5
TOTAL	905,695.32	380,725	366,210		539,485		153,560	

COMPOSITE ANNUAL ACCRUAL RATE	16.95%
THEORETICAL ACCUMULATED DEPRECIATION FACTOR	0.40
COMPOSITE AVERAGE AGE (YEARS)	2.10
DIRECTED WEIGHTED ALG COMPOSITE REMAINING LIFE (YEARS)	3.43

Kentucky - American Water Company

Account #: 340.300 - Computer Software

CALCULATED ANNUAL ACCRUAL AND ACCRUED DEPRECIATION

BASED ON ORIGINAL COST AS OF December 31, 2022

ALG - Remaining Life
Survivor Curve: SQ
ASL: 5
Net Salvage: 0%
Truncation Year:

Year	Original Cost	Calculated Accumulated Depreciation	Allocated Actual Booked Amount	Accumulated Depreciation Factor	Net Book Value	ALG Remaining Life	Annual Accrual	Average Age
2018	1,796,954.83	1,617,259	1,386,204	0.7714	410,751	3.00	136,917	4.5
2019	2,666,409.33	1,866,487	1,599,824	0.6000	1,066,585	3.00	355,528	3.5
2020	3,348,481.56	1,674,241	1,435,044	0.4286	1,913,437	3.00	637,812	2.5
2021	3,339,752.02	1,001,926	858,782	0.2571	2,480,970	3.50	708,849	1.5
2022	2,533,715.54	253,372	217,173	0.0857	2,316,543	4.50	514,787	0.5
TOTAL	13,685,313.28	6,413,284	5,497,027		8,188,286		2,353,893	

COMPOSITE ANNUAL ACCRUAL RATE	17.20%
THEORETICAL ACCUMULATED DEPRECIATION FACTOR	0.40
COMPOSITE AVERAGE AGE (YEARS)	2.34
DIRECTED WEIGHTED ALG COMPOSITE REMAINING LIFE (YEARS)	3.40

Kentucky - American Water Company

Account #: 340.315 - Computer Software - Special Depreciation Rate

CALCULATED ANNUAL ACCRUAL AND ACCRUED DEPRECIATION

BASED ON ORIGINAL COST AS OF December 31, 2022

ALG - Remaining Life
Survivor Curve: SQ
ASL: 10
Net Salvage: 0%
Truncation Year:

Year	Original Cost	Calculated Accumulated Depreciation	Allocated Actual Booked Amount	Accumulated Depreciation Factor	Net Book Value	ALG Remaining Life	Annual Accrual	Average Age
2013	6,596,195.41	6,266,386	5,930,654	0.8991	665,542	3.00	221,847	9.5
2014	193,921.98	164,834	156,002	0.8045	37,920	3.00	12,640	8.5
TOTAL	6,790,117.39	6,431,219	6,086,656		703,461		234,487	

COMPOSITE ANNUAL ACCRUAL RATE	3.45%
THEORETICAL ACCUMULATED DEPRECIATION FACTOR	0.90
COMPOSITE AVERAGE AGE (YEARS)	9.47
DIRECTED WEIGHTED ALG COMPOSITE REMAINING LIFE (YEARS)	3.00

Kentucky - American Water Company

Account #: 340.325 - Computer Software - Customized

CALCULATED ANNUAL ACCRUAL AND ACCRUED DEPRECIATION

BASED ON ORIGINAL COST AS OF December 31, 2022

ALG - Remaining Life
Survivor Curve: SQ
ASL: 15
Net Salvage: 0%
Truncation Year:

Year	Original Cost	Calculated Accumulated Depreciation	Allocated Actual Booked Amount	Accumulated Depreciation Factor	Net Book Value	ALG Remaining Life	Annual Accrual	Average Age
2010	332.88	277	333	1.0000	0	3.00	0	12.5
2018	764,491.32	229,347	764,491	1.0000	0	10.50	0	4.5
2019	1,088,690.04	254,028	1,002,135	0.9205	86,555	11.50	7,527	3.5
TOTAL	1,853,514.24	483,652	1,766,959		86,555		7,527	

COMPOSITE ANNUAL ACCRUAL RATE	0.41%
THEORETICAL ACCUMULATED DEPRECIATION FACTOR	0.95
COMPOSITE AVERAGE AGE (YEARS)	3.91
DIRECTED WEIGHTED ALG COMPOSITE REMAINING LIFE (YEARS)	11.09

Kentucky - American Water Company

Account #: 340.330 - Computer Software - Other

CALCULATED ANNUAL ACCRUAL AND ACCRUED DEPRECIATION

BASED ON ORIGINAL COST AS OF December 31, 2022

ALG - Remaining Life
Survivor Curve: SQ
ASL: 15
Net Salvage: 0%
Truncation Year:

Year	Original Cost	Calculated Accumulated Depreciation	Allocated Actual Booked Amount	Accumulated Depreciation Factor	Net Book Value	ALG Remaining Life	Annual Accrual	Average Age
2019	128,613.14	30,010	50,940	0.3961	77,673	11.50	6,754	3.5
2020	64,303.26	10,717	18,192	0.2829	46,111	12.50	3,689	2.5
TOTAL	192,916.40	40,727	69,132		123,784		10,443	

COMPOSITE ANNUAL ACCRUAL RATE	5.41%
THEORETICAL ACCUMULATED DEPRECIATION FACTOR	0.36
COMPOSITE AVERAGE AGE (YEARS)	3.17
DIRECTED WEIGHTED ALG COMPOSITE REMAINING LIFE (YEARS)	11.83

Kentucky - American Water Company

Account #: 340.500 - Other Office Equipment

CALCULATED ANNUAL ACCRUAL AND ACCRUED DEPRECIATION

BASED ON ORIGINAL COST AS OF December 31, 2022

ALG - Remaining Life
Survivor Curve: SQ
ASL: 15
Net Salvage: 0%
Truncation Year:

Year	Original Cost	Calculated Accumulated Depreciation	Allocated Actual Booked Amount	Accumulated Depreciation Factor	Net Book Value	ALG Remaining Life	Annual Accrual	Average Age
2020	32,291.43	5,382	9,417	0.2916	22,874	12.50	1,830	2.5
2021	12,248.04	1,225	2,143	0.1750	10,105	13.50	749	1.5
TOTAL	44,539.47	6,607	11,560		32,979		2,579	

COMPOSITE ANNUAL ACCRUAL RATE	5.79%
THEORETICAL ACCUMULATED DEPRECIATION FACTOR	0.26
COMPOSITE AVERAGE AGE (YEARS)	2.23
DIRECTED WEIGHTED ALG COMPOSITE REMAINING LIFE (YEARS)	12.77

Kentucky - American Water Company

Account #: 341.100 - Transportation Equipment - Light Duty Trucks

CALCULATED ANNUAL ACCRUAL AND ACCRUED DEPRECIATION

BASED ON ORIGINAL COST AS OF December 31, 2022

ALG - Remaining Life
Survivor Curve: L2.5
ASL: 5
Net Salvage: 25%
Truncation Year:

Year	Original Cost	Calculated Accumulated Depreciation	Allocated Actual Booked Amount	Accumulated Depreciation Factor	Net Book Value	ALG Remaining Life	Annual Accrual	Average Age
2001	1,752.14	1,314	1,314	1.0000	0	3.00	0	21.5
2007	25,016.41	18,762	18,762	1.0000	0	3.00	0	15.5
2009	40,628.13	30,471	30,471	1.0000	0	3.00	0	13.5
2010	593,569.45	400,659	422,149	0.9483	23,028	3.00	7,676	12.5
2011	120,499.89	77,406	81,558	0.9024	8,817	3.00	2,939	11.5
2012	526,179.18	333,561	351,452	0.8906	43,182	3.00	14,394	10.5
2014	193,762.99	115,201	121,380	0.8352	23,942	3.00	7,981	8.5
2015	196,596.06	111,163	117,125	0.7944	30,322	3.00	10,107	7.5
2016	689,092.69	366,290	385,936	0.7468	130,884	3.00	43,628	6.5
2017	446,558.99	222,919	234,876	0.7013	100,043	3.00	33,348	5.5
2018	401,754.44	189,227	199,376	0.6617	101,939	3.00	33,980	4.5
2019	1,082,902.80	460,404	485,099	0.5973	327,079	3.00	109,026	3.5
2020	375,073.59	126,929	133,737	0.4754	147,568	3.00	49,189	2.5
2021	145,087.07	31,333	33,014	0.3034	75,801	3.56	21,292	1.5
2022	113,637.26	8,474	8,929	0.1048	76,299	4.50	16,955	0.5
TOTAL	4,952,111.09	2,494,116	2,625,179		1,088,905		350,516	

COMPOSITE ANNUAL ACCRUAL RATE 7.08%

THEORETICAL ACCUMULATED DEPRECIATION FACTOR 0.53

COMPOSITE AVERAGE AGE (YEARS) 6.50

DIRECTED WEIGHTED ALG COMPOSITE REMAINING LIFE (YEARS) 3.05

Kentucky - American Water Company

Account #: 341.200 - Transportation Equipment - Heavy Duty Trucks

CALCULATED ANNUAL ACCRUAL AND ACCRUED DEPRECIATION

BASED ON ORIGINAL COST AS OF December 31, 2022

ALG - Remaining Life
Survivor Curve: L2
ASL: 15
Net Salvage: 15%
Truncation Year:

Year	Original Cost	Calculated Accumulated Depreciation	Allocated Actual Booked Amount	Accumulated Depreciation Factor	Net Book Value	ALG Remaining Life	Annual Accrual	Average Age
2008	147,234.81	75,353	102,226	0.8168	22,923	5.97	3,841	14.5
2010	262,297.20	126,673	171,849	0.7708	51,103	6.48	7,889	12.5
2011	213,147.21	99,410	134,863	0.7444	46,312	6.77	6,841	11.5
2012	300,009.42	134,207	182,069	0.7140	72,939	7.11	10,265	10.5
2013	455,959.49	193,704	262,785	0.6780	124,780	7.50	16,631	9.5
2014	527,746.56	209,998	284,890	0.6351	163,694	7.98	20,518	8.5
2015	454,040.14	166,091	225,325	0.5838	160,609	8.54	18,797	7.5
2017	117,560.12	33,532	45,491	0.4552	54,435	9.97	5,462	5.5
2021	300,024.34	25,237	34,238	0.1343	220,783	13.52	16,335	1.5
2022	206,395.77	5,839	7,921	0.0452	167,515	14.50	11,552	0.5
TOTAL	2,984,415.06	1,070,044	1,451,659		1,085,094		118,131	

COMPOSITE ANNUAL ACCRUAL RATE	3.96%
THEORETICAL ACCUMULATED DEPRECIATION FACTOR	0.49
COMPOSITE AVERAGE AGE (YEARS)	8.19
DIRECTED WEIGHTED ALG COMPOSITE REMAINING LIFE (YEARS)	8.67

Kentucky - American Water Company

Account #: 341.300 - Transportation Equipment - Autos

CALCULATED ANNUAL ACCRUAL AND ACCRUED DEPRECIATION

BASED ON ORIGINAL COST AS OF December 31, 2022

ALG - Remaining Life
Survivor Curve: S2.5
ASL: 5
Net Salvage: 20%
Truncation Year:

Year	Original Cost	Calculated Accumulated Depreciation	Allocated Actual Booked Amount	Accumulated Depreciation Factor	Net Book Value	ALG Remaining Life	Annual Accrual	Average Age
1981	2,269.65	1,816	1,816	1.0000	0	3.00	0	41.5
2007	16,571.50	13,257	13,257	1.0000	0	3.00	0	15.5
2008	13,152.34	10,522	10,522	1.0000	0	3.00	0	14.5
2022	116,144.05	9,289	43,518	0.4684	49,397	4.50	10,977	0.5
TOTAL	148,137.54	34,884	69,113		49,397		10,977	

COMPOSITE ANNUAL ACCRUAL RATE	7.41%
THEORETICAL ACCUMULATED DEPRECIATION FACTOR	0.47
COMPOSITE AVERAGE AGE (YEARS)	4.05
DIRECTED WEIGHTED ALG COMPOSITE REMAINING LIFE (YEARS)	4.18

Kentucky - American Water Company

Account #: 342.000 - Stores Equipment

CALCULATED ANNUAL ACCRUAL AND ACCRUED DEPRECIATION

BASED ON ORIGINAL COST AS OF December 31, 2022

ALG - Remaining Life
Survivor Curve: SQ
ASL: 25
Net Salvage: 0%
Truncation Year:

Year	Original Cost	Calculated Accumulated Depreciation	Allocated Actual Booked Amount	Accumulated Depreciation Factor	Net Book Value	ALG Remaining Life	Annual Accrual	Average Age
2010	23,374.96	11,687	7,355	0.3147	16,020	12.50	1,282	12.5
2012	4,296.10	1,804	1,136	0.2643	3,161	14.50	218	10.5
2015	37,852.66	11,356	7,146	0.1888	30,706	17.50	1,755	7.5
2020	11,407.25	1,141	718	0.0629	10,689	22.50	475	2.5
TOTAL	76,930.97	25,988	16,355		60,576		3,730	

COMPOSITE ANNUAL ACCRUAL RATE	4.85%
THEORETICAL ACCUMULATED DEPRECIATION FACTOR	0.21
COMPOSITE AVERAGE AGE (YEARS)	8.45
DIRECTED WEIGHTED ALG COMPOSITE REMAINING LIFE (YEARS)	16.55

Kentucky - American Water Company

Account #: 343.000 - Tools, Shop & Garage Equipment

CALCULATED ANNUAL ACCRUAL AND ACCRUED DEPRECIATION

BASED ON ORIGINAL COST AS OF December 31, 2022

ALG - Remaining Life
Survivor Curve: SQ
ASL: 20
Net Salvage: 0%
Truncation Year:

Year	Original Cost	Calculated Accumulated Depreciation	Allocated Actual Booked Amount	Accumulated Depreciation Factor	Net Book Value	ALG Remaining Life	Annual Accrual	Average Age
2005	7,699.03	6,737	6,045	0.7852	1,654	3.00	551	17.5
2006	348,304.03	287,351	257,858	0.7403	90,446	3.50	25,842	16.5
2007	238,682.81	184,979	165,993	0.6955	72,690	4.50	16,153	15.5
2008	112,398.90	81,489	73,125	0.6506	39,274	5.50	7,141	14.5
2009	33,720.99	22,762	20,425	0.6057	13,296	6.50	2,046	13.5
2010	133,295.37	83,310	74,759	0.5609	58,537	7.50	7,805	12.5
2011	93,034.37	53,495	48,004	0.5160	45,030	8.50	5,298	11.5
2012	188,064.77	98,734	88,600	0.4711	99,465	9.50	10,470	10.5
2013	221,459.18	105,193	94,396	0.4262	127,063	10.50	12,101	9.5
2014	132,898.53	56,482	50,685	0.3814	82,214	11.50	7,149	8.5
2015	174,259.51	65,347	58,640	0.3365	115,619	12.50	9,250	7.5
2016	129,757.01	42,171	37,843	0.2916	91,914	13.50	6,808	6.5
2017	115,563.74	31,780	28,518	0.2468	87,046	14.50	6,003	5.5
2018	123,697.35	27,832	24,975	0.2019	98,722	15.50	6,369	4.5
2019	95,076.61	16,638	14,931	0.1570	80,146	16.50	4,857	3.5
2020	265,082.44	33,135	29,734	0.1122	235,348	17.50	13,448	2.5
2021	25,112.90	1,883	1,690	0.0673	23,423	18.50	1,266	1.5
2022	335,957.11	8,399	7,537	0.0224	328,420	19.50	16,842	0.5
TOTAL	2,774,064.65	1,207,717	1,083,759		1,690,306		159,399	

COMPOSITE ANNUAL ACCRUAL RATE	5.75%
THEORETICAL ACCUMULATED DEPRECIATION FACTOR	0.39
COMPOSITE AVERAGE AGE (YEARS)	8.71
DIRECTED WEIGHTED ALG COMPOSITE REMAINING LIFE (YEARS)	11.29

Kentucky - American Water Company

Account #: 344.000 - Laboratory Equipment

CALCULATED ANNUAL ACCRUAL AND ACCRUED DEPRECIATION

BASED ON ORIGINAL COST AS OF December 31, 2022

ALG - Remaining Life
Survivor Curve: SQ
ASL: 10
Net Salvage: 0%
Truncation Year:

Year	Original Cost	Calculated Accumulated Depreciation	Allocated Actual Booked Amount	Accumulated Depreciation Factor	Net Book Value	ALG Remaining Life	Annual Accrual	Average Age
2013	15,686.06	14,902	15,686	1.0000	0	3.00	0	9.5
2014	17,910.62	15,224	17,911	1.0000	0	3.00	0	8.5
2015	4,643.03	3,482	4,643	1.0000	0	3.00	0	7.5
2016	74,831.43	48,640	74,831	1.0000	0	3.50	0	6.5
2017	80,256.63	44,141	40,738	0.5076	39,518	4.50	8,782	5.5
2018	92,441.49	41,599	-18,769	-0.2030	111,211	5.50	20,220	4.5
2019	130,328.76	45,615	-165,387	-1.2690	295,716	6.50	45,495	3.5
2020	77,356.57	19,339	-235,597	-3.0456	312,954	7.50	41,727	2.5
2021	16,835.23	2,525	16,835	1.0000	0	8.50	0	1.5
2022	42,369.59	2,118	4,301	0.1015	38,068	9.50	4,007	0.5
TOTAL	552,659.41	237,586	-244,808		797,467		120,231	

COMPOSITE ANNUAL ACCRUAL RATE 21.75%

THEORETICAL ACCUMULATED DEPRECIATION FACTOR -0.44

COMPOSITE AVERAGE AGE (YEARS) 4.30

DIRECTED WEIGHTED ALG COMPOSITE REMAINING LIFE (YEARS) 5.82

Kentucky - American Water Company

Account #: 345.000 - Power Operated Equipment

CALCULATED ANNUAL ACCRUAL AND ACCRUED DEPRECIATION

BASED ON ORIGINAL COST AS OF December 31, 2022

ALG - Remaining Life
Survivor Curve: R2.5
ASL: 25
Net Salvage: 10%
Truncation Year:

Year	Original Cost	Calculated Accumulated Depreciation	Allocated Actual Booked Amount	Accumulated Depreciation Factor	Net Book Value	ALG Remaining Life	Annual Accrual	Average Age
1988	54,566.42	43,340	49,110	1.0000	0	3.00	0	34.5
1989	701.44	551	631	1.0000	0	3.18	0	33.5
1990	20,380.67	15,831	18,343	1.0000	0	3.42	0	32.5
1991	1,470.02	1,128	1,323	1.0000	0	3.68	0	31.5
1995	53,978.20	38,973	48,580	1.0000	0	4.94	0	27.5
1997	66,151.11	45,829	59,536	1.0000	0	5.76	0	25.5
1999	28,034.41	18,462	25,231	1.0000	0	6.71	0	23.5
2003	4,874.22	2,807	4,290	0.9780	96	9.00	11	19.5
2005	990,821.38	523,508	800,193	0.8973	91,546	10.32	8,868	17.5
2008	27,086.46	12,211	18,665	0.7657	5,712	12.48	458	14.5
2012	8,380.95	2,829	4,323	0.5732	3,219	15.63	206	10.5
2014	39,460.19	10,935	16,715	0.4707	18,799	17.30	1,087	8.5
2015	10,413.35	2,563	3,917	0.4180	5,455	18.16	300	7.5
2017	34,503.67	6,302	9,632	0.3102	21,421	19.93	1,075	5.5
2018	626.03	94	144	0.2552	420	20.83	20	4.5
2020	18,777.83	1,582	2,419	0.1431	14,481	22.66	639	2.5
2021	70,728.81	3,592	5,490	0.0862	58,166	23.59	2,466	1.5
2022	10,324.30	175	268	0.0289	9,024	24.53	368	0.5
TOTAL	1,441,279.46	730,713	1,068,812		228,339		15,498	

COMPOSITE ANNUAL ACCRUAL RATE	1.08%
THEORETICAL ACCUMULATED DEPRECIATION FACTOR	0.74
COMPOSITE AVERAGE AGE (YEARS)	17.43
DIRECTED WEIGHTED ALG COMPOSITE REMAINING LIFE (YEARS)	10.92

Kentucky - American Water Company

Account #: 346.100 - Communication Equipment - Non-Telephone

CALCULATED ANNUAL ACCRUAL AND ACCRUED DEPRECIATION

BASED ON ORIGINAL COST AS OF December 31, 2022

ALG - Remaining Life
Survivor Curve: SQ
ASL: 15
Net Salvage: 0%
Truncation Year:

Year	Original Cost	Calculated Accumulated Depreciation	Allocated Actual Booked Amount	Accumulated Depreciation Factor	Net Book Value	ALG Remaining Life	Annual Accrual	Average Age
2008	599.38	579	486	0.8107	113	3.00	38	14.5
2009	4,859.41	4,373	3,664	0.7541	1,195	3.00	398	13.5
2010	4,414.77	3,679	3,083	0.6982	1,332	3.00	444	12.5
2012	116,058.89	81,241	68,071	0.5865	47,988	4.50	10,664	10.5
2013	100,676.34	63,762	53,425	0.5307	47,251	5.50	8,591	9.5
2014	3,933.85	2,229	1,868	0.4748	2,066	6.50	318	8.5
2015	981.27	491	411	0.4189	570	7.50	76	7.5
2016	76,817.55	33,288	27,891	0.3631	48,926	8.50	5,756	6.5
2018	13,274.68	3,982	3,337	0.2514	9,938	10.50	946	4.5
2019	125,949.09	29,388	24,624	0.1955	101,325	11.50	8,811	3.5
2020	27,120.20	4,520	3,787	0.1396	23,333	12.50	1,867	2.5
2021	654,624.68	65,462	54,850	0.0838	599,774	13.50	44,428	1.5
2022	211,775.54	7,059	5,915	0.0279	205,861	14.50	14,197	0.5
TOTAL	1,341,085.65	300,054	251,412		1,089,673		96,534	

COMPOSITE ANNUAL ACCRUAL RATE	7.20%
THEORETICAL ACCUMULATED DEPRECIATION FACTOR	0.19
COMPOSITE AVERAGE AGE (YEARS)	3.36
DIRECTED WEIGHTED ALG COMPOSITE REMAINING LIFE (YEARS)	11.65

Kentucky - American Water Company

Account #: 346.190 - Remote Control & Instrument

CALCULATED ANNUAL ACCRUAL AND ACCRUED DEPRECIATION

BASED ON ORIGINAL COST AS OF December 31, 2022

ALG - Remaining Life
Survivor Curve: SQ
ASL: 15
Net Salvage: 0%
Truncation Year:

Year	Original Cost	Calculated Accumulated Depreciation	Allocated Actual Booked Amount	Accumulated Depreciation Factor	Net Book Value	ALG Remaining Life	Annual Accrual	Average Age
2008	20,185.63	19,513	16,354	0.8102	3,832	3.00	1,277	14.5
2010	683,657.00	569,714	477,471	0.6984	206,186	3.00	68,729	12.5
2011	1,019,739.21	781,800	655,218	0.6425	364,521	3.50	104,149	11.5
2012	990,490.18	693,343	581,083	0.5867	409,407	4.50	90,979	10.5
2013	2.11	1	1	0.5308	1	5.50	0	9.5
2014	397,889.03	225,470	188,964	0.4749	208,925	6.50	32,142	8.5
2015	99,117.12	49,559	41,534	0.4190	57,583	7.50	7,678	7.5
2016	41,954.79	18,180	15,237	0.3632	26,718	8.50	3,143	6.5
2018	109,683.89	32,905	27,577	0.2514	82,106	10.50	7,820	4.5
2019	149,865.74	34,969	29,307	0.1956	120,559	11.50	10,483	3.5
2021	32,935.54	3,294	2,760	0.0838	30,175	13.50	2,235	1.5
2022	51,716.35	1,724	1,445	0.0279	50,272	14.50	3,467	0.5
TOTAL	3,597,236.59	2,430,472	2,036,952		1,560,284		332,102	

COMPOSITE ANNUAL ACCRUAL RATE	9.23%
THEORETICAL ACCUMULATED DEPRECIATION FACTOR	0.57
COMPOSITE AVERAGE AGE (YEARS)	10.13
DIRECTED WEIGHTED ALG COMPOSITE REMAINING LIFE (YEARS)	4.97

Kentucky - American Water Company

Account #: 346.200 - Communication Equipment - Telephone

CALCULATED ANNUAL ACCRUAL AND ACCRUED DEPRECIATION

BASED ON ORIGINAL COST AS OF December 31, 2022

ALG - Remaining Life
Survivor Curve: SQ
ASL: 15
Net Salvage: 0%
Truncation Year:

Year	Original Cost	Calculated Accumulated Depreciation	Allocated Actual Booked Amount	Accumulated Depreciation Factor	Net Book Value	ALG Remaining Life	Annual Accrual	Average Age
2008	20,843.96	20,149	18,653	0.8949	2,191	3.00	730	14.5
2010	27,048.52	22,540	20,866	0.7714	6,182	3.00	2,061	12.5
2012	43,979.06	30,785	28,499	0.6480	15,480	4.50	3,440	10.5
2016	85,756.23	37,161	34,401	0.4011	51,355	8.50	6,042	6.5
2020	5,183.68	864	800	0.1543	4,384	12.50	351	2.5
TOTAL	182,811.45	111,500	103,218		79,593		12,624	

COMPOSITE ANNUAL ACCRUAL RATE	6.91%
THEORETICAL ACCUMULATED DEPRECIATION FACTOR	0.56
COMPOSITE AVERAGE AGE (YEARS)	9.15
DIRECTED WEIGHTED ALG COMPOSITE REMAINING LIFE (YEARS)	6.21

Kentucky - American Water Company

Account #: 347.000 - Miscellaneous Equipment

CALCULATED ANNUAL ACCRUAL AND ACCRUED DEPRECIATION

BASED ON ORIGINAL COST AS OF December 31, 2022

ALG - Remaining Life
Survivor Curve: SQ
ASL: 20
Net Salvage: 0%
Truncation Year:

Year	Original Cost	Calculated Accumulated Depreciation	Allocated Actual Booked Amount	Accumulated Depreciation Factor	Net Book Value	ALG Remaining Life	Annual Accrual	Average Age
2003	34,611.32	33,746	25,851	0.7469	8,761	3.00	2,920	19.5
2005	594,506.53	520,193	398,483	0.6703	196,024	3.00	65,341	17.5
2007	10,564.45	8,187	6,272	0.5937	4,293	4.50	954	15.5
2008	2,882.94	2,090	1,601	0.5554	1,282	5.50	233	14.5
2009	2,124.82	1,434	1,099	0.5171	1,026	6.50	158	13.5
2010	127,572.58	79,733	61,078	0.4788	66,495	7.50	8,866	12.5
2011	7,169.19	4,122	3,158	0.4405	4,011	8.50	472	11.5
2012	45,559.87	23,919	18,323	0.4022	27,237	9.50	2,867	10.5
2013	493,630.28	234,474	179,614	0.3639	314,016	10.50	29,906	9.5
2015	29,357.25	11,009	8,433	0.2873	20,924	12.50	1,674	7.5
2016	154,283.79	50,142	38,410	0.2490	115,873	13.50	8,583	6.5
2017	78,712.22	21,646	16,581	0.2107	62,131	14.50	4,285	5.5
2018	67,878.88	15,273	11,699	0.1724	56,180	15.50	3,625	4.5
2019	372,458.24	65,180	49,930	0.1341	322,528	16.50	19,547	3.5
2020	243,509.48	30,439	23,317	0.0958	220,193	17.50	12,582	2.5
2021	414,911.46	31,118	23,838	0.0575	391,074	18.50	21,139	1.5
2022	179,817.83	4,495	3,444	0.0192	176,374	19.50	9,045	0.5
TOTAL	2,859,551.13	1,137,202	871,129		1,988,422		192,197	

COMPOSITE ANNUAL ACCRUAL RATE	6.72%
THEORETICAL ACCUMULATED DEPRECIATION FACTOR	0.30
COMPOSITE AVERAGE AGE (YEARS)	7.95
DIRECTED WEIGHTED ALG COMPOSITE REMAINING LIFE (YEARS)	12.18

Kentucky - American Water Company

Account #: 348.000 - Other Tangible Property

CALCULATED ANNUAL ACCRUAL AND ACCRUED DEPRECIATION

BASED ON ORIGINAL COST AS OF December 31, 2022

ALG - Remaining Life
Survivor Curve: SQ
ASL: 20
Net Salvage: 0%
Truncation Year:

Year	Original Cost	Calculated Accumulated Depreciation	Allocated Actual Booked Amount	Accumulated Depreciation Factor	Net Book Value	ALG Remaining Life	Annual Accrual	Average Age
2019	12,906.90	2,259	12,907	1.0000	0	16.50	0	3.5
TOTAL	12,906.90	2,259	12,907		0		0	

COMPOSITE ANNUAL ACCRUAL RATE	0.00%
THEORETICAL ACCUMULATED DEPRECIATION FACTOR	1.00
COMPOSITE AVERAGE AGE (YEARS)	3.50
DIRECTED WEIGHTED ALG COMPOSITE REMAINING LIFE (YEARS)	16.50

SECTION 9

9 ESTIMATION OF SURVIVOR CURVES

9.1 Average Service Life

All assets have a service life, which is defined as "the period of time from its installation until it is retired from service" [3]. All account groups of property are made up of various assets with differing service lives and investment values. To calculate a depreciation rate, one must first calculate an average life for all assets in a single account. This can be done by ascertaining the age at retirement for every asset in an account and plotting it as a percentage of the units surviving at each age interval (a "Survivor Curve"). From the average life for each account, remaining lives can then be found which are then used to calculate the annual depreciation accruals and ultimately depreciation rate. A discussion of the general concept of survivor curves is presented and the Iowa type survivor curves are reviewed.

9.2 Survivor Curves

A survivor curve is defined as "a graph of the percent of units remaining in service expressed as a function of age" [4]. To calculate the average life of the group, the remaining life expectancy, the probable life and the frequency curve, one must first create a survivor curve. Figure 1 shows a typical 40-R4 smoothed survivor curve as well as the accompanying derived curves. The type 40-R4 refers to the Iowa type curve, whose designation will be explained in further detail in the next section

To calculate the average service life, one must calculate the area under the survivor curve and divide by the percent surviving at age zero. The remaining life is equal to the area under the survivor curve and to the right of the current age, divided by the percent surviving at the current age. In Figure 1, for example, the hatched area to the right of age 45 divided by 28.9 percent surviving balance represents the remaining life for an asset that has reached that age. The probable life is "the total life expectancy of the property surviving at any age and is equal to the remaining life plus the current age." [5] If the probable life of the property is calculated for each year of age, the probable life curve shown in the chart can be developed. The frequency curve is calculated by taking the difference between the percent surviving on successive years on the survivor curve[6]. Alternatively, frequency can be empirically determined by finding the amount of retirements at any given age. Plotting retirement frequency from the youngest to oldest ages and then taking the cumulative frequencies will generate percent surviving versus age.

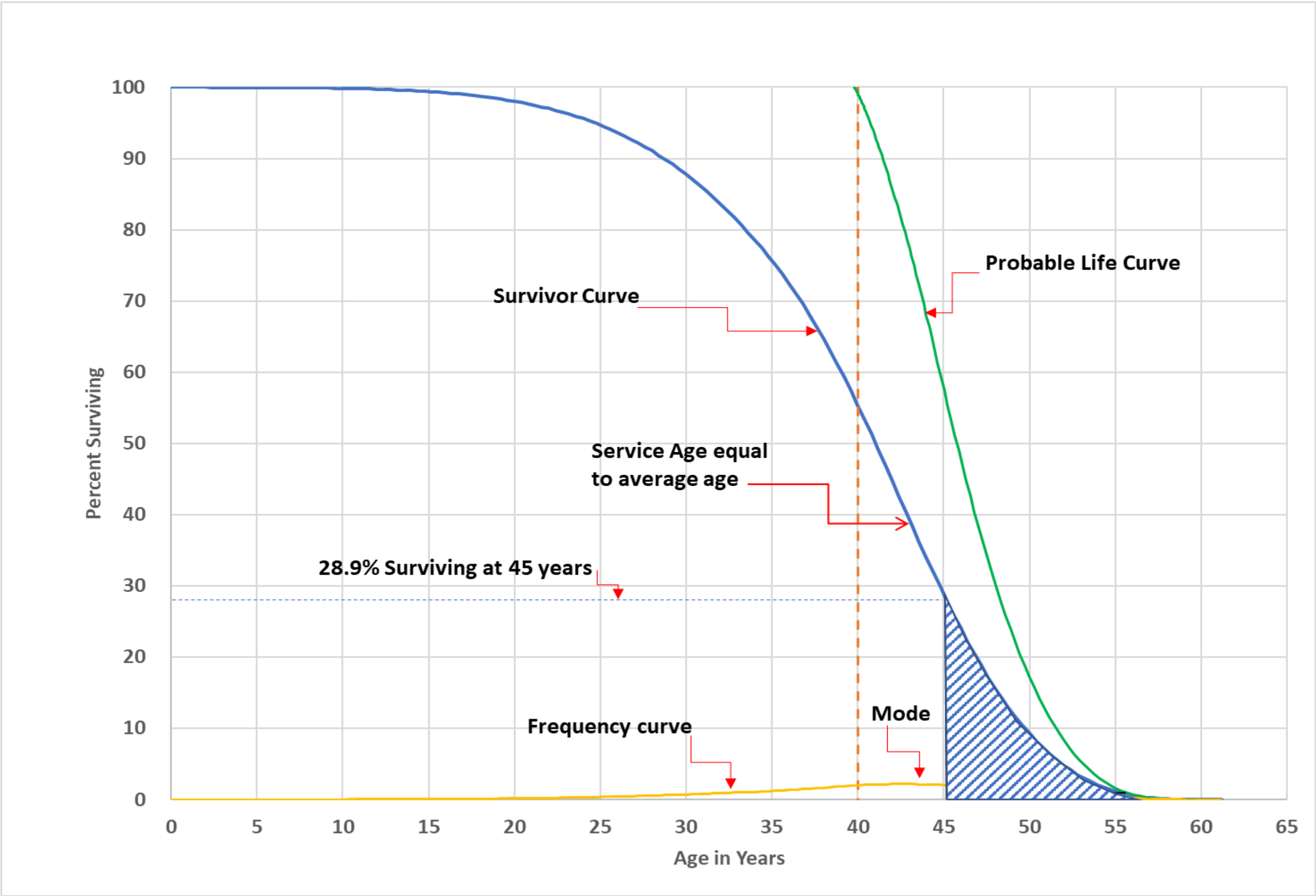
[3] Wolf, Frank K. and W. Chester Fitch, Depreciation Systems (Iowa State University Press, 1994), 21.

[4] *Ibid*, 23.

[5] *Ibid*, 29.

[6] *Ibid*, 23-24.

Figure 1: Typical Survivor Curve (40-R4) and Derived Curves



9.3 Iowa Type Curves

In 1931, Robley Winfrey and Edwin Kurtz of the Engineering Research Institute at Iowa State University published Bulletin 103, which laid the groundwork for what would eventually be known as the Iowa Curves. "The 13 type curves can be used as valuable aids in forecasting the probable future service lives of individual items and of groups of items of different kinds of physical equipment" [7]. The 13 curves described in Bulletin 103 eventually became a series of 22 generalized survivor curves which are used throughout the regulated utility industry. These 22 curves were described in Bulletin 125, published in 1967 by Harold A. Cowles, which became known as the Iowa curves.

The Iowa curves are organized with three variables: the average life of the plant; the location of the mode; and the variation of the life. All Iowa curves have both a letter and a number to represent the shape and height of the mode. The L curves, or left-moded curves, are used when the mode of the curve should be to the left of the average life. There are six L curves are presented in Figure 2. The R curves, or right-moded, are used when the mode of the curve should be to the right of the average life. There are five R curves, which are presented in Figure 3. The S curves, or symmetrically-moded, are used when the mode is equal to the average life. There are seven S curves, which are presented in Figure 4. The O curves, or origin curves, are used when the mode occurs at age 0. There are four O curves, which are presented in Figure 5. There are some occasions where it is appropriate to use a half curve. In these cases, the curve is assumed to be exactly half way between the two curves.

In addition to Bulletin 125, Iowa curves have also been presented in subsequent Experiment Station bulletins and in the text Engineering Valuation and Depreciation[8]. In 1957, Frank V. B. Couch, Jr., an Iowa State College graduate student, submitted a thesis[9] presenting his development of the fourth family consisting of the four O-type survivor curves.

[7] *Ibid*, 21

[8] Marston, Anson, Robley Winfrey and Jean C. Hempstead, Engineering Valuation and Depreciation (The Iowa State University Press, 1953)

[9] Couch, Frank V. B., Jr., Classification of Type O Retirement Characteristics of Industrial Property Unpublished M.S. Thesis (Engineering Valuation, Library, Iowa State College, Ames, Iowa, 1957)

Figure 2: Left Modal or "L" Iowa Type Survivor Curves

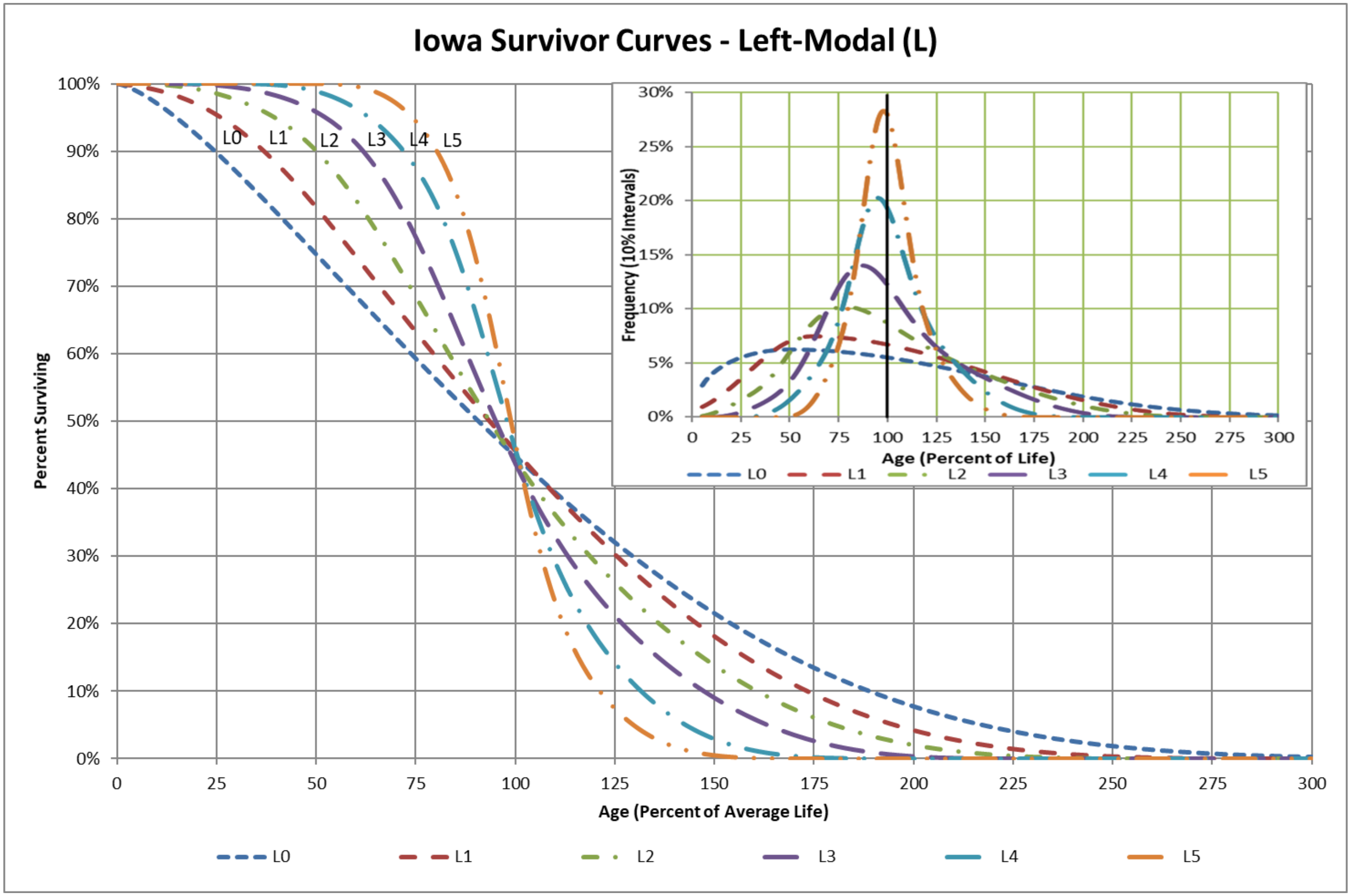


Figure 3: Right Modal or "R" Iowa Type Survivor Curves

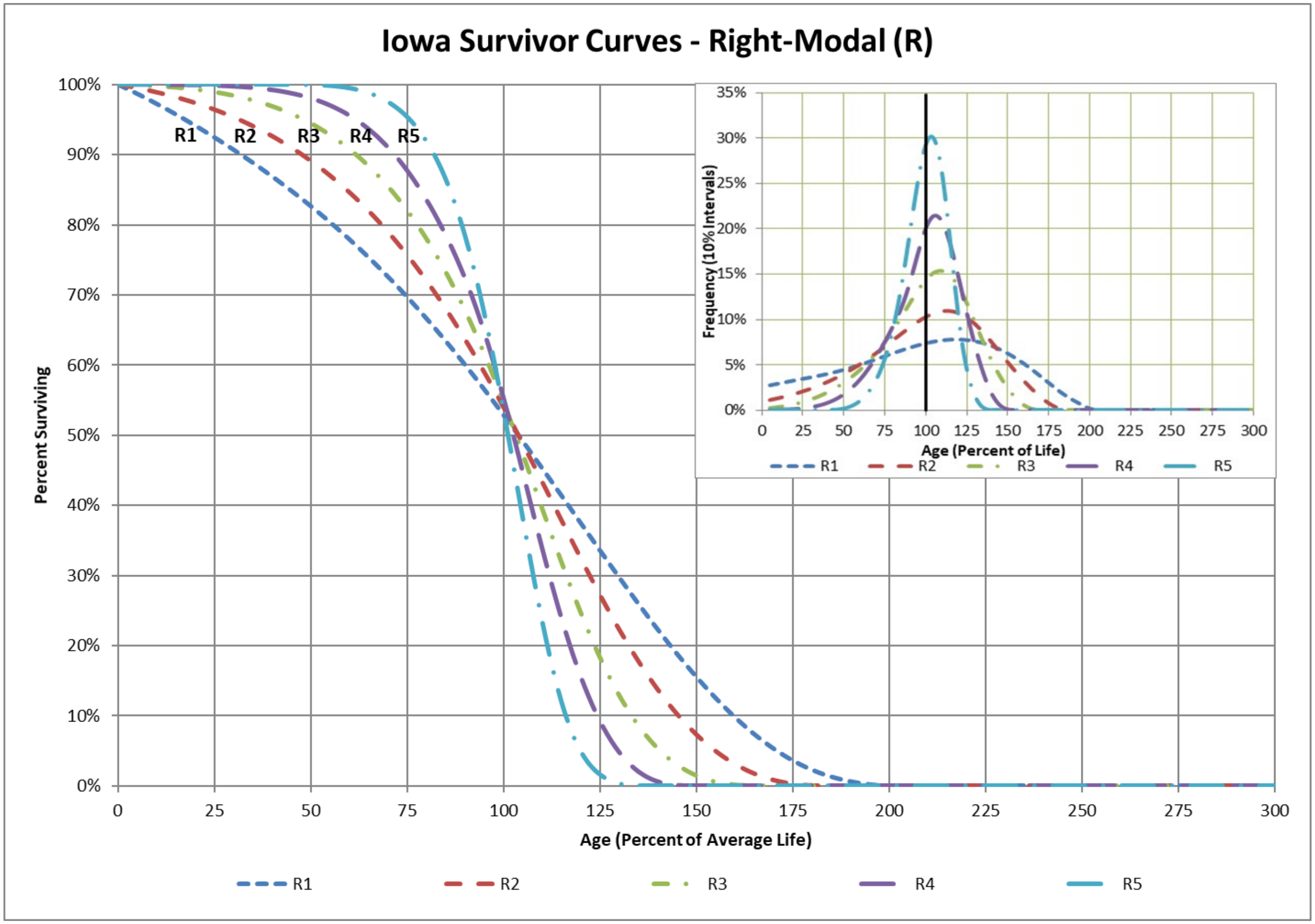


Figure 4: Symmetrical or "S" Iowa Type Survivor Curves

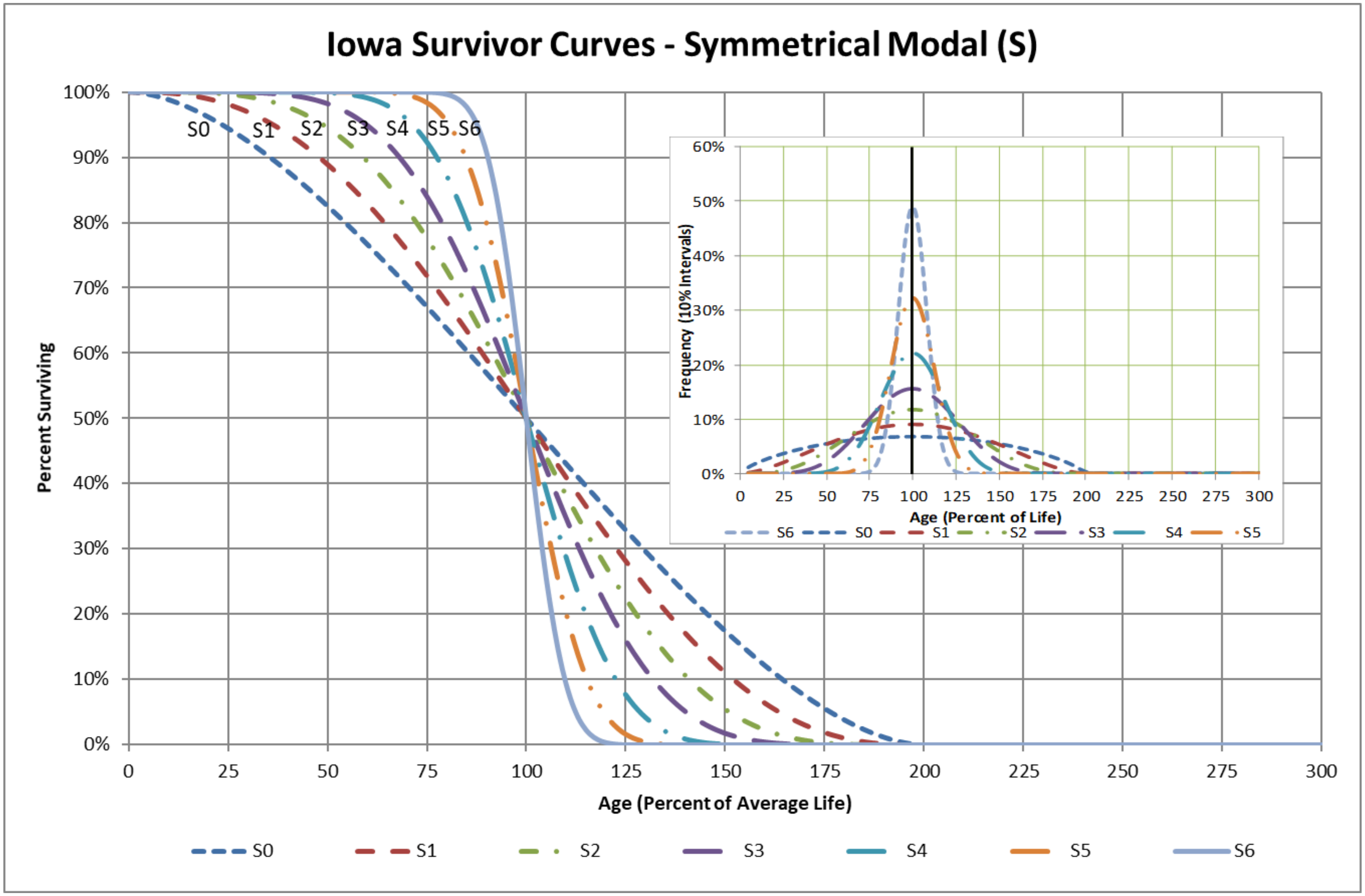
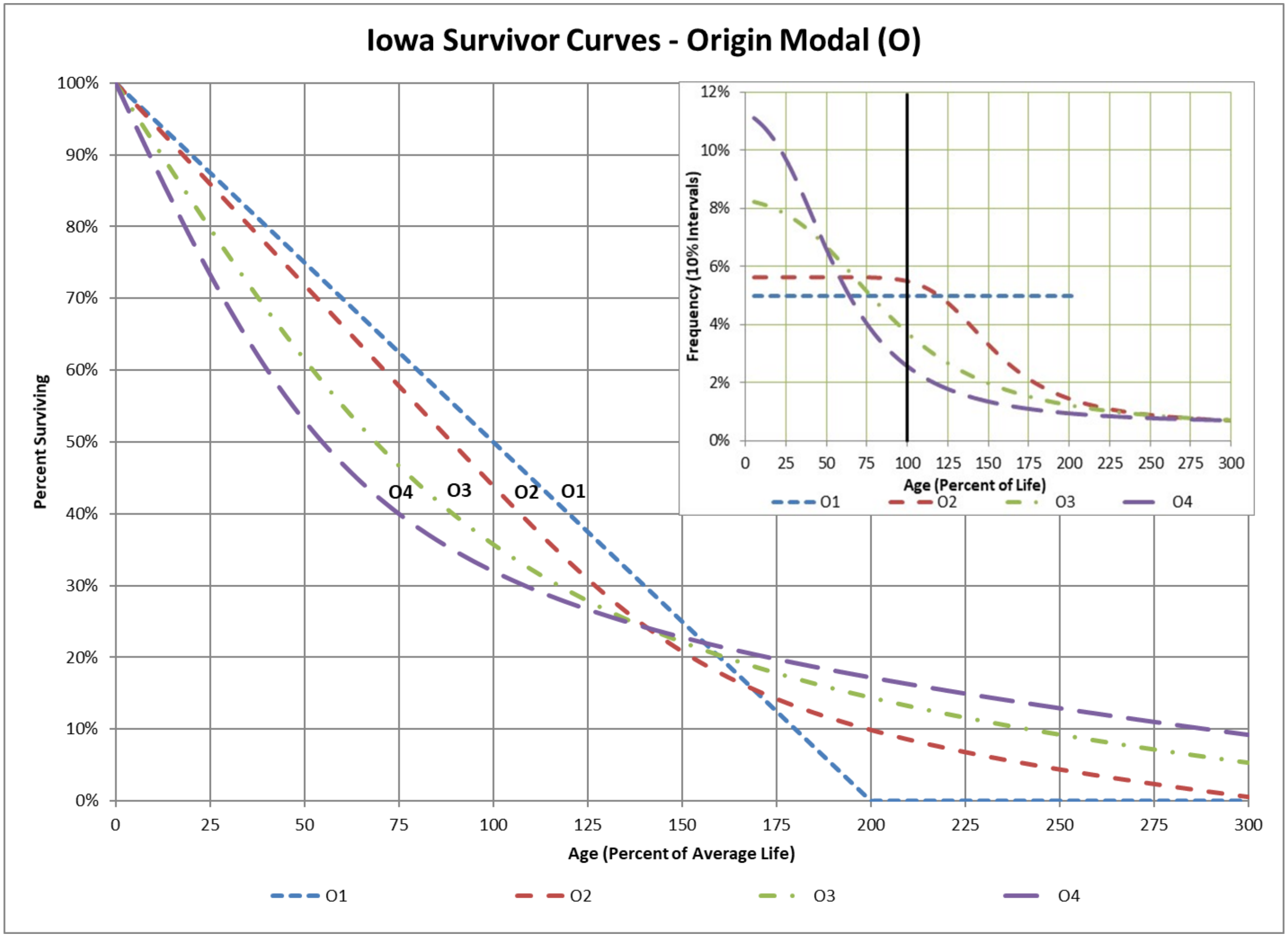


Figure 5: Origin Modal or "O" Iowa Type Survivor Curves



9.4 Retirement Rate Method of Analysis

The retirement rate method is a widely accepted actuarial method used to create survivor curves. This method is also referred to as an original life table. These survivor curves can then be used to determine the average service life of a plant account. The retirement rate method is thoroughly explained in several publications, including Statistical Analyses of Industrial Property Retirements, [10] Engineering Valuation and Depreciation [11] and Depreciation Systems. [12]

The retirement rate method is a subgroup of the placement and the experience band methods, as described in "Depreciation Systems". The placement band method creates a survivor curve which describes the life characteristics of assets placed into service during a selected timeframe. The experience band method creates a survivor curve which describes the life characteristics of assets removed from service during a selected time frame. The retirement rate method creates both placement and experience bands to give the most complete or representative data. An example of the calculations used in the development of a life table follows. The example includes schedules of annual aged property transactions, a schedule of plant exposed to retirement, a life table and illustrations of smoothing the stub survivor curve.

9.5 Schedules of Annual Transactions in Plant Records

The property group used to illustrate the retirement rate method is observed for the experience band 2008-2017 during which there were placements during the years 2003-2017. In order to illustrate the summation of the aged data by age interval, the data was compiled in the manner presented in Schedules 1 and 2. In Schedule 1 (page 9-10), the year of installation (year placed) and the year of retirement are shown. The age interval during which a retirement occurred is determined from this information. In the example which follows, $10,000 of the asset invested in 2003 were retired in 2008. The $10,000 retirement occurred during the age interval between 4 ½ and 5 ½ years (2008 - 2003) on the basis that approximately one-half of the amount of property was installed prior to and after July 1 of each year. That is, on the average, property installed during a year is placed in service at the midpoint of the year for the purpose of the analysis. All retirements also are stated as occurring at the midpoint of a one-year age interval of time, except the first age interval which encompasses only one-half year.

The total retirements occurring in each age interval in a band are determined by summing the amounts for each transaction year-installation year combination for that age interval. For example, the total of $143,000 retired for age interval 4½-5½ is the sum of the retirements entered on Schedule 1 immediately above the stair step line drawn on the table beginning with the 2008 retirements of 2003 installations and ending with the 2016 retirements of the 2011 installations. Thus, the total amount of $143,000 for age interval 4½-5½ equals the sum of:

$$\$10 + \$12 + \$13 + \$11 + \$13 + \$13 + \$15 + \$17 + \$19 + \$20 = \$143\text{ k}$$

[10] Anson, Winfrey & Hempstead, supra note 6

[11] Anson, Winfrey & Hempstead, supra note 6

[12] Wolf & Fitch, supra note 1

Other transactions which affect the group are recorded in a similar manner in Schedule 2 (page 9-11). The entries illustrated include transfers and sales. The entries which are credits to the plant account are shown in parentheses. The items recorded on this schedule are not totaled with the retirements but are used in developing the exposures at the beginning of each age interval.

Schedule 1. Retirements for each year 2008-2017 – summarized by age interval

Experience Band 2008-2017 Placement Band 2003-2017

Retrements (Thousands of Dollars)
Annual Survivors at the Beginning of the Year

Year Placed (1)	2008 (2)	2009 (3)	2010 (4)	2011 (5)	2012 (6)	2013 (7)	2014 (8)	2015 (9)	2016 (10)	2017 (11)	Total Durring Age Interval (12)	Age Interval (13)
2003	10	11	12	13	14	16	23	24	25	26	26	13½-14½
2004	11	12	13	15	16	18	20	21	22	19	44	12½-13½
2005	11	12	13	14	16	17	19	21	22	18	64	11½-12½
2006	8	9	10	11	11	13	14	15	16	17	83	10½-11½
2007	9	10	11	12	13	14	16	17	19	20	93	9½-10½
2008	4	9	10	11	12	13	14	15	16	20	105	8½-9½
2009		5	11	12	13	14	15	16	18	20	113	7½-8½
2010			6	12	13	15	16	17	19	19	124	6½-7½
2011				6	13	15	16	17	19	19	131	5½-6½
2012					7	14	16	17	19	20	143	4½-5½
2013						8	18	20	22	23	146	3½-4½
2014							9	20	22	25	150	2½-3½
2015								11	23	25	151	1½-2½
2016									11	24	153	½-1½
2017										13	80	0-½
Total	**53**	**68**	**86**	**106**	**128**	**157**	**196**	**231**	**273**	**308**	**1,606**	

Schedule 2. Other Transactions for Each year 2008-2017 – summarized by age interval

Experience Band 2008-2017

Placement Band 2003-2017

Acquisitions, Transfers and Sales (Thousands of Dollars)
Annual Survivors at the Beginning of the Year

Year Placed (1)	2008 (2)	2009 (3)	2010 (4)	2011 (5)	2012 (6)	2013 (7)	2014 (8)	2015 (9)	2016 (10)	2017 (11)	Total Durring Age Interval (12)	Age Interval (13)
2003	-	-	-	-	-	-	60[a]	-	-	-	-	13½-14½
2004	-	-	-	-	-	-	-	-	-	-	-	12½-13½
2005	-	-	-	-	-	-	-	-	-	-	-	11½-12½
2006	-	-	-	-	-	-	-	(5)[b]	-	-	60	10½-11½
2007	-	-	-	-	-	-	-	6[a]	-	-	-	9½-10½
2008	-	-	-	-	-	-	-	-	-	-	(5)	8½-9½
2009		-	-	-	-	-	-	-	-	-	-	7½-8½
2010			-	-	-	-	-	-	-	-	-	6½-7½
2011				-	-	-	-	(12)[b]	-	-	-	5½-6½
2012					-	-	-	-	22[a]	-	-	4½-5½
2013						-	-	(19)[b]	-	-	10	3½-4½
2014							-	-	-	-	-	2½-3½
2015								-	-	(102)[c]	(121)	1½-2½
2016									-	-	-	½-1½
2017												0-½
Total	**-**	**-**	**-**	**-**	**-**	**-**	**60**	**(30)**	**22**	**(102)**	**(50)**	

[a] *Transfer Affecting Exposures at Beginning of Year*
[b] *Transfer Affecting Exposures at End of Year*
[c] *Sale with Continued Use*
Parentheses denote Credit amount.

9.6 Schedule of Plant Exposed to Retirement

The development of the amount of plant exposed to retirement at the beginning of each age interval is illustrated in Schedule 3 (page 9-13). The surviving plant at the beginning of each year from 2007 through 2016 is recorded by year in the portion of the table titled "Annual Survivors at the Beginning of the Year." The last amount entered in each column is the amount of new plant added to the group during the year. The amounts entered in Schedule 3 for each successive year following the beginning balance or addition, are obtained by adding or subtracting the net entries shown on Schedules 1 and 2. For the purpose of determining the plant exposed to retirement, transfers-in are considered as being exposed to retirement in this group at the beginning of the year in which they occurred, and the sales and transfers-out are considered to be removed from the plant exposed to retirement at the beginning of the following year. Thus, the amounts of plant shown at the beginning of each year are the amounts of plant from each placement year considered to be exposed to retirement at the beginning of each successive transaction year. For example, the exposures for the installation year 2013 are calculated in the following manner:

Exposures at age 0	=	amount of addition	=	$750,000
Exposures at age ½	=	$750,000 - $ 8,000	=	$742,000
Exposures at age 1½	=	$742,000 - $18,000	=	$724,000
Exposures at age 2½	=	$724,000 - $20,000 - $19,000	=	$685,000
Exposures at age 3½	=	$685,000 - $22,000	=	$663,000

For the entire experience band 2008-2018, the total exposures at the beginning of an age interval are obtained by summing diagonally in a manner similar to the summing of the retirements during an age interval (Schedule 1). For example, the figure of 3,789, shown as the total exposures at the beginning of age interval 4½-5½, is obtained by summing:

$255 + $268 + $ 284 + $311 + $334 + $374 + $405 + $448 + $501 $ $609 = $3,789k

Schedule 3 – Plant exposed to retirement at the beginning of each year, 2008 -2017 – summarized by age interval

Experience Band 2008 - 2017

Placement Band 2003-2017

Exposures (Thousands of Dollars)
Annual Survivors at the Beginning of the Year

Year Placed (1)	2008 (2)	2009 (3)	2010 (4)	2011 (5)	2012 (6)	2013 (7)	2014 (8)	2015 (9)	2016 (10)	2017 (11)	Total at Beginning of Age Interval (12)	Age Interval (13)
2003	255	245	234	222	209	195	239	216	192	167	167	13½-14½
2004	279	268	256	243	228	212	194	174	153	131	323	12½-13½
2005	307	296	284	271	257	241	224	205	184	162	531	11½-12½
2006	338	330	321	311	300	289	276	262	242	226	823	10½-11½
2007	376	367	257	346	334	321	307	267	280	261	1,097	9½-10½
2008	420[a]	416	407	397	386	374	361	347	332	316	1,503	8½-9½
2009		460[a]	455	444	432	419	405	390	374	356	1,952	7½-8½
2010			510[a]	504	492	479	464	448	431	412	2,463	6½-7½
2011				580[a]	574	561	546	530	501	482	3,057	5½-6½
2012					660[a]	653	639	623	628	609	3,789	4½-5½
2013						750[a]	742	724	685	663	4,332	3½-4½
2014							850[a]	841	821	799	4,955	2½-3½
2015								960[a]	949	923	5,719	1½-2½
2016									1,080[a]	1,069	6,579	½-1½
2017										1,220[a]	7,490	0-½
Total	**1,975**	**2,382**	**2,724**	**3,318**	**3,872**	**4,494**	**5,247**	**5,987**	**6,852**	**7,796**	**44,780**	

[a] *Additions during the year.*

	1555	1922	2214	2738	3212	3744	4397	5027	5772	6576	44780
	420	460	510	580	660	750	850	960	1080	1220	0
	1975	2382	2724	3318	3872	4494	5247	5987	6852	7796	44780

9.7 Original Life Tables

The original life table, illustrated in Schedule 4 (page 9-15) is developed from the totals shown on the schedules of retirements and exposures, Schedules 1 and 3, respectively. The exposures at the beginning of the age interval are obtained from the corresponding age interval of the exposure schedule, and the retirements during the age interval are obtained from the corresponding age interval of the retirement schedule. The retirement ratio is the result of dividing the retirements during the age interval by the exposures at the beginning of the age interval. The percent surviving at the beginning of each age interval is derived from survivor ratios, each of which equals one minus the retirement ratio. The percent surviving is developed by starting with 100 percent at age zero and successively multiplying the percent surviving at the beginning of each interval by the survivor ratio, i.e., one minus the retirement ratio for that age interval. The calculations necessary to determine the percent surviving at age 5½ are as follows:

Percent surviving at age 4½	=	88.15		
Exposures at age 4½	=	$3,789,000		
Retirements from age 4½ to 5½	=	$143,000		
Retirement Ratio	=	$143,000 ÷ $3,789,000	=	0.0377
Survivor Ratio	=	1.000 - 0.0377	=	0.9623
Percent surviving at age 5½	=	(88.15) x (0.9623)	=	84.83

The totals of the exposures and retirements (columns 2 and 3) are shown for the purpose of checking with the respective totals in Schedules 1 and 3. The ratio of the total retirements to the total exposures, other than for each age interval, is meaningless. The original survivor curve is plotted from the original life table (column 6, Schedule 4). When the curve terminates at a percent surviving greater than zero, it is called a stub survivor curve. Survivor curves developed from retirement rate studies generally are stub curves.

Schedule 4: Original Life Table - Calculated by the Retirement Rate Method

Experience Band 2008-2017					Placement Band 2003-2017
Age at Beginning of Interval	**Exposures at Beginning of Age Interval**	**Retirements During Age Interval**	**Retirement Ratio**	**Survivor Ratio**	**% Surviving at Beginning of Age Interval**
0	7,490	80	0.0107	0.9893	100.00
0.5	6,579	153	0.0233	0.9767	98.93
1.5	5,719	151	0.0264	0.9736	96.62
2.5	4,955	150	0.0303	0.9697	94.07
3.5	4,332	146	0.0337	0.9663	91.22
4.5	3,789	143	0.0377	0.9623	88.15
5.5	3,057	131	0.0429	0.9571	84.83
6.5	2,463	124	0.0503	0.9497	81.19
7.5	1,952	113	0.0579	0.9421	77.11
8.5	1,503	105	0.0699	0.9301	72.65
9.5	1,097	93	0.0848	0.9152	67.57
10.5	823	83	0.1009	0.8991	61.84
11.5	531	64	0.1205	0.8795	55.6
12.5	323	44	0.1362	0.8638	48.9
13.5	167	26	0.1557	0.8443	42.24
					35.66
Total	**44,780**	**1,606**			

- Exposure and Retirement Amounts are in Thousands of Dollars
- Column 2 from Schedule 3, Column 12, Plant Exposed to Retirement.
- Column 3 from Schedule 1, Column 12, Retirements for Each Year.
- Column 4 = Column 3 divided by Column 2.
- Column 5 = 1.0000 minus Column 4.
- Column 6 = Column 5 multiplied by Column 6 as of the Preceding Age Interval.

9.8 Smoothing the Original Survivor Curve

The smoothing of the original survivor curve eliminates any irregularities and serves as the basis for the preliminary extrapolation to zero percent surviving of the original stub curve. Even if the original survivor curve is complete from 100 percent to zero percent, it is desirable to eliminate any irregularities, as there is still an extrapolation for the vintages which have not yet lived to the age at which the curve reaches zero percent. In this study, the smoothing of the original curve with established type curves was used to eliminate irregularities in the original curve.

The Iowa type curves are used in this study to smooth those original stub curves which are expressed as percentages surviving at ages in years. Each original survivor curve was compared to the Iowa curves using visual and mathematical matching in order to determine the better fitting smooth curves. In Figures 6, 7, and 8, the original curve developed in Schedule 4 is compared with the L, S, and R Iowa type curves which most nearly fit the original survivor curve. In Figure 6, the L1 curve with an average life between 12 and 13 years appears to be the best fit. In Figure 7, the S0 type curve with a 12-year average life appears to be the best fit and appears to be better than the L1 fitting. In Figure 8, the R1 type curve with a 12-year average life appears to be the best fit and appears to be better than either the L1 or the S0.

In Figure 9, the three fittings, 12-L1, 12-S0 and 12-R1 are drawn for comparison purposes. It is probable that the 12-R1 Iowa curve would be selected as the most representative of the plotted survivor characteristics of the group.

Figure 6: Illustration of the Matching of an Original Survivor Curve with a L1 Iowa Type Curve Original and Smooth Survivor Curves

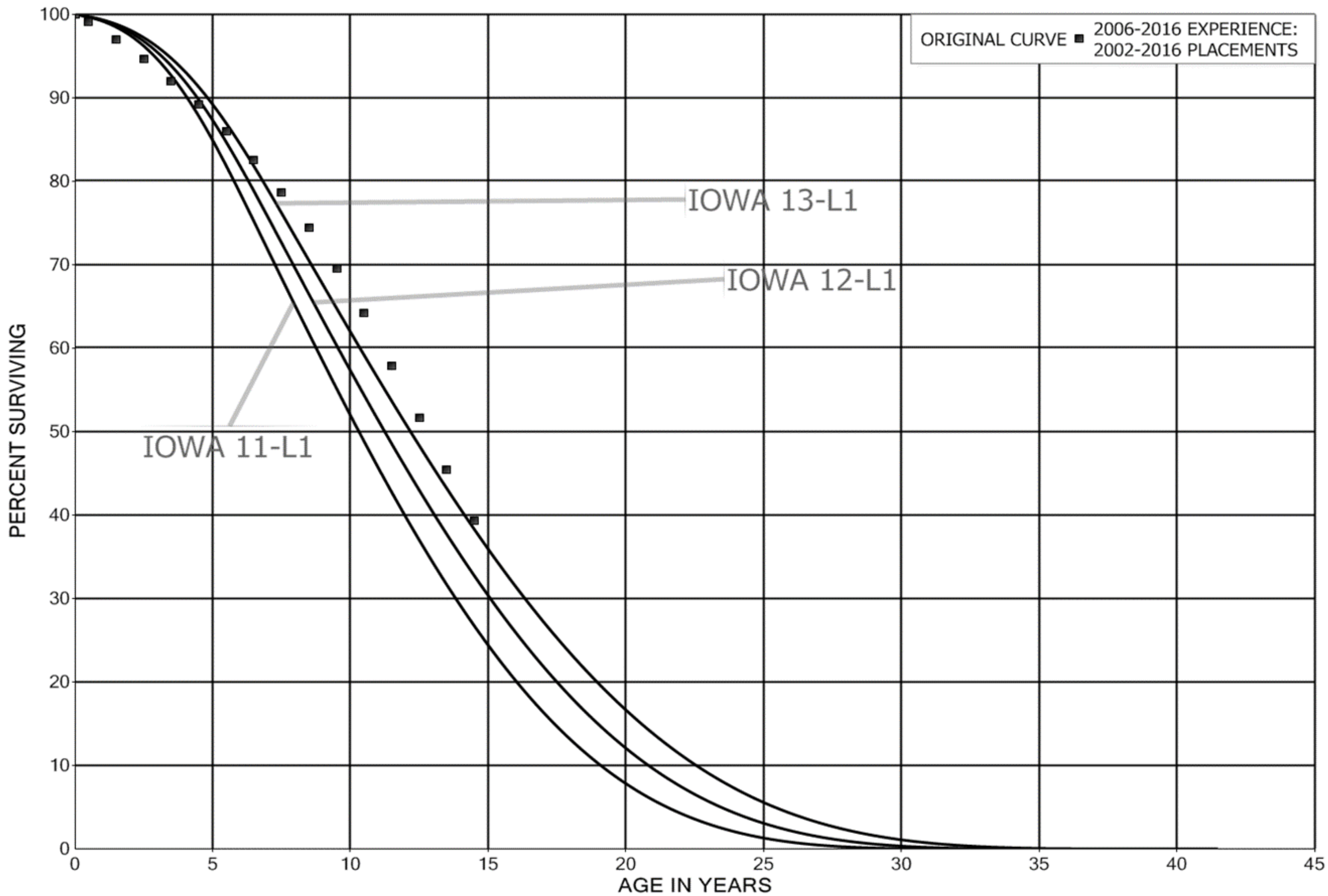


Figure 7: Illustration of the Matching of an Original Survivor Curve with a SO Iowa Type Curve Original and Smooth Survivor Curves

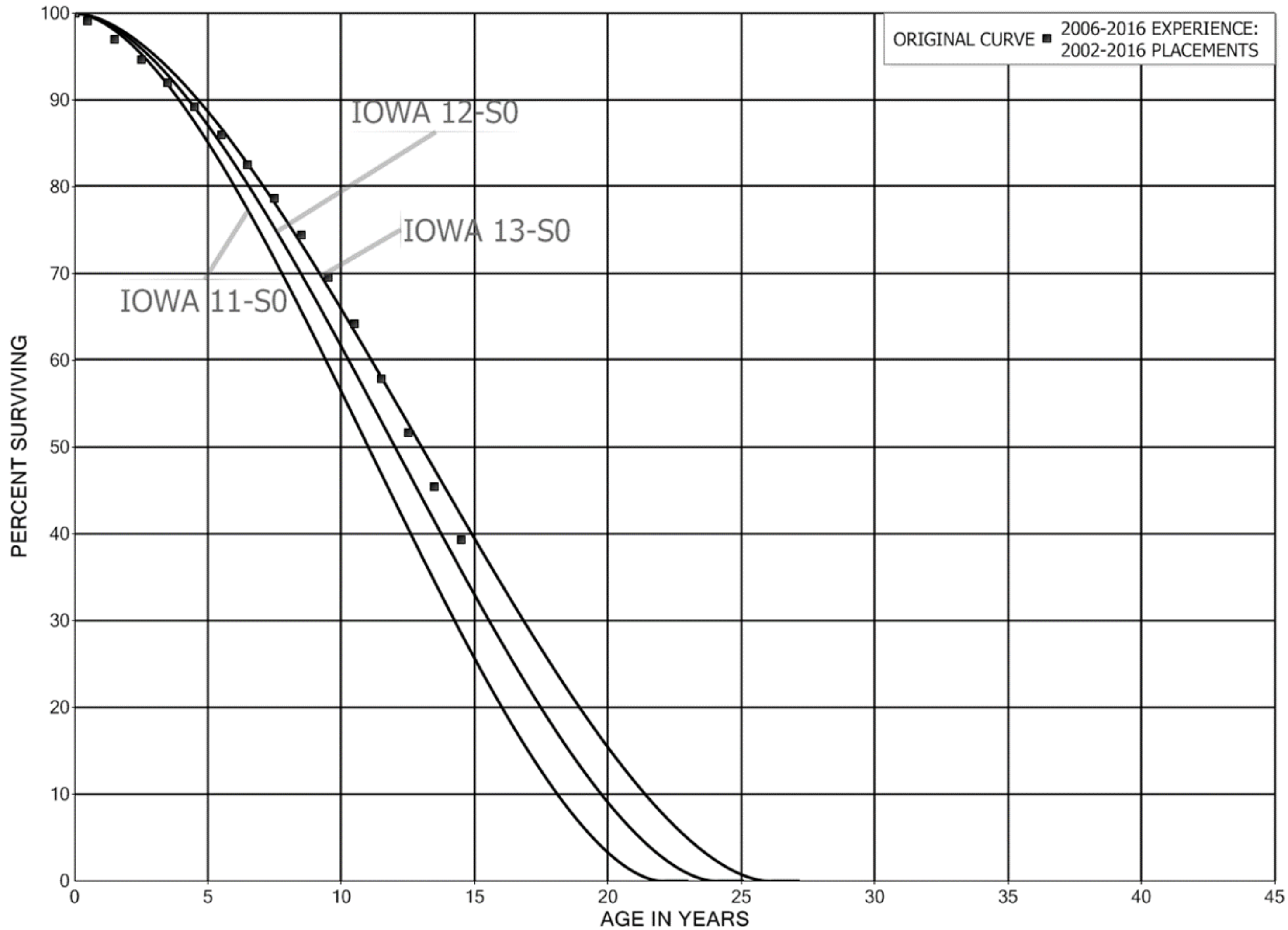


Figure 8: Illustration of the Matching of an Original Survivor Curve with a R1 Iowa Type Curve Original and Smooth Survivor Curves

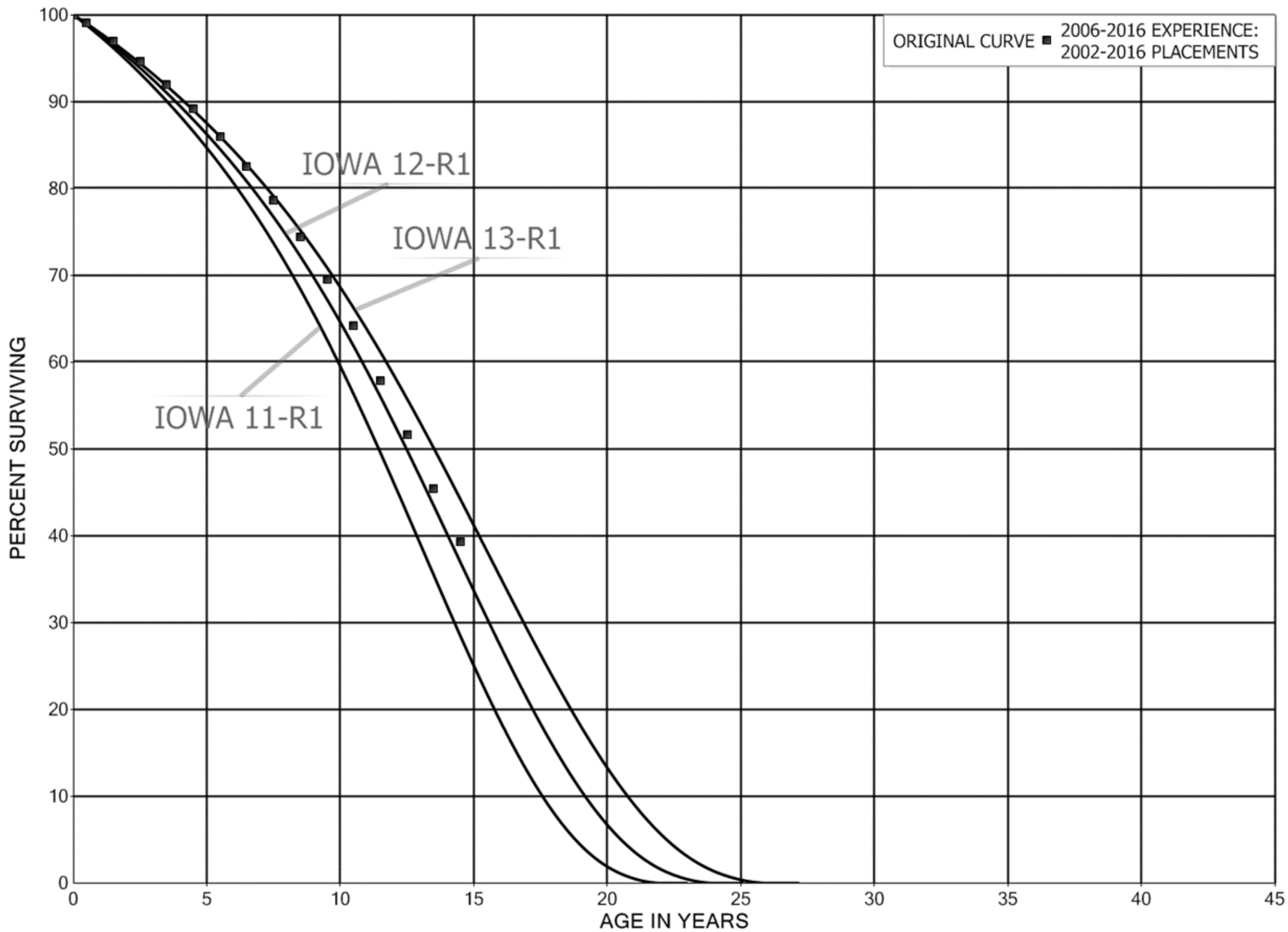
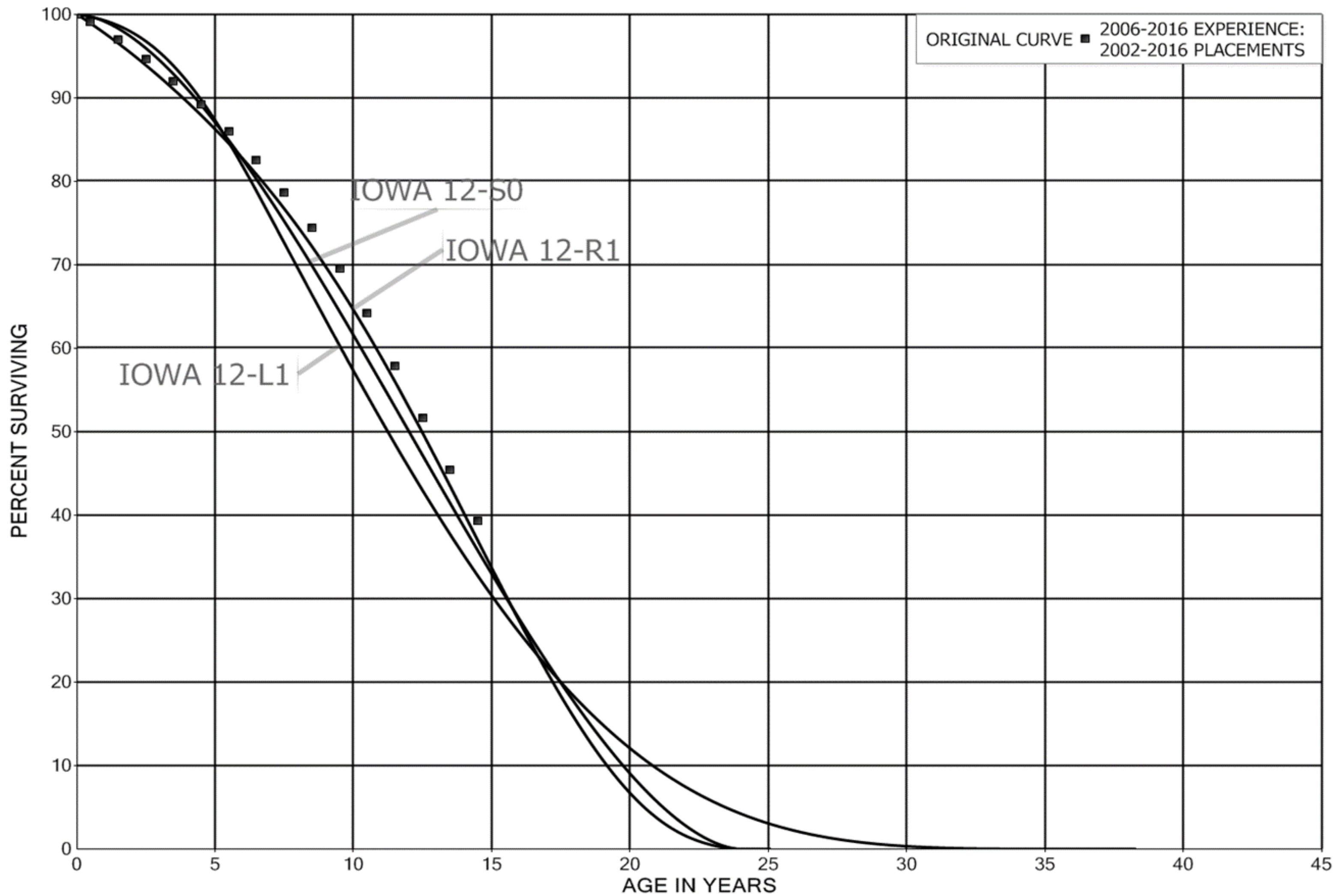


Figure 9: Illustration of the Matching of an Original Survivor Curve with a L1 Iowa Type Curve Original and Smooth Survivor Curves



SECTION 10

10 ESTIMATION OF NET SALVAGE

The estimates of net salvage were based primarily on the professional judgment of Concentric, based in part on historical data, and in part through a comparison to peer companies. The analysis of historic net salvage activity considered gross salvage and cost of removal as recorded to the depreciation reserve account Net salvages as a percentage of the cost of plant retired are calculated for each plant component on both annual and three-year moving average bases.

The net salvage percentages estimated is usually determined using the "Traditional Approach" for net salvage estimation. When a utility retires plant, the plant may be: (1) sold to a third party; (2) reused by the utility for additional service; (3) abandoned in place; or (4) physically removed. In the circumstances where the plant is sold or re-used, a salvage proceeds (or positive salvage amount) is normally recognized. In circumstances where the plant is abandoned in place or physically removed, a cost of removal expenditure (or negative salvage) is incurred. The net of these estimated gross salvage proceeds and the estimated costs of removal are expressed as a percentage of the account's original cost to determine a net salvage percentage. In the circumstances where the salvage proceeds exceed the costs of retirement, a net positive salvage percentage exists. In the circumstances where the costs of removal exceed the salvage proceeds, a net negative salvage as a percentage of the original cost is the result.

The estimation of the net salvage as a percentage of original cost as developed using the traditional approach, includes the following five steps.

1. The annual retirement, gross salvage and cost of removal transactions for the period of analysis is extracted from the plant accounting systems.
2. A net salvage amount (gross salvage proceeds less cost of retirement) is calculated for each historic year. Additionally, a net salvage amount is also calculated for each historic three-year rolling band and the most recent five-year rolling band.
3. The net salvage amount determined above is compared to the original booked costs retired for each period in the manner described, which results in a net salvage percentage of original costs retired for each year, in addition to three-year rolling bands and the most recent five-year rolling band. The annual, the three-year rolling average, and the most recent five-year rolling average net salvage percentages are analyzed to determine a reasonable estimated net salvage percentage. At this point the net salvage percentage is based purely upon statistical analysis.
4. Each account is then compared to the net salvage percentage currently approved, compared to peer companies, and discussed with company engineering staff. Based on the statistical analysis, the review of current and peer company net salvage percentages, and with the professional judgment of Concentric, a net salvage percentage is determined for each account.
5. The net salvage percentage is then used in the depreciation rate calculations in the technical update or report.

LARRY E. KENNEDY, CDP

Senior Vice President

Mr. Kennedy has been in the pipeline, electric, gas utility and municipal infrastructure business for 40 years. As Senior Vice President, Concentric Advisors, ULC, Mr. Kennedy has provided professional consulting services to gas and electric utilities including generation facilities (including nuclear facilities), and high voltage transmission lines, large diameter transmission pipelines, railway systems and municipally owned utility systems. Previously, Mr. Kennedy was with Gannett Fleming Canada ULC, for over 17 years, where he was responsible for completing depreciation studies and provided advice related to large capital program spending and controls for many regulated North American utilities. Mr. Kennedy was also employed by Interprovincial Pipelines Limited (now Enbridge Pipelines) for 15 years in several plant accounting and regulatory positions and with Nova Gas Transmission Pipelines (now TC Energy) for three years as a Depreciation Specialist.

Mr. Kennedy has provided expert witness testimony related to depreciation, stranded costs, capital accounting issues, utility valuation, and property tax issues before several North American regulatory bodies. Mr. Kennedy has completed numerous seminars and all courses offered by Depreciation Programs, Inc. Mr. Kennedy is a member of the teaching faculty of the Society of Depreciation Professionals ("SDP") and has presented depreciation, stranded cost, and capital accounting related topics to the SDP, Canadian Electric Association, Canadian Gas Association, Canadian Property Taxpayers Association, Alberta Utilities Commission, British Columbia Utilities Commission and the Canadian Energy Pipeline Association. Mr. Kennedy is a past Society of Depreciation Professionals President.

PERSONAL INFORMATION

- Diploma, Applied Arts - Business Administration, Northern Alberta Institute of Technology, 1978
- Member, Society of Depreciation Professionals
- Certified Depreciation Professional

EXPERIENCE

Representative Project Experience

- Alliance Pipeline L.P. A number of depreciation studies have been completed by Mr. Kennedy for both the Canadian and US assets of Alliance Pipelines. The most recent studies completed in 2012 for Submission to the National Energy Board of Canada and in 2015 for submission to the FERC (Docket No. RP15-1022-000) to the Federal Energy Regulatory included operational discussions related to the gas transmission plant, the service life analysis for all accounts using the retirement rate analysis, discussion with management regarding outlook, and the inclusion of an Economic Planning Horizon.

- Viking Gas Transmission Company - The assignment included working with the company to develop the appropriate depreciation policy to align with the organization's overall goals and objectives. The resulting depreciation study, which was submitted to the Federal Energy and

Regulatory Commission, incorporated the concepts of time-based depreciation for gas transmission accounts and development of Economic Planning Horizons, including discussion related to the long demand of natural gas.

- Midwestern Gas Transmission Company: The assignment included development of a detailed depreciation study and Testimony to develop the appropriate depreciation policy to align with the organization's overall goals and objectives. The resulting depreciation study, which was submitted to the Federal Energy and Regulatory Commission, incorporated the concepts of time-based depreciation for gas transmission accounts and development of Economic Planning Horizons. The Direct Testimony included significant discussion related to the topics of Decarbonization and changing political climate towards removal of fossil fuel demand forecasts.
- Enbridge Lakehead System: A Technical Update to a 2016 full depreciation study was prepared and filed with the FERC in 2021 in support of updating depreciation rate and resultant depreciation expense. The technical update also included an analysis and recommendation of a 20-year Economic Planning Horizon (Economic Life).

- Consolidated Edison Company of New York, Inc.: Mr. Kennedy co-authored a study and report which presented the results of research focusing on prior periods of transformative change and more recent discussions of policy tools that could address the impacts of climate change on the Company's electric, steam, and natural gas businesses.
- Montana-Dakota Utilities Co.: A study was developed to determine the appropriate depreciation parameters for all electric generation, transmission and distribution assets. The study and associated expert testimony were submitted to the Montana Public Service Commission in 2018 and to the North Dakota Public Service Commission in 2022. Elements of the study included a field review of electric generation and transmission plant, the service life analysis for all accounts using the retirement rate analysis, discussion with management regarding outlook and the estimation of the retirement of generation facilities due to environmental legislation and estimation of net salvage requirements.
- Commonwealth Edison Company: Mr. Kennedy sponsored extensive Rebuttal Testimony related to the average service life, net salvage estimations, and appropriate depreciation practices in a 2020 rate proceeding.
- Great Plains Natural Gas Co.: Annual updates of depreciation rates and net salvage requirements were calculated and submitted to the Minnesota Department of Commerce annually since 2017.
- National Grid USA Service Company Limited: A depreciation study was completed in 2020 for the National Grid High Voltage Direct Current (HVDC) electric interstate transmission line. The study included consideration of the average service life of the system components, the level of components of the system and the compliance of the recommended componentization to the FERC Uniform System of Accounts. The resultant study was used by the company in filings with the Federal Energy and Regulatory Commission (FERC)
- Society of Depreciation Professionals (SDP): Mr. Kennedy has presented at the annual conferences on the topic of the erosion of the regulatory compact throughout North America, the Future of Energy transition and its impacts on recovery of investment. Additionally, Mr. Kennedy is a member of the SDP teaching faculty and has lead a number of workshops on various aspects of decarbonization and has co-instructed on the topic of the future of energy.

Other Representative Project Experience

- Alberta Departments of Energy and Forestry and Agriculture: Detailed toll comparison and valuation models were developed to provide a comparison of the toll fairness of each of the Provinces Rural Electrification Associations ("REA") to the comparable Investor Owned Utilities ("IOU") for the 32 REA's currently operating in Alberta. In addition to providing a toll comparison of the REA and IOU, a fair market valuation for each of the REA's was also prepared. The final report of the toll compatibility and specific valuations were submitted to the Alberta Department of Energy and the Alberta Department of Forestry and Agriculture. Mr. Kennedy was the Responsible Officer on this project.
- Alliance Pipeline L.P. A number of depreciation studies have been completed by Mr. Kennedy for both the Canadian and US assets of Alliance Pipelines. The most recent studies completed in 2012 for Submission to the National Energy Board of Canada and to the Federal Energy Regulatory included operational discussions related to the gas transmission plant, the service life analysis for all accounts using the retirement rate analysis, discussion with management regarding outlook, and the inclusion of an Economic Planning Horizon.
- AltaGas Utilities Inc.: A number of depreciation studies have been completed, which included the assembly of basic data from the Company's accounting systems, statistical analysis of retirements for service life and net salvage indications, discussions with management regarding the outlook for property, and the calculations of annual and accrued depreciation. The studies were prepared for submission to the Alberta Energy and Utilities Board ("Board"). Mr. Kennedy has appeared before the Alberta Utilities Commission on behalf of AltaGas on a number of occasions.
- AltaLink LP: An initial study was developed for submission to the Alberta Utilities Commission ("AUC") in 2002. The study included the estimation of service life characteristics, and the estimation of net salvage requirements for all electric transmission assets. A net salvage study and technical update was also filed with the Board in 2004. Since 2004, additional depreciation studies were filed in 2005, 2010 and 2012, 2016 and 2018. The 2010, 2012, 2016 and 2018 studies included a number of provisions in order to ensure compliance to Alberta's Minimum Filing Requirements for depreciation studies and for compliance to the International Financial Reporting Standards. These studies also specifically analyzed the pace of technical change in the Alberta Electric system, and recently have specifically considered the impacts of early retirements caused by storms and forest fires.
- ATCO Electric: Studies have included the development of annual and accrued depreciation rates for the electric transmission and distribution systems for the Alberta assets of ATCO Electric, in addition to the generation, transmission, and distribution assets of Northland Utilities Inc. (NWT) and the distribution assets of Northland Utilities (Yellowknife) Inc. The ATCO Electric studies were submitted to the AUC for review, while the NWT and Northland Utilities (Yellowknife) Inc. studies were submitted to the Northwest Territories Utilities Board and Yukon Electric Company Limited (YECL) was submitted to the Yukon Public Utilities Board. These studies also specifically analyzed the pace of technical and recently

have specifically considered the impacts of early retirements caused by storms and forest fires.

- ATCO Gas: Studies were prepared in 2010 and 2018 which were the subject of a review by the AUC. Elements of all of the studies included the service life analysis for all accounts using the retirement rate analysis, discussion with management regarding outlook, and the estimation of net salvage requirements. These studies also specifically analyzed the pace of technical change in the Alberta Gas system, and recently have specifically considered the impacts of early retirements caused by storms and forest fires.

- Centra Gas Manitoba, Inc.: The study included development of annual and accrued depreciation rates for all gas plant in service. Elements of the study included a field inspection of metering and compression facilities, service buildings and other gas plant; service life analysis for all accounts using the retirement rate analysis on a combined database developed from actuarial data and data developed through the computed method; discussions with management regarding outlook; and the estimation of net salvage requirements. A similar study was completed in 2006, 2011, and 2015. The 2011 and 2015 studies were the subject of a review by the Manitoba Public Utilities Board in 2012 and 2016. Mr. Kennedy has also consulted on issues regarding International Financial Reporting Standards ("IFRS") compliance and required componentization.

- Enbridge Gas Distribution Inc.: Full and comprehensive depreciation studies have been completed in 2009 and 2011. The 2009 study also included review of the company's gas storage operations. Both studies included the development of annual and accrued depreciation rates for all depreciable natural gas distribution, transmission and general plant assets. Elements of the studies included the service life analysis for all accounts using the computed mortality method of analysis, discussion with management regarding outlook and the estimation of net salvage requirements. Studies were prepared for submission to the Ontario Energy Board.

- Mr. Kennedy has also completed an allocation of the accumulated depreciation accounts into the amounts related to the recovery of original cost and the amounts recovered in tolls for the future removal of assets currently in service. The allocations were determined as of December 31, 2009 and were deemed by the company's external auditors to be in conformance with proper accounting standards and procedures. In 2013, a review of the reserve required for the future removal of assets currently in service was undertaken by Mr. Kennedy. The results of the review were summarized in evidence presented by Mr. Kennedy to the Ontario Energy Board.

- ENMAX Power Corporation: Studies have included the development of annual and accrued depreciation rates for all depreciable electric transmission assets. Elements of the studies included the service life analysis for all accounts using the retirement rate analysis, discussion with management regarding outlook, and the estimation of net salvage requirements. Studies were prepared for submission to the Alberta Department of Energy and more recently for submission to the Alberta Energy and Utilities Board. Similar studies have also been completed for submission for the ENMAX Electric Distribution assets for submission to the AUC. The ENMAX distribution asset assignments also included an extensive asset verification project where the plant accounting and operational asset records were verified to the field assets actually in service.

- Fortis Group of Companies: Studies have included the development of annual and accrued depreciation rates for the electric distribution assets in Alberta and for the generation, transmission, and distribution assets in British Columbia. The FortisBC Inc. studies were completed and filed with the British Columbia Utilities Commission ("BCUC") in 2005, 2010, 2011 and 2018 encompassing both the FortisBC electric and natural gas companies. FortisAlberta Inc. studies were completed in 2004 (updated in 2005), 2009 and 2010. Elements of the studies included the development of average service lives using the retirement rate method of analysis, development of net salvage estimates, compliance with IFRS, and the determination of appropriate annual accrual and accrued depreciation rates. The most recent studies also specifically analyzed the pace of technical change in the Electric systems, and specifically considered the impacts of retirements, system modernization and technical enchantments to the assets.
- International Financial Reporting Standards ("IFRS"): Mr. Kennedy has been retained by numerous clients encompassing most Canadian Provinces and Territories. The assignments included the review of company's assets and depreciation practices to provide opinion on the compliance to the IFRS. The assignments have also included the issuance of opinion to the External Auditors of Utilities to comment on the manner in which the Utilities can minimize differences in the regulatory ledgers and the accounting records used for financial disclosure purposes. Mr. Kennedy has also presented to the Canadian Electric Association, the Society of Depreciation Professionals, the Canadian Energy Pipeline Association and to the BCUC on this topic.
- Mackenzie Valley Pipeline Project: This assignment included the review of the proposed depreciation schedule for the proposed Mackenzie Valley Pipeline. The review included a discussion of the policies used by the company and the depreciation concepts to be included in a depreciation schedule for a Greenfield pipeline. The review was supported through appearance at the oral public hearings before the National Energy Board of Canada ("NEB").
- Manitoba Hydro: A study was developed to determine the appropriate depreciation parameters for all electric generation, transmission and distribution assets. The study was submitted to the Manitoba Public Utilities Board. Elements of the study included a field review of electric generation and transmission plant, the service life analysis for all accounts using the retirement rate analysis, discussion with management regarding outlook and the estimation of net salvage requirements. A similar study was also completed in 2006 and in 2011. The 2011 depreciation study was the subject of a review by the Manitoba Public Utilities Board in 2012. Mr. Kennedy has also consulted with Manitoba Hydro on issues regarding IFRS compliance and required componentization.
- New Brunswick Power: Mr. Kennedy completed a comprehensive depreciation review of the electric generation (including the nuclear facilities), transmission, distribution and general plant assets. The review, which was prepared for submission to the New Brunswick Public

Utilities Board, included a significant amount of discussion regarding the development of depreciation policy for the company. The study also included development of procedures to extract data from the company databases, tours of the company facilities, interviews with operational and management representatives, development of appropriate net salvage rates, development of average service life estimates, and the compilation of the report.

- Newfoundland and Labrador Hydro (NALCOR): Mr. Kennedy developed comprehensive depreciation studies that included the development of depreciation policy and rates for NALCOR. The studies provided a significant review of the previous depreciation policy, which included use of a sinking fund depreciation method and provided justification for the conversation to the straight-line depreciation method. The study, which was prepared for submission to the Newfoundland and Labrador Utilities Commission, included a significant amount of discussion regarding the development of depreciation policy for the company. The study also included development of procedures to extract data from the company databases, tours of the company facilities, interviews with operational and management representatives, development of appropriate net salvage rates, development of average service life estimates, and the compilation of the report for submission in a General Tariff Application. Additional studies were also completed in 2008 and 2010. The 2010 and 2017 studies were the subject of Regulatory Review in 2012 and 2019.

- Ontario Power Generation: Assignments have included a review of the Depreciation Review Committee process completed in 2007. This review provided recommendations for enhanced internal processes and controls in order to ensure that the depreciation expense reflects the annual consumption of service value. Additionally, full assessments of the lives of the regulated assets of the company's electric generation hydro and nuclear plants were completed in 2011 and 2013 and were submitted to the Ontario Energy Board for review.

- TransCanada Pipelines Limited - Alberta Facilities: The assignment included working with the company to develop the appropriate depreciation policy to align with the organization's overall goals and objectives. The resulting depreciation study, which was submitted to the Alberta Energy and Utilities Board, incorporated the concepts of time-based depreciation for gas transmission accounts and unit-based depreciation for gathering facilities. The data was assembled from two different accounting systems and statistical analysis of service life and net salvage were performed. For gathering accounts, the assignment included the oversight of the development of appropriate gas production and ultimate gas potential studies for specific areas of gas supply. Field inspections of gas compression, metering and regulating, and service operations were conducted. Studies were completed in 2002 and 2004, 2007, 2009 and 2012, 2015, and 2018.

- TransCanada Pipelines Limited - Mainline Facilities: The study prepared for submission to the NEB included the development of annual and accrued depreciation rates for gas transmission plant east of the Alberta - Saskatchewan border. Elements of the study included a field inspection of compression and metering facilities, service life and net salvage analysis for all accounts. The study was completed in 2002 and was supported through an appearance before the NEB. Study updates have been completed in 2005, 2007, 2009 and an additional full and comprehensive study was completed in 2011, and 2017. The 2011 study was fully supported through an appearance before the NEB in 2012.

Designations and Professional Affiliations

- Society of Depreciation Professionals -Certified Depreciation Professional
- Society of Depreciation Professionals (former President)

EVIDENCE ENTERED INTO PROCEEDINGS IN THE UNITED STATES

YEAR	CLIENT	APPLICANT	REGULATORY BOARD	PROCEEDING NUMBER
2015	Alliance Pipeline LP	Alliance Pipeline LP	Federal Energy and Regulatory Commission	Docket No. RP15-1022
2019	Viking Gas Transmission Company	Viking Gas Transmission Company	Federal Energy Regulatory Commission	RP19-1340
2020	National Grid USA Service Company Limited	National Grid USA Service Company Limited	Federal Energy Regulatory Commission	Settled through Negotiation
2018	Great Plains Natural Gas Co.	Great Plains Natural Gas Co.	Minnesota Department of Commerce	Annual Depreciation Filing
2018	Montana-Dakota Utilities	Montana-Dakota Utilities	Montana Public Service Commission	Docket D2019.9
2019	Great Plains Natural Gas Co	Great Plains Natural Gas Co	Minnesota Department of Commerce	Annual Depreciation Filing
2020	Cascade Natural Gas Corporation	Cascade Natural Gas Corporation	Oregon Public Utility Commission	UM - 2073
2020	Missouri-American Water Company	Missouri-American Water Company	Missouri Public Service Commission	WR-2020-0344
2020	Great Plains Natural Gas Co	Great Plains Natural Gas Co	Minnesota Department of Commerce	Annual Depreciation Filing
2020	Commonwealth Edison Company	Commonwealth Edison Company	State of Illinois – Illinois Commerce Commission	Docket 20-0393
2021	Intermountain Gas Company	Intermountain Gas Company	Idaho Public Utilities Commission	Case No. INT-21-01
2021	Midwestern Gas Transmission Company	Midwestern Gas Transmission Company	Federal Energy Regulatory Commission	RP21-525-000
2021	Enbridge Lakehead System	Enbridge Lakehead System	Federal Energy Regulatory Commission	DO21-15-000
2021	Consolidated Edison of New York	Consolidated Edison of New York	New York State Public Service Commission	19-G-0066
2022	United Illuminating Company	United Illuminating Company	Connecticut Public Utilities Regulatory Authority	22-08-08
2022	Montana-Dakota Utilities	Montana-Dakota Utilities	North Dakota Utilities Commission	Case No. PU-22-194
2022	Evergy Missouri West	Evergy Missouri West	Evergy Missouri West	ER-2022-0130
2022	Evergy Missouri West	Evergy Missouri West	Evergy Missouri West	ER-2022-0155

YEAR	CLIENT	APPLICANT	REGULATORY BOARD	PROCEEDING NUMBER
2022	Northern Natural Gas Company	Northern Natural Gas Company	Federal Energy Regulatory Commission	RP22-1033-0000
2023	Indiana American Water Company	Indiana American Water Company	Indiana Utility Regulatory Commission	Cause No. 45870
2023	Montana-Dakota Utilities	Montana-Dakota Utilities	Public Service Commission of the State of Montana	2022.11.099

EVIDENCE ENTERED INTO PROCEEDINGS IN CANADA

YEAR	CLIENT	APPLICANT	REGULATORY BOARD	PROCEEDING NUMBER
1999	ENMAX Power Corporation	Edmonton Power Corporation	Alberta Energy and Utilities Board	980550
2000	AltaGas Utilities Inc.	AltaGas Utilities Inc.	Alberta Energy and Utilities Board	Decision 2002-43
2001	City of Calgary	ATCO Pipelines South	Alberta Energy and Utilities Board	2000-365
2001	City of Calgary	ATCO Gas South	Alberta Energy and Utilities Board	2000-350
2001	City of Calgary	ATCO Affiliate Proceeding	Alberta Energy and Utilities Board	1237673
2001	ENMAX Power Corporation	ENMAX Power Corporation - Transmission	Alberta Department of Energy	N/A
2002	Centra Gas British Columbia	Centra Gas British Columbia	British Columbia Utilities Commission	N/A
2002	ENMAX Power Corporation	ENMAX Power Corporation - Transmission	Alberta Department of Energy	N/A
2003	AltaLink LP	AltaLink LP	Alberta Energy and Utilities Board	1279345
2003	Centra Gas Manitoba	Centra Gas Manitoba	Manitoba Public Utilities Board	N/A
2003	City of Calgary	ATCO Pipelines	Alberta Energy and Utilities Board	1292783
2003	City of Calgary	ATCO Electric-ISO Issues	Alberta Energy and Utilities Board	N/A
2003	City of Calgary	ATCO Gas	Alberta Energy and Utilities Board	1275466
2003	City of Calgary	ATCO Electric	Alberta Energy and Utilities Board	1275494
2003	Manitoba Hydro	Manitoba Hydro	Manitoba Public Utilities Board	N/A

YEAR	CLIENT	APPLICANT	REGULATORY BOARD	PROCEEDING NUMBER
2003	TransCanada Pipelines Limited	TransCanada Pipelines Limited	National Energy Board of Canada	RH-1-2002
2004	AltaGas Utilities Inc.	AltaGas Utilities Inc.	Alberta Energy and Utilities Board	1305995
2004	AltaLink LP	AltaLink LP	Alberta Energy and Utilities Board	1336421
2004	Central Alberta Midstream	Central Alberta Midstream	Municipal Government Board of Alberta	N/A
2004	Central Alberta Midstream	Central Alberta Midstream	Municipal Government Board of Alberta	N/A
2004	ENMAX Power Corporation	ENMAX Power Corporation	Alberta Energy and Utilities Board	1306819
2004	Heritage Gas Ltd.	Heritage Gas Ltd.	Nova Scotia Utility and Review Board	N/A
2004	NOVA Gas Transmission Limited	NOVA Gas Transmission Limited	Alberta Energy and Utilities Board	1315423
2004	Westridge Utilities Inc.	Westridge Utilities Inc.	Alberta Energy and Utilities Board	1279926
2005	AltaGas Utilities Inc.	AltaGas Utilities Inc.	Alberta Energy and Utilities Board	1378000
2005	ATCO Electric	ATCO Electric	Alberta Energy and Utilities Board	1399997
2005	ATCO Power	ATCO Power	Municipal Government Board of Alberta	N/A
2005	British Columbia Transmission Corporation	British Columbia Transmission Corporation	British Columbia Utilities Commission	N/A
2005	Centra Gas Manitoba	Centra Gas Manitoba	Manitoba Public Utilities Board	N/A
2005	ENMAX Power Corporation	ENMAX Power Corporation – Transmission	Alberta Energy and Utilities Board	N/A
2005	ENMAX Power Corporation	ENMAX Power Corporation – Distribution Assets	Alberta Energy and Utilities Board	1380613
2005	FortisAlberta Inc.	FortisAlberta Inc.	Alberta Energy and Utilities Board	1371998
2005	FortisAlberta Inc.	FortisAlberta Inc.	Alberta Energy and Utilities Board	N/A
2005	FortisBC, Inc.	FortisBC, Inc.	British Columbia Utilities Commission	N/A
2005	Manitoba Hydro	Manitoba Hydro	Manitoba Public Utilities Board	N/A

YEAR	CLIENT	APPLICANT	REGULATORY BOARD	PROCEEDING NUMBER
2005	New Brunswick Board of Commissioners of Public Utilities	New Brunswick Power Distribution and Customer Service Company	New Brunswick Board of Commissioners of Public Utilities	N/A
2005	Northland Utilities (NWT) Inc.	Northland Utilities (NWT) Inc.	Northwest Territories Utilities Board	N/A
2005	Northland Utilities (Yellowknife) Inc.	Northland Utilities (Yellowknife) Inc.	Northwest Territories Utilities Board	N/A
2005	NOVA Gas Transmission Ltd.	NOVA Gas Transmission Ltd.	Alberta Energy and Utilities Board	1375375
2005	City of Red Deer	City of Red Deer Electric System	Alberta Energy and Utilities Board	1402729
2005	Yukon Energy Corporation	Yukon Energy Corporation	Yukon Utilities Board	N/A
2006	AltaLink LP	AltaLink LP	Alberta Energy and Utilities Board	1456797
2006	BC Hydro	BC Hydro	British Columbia Utilities Commission	N/A
2006	Imperial Oil Resources Ventures Limited	McKenzie Valley Pipeline Project	National Energy Board of Canada	GH-1-2004
2007	Enbridge Pipelines Limited	Enbridge Pipelines Limited	National Energy Board of Canada	RH-2-2007
2007	FortisAlberta Inc.	Fortis Alberta Inc.	Alberta Energy and Utilities Board	1514140
2007	Kinder Morgan	Terasen (Jet fuel) Pipeline Limited	British Columbia Utilities Commission	N/A
2008	ATCO Electric	Yukon Electrical Company Limited	Yukon Utilities Board	N/A
2008	ATCO Gas	ATCO Gas	Alberta Utilities Commission	1553052
2008	City of Lethbridge Electric System	City of Lethbridge	Alberta Utilities Commission	N/A
2008	ENMAX Power Corporation	ENMAX Power Corporation	Alberta Utilities Commission	1512089
2008	Heritage Gas Ltd.	Heritage Gas Ltd.	Nova Scotia Utility and Review Board	N/A
2009	AltaGas Utilities Inc.	AltaGas Utilities Inc.	Alberta Utilities Commission	N/A
2009	Fortis Alberta Inc.	Fortis Alberta, Inc.	Alberta Utilities Commission	1605170
2010	ATCO Electric	ATCO Electric	Alberta Utilities Commission	1606228
2010	Enbridge Pipelines Limited· Line 9	Enbridge Pipelines Limited - Line 9	National Energy Board of Canada	N/A
2010	Gazifere	Gazifere	La Regie de L'Energie	R-3724-2010
2010	Kinder Morgan	Kinder Morgan	National Energy Board of Canada	N/A

YEAR	CLIENT	APPLICANT	REGULATORY BOARD	PROCEEDING NUMBER
2010	Pacific Northern Gas	Pacific Northern Gas	British Columbia Utilities Commission	N/A
2011	AltaGas Utilities Inc.	AltaGas Utilities Inc.	Alberta Utilities Commission	1606694
2011	AltaLink LP	AltaLink LP	Alberta Utilities Commission	1606895
2011	ATCO Electric	Northland Utilities (NWT) Inc.	Northwest Territories Utility Board	N/A
2011	ATCO Gas	ATCO Gas	Alberta Utilities Commission	1606822
2011	FortisAlberta Inc.	Fortis Alberta Inc.	Alberta Utilities Commission	1607159
2011	FortisBC Energy, Inc.	FortisBC Energy, Inc.	British Columbia Utilities Commission	3698627
2011	GazMetro	GazMetro	La Regie de L'Energie	R-3752-2011
2011	Heritage Gas Ltd.	Heritage Gas Ltd.	Nova Scotia Utility and Review Board	N/A
2011	Qulliq	Qulliq	Utilities Rates Review Council	N/A
2011	SaskPower	SaskPower	Internal Review Committee	N/A
2011	TransAlta Utilities Corporation	TransAlta Utilities Corporation	Municipal Government Board of Alberta	N/A
2012	City of Red Deer	City of Red Deer	Alberta Utilities Commission	1608641
2012	Enbridge Gas Distribution Inc.	Enbridge Gas Distribution Inc.	Ontario Energy Board	EB 2011-0345
2012	FortisBC, Inc.	FortisBC, Inc.	British Columbia Utilities Commission	3698620
2012	Manitoba Hydro	Manitoba Hydro	Manitoba Public Utilities Board	2013/2013 GRA
2012	Newfoundland and Labrador Hydro	Newfoundland and Labrador Hydro	Newfoundland and Labrador Board of Commissioners of Public Utilities	N/A
2012	Northwest Territories Power Corporation	Northwest Territories Power Corporation	Northwest Territories Public Utilities Board	N/A
2012	TransCanada Pipelines Limited	TransCanada Pipelines Limited	National Energy Board of Canada	RH-003 -2011
2013	AltaLink LP	AltaLink LP	Alberta Utilities Commission	1608711
2013	lntraGaz Incorporated	lntraGaz Incorporated	La Regie de L'Energie	R-3807-2012
2013	Yukon Electrical Company Limited (YECL)	Yukon Electrical Company Limited (YECL)	Yukon Utilities Board	2013-2015 GRA

YEAR	CLIENT	APPLICANT	REGULATORY BOARD	PROCEEDING NUMBER
2014	Enbridge Gas Distribution	Enbridge Gas Distribution	Ontario Energy Board	EB-2012-0459
2014	ENMAX Power Corporation	ENMAX Power Corporation	Alberta Utilities Commission	1609674
2015	AltaLink LP	AltaLink LP	Alberta Utilities Commission	Proceeding 3524
2015	EPCOR Distribution & Transmission	EPCOR Distribution & Transmission	Alberta Utilities Commission	Proceeding 20407
2015	FortisBC Energy, Inc.	FortisBC Energy, Inc.	British Columbia Utilities Commission	N/A
2015	FortisBC, Inc.	FortisBC, Inc.	British Columbia Utilities Commission	N/A
2015	GazMetro	GazMetro	La Regie de L'Energie	N/A
2015	Manitoba Hydro	Manitoba Hydro	Manitoba Public Utilities Board	2014/15 & 2015/16 GRA
2015	Newfoundland and Labrador Hydro	Newfoundland and Labrador Hydro	Newfoundland and Labrador Board of Commissioners of Public Utilities	N/A
2016	ATCO Electric	ATCO Electric	Alberta Utilities Commission	Proceeding 20272
2017	NALCOR	NALCOR	Newfoundland Public Utilities Board	Settled
2017	TransCanada Pipelines Limited – Mainline Facilities	TransCanada Pipelines Limited – Mainline Facilities	National Energy Board of Canada	RH-1-2018
2017	TransCanada Pipelines Limited – NGTL Facilities	TransCanada Pipelines Limited – NGTL Facilities	National Energy Board of Canada	RH-001-2019
2018	WestCoast Transmission System	WestCoast Transmission System	National Energy Board of Canada	Settled
2018	ATCO Electric	ATCO Electric	Alberta Utilities Commission	Proceeding 24195
2018	ATCO Gas	ATCO Gas	Alberta Utilities Commission	Proceeding 24188
2018	SaskEnergy Inc.	SaskEnergy Inc.	Saskatchewan Review Board	N/A
2018	SaskPower	SaskPower	Saskatchewan Review Board	N/A
2018	AltaGas Utilities Inc.	AltaGas Utilities Inc.	Alberta Utilities Commission	Proceeding 24161
2018	AltaLink LP	AltaLink LP	Alberta Utilities Commission	Proceeding 23848
2018	FortisBC Energy Inc.	FortisBC Energy Inc.	British Columbia Utilities Commission	N/A
2018	FortisBC Inc.	FortisBC Inc.	British Columbia Utilities Commission	N/A

YEAR	CLIENT	APPLICANT	REGULATORY BOARD	PROCEEDING NUMBER
2019	Capital Power Corporation	Capital Power Corporation	Municipal Government Board of Alberta	N/A
2019	TransAlta Corporation	TransAlta Corporation	Municipal Government Board of Alberta	N/A
2019	Trans Mountain Pipeline ULC	Trans Mountain Pipeline ULC	Canadian Energy Regulator	T260-2019-04-01
2019	NB Power	NB Power	New Brunswick Energy Utility Regulator	Pending
2019	ATCO Electric	ATCO Electric Transmission	Alberta Utilities Commission	Proceeding 24964
2020	Enbridge Pipelines Inc.	Enbridge Pipelines Inc.	Canada Energy Regulator (CER)	RH-001-2020
2021	Ontario Power Generation	Ontario Power Generation	Ontario Energy Board	N/A
2021	AltaLink L.P	AltaLink L.P	Alberta Utilities Commission	Proceeding 26059
2022	Enbridge Gas Inc.	Enbridge Gas Inc.	Ontario Energy Board	EB-2022-0200
2022	IntraGaz LP	IntraGaz LP	La Regie de L'Energie	R-4189-2022
2022	BC Hydro	BC Hydro	British Columbia Utilities Commission	Project 1599243
2022	Manitoba Hydro	Manitoba Hydro	Manitoba Public Utilities Board	Manitoba Hydro 2023/24 & 2024/25 General Rate Application
2023	Pacific Northern Gas	Pacific Northern Gas	British Columbia Utilities Commission	Application No. PNG NE2023 to 2024 RRA

COMMONWEALTH OF KENTUCKY
BEFORE THE PUBLIC SERVICE COMMISSION

IN THE MATTER OF:

ELECTRONIC APPLICATION OF KENTUCKY-	**)**	
AMERICAN WATER COMPANY FOR AN	**)**	
ADJUSTMENT OF RATES, A CERTIFICATE	**)**	
OF PUBLIC CONVENIENCE AND NECESSITY	**)**	**CASE NO. 2023-00191**
FOR INSTALLATION OF ADVANCED METERING	**)**	
INFRASTRUCTURE, APPROVAL OF CERTAIN	**)**	
REGULATORY AND ACCOUNTING	**)**	
TREATMENTS, AND TARIFF REVISIONS	**)**	

DIRECT TESTIMONY OF WILLIAM A. LEWIS

June 30, 2023

INTRODUCTION

Q. Please state your name and business address.

A. William A. Lewis. My business address is 2300 Richmond Road, Lexington Kentucky 40502.

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

A. I am employed by Kentucky-American Water Company ("KAWC," "Kentucky-American" or "Company") as the Vice President of Operations.

Q. Have you previously filed testimony before this Commission?

A. Yes, I testified before the Kentucky Public Service Commission ("Commission") on behalf of Kentucky-American in the metering practices investigation case (Case No. 2022-00299).

Q. Please state your educational and professional background and state whether you are a member of any professional organizations.

A. I received a Bachelor of Science degree in Education from Miami University, Oxford, Ohio. I began my career in 1996 as a Department of Public Works Utility Worker for the City of Loveland, Ohio. In 2001 I went to work for the Jefferson Regional Water Authority in Miamisburg, Ohio as the Superintendent/General Manager, where I was responsible for managing the water utility and reported directly to the Board of Trustees. In 2006, I was hired by American Water, Military Services Group as the Utility Manager at Fort Leavenworth, Kansas. I managed all water and wastewater operations and capital programs in support of a federal 50-year Operations & Maintenance contract under the United States

Department of Defense ("DoD") Utilities Privatization program. In 2007 I was promoted to Regional Manager and oversaw the operations, capital programs and administered the contracts for Fort Leavenworth Fort Sill in Oklahoma; Fort Hood in Texas and Scott Air Force Base ("Scott AFB") in Illinois. In 2011, I served as the Regional Manager of Capital Programs for Scott AFB, Fort AP Hill in Virginia, and Fort Meade in Maryland. In 2013, I was promoted to Director of Technical Support, where I oversaw technical operational and capital support of all Military Services operations including new field technology, capital practices, and performed due diligence activities in support of business development programs. In 2014, I was promoted to Director of Growth and Development. In 2018, I transferred from the Military Services Group to New Jersey-American Water Company serving as the Sr. Director of Operations for the North operating region. In that role, I was responsible for utility operations and Distribution System Improvement Charge ("DSIC") delivery for the approximately 95,000 connections in the North operating region. In 2019, I transferred to New Jersey American Water's Central operating region as Sr. Director of Operations. In this role, I was responsible for operations and DSIC delivery for the approximately 220,000 connections in the region. In November 2022, I was promoted to my current role as Vice President of Operations for Kentucky-American. I am a member of the American Water Works Association and am a member of the American Water Works Association ("AWWA") KY/TN Section Water Utility Council. I hold a Kansas Class 3 water treatment License.

Q. What are your responsibilities as Vice President of Operations?

A. I am responsible for all operations of KAWC, which includes treating and furnishing potable water; collecting, treating, and discharging wastewater; and providing customer service. I oversee the safety and continuity of the Company's operations; the Company's water quality efforts; and the upkeep and maintenance of the Company's facilities. I manage a team of approximately 132 professionals that provide high quality water and wastewater service to KAWC customers.

Q. What is the purpose of your testimony in this proceeding?

A. The purpose of my direct testimony is to describe KAWC's operations and discuss our commitment to water quality, health and safety, and our continuing efforts to improve water efficiency. My testimony also addresses certain costs and employee compensation.

KAWC FACILITIES AND OPERATIONS

Q. Please describe the Company's operations and the facilities and property that KAWC utilizes to provide water service to customers.

A. KAWC provides water utility service to over 137,000 customers in all or portions of 14 Kentucky counties. The Company's service territory is divided into three operating districts serving the following counties: the Central District is composed of Bourbon, Clark, Fayette, Harrison, Jessamine, Nicholas, Scott and Woodford counties; the Northern District is composed of Owen, Gallatin, Grant and Franklin counties; and the Southern District is composed of Rockcastle and Jackson counties KAWC also transmits water to ten bulk water customers from various points in the distribution system.[1] KAWC's utility

[1] The bulk water customers are Jessamine South Elkhorn Water District, the City of Nicholasville, the Georgetown Municipal Water and Sewer Service, the City of Versailles, the City of Midway, the City of North Middletown, East Clark County Water District, the Harrison County Water Association, Nicholas County Water District and Peaks Mill Water District.

plant accounts include land and land rights, structures and improvements, collecting and impounding reservoirs, wells, pumping equipment and associated facilities, purification plant and equipment, transmission and distribution mains, distribution storage facilities, service lines, manholes, meters, hydrants and other facilities, including materials and supplies.

Q. Please describe KAWC's water treatment and distribution system assets.

A. KAWC currently operates three water treatment facilities that provide treated water to retail and bulk water customers. These are the Kentucky River Station I ("KRS I"), the Kentucky River Station II ("KRS II") and the Richmond Road Station ("RRS"). The combined treatment capacity at these facilities is 85 million gallons per day ("MGD") – 40 MGD at KRS I, 25 MGD at RRS, and 20 MGD at KRS II. KAWC withdraws water from Pool 9 of the Kentucky River for KRS I and RRS. An intake pumping facility at river level withdraws water and pumps the raw water up a 380-foot bluff. The raw water is then directed to the KRS I treatment plant and may also be directed through a pipeline to the RRS treatment plant or the Jacobson Reservoir. The RRS may utilize raw untreated water supplied directly from the Kentucky River pipeline or withdraw water from the Jacobson Reservoir, located on US 25 south of Lexington. On an emergency basis, RRS has the capability to withdraw water from Lake Ellerslie, located on Richmond Road next to the RRS. KAWC withdraws water from Pool 3 of the Kentucky River for KRS II. River water is pumped up a steep bluff (approximately 300 feet) to the water treatment facility. KAWC's treatment facilities utilize a chemical-mechanical process. Both RRS and KRS II utilize a conventional coagulation and sedimentation process, followed by filtration through sand filters. RRS also employs granular activated carbon as an additional filter media. KRS I has an up-flow solid contact process followed by filtration through mixed media high rate filters. The KRS I, KRS II and RRS facilities use chloramination to maintain residual disinfectant within the distribution system. Each facility is fully staffed by water treatment plant operators certified by the Kentucky Division of Water. KAWC's treatment facilities meet or surpass all federal and state water quality regulations.

Pumps transport the water from the treatment facility to the distribution system for delivery to the customer's home or business. The pumping stations move water 24 hours a day using appropriately sized pumps, pipes and power sources to drive the pumps. This sophisticated equipment requires regular maintenance and upgrades.

Water in our distribution systems travels through over 2,352 miles of Company owned water mains and approximately 90 miles of private mains[2] through a network of pipes that deliver water across cities, towns, subdivisions and neighborhoods to homes, businesses, industrial plants and a multitude of other destinations. To ensure that adequate water quantity and pressure is conveyed where it needs to go, engineers run computer simulations of the hydraulic activity of the water to determine proper pressure, pipe sizing, and other factors (a fire hydrant, for example, will require different flow and pressure characteristics and larger piping than will water for residential use). Before it gets to where it is needed, water may be stored in our 28 storage tanks with a combined capacity of approximately 27.2 million gallons. The Company also maintains approximately 9,963 fire hydrants throughout its distribution system. To reach the far ends of our system or our higher

[2] Private mains are mains that are owned and maintained by a private entity such as a farm, apartment complex, or commercial property.

elevations, water may travel through one of our booster pump stations. Collectively across the communities that we serve in Kentucky, we deliver an average of 43 million gallons of water every day.

Q. What is the condition of KAWC's utility property?

A. KAWC maintains its water utility properties in good operating condition for the rendering of water service. The reports of inspections conducted by the Kentucky Division of Water ("KYDOW") confirm the Company's operations are in compliance with state and federal drinking water laws and regulations. Shelley Porter's Direct Testimony contains information regarding the Company's capital investment activities that are also critical to the continued provision of safe and adequate water utility service.

WATER QUALITY AND SAFETY

A. Commitment to Water Quality

Q. Please discuss KAWC's commitment to water quality.

A. KAWC has provided water service to customers for over 130 years. We are acutely aware that water is the only utility intended for customers to ingest and that customers rely on KAWC to provide them with safe and reliable water service. Water quality is important to the health and well-being of customers. The Company's water quality program is designed to enable the Company to comply with all drinking water quality, water pollution, residuals management, air pollution and hazardous materials laws and regulations, and KAWC has not received any Notice of Violations since 2015. Beyond health and safety, we know that KAWC's customers are also interested in the aesthetic qualities of the water that we treat and deliver to them. We proactively look for ways to optimize treatment capabilities to continue to improve the overall quality of drinking water and strive to create operational efficiencies that also benefit customers.

Q. What are some of the efforts the Company undertakes to monitor and protect source water?

A. The Company monitors source water entering our treatment plants and measures parameters such as turbidity, pH, alkalinity, hardness, dissolved oxygen, and conductivity to establish daily treatment strategies. In addition to sampling performed manually at our water sources, all three of our water treatment plants utilize online automated water quality analyzers that are regularly monitoring water quality at our intakes and feeds that information to our SCADA system. This process allows for a constant source of raw water quality data that can be monitored electronically alerts can be triggered when certain water quality parameters fall outside of established parameters. The main purpose is to detect changes in source water chemistry that would indicate a potential contamination of the source water entering our plant intake. Early detection enables operators to take timely protective actions, including additional treatment.

KAWC also uses WaterSuite, a map-based tool that collects information about potential sources of contamination from various sources and pulls it into a database for a defined area of concern. The database is updated on a regular basis to include the latest available information and has search and reporting capabilities. In the event of a confirmed spill or contaminant release within the watershed, the Company participates with organizations, such as the Ohio River Valley Water Sanitation Commission ("ORSANCO"), to communicate spills and contamination events throughout the water utility community so that emergency response planning can be coordinated.

Lastly, the Company promotes source water protection through community education campaigns, funding of environmental grants that have positive impact to watershed protection, and participation on professional boards and committees that influence watershed policies.

Q. Please describe the Company's water quality testing program.

A. KAWC routinely tests water in its systems to determine if it is meeting the safety standards established by the federal and state regulatory authorities. Our drinking water is tested both before and after treatment to confirm that it satisfies chemical and bacteriological criteria. To help protect the public health, we have multiple barriers in the treatment process to help prevent contamination from reaching our customers. We test for presence of synthetic organic chemicals, inorganic chemicals, volatile organic chemicals, radionuclides, bacteria, disinfection byproducts, and all other contaminants that the regulators require us to monitor at the frequency prescribed by the federal and state regulations and report the results of this testing to the KYDOW, a division of the Kentucky Energy and Environment Cabinet (KYEEC), in accordance with the regulations. In addition, the Company works with our customers to collect and analyze samples for compliance with the Lead and Copper Rule and has begun sampling for perfluoroalkyl and polyfluoroalkyl substances.

As discussed more fully below, water quality regulations have become more stringent since the Company's last rate case requiring additional tracking, monitoring, and reporting. In 2022, KAWC collected and analyzed more than 1,000,000 water chemistry, physical water properties, and routine bacteriological samples. These samples include those taken to assess process effectiveness, and monitor emerging contaminant threats. We also collect other bacteriological samples as needed in response to main breaks and similar emergencies.

Q. What regulations govern the quality and quantity of water service provided by KAWC?

A. Water supply utilities are subject to a complex array of regulations at the federal, state, and local levels with respect to water quantity, water quality and other environmental aspects of their facilities and operations. Drinking water quality is addressed by a combination of federal regulations under the Safe Drinking Water Act of 1973, the federal act that established the United States Environmental Protection Agency ("EPA") as the federal regulatory body governing drinking water. Pursuant to that authority, the EPA has established standards for contaminant levels in drinking water, mandatory treatment methods, monitoring and reporting requirements, and public notification mandates in the event of contaminant level or treatment method noncompliance. The EPA has granted primacy to KYEEC and KYDOW to administer the federal regulatory standards for water systems in Kentucky.

Q. What are some of the new and emerging environmental standards for drinking water quality that will require enhancements or improvements in water treatment facilities and distribution systems?

A. There was a revision to the Lead and Copper Rule ("LCRR") published on January 15, 2021. The revision includes several new requirements including: (1) establishing, and submitting to the EPA, a distribution system inventory of service line material by October 16, 2024 and annually thereafter for both the utility and customer side of the service line;

(2) the inventory must be published online with specific identifiers noting galvanized and lead service lines when and where present; (3) updated requirements for notifying persons served by the water system at the service connection with a lead, galvanized or unknown service line; (4) implementation of the revised method of lead and copper sampling using the 5-liter method; (5) required annual replacement of at least 7% of the initial number of lead service lines identified in the inventory if the Action Level is exceeded; and (6) annual testing of all schools and registered child care facilities within the distribution system at intervals determined by the results of the new testing method. The LCRR also requires, by October 16, 2024, all water systems with one or more lead, galvanized requiring replacement, or lead status unknown service lines in their distribution system to submit a lead service line replacement plan to the State.

The Long Term 2 Enhanced Surface Water Treatment Rule ("LT2ESWTR"), promulgated in 2006, required many years of source water sampling to determine adequacy of existing treatment for Cryptosporidium. Based upon final source water characterization, surface water systems where classed into "BINs" ranging from 1-4 where BIN 1 requires no additional treatment and BIN 4 requires up to 2.5-LOG of additional removal treatment. KAW's treatment plants have received a BIN-2 classification that requires 1-LOG of additional Cryptosporidium treatment. The required additional treatment will be provided by installing ultraviolet light disinfection treatment at all three of the KAWC surface water treatment plants. The 1996 Safe Drinking Water Act ("SDWA") amendments require that once every five years the EPA issue a new list of no more than 30 unregulated contaminants to be monitored by public water systems. The fifth Unregulated Contaminant Monitoring Rule ("UCMR 5") was published in the Federal Register on December 27, 2021. UCMR

5 requires testing of 30 identified contaminants for specified periods of time within the 2023 to 2025 timeframe.

In 2021, the EPA issued two actions to address per- and polyfluoroalkyl substances ("PFAS") in drinking water.[3] KAWC has already begun sampling for PFAS. More recently, the EPA has proposed Maximum Contaminant Level standards to limit six PFAS chemicals in drinking water.[4] In order to remove PFAS from drinking water, additional treatment technologies would likely be required at existing KAWC water treatment facilities. A determination of what technologies to employ if PFAS compounds are present will require a review of the effectiveness of each technology and an analysis of the costs and operational feasibility for each location. However, testing for PFAS, to date, has not identified the need for treatment at any KAWC water treatment plants to meet the proposed EPA MCLs. Testing will continue under UCMR 5 and Company initiated testing.

When changes in regulations make it necessary to modify treatment processes, water quality staff works with staff from engineering and operations to identify, design, and implement the modifications so that the water leaving the plants and traveling through the distribution system continues to meet service and regulatory requirements. We are also committed to playing an active role and contributing to policies and regulations that affect sources of drinking water. We review and provide feedback on applicable permits and

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[3] Contaminants of Emerging Concern Under the Clean Water Act, November 29, 2021 and Federal Role in Responding to Potential Risks of Per- and Polyfluoroalkyl Substances (PFAS), August 10, 2022 available at https://crsreports.congress.gov/product/pdf/R/R45998 and https://crsreports.congress.gov/product/pdf/R/R45986.

proposed regulations supporting state and local measures that balance watershed management with economic growth.

Q. Please discuss KAWC's participation with the Partnership for Safe Water.

A. The Partnership for Safe Water ("Partnership") is an alliance of six organizations[5] with a mission to improve the quality of water delivered to customers by optimizing water system operations. All three of KAWC's water treatment plants have been recognized for optimization and water quality achievements. In 2023, KAWC will be recognized at the American Water Works Association Annual Conference & Expo ACE23 for achieving the following program milestones: Kentucky River II 5 Year Directors Award; Kentucky River Station 25 Year Directors Award; and the Richmond Road Station 25 Year Directors Award.

Q. Is there any other external validation of the success of KAWC's water quality programs?

A. Yes. The KRS II water treatment plant was recognized each of the last 5 years by the Kentucky Energy and Environment Cabinet for optimized drinking water treatment plant performance for turbidity. The RRS water treatment plant achieved this recognition in 2018, 2019, and 2020. In meeting these goals, we helped provide customers with protection against waterborne disease extending above and beyond regulatory

[5] Partnership organizations include EPA, the American Water Works Association ("AWWA"), Association of State Drinking Water Administrators ("ASDWA"), Association of Metropolitan Water Agencies ("AMWA"), National Association of Water Companies ("NAWC") and the Water Research Foundation ("WRF").

requirements. This achievement signifies a commitment to the standards of excellence that are at the heart of the EPA Area-Wide Optimization Program. In 2020, KAWC was recognized by the Centers for Disease Control with the Water Fluoridation Quality award. In 2022, Kentucky-American was recognized with the KY/TN Section AWWA award of excellence for Large Distribution System of the year.

B. Commitment to Safety

Q. Please describe KAWC's overall commitment to safety.

A. The health and safety of our employees and customers is important to our Company and critical to our success. Our co-workers', contractors', and customers' safety is vital, and we focus on it every day. We strive to ensure that the communities we serve are kept safe and that every KAWC employee chooses safety in every job. With the safety of our employees, customers, contractors, and the public in mind, we approach safety with a focus on continuous improvement through the implementation of proactive initiatives, plans, practices, and processes that complement and sustain a robust workplace safety program. KAWC is also committed to securing assets across our system and recognizes the importance of protecting our water sources, treatment plants, infrastructure, and data from malevolent acts, as demonstrated by our robust security and cyber security programs. In addition, the Company's emergency response program demonstrates the Company's recognition that rapid response and recovery from security breaches and all other types of incidents are critical to maintaining the water and wastewater systems.

Q. How is safety an important part of KAWC's operational performance?

A. The Company considers the health and safety of our employees to be a core value as well as a strategy. We are committed to this value through a proactive and robust health and safety program. Our overall goal is to have no employee injured at or away from work as well as to maintain safety and security for our customers as well as contractors. A safe workplace increases employee morale, increases our commitment to one another, and in the long run makes for a more engaged and productive workforce.

Q. Please describe KAWC's safety program and operations' role in promoting safety and a safe working environment at KAWC.

A. KAWC has implemented a variety of safety initiatives to empower employees to act, provide relevant training and equipment, enhance employee engagement and communication, and address safety issues as they arise.

- Employee empowerment: Operational safety begins with employee empowerment. If an employee sees an unsafe behavior or condition, the employee has a responsibility to stop work until the safety issue can be resolved. KAWC managers reinforce this policy through communication to employees during meetings. The use of stop work authority is now tracked across the Company and is considered a leading indicator of a successful safety program. KAWC also empowers employees by encouraging the reporting of safety "near misses," and likewise emphasizes this reporting as a performance metric.[6]

[6] The Company launched its near miss reporting program in 2015. Near Miss reporting involves employees identifying a situation that almost, or could have, resulted in an injury or accident. For example, if a piece of equipment becomes worn outside of a regular maintenance cycle, an employee reports this as a near miss so KAWC can replace the worn part and avoid a potential injury from an equipment malfunction.

During 2022, there were 333 near misses reported by KAWC employees. These near misses are evaluated, and a correction plan is initiated within thirty days of the report. Information about "near misses" is shared throughout the organization. Near miss reporting empowers KAWC employees to use their knowledge of near misses to remain vigilant of potential safety issues and continue to improve safety. The overall goal of the near miss program is to have employees engaged in their work, identifying hazards, and empowering them to correct these hazards. Our near miss program reduces the potential for injury not only to our employees but our customers and the public as well.

- *Training* - All employees are provided safety training every year. Curriculum typically includes topics such as emergency action plans, slips, trips & fall prevention, trenching and shoring, excavation, first-aid, chlorine safety, electric hazards, and traffic management/flagging. Each employee is assigned a specific annual safety training curriculum to match their current job classification. In 2022, the Company provided over 5,627 hours of safety-related training for its employees. .
- *Certified Safe Worker Program* - KAWC organizes and promotes a certified safe worker program, where employees certify they have completed or demonstrated specific safety actions in areas such as health screenings, safety training (including pre-job stretching, CPR/First Aid, stop work authority), submitting safety improvement suggestions, and practicing safety at home. In 2022, approximately 78% of employees completed the criteria to become a Certified Safe Worker. Beyond this, the Company promotes employee training in CPR and First Aid so they can keep their coworkers, families, and our community safe.

- *Personal protective equipment* **-** KAWC provides every employee with the tools and equipment to do their jobs safely. All employees are issued personal protective equipment ("PPE") appropriate to their specific job role to minimize exposure to hazards that cause serious workplace injuries and illnesses. The Company has further reviewed and expanded its use of PPE providing new signage and clear guidance on the PPE needed for different tasks.
- *Site safety inspections* – Safety staff and front-line supervisors regularly visit operational facilities, as well as construction sites, to perform safety inspections. In addition to these routine safety inspections, each of our water and wastewater facilities undergo a quarterly health, safety & environmental walk through with a focus on safety and environmental compliance.
- *Contractor safety* - Contractor safety guidelines are included in KAWC contracts. KAWC contractors must submit safety performance information to demonstrate their commitment to a safe work environment, and contractors with poor safety performance or that don't have a safe work program are disqualified from doing business with KAWC.
- *KAWC Safety Committees* - Every operating area has a council comprised of managers and front-line employees that meet regularly to review accidents, evaluate how to avoid them, and agree on procedural changes to help prevent them in the future.
- *Emergency preparedness and response* – KAWC's emergency response plans consist of an overarching manual paired with facility-specific plans that include local personnel and contacts, emergency action plans, roles and responsibilities, communication protocols, emergency contacts, mutual aid agreements, water and power contingencies,

and accessible equipment and services. KAWC conducted Risk & Resiliency workshops in accordance with the ANSI/AWWA J-100 Standard and incorporated the findings into our Emergency Response Plans. KAWC conducts annual exercises and leadership staff are trained in the National Incident Management System for responding to incidents.

- *Internal chemical management* - KAWC raises employee awareness around potential safety and environmental impacts of onsite chemical handling. KAWC manages a robust aboveground storage tank program including regular inspections and state and federal spill prevention plans to help reduce the risk of spills in our operations and increase employee safety.

The Company has also reviewed its water treatment process at each of its facilities. As mentioned previously, we currently use chloramination, which is a very effective disinfectant process for the safe treatment of our water. The original process used chlorine gas and anhydrous ammonia. An atmospheric release of the chlorine and ammonia gases could pose a risk to our employees and the surrounding communities. As of the date of this filing, the chlorine and anhydrous ammonia gas systems have been replaced with sodium hypochlorite and liquid aqueous ammonia at both the Richmond Road Station and Kentucky River Station 1 WTPs. Our capital plan also includes the removal of chlorine gas and replacement with sodium hypochlorite at the KRS2 water treatment plant in 2026. These changes have reduced the risk to our employees and the surrounding communities in the event of a chemical release.

We also continue to look at other portions of our operations for safety improvements. For example, as we evaluate future upgrades and replacements of booster stations and underground vault structures, we are choosing designs that eliminate employee risks due to confined space. In addition, we are evaluating our existing vaults for safety improvements to mitigate safety hazards including fall protection, electrical hazards, ventilation, and structural deficiencies. In 2017, we instituted a limitation of 16 consecutive hours for our work crews. This new work rule was based on a US Department of Transportation study that demonstrated the unfavorable safety impact of extended long-hour shifts. Our new policy mandates that relief crews be made available within 16 hours (or sooner if requested) for any individual or work crew. The policy also requires 8 hours of rest before returning to work. We believe this policy positively impacts our employee's safety and demonstrates our commitment to safety. The current collective bargaining agreement, ratified in 2022, has been amended to include this requirement.

Q. How does KAWC measure its safety performance?

A. The Company uses a mix of leading and lagging indicators to measure its safety performance. The Company's near miss reporting program is an important leading indicator, while other performance safety metrics are considered lagging indicators. The OSHA Recordable Incident Rate ("ORIR") is a key metric we use to gauge the effectiveness of our safety program. It considers the number of recordable injuries occurring during a specified time frame (e.g., month, quarter, year) and the total number of hours worked by all employees during that same period.[7] American Water establishes a safety target annually to drive continuous improvement (i.e., reduced injury rates). The

[7] The exact methodology for these rates comes from the Department of Labor https://www.bls.gov/iif/osheval.htm.

target is based on a variety of factors, including historical performance and rate of improvement and safety performance data for both utility and non-utility industries (as reported by the Department of Labor). The Company tracks employees' Days Away Restricted or Transferred ("DART") safety metric. DART incorporates a measurement of the severity of an injury by looking at the impact of the injury on the employee. The Company's goal is to eliminate injuries, however, when injuries do occur, the Company uses both the ORIR and the DART trending to track both the number and severity of injuries~~.~~

Q. How do you know that commitment is working?

A. We are building a strong safety culture at KAWC, and our year-over-year safety performance indicates that KAWC's commitment to safety has been effective. In 2015 the Company had fifteen recordable injuries, fourteen of which resulted in days away or restricted time. In 2022, we had a total of three recordable injuries, two of which resulted in days away or restricted time. In eight years, the Company has reduced our total recordable injuries by 80% and reduced our severe injuries by 93%. The Company has demonstrated success and progress in its safety performance and is committed to further improving its safety performance.

Q. Why should the Commission be interested in the Company's emphasis on (and investment in) employee safety?

A. For several reasons. First, a safety-first commitment is the right thing to do, and it speaks to the core values and commitments of KAWC. We care about the well-being of our employees. Second, the Company's know-how in this area is an example of the value of the Company's relationship with the Service Company. The Company is able to benefit from best practices and enterprise-wide initiatives (like near miss reporting and the Certified Safe Worker program) and has access to Service Company expertise. Finally, it is worth noting that the Company has expanded its safety investments and broadened its employee training while still managing its O&M expenses. In other words, the time and energy we devote to safety has not come at the cost of efficiency or the value we provide to our customers – in my view, our safety commitments have only enhanced that value.

OPERATING AND MAINTENANCE EXPENSE

Q. What level of O&M expense is the Company seeking in this case?

A. KAWC is seeking recovery of approximately $46.5 million in O&M expense for the forecasted test period, which represents the forecasted expense levels for the twelve months ending January 2025, which represents about a 6.21% percent annual increase from 2020 levels and about a 2.33% annual increase from 2010 levels, both of which are below the corresponding rate of inflation over the same period. Further, on a per customer basis the Company is only seeing compounded annual increase of 1.2% from 2010 through January 2025 and 5.3% from 2020 through 2025, again both of which are below the corresponding rate of inflation. The requested increases in O&M expense over these periods support the Company's efforts to continue providing high quality water service in the most cost-effective way to our customers in the long-term. KAWC's O&M pro forma adjustments proposed in this case are discussed in greater detail in the direct testimony of KAWC witness Mr. Watkins and Mr. Newcomb.

Q. Please explain some of the drivers of the Company's O&M expense increases since its last rate case.

A. KAWC's requested increase in O&M expense in this case is driven primarily by increases in production costs and staffing levels. The Company is requesting a moderate increase in O&M expense in order to continue providing high quality water service in the most cost effective way to our customers over the long term. Maintaining KAWC's facilities in accordance with safety, environmental and water quality standards require substantial capital investment and annual operations and maintenance expenditures by KAWC. The Company's proposed rates in this case are intended to recover the prudently incurred and just and reasonable level of KAWC's costs in meeting these requirements.

A. Production Costs

Q. **Please explain which operating expenses are considered production costs and how these costs are driving the Company's O&M expense increases in this case.**

A. KAWC's production costs include chemicals used to treat water, as well as power, waste disposal, and purchased water costs. The Company's production costs have almost doubled from the time that KAWC's present rates were set in 2019. In 2019, the Company's production costs were approximately $6.7 million and are projected to be approximately $12.3 million in the forecasted test year in this case. The significant increases in production costs since that last case result from chemicals (~$3.8M) and power (~$1.5M) cost increases. Chemical cost increases are driven by supply-side constraints that limited the supply of material, leading to longer lead times and higher prices as explained in the testimony of Company witness Thomas G. O'Drain. Power costs are the result of increases in Commission approved electricity rates. The pro forma adjustments to production costs in this case are explained in the Direct Testimony of KAWC witness John Watkins.

Q. What are some of the reasons for such significant increases in KAWC's chemical costs since the Company's last rate case?

A. As discussed by Direct Testimony of Thomas O'Drain, the increases in production costs in general and chemicals are not unique to KAWC but rather are national phenomena. The chemical market, for example, has seen price increases, driven by many factors including inflationary increases in commodity and transportation prices, higher energy prices and labor costs.

Q. What specific chemicals does KAWC use as part of its treatment processes?

A. Chemicals are, of course, a required component in water treatment. Without use of specific chemicals, the Company would be unable to provide safe water service as required by governmental regulations. Within its treatment processes, KAWC relies on multiple chemicals, grouped and summarized into categories as follows:

- Poly-Aluminum Chloride, Ferric Chloride, and various Polymers – used primarily in coagulation to separate compounds for filtration.
- Caustic Soda – used as corrosion control for the distribution system, and to regulate the acidity during water treatment by raising the pH of water.
- Chlorine Gas, Sodium Hypochlorite, and Permanganate – used primarily in disinfection and oxidation of naturally-occurring inorganic compounds, as well as to aid in the inactivation of potentially harmful microorganisms.

- Fluoride (Hydrofluosilicic acid, or "HFS") – added to drinking water because of its demonstrated effectiveness in preventing dental cavities.
- Lime – used to treat water hardness by removing minerals such as calcium and magnesium.
- Phosphates – used in the sequestration process to separate naturally occurring iron and manganese from groundwater supplies and to maintain water quality (inhibit corrosion, scale, biofilm, and reduce lead and copper levels) in the distribution system.
- Other Chemicals – various chemicals used in multiple stages, such as the addition of carbon to remove odor-producing compounds and to manage taste, or copper sulfate to treat reservoir raw water agal growth.

Q. Are there restrictions in KAWC's ability to change its chemical consumption based on price or supply pressure?

A. Yes. KAWC is required to comply with all drinking water quality, water pollution, residuals management, air pollution and hazardous materials laws and regulations. These compliance requirements preclude the Company from changing the suite of chemicals used in the Company's water treatment process based on price or supply pressure without making additional investments to change its operations. Water treatment requires the purchasing of the specific chemicals used in the process, and the Company cannot maintain its legal and regulatory compliance without them. Water treatment chemicals are a smaller part of the overall chemical market, and the chemicals KAWC uses are very carefully manufactured and transported to adhere to state mandated standards (NSF-60), and are consistent with the quality and specifications set forth by the American Water Works Association.

Q. How does Service Company Supply Chain support KAWC's efforts to mitigate production cost increases?

A. As described in the testimony of Company witness O'Drain, Supply Chain manages the bid process for KAWC's water treatment chemicals. By leveraging the volume of the entire American Water enterprise, Supply Chain has been successful in securing consistent access to chemicals required to operate the Company on more favorable pricing terms than KAWC could obtain independently. In addition, supply chain can leverage alternate suppliers or work with other American Water affiliates at times when chemical supply is limited. Supply Chain monitors the energy markets for buying opportunities and coordinates with KAWC to purchase both electricity and natural gas supply for use in system operations to minimize the unit price while also mitigating price risk from an extremely volatile energy market.

B. Staffing Costs

Q. Please discuss how KAWC staffs its business operations.

A. We recognize our duty to staff our business in a manner consistent with the provision of safe and adequate utility service. Not only does this require that we pay our employees at levels consistent with the market as discussed later in my testimony, but it also requires a constant evaluation of the right mix of internal and contract labor, straight time versus overtime, training programs, and technology. In this vein, we continue to evaluate costs and expenses going forward, always looking for the best solution for the unique and changing challenges we face. A large portion of our cost structure is for labor, and as a position becomes vacant in our organization, we look to the value of that position. We review the overall need for that position and consider, among other things, whether that work should be performed by internal or contract labor, and whether the position should be transferred to another area or modified. Cost control and improved business performance are the goals of these efforts. We continue to evaluate appropriate positions that KAWC will need to optimize new technology and most effectively serve our customers.

Q. Please summarize some of the operational challenges driving KAWC's O&M cost increases in this case.

A. Kentucky-American has experienced an increase in the number of utility locate requests over the past 5 years. Utility locating is currently performed using in-house staff and now requires more employees to be assigned to daily locating activities and required overtime expense to meet the current level of locates requested in accordance with the requirements set forth by the Kentucky One Call system than was assumed in our last rate filing. Kentucky-American entered into a short-term contract, on April 24, 2023, with a third-party vendor to perform locating services for a duration of 6 months. During this time, internal employees previously performing these duties will be reassigned to support other O&M requirements driven by our growth including, but not limited to, water loss prevention program, fire line and special connection water loss investigations, valve replacement, hydrant replacement, meter pit restorations, and other O&M related activities. This approach will be reevaluated after 6 months to determine its effectiveness. If found to be effective, Kentucky-American intends to continue this process efficiency. Specific staffing needs to support utility locating requirements was addressed in my earlier testimony.

In addition to utility locating, Kentucky-American water is required to administrate the cross-connection control program for our service areas. This includes the identification of existing backflow devices on customer services that meet certain risk levels of potential backflow into our water system, recording of annual inspections performed by third parties, and the physical on-site inspection of new devices. As explained in its Tariff Filing System request, Case No 2022-00425, Kentucky-American would like to utilize a contract American Water Works Company, Inc. signed with Backflow Solutions, Inc. (BSI) to serve as a third-party administrator of the existing annual certification process. As explained more fully in the testimony of witness Newcomb, Kentucky-American's tariff would need to be changed to allow for the possibility that customers could be asked to pay a processing fee (but not by Kentucky-American) for certification that their backflow device is compliant. This BSI fee includes the cost to outsource this work in lieu of adding employee resources.

IMPROVING WATER EFFICIENCY

Q. What is water efficiency?

A. In simple terms, water efficiency means using improved practices and technologies to deliver water service more efficiently. KAWC's efforts to improve water efficiency cover a wide range, and include supply-side practices, such as water loss reduction efforts, improved pump efficiencies, electrical cost management programs, chemical and waste disposal improvement projects, as well as demand-side strategies, such as customer efficiency and public education programs that provide incentives to improve water and energy efficiency. From an operations perspective, improving water efficiency requires achieving a cost-effective mix of prudent investments and improved operations and maintenance management capabilities targeting safety, customer satisfaction, sustainability, and system efficiency.

Q. Please discuss KAWC's efforts to improve water efficiency.

A. The Company's ongoing investment in technology enables a better end-to-end view of its water business. Improved water usage monitoring and leak detection, water quality monitoring, and consumer communications technology are just some of the benefits that result from the deployment of intelligent infrastructure, advanced communications, sensor networks and other technologies.

For instance, improved metering results in more accurate usage information and may increase employee efficiency. Leak detection programs can reduce the amount of water, pressure and energy required to deliver the same amount of water to customers' taps. KAWC has a comprehensive program to manage water loss and proactively promotes wise water use to customers, which can reduce customer demand. Annually, our teams take part in a variety of community events, environmental grant programs, and firefighter grant programs. These events provide our employees with an opportunity to meet with our customers and talk about water conservation, leak detection in our customers' homes, and other ways that customers can improve their water efficiency. KAWC has implemented a multi-faceted effort to educate and encourage residential customers on how they can lower their water bills by putting some simple practices in place around the home and fixing water leaks in a timely manner.

Striving for increased water efficiency is evident in our infrastructure investments, which include main and service replacements to provide a better, more reliable system. Prudent investment in technology enables us to leverage the size and scale of American Water to reduce manual tasks and increase automation. Additionally, our water efficiency efforts are demonstrated by investments in new metering and innovative data collection technologies, and by improved business processes that help us work smarter and more efficiently and, by extension, contribute to our cost control efforts.

Q. How is the concept of improving water efficiency relevant to this case?

A. Improving water efficiency not only reduces operations expense, but also is a more environmentally friendly way of conducting business. When water is used efficiently, it reduces capital and operating costs related to the provision of water service, while also helping to protect and preserve our natural resources. Improving water efficiency saves customers money in the long run, helps protect the environment, supports integrated resource planning, and enhances the economy.

Q. How is KAWC using technology to improve water efficiency?

A. KAWC is using technology to further enhance its preventative maintenance programs. Accurate electronic maps ensure that the institutional knowledge currently held by some of our employees is captured for use by current and future employees. To that end, we have loaded our facilities into a GIS system so that maps of KAWC's water systems are accessible online. GIS includes the location and a short description of the facilities, giving us an electronic spatial view of our entire system. GIS also helps us to locate customers that might be impacted by related service issues and allows us to communicate the impact more effectively with our customers. Since our last filing, our field utility crews are now equipped with GPS equipment and are acquiring GPS coordinates for all repairs, replacements, new valve and hydrant installations, and new service lines as the work is completed. This process ensures the accuracy of the GPS coordinates and quick updates to our overall GIS mapping as opposed to sending crews to perform this work at a later date, requiring multiple trips.

Work1View, our Customer Work Order System, was implemented since our last rate filing. This system is used by our field service representatives ("FSR") to manage customer facing service orders. The system is used to schedule appointments and provides the FSR with all the customer, premises, and meter information needed to work service orders efficiently in the field. The system is also used by our local management team and customer service representatives to dispatch FSRs to scheduled and emergency customer requests. These types of improvements will continue to drive a better customer experience and level of satisfaction.

Q. How can prudent capital expenditures improve water efficiency?

A. The Qualified Infrastructure Program ("QIP") enables us to develop and maintain a more systematic replacement program of our distribution mains throughout our service territory. The systematic replacement that QIP supports is more cost effective for customers in the long run because replacing our aging infrastructure will reduce likelihood of breaks and emergency situations that are not only costly to repair but also disrupt customer service.

Water Loss Control Program

Q. Please describe the Company's program to reduce water loss.

A. Reducing water loss is a complex issue with many contributing factors. As part of its water loss prevention program, the Company has been compiling and analyzing data as well as taking steps to identify, measure, prioritize, and mitigate both real and apparent water loss. The Company's efforts to reduce water loss include pressure management, accelerated infrastructure replacement, active leak detection, rapid response to breaks, fire service and water loss audits, and large meter testing and profiling. Water loss can be classified into two categories: (1) real loss which is water that escapes the distribution system from leaks or storage overflows; and (2) apparent loss due to meter inaccuracies, billing system data errors, and unauthorized consumption.

Q. Please describe some of the Company's efforts to mitigate real water loss?

A. The Company's water loss control interventions identify, measure, and mitigate real water loss by focusing on reducing leakage from transmission and distribution mains and leakage from customer service connections up to the point of customer metering.

- *Leak Detection.* KAWC is addressing real losses by enhancing its leak detection efforts throughout its distribution system. Kentucky-American is planning to deploy active acoustic monitoring devices on fire hydrants throughout our Central distribution system. These devices replace the existing hydrant steamer nozzle cap, do not interfere with the normal operation of the fire hydrant, and use a cell based communication to collect acoustical data that is then uploaded for acoustical analysis. After digital analysis of the acoustical data, points of interest in the distribution are assigned to our leak detection crews for acoustical correlation and leak sounding to pinpoint below grade leaks. This will help to reduce water loss from leaks that are not visually apparent, capture smaller leaks that may not be located through traditional methods, and identify leaks before they become larger thereby mitigating damage to below grade road infrastructure and adjacent properties.

- *Pressure Management.* Effective pressure management can help extend asset life, improve customer service, and reduce water losses and the risks of asset failure. KAWC has undertaken replacement projects to improve the operational efficiency of pumping at our water treatment facilities. This includes replacement of KRS I High Service Pump No. 13 with a high efficiency vertical turbine pump that is sized to better match flows with system demand, the replacement of High Service Pump No. 6 at the Richmond Road WTP with a high efficiency split face pump with a 90% efficient motor paired with a variable frequency drive ("VFD"), and planned replacement of KRS I Low Service Pump with an efficient vertical turbine pump.
- *QIP*. The replacement of aging infrastructure helps address real losses by replacing mains that are leaking or otherwise impaired. KAWC uses its integrated geographic information system ("GIS") mapping information as part of its comprehensive review of water main breaks to identify and better prioritize areas with an abnormally high main break frequency over a defined period. Main breaks are not only costly to repair, but may also impair water quality, disrupt service to customers and/or result in damage to KAWC property, customer property, and city streets. Being able to identify potential problem areas before main breaks occur could avoid failures, reducing the cost of repairs, restoration, and damage to other facilities or property. Witness Citron describes this further in her testimony.

Q. Please describe some of the Company's water loss control interventions employed to identify and mitigate apparent losses?

A. There are several ways the Company is working to mitigate apparent losses. The Company conducts fire service audits, evaluates large meter accuracy, calibrates plant meters that quantify the water sent into our distribution system, and is improving its billing practices:

- *Fire Service Audits*. KAWC has reviewed and improved its processes related to fire services. The Company requires a detector meter on all new fire service installations to help identify unauthorized usage. We monitor our fire services through their attached detector meters. This meter is read monthly and allows us to bill for any small usage on the fire service for the month. If there is consistent month-to-month usage on a detection meter we investigate to determine whether it was for authorized use. We are looking at ways to audit these systems and finding solutions to get a more accurate picture of the water loss we may be seeing in this area. Not only do the audits address apparent water loss, but they also allow us to check for vault safety and any items that may need to be updated for the safety of our employees, as well as include cross connection checks to help ensure the quality of our water to our customers. The cause of the continuous usage ranges from leaks downstream of the detector device and unauthorized use of private fire hydrants, to illicit connections on fire lines.
- *Large Meter Testing and Profiling.* Large meter testing and profiling includes our effluent meters in the plants as well as our large customer meters. KAWC annually tests plant effluent meters in order to ensure accuracy of the system delivery numbers used to calculate NRW for water leaving the Company's three treatment plants. The Company also analyzes consumption patterns to determine if the customers' meters are

still appropriate for their current consumption rates, and if not, the installation of new meters are recommended. In addition, the Company evaluates customers' needs for large meters when the Company is aware that a premise has been repurposed. A customer or premise could have had a need for a large meter in the past but as businesses or buildings are repurposed their routine usage can diminish the need for a large meter. An oversized meter is more susceptible to missing low flows so having appropriately sized meters is important. When the Company determines, in consultation with the customer, that the meter is oversized, it replaces the meter with the appropriately sized meter for the customer's usage.

- *Billing Process*: The Company monitors its customer information system and billing system for inactive accounts with consumption, active accounts with no consumption, premise mismatches, estimated reads and consecutive zero consumptions that may impact apparent water loss levels. These exceptions generate work orders that determine and eliminate the issues that caused the exception.

Q. Please describe some of the Company's challenges with identifying and mitigating real and apparent water loss from Special Connections?

A. Kentucky-American has roughly 270 Special Connections in its distribution system. Special Connections is the term used by KAWC to describe a point of demarcation between its water mains and a private water main that is not metered and is generally located at the tapping sleeve and valve connection between KAWC's main and the private main. Private mains are mains that are owned and maintained by a private entity such as a farm, apartment complex, or commercial property. The Company estimates that there is approximately 90 miles of private mains connected to the KAWC distribution system. As private expansion and improvements are made over time, the quantity of primate mains may increase. Exhibit WAL-1 provides an overview of three of the Special Connections within KAWC's distribution system – Kentucky Horse Park, Bluegrass Airport, and University of Kentucky.

A key point is that a Special Connection does not have a water meter at the connection to the private main. Thus, any loss of water within the private main is reflected as KAWC's water loss. Special Connections historically have been used by KAWC on larger water mains (e.g., 4 to 12in.) that were installed by private developers to serve their projects. Special Connections may also include privately owned fire hydrants and fire line connections that branch off from privately owned mains. Special Connections typically have multiple service connections or end users that are supplied by the private main and metered by KAWC.

Initially, Special Connections were thought to be favorable to KAWC. KAWC did not have to make a capital contribution and did not have to maintain the private mains. Over time, however, as leaks develop and as private owners started to delay or neglect needed repairs, the advantages of Special Connections have been outweighed by other intangible factors. The Special Connection customer is not accountable for the water within its private mains (before the end use customer meters), which allows for real water loss through leaking pipes, unauthorized use of privately owned fire hydrants, and unauthorized connections to be metered between the connection to the KAWC water distribution system and the downstream individual unit meters.

Q. What are some of the different ways to measure water loss?

A. Traditional indicators use a single percentage, either non-revenue water ("NRW") or unaccounted-for water ("UFW") to measure water loss. NRW is the difference between the amount of water that is produced by a water utility for consumption, and the amount of water that is billed to customers. The Commission UFW as "the difference of the total amount of water produced and purchased and the sum of water sold, water used for fire protection purposes,[8] and water used in treatment and distribution operations (e.g., backwashing filters, line flushing)."[9] The Company also uses data loggers and is evaluating establishing temporary district metered areas ("DMAs"), which are temporarily hydraulically separated discrete areas of the water distribution system to compare the metered flow against the metered usage for that specific area of the distribution system. The Company is looking to establish temporary or permanent DMAs where appropriate throughout the distribution system to better identify areas of water loss.

Q. What are KAWC's historical NRW and UFW percentages?

A. Please see the chart below.

Historical NRW and UFW		
Year	**NRW**	**UFW**
2016	16.80%	15.69%
2017	19.80%	18.86%
2018	21.15%	19.95%

[8] A utility may grant free or reduced rate service to fire districts to fight fires or to train firefighters. KRS 278.170 requires fire districts to maintain estimates of the amount of water used for fire protection and training and to report the water usage on a regular basis.

[9] Case No. 2011-00217, Application of Cannonsburg Water District for (1) Approval of Emergency Rate Relief and (2) Approval of the Increase in Nonrecurring Charges (Ky. PSC June 4, 2012), Order at 5, footnote 12.

2019	22.79%	21.10%
2020	21.62%	20.47%
2021	22.08%	21.085
2022	22.67%	21.59%

Q. What has been the evolution of water loss performance indicators?

A. While traditional single percentage water loss indicators have been around for many decades, the AWWA's Water Loss Control Committee has encouraged utilities and other stakeholders not to use single percentage water loss indicators. "The traditional use of a single NRW percentage loss indicator or "unaccounted-for" water percentage – which is imprecise – continues to bring more confusion than coherence to water loss assessments…

> In this report, the WLCC recommended that the water industry not employ the "unaccounted-for water "(UFW) term or express losses as UFW%. Additionally, AWWA recommended against setting loss reduction goals around a specific target such as "less than 10%", recognizing that loss reduction targets are best tailored as system specific goals for each water utility rather than a "one size fits all" approach.[10]

Q. Are you familiar with this Commission's UFW regulatory requirements?

A. Yes. It is my understanding that, per Commission regulations and for ratemaking purposes, a utility's unaccounted-for water loss shall not exceed 15 percent of the total amount of water produced and purchased, excluding water used by a utility in its own operations.[11] The Commission also provided in its regulations and that: .."upon application by a utility in a rate case filing or by separate filing, or upon motion by commission, an alternative

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[10]Key Performance Indicators for Non-Revenue Water Prepared by the AWWA Technical and Education Council's Water Loss Control Committee November 2019. https://www.awwa.org/Portals/0/AWWA/ETS/Resources/WLCCKPIReport%202019.pdf?ver=2019-11-20-094638-933

[11] 807 KAR 5:066, Section 6(3).

level of reasonable unaccounted-for water loss may be established by the commission. utility proposing an alternative level shall have the burden of demonstrating that the alternative level is more reasonable than the level prescribed in this section.[12] The Commission's regulations clearly recognized that there may be circumstances where the Commission might approve an alternative UFW standard for a water utility.

Q. Why is KAWC seeking Commission approval for an alternative level of UFW, and what is a reasonable level of UFW for KAWC?

A. There are two primary influences on KAWC's water loss performance: (1) the Company's management practices and (2) the situation in which KAWC operates.

KAWC's water loss control program has demonstrated effective utility management and stewardship of water resources. The Company tracks the annual volumes of water it manages, measuring not only the amount of water supplied to their customers, but also the water lost. Pillars of KAWC's water loss control program are its pressure management, accelerated infrastructure replacement, active leak detection, rapid response to breaks, and fire service and water loss audits, which includes a review of records and data that traces the flow of water from its source, through the treatment process, into the water distribution system, and delivered to customer properties.

The situation that KAWC operates in can be described by parameters such as pipe length, connection density, topography, cost of water, pressure, the condition, age, and type of meters or distribution piping -- factors that KAWC can manage over time. Special Connections, however, are nearly 4 percent of the distribution system carrying KAWC's

[12] 807 KAR 5:066, Section 6(3).

water and are private mains, facilities and equipment that often are built from substandard designs, with substandard materials, and are not well maintained. Many Special Connections have multiple valve connections with KAWC's mains, and Special Connection customers are not accountable for the water within its private mains. So to the extent that water volumes and pressure are not noticeably reduced to end use customers, the Special Connection has little incentive to design, build, or maintain the private mains and system to higher standards or even to repair leaky pipes. To the extent leaks develop and private owners delay or neglect needed main or service line repairs, fail to remediate unsafe conditions (e.g., meter vaults), use substandard materials in those repairs or in new construction, KAWC is unable to repair or replace mains and other distribution facilities owned by others on property it does not have legal access to, and is unable to shut off the private mains due to the impact on multiple, sometimes independent end users. Similarly, to the extent that unauthorized unmetered connections and consumption occurs within a Special Connection area of the distribution system, the Company is often unable to identify the unauthorized connection on property it does not have legal access to and is unable to shut off the private mains due to the impact on multiple, sometimes independent end users.

Given KAWC's extensive water loss control interventions and its limited ability to manage and influence Special Connections' water loss, KAWC respectfully requests that the Commission establish 20 percent UFW as the reasonable level for KAWC in this case.

KAWC's Metering Proposal

Q. Please discuss the Company's experience with scheduled, periodic replacement of metering equipment.

A. In Case No. 2009-00253, the Commission granted the Company's request for KAWC to deviate from 807 KAR 5:066, Section 16(1), and to keep its 5/8-inch meters in service for 15 years without testing for accuracy.[13] At that time, the Company began investing in meters, (est. 2011 to 2013) that represent much of the current meter population, and the future performance of those meters purchased was not yet known. Based on our analysis of that vintage of meters' performance, we no longer believe that KAWC should keep its 5/8-inch meters in service for 15 years (without testing for accuracy) and that 10 years is a more appropriate period for the scheduled replacement of metering equipment.

Q. What is the Company's plan to transition to more advanced metering technology?

A. The Company is proposing to implement AMI (advanced metering infrastructure) as it completes normal, scheduled, periodic replacement of metering equipment and has submitted an application for a certificate of public convenience and necessity ("CPCN") to do so. The AMI Deployment Plan (Exhibit A to the Application) sets out the metering technology considered and why the Company decided to move forward with the selected AMI metering option for its transition to AMI.

Q. Why is KAWC proposing a transition to AMI?

A. The transition to AMI will enable strategic and permanent improvements in safety, customer experience, operational efficiencies, and environmental benefits. The Company looks forward to leveraging AMI to empower customers with near real-time consumption data to enable smart water use choices, enhance customer communication regarding

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[13] Case No. 2009-00253. Order issued October 5, 2011.

customer water consumption patterns and unusually high-water use, optimize KAWC's ability to measure and address non-revenue water, and improve water system operations and management, among other things.

Q. How will the transition to AMI benefit customers and improve operational efficiency?

A. AMI provides a variety of benefits by allowing the Company to collect hourly consumption data from the meter and transmit it to a computer network. This will improve safety, operational efficiency, and customer service. With AMI, it is no longer necessary for employees to walk or drive by meter routes in order to gather consumption data. This will make our meter reading more efficient, reduce work site safety hazards associated with meter reading, reduce our environmental impact by reducing monthly trips taken to obtain meter readings, and shift our employees time spent reading meters to activities related to customer service requests.

The AMI meters will be deployed as KAWC completes normal, scheduled, periodic replacement of metering equipment. The meter replacement plan anticipates the replacement of approximately 78,000 meters over the next three years that are at or near their replacement age. KAWC's rate case filing includes the capital expenditures for this implementation scheduled to start in 2024.

Technology giving large commercial or industrial users visibility to their consumption has already been rolled out to approximately 270 large accounts. The Company will continue to evaluate and address opportunities with a goal of continuous improvement of the efficiency and customer service related to metering. Initially AMI will increase billing accuracy and reduce the likelihood of estimated bills by providing more timely and accurate reads through the network. The technology will also provide customers with a view of their personal consumption more frequently than monthly, allowing them to monitor their usage for conservation and to identify and address unusually high usage.

Q. How will AMI improve customer service?

A. The implementation of AMI will increase billing accuracy and reduce the likelihood of estimated bills (e.g., due to weather events or other obstacles to accessing customer meters) by automatically providing timely, accurate reads through the network. The Company will also be able to more efficiently collect, organize, analyze, and communicate large quantities of meter data. Customers will have more timely access to water usage data which will allow them to identify opportunities for conservation and bill reducing tips to enable smart water use choices. AMI data can be used to uncover irregularities that may signal a leak, meter tampering or water theft.

Q. How does AMI improve employee and public safety?

A. Having employees in the field reading meters in potentially unsafe environments, inconvenient locations, inclement weather, and exposed to vehicular traffic, animals, and the like, creates an exposure to potential injuries and accidents. Being able to read meters remotely reduces this potential risk, both for injuries to our employees and injuries and damage to third parties.

Q. Did the Company consider reverting back to manual read technology as part of its analysis in the AMI Deployment Plan?

A. No. The Company continues to believe that leveraging advancements in technology is the appropriate course of action to continue to improve service to customers and do so cost effectively. Reverting back to manual read technology would require additional resources and fail to provide the efficiencies and other benefits associated with AMI.

Service Company

Q. Please describe the role that Service Company plays for KAWC.

A. The services KAWC receives from the Service Company are necessary for KAWC's utility operations and provision of service to its customers. The Service Company provides access to highly trained professionals who possess expertise in various specialized areas and who work exclusively for the Company's affiliates. The services provided by the Service Company include, among others, customer service, water quality testing, innovation and environmental stewardship, human resources, communications, information technology and cyber security, finance, accounting, payroll, tax, legal, engineering, accounts payable, supply chain, and risk management. Further, KAWC benefits from the economies of scale in getting these services and expertise on a shared basis at cost. The Service Company provides KAWC an efficient and cost-effective means of obtaining services needed for KAWC's customers and supports KAWC's ongoing efforts to improve water efficiency. KAWC witness Baryenbruch provides testimony and analysis that demonstrates that the Service Company costs charged to KAWC are reasonable.

Q. Can you provide additional examples of the services obtained from the Service Company?

A. Yes. The Service Company operates the American Water ("AW") Central Laboratory located in Belleville, Illinois. The AW Central Laboratory conducts sophisticated testing and analysis for all American Water subsidiaries, including KAWC. The AW Central Laboratory processes nearly 30,000 sample events each year, is certified in 16 states and territories, and is accredited for 38 methodologies and over 250 compounds (160 of which are regulated). The lab has a history of being on the forefront of monitoring, testing, identifying, and controlling analytes in advance of federal regulations, and regularly collaborates with the EPA to help develop federal drinking water standards and regulations. Our highly sophisticated analytical and research capabilities are why the EPA regularly taps into our lab and our research team to help develop federal drinking water standards and regulations.

The Service Company's Information Technology ("IT") team provides effective information technology support and solutions to meet KAWC's business needs. The Company's ongoing investment in technology enables KAWC to better manage its end-to-end view of its water operations from source to the tap. Service Company's IT team works side-by-side with KAWC end-users to develop technological solutions engineered with a focus to enhance our employees' effectiveness and to allow our customers to do business with us more easily.

Through the size and breadth of American Water, the Service Company Supply Chain team has continued to increase its purchasing power and obtain significant discounts on the necessary equipment needed to manage and maintain our system—including pipes, fittings, water treatment chemicals, fleet, IT hardware, uniforms, safety and tool supplies, and specialized services—at prices that we otherwise would be unable to obtain separately.

EMPLOYEE COMPENSATION

Q. Please describe KAWC's approach to its employee compensation program.

A. The Company aims to offer compensation that is on par with other companies Kentucky American Water competes with for talent. Therefore, the Company targets its total direct compensation (base and performance compensation) for each role near the market median (50^{th} percentile). Offering market-level total compensation ensures that Kentucky American Water's compensation is not only competitive, but also reasonable. By using a combination of base and performance compensation, the Company satisfies a dual objective of a competitive market-based total compensation for all employees, while continuing to motivate employees to achieve goals that will improve performance and efficiency for the benefit of our customers. We believe this approach is superior to setting base compensation targets at market median and not offering performance compensation.

Q. Is KAWC's employee compensation expense a necessary cost to serving its customers?

A. Yes. Employee compensation is a cost of providing utility service, like other prudently incurred costs of service recoverable in rates. Employee compensation must therefore be assessed through the same lens as all other operating costs of the Company: if it is prudently incurred and reasonable in amount, relative to what the industry pays for the same services, it should be recoverable through rates. The Company is presenting evidence that its levels of compensation are reasonable. Where the Company's total compensation level is in line with or below the market, as will be demonstrated in this case, regardless of the combination of fixed and performance-based components that the employees earn, then the

Company's overall compensation expense is reasonable and prudently incurred and thus, should be recoverable like all other costs of service.

Q. Is the Company's performance compensation program reasonable?

A. Yes. The Company retained the services of Willis Towers Watson ("WTW") to perform a total compensation study to determine if the total direct compensation[14] and total remuneration[15] provided to KAWC employees, when viewed against the market of talent for employees of similar positions, is at market levels based on the Company's stated compensation philosophy. The findings of WTW's compensation study are detailed in the Direct Testimony of Company witness Robert V. Mustich. Therein, Mr. Mustich reached the following conclusions:

- The Company's total direct compensation programs are comparable to and competitive with market practices of other similarly-sized utilities and of industry generally.
- KAWC employees are generally below the competitive range of market median for each element of total remuneration.
- KAWC's market-based compensation programs are reasonable.
- The target total direct compensation and total renumeration provided to the Company's employees is already below the median competitive range of the market.

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[14] Total direct compensation includes base pay, plus target annual performance compensation and long-term performance compensation. *See* WTW 2023 General Rate Case Total Remuneration Study, Appendix G, p. G-2.

[15] Total remuneration included total direct compensation plus benefits. *Id.*

Q. Is the totality of the Company's market based total compensation a prudently incurred expense?

A. Yes. As Mr. Mustich has demonstrated in his Direct Testimony, the Company's overall total direct compensation (which includes base compensation and all performance compensation), as well as the Company's total renumeration (which also includes benefits), is below the competitive market range. Therefore, KAWC's total compensation expense is reasonable and prudently incurred.

Q. How is performance compensation provided to employees?

A. Performance compensation may be awarded under two plans – the Annual Performance Plan ("APP") and the Long-Term Performance Plan ("LTPP"). All full-time employees participate in the APP. Eligibility for the LTPP is limited to certain exempt employees.

Q. Please describe the key performance objectives underlying the APP.

A. The APP is designed to recognize and reward performance against key performance goals and targets that drive the Company's strategy.

For 2023, the APP goals are as follows:

STRATEGY	GOAL	TARGET	WEIGHT
GROWTH	EPS Range	$4.72-$4.82	50%
CUSTOMER	Customer Satisfaction	2nd Quartile	15%
SAFETY	OSHA Recordable Injury Rate (ORIR)	0.62 or less	7.5%
	Days Away, Restricted and Transfer (DART) severity rate	0.30 or less	7.5%
ENVIRONMENTAL LEADERSHIP	Drinking Water Compliance Notice of Violation (NOVs)	≤ 6 NOVs	7.5%
	Drinking Water Quality Notice of Violation (NOVs)	≤ 2 NOVs	7.5%
PEOPLE	Women Representation	Increase women representation to 25.0%	2.5%
	Ethnic and Racial Diversity Representation	Increase ethnic & racial diversity to 21.0%	2.5%

Q. Please describe the LTPP.

A. American Water provides restricted stock units ("RSUs") and performance stock units ("PSUs") as long-term performance compensation under the LTPP. American Water's RSUs and PSUs are based on three-year vesting periods. RSUs are based on time-based vesting and PSUs are based on performance vesting conditions.[16]

Q. How do the APP and LTPP compensation plans benefit customers?

A. The Company's performance compensation plans align the interests of our customers, employees and investors. The design of the plans emphasizes customer service, environmental compliance, a safe work environment, and people, as well as certain financial goals. All of the APP and LTPP performance objectives – both operational and financial – focus employees' efforts in ways that ultimately benefit customers. The use of multiple measures further strengthens our ability to drive results across the enterprise.

Q. How do the operational goals of the APP benefit customers?

A. The operational goals of the APP are designed to focus plan participants on the results that can most directly influence customer satisfaction, health and safety, environmental performance, and workforce diversity. Customers benefit from the plan goals because operational performance is improved by controlling costs, capturing efficiencies, promoting effective safety and risk management practices, enhancing customer service, and doing so with a diverse workforce that reflects the communities we serve. Achievement is determined by goals that directly benefit customers by creating a more productive

[16] American Water uses a combination of compounded EPS growth and relative total shareholder return ("TSR") ranking over a three-year performance period as the basis for measuring performance for PSU awards. For the portion of American Water's PSUs that are contingent on relative TSR percentile performance, American Water compares performance to its peer group.

workforce that is focused on customer satisfaction and achieving efficiency, environmental, and safety goals. For example, goals limiting the number of Notices of Violation (NOV) for drinking water regulations help maintain a focus on providing safe and reliable water service, while goals for customer satisfaction measure the level to which customers value the activities and services performed by employees throughout the business.

Q. How do the financial goals of the APP and the LTPP benefit customers?

A. The financial goals of the APP and LTPP benefit customers in many ways. Achieving financial goals, such as targeted earnings per share ("EPS"), requires continual attention to operating efficiently. That is, unless the utility controls its operating costs, it cannot achieve a targeted EPS. This necessitates employees at all levels of the organization to remain focused on increasing efficiency, decreasing waste, and boosting overall productivity. As a result, the Company controls operating costs to the benefit of customers, because doing so mitigates rate increases. Consequently, when financial goals are achieved through efficiency, as is the case for the Company, the interests of customers, employees, and investors are aligned. Achieving the financial goals also helps ensure that the Company can gain access to capital at reasonable rates. KAWC witness Mr. Furia addresses this in his testimony.

Q. Do the Company's employees typically earn their performance compensation?

A. Yes. The Company has funded performance compensation every year for at least the past decade. The level has varied from year to year based on achievement of targets or exceeding targets, but the organization's performance has resulted in the payment of performance compensation typically equal to or greater than the target level. The Company only seeks recovery at the target level.

Q. Is there other evidence of the tangible benefit to customers from the performance pay component of the Company's total market-based compensation program?

A. Yes. Again, it is important to consider the impact of a utility's financial health on its access to capital at reasonable costs. The Company's customers have benefitted from the Company's access to capital at favorable rates. Because utilities are capital intensive and must routinely and consistently access the capital markets at reasonable costs, customers ultimately benefit when their utility has the financial health to do so. Mr. Furia explains that achieving predictable financial results benefits customers through lower capital costs to finance the business.

APP results from 2018 through 2022 demonstrate additional customer benefits. KAWC has remained in the top half of the customer satisfaction survey throughout this period and the Company has not incurred any drinking water related NOVs. In addition, reducing OSHA incidents increases safety—customer safety and employee safety. No one can credibly dispute the benefits of improved safety. Further, reduced accidents reduce the attendant costs—workers' compensation, damage repair, etc.—which mitigates the operating costs that customers pay through rates. A commitment to work to achieve safety performance goals reflects an engaged workforce that is focused on providing safe, reliable and affordable service to KAWC's customers. Like ORIR, customers benefit from lower DART results through more efficient employee efforts and lower costs from occupational illnesses and injuries.

Q. Is providing appropriate levels of compensation to employees critical to the Company's ability to continue to provide safe and adequate service?

A. Yes, it is. Competition among companies to attract and retain the best and highest performing employees is keen. In recruiting new employees or retaining existing employees, both the Company and American Water compete with general industry in surrounding regions and nationally. For KAWC, the region includes companies in the manufacturing and service industries in addition to other utilities and construction companies. The Company's compensation program seeks to provide employees with a total compensation package on par with those offered by companies with which it competes for employees.

Q. Please summarize why the Company's total market-based compensation, including its performance-based compensation component, should be recoverable through rates.

A. The performance-based compensation component of the Company's total market-based compensation plan aligns the interests of our customers, employees, and investors. The market-based compensation philosophy that KAWC has adopted allows it to attract and retain the workforce needed to continue to provide safe and reliable service. The plans contain tangible goals that are designed to do several things, *i.e.*, measure and compensate employees for achieving goals based on delivering clean, safe, reliable, and affordable water service and provide first-in-class customer service when doing so. The components include goals that can most directly influence customer satisfaction, health and safety, environmental performance, and operational efficiency. Customers derive a direct benefit from our focus on these key measures in the plan. Further, the plans' well-grounded financial measures keep the organization focused on improved performance at all levels, particularly in increasing efficiency, decreasing waste, and boosting overall productivity. The Company has demonstrated that its overall compensation levels are below the market, and thus, are a reasonable and prudently incurred cost of service that is appropriately included in rates.

Q. Does this conclude your prepared direct testimony?

A. Yes, it does.

VERIFICATION

COMMONWEALTH OF KENTUCKY)
) SS:
COUNTY OF FAYETTE)

The undersigned, William Andy Lewis, being duly sworn, deposes and says that he is the Vice President of Operations for Kentucky-American Water Company, that he has personal knowledge of the matters set forth in the accompanying testimony for which he is identified as the responsible witness, and that the answers contained therein are true and correct to the best of his information, knowledge and belief.

William A. Lewis

Subscribed and sworn to before me, a Notary Public in and before said County and State, this 21st day of June, 2023.

Molly McCleese Van Over
Notary Public

My Commission Expires:

July 31, 2025
Notary ID: KYNP26988

EXHIBIT WAL-1 TO KAW_DT_WAL_063023
FILED UNDER SEAL PURSUANT TO THE PETITION FOR CONFIDENTIAL TREATMENT FILED ON JUNE 30, 2023

BEFORE THE KENTUCKY
PUBLIC SERVICE COMMISSION

Case No: 2023-00191

KENTUCKY-AMERICAN WATER COMPANY

DIRECT TESTIMONY OF
ROBERT V. MUSTICH

I. Introduction

Q. Please provide your name, position and business address.

A. My name is Robert V. Mustich. I am Managing Director and East Region Rewards Business Leader for Willis Towers Watson. Willis Towers Watson is a leading global professional services company which has 45,000 associates throughout the world, and offers solutions in the areas of corporate risk and broking; human capital and benefits; health care exchange solutions; and investment, risk, and reinsurance. My business address is 800 North Glebe Road, Arlington, VA 22203.

Q. Please explain Willis Towers Watson's experience in providing compensation and benefits consulting services to organizations like Kentucky American Water Company (KYAWC, Kentucky American Water, or the Company).

A. Willis Towers Watson has extensive experience serving clients in the utility industry, having served approximately 100 utilities in the U.S. within the last year. Because we invest so heavily in our utility industry capabilities, we have rich competitive industry compensation and benefits information that enables us to benchmark Kentucky American Water against similar companies in the U.S. Given Willis Towers Watson's breadth and depth of resources, we are frequently engaged by companies to evaluate the competitiveness of their compensation philosophy, compensation and benefit levels, variable compensation design and pay structures, and other consulting services. Willis Towers Watson and I have conducted similar competitive compensation studies for other utility clients.

Q. Please state your educational and professional background and experience.

A. I graduated from American University with a BS/BA in Human Resources Management. I have over 30 years of industry and compensation consulting services experience, have been with Willis Towers Watson for over 25 years, and have assisted management and Boards of Directors at numerous companies in designing and assessing total compensation programs. Since joining the firm in 1997, I have consulted with numerous utilities and serve as a senior member of our utilities industry practice. I have conducted competitive assessments of total compensation for numerous public utilities throughout the U.S. Prior to joining Willis Towers Watson, I was a senior compensation consultant for PricewaterhouseCoopers (formally Coopers and Lybrand, LLP) performing similar compensation consulting services for clients. Prior to that, I held corporate senior staff compensation and benefits positions.

II. Purpose of Testimony

Q. What is the purpose of your testimony?

A. The purpose of my testimony is to demonstrate that the target total remuneration provided to Kentucky American Water employees, when viewed against the markets for talent for employees in similar positions, is below the competitive range of market. Willis Towers Watson specifically focused on the following aspects of Kentucky American Water's program:

- Total compensation philosophy;
- Competitive market positioning of target total remuneration (base salary plus short-term variable compensation plus long-term variable compensation plus benefits)
- Design of short-term variable compensation program; and
- Design of long-term variable compensation program.

Q. Please define Target Total Cash Compensation.

A. Target Total Cash Compensation represents the sum of base salary plus target short-term variable compensation.

Q. Please define Target Total Direct Compensation.

A. Target Total Direct Compensation represents the sum of base salary, plus target short-term variable compensation, plus long-term variable compensation.

Q. Please define Target Total Remuneration.

A. Target Total Remuneration represents the sum of base salary, plus target short-term variable compensation, plus long-term variable compensation, plus benefits.

III. Overview of Total Compensation Philosophy

Q. Does Kentucky American Water have a defined compensation philosophy?

A. Yes, American Water Works Company, Inc. (American Water), KYAWC's parent, has a defined compensation philosophy that is utilized by Kentucky American Water.

Q. How would you define the parent company's compensation philosophy?

A. American Water's compensation philosophy is to generally pay compensation that is competitive with those of comparable organizations for jobs of similar responsibility. To carry out this philosophy, American Water's objective is to target total direct compensation (base, short-term variable compensation, and long-term variable compensation) at the median (50th percentile) of the market with greater earning opportunity for exceptional performance.

Q. How does this compensation philosophy compare with other utilities?

A. It is comparable. Willis Towers Watson examined the proxy statements for two peer groups: (1) Large Utility Peer Group, 15 publicly-traded utilities comparable to American Water and (2) Small Utility Peer Group, 10 publicly-traded utilities comparable to Kentucky American Water. Based on our review, we believe American Water's compensation philosophy is well-aligned with utility peers, as a majority of both Large Utility Peer Group companies (11 of 15, 73%) and Small Utility Peer Group companies (4 of 10, 40%) target the market median (50th percentile) for some or all pay elements. Our consulting experience also suggests that American Water's median (50th percentile) pay philosophy is comparable to typical market practice found in general industry.

IV. Summary of Willis Towers Watson's Total Remuneration Study

Q. Did you conduct a compensation study of Kentucky American Water's total remuneration program?

A. Yes, and a copy of the Study is included as **Exhibit RVM-1 (Confidential)** to my testimony.

Q. Please describe how the study was conducted.

A. Willis Towers Watson utilized three data sources to assess Kentucky American Water's total remuneration program. As we did in assessing American Water's total compensation philosophy, we assessed the design of its short-term variable and long-term variable compensation programs using proxy disclosures of groups of public utilities referred to as the Large Utility Peer Group and the Small Utility Peer Group. Competitive market positioning of Kentucky American Water's target total remuneration levels was compared to Willis Towers Watson published compensation and benefits surveys.

Q. How did you define "competitive" for the purposes of your study?

A. Willis Towers Watson and typical market practice define an element of total remuneration as being competitive if it falls in a range that extends between 10% below to 10% above market median of total remuneration.

Q. Please describe how you assessed the competitiveness of Kentucky American Water's target total remuneration levels?

A. Willis Towers Watson assessed the competitiveness of target total remuneration provided by Kentucky American Water to its variable eligible population based on a selection of Kentucky American Water jobs ("benchmark jobs"). Benchmark jobs are those positions that are common across comparable organizations and for which compensation data are available from published surveys.

To conduct this analysis we reviewed compensation data provided to us by Kentucky American Water and examined Willis Towers Watson's compensation and benefits surveys. These surveys are comprised of compensation and benefits data from over 1,000 U.S. based companies, and Willis Towers Watson has been conducting these surveys for over 25 years.

Kentucky American Water's current compensation and benefit levels were compared to the market 50th percentile (market median) for two different market perspectives to determine the competitiveness of total remuneration and to validate the alignment with American Water's current compensation philosophy (targeting compensation at the 50th percentile of market).

To derive 50th percentile (median) market values, Willis Towers Watson weighted energy services and general industry survey data 60% and 40%, respectively, to place a greater weight on the energy services market data since this includes regulated entities most similar to Kentucky American Water for positions that are not industry specific. Given that these positions can be recruited or lost to companies in any industry, the use of general industry survey data ensures that non-industry specific positions are being compensated competitively. Industry specific positions were compared only to energy services industry data.

Willis Towers Watson's assessment of benchmark jobs represents approximately 67% of the population of Kentucky American Water employees as of March 1, 2023. Specific details regarding our study, which includes a detailed description of the study methodology, are included in **Exhibit RVM-1 (Confidential)**.

Q. Please describe how you determined the competitiveness of Kentucky American Water's target total remuneration?

A. Two different market perspectives were examined to validate the competitiveness of Kentucky American's target total remuneration.

A national market perspective was examined which consisted of the entire population of survey participants in Willis Towers Watson's Energy Services and General Industry databases. This perspective represents a U.S. national total remuneration perspective and is aligned with American Water's compensation philosophy.

A Midwest regional perspective including Arkansas, Illinois, Indiana, Iowa, Kansas, Kentucky, Michigan, Missouri, Nebraska, Ohio, Oklahoma, Tennessee, Wisconsin, and West Virginia labor markets was also examined, which consisted of the same entire survey participant population from Willis Towers Watson's Energy Services Industry and General Industry databases but was customized to identify a Midwest-specific geographic dataset. This dataset identified employees who work in the fourteen states listed above for companies headquartered anywhere in the United States.

Q. What were the results from the national perspective?

A. Kentucky American Water's target total remuneration as reported in Exhibit 1 (below) is below the range of competitive market median by being 13% (represents a weighted average of all positions reviewed) below the market median. Again, we consider market competitiveness to fall within a plus or minus 10% of median range.

Exhibit 1

Summary of Kentucky American Water Target Total Remuneration vs. Market Median (National Market Perspective)			
Base Pay	**Target Total Cash Compensation**	**Target Total Direct Compensation**	**Target Total Remuneration**
-13%	-13%	-13%	-13%

Q. What were the compensation study results from the Midwest Regional perspective?

A. Kentucky American Water's target total remuneration as reported in Exhibit 2 (below) is below the range of competitive market median by being 11% (represents a weighted average of all positions reviewed) below the market median.

Exhibit 2

Summary of Kentucky American Water Target Total Remuneration vs. Market Median (Mid-West Regional Market Perspective)			
Base Pay	**Target Total Cash Compensation**	**Target Total Direct Compensation**	**Target Total Remuneration**
-10%	-10%	-11%	-11%

Q. In your opinion and based on the results of the study, are Kentucky American Water

employees overcompensated?

A. No. Kentucky American Water employees are generally at the low end or below the typical range (+/- 10%) of market median for each element of total remuneration.

V. Summary of Willis Towers Watson's Performance Compensation Program Assessment

Q. Did you conduct an assessment of American Water's performance compensation program?

A. I assessed American Water's annual and long-term performance compensation programs.

Q. What was the purpose of this assessment?

A. This assessment was completed to compare the design of American Water's performance compensation program (that is applicable to Kentucky American Water) and its various elements to market practice.

Q. What were the findings of the assessment?

A. Overall, our review indicates that American Water's performance compensation programs are comparable to and competitive with designs of utility peers, based on a review of the Large Utility Peer Group and the Small Utility Peer Group referenced earlier. Like American Water, every company in the Large Utility Peer Group and all but one in the Small Utility Peer Group has performance compensation programs which are used to help attract, motivate and retain critically skilled employees needed to successfully run the business. Companies design their performance compensation programs to align with their business strategies and circumstances, so there tends to be a range of practices regarding how the programs are designed. American Water's performance compensation programs complement each other by assessing performance holistically using a balanced scorecard approach, incorporating stock performance, financial, customer, safety, technology and operational efficiency metrics. American Water's program designs are consistent with market practices for utilities. Specific details regarding our assessment are included in **Exhibit RVM-1 (Confidential)**.

<u>VI. Overall Findings</u>

Q. What are the conclusions of your analysis?

A. Overall, our analysis indicates that Kentucky American Water's total remuneration programs are comparable to and competitive with market practices of other similarly-sized utilities and are therefore reasonable. Kentucky American Water, like all the companies it competes with for talent, has to provide a competitive total remuneration opportunity delivered via programs that benefit employees, customers and shareholders. Kentucky American Water attempts to achieve this goal with its balanced and competitive base salary, short-term and long-term variable compensation programs and benefits. My experience working with both utilities and general industry companies and the results of this study included as **<u>Exhibit RVM-1 (Confidential)</u>** indicate the programs at Kentucky American Water are within a broad range of market norms and are not excessive in design or level of pay.

Q. What other conclusion can you draw from your assessment?

A. Kentucky American Water provides a total direct compensation opportunity delivered through market-based programs that are intended to compete in the market for talent. Kentucky American Water attempts to achieve this goal by delivering total compensation through balanced base salary and annual and long-term performance compensation programs which align employees, customers, and investors interests. The Company's compensation plans are important management tools to reinforce performance expectations, which is why they are so universally present in both the utility and general business sectors nationally.

Q. Are there other ways that Kentucky American Water's compensation programs benefits customers?

A. Yes. Customers receive a benefit when a utility retains a talented workforce, because a stable workforce avoids the costs of hiring and training new employees. Because Kentucky American Water's performance pay program makes Kentucky American Water's employees' total compensation reasonable, the Company's performance pay helps ensure a stable workforce. Kentucky American Water's LTPP program is particularly intended to reduce attrition at the higher ranks of the organization. Senior management turnover and the loss of expertise can degrade the continuity of strategy and execution, which is why these types of compensation programs are well accepted in the industry. Importantly, the LTPP achieves its goals of reducing leadership attrition at a lower cost to customers than simply increasing leadership's base pay, because performance pay under the LTPP is stock-based. Employees must remain with the organization to realize the full vesting of their awards over a three-year period.

Q. Does this conclude your testimony?

A. Yes, it does.

VERIFICATION

COMMONWEALTH OF VIRGINIA

The undersigned, Robert V. Mustich, being duly sworn, deposes and says that he is the Managing Director and East Region Rewards Business Leader for Willis Towers Watson, that he has personal knowledge of the matters set forth in the accompanying testimony for which he is identified as the responsible witness, and that the answers contained therein are true and correct to the best of his information, knowledge and belief.

Robert V Mustich

Robert V. Mustich

Subscribed and sworn to before me, a Notary Public in the Commonwealth of Virginia, this 23rd day of June, 2023.

Notary Public

My Commission Expires:
March 31, 2027

ERIK JOHN KAMPMAN
NOTARY PUBLIC
REG. #7510575
COMMONWEALTH OF VIRGINIA
MY COMMISSION EXPIRES MARCH 31, 2027

EXHIBIT RVM-1 TO KAW_DT_RVM_063023
FILED UNDER SEAL PURSUANT TO THE PETITION FOR CONFIDENTIAL TREATMENT FILED ON JUNE 30, 2023

COMMONWEALTH OF KENTUCKY
BEFORE THE PUBLIC SERVICE COMMISSION

IN THE MATTER OF:

ELECTRONIC APPLICATION OF KENTUCKY-	**)**	
AMERICAN WATER COMPANY FOR AN	**)**	
ADJUSTMENT OF RATES, A CERTIFICATE	**)**	
OF PUBLIC CONVENIENCE AND NECESSITY	**)**	**CASE NO. 2023-00191**
FOR INSTALLATION OF ADVANCED METERING	**)**	
INFRASTRUCTURE, APPROVAL OF CERTAIN	**)**	
REGULATORY AND ACCOUNTING	**)**	
TREATMENTS, AND TARIFF REVISIONS	**)**	

DIRECT TESTIMONY OF KATHRYN NASH

June 30, 2023

Q. Please state your name and business address.

A. My name is Kathryn Nash and my business address is 2300 Richmond Rd, Lexington, KY 40502.

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

A. I am employed Kentucky-American Water Company ("Kentucky-American," "KAWC" or "Company") as President.

Q. What is your educational background?

A. I have an undergraduate degree in Finance and an MBA with a concentration in Operations Management.

Q. Please describe your business experience.

A. Prior to joining Kentucky-American, I spent six years leading multiple divisions for Waste Management and thirteen years with Tennessee Valley Authority, a federal electric utility, working on large scale environmental clean-up projects. Over the course of my career, I have lead organizations ranging from 150 to over 1,000 employees, managed budgets in excess of $1 billion, worked with collective bargaining agreements in multiple states, drove business development and strategic growth, engaged with communities, developed and trained employees, and worked with and reported up to a board.

Q. Please describe your duties as President of KAWC.

A. As President of KAWC, I am responsible for all aspects of the Company's business including financial, operations (production, distribution, customer service, engineering and capital investment planning), employee relations, environmental, and regulatory affairs. In this role, I am ultimately responsible for assuring that the Company delivers high-quality water and wastewater services to our customers. This responsibility includes taking care to see that all activities of the Company are carried out in compliance with local, state and federal laws and regulations, and standards of good business practice.

Q. Have you previously testified before the Kentucky Public Service Commission?

A. Yes, I have. I testified before the Kentucky Public Service Commission in Case No. 2022-00299.

Q. Please describe the areas KAWC serves.

A. Kentucky-American supplies water and/or wastewater services, and public and private fire service to people in Lexington and portions of Bourbon, Clark, Fayette, Franklin, Gallatin, Grant, Harrison, Jackson, Jessamine, Nicholas, Owen, Rockcastle, Scott and Woodford Counties.

PURPOSE AND SUMMARY OF KAWC'S TESTIMONY

Q. Please describe the purpose of your testimony.

A. There are several reasons why I am offering testimony in this case. I will introduce the witnesses who will testify on behalf of the Company. I will also explain the major drivers of the Company's requested rate relief in this proceeding, which is primarily the significant capital investments that the Company has made and plans to make through January 31, 2025. I discuss the value of service the Company provides while maintaining the affordability of rates for its customers. I provide an overview of certain ratemaking proposals in this case, including a universal affordability tariff, the expansion of its Qualified Infrastructure Program ("QIP") and determination that an alternative unaccounted for water ("UFW") percentage of 20% is more appropriate for the Company than the Commission's general 15% standard. I also discuss the Company's ongoing efforts to improve water efficiency and productivity. Finally, I will discuss the Company's community outreach efforts and corporate citizenship, which are emblematic of who we are as a company.

Q. Please list KAWC's witnesses in this case and a brief summary of their testimony.

A. In addition to my direct testimony, the following witnesses provide testimony in support of the Company's request:

William A. Lewis:	will testify on KAWC's facilities and operations, commitment to water quality and safety, production costs, improving water efficiency, and employee compensation.
Shelley W. Porter:	will testify on the Company's capital investment planning process, plant additions, and some of the risks and challenges for water utilities associated with increased regulation and climate variability.
Krista Citron:	will testify on the Company's QIP and its proposed expansion.
Jeffrey Newcomb:	will testify on the Company's revenue requirement, minimum standard filing requirements, revenues, tariff changes, certain operations and maintenance ("O&M") expenses, QIP rider and regulatory and accounting treatment for certain expenses.
Charles B. Rea:	will testify on affordability, the impact of declining consumption on the Company's revenues, revenue related adjustments, rate design, and the proposed Universal Affordability Tariff.

John M. Watkins:	will testify on certain O&M expenses, including labor and labor related, production costs, and service company, among others.
Thomas O’Drain:	will testify on the Company’s current chemical prices and drivers of increases through 2025.
Patrick L. Baryenbruch:	will testify on the reasonableness of Service Company costs.
Wesley Selinger:	will testify on the Company’s rate base, depreciation and amortization, and class cost of service study.
Larry Kennedy:	will testify on the comprehensive depreciation study of the distribution and general plant in service of the Company performed as of December 31, 2022.
Melissa Schwarzell:	will testify on the Cost Benefit Analysis included in the Company’s application for a Certificate of Public Convenience and Necessity (“CPCN”) for Advanced Metering Infrastructure (“AMI”)
Nicholas Furia:	will testify on the Company's capital structure.
Ann E. Bulkley:	will testify on her recommendation regarding rate of return on rate base and assessment of the reasonableness of KAWC’s proposed capital structure.
Robert V. Mustich:	will testify on the reasonableness of the Company’s compensation program and benchmarks the Company’s compensation expense against national and regional peer groups, including performance compensation and benefits.
Harold Walker:	will testify on the lead lag study and the appropriate cash working capital allowances for inclusion in the

Company's rate base.

REASONS FOR RELIEF REQUESTED

Q. When were KAWC's current rates approved?

A. The Commission approved KAWC's base rates in its Order issued June 27, 2019 in Case No. 2018-00358. Those rates were effective June 28, 2019 and were based on a forecasted test period ended June 30, 2020.

Q. How has KAWC notified customers of its proposed rates?

A. KAWC placed notifications in local papers within the service territory that describe the proposed rates, provides information regarding this proceeding, and contact information for KAWC. In addition, there is information available on KAWC's website, and KAWC has communicated with local media outlets regarding the proposed rates.

Q. What is the amount of the Company's rate request, and how would it affect customer bills if approved?

A. The Company is seeking a rate increase to produce additional revenues of $26.1 million per year, or a 22.7% increase over water service revenues. For an average residential customer using 3,800 gallons of water per month, the requested rate increase will increase the bill from $40.77 (including QIP) to $49.73.

Q. Why is Kentucky-American requesting rate relief at this time?

A. KAWC has provided service to our customers for over 130 years. Our customers rely on the Company to provide them with safe and reliable water service. We take very seriously our obligation to meet our customers' needs and expectations, but water service is not without cost. It requires us to incur a substantial amount of O&M expense, as well as make ongoing, significant capital investments. This filing, however, is primarily driven by the investments we are making to maintain and improve our infrastructure. We are accelerating investment in infrastructure that is nearing the end of its useful life and in need of replacement. In the area of O&M expense, the Company has been quite successful in controlling our costs in the past. As explained by Mr. Watkins, both overall and on a per customer basis the Company has been able to keep its O&M expense increases below the rate of inflation. While the Company has effectively controlled its O&M expenses in the past, the Company must seek its prudently incurred and reasonable O&M costs which reflect, among other things, increases in production costs as supported by Mr. Watkins and Mr. O'Drain and the full cost of paying our employees total market-based compensation as supported by Mr. Lewis and Mr. Mustich. Furthermore, the Company must maintain its ability to attract capital to continue its investment in infrastructure and have timely recovery of these expenditures. We continue to maintain adequate sources of supply, treatment, pumping, transmission and distribution facilities, as well as to comply with applicable laws and regulations – that is our public service obligation. But the necessary funding level to help ensure the safety and integrity of the systems is not the same as the funding levels that best serve the long-term interests of our customers. From the perspective of long-term sustainable customer service and pricing, the Company's goal is to continue providing high quality water service in the most cost-effective way through the replacement, operation, maintenance, and rehabilitation of assets for present and future customers.

VALUE OF WATER SERVICE AND AFFORDABILITY

Q. In general, why is KAWC's proposed rate increase reasonable and appropriate?

A. KAWC's proposed rate increase is reasonable and appropriate because, as I previously discussed, it is driven primarily by the need to make the investments necessary to keep our water service safe and reliable. Such investments cannot be avoided and are in the long-term best interests of our customers. If such investment is not made, our customers will be adversely impacted in the long run as costs will increase even more. For example, when mains are not replaced in a timely fashion our costs rise, as unanticipated main breaks create water quality issues, unexpected expenses, and disruption to our communities.

Q. Has KAWC evaluated the impact of the proposed rate increases on its customers?

A. Yes, we have. We know our water service is critical, and we know how important it is for that service to remain affordable. A Kentucky residential customer using 3,800 gallons of water per day would pay under $600 per year for water under our rate proposal. Put another way, under the Company's proposed rates, an annual residential bill of $600 equates to about $1.65 per day. Therefore, for about $1.65 per day an average residential customer has all the water he or she and their family need to drink, cook, wash, and maintain their general health and well-being.

Q. Has the Company performed an analysis of the affordability of the Company's service under the proposed rates?

A. Yes. Mr. Rea has conducted a detailed analysis of the affordability of our historical and proposed rates and relates the median household income for customers in our service territory to our utility bills over time. Even with the rate increase necessitated to continue to provide safe, reliable and efficient service over the long-term, Mr. Rea's analysis demonstrates that our water service, overall, has become more affordable over time and will remain affordable under the Company's proposed rates. His testimony compares historical average monthly water bills to monthly household income for KAWC customers from 2012 through 2022, both in absolute terms and in terms of bill to income ("BTI") ratios. Mr. Rea then analyzed the Company's proposed bills in this case and estimated median household income ("MHI") for KAWC customers during the forecasted test year. His analysis shows that BTI Ratios for KAWC's residential customer base have improved over time from 0.7% in 2012 to 0.6% in 2022 and are expected to be 0.68% under the Company's proposed rates in this case during the forecasted test year. This is a tangible demonstration that our customer bills have become more affordable and will remain affordable even with KAWC's requested rate increase.

Q. Is this positive trend in affordability reflective of the value of service that KAWC's customers enjoy from the Company?

A. Yes. This positive trend in affordability is a result of the long-term investment and management practices of the Company and is a positive reflection of the fact that the investment strategies the Company has undertaken over time and the way that the Company has proactively managed the system is in the long-term best interests of our customers. As Mr. Newcomb explains, the Company investment in infrastructure since the last rate case has outpaced its prior investment by approximately 250%. Nevertheless, the Company's service has remained affordable, largely in part due to the Company's ability to manage its O&M expense. The combination of proactive investment, steady O&M, and strong and improving affordability demonstrates that the Company's management of the business and investment in the business delivers a high-value service to customers at affordable rates which is in the long-term best interest of our customers.

Q. How does KAWC maintain the affordability of its water service?

A. An important way that we maintain affordability is by continuously seeking to improve our business processes and make investments that improve operational efficiencies, and we have been very successful in doing so. As Mr. Lewis and Ms. Porter explain, we use targeted investments to permit us to work smarter and more efficiently as well as leveraging the power of our organization to both share learning on best practices and purchase equipment and supplies at advantageous terms. All of these help us manage and contain cost increases.

Q. Notwithstanding the overall affordability of KAWC's rates, are there customers who might face affordability issues?

A. Yes, some of our customers face challenging economic circumstances. Thus, Mr. Rea also examined the affordability of our rates for our more vulnerable customers. His assessment compares annualized bills for "basic water service" (i.e., service that is necessary and reasonable to meet basic household needs for drinking, cooking, sanitation, and general health service that does not include seasonal discretionary water use) to measures of household income for lower income groups. The Company estimates that there are approximately 11,000 residential customers in its service areas with household incomes at or below 100% of Federal Poverty Level ("FPL"), or approximately 9% of the Company's residential water customer base. For customers with household incomes at 100% FPL, the average BTI Ratio is approximately 2-3% for basic water service, which we define as 40 gallons of water per household resident per day, and for customers whose household incomes are at 50% of FPL, the average BTI Ratio is approximately 5% for basic water service. For these more vulnerable customers, the Company continues to offer various assistance programs, which I describe below. The Company is also proposing in this case a new, universal affordability tariff rate to further address the affordability of water service for vulnerable customers, as explained in more detail by Mr. Rea.

Q. What customer assistance programs does KAWC offer its more vulnerable customers to maintain the affordability of its service?

A. KAWC offers several targeted customer assistance programs to help our most vulnerable customers. KAWC supports community low-income customers through KAWC's Help to Others (H2O) program. The H2O program is an emergency bill-paying assistance program funded by KAWC and donations from customers who want to help other customers in need. Customers who qualify may receive grants of up to $125 annually toward their KAWC bill.[1] This emergency assistance program is administered by Dollar Energy, an independent, non-profit organization. KAWC's residential customers have the option of paying bills under the Company's budget billing plan, whereby the total service for the succeeding twelve-month period is estimated in advance, and bills are rendered monthly based on one-twelfth of the twelve-month estimate. In addition, the Company offers its customers flexible payment arrangements through installment agreements if they are financially unable to pay a water service bill when due. The length of a payment arrangement can vary, and there is no limit to the number of installment agreements available to our customers provided that prior installment agreements terms have been fully met.

Q. You mentioned KAWC is proposing a universal affordability tariff to assist its most vulnerable customers. What is KAWC's proposal?

A. The Company is proposing a multi-tiered universal affordability tariff that offers discounts

[1] The maximum grant amount was temporarily increased to $250 through December 31, 2023.

on both the basic 5/8” meter charge and the volumetric charges for water service to help the estimated 11,000 residential water service customers with household incomes at or below 100% of the FPL. As explained by Mr. Rea, the Company’s proposed tariff will make water service more affordable for this group of customers by offering a 60% discount on applicable volumetric base rates for qualifying customers between 0% and 50% of the FPL and a 20% discount on such rates for qualifying customer between 50% and 100% of the FPL. Under this tariff, a typical Basic Water Service bill for a three-person household would be reduced from $46.44 per month under proposed rates to $37.15 per month, which is a discount of 20% on the total bill and is less than what these customers would pay for Basic Water Service under the Company’s current rates.

ADDITIONAL RATEMAKING PROPOSALS

Q. Please briefly discuss the additional ratemaking proposals KAWC is requesting in this case.

A. There are two I would like to highlight. The Company is requesting expansion of its existing QIP and a determination that an alternative UFW percentage of 20% is more appropriate for the Company than the Commission’s general 15% standard.

Q. Please provide an overview of the Company’s proposal to expand the QIP.

A. Aging infrastructure remains a challenge for water utilities across the country, including KAWC. While the existing scope of the QIP has allowed the Company to accelerate some replacement of its aging infrastructure, it is not sufficient to address the pace at which the Company’s aging infrastructure should be replaced to best serve the long-term interest of our customers. In the proceeding, the Company is proposing one small step towards implementing the QIP as it was originally designed by expanding the QIP from an annual replacement of 10-13 miles of cast iron main to 27-34 miles of any material of main (as prioritized). As Ms. Citron discusses in greater detail, nearly 250 miles of pipes of various materials will have already reached or exceeded their useful life on or before the year 2025. While we understand we can't tackle it all at once, we need to do more to further advance the Company's proactive infrastructure replacement efforts, which will help mitigate costs for customers. As discussed in Citron's Direct Testimony, planned pipe replacement cost $331 per foot whereas reactive pipe replacements cost over $1,000 per foot on average. That's more than three times the cost to replace a broken pipe than to replace it as part of proactive replacement program, such as QIP. As Ms. Citron further points out, to the extent that pipe replacement is deferred into the future, service quality will suffer from an increasing number of pipe breaks and the resulting service disruptions, health risks from potential drinking water contamination, property damage, and opportunity costs related to community health and economic development. Deferral of pipe replacements year by year has a cumulative effect on the future cost to customers for replacing these pipes, leaving future customers with much larger bills. The Company's QIP expansion proposal will allow the Company to address the replacement of its aging infrastructure as cost effectively as possible over the long-term.

Q. What is KAWC's request related to UFW?

A. As Mr. Lewis discusses in his direct testimony, KAWC is requesting that the Commission establish 20 percent UFW as the reasonable level for KAWC in this case. As Mr. Lewis explains, KAWC's water loss control program has demonstrated effective utility management and stewardship of water resources and there are circumstances present in

KAWC's service territory that warrant the Commission's approval of an alternative level of UFW.

<u>IMPROVING WATER EFFICIENCY AND PRODUCTIVITY</u>

Q. Please explain the concept of water efficiency.

A. Water efficiency means using improved practices and technologies to deliver water service more efficiently. Water efficiency efforts include supply-side practices, such as more accurate meter reading, leak detection, main replacement and repair programs, as well as demand-side strategies, such as public education programs to encourage the wise use of water. Improving water efficiency reduces operating costs (e.g., pumping and treatment) and reduces the need to spend capital developing new supplies and expanding our water infrastructure. It also reduces withdrawals from limited freshwater supplies, leaving more water for future use and improving the ambient water quality and aquatic habitat.

Q. How is the concept of improving water efficiency relevant to this case?

A. Improving water efficiency is a common thread throughout the entire fabric of this case. At its core, this case is about investments we are making to better serve our customers. Striving for increased water efficiency is evident in our infrastructure investments, such as the main and service replacements that help us provide a better, more reliable system. Our water efficiency efforts are demonstrated by investments in new technologies, and by improved business processes that help us work smarter and more efficiently and, by extension, contribute to our cost control efforts. As discussed by Mr. Lewis, in addition the leveraging technology to improve water efficiency, the Company also focuses on other efforts, such as its water loss control program. As discussed in Ms. Porter's direct testimony, the investments we are making to better serve our customers are primarily in non-revenue producing investments – replacing aging infrastructure, enhancing reliability and resiliency, and water efficiency investments. Several projects included in this case involve the installation of higher efficiency pumps, which help reduce the amount of energy necessary to operate those pumps on a going forward basis. As we plan our investments, however, we know how important it is to balance the need for system improvements with what our customers pay for water service. Consequently, the Company continually strives to find more efficient and cost-effective ways to operate and maintain its business. For example, as Ms. Porter explains, the Company looks for value engineering opportunities when it plans projects to maximize their cost effectiveness. By doing so, the Company was able to accomplish a significant decrease in the original estimated costs for the installation of ultraviolet equipment at the Richmond Road water treatment plant.

Q. You mention investments in new technology. Is AMI one of those technologies that will contribute to water efficiency?

A. Yes, as discussed in the Company's AMI Deployment Plan (Exhibit A to the Application) the implementation of AMI will result in improved efficiencies associated with reducing the need for manual re-reads and the number of certain service orders, and improving meter reading and bill accuracy, as well as leak detection and non-revenue water reduction efforts.

Q. Please provide an overview of the Company's request to implement AMI.

A. As part of its application in this proceeding, the Company has submitted an application for a CPCN for the implementation of AMI. KAWC plans to deploy cellular AMI technology over the course of the next decade, as it completes normal, scheduled, periodic replacement of its existing metering equipment throughout its service territory. Unlike some other proposed AMI deployments in the state, KAWC is not planning to accelerate the replacement of its entire meter reading system regardless of its age or condition. Rather, KAWC will transition to an updated technology for meter reading equipment as it completes meter and endpoint replacements in the normal course of business. The Company's transition to AMI will provide both operational benefits and efficiencies and provide enhanced customer service to customers, as discussed in greater detail in Exhibit A.

Q. You also mention the Company's water loss control program. How do the Company's efforts to reduce water loss contribute to improving water efficiency?

A. As explained by Mr. Lewis, the Company has implemented various practices and processes to help reduce water loss, including pressure management, accelerated infrastructure replacement (QIP), active leak detection, rapid response to breaks, fire service and water loss audits, and large meter testing and profiling. Water loss can be classified into two categories: (1) real loss which is water that escapes the distribution system from leaks or storage overflows; and (2) apparent loss due to meter inaccuracies, billing system data errors, and unauthorized consumption. The Company is tackling them both to help mitigate increases in operating costs associated with treating, pumping and delivering water to customers, as well as maintain the reliability and resiliency of the system (including water supplies).

Q. Does KAWC gain efficiencies from its affiliation with American Water?

A. Yes. Our affiliation with the American Water family of companies allows us to leverage the expertise, purchasing power and financial strength of the larger organization. For example, Service Company provides a wide spectrum of necessary, cost-effective, value-added services that enable KAWC to fulfill its responsibilities in a more cost-effective manner. These services include water quality testing at the state-of-the-art American Water Laboratory, as well as customer service, human resources, supply chain, legal, corporate finance, environmental safety, engineering, communications, and information technology systems. By providing services on a shared basis at cost, the Service Company allows KAWC to provide its customers these necessary services and expertise more cost-effectively than the Company can on its own. Company witness Mr. Pat Baryenbruch demonstrates that the services that KAWC obtained from Service Company are cost effective and reasonable in amount. In addition, American Water Capital Corp. ("AWCC") provides the Company with access to short-term loans, long-term borrowings, and cash management services at very competitive rates; rates that KAWC would not be able to obtain on its own due to our relatively small size. Mr. Furia discusses the benefits that AWCC provides the Company.

COMMUNITY OUTREACH

Q. Please describe Kentucky-American's commitment to the communities it serves.

A. We enjoy a number of positive relationships in the communities we serve, including with the Lexington-Fayette Urban County Government, the city of Owenton in Owen County, and the cities of Millersburg and North Middletown in Bourbon County, in areas such as education, economic development, environmental protection, fire safety and assistance for low-income families. The Company takes its commitment to the communities we have the privilege to serve very seriously. As such, we are community partners for a number of local initiatives and events. For example, in 2023 KAWC sponsored for the 38th year the Kentucky-American Water Science Fair coordinated by Fayette County Public Schools, a district-level event attracting hundreds of elementary, middle and high school students from public, private, and home schools for a day of competition and fun, hands-on educational exhibits showcasing how the lessons students learn in their science classrooms applies to real life.

The Company also provides support for Reforest the Bluegrass, an annual riparian reforestation event in Fayette County during which hundreds of volunteers plant thousands of tree seedlings near an urban stream. Likewise, the Company has an ongoing partnership with the Lexington Division of Police and local Drug Enforcement Agency officials in offering two drug take-back days each year at the Company's Richmond Road location designed to assist citizens in keeping expired and no-longer-needed medications out of the wrong hands and out of waterways. The Company also sponsors or contributes to a number of initiatives that enhance our communities. For example, KAWC provides grants to local firefighting organizations to fund critical needs, such as additional hoses, communication equipment, and training. Since its inception in 2011, KAWC has contributed $91,500 to professional and volunteer fire and rescue organizations. With respect to having pride in our service area, KAWC assists with the operational expenses for the fountains at Triangle Park, which are a landmark in the City of Lexington, and also supports a number of community festivals, such as Sweet Owen Days in Owen County, Christmas at Mustard Seed Hill in Millersburg, Founders' Day at McConnell Springs and Homecoming in Livingston. KAWC also provides its H2O to Go station, a portable trailer equipped with water dispensers which provides refreshing tap water at races, walks, festivals and other large outside events, and the company's mascot, Puddles the Duck, participates in events, as feasible, too. Our commitment to the areas we serve is not confined to monetary shareholder contributions.

KAWC has adopted a portion of Richmond Road near its offices in Lexington as well as a portion of US 127 in Owen County near its Kentucky River Station II water treatment facility through the “Adopt-a-Highway” program sponsored by the Kentucky Transportation Cabinet. Many of our employees donate their time by performing trash pick-ups through this program to provide a clean environment and instill civic pride. Similarly, KAWC annually engages in a United Way campaign in which our employees support local charitable and non-profit organizations, and annually in September, employees participate in Americans in Action community service efforts such as volunteering time at local animal shelters, serving meals to the homeless, and donating gently used clothing and accessories for foster children.

KAWC also offers a total of $5,000 each year to area organizations through its Environmental Grant Program to assist with a variety of environmental initiatives. Organizations are eligible for grants up to $5,000 for community-based projects that improve, protect and restore drinking water supplies and surrounding watersheds. Since 2006, this program has provided $252,000 in such grants. On an annual basis, KAWC awards Ripple Effect Scholarships to high school seniors who demonstrate academic excellence, an ongoing commitment to environmental stewardship and interest in a related career. Since the program’s inception in 2002, KAWC has awarded a total of $69,000 in Ripple Effect Scholarships to 121 students.

Q. What are some of the specific activities Kentucky-American Water has partnered in?

A. Being a good neighbor is part of our mission at Kentucky-American. The employees of Kentucky-American play an active role in the communities we serve by getting involved in a variety of environmental and educational activities related to water, everything from watershed clean-up efforts to school programs focused on drinking water and source water protection. KAWC leadership team members give back to the community by serving on a number of boards and committees for civic and charitable causes, such as the American Red Cross, Big Brothers Big Sisters of the Bluegrass, Bluegrass GreenSource, Bluegrass Tomorrow, Commerce Lexington, Junior Achievement of the Bluegrass, United Way, the Urban League, Greenspace Trust and Women Leading Kentucky. We work with a number of community-based partners throughout our service areas to improve the overall quality of life where our employees and neighbors live and work.

In addition, KAWC highlights to nonprofit organizations in its service area the grant programs offered by the American Water Charitable Foundation (AWCF) so that they can apply for funds, if interested and eligible. Among the organizations, programs and projects to have received AWCF grant funds since 2019 are a handicapped-accessible fishing pier project coordinated by the Unions Sportsmen Alliance at Lexington's Jacobson Park; God's Pantry food bank for assistance during the pandemic; a regional, comprehensive watershed education program coordinated by Bluegrass Greensource; and a new splashpad accompanied by educational signage – to include watershed education – at Charles Young Park in downtown Lexington.

Q. Does this complete your testimony?

A. Yes, it does.

VERIFICATION

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

The undersigned, Kathryn Nash, being duly sworn, deposes and says that she is the President of Kentucky-American Water Company, that she has personal knowledge of the matters set forth in the accompanying testimony for which she is identified as the responsible witness, and that the answers contained therein are true and correct to the best of her information, knowledge and belief.

Kathryn Nash
Kathryn Nash

Subscribed and sworn to before me, a Notary Public in and before said County and State, this 21st day of June, 2023.

Molly McCleese Van Over
Notary Public

My Commission Expires:
July 31, 2025
Notary ID: KYNP26988

COMMONWEALTH OF KENTUCKY
BEFORE THE PUBLIC SERVICE COMMISSION

IN THE MATTER OF:

ELECTRONIC APPLICATION OF KENTUCKY-	**)**	
AMERICAN WATER COMPANY FOR AN	**)**	
ADJUSTMENT OF RATES, A CERTIFICATE	**)**	
OF PUBLIC CONVENIENCE AND NECESSITY	**)**	**CASE NO. 2023-00191**
FOR INSTALLATION OF ADVANCED METERING	**)**	
INFRASTRUCTURE, APPROVAL OF CERTAIN	**)**	
REGULATORY AND ACCOUNTING	**)**	
TREATMENTS, AND TARIFF REVISIONS	**)**	

DIRECT TESTIMONY OF JEFFREY NEWCOMB

June 30, 2023

Q. Please state your name and business address.

A. My name is Jeffrey Newcomb. My business address is 2300 Richmond Road, Lexington, Kentucky 40502.

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

A. I am employed by American Water Works Service Company, Inc. ("Service Company"). Service Company is a wholly owned subsidiary of American Water Works Company, Inc. ("American Water") that provides services to Kentucky-American Water Company ("KAWC", "Kentucky-American" or the "Company") and its affiliates. My current role is Senior Manager, Rates and Regulatory.

Q. Have you previously filed testimony before this or any other commission?

A. I have sponsored testimony before the Kentucky Public Service Commission ("PSC") in Case No. 2023-00030. I have also previously submitted testimony before the Indiana Utility Regulatory Commission in support of Northern Indiana Public Service Company LLC's gas rate case in Cause No. 45621 and the Public Service Commission of Maryland in support of Columbia Gas of Maryland, Inc.'s gas rate case in Case No. 9644.

Q. Please state your educational and professional background.

A. I graduated from the Kelley School of Business, Indiana University, Bloomington, Indiana, in 2007 as a Bachelor of Science in Business Administration, and in 2008 as a Master of Business Administration, both with a major in Accounting. My professional career started with Ernst & Young, LLP, as an Intern during the summers of 2006 and 2007 before working full-time as an Associate from 2008 to 2010 and Senior Associate from 2010 to 2011 with the firm's tax practice in Chicago, Illinois. Prior to joining American Water, I worked for NiSource Inc. from 2011 to 2022, where I held various roles during my tenure, including Senior Financial Analyst in Accounting, Lead Financial Planning Analyst, Lead Regulatory Strategy and Support Analyst, Capital Planning and Execution Manager, and Manager, Regulatory – Rate Case Optimization. I accepted my current position of Senior Manager, Rates and Regulatory, for Kentucky-American Water Company on October 3, 2022.

Q. What are your duties as Senior Manager, Rates and Regulatory?

A. As Senior Manager, Rates and Regulatory, for Kentucky-American Water Company, my duties generally consist of management and execution of the rates and regulatory function of Kentucky-American. My responsibilities include the preparation of written testimony, exhibits, and work papers in support of rate applications and other regulatory filings, as well as responses to data requests for Kentucky-American.

Q. What is the purpose of your direct testimony in this proceeding?

A. The scope of my testimony will include the following topics:

- Development of the Forecasted Test Year
- Minimum Standard Filing Requirements
- Revenue Requirement, Revenue Deficiency, and Average Bill
- Present Rate Revenue and Proposed Rate Revenue
- Tariff Changes
- Select Expenses:
    - Contract Services
    - Miscellaneous Expense
    - Rents
    - Regulatory Expense

- Electronic Payment Fees
- Taxes Other Than Income (excluding Payroll Taxes)

• Qualified Infrastructure Program

• Regulatory and Accounting Treatments for Select Expenses:
  - Production Costs
  - Pension and Other Post-Employment Benefits (“OPEB”) Expenses
  - Tax Expenses (excluding Sales Tax)

DEVELOPMENT OF THE FORECASTED TEST YEAR

Q. What is the base period in this case?

A. The Company has used a base period of the twelve months ending September 30, 2023. This base period data reflects six months of actual data (October 1, 2022, to March 31, 2023) and six months of forecasted data (April 1, 2023, to September 30, 2023).

Q. Please explain the development of the Company’s fully forecasted test period.

A. The fully forecasted test period in this case is the twelve months following the suspension period (“forecasted test year”). For revenues and expenses, this is February 1, 2024, to January 31, 2025. For thirteen month average rate base and capitalization, the period is from January 2024 to January 2025.

The development of the forecasted test year is completed using the same assumptions and methodologies as used in the forecast developed by management. To the extent there are differences, they relate to timing differences, and availability of more recent information. The Company has made pro forma adjustments to the base period for any known or projected increases or decreases to arrive at the forecasted test year expenses, investments, financings, and revenues on which KAWC proposes to base its rates.

Q. Did the Company include the revenues and costs of any acquired systems in its rate case forecast?

A. No. KAWC does not have any acquired systems to include in its rate case forecast.

MINIMUM STANDARD FILING REQUIREMENTS

Q. Please describe the Company's Minimum Standard Filing Requirements

A. Consistent with Kentucky law for forecasted test year rate cases, the Company has provided Exhibits 1 through 37 to the Application. Please see Exhibit JN-1, attached to this testimony, for a list of these exhibits and their sponsors.

REVENUE REQUIREMENT, REVENUE DEFICIENCY, AND AVERAGE BILL

Q. Please describe Kentucky-American's revenue requirement.

A. The Company's revenue requirement is equal to the cost of providing water service to more than 138,000 customers throughout fourteen Kentucky counties (including Bourbon, Clark, Fayette, Franklin, Gallatin, Grant, Harrison, Jackson, Jessamine, Nicholas, Owen, Rockcastle, Scott, and Woodford Counties). Providing water service is a sprawling endeavor that starts with sourcing more than 15 billion gallons of surface water from Kentucky lakes and rivers, then treating it to meet or surpass drinking water standards, and finally pumping and distributing it through approximately 2,300 miles of main to reach all homes, businesses, schools, and industries throughout KAWC's service territory. Along the way, the Company must ensure adequate capacity and storage to accommodate peak usage and to help protect our communities during fire events. The Company also provides customer service, monthly billing, 24-hour emergency call handling, and a self-service website. The Company monitors water quality for a host of contaminants and maintains the distribution system by exercising valves, flushing hydrants, and repairing main breaks at all hours and in all weather conditions. All of these efforts support the Company's provision of safe, clean, reliable water service, sanitation, and fire protection service to customers.

To accomplish all of this, the Company incurs costs for which it seeks recovery through the ratemaking process. The Company's costs include a variety of operating expenses, depreciation and amortization, and various local, state, and federal taxes. The Company also must provide a return, at least equal to the cost of capital, on over $588 million in water infrastructure rate base that supports the Company's provision of service to customers.

Q. What is Kentucky-American's revenue requirement for the forecasted test year in this proceeding?

A. The Company's forecasted revenue requirement in this proceeding, equal to the cost of providing service, is approximately $142.3 million for the 12 months ending January 31, 2025. The Company's forecasted revenue requirement is found on Exhibit 37, Schedule A.

Q. Please describe how the Company's revenue deficiency is derived.

A. The Company's revenue deficiency, found on Exhibit 37, Schedule A, is measured as the difference between the forecasted revenue requirement and the Company's forecasted revenues at present rates. The Company's revenue deficiency in this proceeding is calculated to be approximately $26.1 million, which is an approximate 22.7 percent deficiency.

Q. When were Kentucky-American's present water rates established?

A. Kentucky-American's present water rates were most recently established through Case No. 2018-00358. The rates were ordered on June 27, 2019, with an effective date of June 28, 2019. Revenue at present water rates also reflects an 8.27 percent QIP Rider charge proposed by the Company in Case No. 2023-00030, adjusted for a theoretical QIP Rider charge the Company would propose in 2024 if not filing this Application. The theoretical QIP Rider charge is 10.57 percent and is applied to base revenue at present water rates for July 1, 2024, to January 31, 2025.

Q. What are the key drivers of revenue deficiency in this case?

A. The revenue deficiency in this case is fundamentally driven by over $145 million of rate base growth since the 2018 Rate Case, increases in certain operations and maintenance ("O&M") expenses, and increases in property taxes charged to the Company by state and local governments.

Q. What does this rate request mean for the average residential customer?

A. While the revenue deficiency (both on a dollar basis and percentage basis) seems significant, the average residential bill as we head into 2024 is still proposed to be under $50 per month,[1] less than 0.7 percent of median household income. For comparison, in 2019, when the current rates ("present rates") went into effect, the average residential bill was just under $40; less than 0.6 percent of median household income. The Company's request is to have residential customers paying about $9 more per month than they were paying nearly half a decade before. This is a testament to the value the Company provides

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[1] As shown on Exhibit 37, Schedule N.

to its customers. As Company witness Rea demonstrates in his direct testimony, the Company's rates have remained affordable for the majority of its customers, all while the Company has increased its level of investment in replacement of aging infrastructure and improvements to water treatment and distribution facilities to continue to provide high quality and reliable service to customers and the communities it serves. In fact, the $145 million of rate base growth over the 55 month period between what was ordered in Case No. 2018-00358, with a forecasted test year ending June 30, 2020, and proposed in this case, with a test year ending January 31, 2025, compared to the $59 million of rate base growth over a 70 month period between what was ordered in Case No. 2012-00520, with a forecasted test year of July 31, 2014, and what was ordered in Case No. 2018-00358, shows that recent rate base investment, over a shorter period of time, has outpaced past investment, over a longer period, by nearly 250 percent. The Company has been able to do so in part through its effective management of the system, evidenced by its ability to keep increases in its operations and maintenance expense below the rate of inflation, as discussed by Company witnesses Watkins and Lewis.

PRESENT RATE REVENUE AND PROPOSED RATE REVENUE

Q. Has the Company calculated its forecasted test year revenues under current and proposed rates?

A. Yes. Company witness Rea is sponsoring exhibits that show Kentucky-American's forecasted test year revenues under current and proposed rates and the associated revenue shortfall under current rates, as well as the makeup of the Kentucky-American's Other Revenues.

Q. Has the Company proposed a rate design in this case?

A. Yes. Company witness Rea's testimony describes Kentucky-American's rate design and rate design proposals for water service in this case.

<u>TARIFF CHANGES</u>

Q. Has the Company proposed changes to its tariff in this proceeding?

A. Yes. Exhibit 37 L provides a narrative explanation of these changes. The changes can also be seen on Exhibit 2 which shows the proposed tariff changes and Exhibit 3, which compares the current and proposed tariffs. Of note are the proposed tariff additions of an AMI opt-out fee and proposed language clarifying cross-connection backflow certifications.

Q. What challenges, or opportunities for improvement, are addressed by the Company's proposed language clarifying cross-connection backflow certifications?

A. The challenges, or opportunities for improvement, addressed by the Company's proposed language clarifying cross-connection backflow certifications, regarding the expense of testing, which would include a fee for reporting test results to the Company's third-party contractor, Backflow Solutions, Inc. ("BSI"), include the following:

1) <u>Manually entering test data into the system of record</u>: Kentucky-American oversees approximately 11 thousand backflow assemblies ("BFAs"). The active BFAs are required to be tested annually, creating the need to manually enter 11 thousand test records into the system of record, SAP.

2) <u>Timeliness of test report entry into system of record SAP</u>: In 2022, 90 percent of tests were not logged into SAP until at least two weeks after the test was completed. Furthermore, 59 percent of tests were not logged into SAP until at least four weeks

after the test was completed. This delay is caused by a combination of the tester mailing physical test reports and a backlog of test reports needing manual entry into SAP, and the lag makes it difficult to ascertain a true testing compliance rate.

3) Test letters mailed to compliant customers: Kentucky-American sends three test letters to customers with backflow assemblies. The first letter goes out 60 days prior to the test due date, the second 20 days prior, and the third 8 days prior. A customer may test their device between the first and second test letter creation dates, but if there is a delay in entering the test report into SAP, the customer will receive a second test letter (and possibly a third) when the completed test report has not yet been entered into SAP. As a result, in 2022, more than 2,500 test reminder letters were sent to customers who were in compliance.

4) Staffing requirements for increased cross connection program focus on key activities such as inspections, surveys, and enforcement: A significant portion of the cross connection program's staffing resources are dedicated to test data entry and related tasks.

5) Oversight of tester licensure and test kit calibration: Kentucky-American is responsible for maintaining a list of certified testers and test kit calibration dates within SAP. In the first quarter of 2023, the Company made 30 changes (new/updated record entries) to the certified tester list. Further, testers do not often send their updated certification proactively, and tests cannot be entered into SAP if a tester's certification expiration date has passed. This requires Kentucky-American to reach out to testers so that their certification information can be updated and their submitted test reports can be entered.

6) Consolidated test letter mailing: SAP sends test reminder letters for each individual BFA. SAP does not have the ability to generate a single consolidated mailing for customers that have multiple BFAs. Kentucky-American has 74 customers with more than ten BFAs, with one customer having as many as 268 BFAs.

Q. How does BSI help address these challenges and opportunities for improvement?

A. The ways that BSI helps address the challenges and opportunities for improvement discussed above, include the following:

1) Manually entering test data into the system of record: The BSI platform requires testers to enter test results directly into an online portal. The results are written back to the water purveyor database within BSI in near real-time, and Kentucky-American no longer has to expend resources manually entering test data.

2) Timeliness of test report entry into system of record SAP: An understanding of real-time/true testing compliance rate is gained because of the nature of the BSI platform.

3) Test letters mailed to compliant customers: After passing test results are entered into BSI's online portal, subsequent test reminder letters will not be sent until the next annual test due date.

4) Staffing requirements for increased cross connection program focus on key activities such as inspections, surveys, and enforcement: With the operational efficiencies gained from the test result submission process using BSI, the Company's cross-connection team can focus staffing resources on other activities that improve public health protection and customer service.

5) <u>Oversight of tester licensure and test kit calibration</u>: BSI manages tester certification and test kit calibration. A tester cannot submit a test report within the BSI platform unless both the certification and test kit calibration are valid. Testers submit updated certification and calibration records directly to BSI.

6) <u>Consolidated test letter mailing</u>: BSI allows customers to opt-into consolidated letter mailing. Customers that opt-in will receive a single piece of mail that provides a tabular summary of all BFAs that require testing.

SELECT EXPENSES

Q. Please describe the operating expenses related to and any adjustments for contract services.

A. The contract services expense includes costs associated with snow removal, lawn mowing and landscaping, lab testing, accounting, audit and legal fees (other than those associated with a rate case proceeding), and other certain services that are performed by a contracted third party. Adjustments for contract services include an inflation adjustment based on Consumer Price Index ("CPI") data from the Bureau of Labor Statistics ("BLS"), an adjustment for utility location ("line locates") outsourcing, and an adjustment for the contracting of leak detection services. Company witness Lewis further discusses the line locates outsourcing and contracting of leak detection services. The forecasted test year contract services expense can be found in Exhibit 37, Schedules C and D.

Q. Please describe the operating expenses related to and any adjustments for miscellaneous expense.

A. The operating expense described as miscellaneous expense includes expenses for customer education, community relations, membership dues, directors' fees, hiring costs, office power, heating and oil, as well as other miscellaneous expenses such as laboratory supplies. The adjustments made to miscellaneous expense include an adjustment for inflation based on CPI data from BLS, an adjustment to remove charitable contributions, and an adjustment to normalize inventory scrap write-offs. The forecasted test year miscellaneous expense can be found in Exhibit 37, Schedules C and D.

Q. Please describe the operating expenses related to and any adjustments for rents.

A. Kentucky-American incurs expense for rents associated with copy machines and other miscellaneous items, as well as office space, and easements. The adjustment made to rent expense is for inflation based on CPI data from BLS. The forecasted test year rent expense can be found in Exhibit 37, Schedules C and D.

Q. Please describe the operating expenses related to and any adjustments for regulatory expense.

A. The purpose of this adjustment is to annualize rate case expense for the costs related to this rate filing. Estimated costs related to this rate filing include legal fees, consultants' costs, travel expenses, and other expenses. KAWC proposes that these costs be amortized over a two year period. The forecasted test year regulatory expense can be found in Exhibit 37, Schedules C and D, and also Schedule F-6.

Q. Should reasonable and prudently incurred rate case expense be recovered?

A. Yes. The cost of litigating a rate case is a normal and essential cost of service for any regulated public utility and should be treated as such. As a regulated utility, KAWC has a legal obligation to provide safe and adequate service to its customers at just and reasonable rates. Periodic rate changes are necessary to support the Company's continued provision of safe and adequate service to its customers. The way that KAWC changes its base rates is through the rate case process.

Q. Please explain the adjustment to other customer accounting expense for electronic payment fees.

A. The purpose of this adjustment is to annualize electronic payment fees assessed by KAWC's vendor for customer payments processed via credit card and electronic check as an operating expense. The Company proposes to waive the vendor's electronic payment processing fees currently paid by individual customers and include these fees as base operating expense within the forecasted test year. The forecasted test year electronic payment fees can be found in Exhibit 37, Schedules C and D.

Q. Why is the Company proposing to include electronic payment fees?

A. The Company's goal is to provide customers with the most convenient options to pay their bill. Customers are accustomed to many transactions that are paid electronically, including with a credit card, as most online transactions are today. Charging a fee on top of the customer bill adds friction to the process of paying a bill. Eliminating the direct payment of the fee is expected to help more customers pay their bill on time, avoid late fees and potential disconnections, and improve timely collections. According to a National Association of State Utility Consumer Advocates ("NASUCA") resolution (Resolution 2012-07),[2] "state public utility commissions are urged to survey the utilities within their

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[2] NASUCA, *2012-07 Urging Utilities to Eliminate "Convenience" Fees for Paying Utility Bills with Debit and Credit Cards and Urging Appropriate State Regulatory Oversight*, available at https://www.nasuca.org/2012-07-urging-utilities-to-eliminate-convenience-fees-for-paying-utility-bills-with-debit-and-credit-cards-and-urging-appropriate-state-regulatory-oversight/.

jurisdictions to determine the options that are available to consumers for paying utility bills without incurring additional charges."

Q. Can you identify what is included in general tax ("taxes other than income")?

A. Yes. General tax includes expenses incurred for property tax, payroll taxes, other taxes and licenses, and regulatory assessment fees. I will discuss the adjustments to property tax, other taxes and licenses, and regulatory assessment fees. Please refer to the labor and related expenses testimony of Company witness Watkins for a discussion of payroll taxes.

Q. Please describe the adjustments for property tax expense.

A. Property tax has two components, a county/city liability and a state liability. Both liabilities are calculated by multiplying tax rates by the assessed value of property. The adjustments to property tax expense include: (1) an adjustment related to the forecasted change in net water utility plant in-service ("UPIS") and forecasted change in property tax rates, where the forecasted change in net water UPIS is supported by Company witness Selinger, and the forecasted change in property tax rates was calculated using a four-year average of actual overall property tax rates from the final assessments for tax years 2019 to 2022 and applying an assumed 3 percent annual escalation, and (2) an adjustment to the state property tax rate applied to water pipeline property, where the adjustment to the state property tax rate applied to water pipeline property was calculated as the difference between the tangible personal property tax rate for state to the estimated effective state property tax rate for all other property and multiplying that difference by the forecasted portion of net water UPIS that is assumed to be considered water pipeline property for state property tax purpose. The tangible personal property tax rate comes from the final assessment for tax year 2022 and has been constant for tax years 2019 to 2022. The estimated effective state property tax rate for all other property was calculated using a four-year average and applying an assumed 3 percent annual escalation. The Company has assumed the following utility plant accounts will be considered tangible personal property for property tax purposes based on interpretation of guidance provided by the Kentucky Department of Revenue within a May 31, 2023, email received from Robert Carbin, Business Appraiser Branch Manager, Office of State Valuation: Utility Plant Accounts 309-Supply Mains, 330-Distribution Reservoirs and Standpipes, 331-Transmission and Distribution Mains, and 333-Services.

Q. What is the utility regulatory assessment fee in this case?

A. This component of taxes other than income is also referred to as Utility Regulatory Assessment tax ("PSC Fee"). The Company has forecasted the PSC Fee for the forecasted test year by applying the current PSC Fee rate to the total forecasted revenues, less AFUDC. The current PSC Fee rate was calculated using the Company's Annual Public Service Commission Assessment for the period July 1, 2022, to June 30, 2023.

Q. Are there any other adjustments to taxes other than income?

A. Yes. There are adjustments to payroll tax as discussed by Company witness Watkins, and an adjustment to remove the de minimis base period amounts of tax discounts and other taxes and licenses from the forecasted test year.

QUALIFIED INFRASTRUCTURE PROGRAM ("QIP")

Q. Please discuss the history of QIP and how the current QIP works.

A. The current QIP rider is a regulatory tool providing recovery of the costs of capital, depreciation, and taxes associated with qualified infrastructure investment between base rate case filings. After the Commission approved KAWC's QIP in Case No. 2018-00358, KAWC filed its first QIP case for QIP Year 1. QIP Year 1 was for the period July 1, 2020, to June 30, 2021, and it was Case No. 2020-00027. The Commission decided that case by Order on June 17, 2020. In that Order, the Commission scaled back significantly the infrastructure asset classes that could be included in the QIP charge from what it had approved in Case No. 2018-00358, and then approved a QIP charge amount of 0.97%.

KAWC's next QIP case for QIP Year 2 was Case No. 2021-00090. In that case, the Commission scaled back even further the infrastructure asset classes that could be included in the QIP charge and approved a cumulative QIP charge of 2.04%.

KAWC then filed a QIP case for QIP Year 3, which was Case No. 2022-00032. In that case, the Commission approved a cumulative QIP charge of 4.61% and KAWC's proposed revision to the calculation of its QIP 2 rate to reflect forecasted "end-of-period" construction investment. The Commission also directed KAWC in its 2023 QIP filing that its end-of-period update to QIP 3 should reflect the actual construction costs incurred for the QIP 3 projects as of January 31, 2023, that the remaining five months (February 1, 2023 to June 30, 2023) of the QIP 3 period should reflect the forecasted construction costs for that period, and additionally, any differences between the forecasted construction costs for the remaining period and what was forecasted in Case No. 2022-00032 should be supported by filed testimony.

Most recently, KAWC proposed in Case No. 2023-00030: (a) a single asset class for the Year 4 QIP ("QIP 4"), which is "Budget Line B: QIP Mains Replaced/Restored;" (b) the end-of-period update to QIP 3 reflecting the actual construction costs incurred for the QIP 3 projects as of January 31, 2023; (c) the remaining five months (February 1, 2023-June 30, 2023) of the QIP 3 period reflects the forecasted construction costs for that period, and additionally, any differences between the forecasted construction costs for the remaining period and what was forecasted in Case No. 2022-00032. The revenue requirement for QIP 4 was based on the 47 proposed projects in that "Budget Line B" asset class. The total amount requested for QIP 4, which is for the period July 1, 2023, to June 30, 2024, is the QIP Year 1 authorized reconciliation amount of 1.03%, plus the QIP Year 2 authorized reconciliation amount of 2.33%, plus an additional charge of 3.59% for the recalculated rate base of QIP Year 3 based on "end of period" values as of June 30, 2023, plus an additional charge of 1.32% for the projects proposed in QIP Year 4 based on a forecasted 13-month average rate base for those forecasted projects for a cumulative charge of 8.27%. Some key mechanics of how the current QIP works are described below. These include:

1) Qualified Investments: The QIP rider applies only to qualified, non-revenue producing plant investment that is incremental to recovery in the most recent base water rate proceeding.

2) QIP Test Periods and Annual QIP filings: The QIP surcharge is established on an annual prospective basis through an annual QIP filing ("Annual Filing") made at least 90 days prior to the commencement of the QIP test period ("QIP Period"), with each QIP Period being twelve months long (July to June).

3) Calculation of the QIP Rider: The Annual Filings include a detailed listing of each qualifying QIP project for the Commission's review of eligibility and prudence of the projects. Components of the revenue requirement calculation include:

Pre-Tax Return: The qualified additions and removal expenditures, less the QIP related accumulated depreciation and QIP related accumulated deferred income taxes, multiplied by the rate of return on capital authorized in the most recent base water rate case, grossed up for federal and state taxes.

Depreciation and Property Tax Expense: The qualified plant additions are reduced by the retirements associated with the QIP eligible additions, in the calculation of applicable depreciation and property tax expense.

The depreciation rates last approved by the Commission, for the respective plant accounts in which the specific items of QIP-eligible plant are recorded, are used to determine the depreciation expense.

The property tax rate per dollar of net plant used to calculate property tax as approved in the most recent rate case is the property tax rate for QIP net plant.

Total Revenue Requirement: The total QIP revenue requirement is equal to the pre-tax return plus the depreciation and property tax.

QIP Percentage: The QIP percentage to charge is calculated by dividing the QIP revenue requirement by the total authorized water revenues for the classes listed on the QIP tariff sheet. Authorized water revenues include meter fees, volumetric water sales, fire service fees, and public and private hydrant fees from the Company's most recent base rate case.

The QIP Rider is cumulative and remains in place until reset at zero on the effective date of new base rates in the Company's next general rate case proceeding.

4) Balancing Adjustment Filings and Timing: The Company's current QIP mechanism also includes an annual Balancing Adjustment Filing. This filing is made within 90 days after the conclusion of each QIP Period, with the intention of

establishing a Balancing Adjustment within 180 days after the conclusion of each QIP Period. That filing includes a detailed listing of each qualifying QIP project completed and placed in service during the immediately preceding QIP period, including any project modifications resulting from changing priorities.

The actual QIP revenues billed under the rider for the immediately preceding QIP period are subtracted from the actual revenue requirement, as updated in the Balancing Adjustment Filing. This yields the Balancing Adjustment credit or surcharge, which measures any over or under recovery of actual QIP revenue requirement. A balancing adjustment percentage is calculated by dividing the balancing adjustment credit or surcharge by the authorized water revenues from the most recent rate case, then multiplying by the number of effective days remaining before the next QIP period begins, divided by 365. The balancing adjustment percentage is added to or deducted from the current QIP rate, and the balanced QIP rate goes into place approximately 180 days after the end of the prior QIP period. This percentage calculation yields a rate that is designed to credit to or recover from customers the Balancing Adjustment Credit or Surcharge before the next QIP period begins.

Q. What will happen to the QIP Rider upon approval of new rates in this proceeding?

A. The QIP Rider charge proposed by the Company in Case No. 2023-00030 will be reset to zero as of the effective date of the new base rates in this proceeding. At that time, the base rates would be providing recovery of the annual costs that had previously been recovered through the QIP.

Q. What does the Company propose for the Balancing Adjustment Filing for QIP Year 3?

A. The Company proposes that the Balancing Adjustment Filing for QIP Year 3, for the QIP Period July 2022 to June 2023, be filed no later than September 29, 2023. The Company also proposes that the balancing adjustment percentage be calculated by dividing the balancing adjustment credit or surcharge by the authorized water revenues ultimately approved in this proceeding, then multiplying by the number of effective days the balancing adjustment rate will be in place, divided by 366 since 2024 is a leap year. The Company further proposes that the Balancing Adjustment Filing for QIP Year 3 have the same rates effective date as new base rates in this proceeding and that the rate remain in effect until the end of the forecasted test year in this case (January 31, 2025).

Q. Is the Company proposing any changes or clarifications to the QIP Rider in this case?

A. Yes. The Company is proposing the following changes and clarifications:

1) Qualified Investments: The Company is proposing updates to what should be considered qualified investments. The proposed updates to qualified investments are described and supported by Company Witness Citron and the proposed QIP tariff sheet on Exhibit 2.

2) QIP Test Periods and Annual QIP filings: The QIP surcharge will continue to be established on a prospective basis through an annual QIP filing ("Annual Filing"), but the Company proposes that the first post-case QIP test period ("QIP Period") be the full eleven months following the forecasted test year in this case, which would be February 2025 to December 2025. The Company proposes to make its first Annual Filing at least 120 days prior to the commencement of this first QIP

Period (by October 4, 2024). Subsequent Annual Filings would follow a similar schedule, with the Annual Filing being made at least 120 days prior to the commencement of the next QIP Period (by September 3), which will be full twelve month calendar periods, with the first full twelve month calendar period being January 2026 to December 2026.

3) Calculation of the QIP Rider: Currently, the return on net QIP-eligible plant in-service, at the overall rate of return on capital authorized in the Company's latest base water rate case, is only grossed up for federal and state income taxes, consistent with the Company's tariff. The Company is proposing that, going forward, the return on net-QIP eligible plant in-service, at the overall rate of return on capital authorized in the Company's latest base water rate case, be grossed up by applying the gross revenue conversion factor authorized in the Company's latest base water rate case. Applying the gross revenue conversion factor to the return on component of the QIP revenue requirement is appropriate because it accounts for the additional uncollectible and PSC Fee expense the Company can expect to experience as a result of incremental QIP revenues. No other changes would be made to how the QIP revenue requirement is calculated.

4) QIP Percentage: The Company proposes that the QIP percentage be calculated by dividing the QIP revenue requirement by the total authorized water revenues as approved in the most recent rate case for the classes listed on the QIP tariff sheet, then multiply the resulting QIP percentage by the number days the QIP percentage will be in effect, divided by 365 days (366 days in a leap year). Authorized water revenues will continue to include meter fees, volumetric water sales, fire service

fees, and public and private hydrant fees from the Company's most recent base rate case. This percentage calculation will yield a rate that is designed to recover from customers the QIP revenue requirement over the rate effective period. The QIP Rider Surcharge would continue to be cumulative and remain in place until reset to zero on the effective date of new base rates in the Company's next general rate case proceeding.

5) <u>Balancing Adjustment Filings and Timing</u>: Currently, the Balancing Adjustment Filings are made annually within 90 days after the conclusion of each completed QIP Period, separate from the Annual Filing, necessitating an extra regulatory proceeding and rate change annually at the time and expense of the Commission, any intervenors, and the Company. Had the Balancing Adjustment been filed contemporaneously with the Annual Filing since the inception of QIP, the time and expense associated with three Balancing Adjustment filings and rate changes would have been avoided. The Company is accordingly proposing that the Balancing Adjustment Filings be made contemporaneously with the Annual Filing going forward for each completed QIP Period (e.g., for the first QIP Period after this proceeding, which would be the eleven months ending December 31, 2025, the filing would be due by September 3, 2026), with the intention of establishing a Balancing Adjustment after the conclusion of each QIP Period that is more administratively efficient for all stakeholders. That filing would continue to include a detailed listing of each qualifying QIP project completed and placed in service during the immediately preceding QIP period, including any project modifications resulting from changing priorities.

The actual QIP revenues billed under the rider for the immediately preceding QIP period will continue to be subtracted from the actual revenue requirement, as updated in the Balancing Adjustment Filing. This will continue to yield the Balancing Adjustment credit or surcharge, which measures any over or under recovery of actual QIP revenue requirement. The Company proposes that the balancing adjustment percentage be calculated by dividing the balancing adjustment credit or surcharge by the authorized water revenues from the most recent rate case for the classes listed on the QIP tariff sheet, then multiplying the resulting percentage by the number days the balancing adjustment percentage will be in effect, divided by 365 days (366 days in a leap year). The Company proposes that the balancing adjustment percentage continue to be added to or deducted from the Annual Filing QIP percentage that the balancing adjustment is being filed with, and that the combined percentage will be in effect until replaced by the percentage of the subsequent combined Annual and Balancing Adjustment Filing. This percentage calculation will yield a rate that is designed to credit to or recover from customers the Balancing Adjustment Credit or Surcharge over the rate effective period.

Q. Is the Company proposing any changes to how the QIP will be billed to customers?

A. No. The QIP will still be expressed as a percentage of water and fire service charges for each customer class included in the QIP tariff. It would be applied to all water revenue (meter fees, fire service fees, public or private hydrant fees, and volumetric water sales), but prior to the inclusion of any other surcharge or tax (such as franchise fees or Kentucky

River Authority ("KRA") fees). The QIP will continue to be reflected as a line item on each customer's bill.

REGULATORY AND ACCOUNTING TREATMENTS

Q. For what expenses is the Company requesting regulatory accounting deferral treatment?

A. The Company is requesting regulatory accounting deferral treatment for: (1) production expenses, (2) pension and OPEB expenses; (3) taxes other than income (excluding sales tax) and income taxes. Each of these expenses are supported in this case by Company witness Watkins, except for taxes other income (excluding payroll taxes supported by Company witness Watkins), which I support in my testimony.

Q. What specifically does the Company request as "regulatory accounting deferral treatment" for these expenses?

A. The Company requests that through the conclusion of the Company's next rate proceeding, the Company be permitted to record any amounts above or below the projected level of the expenses mentioned above and defined in more detail below into separate regulatory asset or liability accounts. At the time of the next rate proceeding, the Company will address the recovery of the balances and any request to continue regulatory asset or liability treatment beyond that next base rate proceeding.

Q. How would the Company's proposed regulatory accounting treatment operate?

A. The respective annual level of expenses of each account is to be established in this rate case as part of the Company's base rates. Upon the effective date of new rates in this case, the Company would compare its actual expenses incurred to the amount included within base rates. The difference between the two would be deferred to a regulatory asset or liability with the balance included in base rates and, if approved by the Commission, amortized over a defined period determined in the Company's next general rate case.

Q. Is the Company proposing to recover carrying costs on deferred balances?

A. No. The Company is only proposing to defer any variance between the base level established in this case and the actual level incurred to an asset or liability account. Deferred balances will be addressed in the Company's next general rate case where the Commission may determine an appropriate amortization period. At that time, if approved by the Commission, the annual amortization expense will be included.

Q. What legal standard has the Commission historically applied when considering regulatory accounting treatment?

A. The Commission has stated that a utility must obtain Commission approval for accounting adjustments before establishing any expense as a new regulatory asset.[3] A regulatory asset

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[3] ASC 980-340-25-1 provides, in full, as follows:

25-1 Rate actions of a regulator can provide reasonable assurance of the existence of an asset. An entity shall capitalize all or part of an incurred cost that would otherwise be charged to expense if both of the following criteria are met:

> a. It is probable (as defined in Topic 450) that future revenue in an amount at least equal to the capitalized cost will result from inclusion of that cost in allowable costs for rate-making purposes.
>
> b. Based on available evidence, the future revenue will be provided to permit recovery of the previously incurred cost rather than to provide for expected levels of similar future costs. If the revenue will be provided through an automatic rate-adjustment clause, this criterion requires that the regulator's intent clearly be to permit recovery of the previously incurred cost.

A cost that does not meet these asset recognition criteria at the date the cost is incurred shall be recognized as a regulatory asset when it does meet those criteria at a later date.

is created when a utility is authorized to capitalize an expenditure that would be recorded as a current expense under traditional accounting rules. A utility may request recovery of the capitalized amount in future rates, but recovery is subject to Commission review and approval. The authority to establish regulatory assets arises out of the Commission's plenary authority to regulate utilities under KRS 278.040 and its authority to establish a system of accounts for utilities under KRS 278.220.

The Financial Accounting Standards Board's Statement of Financial Accounting Standards No. 71, Accounting for the Effects of Certain Types of Regulation, which was codified as Accounting Standards Codification (ASC) 980, Regulated Operations, provides the criteria for recognition of a regulatory asset. Supplemental to generally accepted accounting principles ("GAAP"), long-standing Commission precedent provides that regulatory assets may be established when a utility incurs (1) an extraordinary, nonrecurring expense that could not have been reasonably 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 a savings that fully offsets the cost.[4]

Q. Please summarize the Company's request with regard to the production expense.

A. The Company requests the Commission authorize the requested level of expense identified and supported in this case by Company witness Watkins, for recovery in this proceeding. As discussed above, the Company also requests that the Commission allow the Company

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[4] See Case No. 2008-00436, *The Application of East Kentucky Power Cooperative, Inc. for an Order Approving Accounting Practices to Establish a Regulatory Asset Related to Certain Replacement Power Costs Resulting from Generation Forced Outages* (Ky. PSC Dec. 23, 2008).

to record any amounts above or below the amount authorized in rates to a regulatory asset or liability, as appropriate, from the effective date of new rates in this proceeding until the Company's next base rate case. As proposed, this production expense accounting deferral will protect both customers and the Company against the volatility in production expense.

Q. Why is it appropriate that the Company be permitted to record the amount of production expense, above or below the amount authorized in rates to a regulatory asset or liability?

A. Production costs are a significant operating expense that the Company must incur to provide safe and reliable service to its customers. The Company is already seeing volatility in these expenses as discussed by Company witness O'Drain. This fluctuation and volatility are extraordinary and outside of the Company's control. In addition, the Company does not control when electric providers make rate filings nor does the Company control the outcome of those cases. However, those rates are approved by the Commission following a determination that they are just and reasonable.

Further, water utilities under the Commission's jurisdiction who purchase their water, and their customers, are already afforded similar protection in the form of a purchase water adjustment mechanism. KAWC produces substantially all of its water, and therefore, the Company and its customers should be afforded similar protection as they would if that water was purchased instead of produced. The purpose of the Company's request for deferral is to both protect the Company's customers if the expense were to decrease in the future, as well as to allow the Company the opportunity to include in a future proceeding the increased levels of cost.

Q. Would the regulatory accounting treatment sought by the Company disincentivize management to control production expense?

A. No. The Company is committed to providing safe and reliable water service to its customers at affordable rates. This request does not change that; it simply ensures that customers only pay for the production expenses incurred, nothing more and nothing less, while allowing the Company to collect the proper revenues to cover production expenses incurred to continue to provide safe and reliable service. This does not grant the Company a "free-pass" to mismanage production expenses. When returning in the next case, the Company will need to show the results of the production expense regulatory accounts and ask for recovery. Those balances would be subject to Commission scrutiny to determine their reasonableness.

Q. How do you propose these accounts would work?

A. There would be separate regulatory asset and liability accounts for each production expense grouping shown on Exhibit 37, Schedule C and D, including (1) Purchased Water, (2) Fuel & Power, (3) Chemical, and (4) Waste Disposal. Beginning the first month after rates are in effect, the Company will record the difference between the expense authorized in this case and the actual expense. The annual number approved divided by 12 will result in a monthly authorized amount which will be compared to the actual expense for the month. If the actual expense is lower than the authorized amount in rates, a regulatory liability will be set up to record the difference. If the actual expense is higher than the authorized amount in rates, a regulatory asset will be recorded. At the time of the next rate case, the Company will present the net amount in these accounts for return to the customers (in the case of a net Regulatory Liability) or for collection in rates (in the case of a net Regulatory Asset).

Q. Has the Company reviewed how the fluctuations in expense from year to year would have impacted the Company and its customers if deferral of production expenses had been in place previously?

A. Yes, see the chart below which lays out the authorized level of production expense and the actual amounts booked by calendar year. In the variance column, a positive number indicates that the actual expense exceeded the authorized level, and a negative number indicates that the actual amount was lower than the authorized level. For example, if the requested deferral treatment had been in place beginning in 2020, the Company would have recorded a regulatory liability of $787 thousand in 2020, a regulatory liability of $182 thousand in 2021, and a regulatory asset of $1,727 thousand in 2022. The net regulatory asset of $758 thousand would have been presented in this case for amortization and collection in base rates.

Total Production Expense			
	Authorized	Actual	Variance
2014	$6,262,927	$5,708,789	($554,138)
2015	6,262,927	5,915,196	(347,731)
2016	6,355,162	6,442,729	87,567
2017	6,532,991	6,426,312	(106,679)
2018	6,532,991	6,506,304	(26,687)
2019	7,027,201	6,726,850	(300,351)
2020	7,502,812	6,715,508	(787,304)
2021	7,502,812	7,320,602	(182,210)
2022	7,502,812	9,230,012	1,727,200

Q. Please summarize the Company's request with regard to the Pension and OPEB expense.

A. The Company requests the Commission authorize the requested level of expense identified and supported in this case by Company witness Watkins, for recovery in this proceeding. As discussed above, the Company also requests that the Commission allow the Company to record any amounts above or below the amount authorized in rates to a regulatory asset or liability, as appropriate, from the effective date of new rates in this proceeding until the Company's next base rate case. As proposed, this pension/OPEB expense accounting deferral will protect both customers and the Company against the volatility in pension/OPEB expense.

Q. Why is it appropriate that the Company be permitted to record the amount of Pension and OPEB, above or below the amount authorized in rates to a regulatory asset or liability?

A. Pension and OPEB expenses mentioned in this section are based on a forecasted test year ending January 2025, but the actual 2023 costs were used for pension and OPEBs in this case. The amount of the expenses going forward will change based on a number of factors. In fact, Pension and OPEB expenses are a complex calculation based upon actuarial reports that consider a number of variables. The level of fluctuation in these expenses from year to year can change drastically based on market fluctuations and the factors used to calculate the expenses. In this case, Pension expense drives $113,286 of revenue requirement increase and OPEB drives another $48,375. The pension expense in the base year was $23,580 and the future test year amount is $136,866, which is a 480 percent increase. The OPEB expense in the base year was ($648,697) and the future test year amount is ($600,322), which is a 7.5 percent increase. When markets change and this expense reverses, customers will benefit through the recording of these deferral accounts. In the past, if Kentucky-American had a balancing account, Pension and OPEB costs that had gone down in those subsequent years would have been returned to customers. This deferral ensures that customers only pay for the Pension and OPEB expenses incurred, nothing more and nothing less, while allowing the Company to collect the proper revenues to cover a portion of the Company's labor related expenses already experiencing volatility. This fluctuation and volatility are outside of the Company's control and is a significant expense for the Company. The purpose of the Company's request for deferral is to both protect the Company's customers if the expense were to decrease in the future, as well as to allow the Company the opportunity to include in a future proceeding the increased levels of cost.

Q. How do you propose these accounts would work?

A. There would be separate regulatory asset and liability accounts for both Pension and OPEB. Beginning the first month after rates are in effect, the Company will record the difference between the expense authorized in this case, of which the Company is requesting $136,866 for Pension and ($600,322) for OPEBs, and the actual expense. The annual number approved divided by 12 will result in a monthly authorized amount which will be compared to the actual expense for the month. If the actual expense is lower than the authorized amount in rates, a regulatory liability will be set up to record the difference. If the actual expense is higher than the authorized amount in rates, a regulatory asset will be recorded. At the time of the next rate case, the Company will present the net amount in these accounts for return to the customers (in the case of a net Regulatory Liability) or for collection in rates (in the case of a net Regulatory Asset).

Q. Has the Company reviewed how the fluctuations in expense from year to year would have impacted the Company if deferral of pension and OPEB expenses had been in place previously?

A. Yes, see the chart below which lays out the authorized level of pension and OPEB expense and the actual amounts booked by calendar year. In the variance column, a positive number indicates that the actual expense exceeded the authorized level, and a negative number indicates that the actual amount was lower than the authorized level. For example, if the requested deferral treatment had been in place beginning in 2020, the Company would have recorded regulatory liabilities of $1,198 thousand in 2020, regulatory liabilities of $1,636 thousand in 2021, and regulatory liabilities of $1,716 thousand in 2022. The net regulatory liabilities of $4,550 thousand would have been presented in this case for amortization and returned to customers in base rates.

Pension					OPEB			
	Authorized	Actual	Variance		Authorized	Actual	Variance	
2014	$947,305	$246,193	($701,112)	2014	$672,410	$251,967	($420,443)
2015	947,305	599,719	(347,586)	2015	672,410	512,546	(159,864)
2016	832,227	648,092	(184,135)	2016	642,001	212,336	(429,665)
2017	602,070	702,667	100,597	2017	581,184	108,278	(472,906)
2018	602,070	507,241	(94,829)	2018	581,184	(492,184)	(1,073,368)
2019	500,795	592,861	92,066	2019	327,609	(729,023)	(1,056,632)
2020	399,519	132,730	(266,789)	2020	74,033	(857,522)	(931,555)
2021	399,519	(218,456)	(617,975)	2021	74,033	(944,461)	(1,018,494)
2022	399,519	(270,481)	(670,000)	2022	74,033	(972,122)	(1,046,155)

Q. Please summarize the Company's request with regard to the general tax ("taxes other than income") expense.

A. The Company requests the Commission authorize the requested level of expense identified and supported in this case as discussed earlier in my testimony for recovery in this proceeding. As discussed above, the Company also requests that the Commission allow the Company to record any amounts above or below the amount authorized in rates to a regulatory asset or liability, as appropriate, from the effective date of new rates in this proceeding until the Company's next base rate case. As proposed, this taxes other than income expense accounting deferral will protect both customers and the Company against the volatility in taxes other than income expense.

Q. Why is it appropriate that the Company be permitted to record the amount of Taxes Other Than Income expense, above or below the amount authorized in rates to a regulatory asset or liability?

A. Long-standing Commission precedent provides that regulatory assets may be established when a utility incurs an expense resulting from a statutory or administrative directive. Taxes other than income expenses are an incurred expense resulting from statutory or administrative directive. The change in classification of water pipeline property to tangible personal property, as discussed earlier in my testimony, is just one example of how taxes other than income expenses have been impacted by statutory or administrative directive. Also, the Company appeals its property tax assessments to lower its property tax bill on a regular basis. The timing and results of these appeals are uncertain, but the Company believes that its customers should benefit from appeals that are successful and may likely lower actual property tax expense below the level authorized in base rates.

Q. How do you propose these accounts would work?

A. There would be separate regulatory asset and liability accounts for all taxes other than income, shown as "General Tax" on Exhibit 37, Schedule C. Beginning the first month after rates are in effect, the Company will record the difference between the expense authorized in this case, adjusted for property taxes and PSC Fees authorized in subsequent QIP filings, and the actual expense. The annual number approved divided by 12 will result in a monthly authorized amount which will be compared to the actual expense for the month. If the actual expense is lower than the authorized amount in rates, a regulatory liability will be set up to record the difference. If the actual expense is higher than the authorized amount in rates, a regulatory asset will be recorded. At the time of the next rate case, the Company will present the net amount in these accounts for return to the customers (in the case of a net Regulatory Liability) or for collection in rates (in the case of a net Regulatory Asset).

Q. Has the Company reviewed how the fluctuations in expense from year to year would have impacted the Company if deferral of taxes other than income expenses had been in place previously?

A. Yes, see the chart below which lays out the authorized level of taxes other than income expense and the actual amounts booked by calendar year. In the variance column, a positive number indicates that the actual expense exceeded the authorized level, and a negative number indicates that the actual amount was lower than the authorized level. For example, if the requested deferral treatment had been in place beginning in 2020, the Company would have recorded a regulatory asset of $197 thousand in 2020, a regulatory asset of $754 thousand in 2021, and a regulatory liability of $2,104 thousand in 2022. The net regulatory liability of $1,153 thousand would have been presented in this case for amortization and returned to customers in base rates.

General Taxes			
	Authorized	Actual	Variance
2014	$5,126,177	$5,753,035	$626,858
2015	5,126,177	6,562,434	1,436,257
2016	5,487,072	6,321,985	834,913
2017	6,208,863	6,118,875	(89,987)
2018	6,208,863	7,905,667	1,696,804
2019	7,018,330	7,050,369	32,039
2020	7,888,232	8,085,707	197,476
2021	8,090,113	8,844,518	754,406
2022	8,413,946	6,309,934	(2,104,012)

Q. Please summarize the Company's request with regard to the Income Taxes.

A. The Company requests the Commission authorize the requested level of expense identified and supported in this case by Company witness Watkins, for recovery in this proceeding. Between the time this proceeding is approved and the next general rate case filing, should there be any enacted federal or state income tax rate change, the Company requests that the Commission allow the Company to defer, to a regulatory asset or liability as appropriate, the effect of the change in income tax expense, versus authorized, until the next general rate case filing. Then in that next general rate case, its recovery or refund can be determined and incorporated in base rates. In addition, any effect, excess or deficit, of the federal or state rate change on accumulated deferred income taxes can be included. As proposed, this deferral will protect both customers and the Company in the event of changes in income tax rates.

Q. Why is it appropriate that the Company be permitted to defer the effect of a federal or state income tax rate change and record the amount, above or below the amount authorized in rates to a regulatory asset or liability?

A. Long-standing Commission precedent provides that regulatory assets may be established when a utility incurs an expense resulting from a statutory or administrative directive. Income Taxes are an incurred expense resulting from statutory or administrative directive. Deferring the effects of a federal or state income tax rate change, whether a material change such as what occurred with the Tax Cuts and Jobs Act in 2017 or a minor change, will allow the Company to accrue the effects of the change between rate case filings and recover from customers or refund to customers that effect in base rates in the next general rate case without the Commission having to initiate a filing requirement.

Q. How do you propose these accounts would work?

A. At the point of an enacted income tax rate change, the Company would start to accrue the difference between authorized income tax expense and income tax expense using the new income tax rates. The accrual will continue until new customer base rates are anticipated to go into effect, calculated using the new income tax rates. If the income tax rate increases, it will be booked to a regulatory asset account. If the income tax rate decreases, it will be booked to a regulatory liability account. In addition to the change in income tax expense, the change in accumulated deferred income taxes will be calculated at the enactment date and booked separately to either a regulatory asset (income tax rate increase) or regulatory liability (income tax rate decrease). Amortization into customer base rates will begin with new rates set in the next general rate case.

Q. Does this conclude your direct testimony?

A. Yes.

VERIFICATION

COMMONWEALTH OF KENTUCKY)
) SS:
COUNTY OF FAYETTE)

The undersigned, Jeffrey Newcomb, being duly sworn, deposes and says that he is the Senior Manager, Rates and Regulatory, for Kentucky-American Water Company, that he has personal knowledge of the matters set forth in the accompanying testimony for which he is identified as the responsible witness, and that the answers contained therein are true and correct to the best of his information, knowledge and belief.

Jeffrey Newcomb

Subscribed and sworn to before me, a Notary Public in and before said County and State, this 20th day of June, 2023.

Molly McCleese Van Over
Notary Public

My Commission Expires:
July 31, 2025
Notary ID: KYNP26988

KENTUCKY-AMERICAN WATER COMPANY
CASE NO. 2023-00191
RATE CASE EXHIBITS AND SPONSORS

Exhibit	**Sponsor**
Exhibit 1 Present tariffs - Kentucky American Water	J. Newcomb
Exhibit 2 Proposed tariffs - Kentucky American Water	J. Newcomb
Exhibit 3 Comparative sheets of Tariffs	J. Newcomb
Exhibit 4 Certified copy of Articles of Incorporation and Amendments	J. Newcomb
Exhibit 5 Certificate of Good Standing	J. Newcomb
Exhibit 6 Certified copy of a Certificate of Assumed Name	J. Newcomb
Exhibit 7 Customer Notices	J. Newcomb
Exhibit 8 PSC Notice	J. Newcomb
Exhibit 9 Rate base/capital reconciliation	W. Selinger and N. Furia
Exhibit 10 Testimonies (Cover Sheet)	J. Newcomb
Exhibit 11 Capital construction budget with 3-year forecast	S. Porter
Exhibit 12 Description of forecast factors (Cover Sheet)	J. Newcomb
Exhibit 13 Annual and monthly budget for the 12 months preceding the filing date, the base period and the forecasted period	J. Newcomb and S. Porter
Exhibit 14 Statement of Attestation	K. Nash
Exhibit 15 Information about major construction projects > 5% of total	S. Porter and K. Citron
Exhibit 16 Information about other construction projects < 5% of total	S. Porter and K. Citron
Exhibit 17 Financial Forecast – operating income	J. Newcomb
Exhibit 18 Financial forecast - balance sheet	J. Newcomb
Exhibit 19 Financial forecast - cash flow	J. Newcomb
Exhibit 20 Financial forecast - revenue requirement	J. Newcomb
Exhibit 21 Financial forecast - employee level	J. Watkins
Exhibit 22 Financial forecast - labor cost changes	J. Watkins
Exhibit 23 Financial forecast - capital structure requirements	N. Furia
Exhibit 24 Financial forecast - rate base	W. Selinger
Exhibit 25 Financial forecast - water sales (gallon)	C. Rea
Exhibit 26 Financial forecast - customer forecast	C. Rea
Exhibit 27 Most recent stock or bond prospectus (Most recent)	N. Furia
Exhibit 28 Annual reports to shareholders	J. Newcomb
Exhibit 29 Current chart of accounts	J. Newcomb
Exhibit 30 Last 12 monthly managerial reports	J. Newcomb
Exhibit 31 Monthly budget variance reports for 12 months pre-base period and as available, for base period and subsequent months M&D	J. Newcomb

Exhibit 32 Independents auditor's annual opinion report and any written findings of material weaknesses in internal controls	J. Newcomb
Exhibit 33 Summary of last depreciation study	L. Kennedy
Exhibit 34 List of software, program and models used	J. Newcomb
Exhibit 35 Affiliate, general or home office allocations	J. Watkins
Exhibit 36 Cost of service study	W. Selinger
Exhibit 37 Schedule A (A) Jurisdictional financial summary for the base and forecast period	J. Newcomb
Exhibit 37 Schedule B Rate Base	W. Selinger
Exhibit 37 Schedule C Operating Income	J. Newcomb
Exhibit 37 Schedule D Summary of Adjustments to Operating Income	J. Newcomb
Exhibit 37 Schedule E Income Tax Expense	J. Watkins
Exhibit 37 Schedule F Social and service club dues, charitable contributions, initiation fees / country club expenses, employee party, outing & gift expense; customer service, sales promotion & misc, advertising, professional services, rate case expense, civic, political, and related expenses.	J. Newcomb
Exhibit 37 Schedule G Payroll costs, analysis, and executive compensation	J. Watkins
Exhibit 37 Schedule H Gross revenue conversion factor	J. Newcomb
Exhibit 37 Schedule I Comparative Income Statement and revenue statistics	J. Newcomb and C. Rea
Exhibit 37 Schedule J Cost of capital	N. Furia
Exhibit 37 Schedule K Comparative financial data and earnings measures	J. Newcomb and N. Furia
Exhibit 37 Schedule L Narrative description and explanation of all proposed tariff changes	J. Newcomb
Exhibit 37 Schedule M Revenue summary and billing analysis	C. Rea
Exhibit 37 Schedule N Typical bill comparison under present and proposed rates	C. Rea

COMMONWEALTH OF KENTUCKY
BEFORE THE PUBLIC SERVICE COMMISSION

IN THE MATTER OF:

ELECTRONIC APPLICATION OF KENTUCKY-AMERICAN WATER COMPANY FOR AN ADJUSTMENT OF RATES, A CERTIFICATE OF PUBLIC CONVENIENCE AND NECESSITY FOR INSTALLATION OF ADVANCED METERING INFRASTRUCTURE, APPROVAL OF CERTAIN REGULATORY AND ACCOUNTING TREATMENTS, AND TARIFF REVISIONS	**))))))))**	**CASE NO. 2023-00191**

DIRECT TESTIMONY OF THOMAS G. O'DRAIN

June 30, 2023

Q. Please state your name and business address.

A. My name is Thomas G. O'Drain. My business address is 1 Water Street, Camden, NJ 08102.

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

A. I am employed by the American Water Works Service Company, Inc. ("AWWSC" or the "Service Company"). The Service Company is a wholly owned subsidiary of American Water Works Company, Inc. ("American Water") that provides services to Kentucky-American Water Company Inc. ("KAWC", "Kentucky-American" or the "Company"). My title is Director of National Categories and Corporate Procurement.

Q. Have you previously filed testimony before this or any other commission?

A. I have provided testimony in support of American Water's chemical, fuel, and power expenses in regulatory proceedings before the Illinois Commerce Commission (Docket No. 22-0210), the Virginia State Corporation Commission (Case No. PUR-2021-00255), the Missouri Public Service Commission (Case No. WR-2022-0303), the New Jersey Board of Public Utilities (BPU Docket No. WR22010019), the Indiana Utility Regulatory Commission (Cause No. 45870) and the West Virginia Public Service Commission (Case Nos. 23-0383-W-42T and 23-0384-S-42T). This is the first time I am submitting testimony before the Kentucky Public Service Commission ("PSC" or "Commission").

Q. Please state your educational and professional background.

A. I received a Bachelor of Arts in History from Rowan University in 1995, and I received my Master of Business Administration from the University of Phoenix in 2006. I have over

25 years of experience in supply chain management and procurement, with relevant experience in category and product management, supplier relationship management, demand forecasting, and inventory management. I began my career in retail store management for CompUSA in 1993 and advanced through several promotions from Regional Purchasing Manager in 1998, Replenishment Buyer in 2001, to Category Manager in 2004. I was then employed as a Category Manager for TESSCO Technologies from 2006 – 2008, and as Manager of Replenishment and Allocations for David's Bridal from 2008 until joining AWWSC as a Category Manager in 2014. In 2016, I was promoted to Senior Manager of Corporate Procurement, and in March of 2022, I was named Senior Manager of National Category Management. In October of 2022, I was named the Director of National Categories and Corporate Procurement, after serving in the role in an interim fashion since September of 2021.

Q. What are your duties as Director of National Categories and Corporate Procurement?

A. My responsibilities as Director of National Categories and Corporate Procurement include the management of a team of procurement professionals focused on two key areas. The National Category team is responsible for sourcing, contracting, and ongoing relationship management of American Water's national material suppliers. This team covers Chemicals, Direct Materials, Meters, and MRO (Maintenance, Repair and Operations supplies). The Corporate Procurement team is responsible for the sourcing, contracting, and ongoing relationship management of American Water's corporate service suppliers, which, among others, include categories such as Information Technology, Human

Resources, Corporate Engineering, Accounting / Finance / Treasury, Energy, and Supply Chain.

Q. What is the purpose of your direct testimony in this proceeding?

A. The purpose of my Direct Testimony is to support the current chemical prices, and drivers of increases from 2023 through 2025 used to calculate the annual level of chemical expense for the Company. The annual level of chemical expense, including the methodology for calculating this amount, is explained in greater detail in the Direct Testimony of Company Witness John Watkins.

CHEMICAL SOURCING PROCESS

Q. Please provide a general overview of how chemicals are sourced to manage KAWC's business requirements.

A. KAWC relies on the specialized expertise of Service Company to handle, among other responsibilities, supplier management, contract negotiations, and executing the Company's annual chemical bid, all of which support KAWC's chemical needs. Annually, Supply Chain collaborates with the Company's operations teams to prepare the aforementioned chemical bid. This collaboration requires an understanding of all chemical requirements that would impact the upcoming bid; confirmation of the chemicals that will be bid along with specifications and typical order quantities; any changes to treatment plant processes or equipment that would require changes to the current chemical specifications; any new facilities planned that will be added to the bid, and any new facility chemical requirements.

Supply Chain conducts an annual nationwide sourcing event for all chemicals enterprise-wide (including KAWC), working with over 90 chemical suppliers during the bidding process. Typically, several new suppliers are certified and added to the bidding process each year. In late August to early September, Supply Chain releases the bid requirements (chemicals required, specifications, expected order quantities, and delivery locations) to certified suppliers, with the request for bidders to offer firm, fixed prices for the upcoming year. These prices are expected to be all-in, delivered prices to ensure that Supply Chain can evaluate all suppliers on a level playing field. The deadline for suppliers to submit bids is typically 4-to-5 weeks from the release date of the bid, at which point Supply Chain reviews the submissions to assess the reasonableness of the supplier's responses (to avoid awarding or eliminating a supplier in cases where it appears that their bid is an obvious error). The goal of the bid process is to determine the most ideal supplier based on the best value for the specific state, plant, and chemical while having confidence that the awarded supplier can reliably supply the required chemicals.

The bid recommendations are provided to the KAWC operations teams for their assessment of financial impacts and operational alignment. The KAWC team gives feedback to supply chain, selecting the suppliers that they feel offer the best overall value to the Company's customers, as the state team has experience working with these suppliers. Once the bids are finalized and accepted, Supply Chain works with the suppliers to draft new or amend existing contracts to create the next year's pricing terms for each of the chemicals the supplier has been selected to provide.

Q. Has Service Company typically been able to lock in agreed-upon prices for chemicals for an annual period?

A. For most of the past decade, water treatment chemicals were a very stable market, with chemical pricing set on an annual basis and few, if any, product availability concerns. The annual bidding process would usually result in small price changes that mostly followed inflation. Future years could be expected to follow that inflation curve, and actual chemical expenses were generally consistent with projected expense levels. In rare cases of significant weather events, major plant downtime, or other chemical availability disruptions, there might be temporary price increases, as the situations usually caused a supplier to use alternate means to acquire chemical supplies, adding additional time and costs. In these instances, Service Company had to balance the risk and impact of a price increase outside of the standard bidding process with the supplier's ability to continue to deliver an uninterrupted supply of chemicals to support all the operating companies' ongoing water treatment obligations. These situations were rare, however, and the Company could reasonably rely upon the stability of the chemical market in past years. This, however, has not been the experience in recent years, as I discuss further below.

Q. Has Service Company been able to lock in agreed-upon prices for chemicals for all of calendar year 2023?

A. Not in the majority of instances. Specific to KAWC, there are 37 unique chemical, supplier, plant combinations that carry agreed-upon prices for water-specific chemicals. Of these, 12 (32%) have current agreements governing prices for the calendar year of 2023, 10 (27%)

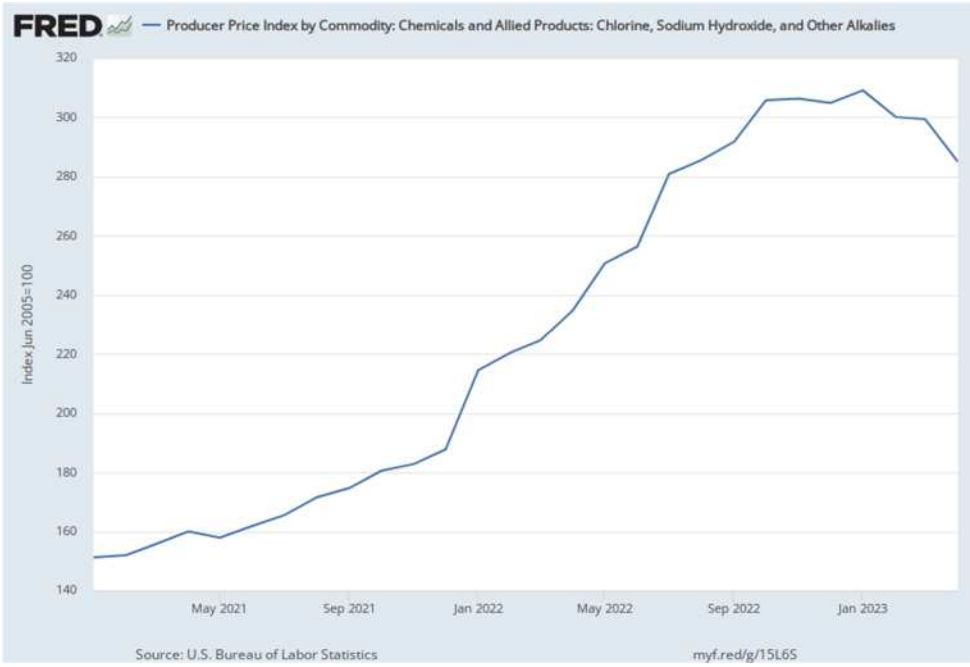
have prices through June 30, 2023, and 15 (41%) have prices that are negotiated on a quarterly basis.

Q. How has the process for 2023 differed from prior years?

A. During the chemical bids events conducted in 2021 (for 2022 prices) and 2022 (for 2023 prices), there were significant increases in prices compared to prior years. For example, in 2021, chlorine deliveries averaged [redacted] per pound. For 2022, the average price bid was [redacted] per pound, and after half-year and quarterly increases in 2022, the year-ending average price was [redacted] per pound. In 2023, KAWC's chlorine average price bid was [redacted] per pound, under a contract that carries a quarterly negotiated price. Information gathered from the Federal Reserve Economic Data ("FRED")[1] specific to Chlorine, Sodium Hydroxide, and Other Alkalis shows the pricing trend starting in 2021 through the most recent reading, which was in April, 2023. As can be seen from the graph in Figure 1 below, pricing has significantly increased over the past two-plus years.

[1] FRED is "an online database consisting of hundreds of thousands of economic data time series from scores of national, international, public, and private sources." https://fred.stlouisfed.org

Figure 1



In discussions prior to the formal bidding process for 2023, many suppliers indicated that, due to the continued extreme volatility in the chemical market, they were still not willing to lock in chemical prices for a full calendar year, as they had continued to experience repeated price increases from their suppliers over the last two years. In fact, most were only willing to lock in pricing for an even shorter period of time than they did in 2022, as some who were willing to commit to firm prices for a longer period of time were forced to endure losses as their costs rose all through the year. Since few suppliers were willing to offer annual contracts, and American Water cannot produce safe water without chemicals, suppliers were permitted to bid for a shorter period, with prices set for three or six-month increments. As can be seen from the much higher percentage of shorter-term contracts, suppliers remain concerned about increasing prices and are unwilling to take on the risk of higher costs while offering American Water a fixed price. This is a market reality that participants in the water treatment business are also experiencing, not just American Water[2].

2023 CHEMICAL PRICING

Q. What is driving the significant increases and volatility in chemical prices in 2023?

A. Over the last two years, the chemical market has seen unprecedented price increases, driven by many factors such as inflationary increases in commodity and transportation prices, volatile energy prices caused by, among other factors, the conflict in Ukraine, high labor costs, and overall supply pressure within a consolidating chemical market. Suppliers who have been negatively impacted by under-forecasting cost increases from their manufacturers have been increasing the bid prices they offer to their customers because of their fear of suffering continued heavy losses supplying chemicals at a price that no longer covers their costs. The following categories give an overview of some of these cost drivers, and why prices have increased so dramatically in recent years.

- Transportation Costs: Across the country, companies had been experiencing the impacts of a national driver shortage, vehicle & container production challenges, and increased fuel costs, which created significant pricing pressure on shipping services. While fuel prices have eased from their 2022 peak, truck driver employment numbers

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[2] See https://www.sandiegouniontribune.com/news/politics/story/2022-08-03/water-sewage-treatment-inflation-supply-chain#:~:text=The%20city's%20cost%20for%20liquid,Alvarado%20and%20Miramar%20treatment%20plants.

continue to dwindle, and government regulations make the transport of chemicals less desirable for a driver than other types of freight, limiting the pool of potential shipping partners. In addition, drivers who transport chemicals need special training to ensure the safe delivery of chemicals, which makes the current labor market challenges even more difficult for this industry. Record high diesel prices in 2022 led to significant fuel surcharge increases, and even as prices have started to decline, the continued conflict in Ukraine, and the shortage of US diesel fuel kept prices at elevated levels through the winter of 2023. And while fuel prices have continued to ease in the spring of 2023, situations arising from the continued war in Ukraine, political instability in Russia, and the Organization of the Petroleum Exporting Countries ("OPEC") intervention to raise prices would change the pricing direction of fuel and transportation, as happened in 2022. Rail transportation is also an important part of the chemical supply chain. The January 2023 train derailment at East Palestine, Ohio has brought renewed congressional scrutiny to chemical transportation safety and brought to light just how antiquated those systems are on the country's rail cars. The current expectation is that higher safety standards, including new braking systems, will be mandated in the future, and those costs will be passed on to the rail company's customers, which in turn will lead to higher chemical prices in the market.

- Supplier Consolidation: Larger suppliers are dominating the chemical production space, which leaves little room for opportunities to seek more favorable prices. As an example, the chlor-alkali market in 2010 had more than 10 major producers that produced chemicals for the water treatment industry. In 2023, only five major producers remained, three of which typically supply American Water's suppliers. Of those three, one of the largest producers has made it clear publicly in an earnings call that the price increases, or ratchets, currently experienced will not reverse, going so far as to say they would sell zero volume to preserve this ratcheted price policy.[3] In their Q4, 2022 earnings call, that manufacturer confirmed that their "chlorine ratchet continues to turn only one way" while stating that they expected chlorine pricing to increase through 2023.[4] These suppliers have also had frequent unplanned plant shutdowns, or emergency maintenance procedures, that have limited the supply of material, leading to longer lead times and higher prices. With fewer suppliers, and the high costs of building a chemical plant barring new competition, those suppliers who remain in the market have a much greater ability to increase costs on a regular basis. Consolidation is also happening in the distributor market, as smaller companies are purchased by their larger rivals.[5] In November of 2022, Brenntag announced that it was exploring the purchase of Univar, which are two of the largest chemical distributors in North America. While the deal ultimately did not take place, the loss of competition would have led to higher prices for KAWC as two large rivals no longer had to compete for business. The rise of publicly traded chemical distributors is leading to more mergers and acquisitions activity, as these publicly-traded companies chase growth and profits.

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[3] Olin Corporation Second Quarter Earnings Conference Call, July 28, 2021 https://www.olin.com/investors/events-presentations/past-events/

[4] See https://seekingalpha.com/article/4573050-olin-corporation-oln-q4-2022-earnings-call-transcript

[5] *See* https://everchem.com/consolidation-chemical-distribution/.

- Energy Costs: Chemicals are heavily linked with the energy market, both in the consumption of raw materials and the production of the end-product. Prices for electricity were 14.3% higher in 2022 compared to 2021, more than double the rate of inflation.[6] While natural gas costs have eased since their 2022 highs, the average cost for 2022 was 53% higher than 2021,[7] and more than 200% higher than the average for 2020.[8] These prices were taken into consideration when chemicals were bid for 2023, and even though we have seen some lower fuel and natural gas costs in 2023, as of June, 2023, electricity is still up 8.5% over 2022, which is a critical input for the production of most chemicals.

- Demand for Other Products: Global demand was weak during the 2020 COVID-19 government-mandated shutdowns, and many companies were forced to cut production and lay off workers. The global economy came back in 2021, and those companies that had reduced production capacity were suddenly struggling to keep up with the increased needs of the market. Even with supply chain issues easing in recent months, manufacturers have produced less chemical supply for the water treatment market than in previous years, strengthening their pricing position and reducing resiliency. NSF certification requirements and other high standards for water treatment chemicals make

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[6] *See Consumer Price Index News Release* (Jan. 12, 2023), available at https://www.bls.gov/news.release/archives/cpi_01122023.htm (showing a 14.3% percentage change for electricity for the "Unadjusted 12-mos. ended Dec. 2022).

[7] *See* U.S. Energy Information Administration, *Average cost of wholesale U.S. natural gas in 2022 highest since 2008* (Jan. 9, 2023), available at https://www.eia.gov/todayinenergy/detail.php?id=55119.

[8] *See* U.S. Energy Information Administration, *Henry Hub Natural Gas Spot Price* (Mar. 8, 2023), available at https://www.eia.gov/dnav/ng/hist/rngwhhdm.htm (showing the monthly 2020 prices, that result in an average price of $2.035, as compared to the 2022 average price of $6.418 supported by the monthly 2022 prices).

these chemicals more expensive to produce, and the remaining manufacturers have found that they can achieve higher margins serving other chemical markets with lower quality specifications. With decreased supply in the market, American Water (and the water industry in general) has had to pay higher prices and accept longer lead times with less on-time delivery reliability than in previous years.

Q. Has KAWC experienced increases in its chemical prices in its 2023 contracts?

A. Yes. KAWC's 2023 contractual prices have grown 24% from the end-of-year prices in 2022, equating to approximately $0.8 million of increases to annual expenses.[9] This is on top of what the Company experienced in 2022, where prices at the end of 2022 were approximately 76% higher than what the Company experienced at the end of 2021, resulting in approximately $1.5 million of increases to annual expenses. As I explained earlier in my testimony, a significant portion (60%) of the 2023 contracts are fixed only through June 30, 2023. Although cost uncertainty exists as a result of these short-term contracts, the Company has not included any estimated increases in 2023 above current contractual levels.

Table TGO-1

[9] Figures noted here and in Table TGO-1 are based on the same normalized usage for chemicals for all periods and reflect only the impacts associated with the change in pricing. Actual chemical expense would fluctuate annually based on usage.

Contractual Price Increases		
Chemical Family	% Increase - 2021 to 2022	% Increase - 2022 to 2023
Caustic Soda	166%	-10%
Chemicals - Other	19%	46%
Chlorine	319%	41%
Ferric Chloride	25%	53%
HFS (Fluoride)	3%	25%
Phosphates	153%	8%
Polymers	33%	2%
Sodium Hypochlorite	206%	9%
Total Increase	**76%**	**24%**

Looking at the largest movements, chlorine (an essential chemical used to disinfect the water supply) saw an increase of 319% from 2021 to 2022, and another 41% increase for 2023. Phosphates saw an increase of 153% in 2022, and another 8% in 2023. Sodium Hypochlorite saw significant increases as well, increasing 206% in 2022, and another 9% in 2023. For these three chemicals, all of these contractual prices in effect in 2023 are set only through June 30, 2023.

Q. What if anything is Supply Chain doing today to mitigate these price increases?

A. Supply Chain continues to actively work with suppliers to find ways to mitigate market pressure, but as I explained earlier, this is extremely difficult when suppliers and their manufacturers are all experiencing the same market pressures. The intent of agreeing to shorter-term pricing was to share risk and manage prices by providing an opportunity to adjust if market conditions changed. In the past two years, however, prices have continued to increase, keeping suppliers fearful of future rising costs. When discussing 2023 bids with suppliers, they used recent history as a guide for pricing in their bids. As I described earlier in my testimony, with market forces continuing to influence prices, suppliers saw few signs that pricing pressures were easing. While Supply Chain will continue to use market competition and the threat of moving to alternate suppliers as a means to keep prices as low as possible, the market forces influencing prices remain in place, leading suppliers to bid conservatively with higher hedge factors, reducing their potential upward pricing risks.

Q. What does this increase in prices mean for the term beyond current contracts?

A. So far, 2023 has seen some pricing stabilization, but no significant reductions. From KAWC's most recent quarterly price update (April of 2023), two prices increased while the rest stayed the same. At the current time, however, no suppliers appear confident in the direction of the market, and with 2024 chemicals bid later in the summer, we have not yet seen information that would tell that we have seen the end of price increases.

2024 & 2025 CHEMICAL PRICING

Q. How has the Company assessed prices into 2024?

A. Unlike in the great recession of 2008-2009, American Water has not seen market corrections that would move prices back toward historical numbers. Communications between Supply Chain and its suppliers have revolved around the price uncertainty experienced by the Company's suppliers and the need to consider price uncertainty into future forecasts. As discussed previously, many factors are contributing to the rise in chemical prices seen over the last two years. The rate of inflation has shown some signs of easing from the dramatic increases seen in the last two years but the rate of inflation has only slowed down, not reversed, and have remained above historic rates. With suppliers not confident about the direction of their future prices, that leads us to believe that suppliers will continue to add additional price uncertainty in their bid prices to cover those market fluctuations into their bid prices. Demand remains high and the chemical market has a limited supply of material available, with little incentive for manufacturers to increase production. With the upcoming hurricane season, the weather could also play a part in future prices. A hurricane strike in the Gulf of Mexico, where the majority of domestic chemical production takes place, could make a bad situation much worse.

Moving forward to 2024, Supply Chain has compiled information from the Company's chemical suppliers to forecast future pricing for KAWC, and that data reflects an approximate 8%-9% overall price increase for each of 2024 and 2025.

Table TGO-2[10]

Contractual Price Increases		
Chemical Family	**% Increase - 2023 to 2024**	**% Increase - 2024 to 2025**
Caustic Soda	5%	5%
Chemicals - Other	10%	10%
Chlorine	10%	10%
Ferric Chloride	12%	12%
HFS (Fluoride)	4%	4%
Phosphates	8%	8%
Polymers	5%	5%
Sodium Hypochlorite	10%	10%
Total Increase	**9%**	**9%**

By chemical family, some drivers of these increases are as follows:

- Caustic Soda: Caustic Soda prices vary based on caustic demand and market conditions for water treatment needs and other sectors of the economy. The chemical is also used in the manufacturing of petroleum products, soap, detergents, alumina, pulp and paper,

[10] Reference Footnote 7.

chemical products, as well as pharmaceuticals. Producer outages are also creating a tight supply. Some planned maintenance of older plants is always expected, but some complete shutdowns of other antiquated sites has lowered total production capacity in recent years.

- Chlorine: Chlorine increases typically follow the caustic market. Despite rising demand, manufacturers have reduced more than 10% of the total U.S. production capacity in the last several years by closing older plants. Olin, the largest producer, has closed three plants since 2021. This has led to supply shortages, longer lead times, and rising prices. Additionally, as with Caustic soda, high energy needs for production coupled with inflationary impacts the U.S. has seen over the last two years have contributed to the high price.

- Ferric Chloride: High demand from wastewater treatment plants and increasingly stringent regulations for treating sewage water and industrial waste to curtail pollution is likely to lead to higher prices. In addition, two of the three main raw materials – chlorine and hydrochloric acid – have seen significant cost increases in recent years, and reductions in steel availability due to U.S. sanctions, and a reduction in the availability of scrap steel has reduced the availability of the base rate material.

- HFS (Hydrofluosilicic acid or Fluoride): Overall, the HFS market has been steadily increasing, with the market growing at an estimated 5% annually through 2030.

- Phosphates: Phosphate is growing as a commodity because of its use in batteries and fertilizer. The phosphate market is expected to experience a compound annual increase of 5% between 2022 and 2028 primarily because of these two industries. The large increase in demand for electric vehicles is fueling the increasing production of lithium-iron-phosphate batteries. In addition, the increasing use of phosphates in fertilizer along with shrinking global supplies are leading to increased raw material costs.

- Polymers: Demand is a significant driver of price increases recently. In addition, emulsion polymers are a petroleum-based product, and as petroleum price uncertainty has increased due to unrest in Europe, upward pressure on polymers prices are expected to continue.

- Sodium Hypochlorite: Caustic soda prices also impact the prices of sodium hypochlorite, and as noted above, major manufacturers of chlorine have shut down several plants, reducing the supply of this necessary product, which has created more demand for sodium hypochlorite, increasing prices. Transportation costs especially impact sodium hypochlorite, as a treatment plant would require ten times more hypochlorite over chlorine for the same treatment impact.

- Chemicals – Other: The various cost drivers described for other chemical families have contributed to the rises seen in this chemical grouping as well.

In addition to the above-known impacts on chemical prices, there are other factors that may lead to additional expenses to KAWC. For example, the United States Environmental Protection Agency ("EPA") is finalizing its proposed limits on PFAS[11] (also known as "forever chemicals") in drinking water. PFAS is particularly hard to remove in the water

[11] Per- and Polyfluorinated Substances – a group of chemicals used to make fluoropolymer coatings and products that resist heat, oil, stains, grease, and water.

treatment process for both drinking water and wastewater treatment plants, and the science behind its removal is still being defined. The expectation, however, is that reaching the new EPA-defined PFAS Maximum Contaminant Levels ("MCLs") may require KAWC to invest in plant upgrades and additional water treatment chemicals that will add significant expenses to the Company in order to be compliant with the EPA MCLs. This is just one example of where outside regulation may add unforeseen costs to the Company in order to continue to provide service to our customers that meets state and federal standards.

Q. Please summarize the impacts to chemical expenses as a result of these pricing updates.

A. Throughout my Direct Testimony, I have discussed how recent movements in the chemical market are impacting the costs of the Company's water and wastewater treatment chemicals. Material price increases in 2022 and 2023 have been driven by external factors outside of the control of the Company and in most cases, outside of the control of many of the Company's suppliers. These factors will continue to impact pricing beyond current contracts, based on ongoing discussions with suppliers, as past price increases factor into the future bid prices. Although price agreement timelines have been adjusted to hedge future price risk, the Company expects to see continued upward pressure in chemical pricing, given that cost drivers that have led to recent increases appear to be structural in nature, and KAWC has not yet seen signs that chemical price increases are reversing in a manner that would tell the Company that the market has a clear direction.

Q. Does this complete your Direct Testimony?

A. Yes, it does.

VERIFICATION

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

The undersigned, Thomas G. O'Drain Jr., being duly sworn, deposes and says that he is the Director of Corporate Procurement and National Supply Chain Materials Category for American Water Works Service Company, Inc., that he has personal knowledge of the matters set forth in the accompanying testimony for which he is identified as the responsible witness, and that the answers contained therein are true and correct to the best of his information, knowledge and belief.

Thomas G. O'Drain Jr.

Thomas G. O'Drain Jr.

Subscribed and sworn to before me, a Notary Public in and before said County and State, this 21st day of June, 2023.

Martha B. Mazeika

Notary Public

My Commission Expires:

MARTHA B. MAZEIKA
NOTARY PUBLIC OF NEW JERSEY
Comm. #2419220
My Commission Expires 3/30/2027

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COMMONWEALTH OF KENTUCKY
BEFORE THE PUBLIC SERVICE COMMISSION

IN THE MATTER OF:

ELECTRONIC APPLICATION OF KENTUCKY-	**)**	
AMERICAN WATER COMPANY FOR AN	**)**	
ADJUSTMENT OF RATES, A CERTIFICATE	**)**	
OF PUBLIC CONVENIENCE AND NECESSITY	**)**	**CASE NO. 2023-00191**
FOR INSTALLATION OF ADVANCED METERING	**)**	
INFRASTRUCTURE, APPROVAL OF CERTAIN	**)**	
REGULATORY AND ACCOUNTING	**)**	
TREATMENTS, AND TARIFF REVISIONS	**)**	

DIRECT TESTIMONY OF SHELLEY W. PORTER, P.E.

June 30, 2023

Q. Please state your name and business address.

A. My name is Shelley W. Porter and my business address is 2300 Richmond Road, Lexington, Kentucky 40502.

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

A. I am employed by Kentucky-American Water Company ("KAWC" or "Company") as Director of Engineering.

Q. Have you previously filed testimony before this commission?

A. Yes. I have provided written testimony in Case No. 2022-00032, which was KAWC's Application for a Qualified Infrastructure Program Rider.

Q. Please state your educational and professional background.

A. I received a Bachelor of Science in Civil Engineering from West Virginia University Institute of Technology in 2006. I earned a Master of Science in Engineering, Environmental Engineering emphasis (May 2010) and Engineering Management emphasis (December 2010). I am a registered Professional Engineer (WV #19753 and KY#29229) and a designated Model Law Engineer (MLE).

I have been employed by the Company as the Director of Engineering since June 2021. Prior to joining the Company, I was employed by West Virginia-American Water Company where I began as Project Manager in 2013, until I was promoted to Engineering Manager in 2019. I currently serve on the Board for the Commonwealth of Kentucky Infrastructure Authority. I am an active member of the American Society of Civil Engineers ("ASCE"), the Women's International Network of Utility Professionals ("WINUP"), the Water Environment Federation ("WEF"), and the American Water Works Association ("AWWA"). I have received the George Warren Fuller Award by

AWWA for distinguished service to the water supply field and serve on AWWA's Asset Management committee.

Q. What are your duties as director of engineering?

A. I am responsible for the Company's engineering activities including planned pipeline installation and infrastructure replacements, comprehensive and targeted planning studies, risk and resiliency assessments, tank painting, water system planning, design, and construction management of capital infrastructure investments greater than $250,000, and mapping/records including our geographic information system ("GIS"). This includes new main extensions and working with developers, replacement mains, and water treatment plant upgrades. I coordinate technical assistance to all other Company departments as needed and oversee the capital budget development and implementation.

Q. What will you be addressing in your testimony?

A. My testimony will explain KAWC's capital investment planning process, support the Company's investments in water utility plant, highlighting significant capital projects, and discuss the risks associated with furnishing public water service.

<u>CAPITAL INVESTMENT PLANNING PROCESS</u>

Q. Please describe the Company's capital investment planning and governance process.

A. The Company uses a standardized Capital Program Management ("CPM") process to manage all of its capital investments. KAWC conducts targeted and comprehensive planning studies, pipeline prioritization modeling for distribution system replacement planning, and risk and resiliency and asset assessments to assess and make investment recommendations and evaluates capital needs on an ongoing basis to assess any changed circumstances and ensure that appropriate projects are being prioritized. Capital investment programs and projects are prioritized within an overall strategic planning process, utilizing drivers associated with various asset investment strategies (such as safety, regulatory compliance, capacity, customer satisfaction, etc.), to formulate a strategic capital investment plan. More detailed design engineering is conducted, and implementation plans are developed for those projects that are contained in the capital investment plan. The Company's annual capital construction plan is based upon projects and programs contained in the capital investment plan. On an annual basis, main replacement projects are prioritized on a state-wide basis. Numerous factors are considered when determining funding allocations for infrastructure investment, such as current and future service needs, assessments of the physical condition of existing plant, economic and risk factors, performance characteristics, regulatory compliance, and the potential to coordinate with municipalities and other utilities in joint improvement projects.

The CPM governance process provides for formal approvals and consistent controls that optimize the effectiveness of asset investment, including dedicated project managers responsible for managing the stage of the project and overseeing project spending and monthly review meetings to discuss the status of ongoing projects. By having a good project planning, budget and ongoing review process, KAWC is able to manage a wide variety of projects within the overall cost of its plant construction budget.

Q. Please describe the capital comprehensive planning studies, assessments and project prioritization activities in more detail.

A. The Company's planning studies, prioritization activities and other assessments provide a forward looking review of the needs of the system and the infrastructure to allow the Company to continue to operate safely, efficiently and meet current and future regulations. KAWC uses Comprehensive Planning Studies ("CPS"), which evaluate the distribution system, storage facilities and production capacities as an important piece of planning for construction processes. The CPS identifies projects for construction over a fifteen-year planning horizon. Targeted studies are also completed for construction project needs that arise between CPS cycles and are evaluated, developed, and estimated to the same degree as a CPS project prior to being considered and placed within the portfolio of planned projects. KAWC also completes risk assessments and asset assessments to identify needed capital projects. Capital investment projects are identified and are prioritized using asset investment strategy considerations of safety, regulatory compliance, capacity and growth, infrastructure renewal, efficiency, resiliency, reliability, likelihood and consequence of failure and quality of service. The comprehensive planning studies, targeted studies, assessments and prioritization of identified capital investment projects are key inputs to the Company's capital investment plan. Because of the specific nature of the large asset class of distribution system pipe, the Company completes a separate distinct evaluation for identifying capital investment priorities in distribution systems. These evaluations are detailed prioritization modeling of the distribution system piping that, as further described below, assesses service risks associated with pipeline failure risks for all pipes in the Company's approximately 2,352 miles of water main.

Q. Please describe the distribution prioritization modeling in more detail.

A. The Company has created and implemented a GIS based prioritization model using GIS software and prioritization modeling software for identifying and prioritizing pipeline replacement investments across its approximately 2,352 miles of water piping. The model prioritizes pipeline replacements through identification of service risks associated with pipe failure risks. Pipe failure risks are identified through pipe failure history, pipe material type, the decade pipe was installed, and pipe diameter. Pipe failure history is a significant input into the pipeline replacement prioritization model. These pipe failures are identified during the Company's unscheduled pipeline replacement projects and are also identified during pipeline repair work. Pipe failures are collected and tracked in the Company's GIS system. Consequences of pipe failures are also an input to the prioritization model. Both the likelihood and consequence of failure are discussed in greater detail in the Citron Direct Testimony.

Q. Please describe the general project categories in the Company's capital investment plan.

A. The Company's capital investment plan can be divided into two distinct areas: Recurring Projects ("RP") and investment projects ("IP"). RPs are designated as such because they are capital projects and programs that the Company undertakes on a regular annual basis. IPs are projects typically having a Company investment of $250,000 or greater and require greater planning and scoping needs. Whether RPs or IPs, all aspects of the Company's capital program are essential to continuing to provide safe and reliable service to KAWC's customers and support the long-term viability and resiliency of the Company's water systems.

Q. Please describe the factors used in the preparation of the forecast period as they relate to the recurring projects that are included within the Company's capital investment plan.

A. Recurring construction project costs are trended from historical and forecasted data. The criteria for evaluating the priority of the recurring projects are: regulatory requirements; risk and resiliency evaluations; operational and water quality needs; asset condition assessments and engineering requirements; pipeline prioritization models (as described above) and external paving/road construction plans; water resource management; and consideration of national trends in cybersecurity.

KAWC uses engineering criteria based on accepted engineering standards and practices that provide adequate capacity and appropriate levels of reliability to satisfy residential, commercial, industrial, and public authority needs, and provide flows for fire protection. The criteria are developed from regulations, professional standards and KAWC engineering policies and procedures.

Q. Please describe how investment projects are included within the Company's capital investment plan.

A. Investment Projects are typically projects greater than $250,000 that the Company describes as major projects. These projects represent investments made to meet environmental or water quality regulations, infrastructure capacity expansion or rehabilitation. These projects allow the Company to meet the service demands of the community, help ensure regulatory compliance, and reduce asset failure.

The determination whether to include an Investment Project within the investment plan starts with the development of the anticipated demand projections of the system, the identification of improvements needed to meet those demands and the adoption of strategies designed to bring about the correct prioritization and distribution of capital spending for the various requirements of the business. Specific capital planning requirements are addressed in both the short term (one year) and the longer term (five years). Projects are prioritized using objective criteria that validate the need for a project and assess the risk of not doing the project. A key aspect of this planning technique is that it is flexible and can be adjusted as needed to address new priorities, such as new regulatory requirements, unplanned equipment failures, large or sudden growth of a service area, or new regulatory requirements.

Q. Please explain the types of projects included in the capital plan that are considered recurring projects.

A. A brief description follows:

Item DV (Projects Funded by Others) - This investment plan item is for the installation of new mains, valves, hydrants, and fire service connections that are funded entirely by others. This investment plan item may also include the replacement of existing components of water supply, water treatment, water pumping, water storage, and water pressure regulation facilities not funded by company expenditures. The majority of these expenditures are funded through deposit agreements and as non-refundable contributions. The projected expenditure amount is developed through discussions with home builders and developers as well as a review of plats.

Item A - This investment plan item is for new water mains, valves, and other appurtenances that are funded by the Company, including upsizing of developer initiated extensions; Company initiated and funded new mains that are not related to immediate growth, such as new mains that eliminate existing dead ends or provide new transmission capacity; and new customer - initiated extensions in accordance with tariffs that may include some customer contribution. This item may also include new mains that parallel existing mains to increase transmission capacity, provide reliability, or establish an additional pressure gradient.

Item B - This investment plan item is for the scheduled replacement, renewal or improvement of existing water mains including valves and other appurtenances. This line includes the Qualified Infrastructure Program ("QIP") replacement projects, which consist of the replacement of aging water mains and associated services, valves, hydrants, and restoration that are incidental to the main replacement work.

Item C - This investment plan item is for the unscheduled replacement or restoration of existing water mains, including valves and other appurtenances. This item is primarily used for emergency replacements.

Item D - This investment plan item is for the relocation of existing water mains, including valves and other appurtenances, as required by municipal or state agencies. This investment line item includes replacement of services in conjunction with these projects.

Item E - This investment plan item is for the installation of new hydrants, including hydrant assemblies and valves that are installed on existing mains. This item generally includes all public hydrants.

Item F - This investment plan item is for the replacement of leaking, failed or obsolete hydrants, including hydrant assemblies and valves that are Company funded.

Item G - This investment plan item is for the installation of new water services or improvements, including corporation stops, setters, and shut-off valves.

Item H - This investment plan item is for the replacement of water services or improvements, including the replacement of corporation stops, setters, or shut-off valves.

Item I - This investment plan item is for the installation of new meters.

Item J - This investment plan item is for the replacement or improvement of existing customer meters and end-points.

Item K - This investment plan item is for the replacement of existing Information Technology System equipment and systems due to failure or obsolescence and new items to achieve efficiency or address new requirements.

Item L - This investment item is for the installation or replacement of existing SCADA Equipment and Systems. The acronym SCADA can be defined in several slightly different ways, but KAWC generally defines it as System Control and Data Acquisition, which is the computerized system for monitoring and operating the treatment plants and network facilities. We address these important investment costs separately from general Information Technology System equipment costs.

Item M - This investment item is a division for Security Equipment and Systems. This may include fencing, alarm systems, cameras, barricades, electronic detection or locking systems, software, or other assets related directly to security.

Item N - This investment plan item is for the replacement or improvement of building systems, equipment or furnishings for offices and operations centers, including copy machines, and communication systems other than computers.

Item O - This investment plan item is for replacement of vehicles, including utility trucks, cars and light and medium trucks and accessories.

Item P - This investment plan item is for the replacement or purchase of construction, shop, garage, meter reading, GPS, safety and storeroom equipment.

Item Q - This investment plan item is for the new purchase or replacement of existing components of water supply, treatment, pumping, storage, and pressure regulation facilities, including associated building components and equipment. Replacements may be planned or made because of failure or may include improvements. This item also includes laboratory equipment and replacement of filter media used in the treatment.

Item S - This investment item is for preliminary engineering studies primarily used for planning purposes. At the initiation of a project, these capital dollars are transferred to the appropriate construction project.

Item T12 - This investment includes the Company's investment in technology projects ("Enterprise Solutions") that are completed on an enterprise-wide basis for the benefit of all of American Water's operating utilities (including KAWC) and are comprised of investments that upgrade and enhance our foundational technology, as well as customer facing platforms, among others, to continue to provide safe, reliable and efficient service to customers.

Q. Does KAWC focus on control of capital expenditure costs in its normal day-to-day activities?

A. Yes. All significant construction work is performed by independent contractors and competitive bids are received from KAWC qualified bidders. KAWC maintains a list of qualified bidders that meet minimum safety ratings in ISNet, which is the Company's third-party safety review program. The ISNet program includes annual safety performance reviews, a review of safety performance data, and maintains contractors' insurance certificates with required Company insurance coverages for the type of work performed. KAWC continues to grow the eligible contractors list through meeting with potential contracting companies interested in performing work for KAWC and providing guidance on American Water's vendor registration process and ISNet evaluation submission. The Service Company Supply Chain department receives competitive bids for materials and supplies, such as pipe, valves, fittings, meters, chemicals and other commodity items that are either manufactured or distributed both regionally and nationally. KAWC has the advantage of being able to purchase these materials and supplies on as needed basis at favorable prices. In recent years, Service Company also has undertaken procurement initiatives for services and materials to help reduce costs or mitigate price increases through either streamlined selection or utilization of large volume purchasing power. Among the initiatives that have directly impacted capital expenditures are the use of master services agreements with pre-qualified engineering consultants, national vehicle fleet procurement, and national preferred vendor identification.

KAWC has also taken additional initiatives to directly procure through competitive bidding equipment for some IP project work such as ultraviolet ("UV") equipment for the projects at Richmond Road and KRS II WTPs. This allows for less design revisions during construction, reduced contractor overhead, the ability to negotiate warranties and lock in future costs for wear items directly with the vendor. KAWC continues to look for value engineering opportunities to reduce project costs through design approaches. An example of this was the ability to accomplish a significant decrease in the original estimated costs for the installation of UV at Richmond Road, which was anticipated to require a separate building and significant piping. KAWC was able to reduce the anticipated project estimate from over $7.2M to a projected cost of $3.5M through an approach of installing individual UV units on each filter effluent, not requiring a construction of a new facility. Additionally, KAWC combined the procurement process for each of the equipment and construction services required for the Richmond Road and Kentucky River Station II ("KRS II") UV projects to take advantage of volume, planning, and mobilization efficiencies. KAWC continues to drive savings and efficiencies in the implementation of its QIP program through planned replacement of main nearing or exceeding its useful life, paving partnerships with Lexington-Fayette Urban County Government and coordinated planning with other utilities, creation and improvement of standardized bidding documents, the continual enhancements of pipeline prioritization modeling allowing for both likelihood of failure and consequence of failure analysis that is intended to be reran during replacement planning activities, incorporating updates to GIS asset data and up to date system maintenance and leak repair data from MapCall, the Company's operational work management system. As such, QIP allows the Company to plan and deploy capital more efficiently over the long term. For example, the Company's experience with pipe replacement is a clear indicator of the efficiency gained from proactive capital deployment. As discussed in Citron's Direct Testimony, planned pipe replacement costs $331 per foot whereas reactive pipe replacements cost over $1,000 per foot on average. That's more than three times the cost to replace a broken pipe than to replace it as part of proactive replacement program, such as QIP.

From the perspective of long-term sustainable customer service and maintaining affordable water rates, replacing pipes that are near the end of their useful life in a proactive, systematic, responsible manner will result in lower costs to customers over time as compared with deferring such replacements and addressing problems, such as leaks and main breaks, as they arise. As stated above, planned pipe replacements are much less costly on a unit cost basis than the costs of addressing pipe breaks on an ad hoc basis that can result in service disruptions, property damage, health risks from potential drinking water contamination exposure during pipe breaks, related community opportunity costs related to community health and economic development, and the steep increase in future pipe replacements resulting from prior deferrals of the replacements.

DESCRIPTION OF PLANT ADDITIONS

Q. What level of capital investment and plant additions is the Company seeking to recover in this case?

A. Since the effective date of rates in the Company's last rate case (June 28, 2019), the Company has invested or plans to invest approximately $329.6 million of gross plant additions through January of 2025 in its water facilities. Of the $329.6 million, $243.1 million has been or will be placed into service prior to rates going into effect in February 2024. The remaining $86.5 million will be placed in service during the first-year rates are in effect. In total, of the $329.6 million in investments, $78.3 million is QIP-eligible investment. Please see KAWC_DT_Porter_Exhibit_1 for the Company's forecasted capital investment for 2023, 2024 and 2025.

Q. Please further describe the Company's investment in RPs.

A. Approximately $239.2 million of the $329.6 million in investment pertains to RPs, which, as discussed in greater detail above, include projects like main replacements generally 12 inch and smaller, reinforcement and replacement of service line and meter setting installations, meter purchases, projects to replace and maintain treatment equipment, vehicle replacements, investments that further enhance the Company's hardware, software, and related technology appurtenances and systems, and to a lesser extent the purchase of tools, furniture and equipment.

Q. Please further describe the Company's investment in IPs.

A. The remaining $90.4 million of the $329.6 million in investment pertains to IP investments that support the adequacy and resiliency of the water treatment facilities. The projects KAWC has constructed or plans to construct are critical components of the Company's commitment to maintaining and enhancing the reliability and resiliency of its systems, and those it acquires. These projects allow the Company to continue to provide the high quality and reliable water service to customers and are necessary to support the long-term viability and resiliency of the Company's water systems. The Company's IPs are discussed in greater detail below.

Q. Please describe the IPs placed in service by the Company from the effective date of rates in the last case through 2022.

A. Investment Projects placed in service since the effective date of rates in the last rate case (June 28, 2019) through 2022 include the following:

<u>I12-020079 Jacobson Reservoir Pump Station Improvements ($3,610,000)</u>

This project included the construction of a powder-activated carbon storage and feed system at the Jacobson Reservoir. Previously the Jacobson Pump Station provided source water from Reservoir 4 to Richmond Road Station, where the raw water was treated for taste and odor through a bag feed system. The construction of the powder-activated carbon feed system at the Jacobson Reservoir allows operations staff to feed appropriate amounts of powder-activated carbon and treat taste and odor in an efficient manner through allowing the PAC longer contact time. The project was placed in service September 2019.

<u>I12-020067 Richmond Road Station Chemical Facility Upgrade ($19,300,000)</u>

This project incorporated several components of chemical storage and delivery to enhance the robustness and reliability of Richmond Road Station ("RRS") operations. A major component of the project was the transition from chlorine gas and anhydrous ammonia to the safer liquid sodium hypochlorite and aqueous ammonia. Chlorine gas can be a safety hazard for employees and the public. As the Company evaluated its risks it identified gaseous chlorine as a potential serious health hazard to its employees and the larger community. Accordingly, to eliminate this safety concern, the Company invested in this conversion by building the infrastructure to use liquid chlorine at this facility. The conversion from gaseous to liquid chlorine eliminated the use of gaseous chlorine at the facility, which eliminates the dangers of an accidental release of the toxic gases or a deliberate attack that would pose a danger to the public and the Company's operations staff if this event occurred. The project also centralized many of the chemicals used for the treatment of water at RRS, allowing for the consolidated storage and management of chemicals, which has led to improved safety and efficiency for the operation of RRS. The project was placed in service September 2019.

I12-020055 New Circle Road Phase 2 ($2,150,000) – This project included the relocation of 1,390 linear feet ("LF") of 20-inch water main and 1,590 LF of 12-inch water main in response to the Kentucky Department of Transportation's widening of New Circle Road to increase safety and improve the flow of traffic. The project was located along New Circle Road between Georgetown Road and Boardwalk Avenue in Lexington. The project was placed in service October 2019 in conjunction with Kentucky Department of Transportation's widening project schedule.

I12-020099 Kentucky River Station I ("KRS I") High Service Pumps No. 13 Replacement ($1,469,000) – This project replaced high service pump 13 with a new high efficiency vertical turbine pump. This enhanced the ability of the KRS I facility to better match flows with system demand and improved the efficiency of the high service pumps to utilize power. The project was placed in service May 2020.

<u>I12-300008 Owenton Maintenance Garage ($2,577,000)</u> – This project provided a 9,900 square-foot maintenance garage to support the field crews for the Northern Division. The building contains nearly 6,600 square feet of garage space to allow for climate-controlled storage of the division's materials and equipment. The maintenance garage building also contains nearly 3,400 square feet of support area for restroom and shower facilities, a break room and areas for support and supervisorial personnel. The garage occupies 0.23 acres of the 4-acre site, allowing for the centralized storage of large material and equipment, consolidation of staff and the ability to accept deliveries of material in a safer, more organized manner. The project was placed in service in May of 2020.

<u>I12-020074 Athens Boonesboro Main Extension – Phase II ($3,460,000)</u> - This project completed water system improvements along Athens-Boonesboro Road in Fayette County and made various improvements in Clark County to allow for the connection of KAWC customers to the Company's Central Service Area. The water main extension occurred along Athens-Boonesboro, Quisenberry, Waterworks, Old Stone Church and Combs Ferry roads and allowed the Company to eliminate the use of purchased water for the customers in the area of the project and allowed them to be served by KAWC's three existing water treatment facilities. The project also enhanced water pressures and water quality for customers in the area. The project was placed in service August 2020.

<u>I12-020037 KRS I Chemical Storage and Feed Improvements ($17,500,000)</u> – This project incorporated several components of chemical storage and delivery to enhance the robustness, safety and reliability of KRS I operations. A major component of the project was the transition from chlorine gas and anhydrous ammonia to the safer liquid sodium hypochlorite and aqueous ammonia. As noted above, chlorine gas can be a safety hazard for employees and the public. As the Company has evaluated its risks it has identified gaseous chlorine as a potential serious health hazard to its employees and the larger community. Accordingly, to eliminate this safety concern, the Company is investing in this conversion by building the infrastructure to use liquid chlorine at this facility. As explained above, the conversion will eliminate the use of toxic gases that would pose a danger to the public and the Company's operations staff if a release event occurred. The project was placed in service in September 2020.

I12-020076 KRS I Replace Incline Car ($4,570,000) - This project replaced an incline car at KRS I that was installed in 1956. The incline car is the main means for operators and maintenance personnel to gain access to the KRS I low service intake pumps and structure. The new incline car installation addressed safety concerns and increased the capacity for moving both personnel and their equipment to the low service intake pumps and structure. The project was placed in service July 2021.

 

<u>I12-020106 RRS High Service Pumps No. 6 Replacement ($777,000)</u> – This project replaced high service pump 6 with a new high efficiency split case pump. This work continued KAWC's replacement of high service pumps to improve both the operational and energy efficiency of the facility's high service pumps. The update of high service pump 6 included the installation of a new 90% efficient motor paired with a variable frequency drive that controls the new split case pump. The update of pump 6 allows the facility to better match flows with system demand and improves the efficiency of the high service pumps to utilize power. The project was placed in service April 2022.

Q. Please explain the IPs placed in service or planned to placed in service during 2023 through the end of the forecasted test year (January 31, 2025)?

A. Investments Projects that have been or plan to be in service during 2023 through January 31, 2025 are as follows:

<u>I12-300010 Kentucky River Station II Ultraviolet Disinfection ($3,750,000)</u> – This project will provide KRS II water treatment plant ("WTP") with the required additional 1-log removal of cryptosporidium, giardia and viruses in response to the Bin 2 classification within the United States Environmental Protection Agency ("US EPA") Enhanced Long Term 2 Surface Water Treatment Rule. UV disinfection was selected based on the US EPA's toolbox evaluation. The project will include one duty and one standby reactor that will be located within a pre-designed area for UV when KRS II WTP was built. The flex reactor can incorporate additional lamps if needed in the future to provide additional log removal or meet future capacity expansions. The project is currently in the implementation phase and will be placed in service in December 2023.

<u>I12-020094 Cox Street Booster Station ($1,300,000)</u> – This project will replace the two existing below-grade booster pump stations with an at-grade pump station. The project will include review of the pumping requirements for the pump station, which supports both the 1 million gallon ("MG") ground storage tank and the 1 MG elevated storage tank at Cox Street. The project will address safety concerns associated with underground facilities and confined spaces and enhance the reliability and efficiency of the pump station. This project is in the implementation phase and is expected to be placed in service by December 2023.

I12-020108 Meter Shop Bench Upgrade ($575,000) – This project will upgrade the existing meter testing facilities, which consist of a bench and tank that are sized to test meters in volume measurements of cubic feet and are dependent upon manual timing and calculations. This project includes a new meter bench and associated piping and tankage, along with the electrical modifications required for the new bench and the installation of a garage door to facilitate installation. The new meter bench will allow meter testing for 5/8" meter through 2" meters to be conducted in gallons per minute, which is consistent with the units used for billing by the Company. The new system will also improve efficiency of meter testing by electronically measuring and documenting testing. This project is expected to be placed in service by December 2023.

I12-02XXXX Winchester Road Hydraulic Improvements ($577,000) – This project will install approximately 1200 LF of 24" ductile iron pipe ("DIP") under I-75 from Winchester Road to Polo Club Road to improve hydraulics in this area of our system. This project is expected to be placed in service by December 2023.

I12-02XXXX KRS I Hydrotreater Drive Replacement Nos. 1 and 2 ($400,000) – This project will replace the drives that operate the rake arms within Hydrotreaters Nos. 1 and 2. The existing drives have been maintained since the 1950s and will be replaced with variable speed drives with more efficient motors. This project is expected to be placed in service by December 2023.

I12-020083 Richmond Road Station UV Disinfection ($3,500,000) – This project will provide RRS the required additional 1-log removal of cryptosporidium, giardia and viruses in response to the Bin 2 classification within the US EPA Enhanced Long Term 2 Surface Water Treatment Rule. UV disinfection was chosen based on the US EPA's toolbox evaluation. The project will include seven duty and one standby reactor placed on the filter effluent lines within the existing filter building pipe gallery. By doing so, the anticipated need for construction of a separate UV building was eliminated, avoiding additional construction costs associated with doing so and making maintenance more efficient and centralized for operations. The project is currently in the implementation phase and is planned to be placed in service in May 2024.

I12-020095 Mercer Road Booster Station ($1,400,000) – This project will replace the existing below-grade booster pump station with an at-grade pump station. The project will include review of the pumping requirements for the pump station, which supports the 2 MG elevated storage tank at Mercer Road. The project will address safety concerns associated with underground facilities and confined spaces and enhance the reliability and efficiency of the pump station. This project is expected to be placed in service by June 2024.

I12-020109 Ford Hampton Booster Station ($1,700,000) – This project will install an at-grade booster pump station and hydropneumatic tank, replace approximately 3,600 LF of thin-wall plastic piping on the discharge side of the booster and approximately 4,750 LF of thin-wall plastic piping on the suction side of the booster with new DIP main and the addition of SCADA integration which allows visibility of operations remotely. The project will enhance the reliability of water service to the area. This project is expected to be placed in service by September 2024.

I12-020107 Kentucky River Station I Gravity Thickeners ($8,000,000) – KRS I utilizes Aldrich units for flocculation, sedimentation and filtration within the treatment train. The center of each Aldrich unit contains a center drum that has rake arms attached to it that skim the bottom floor of the Aldrich unit. The rake arms are slowly turned by an electric drive and pushes the flocculated sludge to the center drain where it can be pumped to the washwater holding tanks. After the sludge enters the washwater holding tanks it will be pumped into the geotubes and the remaining sludge and water enter the lagoons for final settling. The sludge settles in the lagoons and the water works its way through each lagoon before it is dechlorinated and returned to the Kentucky River. The solids handling at KRS I has become inadequate for the needs and is causing significant operational and maintenance costs for dredging of the existing lagoons. The frequency that the three existing lagoons are dredged continues to increase along with the amount of total solids based on increased water treated. Each time the lagoons are dredged some soil loss occurs in the existing lagoon walls. Large rain events that cause flooding along the Kentucky River dramatically increase the turbidity of the water which causes more sludge to be removed.

KAWC completed a Solids Handling Master plan for the KRS I WTP that included short, middle and long-term improvement steps. The initial short-term improvement which has been completed was to install geotubes to catch solids after they leave the washwater holding tanks and before they enter the lagoons. The geotubes themselves are large filter bags that catch solids but allow liquids to pass. A small amount of polymer would need to be pumped into the line feeding the geotubes to promote adhesion between particles. This would allow for water to pass through the geotubes, into the lagoons and eventually be discharged back into the river.

The middle term improvement is the construction of two Gravity Thickener tanks that would promote the equilization and thickening of sludge. The thickened sludge could be routed into the geotubes or into the lagoons. The slow release would allow for a more even distribution of sludge across the lagoons, which would allow for less frequent dredging. The final long term improvement includes the addition of a mechanical dewatering facility that would house a equipment such as the screw press.

This project is the middle term, second step consisting of two concrete gravity thickener tanks, one thickened pump station, one supernatant pump station and approximately 2,000 feet of piping ranging from 8" inches to 30" inches in diameter. The project will utilize the existing washwater holding tanks and send sludge to the gravity thickener tanks prior to the geotubes and then lagoons. The benefits will be a more consistent and higher solids content within the sludge. This project will greatly enhance the KRS I solids handling during high turbidity river events due to the increase in storage capacity of washwater. The project is expected to be placed in service by October 2024.

I12-020113 Millersburg Transmission Main ($12,800,000) – This project will construct approximately 64,000 LF of new 12" and 16" transmission water main from KAWC's Central Division to KAWC's Millersburg system. The Millersburg system is isolated from the rest of KAWC's system, and therefore, KAWC must purchase water to supply Millersburg. The current purchase source does not provide an adequate supply to meet the current or anticipated future demand of Millersburg and KAWC's wholesale customers. The project will significantly increase the available supply and improve service to Millersburg. The project is expected to be placed in service by December 2024.

<u>I12-0200XX KRS I Low Service Pump Replacement ($2,000,000)</u> – This project will replace a low service pump with a new high efficiency vertical turbine pump. This will enhance the ability of the KRS I facility to better match flows with system demand and improve the efficiency of the low service pumps to utilize power. The project is expected to be placed in service by December 2024.

<u>I12-300013 Owenton Booster Station ($1,560,000)</u> – This project will include the construction of a new at-grade booster pump station and hydro-pneumatic tank in the Northern Division. The new pump station and tank will improve pressures in northern Owen County and reduce the need for purchased water. A new control valve to improve tank operations will also be constructed as part of the project. This project is expected to be placed in service by December 2024.

<u>RISKS ASSOCIATED WITH FURNISHING PUBLIC WATER SERVICE</u>

Q. What regulations govern the quality and quantity of water provided by KAWC?

A. Water supply utilities are subject to a complex array of regulations at the federal, state and local levels with respect to water quantity, water quality and other environmental aspects of their facilities and operations. Drinking water quality is addressed by a combination of federal regulation under the Safe Drinking Water Act of 1973 and state regulation under Title 401 of the Kentucky Administrative Rules Chapter 8. The federal act established the US EPA as the federal regulatory body governing drinking water. Pursuant to that authority, US EPA has established standards for contaminant levels in drinking water,[1] mandatory treatment methods, monitoring and reporting requirements, and public notification mandates in the event of contaminant level or treatment method noncompliance.[2] The EPA has granted "primacy" to the Kentucky Division of Water ("DOW") to administer the federal regulatory standards.

Over the years, regulatory protection has been extended through the establishment of maximum contaminant levels ("MCLs") or by treatment requirements that target additional contaminants. MCLs determine the maximum level of each covered substance within the drinking water that is deemed safe for the customer. They also include requirements for monitoring, remediation, and public notice when standards are exceeded. There are now MCLs for over 90 individual organic and inorganic chemicals, including groups like trihalomethanes (THMs) and haloacetic acids, and E. coli bacteria indicator microorganisms.[3] In addition, treatment technology requirements include specifications that surface water filtration and groundwater disinfection cover protozoa, viruses, and other bacteria.

In recent years there has been an increase in public concern over water quality standards and regulation. This increase has led to growth and increased stringency in US EPA and state drinking water regulation.

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[1] *See* EPA - National Primary Drinking Water Regulations at https://www.epa.gov/sites/production/files/2016-06/documents/npwdr_complete_table.pdf (last visited Nov. 19, 2018).
[2] *See* 40 C.F.R. Parts 141-143.
[3] *See* https://www.epa.gov/dwreginfo/drinking-water-regulations.

Q. What risks associated with furnishing safe and adequate water quality and water quantity is KAWC facing?

A. The US EPA has continued to make its regulations concerning disinfection byproducts more stringent, has revised the Lead and Copper Rule, and has also proposed a National Primary Drinking Water Regulation establishing MCL standards for six per- and polyfluoroalkyl substances ("PFAS") in drinking water.[4] While the Company has been anticipating the PFAS rulemaking, the Company is carefully reviewing the proposed regulation to assess the MCLs actually proposed in the regulation, including the four parts per trillion requirements for PFAS. KAWC is evaluating whether it may need to employ additional treatment technologies at existing water treatment facilities and the estimated capital expenditures for additional treatment, including additional estimated operating expenses. However, testing for PFAS, to date, has not identified the need for treatment at any KAWC water treatment plants but the Company continues to perform testing.

Q. Please describe the US EPA's efforts to make its disinfectant byproducts regulations more stringent.

A. Disinfection byproducts are produced by the interaction of disinfection agents (such as chlorine) with constituents (such as organic compounds) that naturally occur in source water. The Stage 2 Disinfectants and Disinfection Byproducts Rule ("Stage 2 DBPR") adopted in 2006, coupled with increasingly stringent disinfection regulations of the Long Term Enhanced Surface Water Treatment Rules, requires a very careful balancing of treatment processes and source water monitoring to meet the twin goals of killing

[4] *See* https://www.epa.gov/pfas/key-epa-actions-address-pfas.

microbes (such as giardia and E. coli) while avoiding unacceptable concentrations of disinfection byproducts such as Chlorite, Bromate, THMs, and Halogenic acetic acids.

In addition to the Stage 2 DBPR, the US EPA was required by the 1996 Amendments to the Safe Drinking Water Act to develop rules to balance the risks between microbial pathogens and disinfection byproducts ("DBPs"). The Long Term 2 Enhanced Surface Water Treatment Rule ("LT2"), adopted in 2006, is the second phase of rules required by Congress to address microbial pathogens. The purpose of the LT2 is to reduce illness linked to the contaminant Cryptosporidium and other pathogenic microorganisms in drinking water. The rule supplements existing regulations by targeting additional Cryptosporidium treatment requirements in facilities that take steps to decrease formation of disinfection byproducts that result from chemical water treatment. Cryptosporidium is a significant concern in drinking water because it contaminates most surface water used as drinking water sources, it is resistant to chlorine and other disinfectants, and it has caused waterborne disease outbreaks.

Q. What effects does KAWC expect these rules to have on its operations?

A. KAWC believes that both the Stage 2 DPBR and the LT2 will have major impacts on its operations in the near and long term. KAWC conducted recent facility-specific studies that indicate that major improvements at Kentucky River Station I will be needed to allow the 45 million gallon treatment facility to meet the requirements of both rules as well as positioning it to meet future regulations. In addition, KAWC completed its second round of source monitoring in accordance with the LT2 for all three of its water treatment facilities during 2016 and 2017. As a result, the Company expects to implement UV disinfection and other enhancements to the clearwell, including an additional 1-log treatment for Cryptosporidium removal and inactivation, in order to meet LT2 Cryptosporidium requirements.

Q. Please describe the impact of the Revised Lead and Copper Rule on KAWC.

A. The EPA's revised Lead and Copper Rule is impacting the Company's approach and investment in line replacement necessary to maintain compliance and to continue to address the changing regulatory landscape in this area. In 2023 and 2024, the Company is expected to conduct an inventory of the Company's and the customers' service lines. This inventory must identify the material of not only the company-owned portion of the service line, but also the customer-owned portion of the service line. This inventory requires extensive customer engagement, a thorough review of Company records, and various methods to identify the material of all of the Company and customer service lines. As noted by Mr. Lewis in his direct testimony, the revision of the lead and copper rule requires the Company to develop a replacement plan, which will create a schedule for the replacement of service lines that are either lead or galvanized, downstream of lead.

Q. Does climate variability pose additional risks for water supply utilities such as KAWC?

A. Yes. Whatever the debate may be concerning the causes of climate variability, water supply utilities face the reality of climatic variability and attendant stresses on water resources and system recovery. "Extreme rainfall events have increased in frequency and intensity in the Southeast, and there is *high confidence* they will continue to increase in the future."[5] That means we can expect more frequent and intense high-precipitation events and floods, along with high damaging storm events – which impact water utilities.

Water supply systems are fundamentally resource-dependent and, therefore, the effects of climate variability pose a significant on-going risk and create challenges with regard to maintaining a reliable water supply during the full range of potential future conditions, including even what might be assumed to be "normal" periods. The safe yields of water supply sources have historically been evaluated based on historical climatic patterns, data from so called "droughts of record" or dry period frequency analysis. However, changing climatic conditions suggest that historical hydrologic data (which in many cases only reflect 50-100 years of rainfall and stream flow measurement collection – a quite short period in geologic or climatic time) may not accurately predict future conditions. Thus, the calculated safe yield of streams, reservoirs and groundwater wells are put in question as the effects of climate variability are experienced across southeastern United States. Thus, in response to climate variability, water supply systems must address the risks posed to the reliability and resilience of their sources. While droughts are the major challenge for water supply systems, heavy precipitation and high-flow events are the concern of water systems.

The effects of climate variability impact the resilience of a system to withstand an event without interruption of providing service to the customers or, if service is interrupted, to restoring the service in a timely manner. Like all large users dependent on electricity from the grid, water utilities must plan for power outages and develop plans for maintaining continuity of operations when such outages occur. Nonetheless, recent

[5] Fourth National Climate Assessment, ch. 19 – Southeast, available at http://nca2018.globalchange.gov/.

weather patterns combined with the issue of aging infrastructure are causing utilities to review traditional planning and design criteria. The design standards for supplies, treatment plants, pump stations and tanks are taken together to achieve a level of zero service outages. The so-called new normal has led experts to look beyond traditional reliability and emergency planning into a world that needs the speed of recovery and resiliency for much more widespread and damaging events. Updating infrastructure to keep up with the increase in extreme weather and ensuring that adequate service can be maintained for extended time periods after an extreme event is just as important as addressing the aging infrastructure.

Q. Does this conclude your testimony?

A. Yes.

VERIFICATION

COMMONWEALTH OF KENTUCKY)
) SS:
COUNTY OF FAYETTE)

The undersigned, Shelley Porter, being duly sworn, deposes and says that she is the Director of Engineering for Kentucky American Water, that she has personal knowledge of the matters set forth in the accompanying testimony for which she is identified as the responsible witness, and that the answers contained therein are true and correct to the best of her information, knowledge and belief.

Shelley W. Porter

Shelley Porter

Subscribed and sworn to before me, a Notary Public in and before said County and State, this 21st day of June, 2023.

Molly McCleese Van Over

Notary Public

My Commission Expires:

July 31, 2025

Notary ID: KYNP26988

Kentucky American Water
Capital Project Spend Forecast
2023-2025

Business Unit	Project #	Project Title	2023	2024	2025
		RECURRING PROJECTS			
Kentucky	R12-**A1	Mains - New	749,886	765,000	748,549
Kentucky	R12-**B1	Mains - Replaced / Restored	24,179,084	21,585,200	42,478,470
Kentucky	R12-**C1	Mains - Unscheduled	1,566,342	1,660,000	1,660,000
Kentucky	R12-**D1	Mains - Relocated	2,325,200	700,000	1,416,000
Kentucky	R12-**E1	Hydrants, Valves, and Manholes - New	325,518	419,500	419,500
Kentucky	R12-**F1	Hydrants, Valves, and Manholes - Replaced	2,278,540	2,266,799	2,320,000
Kentucky	R12-**G1	Services and Laterals - New	1,676,432	3,247,500	3,344,500
Kentucky	R12-**H1	Services and Laterals - Replaced	515,001	1,205,000	1,205,001
Kentucky	R12-**I1	Meters - New	534,288	45,500	45,500
Kentucky	R12-**J1	Meters - Replaced	5,190,900	13,352,672	7,754,482
Kentucky	R12-**K1	ITS Equipment and Systems (Local)	450,443	401,589	789,604
Kentucky	R12-**L1	SCADA Equipment and Systems	228,024	899,000	683,000
Kentucky	R12-**M1	Security Equipment and Systems	405,953	625,000	625,000
Kentucky	R12-**N1	Offices and Operations Centers	1,414,540	793,000	550,000
Kentucky	R12-**O1	Vehicles	885,000	1,400,000	1,000,000
Kentucky	R12-**P1	Tools and Equipment	719,524	2,041,100	484,955
Kentucky	R12-**Q1	Process Plant Facilities and Equipment	3,027,729	3,209,499	2,866,000
Kentucky	R12-**S1	Engineering Studies	158,411	75,000	75,000
Kentucky	R12-**T12	ITS Equipment and Systems - Enterprise Solutions	3,343,170	2,996,000	2,996,000
		TOTAL RPs	**49,973,985**	**57,687,360**	**71,461,561**
		INVESTMENT PROJECTS			
Kentucky	I12-020059	KRS2 Transfer Switch			211,348
Kentucky	I12-020082	KRS1 UV Facility		1,045,351	7,674,348
Kentucky	I12-020083	RRS - UV Facility	953,352	2,056,314	
Kentucky	I12-020094	Cox Street Booster Station	872,894	200,000	
Kentucky	I12-020095	Mercer Rd Booster Station	251,806	1,127,063	
Kentucky	I12-020102	KRS1 Low Service Pump Improvements		2,000,000	202,228
Kentucky	I12-020107	KRS1 Gravity Thickener	1,079,821	7,000,000	
Kentucky	I12-020108	Meter Shop Upgrade	443,109		
Kentucky	I12-020109	Ford Hampton Booster Station	335,397	1,416,814	
Kentucky	I12-020113	Millersburg Transmission Main	736,000	12,100,000	
Kentucky	I12-02xxx2	KRS 1 Screw Press			2,895,386
Kentucky	I12-02xxx3	Winchester Road Hydraulic Improvements	574,586		
Kentucky	I12-02xxx5	Low Service Pumps for RRS			2,257,393
Kentucky	I12-02xxx9	KRS1 Hydrotreater Drive Replacement 1 & 2	400,000		
Kentucky	I12-02xx15	KRS1 Low Service Pump Replacement	99,000		
Kentucky	I12-300010	KRS2 - UV Facility	3,389,182	164,000	
Kentucky	I12-300013	Owenton Booster Station	600,000	800,000	
		Total Investment Projects	**9,735,148**	**27,909,543**	**13,240,703**
		Total RP and IPs	**59,709,133**	**85,596,903**	**84,702,264**

COMMONWEALTH OF KENTUCKY
BEFORE THE PUBLIC SERVICE COMMISSION

IN THE MATTER OF:

ELECTRONIC APPLICATION OF KENTUCKY-	**)**	
AMERICAN WATER COMPANY FOR AN	**)**	
ADJUSTMENT OF RATES, A CERTIFICATE	**)**	
OF PUBLIC CONVENIENCE AND NECESSITY	**)**	**CASE NO. 2023-00191**
FOR INSTALLATION OF ADVANCED METERING	**)**	
INFRASTRUCTURE, APPROVAL OF CERTAIN	**)**	
REGULATORY AND ACCOUNTING	**)**	
TREATMENTS, AND TARIFF REVISIONS	**)**	

DIRECT TESTIMONY OF CHARLES B. REA

June 30, 2023

Q. Please state your name and business address.

A. My name is Charles B. Rea. My business address is 5201 Grand Avenue, Davenport, IA 52801.

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

A. I am employed by the American Water Works Service Company, Inc. ("AWWSC"). My title is Senior Director, Regulatory Pricing & Affordability.

Q. Have you previously testified before the Kentucky Public Service Commission?

A. I have not.

Q. Have you previously filed testimony before any other regulatory commissions?

A. Yes. During my employment with AWWSC, I have provided testimony regarding the cost of service, rate design proposals, revenue projections, and affordability analyses for New Jersey-American Water Company, Virginia-American Water Company, Pennsylvania-American Water Company, Maryland-American Water Company, West Virginia-American Water Company, Iowa-American Water Company, Missouri-American Water Company, Indiana-American Water Company, and Illinois-American Water Company. I have also testified on numerous occasions in Iowa, Illinois, and South Dakota on issues regarding energy efficiency and electric and natural gas cost of service and rate design.

Q. Please state your educational and professional background.

A. I received a Bachelor of Arts degree in Computer Science from the University of Illinois at Springfield in 1986 and a Master of Science degree in Statistics and Operations Research from Southern Illinois University at Edwardsville in 1990.

I have been employed by AWWSC since January 2018 in my role as Senior Director, Rates and Regulatory. Previous to my employment with AWWSC, I was employed by MidAmerican Energy Company from June 1990 through January 2018. I have more than thirty years of utility experience covering a wide range of issues including electric system planning, sales and revenue forecasting, electric load research, marketing, rates, class cost of service, and energy efficiency. Most recently at MidAmerican, I was Director, Energy Efficiency and Regulatory Analytics. In that position, I had responsibility for planning, evaluation, and operational management of MidAmerican's energy efficiency and demand response programs in Illinois, Iowa, and South Dakota, as well as direct responsibility for electric and natural gas sales and revenue forecasting, electric peak demand forecasting, load research, retail pricing of electric and natural gas products, and electric and natural gas cost of service and rate design.

Q. What are your current employment responsibilities?

A. My primary responsibility in my role as Senior Director, Rates and Regulatory is to serve as a subject matter expert on cost of service, rate design, revenue, and affordability of service issues for AWWSC's operating company affiliates, including Kentucky-American Water Company ("KAWC" or the "Company"). I am responsible for the development and preparation of cost of service and rate design analyses and filings, as well as rate design proposals to our internal and external stakeholders. I am also responsible for projections of revenues for rate case purposes, and I am responsible for developing and presenting information on the affordability of our water and wastewater service to our customers.

Q. What is the purpose of your direct testimony in this proceeding?

A. The purpose of my Direct Testimony is to sponsor KAWC's rate design proposals, affordability analyses, and revenue projections including adjustments to KAWC's historical billing determinants. Specifically, I will address the following issues:

- Affordability
- Value Proposition of KAWC Water Service
- Water Rate Design
- Universal Affordability
- Analysis of KAWC Water Consumption
- Revenue Calculations

Q. Please identify the schedules you will be sponsoring and for which you will be providing testimony.

A. I am sponsoring the following Company Schedules attached to my Direct Testimony:

- Exhibit CBR-1: Affordability Analysis of Water Service
- Exhibit CBR-2: Residential Cost of Service
- Exhibit CBR-3: Residential and Commercial Usage Modeling

In addition to these exhibits attached to my direct testimony, I am also sponsoring the following filed exhibits:

- Exhibit 25 (Financial Forecast – Water Sales (Gallons))
- Exhibit 26 (Financial Forecast – Customer Forecast)
- Exhibit 37 (Accounting Schedules)

I am also sponsoring workpapers to support Exhibits 25, 26 and 37 labeled Revenue WP Support.

AFFORDABILITY OF SERVICE

INTRODUCTION

Q. Please discuss why the affordability for water service is important to the Company.

A. The Company knows that its water service is essential, and we know how important it is for that service to remain affordable. The concept of affordability for water service is based on the idea that everyone should have access to drinking water that is: (1) safe, meaning it complies with EPA regulations and Safe Drinking Water Act standards; (2) reliable, so that it is resilient in the face of floods, droughts, and other climate risks; and (3) affordable. The affordability analyses done by the Company shows that KAWC's water service, overall, has become more affordable over time and will remain affordable under the Company's proposed rates. The concept of affordability, particularly in the context of KAWC's rates, is also discussed in the direct testimony of Kathryn Nash.

Q. How does the Company assess the affordability of its water service?

A. The Company assesses affordability of its water service by comparing annual bills for water service to household income in the communities that we serve. Such an assessment requires at least two data points – the average monthly or annual bill for water service and some measure of household income for the customer population. For the broader residential customer base, the most commonly available household income measure is Median Household Income ("MHI"), which can be measured at a community level and is paired with a data set that provides the number of customers served in each community to arrive at a weighted number that represents MHI for the Company's entire service territory. At a more detailed level, individual household income is considered, and affordability can then be assessed across a full range of households based on their various income levels and bills for water and/or wastewater service. A variety of household income data is readily and publicly available from the U.S. Census Bureau through the American Community Survey ("ACS") at the state, county, and community levels.

Q. Has the Company conducted an analysis of the affordability of its water service?

A. Yes. The Company's affordability study for water service is provided in Exhibit CBR-1. This analysis consists both of an Enterprise-Level Analysis and a Community-Level Analysis.

<u>ENTERPRISE-LEVEL ANALYSIS</u>

Q. Please describe the Company's Enterprise-Level Analysis of affordability of service.

A. The Enterprise-Level Analysis of affordability for water service is a historical comparison of average monthly bills for KAWC residential customers to MHI for the Company's residential customers. The metric used to describe affordability is the Bill-to-Income ("BTI") Ratio, which is defined as annual water bills divided by estimated annual household income.

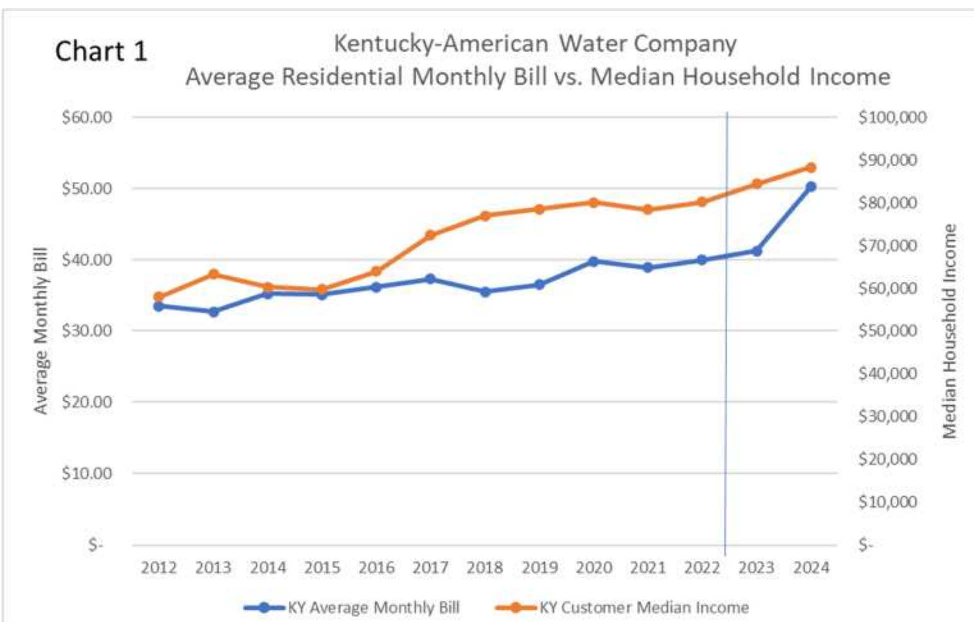
Q. How do you determine MHI for the customers in the Company's service territory?

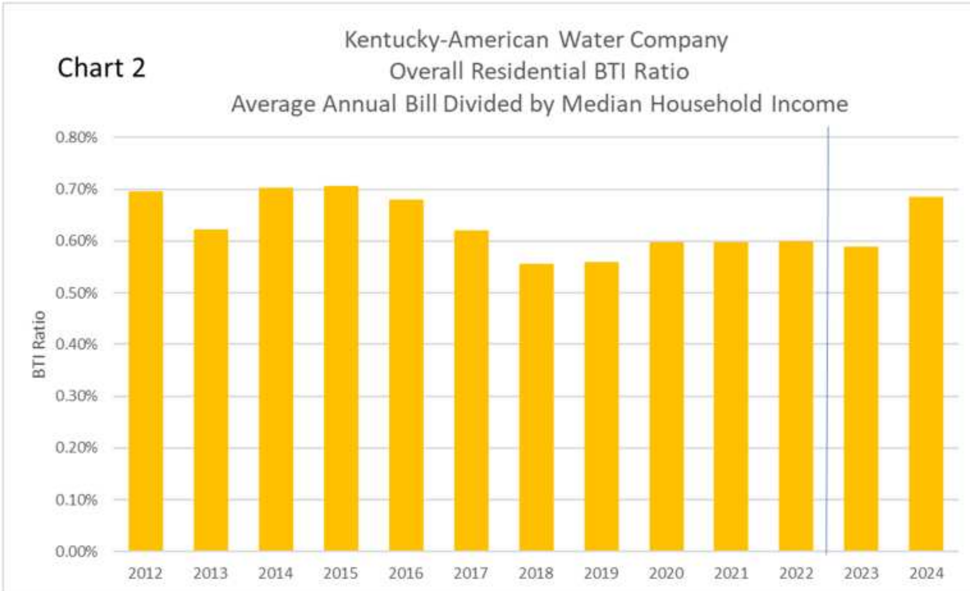
A. The MHI for the Company's service territory is a weighted average of the number of customers the Company serves in each community in the service territory and the median household income in each of those communities for owner-occupied and single-unit renter occupied homes as reported by data in the ACS based on the most recent year's available data (2021 in this proceeding). The relationship between this service territory specific figure and the MHI for the Commonwealth of Kentucky for 2021 (also provided at the community level through the ACS) is then applied to historical MHI data for the

Commonwealth of Kentucky to arrive at historical MHI data for the KAWC service territory.

Q. What are the results of your statewide enterprise-level analysis of affordability?

A. The charts below compare historical average monthly water bills to MHI for Kentucky-American customers from 2012 through 2022 stated in absolute terms and stated in terms of BTI Ratio, along with estimated average monthly bills under the Company's proposed rates in this case and estimated MHI for Kentucky-American customers during the forecasted test year (twelve month ending January 2025). The data shows that the BTI Ratios for water service for Kentucky-American customers have decreased from 2012 to 2022 starting at approximately 0.7% of MHI in 2012 to approximately 0.6% of MHI in 2022. The BTI Ratio at the median income level is expected to be 0.68% under the Company's proposed rates in this case.





Q. Is there a generally accepted standard for the affordability of water expressed as a percentage of median household income?

A. A benchmark for affordability expressed as a total bill's percentage of MHI is a policy decision; however, bills less than 2.0% or 2.5% of MHI for water and 4.0% to 4.5% of MHI for combined water/wastewater are considered "affordable" by some.[1] As I previously testified, the overall BTI Ratios for water service for Kentucky-American customers have decreased from over the last decade and is expected to be 0.68% under the Company's proposed rates in this case, which is well below the 2% benchmark for this metric which is at the conservative end of the range of affordability often cited.

[1] Teodoro, Manuel P. "Measuring Household Affordability for Water and Sewer Utilities." Journal AWWA, 2018, doi:10.5942/jawwa.2018.110.0002.

COMMUNITY-LEVEL ANALYSIS

Q. Please describe the Company's Community-Level Analysis of affordability.

A. The Community-Level Analysis takes a deeper dive into the affordability of water service at a local level across different customer demographics and proposed rates for each community that the Company serves. For larger communities, the analysis is done at a zip-code level.

Q. What information is needed to conduct an analysis of the affordability of service at this detailed level?

A. In order to properly assess affordability of service at the community level, the following information is used:

- Number of customers served in each community
- The distribution of owner-occupied households and renter-occupied households by income level in each community
- The percentage of occupied housing units that are owner-occupied households and renter-occupied households that are not in multi-dwelling buildings in each community.
- Average number of persons per household in each community for both owner-occupied and renter-occupied households.
- The distribution of the size of households (one-person, two-person, etc,) for households of different income levels
- Standard definition of Basic Water Service
- Current or proposed rate structures

I will return to the Community Level analysis after I discuss the concept of Basic Water Service.

Q. Please describe the concept of Basic Water Service.

A. Basic Water Service is a water usage level that reflects water consumption provided for basic human services (cooking, cleaning, sanitation, and general health requirements), which is then assumed to be constant from month-to-month and not subject to significant seasonality or weather conditions. This standard can be expressed in terms of gallons per resident per day. This service is different from discretionary seasonal water usage for filling swimming pools, lawn irrigation, etc. This definition of Basic Water Service can be used to customize a level of usage that accurately reflects water service for different sizes of households.

Q. How do you define Basic Water Service for the purposes of your community-level affordability analysis?

A. For the purpose of the Company's affordability analyses, Basic Water Service is defined to be 40 gallons of water per household member per day. This figure is based on the review of relevant literature on the subject and a review of Company billing data for residential customers in months with minimum levels of discretionary water usage which supports the definition of 40 gallons of water per household per day.

Q. What information does your Community-Level Analysis provide?

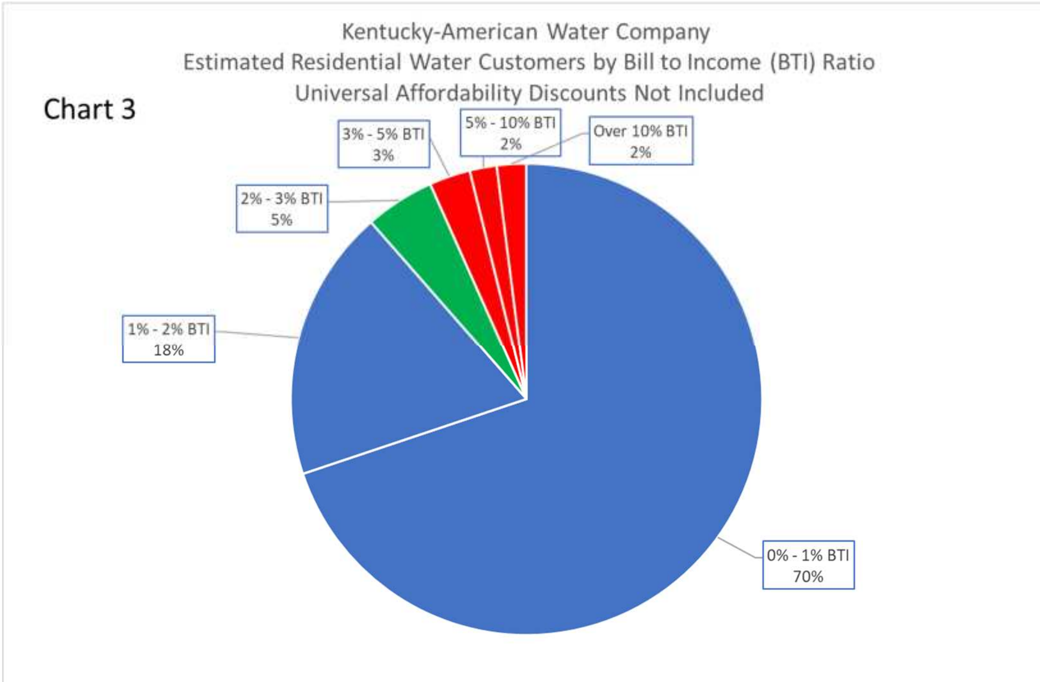
A. The Company's Community-Level Analysis provides a complete set of demographic information for the Company's customer base in each community and a set of affordability data for its service territory in total and for various cross sections of the Company's customers.

Q. What demographic information does the community-level analysis provide?

A. The demographic information provided by this analysis is primarily economic in nature, although the analysis can be expanded to provide information on various identifiers such as race, languages spoken, etc. The primary demographic (economic) information provided by the analysis is the estimated number of customers at different levels of Federal Poverty Level ("FPL") and at different levels of household income. FPL is a measurement set by the U.S. Department of Health and Human Services of the minimum amount of annual income that is needed for individuals and families to pay for essentials, such as room and board, clothes, and transportation. The FPL takes into account the number of people in a household, their income, and the state in which they live. For Kentucky, the FPL guidelines for 2023 are set at $13,590 for a household size of one and $4,720 per year for each additional household member.

Q. What does your Community-Level Analysis show?

A. Chart 3 below shows the estimated number of residential customers whose bills for Basic Water Service under the Company's proposed rates would take up varying levels of household income.



This chart shows that under the Company's proposed rate structure, the Affordability Index metric (discussed below) for the Company's service territory in total is 88% under proposed rates, meaning that 88% of our residential customers can expect to see bills for Basic Water Service to be less than 2% of their household income. The Company estimates that there are approximately 14,000 residential water customers that will see bills for Basic Water Service above 2% of their household income, which is approximately 12% of the total customer population.

Q. Please describe the Affordability Index.

A. The Affordability Index ("AI") is a metric that very simply reflects the percentage of a group of customers for whom Basic Water Service is expected to be less than a given percentage of annual household income. Consistent with my previous discussion in testimony regarding standards for affordability, the Company uses 2% of household income as the benchmark for this metric which is at the conservative end of the range of affordability often cited. As an example, if for a certain group of customers, it is estimated that 80% of those customers will have bills for Basic Water Service that is less than 2% of annual household income, the AI value for that group of customers is 80%.

The AI metric is designed to reflect the percentage of residential customers in a state, community, or demographic group for whom Basic Water Service is expected to cost 2% or less of annual household income. An AI value of 100% means that all customers within a selected group can expect Basic Water Service at less than 2% of household income. An AI value of 70% means that approximately 70% of customers within a selected group can expect Basic Water Service at less than 2% of household income, which means that 30% of customers in that group and expect Basic Water Service to cost more than 2% of household income. The AI value is calculated based on modeling of proposed rates and community-level demographic information I previously described in my testimony which assess affordability across the entire range of customer demographics in each community we serve.

Q. You've identified a segment of the customer population with BTI Ratios greater than 2%. What are the economic demographics of this customer group?

A. The economic demographics of this customer group show household incomes generally less than $35,000 per year. Approximately 80% of the customers that have been identified as potentially having challenges with affordability of service have household incomes less than $20,000 per year.

Q. Do you have information on the Affordability Indices of service by income group?

A. Table 1 below shows AI values for the Company's residential customers by income level. This table shows that for households with annual income of $50,000 per year or more, we expect that Basic Water Service will equate to less than 2% of household income for virtually all of these customers which results in an AI value of 100%. For customers with household incomes in the $15,000 to $50,000 range we expect there will be a mix of customers for whom Basic Water Service will be less than 2% of household income which results in varying AI levels, and for customers with household incomes below $15,000 per year we expect that all bills under proposed rates will likely be higher than 2% of household income.

TABLE 1 *Affordability Index by Annual Household Income*	Customers	Affordability Index
Over $50,000	83,876	100%
$35,000 - $50,000	13,627	97%
$25,000 - $35,000	9,322	87%
$20,000 - $25,000	4,739	71%
$15,000 - $20,000	3,579	37%
$10,000 - $15,000	3,155	0%
$5,000 - $10,000	2,880	0%
$0 - $5,000	2,947	0%

<u>CONCLUSIONS</u>

Q. How is all of this affordability information useful?

A. Assessing affordability information of water service for the entire residential customer population can tell you whether customers in general are having or would have difficulty paying their water bills under the Company's current or proposed tariff structure. Assessing affordability information of water service for lower-income customers can tell you the number of customers that may be having trouble paying their utility bills, where the customers are in the Company's service territory, and the extent to which those bills may pose challenges for certain customers. This can, in turn, inform decision-makers about the size and scope of efforts that may be needed to help these vulnerable customers better afford water service that may include customer grants, tariff discounts, levelized billing, and outreach programs.

Q. What conclusions do you draw based on the Company's Community-Level Affordability study?

A. There are three conclusions that can be drawn from Company's affordability study:

- The affordability of the Company's water service from 2012 through the forecast test period indicates that the way the Company has invested in and managed its water systems in the Company's service territory has indeed been for the long-term benefit of our customers.
- The Company's water service has been, is, and is expected to continue to be affordable for the majority of its residential customers, including under the rates proposed in this case.
- There are, however, groups of customers for whom affordability of water service may be challenging.

Q. How do the Company's affordability analyses and mitigation strategies enhance the value of the Company's water service?

A. All stakeholders (regulators, customers, consumer advocates, community leaders, employees, shareholders, etc.) benefit from a financially sound utility providing safe, reliable, and affordable service to its customers. The Company's analyses provide important insights to the affordability of its services and can help inform all stakeholders on strategies for improving affordability for customer groups that may be struggling financially.

Q. Is the Company proposing to help customers for whom affordability of water service is likely an issue?

A. Yes. The Company is proposing a Universal Affordability Tariff specifically designed so that all participating customers have an opportunity to receive Basic Water Service at a level of approximately 2% of annual household income or less. I will address this proposal later in my testimony

RATE DESIGN

Q. Please describe the Company's rate design for water service.

A. The Company's rate design for water service features monthly meter charges that are differentiated by meter size and apply uniformly to all customers groups, and a volumetric rate design with separate volumetric rates for each customer class. The current meter charges and volumetric rates are shown in the tables below:

TABLE 2

Monthly Meter Charges	**Meter Charge**
5/8" Meter	$15.00
¾" Meter	$22.40
1" Meter	$37.30
1 ½" Meter	$74.70
2" Meter	$119.50
3" Meter	$224.00
4" Meter	$373.40
6" Meter	$746.70
8" Meter	$1,194.70

TABLE 3 *Volumetric Charges*	Volumetric Rate
Residential	$5.5750
Commercial	$5.2066
Industrial	$4.3050
Public Authorities	$4.7960
Sales for Resale	$4.2360
Bulk	$3.3480

Q. Does the Company provide fire service rates?

A. Yes. The Company provides fire service rates for both private and public fire service. Private fire service rates are monthly charges that are differentiated by service line size and provides for fees for private fire hydrants and fees for usage under the Company's commercial meter service charges and volumetric charges. The Company also provides rates for public fire service which are charged on a monthly flat fee basis per hydrant.

Q. Does the Company have any customers under contract rates?

A. Yes. The Company has two customers on contract rates and those rates are not subject to change as a result of any revenue increases resulting from this proceeding.

Q. Is the Company including any acquisitions in rate design in this proceeding?

A. No, it is not.

Q. Is the Company proposing any changes to its water service rate design?

A. No. The Company is not proposing any changes to its rate design.

Q. Is the Company proposing to change monthly meter charges in this proceeding?

A. Yes. the Company is proposing to increase the 5/8" monthly meter charge to $20.00 per month, which is a 33% increase over the current monthly meter charge of $15.00. The

Company is proposing to increase meter charges for larger size meters by approximately the same percentage.

Q. Please describe how the Company is proposing to change volumetric rates in this proceeding.

A. The Company is proposing in this case to increase volumetric rates by the same percentage amount for each customer class (approximately 36%) in order to maintain the relative differences in volumetric rates between the customer classes. The Company is also proposing to increase private fire and public fire rates by the same percentage amount as for the volumetric rates.

Q. Do you have a table that provides the Company's complete proposed rate design for water service in this case?

A. The table below provides present rate and proposed rates for the Company's proposed revenue requirement in this case.

TABLE 4 ***Monthly Meter Charges***	**Current** **Meter Charge**	**Proposed** **Meter Charge**	**Percent** **Increase**
5/8" Meter	$15.00	$20.00	33%
¾" Meter	$22.40	$29.80	33%
1" Meter	$37.30	$49.60	33%
1 ½" Meter	$74.70	$99.40	33%
2" Meter	$119.50	$158.90	33%
3" Meter	$224.00	$297.90	33%
4" Meter	$373.40	$396.60	33%
6" Meter	$746.70	$993.10	33%
8" Meter	$1,194.70	$1,589.00	33%

TABLE 5 *Volumetric Charges*	Current Volumetric Rate	Proposed Volumetric Rate	Percent Increase
Residential	$5.5750	$7.8249	36%
Commercial	$5.2066	$7.0760	36%
Industrial	$4.3050	$5.8505	36%
Public Authorities	$4.7960	$6.5179	36%
Sales for Resale	$4.2360	$5.7566	36%
Bulk	$3.3480	$4.5613	36%

UNIVERSAL AFFORDABILITY

BACKGROUND

Q. Does the Commonwealth of Kentucky have statutes and legislation that addresses discrimination as to rates and services regarding free or reduced rate services?

A. Yes. Kentucky Revised Statute 278.170 specifically addresses issues related to discrimination for free or reduced rate services. Specifically, Kentucky Revised Statue 28.170(1) states the following:

> ***No utility shall, as to rates or service, give any unreasonable preference or advantage to any person or subject any person to any unreasonable prejudice or disadvantage, or establish or maintain any unreasonable difference between localities or between classes of service for doing a like and contemporaneous service under the same or substantially the same conditions.***

Q. Is the Company proposing a low-income discount tariff in this case?

A. Yes. The Company is proposing a Universal Affordability Tariff that I describe in this section of my Direct Testimony.

Q. Has the Company previously proposed a low-income discount program in previous rate cases?

A. Yes. In Case No. 2004-00103 the Company proposed a low-income discount tariff program that would have provided a 25 percent discount in the meter charge of Central Division residential customers whose annual income was equal to or below 100% of FPL and in the initial blocks of similar Northern Division customers. The estimated cost of the program at that time in terms of total discounts offered was estimated at $30,000.

Q. Was that proposal accepted by the Commission at that time?

A. No, it was not.

Q. What reasons did the Commission give at that time for rejecting the Company's proposed low-income discount program?

A. The Commission's order in that case stated that there was not sufficient support to establish a new customer class based solely on customer income. Specifically, the Commission's order in that case stated the following:[2]

- None of the proponents of the proposed discount have provided any convincing empirical data to demonstrate that Kentucky-American's cost of providing water service to residential customers whose annual income is equal to or less than the national poverty level significantly differs from those whose annual income is greater than the national poverty level.

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[2] Final Order in Case No. 2004-00103 p. 80.

- Discount proponents have also failed to provide any statutory or decisional authority for the proposition that customer income levels may constitute a reasonable basis to distinguish customers for cost-of-service purposes.

The Commission also stated in its order that it questioned the reasonableness and effectiveness of the proposed discount stating that the proposed discount represented less than 10 percent of an average monthly bill and that the Commission failed to see how the discount would achieve any of the objectives for which it is intended.[3] The Commission also stated an opinion in that order that any successful low-income assistance program requires greater effort from the utility and that if a proposed assistance program is to be more than merely a transfer of income from one customer group to another, the utility must also make significant contributions.[4]

DESCRIPTION

Q. Please describe the Company's proposed Universal Affordability Tariff.

A. The Company's proposed Universal Affordability Tariff for water service includes multiple tiers of discounts based on different levels of household income stated as multiples of Federal Poverty Level ("FPL"). The tariff offers discounts on both the basic 5/8" meter charge and the volumetric charges for water service. The Company's proposed discount schedule is as follows:

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[3] Ibid, p. 83-84.
[4] Ibid, p. 84.

TABLE 6 *Household Income*	Water Basic Service Discount	Water Volumetric Discount
0% - 50% FPL	60%	60%
50% - 100% FPL	20%	20%

For 2023, the household income levels that would qualify customers for this program are as follows:

TABLE 7 *Household Size*	Household Income at 50% FPL	Household Income at 100% FPL
1	$7,290	$14,580
2	$9,860	$19,720
3	$12,430	$24,860
4	$15,000	$30,000
5	$17,570	$35,140
6	$20,140	$40,280
7	$22,710	$45,420

Q. What is the driving principle behind the Company' new Universal Affordability tariff?

A. The driving principle behind the Company's proposed Universal Affordability tariff is to provide participating customers discounts such that the expected bill for Basic Water Service (40 gallons of water per household member per day) will be no more than 2% of their annual household income

Q. Why is the Company proposing this new Universal Affordability Tariff?

A. The Company recognizes through the affordability analysis I have previously described in my testimony that there will always be groups of customers that will have issues with the affordability of water service, regardless of the level of rates approved in this proceeding. The Company's proposed tariff along with the tariffs and process proposed for general water service in this proceeding will provide Kentucky-American water service customer access to pricing tools that are designed to help ensure that the cost of Basic Water Service will be no more than 2% of their annual household income.

Q. What is the total population of customers that would be eligible for discounts under the Company's proposed tariff?

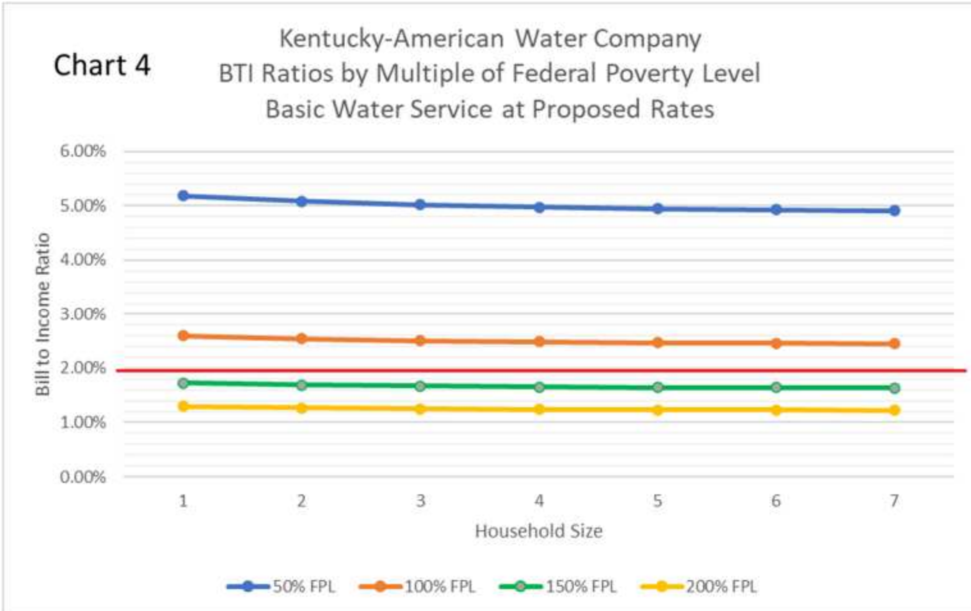
A. The Company estimates that there are approximately 11,000 water customers with household incomes at or below 100% of FPL that would qualify for service under the Company's proposed Universal Affordability tariff.

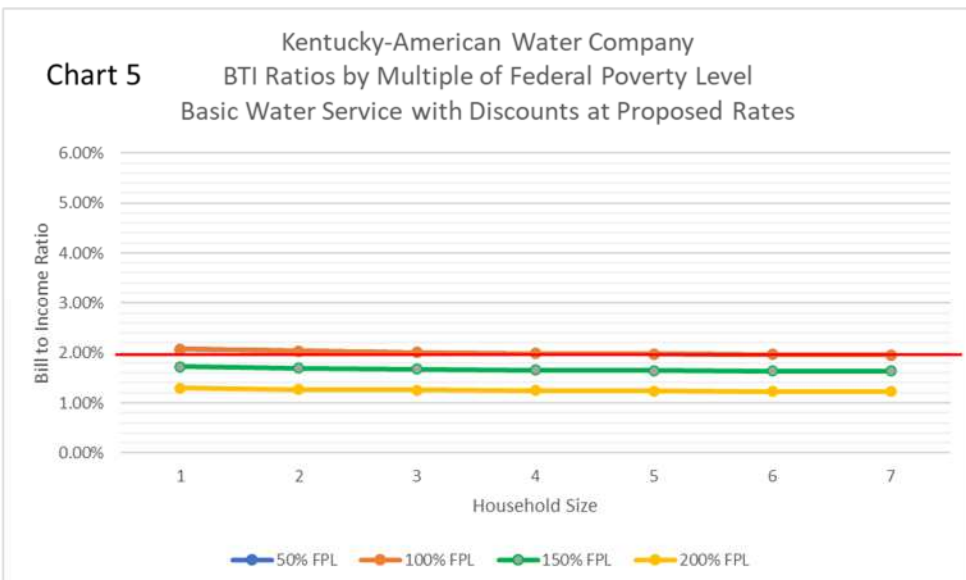
TABLE 8 *Household Size*	Estimated Customers at 0%-50% FPL	Estimated Customers at 50%-100% FPL
1	2,312	2,769
2	1,243	1,116
3	527	611
4	405	611
5	206	371
6	92	205
7	75	161

<u>IMPACTS ON CUSTOMERS</u>

Q. What impact will this proposed tariff have on the affordability of water service for lower-income customers?

A. The impact for customers associated with the proposed tariff will be significant. The charts below show expected bills for Basic Water Service as a percentage of household income for different household sizes and household incomes expressed as a percentage of FPL both before and after the Universal Affordability Tariff is applied based on proposed rates in this case.





The charts show that under the Company's proposed rates, customers with household incomes at 100% FPL will still see bills for Basic Water Service at 2 to 3% of household income, and customers whose household incomes are at 50% of FPL will see bills for Basic Water Service at approximately 5% of household income. The Company's proposed tiered discounts provide customers at each interval of FPL the opportunity to have Basic Water Service bills in the 1% to 2% range of household income.

Q. Is the Company proposing to roll an assumed level of discounts offered under this tariff into base rates to be paid for by other water service customers?

A. Yes. The Company is proposing an assumption of 10% participation in the Universal Affordability Tariff in this proceeding as a basis for rolling in an assumed level of discounts to be paid for by other water service customers.

Q. How is the Company proposing to spread the costs of the assumed discounts across the different volumetric rates in the Company's proposed rate design that you testified to previously?

A. The total amount of discounts the Company is proposing to roll directly back into base rates is approximately $116,000. These discounts are rolled directly into the residential volumetric rate, meaning that other residential customers will pay for the cost of the expected discounts assuming 10% participation.

<u>JUSTIFICATION</u>

Q. Is there a cost-based justification for the Company's proposed Universal Affordability Tariff?

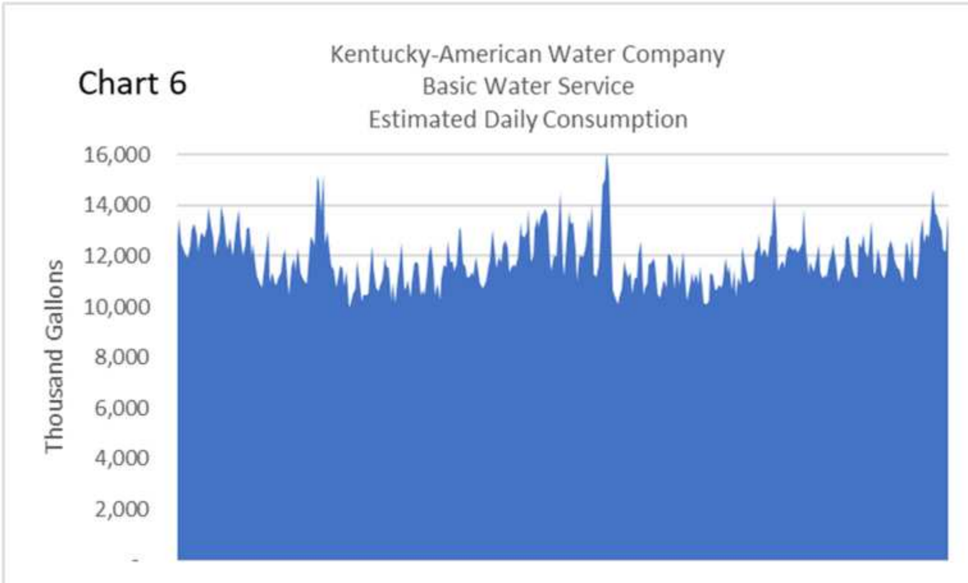
A. Yes, there is.

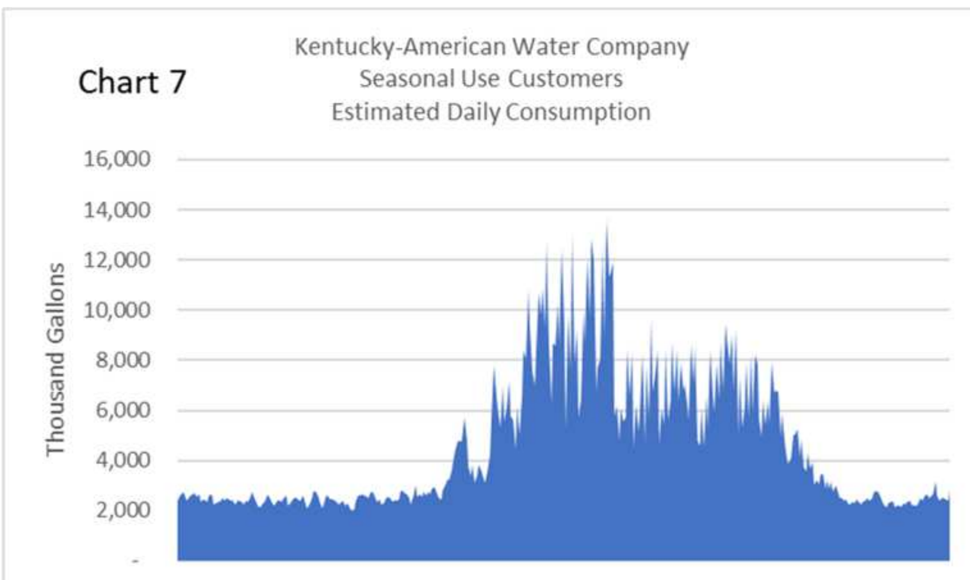
Q. Please explain.

A. Across the American Water footprint, usage data and customer demographic data shows that there is a positive correlation between household income and the seasonal use of water, meaning that communities with higher household incomes, and by extension the customers in those communities, generally have more discretionary seasonal use of water then communities with lower household incomes. Lower income customers generally don't use water for discretionary purposes in the summertime to the extent that higher income customers do and generally only use Basic Water Service as I have described it previously in my testimony.

Q. Is there a fundamental difference between Basic Water Service and Seasonal Service from a cost perspective?

A. Yes. The charts below show daily consumption patterns for residential customers who use Basic Water Service and residential customers who use more seasonal discretionary water. These charts are derived from advanced metering infrastructure ("AMI") data in states where American Water has AMI in place that are used to develop the cost of service allocators that in the cost of service analysis sponsored by Company Witness Selinger. Chart 6 shows a daily consumption profile for 2022 for residential customers whose usage is flat and constant throughout the year. This group of customers has very little seasonal usage, and nearly all of the consumption for these customers is at or below the baseline, which is shown in red on the chart. The sawtooth pattern in this chart represents increased usage on weekend days relative to weekdays, which is a typical pattern for residential customers. Chart 7 shows a daily consumption profile for 2022 for residential customers whose usage is much more seasonal. This group of customers represents those whose seasonal usage, or extra usage above the baseline, makes up 20% or more of their total annual consumption. The sawtooth pattern is also present in this chart in the non-summer months, but the primary feature of this chart is the seasonal nature of the consumption pattern for these customers.





Q. What do these charts shows in terms of cost causation, cost of service, and relative pricing for these groups of customers?

A. The biggest driver of cost of service allocations to customer class for the purposes of setting rates is consumption patterns, and the consumption patterns for these two groups of customers are obviously very different. The Base/Extra allocation methodology for cost of service, which is described in more detail by Company Witness Selinger, is widely regarded as the industry standard, is effectively designed to reward load factor (or capacity factor). This means that steadier flatter consumption patterns are allocated less cost per gallon of water served than consumption patterns that are peakier or more seasonal. This makes logical sense, in that the cost of investments used to serve higher amounts of water can be spread over a larger usage base with a resulting lower volumetric rate than the same cost of the same size investment that serves smaller amounts of water because the investment is not utilized as efficiently.

Q. What does this imply about the cost of providing service to Basic Service Water customers compared to seasonal use customers?

A. These relationships show that from a cost causation perspective, it is cheaper on a per unit basis to provide Basic Water Service than it is to provide peakier seasonal service. It is, therefore, entirely appropriate from a cost of service perspective that Basic Water Service should be priced at a lower rate than seasonal water service.

Q. Have you done an analysis of the relative cost of providing service to seasonal use customers and basic service customers?

A. Yes. Exhibit CBR-2 provides a partial cost of service analysis of the allocated revenue requirements to residential customers for Source of Supply, Pumping, Treatment, Transmission, Distribution, and Storage functions as presented in the cost of service analysis presented by Company Witness Selinger broken down into seasonal use customers and basic water service customers. This analysis takes the revenue requirements allocated to the residential class in Mr. Selinger's cost of service analysis and further allocates them into the Seasonal Use and Basic Water Service subgroups I previously identified. Maximum day and maximum hour peaking factors used to allocate these costs are derived from the AMI data used to generate the daily (and hourly) consumption patterns shown in the charts above. The results of this analysis are summarized in the table below:

TABLE 9 Residential Cost of Service	**Maximum Day Peaking Factor**	**Maximum Hour Peaking Factor**	**Allocated Revenue Requirement**	**Cost per Thousand Gallons**
Seasonal Use	2.99	10.14	$17,602,220	$10.61
Basic Water Service	1.36	2.67	$21,639,790	$4.98

This table shows that the allocated cost for 1,000 gallons of providing service for the production, transmission, and delivery functions to seasonal use customers is more than twice the cost of providing the same service to Basic Water Service customers. This difference in cost of service is related entirely to the differences in consumption patterns for these two groups of customers which is clear from the charts shown above and is a direct result of the maximum day and maximum hour peaking factors being higher for the seasonal use group than for the Basic Water Service group.

Q. You mentioned previously in testimony that there is a relationship between seasonal water usage and household income?

A. Yes. As I mentioned previously, data across the American Water footprint and specifically in the Kentucky-American service territory shows that there is a positive correlation between household income and the seasonal use of water. This means that higher income households are more likely to have significant amounts of seasonal discretionary water use in the summertime and lower income households are much less likely to have significant amounts of seasonal water use and are therefore more likely to be Basic Water Service customers.

Q. Is this true also for Kentucky-American's residential customers?

A. Yes, it is.

Q. Have you done an analysis of usage patterns for the Company's residential customers that correlate usage characteristics to household income?

A. Yes. This analysis uses information provided in the affordability analysis I previously discussed in my direct testimony to break down the Company's residential customers into three different subgroups based on median household income in the different communities the Company serves. These groups are as follows:

- High Income Group: Customers in communities or zip codes with median household incomes greater than $100,000 per year.
- Middle Income Group: Customers in communities or zip codes with median household income between $50,000 and $100,000 per year.
- Low Income Group: Customers in communities or zip codes with median household incomes less than $50,000 per year.

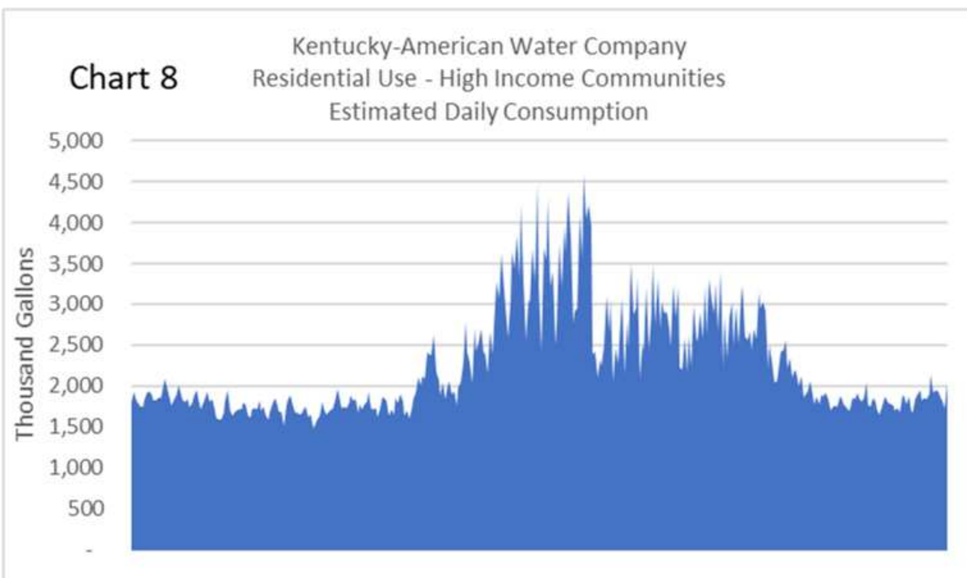
The table below shows summary statistics for each of these income groups:

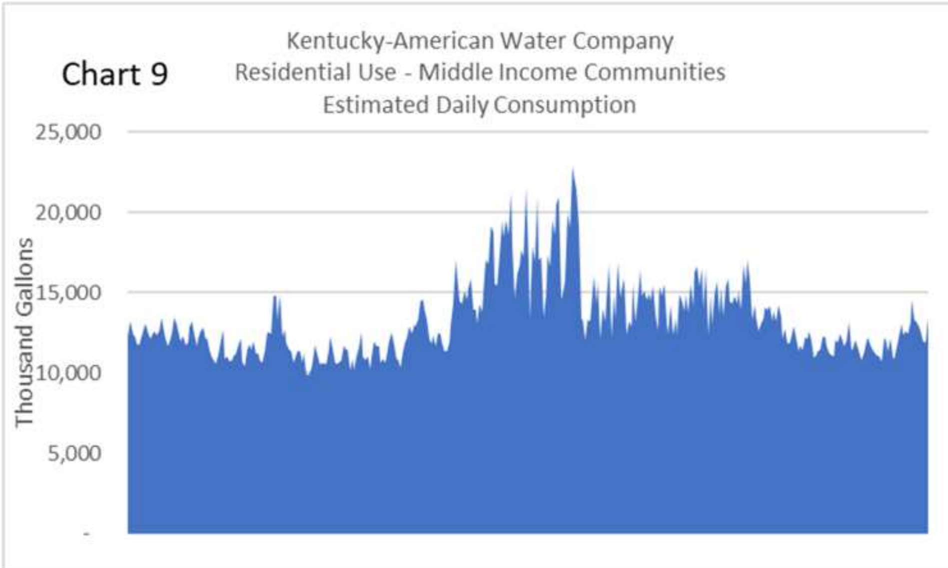
TABLE 10 Residential Customers by Income Group	Total Customers	Percentage of Customers that are Seasonal	July-August Use per Seasonal Customer
High Income	17,702	27%	131,000
Middle Income	119,153	17%	101,000
Low Income	9,549	15%	76,500

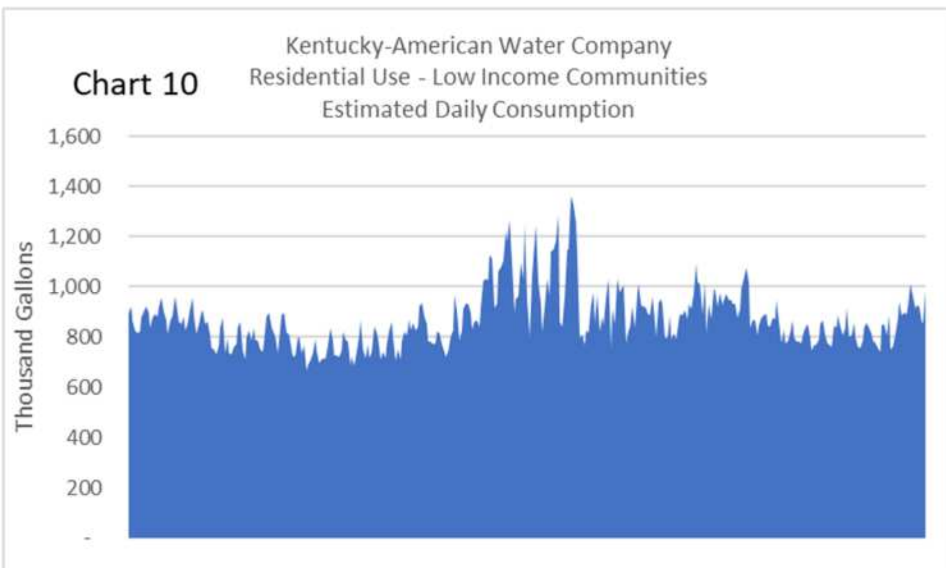
The data shows that residential customers in high income communities tend to be seasonal use customers at almost twice the rate than residential customers in low income communities (27% versus 15%), and that seasonal use customers in high income customers use almost twice as much water than seasonal use customers in low income communities (131,000 gallons per month vs 76,500 gallons per month).

Q. Have you developed AMI-based consumption patterns for customers in these income subgroups similar to the AMI-based consumption patterns you previously showed for seasonal use and Basic Water Service?

A. Yes. The charts below show Estimates of any water consumption for residential customers in these three subgroups which again are based on AMI data in states where American Water has AMI in place that are used to develop the cost of service allocators that in the cost of service analysis sponsored by Company Witness Selinger.







The charts show that daily consumption over the course of the year tends to be more seasonal and more peaky in communities with higher incomes then in communities with lower incomes, which is consistent with the monthly usage characteristics for customers in these communities. Just as with the analysis of seasonal use versus Basic Water Service, these differences in consumption patterns will lead to a higher cost of service on a dollars per thousand gallon basis in higher income communities than for lower income communities.

Q. Have you done an analysis of the relative cost of providing service to customers in these different income subgroups?

A. Yes. In addition to the analysis for seasonal use and Basic Water Service customer groups, Exhibit CBR-2 provides a partial cost of service analysis of the allocated revenue requirements to residential customers for Source of Supply, Pumping, Treatment, Transmission, Distribution, and Storage functions as presented in the cost of service analysis presented by Company Witness Selinger broken down into the income subgroups I've described based on the estimated daily (and hourly) consumption pattern for customer in these communities. The results of that analysis are summarized below.

TABLE 11 Residential Cost of Service	Maximum Day Peaking Factor	Maximum Hour Peaking Factor	Allocated Revenue Requirement	Cost per Thousand Gallons
High Income Group	2.03	5.82	$6,598,590	$8.02
Middle Income Group	1.72	3.39	$30,809,314	$6.34
Low Income Group	1.57	2.88	$1,834,106	$5.78

This table shows that the allocated cost for 1,000 gallons of providing service for the production, transmission, and delivery functions to customer in the high income group is almost 40% higher than the cost of providing the same service to customers in the low income group. Just as with seasonal use versus Basic Water Service, this difference in cost of service is related entirely to the differences in consumption patterns for these two groups of customers which is due to the different mix of customers in these communities, the prevalence of seasonal use customers as a percentage of the total community, and the extent to which those customers have higher usage in summer months.

Q. What does this all say about subsidization of service between lower income customers and higher income customers?

A. If a) seasonal water service is more expensive on a per unit basis to serve than basic water service from a cost of service and cost causation perspective, b) higher income customers are more likely to have significant higher cost seasonal water use than lower income customers, and c) a single volumetric rate applies to all service for all customers, both Basic Water Service and seasonal service as is the case in the Company's service territory, the result is that ***lower income customers are actually subsidizing higher income customers*** under the Company's current rate design. This perspective provides the foundation for the development of the Universal Affordability tariff.

Q. Based on this information, do you believe it is unreasonably discriminatory to offer a special discounted rate to lower income customers?

A. No. While there will always be times in rate design where the rates charged to customers are different than cost of service would indicate for a variety of reasons, it is certainly not discriminatory to offer lower income customers a reduced rate relative to the rate that is charged to the population in total based on an analysis of actual usage patterns and demographics. While the Kentucky statute does not specifically address the creation of a reduced rate for lower-income customers, that rate is absolutely justified from the perspective of cost of service and cost causation.

Q. What is the justification for offering a Universal Affordability Tariff?

A. As I discussed previously in my testimony, lower income customers that do not use water for seasonal discretionary purposes are actually subsidizing higher income customers that do use water for seasonal discretionary purposes. It therefore cannot be credibly asserted that a discount tariff that reduces cost for lower income customers is an undue subsidy. To the contrary, it is helping to reduce a subsidy that already exists in the other direction. The Company's affordability assessment, rate design analysis, and cost of service analysis provides the Commission all of the factual support necessary to target bills for all residential customers at 2% of household income or less without unduly discriminating against any customer group. All stakeholders benefit from a financially stable utility providing safe, reliable, and affordable service to its customers and it is in the public interest to implement a rate design package that makes water service affordable for as many customers as possible. The Company's proposed rate design in this case, along with the Company's proposed Universal Affordability tariff, does just that.

ANALYSIS OF KAWC CUSTOMER USAGE

INTRODUCTION

Q. Are there usage and revenue forecasts that the Company is proposing in this case that require a quantitative analysis of water consumption by KAWC's customers?

A. Yes. I will explain the modeling used to develop the revenue forecasts for the residential and commercial classes, and thereafter, I will discuss the development of the revenue projections for all customer classes (residential, commercial, industrial, public authorities, and sales for resale). For residential and commercial customers, the Company is modeling historical monthly usage per customer from January 2013 through December 2022 to forecast monthly usage per customer for the period January 2023 through December 2027 taking into account trends in declining use, weather normalization, and the impact of the COVID-19 public health emergency on water consumption for KAWC's water service customers. These adjustments for declining use, weather, and COVID-19 require the

Company to analyze water consumption and determine (1) if there is a significant and pervasive rate of decline in water use per customer over time, (2) if there are significant relationships between water consumption and weather conditions in the Company's service territory, and (3) if the COVID-19 public health emergency has had a significant impact on water consumption for KAWC's customers, to determine if a COVID-related adjustment to usage is appropriate in months where usage may have been affected by the pandemic.

STATISTICAL MODELING

Q. What is a statistical linear regression model?

A. Statistical linear regression modeling is a commonly used type of mathematical predictive analysis. The overall idea of regression modeling is to examine two things: (1) does a set of independent explanatory variables do a good job of predicting an outcome (dependent) variable, and (2) which independent explanatory variables, in particular, are significant predictors of the dependent variable, and in what way do they help predict the results of the dependent variable.

There are three major uses for statistical linear regression analysis. These major uses are: (1) determining the predictive power of independent explanatory variables; (2) forecasting the effect that independent variables have on a dependent variable; and (3) trend forecasting. First, the regression analysis can be used to identify the strength of the effect that independent explanatory variables have on a dependent variable. A typical question is: "What is the strength of the relationship between summer heat, precipitation, and water sales?" Second, the regression analysis can be used to forecast the effects or impacts of changes. That is, the regression analysis helps us understand how much the dependent variable changes with a change in one or more of the independent variables. A typical question is: "How much water sales can the Company expect to lose for each inch of rainfall above normal in any given period?" Third, regression analysis can predict trends and future values. The regression analysis can be used to get point estimates of future values of the dependent variable based on assumed values for the independent variables. A typical question can be: "Given current trends in water sales, what can we expect water sales to be each month next year assuming normal weather?"

Q. What does a statistical linear regression model produce?

A. A statistical linear regression analysis is a way of mathematically validating which independent variables have a significant impact on the dependent variable – the main factor, the one you are trying to better understand or predict. A statistical linear regression model produces an equation that describes a historical relationship between a set of independent variables and a single dependent variable that can be used to forecast future values of the dependent variable based on assumed values of the independent variables. An example of such an equation is shown below:

UPCn = a0 + (a1 x RAINn) + (a2 x CDDn) + (a3 x HDDn)
+ (a4 x COVID-19n) + (a5 x TIMEn)

Where:
UPCn = Use per customer in month n
RAINn = Rainfall in month n
CDDn = Cooling Degree Days ("CDD") in month n
HDDn = Heating Degree Days ("HDD") in month n
COVIDn = COVID-19 effect in month n (0% to 100%)
TIMEn = Year/Month for month n

and: a0 = constant term

a1 = coefficient for RAIN

a2 = coefficient for CDD

a3 = coefficient for HDD

a4 = coefficient for COVID-19 impact per customer

a5 = coefficient for TIME (declining use value)

In this example, use per customer is the dependent variable (outcome) and all other variables are independent variables (predictors).

Q. Can statistical linear regression models be used to weather normalize historical water sales for different customer classes?

A. Yes. In the statistical model in the example above, the a1 coefficient for RAIN can be used to estimate the impact of rainfall on use per customer in any given historical period and estimate the impact of what use per customer would have been if rainfall had been different, especially when actual precipitation was higher or lower than normal. Below is a sample calculation of how weather normalization works with a statistical regression model that uses the weather as a strong predictive independent variable that affects the use per customer dependent variable.

IMPACTn = a1 x (ACTUAL RAINn – NORMAL RAINn)

Where: IMPACTn = Weather impact due to abnormal rainfall in period n

ACTUAL RAINn = Actual Rainfall (in inches) in period n

NORMAL RAINn = Average Rainfall (in inches) in period n

If the value of the a1 coefficient for rainfall is -0.30 in this example, actual rainfall for the period is 6 inches and normal rainfall for the period is 4 inches, the weather impact for the period due to higher-than-normal rainfall is a negative 600 gallons per customer meaning that the Company sold 600 fewer gallons per customer of water than it otherwise would have [-0.30 x (6 – 4) = -0.60]. If there are multiple weather variables in the statistical regression analysis, this calculation is completed separately for each variable and the sum of the calculations is rolled up into a single weather impact. This approach to weather normalization allows an analyst to independently assess the impact of each weather component, and also allows an analyst to state the weather impacts over time both in terms of consumption and in terms of revenues by multiplying the consumption impact by a volumetric price.

Q. Can statistical linear regression models be used to estimate the impacts of COVID-19 on water sales for different customer classes?

A. Yes. In the statistical model example above, the a4 coefficient for COVID-19 is the estimate of the impact of the COVID-19 public health emergency on monthly use per customer. The historical data set contains a variable for each month that indicates the assumed qualitative level impact of COVID-19 in that month. In all months prior to April 2020, that value was set at 0%. From April 2020 through December 2021, that value is set at 100% when maximum COVID-19 impacts are observed or can be set at a level less than 100% where we see reduced COVID-19 impacts on usage. The coefficient for the COVID-19 impact variable estimates the average monthly use per customer based on the months that have been designated as COVID-19 months. This coefficient can then be used to (1) identify a normal level of usage that is not influenced by the impact of COVID-19, in a manner similar to a normalization calculation that adjusts for the influence on water usage associated with weather conditions that depart from normal, and (2) reflect estimates of future impacts of the COVID-19 public health emergency

Q. Can these models be used to estimate trends in declining use per customer for different customer classes?

A. Yes. In the same statistical model example represented above, the a5 coefficient for TIME is the estimate of declining use per customer per month. This coefficient measures the rate of decline in use per customer over the historical data set independent of the effect of any other variable in the model. The historical data set contains a variable for each month which is a timestamp that starts at 1 for the first month in the dataset and increases by 1 for every month going forward. This acts as a trend variable for both historical periods in the dataset and future forecast periods. The coefficient for this trend variable is applied to future increasing values of the trend which results in decreasing forecasts of use per customer.

Q. How does one assess the accuracy of a statistical linear regression model?

A. A statistical linear regression model produces a set of statistics that can be used to judge the accuracy and fitness of the model. The most common statistics are (1) the "R-Squared" value, which is a statistical measure in a regression model that determines the proportion of variance in the dependent variable that can be explained by the independent variables, and (2) values and standard deviations for the coefficients, which can be used to determine "t-statistics" and "p-values" which tell how accurately and precisely the different coefficients are being calculated and whether the associated independent variables are strong predictors of the dependent variable.

In the equation described above, the "R-Squared" value is a statistic that measures the percentage of variation from time period to time period in the dependent variable (water use per customer) that is explained by the mathematical relationship with the independent variables. The R-Squared can range from 0% (no explanatory ability) to 100% (perfect explanatory accuracy). In general, the higher the R-squared, the better the predictive value of the model.

The second major test involves comparisons of the values of each of the model coefficients and their associated standard errors. Because a statistical regression model estimates an explanatory relationship between a dependent variable and a set of independent variables, there will always be some degree of uncertainty around what that explanatory relationship actually is. As a result, each model coefficient has a level of uncertainty around it, and this level of uncertainty is represented by measuring how many standard errors each coefficient is away from zero, which the model also calculates.

Dividing the value of each coefficient by its standard error yields a t-statistic which can be used to judge the predictive power of the independent variable that the coefficient represents. For example, in the case of the generic statistical model described above, if the value of the a1 coefficient for rainfall is -0.30 and the standard error for that coefficient is 0.05 (meaning that the real value of the coefficient could be anywhere between -0.35 and -0.25 with -0.30 being the most likely value), the value of the t-statistic is -6.0 (-0.30 divided by 0.05 = 6.0). Generally speaking, t-statistic values greater than 2.0 for positive coefficients or less than -2.0 for negative coefficients indicate an acceptable predictive relationship between that independent variable and the dependent variable of interest. The higher the t-statistic value, the greater the confidence we have in the coefficient as a predictor. Values between 2.0 and -2.0 indicate that the predictive power of that independent variable may not be very strong.

Q. Are there other more qualitative ways to determine whether a statistical linear regression model is accurate and produces reasonable results?

A. Yes. There are also several qualitative ways to determine whether a statistical regression model accurately describes the relationship that a chosen set of independent variables has with the dependent variable:

- **<u>Does the model represent reality?</u>** If it is generally known that water consumption is seasonal and is driven in the summertime by heat and precipitation, it is logical to assume that a statistical model that attempts to describe and predict seasonal water consumption would have explanatory variables related to summer heat and precipitation, and those explanatory variables would be shown to have a strong predictive value in the model. Models that attempt to accurately describe the drivers behind water consumption that do not contain statistically significant coefficients for independent variables that are logically known to drive water consumption are likely not strong predictive models.
- **<u>Are the signs of the coefficients for major independent variables correct?</u>** If water consumption increases in the summertime with increasing heat and decreases in the summertime with increasing precipitation, it is logical to expect that the coefficients for the independent variables that represent summertime heat and summertime precipitation would be positive and negative, respectively.
- **<u>Is the model based on a robust data set?</u>** It is easy for a statistical model with many independent variables and relatively few observations of the dependent

variable to accurately explain variation in the dependent variable, but that does not mean that the model has strong predictive power if the data set being analyzed is small in scope. A statistical model that attempts to describe water consumption that has good predictive explanatory power over multiple years of monthly historical data is very useful and accurate in projecting future trends and in explaining how changes in strong predictive independent variables will affect levels of the dependent variable.

- **Do the impacts on the dependent variable that the model describes make logical sense?** It is possible outside of a statistical linear regression model to make ballpark estimates of other facts like the impact of COVID-19 on water consumption and long-term trends in declining use. This can be done with a simple linear plot of annual usage data by year. For example, if a linear plot of annual usage data suggests that there is a downward trend of approximately 1,000 gallons per customer per year, one would expect that a statistical model that is measuring that impact would yield a result that is similar. The same is true when looking at the potential impacts of COVID-19 on water consumption. If a visual examination of data suggests that water use per customer for a commercial class has decreased by 2,000 gallons per customer in 2020 due to the COVID-19 emergency, it is logical to expect a statistical regression model that attempts to statistically measure that impact to yield estimates consistent with that expectation.

KAWC SPECIFIC INFORMATION

Q. Please describe the statistical linear regression model you are using to analyze water consumption data for KAWC.

A. In this proceeding, we are using multiple regression statistical models to analyze use per customer for the residential and commercial classes that relate the dependent variable (i.e., water use per customer) to a collection of independent variables. The models use 120 months of monthly data beginning in January 2013 through December 2022. Each regression model uses independent variables that can be broken down into four categories to explain monthly use per customer. The four categories are:

- **Weather**: The weather variables used in the models are Cooling Degree Days ("CDDs") and Heating Degree Days ("HDD"). These weather variables are a weighted average of current month and lagged month weather readings taken by the National Oceanic and Atmospheric Administration at Lexington Bluegrass Airport. This weighted average lagged approach is used to account for the differences between billing month sales and calendar month weather. Coefficients from these variables show the impact of weather on monthly use per customer over the 10-year period. Weather variables are modeled as monthly deviations from normal for each month in the data set (actual weather for the month less normal weather for the month for each individual weather variable). Normal weather is calculated for each month of the year based on the weather over the ten-year period that the historical data spans.

- **Time**: The time variable is a trending variable that notes the passage of time in the model and produces a coefficient that estimates the monthly decline in usage per customer over the 10-year model. The time variable captures the range of conservation efforts that have been implemented by customers over time, such as the installation of more water-efficient fixtures and appliances. Time on its own is of no consequence, but it is a powerful variable because it is the medium for capturing the conservation effect.

- **COVID-19 indicator**: The COVID-19 indicator variable is set at 0% for months prior to April 2020 and 100% for the months of April 2020 through December 2021. The effect of this variable in the model is to look specifically for increases or decreases in use per customer for the April 2020 through December 2021 timeframe that may have happened due to systemic changes in the amounts of water customers use as a result of the COVID-19 public health emergency.
- **Monthly indicators**: The monthly indicator variables in the model measure structural monthly and/or seasonal changes in use per customer that cannot be explained by any of the other variables in the model.

Q. You mentioned that you have developed models for customer usage relating to the residential and commercial classes. Are you also modeling usage for the industrial, OPA, Sales for Resale customer classes, and for fire service classes?

A. No. The statistical modeling in this case is only for the residential and commercial classes. Usage estimates for the industrial, sales for resale, and OPA classes are developed using a simple multi-year average and are described later in the revenue section of my testimony.

Q. You previously discussed the various statistical tests used for accuracy and predictability. Please discuss the results of these tests for your models and why they are appropriate to use in this proceeding.

A. As shown in Exhibit CBR-3, the values of the coefficients, standard errors, and t-statistics for the major explanatory variables in the models are as follows:

TABLE 12
Residential Model Major Explanatory Variables

Residential Model Major Explanatory Variables	Coefficient	Standard Error	T-Statistic
Declining Use Trend	-0.0035	0.0008	-4.4724
Precipitation	-0.0867	0.0193	-4.4869
CDD	0.0019	0.0006	3.0794
HDD	0.0007	0.0003	2.6611
Covid-19 Impact	0.1464	0.0727	2.0135

TABLE 13
Commercial Model Major Explanatory Variables

Commercial Model Major Explanatory Variables	Coefficient	Standard Error	T-Statistic
Declining Use Trend	0.0051	0.0083	0.6130
Precipitation	-0.3139	0.1643	-1.9104
CDD	0.0166	0.0074	2.2300
Covid-19 Impact	-1.5805	0.7765	-2.0354

The statistics for the individual explanatory independent variables above show a high degree of explanatory power with all parameters having t-statistics all outside of the +/- 2.00 range with the exception of the declining use variable for commercial customers. The sign for the precipitation variable is negative as expected, meaning that more rainfall over a summer period results in less seasonal water usage from our residential customers. The sign for the CDD variable is positive, which indicates that the hotter the weather gets in the summer, customers use more water, which is expected, and the COVID-19 impact variable indicates that residential usage went up as a result of COVID-19. The sign for the declining use variable is negative and is statistically significant which means that there is a pervasive decline in use per customer for residential customers over the ten-year historical period.

Q. Your regression models show a trend of declining use per customer. What is the amount of declining use your models have identified?

A. The annual amount of declining use identified for residential customers is approximately 500 gallons per year per. The annual amount of increasing use identified for commercial customers is approximately 700 gallons per year.

<u>CONTINUING TRENDS</u>

Q. Why do you believe that declining use is a valid trend for residential customers that will continue?

A. Consumption patterns for the Company's customers are similar to those for other American Water operating companies which have experienced a decline in residential consumption per customer averaging approximately -2.0% per year over the last 10 years. According to the 2010 Water Research Foundation report, "many water utilities across the United States and elsewhere are experiencing declining water sales among households." The report further states: "A pervasive decline in household consumption has been determined at the national and regional levels."[5]

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[5] Coomes, Paul et al., North America Residential Water Usage Trends Since 1992 – Project #4031, page 1 (Water Research Foundation, 2010).

Q. What is causing the decline in residential customers' usage?

A. Several factors drive the decline in residential customers' usage. These factors include the incremental introduction of low-flow fixtures and appliances, new regulations that lead to further reductions in fixture flow rates, conservation programs, and public initiatives that have led to greater consumer water conservation awareness.

Plumbing fixtures such as toilets, showerheads, and faucets available to consumers today are more water-efficient than those fixtures manufactured in the past. Similarly, appliances such as dishwashers and washing machines are also more water efficient. When a customer replaces an older toilet, washing machine, or dishwasher with a new unit, the new unit will almost certainly use less water than the one it replaced. Similarly, the construction of new homes results in the installation of water-efficient fixtures meeting new, more efficient, regulatory standards.

Q. How much water do the new fixtures and appliances save?

A. The Energy Policy Act of 1992 mandated the manufacture of water-efficient toilets, showerheads, and faucet fixtures. For example, a toilet manufactured after 1994 must use no more than 1.6 gallons per flush, compared to a pre-1994 toilet, which typically used from 3.5 to 7 gallons per flush. In fact, toilets using only 1.28 gallons per flush or less are becoming more prevalent in the marketplace. Replacing an old toilet with a new one, therefore, can save from 2 to nearly 6 gallons per flush. The United States Environmental Protection Agency estimates that there are more than 220 million toilets in the United States and that approximately 10 million new toilets are sold each year for installation in new homes and businesses or replacement of aging fixtures in existing homes and businesses.

The Energy Independence & Security Act of 2007, which established stringent efficiency standards for dishwashers and washing machines, has further reduced indoor water consumption. Dishwashers manufactured after 2009 and washing machines manufactured after 2010 must use 54% and 30% less water, respectively. All other factors being equal, a typical residential household in a new home constructed in 2015, with water-efficient toilets, washing machines, dishwashers, and other fixtures, uses approximately 35% less water for indoor purposes than a non-retrofitted home built prior to 1994.

Q. Are there other factors contributing to the continued decline in water consumption patterns?

A. Yes. Programs to raise customer awareness and interest in the benefits of conserving water and energy continue to increase. As awareness of water and energy efficiency increases, customers may decide to replace a fixture or appliance even before it has broken. Additionally, customers may further reduce consumption by changing their household water use habits in other various ways.

Q. Do you expect the trend of declining usage to continue in the future?

A. Yes. Water-efficient fixtures and other drivers such as conservation education and government-mandated standards will continue to drive further efficiency into residential and nonresidential usage per customer. In fact, the trend is well established and continues to affect water usage on the Company's system as well as most water utilities across the United States. The rate of the continued trend is dependent on the pace of fixture replacement within the Company's footprint as well as the broadening acceptance of a conservation ethic through raised customer and business awareness programs, government conservation policy, and similar behavior modification-related programs.

Technology is now available for newer, more water-efficient products that further improve on Energy Policy Act levels, and there has been a growing movement to codify these more stringent specifications. The introduction of progressive code modifications – such as the International Code Council's International Green Construction Code and the International Association of Plumbing and Mechanical Officials Green Plumbing and Mechanical Code Supplement (2011) – support uniform implementation of increased water efficiency standards. An article in the June 2012 issue of the AWWA Journal entitled "Insights into declining single-family residential water demands" recognizes this decline in water consumption: "[r]educed residential demand is a cornerstone of future urban water resource management. Great progress has been made in the last 15 years and the industry appears poised to realize further demand reductions in the future."[6] The trend of declining water consumption based on improved water efficiency has continued over time.

CONCLUSION

Q. Normalizing historical usage for weather and the COVID-19 emergency, what has the overall trend been for use per customer for the residential class?

A. The statistical analysis of residential usage shows that once weather effects and the one-time effects of COVID-19 have been accounted for, there is a significant downward trend in usage for residential customers. The chart below shows use per customer for the residential class for the ten years ending December 2022, adjusted for the weather impacts and COVID-19 impacts I previously described in my testimony.

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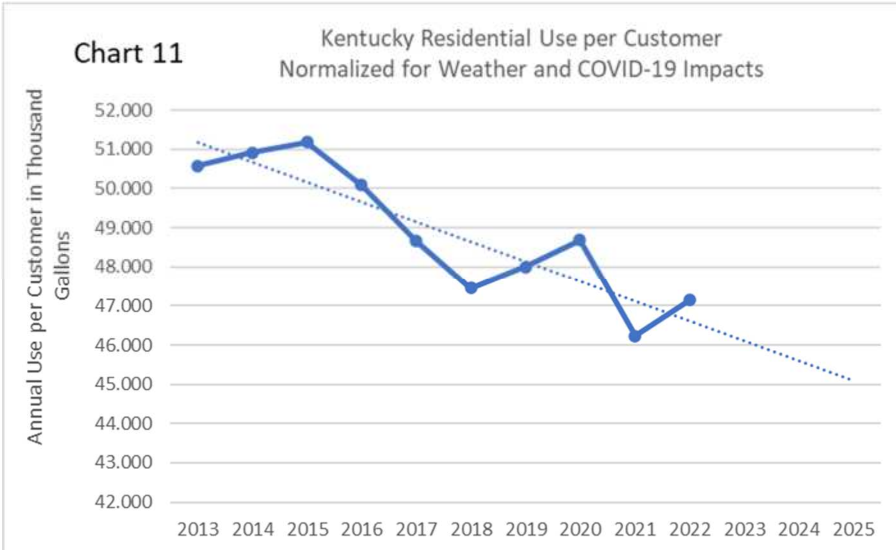
[6] DeOreo, William and Mayer, Peter. American Water Works Association Journal. Vol. 104. Issue 6. http://apps.awwa.org/WaterLibrary/showabstract.aspx?an=JAW_0076117. June 2012.



Q. What conclusions do you draw from this chart and your supporting analysis?

A. The chart and the supporting analysis demonstrate that there has been a significant and pervasive decline in normalized use per customer for residential customers in the KAWC service territory. The Company's modeling normalizes for weather and COVID-19 and shows that there is a pervasive decline in residential usage over the past ten years. The historical trends in adjusted monthly use per customer for the residential class will continue through the for the relevant time periods going forward.

<u>REVENUE FORECAST AND ASSOCIATED CALCULATIONS</u>

Q. Please generally describe the process of calculating and forecasting present rate revenues and proposed rate revenues in this case.

Present and proposed revenues in this proceeding are presented in Exhibit 37 and supported by the forecasted sales and customer counts provided in Exhibit 25 and 26. Present and proposed revenues by month are also provided in the file labeled Exhibits (25, 26, 37) Revenue WP Support. Revenue calculations are done for the Base Year, which is 12-months ended September 2023 consisting of six months of actuals through March 2023 and six months of projections through September 2023 and extending through the forecasted test period (12 months ended January 2025) and out through December 2027. Revenue and billing determinant projections are provided by month through 2027 in the Revenue WP Support workpapers.

Q. Please describe the process for calculating present rate revenue for the Residential and Commercial customer classes.

A. Residential and Commercial classes present rate revenue was forecasted by establishing the relevant billing determinants during the forecasted test period and multiplying these by the present tariffed rates. Billing determinants were forecasted as follows:

- **Volumetric usage per customer**: Volumetric consumption per customer for the residential and commercial classes was forecasted using the statistical modeling I described previously in my testimony.
- **Number of customers**: The Company started with customer counts as of March 2023. Average organic growth for the years 2019, 2021, and 2022 was used to project customer additions per month through the forecasted test year and out through December 2027.
- **Number of meter billings**: The Company used the actual bill analysis of meter counts for March 2023 to project meter counts going forward for the residential and commercial class. The relationship between meter counts and customer counts in March 2023 is used to project increases in meter counts as customer counts increase which results in increased meter billing determinants for both classes in the forecasted periods.

Q. Why was 2020 not included in the customer growth calculations?

A. 2020 was not included in the customer growth calculations because customer counts were significantly affected by the COVID-19 pandemic in 2020. To remove anomalies in customer growth patterns for the forecast period that may arise because of inclusion of the 2020 data, 2020 was not used. This is true not only for customer growth calculations but also for instances where a three-year average of usage per customer or total usage was used in the case of industrial, OPA, and Sales for Resale usage forecasts.

Q. Please describe the process for calculating revenues for the remaining customer classes.

A. The process for calculating revenue for the remaining customer classes is described below:

- **Industrial and Sales for Resale**: For these classes, the Company analyzed the actual historical usage of each customer individually, reviewing 2019, 2021, and 2022 data in order to forecast projected usage. Current meter counts as of March 2023 were used to forecast future meter billings.
- **Other Public Authorities and Miscellaneous**: For these classes, the Company uses a three-year average of use per customer for 2019, 2021, and 2022 and applies that average to customer counts and meter counts for March 2023. No customer growth is assumed going forward for these classes.
- **Private Fire and Public Fire**: For these classes, the number of active fire hydrants and fire services was taken as of March 2023 and used for forecasting revenue. Growth in billing determinants is based on three-year average growth rates for 2019, 2021 and 2022 similar to customer growth calculations for the residential and commercial classes.

Q. Please describe the determination of proposed revenues for Miscellaneous Revenues.

A. The determination of Miscellaneous Revenues is as follows:

- Rent revenues is based on actual lease agreements in place as of 2023.
- Late Fees are based on the three-year average ratio of late payments to billed revenues applied to new forecast revenues.
- NSF revenues, Reconnect Fees, and Application Fees are based on three-year average revenues from 2019, 2021, and 2022.
- Revenue from Usage Data fees is held constants at March 2023 levels.
- Miscellaneous Service revenues ends July 2024 and represents the amortization of deferred billed revenue over a two-year period related to the closure of an industrial customer as approved by the Commission in Case No. 2018-00358.

Q. How are proposed rate revenues determined?

A. Proposed rate revenue is the result of the forecasted test year billing determinants multiplied by the rates developed and presented in my direct testimony. When applied to the forecasted billing determinants, these prices yield proposed rate revenue equal to Kentucky-American's cost of providing water service, as documented in this proceeding.

Q. Are present and proposed rate revenues summarized on the exhibits and schedules you are sponsoring?

A. Yes. Both present and proposed rates are summarized on Exhibit 37 Schedule M and Exhibit 37 Schedule N.

- Schedule M summarizes billing determinants (such as meter billings and volumes of water at various block rates) and prices to calculate both present and proposed rate revenue. The schedule is shown for the total water operation and also by class.

- Schedule N provides a present and proposed rate bill comparison at various water consumption levels by class. Schedule N also shows the average bill, based on average water consumption for each class and the most common meter size for the class.

CONCLUSION

Q. Does this conclude your direct testimony?

A. Yes.

VERIFICATION

STATE OF IOWA)
) **SS:**
COUNTY OF SCOTT)

The undersigned, Charles Rea, being duly sworn, deposes and says that he is the Senior Director of Enterprise-Wide Regulatory Pricing and Affordability for American Water Works Service Company, Inc., that he has personal knowledge of the matters set forth in the accompanying testimony for which he is identified as the responsible witness, and that the answers contained therein are true and correct to the best of his information, knowledge and belief.

Charles Rea
Charles Rea

Subscribed and sworn to before me, a Notary Public in and before said County and State, this 22 day of June, 2023.

Brittany J Hodges
Notary Public

My Commission Expires:

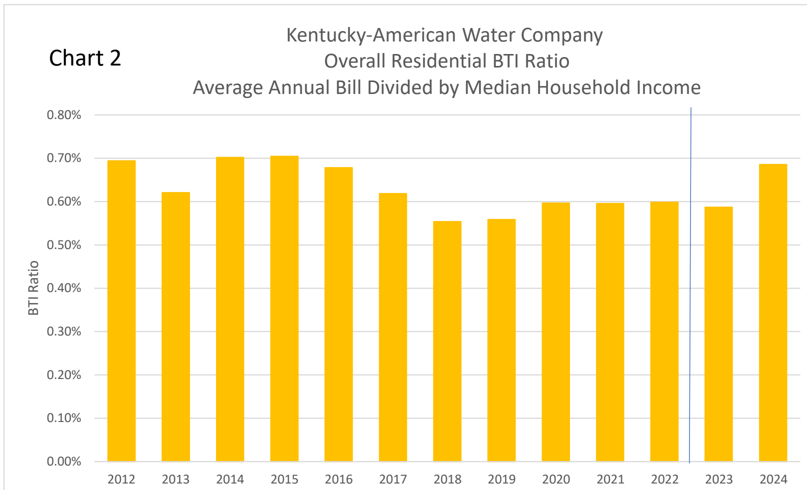
October 28, 2023

NOTARIAL SEAL IOWA
BRITTANY J HODGES
Commission Number 786721
My Commission Expires
October 28, 2023

Kentucky-American Water Company
Water Affordability Analysis

Residential Statistics	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
KY Revenue	$ 37,712,582	$ 42,860,958	$ 44,454,703	$ 44,202,295	$ 47,988,440	$ 48,304,403	$ 50,358,450	$ 52,520,983	$ 50,509,099	$ 52,892,674	$ 58,306,583	$ 57,543,572	$ 59,564,318	$ 61,978,034	$ 76,108,081
KY Customers	108,169	108,971	110,473	112,429	113,268	114,637	115,987	117,203	118,472	120,557	122,008	123,090	124,036	125,069	126,101
KY Statewide Median Income	$ 41,104	$ 39,856	$ 41,086	$ 44,879	$ 42,786	$ 42,387	$ 45,369	$ 51,348	$ 54,555	$ 55,662	$ 56,755	$ 55,629	$ 56,858	$ 59,838	$ 62,387
KY Customer Median Income	$ 58,002	$ 56,241	$ 57,977	$ 63,329	$ 60,376	$ 59,813	$ 64,021	$ 72,458	$ 76,983	$ 78,545	$ 80,088	$ 78,499	$ 80,234	$ 84,438	$ 88,035
KY Average Monthly Bill	$ 29.05	$ 32.78	$ 33.53	$ 32.76	$ 35.31	$ 35.11	$ 36.18	$ 37.34	$ 35.53	$ 36.56	$ 39.82	$ 38.96	$ 40.02	$ 41.30	$ 50.30
KY BTI Ratio	0.60%	0.70%	0.69%	0.62%	0.70%	0.70%	0.68%	0.62%	0.55%	0.56%	0.60%	0.60%	0.60%	0.59%	0.69%

1.4111 State adjustment factor to reflect the difference between statewide MHI and MHI for AW customers in the state



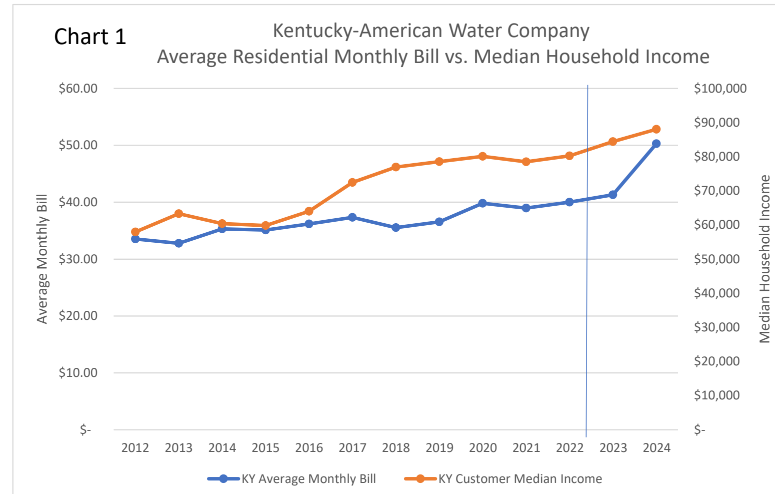


Chart 1 Kentucky-American Water Company Overall Residential BTI Ratio Average Annual Bill Divided by Median Household Income
Chart 2 Kentucky-American Water Company Average Residential Monthly Bill vs. Median Household Income

Kentucky-American Water Company
Water Affordability Summary - Bills for Basic Water Service
Customer Counts as of December 31, 2022

Income		Average		--- Customers by FPL ---											--- Customers by BTI ---										
Level	Size	Income	Customers	0-50%	50%-100%	100%-150%	150%-200%	200%-250%	250%-300%	300%-350%	350%-400%	400%-450%	450%-500%	Over 500%	0%-1%	1%-2%	2%-3%	3%-4%	4%-5%	5%-6%	6%-7%	7%-8%	8%-9%	9%-10%	Over 10%
$0-$5k	1	$ 3,000	1,661	1,661	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	33	199	166	133	1,130
$0-$5k	2	$ 3,000	728	728	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	73	655
$0-$5k	3	$ 3,000	259	259	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	259
$0-$5k	4	$ 3,000	166	166	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	166
$0-$5k	5	$ 3,000	79	79	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	79
$0-$5k	6	$ 3,000	32	32	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	32
$0-$5k	7	$ 3,000	23	23	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	23
$5-$10k	1	$ 7,500	1,808	651	1,157	-	-	-	-	-	-	-	-	-	-	-	-	542	615	398	253	-	-	-	-
$5-$10k	2	$ 7,500	613	515	98	-	-	-	-	-	-	-	-	-	-	-	-	-	123	184	135	98	74	-	-
$5-$10k	3	$ 7,500	215	215	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	30	56	43	34	26	26
$5-$10k	4	$ 7,500	140	140	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	14	34	25	20	48
$5-$10k	5	$ 7,500	66	66	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4	14	12	36
$5-$10k	6	$ 7,500	23	23	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	5	18
$5-$10k	7	$ 7,500	16	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	15
$10-$15k	1	$ 12,500	2,239	-	1,612	627	-	-	-	-	-	-	-	-	-	-	1,612	627	-	-	-	-	-	-	-
$10-$15k	2	$ 12,500	537	-	537	-	-	-	-	-	-	-	-	-	-	-	-	408	129	-	-	-	-	-	-
$10-$15k	3	$ 12,500	177	53	124	-	-	-	-	-	-	-	-	-	-	-	-	39	99	39	-	-	-	-	-
$10-$15k	4	$ 12,500	127	99	28	-	-	-	-	-	-	-	-	-	-	-	-	-	43	56	28	-	-	-	-
$10-$15k	5	$ 12,500	44	44	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	19	17	9	-	-	-
$10-$15k	6	$ 12,500	17	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	7	6	3	-	-
$10-$15k	7	$ 12,500	12	12	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	4	3	2	-
$15-$20k	1	$ 17,500	2,311	-	-	2,311	-	-	-	-	-	-	-	-	-	1,340	971	-	-	-	-	-	-	-	-
$15-$20k	2	$ 17,500	728	-	480	247	-	-	-	-	-	-	-	-	-	-	728	-	-	-	-	-	-	-	-
$15-$20k	3	$ 17,500	256	-	256	-	-	-	-	-	-	-	-	-	-	-	72	184	-	-	-	-	-	-	-
$15-$20k	4	$ 17,500	167	-	167	-	-	-	-	-	-	-	-	-	-	-	-	114	53	-	-	-	-	-	-
$15-$20k	5	$ 17,500	74	18	56	-	-	-	-	-	-	-	-	-	-	-	-	10	56	7	-	-	-	-	-
$15-$20k	6	$ 17,500	26	19	7	-	-	-	-	-	-	-	-	-	-	-	-	-	13	14	-	-	-	-	-
$15-$20k	7	$ 17,500	18	18	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	12	5	-	-	-	-
$20-$25k	1	$ 22,500	2,789	-	-	223	2,566	-	-	-	-	-	-	-	-	2,789	-	-	-	-	-	-	-	-	-
$20-$25k	2	$ 22,500	1,108	-	-	1,108	-	-	-	-	-	-	-	-	-	554	554	-	-	-	-	-	-	-	-
$20-$25k	3	$ 22,500	387	-	232	155	-	-	-	-	-	-	-	-	-	-	387	-	-	-	-	-	-	-	-
$20-$25k	4	$ 22,500	253	-	253	-	-	-	-	-	-	-	-	-	-	-	142	111	-	-	-	-	-	-	-
$20-$25k	5	$ 22,500	123	-	123	-	-	-	-	-	-	-	-	-	-	-	-	123	-	-	-	-	-	-	-
$20-$25k	6	$ 22,500	47	-	47	-	-	-	-	-	-	-	-	-	-	-	-	28	19	-	-	-	-	-	-
$20-$25k	7	$ 22,500	32	6	26	-	-	-	-	-	-	-	-	-	-	-	-	2	30	-	-	-	-	-	-
$25-$35k	1	$ 22,500	4,700	-	-	-	1,034	3,196	470	-	-	-	-	-	376	4,324	-	-	-	-	-	-	-	-	-
$25-$35k	2	$ 30,000	2,652	-	-	637	2,016	-	-	-	-	-	-	-	-	2,652	-	-	-	-	-	-	-	-	-
$25-$35k	3	$ 30,000	931	-	-	894	37	-	-	-	-	-	-	-	-	670	261	-	-	-	-	-	-	-	-
$25-$35k	4	$ 30,000	584	-	164	421	-	-	-	-	-	-	-	-	-	105	479	-	-	-	-	-	-	-	-
$25-$35k	5	$ 30,000	259	-	192	67	-	-	-	-	-	-	-	-	-	-	239	21	-	-	-	-	-	-	-
$25-$35k	6	$ 30,000	117	-	117	-	-	-	-	-	-	-	-	-	-	-	65	51	-	-	-	-	-	-	-
$25-$35k	7	$ 30,000	79	-	79	-	-	-	-	-	-	-	-	-	-	-	16	63	-	-	-	-	-	-	-
$35-$50k	1	$ 37,500	5,338	-	-	-	-	-	2,028	2,455	854	-	-	-	5,338	-	-	-	-	-	-	-	-	-	-
$35-$50k	2	$ 37,500	4,670	-	-	-	467	2,895	1,308	-	-	-	-	-	1,588	3,082	-	-	-	-	-	-	-	-	-
$35-$50k	3	$ 37,500	1,641	-	-	-	1,214	427	-	-	-	-	-	-	-	1,641	-	-	-	-	-	-	-	-	-
$35-$50k	4	$ 37,500	1,048	-	-	461	587	-	-	-	-	-	-	-	-	1,048	-	-	-	-	-	-	-	-	-
$35-$50k	5	$ 37,500	562	-	-	517	45	-	-	-	-	-	-	-	-	427	135	-	-	-	-	-	-	-	-
$35-$50k	6	$ 37,500	244	-	34	209	-	-	-	-	-	-	-	-	-	97	146	-	-	-	-	-	-	-	-
$35-$50k	7	$ 37,500	124	-	57	67	-	-	-	-	-	-	-	-	-	5	119	-	-	-	-	-	-	-	-
$50-$75k	1	$ 62,500	6,503	-	-	-	-	-	-	-	1,170	1,691	1,821	1,821	6,503	-	-	-	-	-	-	-	-	-	-
$50-$75k	2	$ 62,500	8,060	-	-	-	-	-	1,612	2,902	2,902	645	-	-	8,060	-	-	-	-	-	-	-	-	-	-
$50-$75k	3	$ 62,500	3,118	-	-	-	-	935	1,434	748	-	-	-	-	2,432	686	-	-	-	-	-	-	-	-	-
$50-$75k	4	$ 62,500	2,145	-	-	-	472	1,201	472	-	-	-	-	-	729	1,416	-	-	-	-	-	-	-	-	-
$50-$75k	5	$ 62,500	1,124	-	-	-	675	450	-	-	-	-	-	-	-	1,124	-	-	-	-	-	-	-	-	-
$50-$75k	6	$ 62,500	443	-	-	106	328	9	-	-	-	-	-	-	-	443	-	-	-	-	-	-	-	-	-
$50-$75k	7	$ 62,500	250	-	-	130	120	-	-	-	-	-	-	-	-	250	-	-	-	-	-	-	-	-	-
$75-$100k	1	$ 87,500	3,696	-	-	-	-	-	-	-	-	-	-	3,696	3,696	-	-	-	-	-	-	-	-	-	-
$75-$100k	2	$ 87,500	6,741	-	-	-	-	-	-	-	-	2,022	2,427	2,292	6,741	-	-	-	-	-	-	-	-	-	-
$75-$100k	3	$ 87,500	2,928	-	-	-	-	-	-	644	1,347	937	-	-	2,928	-	-	-	-	-	-	-	-	-	-
$75-$100k	4	$ 87,500	2,224	-	-	-	-	-	712	1,245	267	-	-	-	2,224	-	-	-	-	-	-	-	-	-	-
$75-$100k	5	$ 87,500	1,011	-	-	-	-	243	668	101	-	-	-	-	910	101	-	-	-	-	-	-	-	-	-
$75-$100k	6	$ 87,500	422	-	-	-	-	304	118	-	-	-	-	-	203	220	-	-	-	-	-	-	-	-	-
$75-$100k	7	$ 87,500	225	-	-	-	81	144	-	-	-	-	-	-	9	216	-	-	-	-	-	-	-	-	-
$100-$150k	1	$ 125,000	3,440	-	-	-	-	-	-	-	-	-	-	3,440	3,440	-	-	-	-	-	-	-	-	-	-
$100-$150k	2	$ 125,000	8,925	-	-	-	-	-	-	-	-	-	-	8,925	8,925	-	-	-	-	-	-	-	-	-	-
$100-$150k	3	$ 125,000	4,223	-	-	-	-	-	-	-	-	338	929	2,956	4,223	-	-	-	-	-	-	-	-	-	-
$100-$150k	4	$ 125,000	3,746	-	-	-	-	-	-	-	824	1,049	1,049	824	3,746	-	-	-	-	-	-	-	-	-	-
$100-$150k	5	$ 125,000	1,628	-	-	-	-	-	-	456	521	521	130	-	1,628	-	-	-	-	-	-	-	-	-	-
$100-$150k	6	$ 125,000	638	-	-	-	-	-	153	230	242	13	-	-	638	-	-	-	-	-	-	-	-	-	-

Kentucky-American Water Company
Water Affordability Summary - Bills for Basic Water Service
Customer Counts as of December 31, 2022

Income Level	Size	Average Income	Customers	--- Customers by FPL --- 0-50%	50%-100%	100%-150%	150%-200%	200%-250%	250%-300%	300%-350%	350%-400%	400%-450%	450%-500%	Over 500%
$100-$150k	7	$ 125,000	346	-	-	-	-	35	145	145	21	-	-	-
Over $150k	1	$ 200,000	2,475	-	-	-	-	-	-	-	-	-	-	2,475
Over $150k	2	$ 200,000	8,203	-	-	-	-	-	-	-	-	-	-	8,203
Over $150k	3	$ 200,000	4,303	-	-	-	-	-	-	-	-	-	-	4,303
Over $150k	4	$ 200,000	4,249	-	-	-	-	-	-	-	-	-	-	4,249
Over $150k	5	$ 200,000	1,783	-	-	-	-	-	-	-	-	-	214	1,569
Over $150k	6	$ 200,000	646	-	-	-	-	-	-	-	-	116	116	414
Over $150k	7	$ 200,000	381	-	-	-	-	-	-	-	69	76	84	152
		Total:	124,124	4,860	5,844	8,181	9,642	9,839	9,120	8,927	8,216	7,407	6,770	45,318

Income Level	Size	--- Customers by BTI --- 0%-1%	1%-2%	2%-3%	3%-4%	4%-5%	5%-6%	6%-7%	7%-8%	8%-9%	9%-10%	Over 10%
$100-$150k	7	346	-	-	-	-	-	-	-	-	-	-
Over $150k	1	2,475	-	-	-	-	-	-	-	-	-	-
Over $150k	2	8,203	-	-	-	-	-	-	-	-	-	-
Over $150k	3	4,303	-	-	-	-	-	-	-	-	-	-
Over $150k	4	4,249	-	-	-	-	-	-	-	-	-	-
Over $150k	5	1,783	-	-	-	-	-	-	-	-	-	-
Over $150k	6	646	-	-	-	-	-	-	-	-	-	-
Over $150k	7	381	-	-	-	-	-	-	-	-	-	-
Total:		86,721	23,192	5,924	2,324	1,180	759	551	397	322	270	2,485

Kentucky-American Water Company
Residential Cost of Service Analysis

Cost Category	Residential Allocation	Seasonal Allocation	Basic Service Allocation	Seasonal Allocator	Basic Service Allocator	High Income Allocation	Mid Income Allocation	Low Income Allocation	High Income Allocator	Mid Income Allocator	Low Income Allocator
Source of Supply Expense											
Fixed	$ 2,854,380	$ 1,276,144	$ 1,578,236	0.44708	0.55292	$ 451,550	$ 2,267,912	$ 134,918	0.15820	0.79454	0.04727
Variable	$ 238,712	$ 65,978	$ 172,734	0.27639	0.72361	$ 32,723	$ 193,372	$ 12,617	0.13708	0.81006	0.05286
Power and Pumping Expenses											
Fixed	$ 1,716,381	$ 767,364	$ 949,017	0.44708	0.55292	$ 271,524	$ 1,363,729	$ 81,128	0.15820	0.79454	0.04727
Variable	$ 322,241	$ 89,064	$ 233,176	0.27639	0.72361	$ 44,173	$ 261,035	$ 17,032	0.13708	0.81006	0.05286
Water Treatment											
Fixed	$ 14,374,809	$ 6,426,729	$ 7,948,081	0.44708	0.55292	$ 2,274,029	$ 11,421,324	$ 679,456	0.15820	0.79454	0.04727
Variable	$ 5,372,712	$ 1,484,967	$ 3,887,745	0.27639	0.72361	$ 736,502	$ 4,352,231	$ 283,979	0.13708	0.81006	0.05286
Transmission	$ 5,318,731	$ 2,377,913	$ 2,940,818	0.44708	0.55292	$ 841,399	$ 4,225,931	$ 251,401	0.15820	0.79454	0.04727
Distribution	$ 8,436,548	$ 4,770,545	$ 3,666,003	0.56546	0.43454	$ 1,815,929	$ 6,272,137	$ 348,481	0.21525	0.74345	0.04131
Storage	$ 607,497	$ 343,517	$ 263,981	0.56546	0.43454	$ 130,761	$ 451,643	$ 25,093	0.21525	0.74345	0.04131
Total Rev. Rqmt.	$ 39,242,010	$ 17,602,220	$ 21,639,790			$ 6,598,590	$ 30,809,314	$ 1,834,106			
Usage	5,748,449	1,658,566	4,342,239			822,602	4,861,026	317,177			
Unit Cost	$ 6.83	$ 10.61	$ 4.98			$ 8.02	$ 6.34	$ 5.78			

Residential Revenue Allocations are from the Company's cost of service study sponsored by Company Witness Selinger

Kentucky American Water Company
Residential

							0.3893	-0.1380	-0.1127	-0.0251	0.1581	0.7624	0.9029	0.9578	0.7972
Period	Obs	Year	Month	Cust	Sales	UPC	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
1	61	2013	1	110,286	466,325	4.228	1	0	0	0	0	0	0	0	0
1	62	2013	2	110,430	434,074	3.931	0	1	0	0	0	0	0	0	0
1	63	2013	3	110,601	405,078	3.663	0	0	1	0	0	0	0	0	0
1	64	2013	4	110,770	418,930	3.782	0	0	0	1	0	0	0	0	0
1	65	2013	5	112,842	455,956	4.041	0	0	0	0	1	0	0	0	0
1	66	2013	6	112,909	528,796	4.683	0	0	0	0	0	1	0	0	0
1	67	2013	7	112,957	475,444	4.209	0	0	0	0	0	0	1	0	0
1	68	2013	8	113,608	529,828	4.664	0	0	0	0	0	0	0	1	0
1	69	2013	9	113,783	512,147	4.501	0	0	0	0	0	0	0	0	1
1	70	2013	10	113,723	528,595	4.648	0	0	0	0	0	0	0	0	0
1	71	2013	11	113,691	400,534	3.523	0	0	0	0	0	0	0	0	0
1	72	2013	12	113,777	459,418	4.038	0	0	0	0	0	0	0	0	0
2	73	2014	1	113,816	493,103	4.332	1	0	0	0	0	0	0	0	0
2	74	2014	2	113,795	493,795	4.339	0	1	0	0	0	0	0	0	0
2	75	2014	3	113,580	437,161	3.849	0	0	1	0	0	0	0	0	0
2	76	2014	4	113,585	446,063	3.927	0	0	0	1	0	0	0	0	0
2	77	2014	5	113,550	452,219	3.983	0	0	0	0	1	0	0	0	0
2	78	2014	6	113,659	522,245	4.595	0	0	0	0	0	1	0	0	0
2	79	2014	7	113,591	581,709	5.121	0	0	0	0	0	0	1	0	0
2	80	2014	8	114,292	516,761	4.521	0	0	0	0	0	0	0	1	0
2	81	2014	9	114,408	516,726	4.517	0	0	0	0	0	0	0	0	1
2	82	2014	10	114,505	510,909	4.462	0	0	0	0	0	0	0	0	0
2	83	2014	11	114,440	386,993	3.382	0	0	0	0	0	0	0	0	0
2	84	2014	12	114,534	445,274	3.888	0	0	0	0	0	0	0	0	0
3	85	2015	1	114,636	496,999	4.335	1	0	0	0	0	0	0	0	0
3	86	2015	2	114,766	409,081	3.564	0	1	0	0	0	0	0	0	0
3	87	2015	3	115,014	472,025	4.104	0	0	1	0	0	0	0	0	0
3	88	2015	4	115,157	461,866	4.011	0	0	0	1	0	0	0	0	0
3	89	2015	5	115,174	444,309	3.858	0	0	0	0	1	0	0	0	0
3	90	2015	6	115,527	563,334	4.876	0	0	0	0	0	1	0	0	0
3	91	2015	7	115,691	513,500	4.439	0	0	0	0	0	0	1	0	0
3	92	2015	8	115,882	518,053	4.471	0	0	0	0	0	0	0	1	0
3	93	2015	9	116,068	574,523	4.950	0	0	0	0	0	0	0	0	1
3	94	2015	10	116,091	541,831	4.667	0	0	0	0	0	0	0	0	0
3	95	2015	11	116,144	425,337	3.662	0	0	0	0	0	0	0	0	0
3	96	2015	12	116,165	450,092	3.875	0	0	0	0	0	0	0	0	0
4	97	2016	1	116,124	438,318	3.775	1	0	0	0	0	0	0	0	0
4	98	2016	2	116,263	430,536	3.703	0	1	0	0	0	0	0	0	0
4	99	2016	3	116,397	431,088	3.704	0	0	1	0	0	0	0	0	0
4	100	2016	4	116,599	464,312	3.982	0	0	0	1	0	0	0	0	0
4	101	2016	5	116,819	436,240	3.734	0	0	0	0	1	0	0	0	0
4	102	2016	6	116,944	543,599	4.648	0	0	0	0	0	1	0	0	0
4	103	2016	7	116,893	556,625	4.762	0	0	0	0	0	0	1	0	0
4	104	2016	8	117,139	565,559	4.828	0	0	0	0	0	0	0	1	0
4	105	2016	9	117,276	566,648	4.832	0	0	0	0	0	0	0	0	1
4	106	2016	10	117,385	549,271	4.679	0	0	0	0	0	0	0	0	0

Kentucky American Water Company
Residential

							0.3893	-0.1380	-0.1127	-0.0251	0.1581	0.7624	0.9029	0.9578	0.7972
Period	Obs	Year	Month	Cust	Sales	UPC	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
4	107	2016	11	117,324	501,169	4.272	0	0	0	0	0	0	0	0	0
4	108	2016	12	117,366	471,584	4.018	0	0	0	0	0	0	0	0	0
5	109	2017	1	117,337	467,875	3.987	1	0	0	0	0	0	0	0	0
5	110	2017	2	117,359	421,264	3.590	0	1	0	0	0	0	0	0	0
5	111	2017	3	117,658	403,788	3.432	0	0	1	0	0	0	0	0	0
5	112	2017	4	117,991	426,740	3.617	0	0	0	1	0	0	0	0	0
5	113	2017	5	118,171	464,428	3.930	0	0	0	0	1	0	0	0	0
5	114	2017	6	118,262	536,481	4.536	0	0	0	0	0	1	0	0	0
5	115	2017	7	118,218	535,084	4.526	0	0	0	0	0	0	1	0	0
5	116	2017	8	118,378	541,171	4.572	0	0	0	0	0	0	0	1	0
5	117	2017	9	118,437	552,157	4.662	0	0	0	0	0	0	0	0	1
5	118	2017	10	118,485	489,137	4.128	0	0	0	0	0	0	0	0	0
5	119	2017	11	118,442	452,419	3.820	0	0	0	0	0	0	0	0	0
5	120	2017	12	118,448	430,850	3.637	0	0	0	0	0	0	0	0	0
6	121	2018	1	118,548	504,760	4.258	1	0	0	0	0	0	0	0	0
6	122	2018	2	119,046	423,817	3.560	0	1	0	0	0	0	0	0	0
6	123	2018	3	119,170	398,240	3.342	0	0	1	0	0	0	0	0	0
6	124	2018	4	119,359	422,111	3.536	0	0	0	1	0	0	0	0	0
6	125	2018	5	119,414	457,844	3.834	0	0	0	0	1	0	0	0	0
6	126	2018	6	119,452	547,569	4.584	0	0	0	0	0	1	0	0	0
6	127	2018	7	119,450	521,015	4.362	0	0	0	0	0	0	1	0	0
6	128	2018	8	119,617	529,667	4.428	0	0	0	0	0	0	0	1	0
6	129	2018	9	119,568	488,661	4.087	0	0	0	0	0	0	0	0	1
6	130	2018	10	119,588	500,289	4.183	0	0	0	0	0	0	0	0	0
6	131	2018	11	119,609	426,610	3.567	0	0	0	0	0	0	0	0	0
6	132	2018	12	119,500	425,196	3.558	0	0	0	0	0	0	0	0	0
7	133	2019	1	119,738	468,191	3.910	1	0	0	0	0	0	0	0	0
7	134	2019	2	120,022	436,030	3.633	0	1	0	0	0	0	0	0	0
7	135	2019	3	119,963	428,647	3.573	0	0	1	0	0	0	0	0	0
7	136	2019	4	120,545	410,551	3.406	0	0	0	1	0	0	0	0	0
7	137	2019	5	120,691	481,374	3.988	0	0	0	0	1	0	0	0	0
7	138	2019	6	120,587	521,838	4.327	0	0	0	0	0	1	0	0	0
7	139	2019	7	120,926	509,428	4.213	0	0	0	0	0	0	1	0	0
7	140	2019	8	121,087	586,546	4.844	0	0	0	0	0	0	0	1	0
7	141	2019	9	121,179	546,087	4.506	0	0	0	0	0	0	0	0	1
7	142	2019	10	121,312	653,878	5.390	0	0	0	0	0	0	0	0	0
7	143	2019	11	121,224	432,935	3.571	0	0	0	0	0	0	0	0	0
7	144	2019	12	121,176	456,248	3.765	0	0	0	0	0	0	0	0	0
8	145	2020	1	121,219	518,497	4.277	1	0	0	0	0	0	0	0	0
8	146	2020	2	121,285	353,896	2.918	0	1	0	0	0	0	0	0	0
8	147	2020	3	121,524	456,507	3.757	0	0	1	0	0	0	0	0	0
8	148	2020	4	121,741	476,155	3.911	0	0	0	1	0	0	0	0	0
8	149	2020	5	121,941	473,588	3.884	0	0	0	0	1	0	0	0	0
8	150	2020	6	122,061	540,514	4.428	0	0	0	0	0	1	0	0	0
8	151	2020	7	122,201	668,078	5.467	0	0	0	0	0	0	1	0	0
8	152	2020	8	122,376	615,613	5.031	0	0	0	0	0	0	0	1	0

Kentucky American Water Company
Residential

							0.3893	-0.1380	-0.1127	-0.0251	0.1581	0.7624	0.9029	0.9578	0.7972
Period	Obs	Year	Month	Cust	Sales	UPC	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
8	153	2020	9	122,446	591,081	4.827	0	0	0	0	0	0	0	0	1
8	154	2020	10	122,266	528,076	4.319	0	0	0	0	0	0	0	0	0
8	155	2020	11	122,510	440,961	3.599	0	0	0	0	0	0	0	0	0
8	156	2020	12	122,528	409,614	3.343	0	0	0	0	0	0	0	0	0
9	157	2021	1	122,431	504,369	4.120	1	0	0	0	0	0	0	0	0
9	158	2021	2	122,325	413,144	3.377	0	1	0	0	0	0	0	0	0
9	159	2021	3	122,462	434,249	3.546	0	0	1	0	0	0	0	0	0
9	160	2021	4	122,708	453,677	3.697	0	0	0	1	0	0	0	0	0
9	161	2021	5	122,990	482,580	3.924	0	0	0	0	1	0	0	0	0
9	162	2021	6	123,112	524,487	4.260	0	0	0	0	0	1	0	0	0
9	163	2021	7	123,209	572,926	4.650	0	0	0	0	0	0	1	0	0
9	164	2021	8	123,503	563,482	4.562	0	0	0	0	0	0	0	1	0
9	165	2021	9	123,599	558,747	4.521	0	0	0	0	0	0	0	0	1
9	166	2021	10	123,590	483,181	3.910	0	0	0	0	0	0	0	0	0
9	167	2021	11	123,601	455,774	3.687	0	0	0	0	0	0	0	0	0
9	168	2021	12	123,551	427,962	3.464	0	0	0	0	0	0	0	0	0
10	169	2022	1	123,618	503,978	4.077	1	0	0	0	0	0	0	0	0
10	170	2022	2	123,624	426,017	3.446	0	1	0	0	0	0	0	0	0
10	171	2022	3	123,753	409,766	3.311	0	0	1	0	0	0	0	0	0
10	172	2022	4	123,900	420,915	3.397	0	0	0	1	0	0	0	0	0
10	173	2022	5	124,047	482,359	3.889	0	0	0	0	1	0	0	0	0
10	174	2022	6	124,070	512,695	4.132	0	0	0	0	0	1	0	0	0
10	175	2022	7	124,025	582,053	4.693	0	0	0	0	0	0	1	0	0
10	176	2022	8	124,268	625,686	5.035	0	0	0	0	0	0	0	1	0
10	177	2022	9	124,301	486,180	3.911	0	0	0	0	0	0	0	0	1
10	178	2022	10	124,272	647,287	5.209	0	0	0	0	0	0	0	0	0
10	179	2022	11	124,303	436,664	3.513	0	0	0	0	0	0	0	0	0
10	180	2022	12	124,255	453,574	3.650	0	0	0	0	0	0	0	0	0
11	181	2023	1	124,309	464,122	3.734	1	0	0	0	0	0	0	0	0
11	182	2023	2	124,437	435,125	3.497	0	1	0	0	0	0	0	0	0
11	183	2023	3	124,582	438,766	3.522	0	0	1	0	0	0	0	0	0
11	184	2023	4	124,868	429,497	3.440	0	0	0	1	0	0	0	0	0
11	185	2023	5	125,036	432,618	3.460	0	0	0	0	1	0	0	0	0
11	186	2023	6	125,084	500,575	4.002	0	0	0	0	0	1	0	0	0
11	187	2023	7	125,165	529,794	4.233	0	0	0	0	0	0	1	0	0
11	188	2023	8	125,365	561,343	4.478	0	0	0	0	0	0	0	1	0
11	189	2023	9	125,415	549,803	4.384	0	0	0	0	0	0	0	0	1
11	190	2023	10	125,412	583,189	4.650	0	0	0	0	0	0	0	0	0
11	191	2023	11	125,442	423,535	3.376	0	0	0	0	0	0	0	0	0
11	192	2023	12	125,403	417,478	3.329	0	0	0	0	0	0	0	0	0
12	193	2024	1	125,457	463,107	3.691	1	0	0	0	0	0	0	0	0
12	194	2024	2	125,585	433,832	3.454	0	1	0	0	0	0	0	0	0
12	195	2024	3	125,730	437,496	3.480	0	0	1	0	0	0	0	0	0
12	196	2024	4	126,016	428,120	3.397	0	0	0	1	0	0	0	0	0
12	197	2024	5	126,184	431,258	3.418	0	0	0	0	1	0	0	0	0
12	198	2024	6	126,232	499,835	3.960	0	0	0	0	0	1	0	0	0

Kentucky American Water Company
Residential

							0.3893	-0.1380	-0.1127	-0.0251	0.1581	0.7624	0.9029	0.9578	0.7972
Period	Obs	Year	Month	Cust	Sales	UPC	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
12	199	2024	7	126,313	529,316	4.191	0	0	0	0	0	0	1	0	0
12	200	2024	8	126,513	561,138	4.435	0	0	0	0	0	0	0	1	0
12	201	2024	9	126,563	549,487	4.342	0	0	0	0	0	0	0	0	1
12	202	2024	10	126,561	583,180	4.608	0	0	0	0	0	0	0	0	0
12	203	2024	11	126,590	422,061	3.334	0	0	0	0	0	0	0	0	0
12	204	2024	12	126,551	415,953	3.287	0	0	0	0	0	0	0	0	0

Kentucky American Water Company
Residential

						Rain Lag 2	0.2	CDD Lag	HDD Lag	
						Rain Lag 1	0.6	1.0	1.0	
				0.8289	-0.0675	-0.0035	-0.0867	0.0019	0.0007	0.1464
Period	Obs	Year	Month	Oct	Nov	Trend	Rain (Diff)	CDD (Diff)	HDD (Diff)	COVID
1	61	2013	1	0	0	-119	0.000	0	-44	0
1	62	2013	2	0	0	-118	0.000	0	-66	0
1	63	2013	3	0	0	-117	0.000	0	48	0
1	64	2013	4	0	0	-116	-0.131	-2	0	0
1	65	2013	5	0	0	-115	0.380	7	0	0
1	66	2013	6	0	0	-114	0.821	-14	0	0
1	67	2013	7	0	0	-113	2.189	-11	0	0
1	68	2013	8	0	0	-112	2.587	-67	0	0
1	69	2013	9	0	0	-111	0.378	-17	0	0
1	70	2013	10	1	0	-110	-0.733	-39	0	0
1	71	2013	11	0	1	-109	0.441	-6	0	0
1	72	2013	12	0	0	-108	0.000	0	65	0
2	73	2014	1	0	0	-107	0.000	0	71	0
2	74	2014	2	0	0	-106	0.000	0	204	0
2	75	2014	3	0	0	-105	0.000	0	126	0
2	76	2014	4	0	0	-104	-0.743	-2	0	0
2	77	2014	5	0	0	-103	0.516	-8	0	0
2	78	2014	6	0	0	-102	0.523	5	0	0
2	79	2014	7	0	0	-101	-0.199	25	0	0
2	80	2014	8	0	0	-100	-0.437	-103	0	0
2	81	2014	9	0	0	-99	2.412	10	0	0
2	82	2014	10	1	0	-98	1.437	-37	0	0
2	83	2014	11	0	1	-97	-0.081	-23	0	0
2	84	2014	12	0	0	-96	0.000	0	181	0
3	85	2015	1	0	0	-95	0.000	0	53	0
3	86	2015	2	0	0	-94	0.000	0	72	0
3	87	2015	3	0	0	-93	0.000	0	329	0
3	88	2015	4	0	0	-92	2.735	-2	0	0
3	89	2015	5	0	0	-91	4.002	-10	0	0
3	90	2015	6	0	0	-90	-0.407	18	0	0
3	91	2015	7	0	0	-89	0.443	8	0	0
3	92	2015	8	0	0	-88	1.953	-22	0	0
3	93	2015	9	0	0	-87	-1.062	-80	0	0
3	94	2015	10	1	0	-86	-1.225	-5	0	0
3	95	2015	11	0	1	-85	-0.853	-31	0	0
3	96	2015	12	0	0	-84	0.000	0	-143	0
4	97	2016	1	0	0	-83	0.000	0	-263	0
4	98	2016	2	0	0	-82	0.000	0	48	0
4	99	2016	3	0	0	-81	0.000	0	-15	0
4	100	2016	4	0	0	-80	-1.389	0	0	0
4	101	2016	5	0	0	-79	-0.906	3	0	0
4	102	2016	6	0	0	-78	0.409	-53	0	0
4	103	2016	7	0	0	-77	-0.257	33	0	0
4	104	2016	8	0	0	-76	-0.201	48	0	0
4	105	2016	9	0	0	-75	0.402	97	0	0
4	106	2016	10	1	0	-74	-1.509	67	0	0

Kentucky American Water Company
Residential

						Rain Lag 2	0.2	CDD Lag	HDD Lag	
						Rain Lag 1	0.6	1.0	1.0	
				0.8289	-0.0675	-0.0035	-0.0867	0.0019	0.0007	0.1464
Period	Obs	Year	Month	Oct	Nov	Trend	Rain (Diff)	CDD (Diff)	HDD (Diff)	COVID
4	107	2016	11	0	1	-73	-3.013	28	0	0
4	108	2016	12	0	0	-72	0.000	0	-125	0
5	109	2017	1	0	0	-71	0.000	0	98	0
5	110	2017	2	0	0	-70	0.000	0	-210	0
5	111	2017	3	0	0	-69	0.000	0	-279	0
5	112	2017	4	0	0	-68	-1.601	3	0	0
5	113	2017	5	0	0	-67	-1.854	41	0	0
5	114	2017	6	0	0	-66	-0.149	-15	0	0
5	115	2017	7	0	0	-65	0.357	-37	0	0
5	116	2017	8	0	0	-64	-0.095	16	0	0
5	117	2017	9	0	0	-63	-0.014	-78	0	0
5	118	2017	10	1	0	-62	0.425	-58	0	0
5	119	2017	11	0	1	-61	0.561	7	0	0
5	120	2017	12	0	0	-60	0.000	0	-48	0
6	121	2018	1	0	0	-59	0.000	0	167	0
6	122	2018	2	0	0	-58	0.000	0	75	0
6	123	2018	3	0	0	-57	0.000	0	-221	0
6	124	2018	4	0	0	-56	1.465	-2	0	0
6	125	2018	5	0	0	-55	0.418	-14	0	0
6	126	2018	6	0	0	-54	1.177	116	0	0
6	127	2018	7	0	0	-53	-0.299	52	0	0
6	128	2018	8	0	0	-52	-0.847	7	0	0
6	129	2018	9	0	0	-51	1.244	21	0	0
6	130	2018	10	1	0	-50	4.785	65	0	0
6	131	2018	11	0	1	-49	3.349	75	0	0
6	132	2018	12	0	0	-48	0.000	0	105	0
7	133	2019	1	0	0	-47	0.000	0	-31	0
7	134	2019	2	0	0	-46	0.000	0	-11	0
7	135	2019	3	0	0	-45	0.000	0	-161	0
7	136	2019	4	0	0	-44	-0.537	0	0	0
7	137	2019	5	0	0	-43	-0.660	4	0	0
7	138	2019	6	0	0	-42	-0.069	44	0	0
7	139	2019	7	0	0	-41	0.759	-34	0	0
7	140	2019	8	0	0	-40	-1.365	64	0	0
7	141	2019	9	0	0	-39	-2.848	69	0	0
7	142	2019	10	1	0	-38	-1.987	176	0	0
7	143	2019	11	0	1	-37	1.731	25	0	0
7	144	2019	12	0	0	-36	0.000	0	91	0
8	145	2020	1	0	0	-35	0.000	0	-109	0
8	146	2020	2	0	0	-34	0.000	0	-247	0
8	147	2020	3	0	0	-33	0.000	0	32	0
8	148	2020	4	0	0	-32	0.313	5	0	1
8	149	2020	5	0	0	-31	0.224	-19	0	1
8	150	2020	6	0	0	-30	-0.413	-51	0	1
8	151	2020	7	0	0	-29	-1.683	-54	0	1
8	152	2020	8	0	0	-28	-1.659	45	0	1

Kentucky American Water Company
Residential

						Rain Lag 2	0.2	CDD Lag	HDD Lag	
						Rain Lag 1	0.6	1.0	1.0	
				0.8289	-0.0675	-0.0035	-0.0867	0.0019	0.0007	0.1464
Period	Obs	Year	Month	Oct	Nov	Trend	Rain (Diff)	CDD (Diff)	HDD (Diff)	COVID
8	153	2020	9	0	0	-27	-1.052	-44	0	1
8	154	2020	10	1	0	-26	0.125	-82	0	1
8	155	2020	11	0	1	-25	-0.199	-39	0	1
8	156	2020	12	0	0	-24	0.000	0	-82	1
9	157	2021	1	0	0	-23	0.000	0	149	1
9	158	2021	2	0	0	-22	0.000	0	-11	1
9	159	2021	3	0	0	-21	0.000	0	171	1
9	160	2021	4	0	0	-20	-0.329	-2	0	1
9	161	2021	5	0	0	-19	-1.220	-12	0	1
9	162	2021	6	0	0	-18	-0.303	-63	0	1
9	163	2021	7	0	0	-17	0.655	-35	0	1
9	164	2021	8	0	0	-16	0.321	-66	0	1
9	165	2021	9	0	0	-15	1.236	1	0	1
9	166	2021	10	1	0	-14	0.719	-66	0	1
9	167	2021	11	0	1	-13	0.881	1	0	1
9	168	2021	12	0	0	-12	0.000	0	13	1
10	169	2022	1	0	0	-11	0.000	0	-187	0
10	170	2022	2	0	0	-10	0.000	0	149	0
10	171	2022	3	0	0	-9	0.000	0	-30	0
10	172	2022	4	0	0	-8	0.221	-2	0	0
10	173	2022	5	0	0	-7	-0.896	8	0	0
10	174	2022	6	0	0	-6	-1.589	15	0	0
10	175	2022	7	0	0	-5	-1.961	55	0	0
10	176	2022	8	0	0	-4	-0.257	82	0	0
10	177	2022	9	0	0	-3	-0.698	22	0	0
10	178	2022	10	1	0	-2	-2.039	-25	0	0
10	179	2022	11	0	1	-1	-2.817	-37	0	0
10	180	2022	12	0	0	0	0.000	0	-59	0
11	181	2023	1	0	0	1	0.000	0	-213	0
11	182	2023	2	0	0	2	0.000	0	188	0
11	183	2023	3	0	0	3	0.000	0	192	0
11	184	2023	4	0	0	4	-0.132	-19	0	0
11	185	2023	5	0	0	5	-0.342	-113	0	0
11	186	2023	6	0	0	6	-0.205	-138	0	0
11	187	2023	7	0	0	7	-0.266	-91	0	0
11	188	2023	8	0	0	8	0.287	36	0	0
11	189	2023	9	0	0	9	1.512	130	0	0
11	190	2023	10	1	0	10	-0.797	150	0	0
11	191	2023	11	0	1	11	1.234	45	0	0
11	192	2023	12	0	0	12	0.000	0	-181	0
12	193	2024	1	0	0	13	0.000	0	-213	0
12	194	2024	2	0	0	14	0.000	0	188	0
12	195	2024	3	0	0	15	0.000	0	192	0
12	196	2024	4	0	0	16	-0.132	-19	0	0
12	197	2024	5	0	0	17	-0.342	-113	0	0
12	198	2024	6	0	0	18	-0.205	-138	0	0

Kentucky American Water Company
Residential

						Rain Lag 2	0.2	CDD Lag	HDD Lag	
						Rain Lag 1	0.6	1.0	1.0	
				0.8289	-0.0675	-0.0035	-0.0867	0.0019	0.0007	0.1464
Period	Obs	Year	Month	Oct	Nov	Trend	Rain (Diff)	CDD (Diff)	HDD (Diff)	COVID
12	199	2024	7	0	0	19	-0.266	-91	0	0
12	200	2024	8	0	0	20	0.287	36	0	0
12	201	2024	9	0	0	21	1.512	130	0	0
12	202	2024	10	1	0	22	-0.797	150	0	0
12	203	2024	11	0	1	23	1.234	45	0	0
12	204	2024	12	0	0	24	0.000	0	-181	0

Kentucky American Water Company
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Period	Obs	Year	Month	Predicted	Actual	Variance	Weather Effect	Billing Adjustments
1	61	2013	1	4.280	4.228	0.052	0.124	0
1	62	2013	2	3.733	3.931	-0.198	-0.186	0
1	63	2013	3	3.838	3.663	0.176	-0.106	0
1	64	2013	4	3.896	3.782	0.114	0.034	0
1	65	2013	5	4.048	4.041	0.007	0.165	0
1	66	2013	6	4.570	4.683	-0.113	0.145	0
1	67	2013	7	4.594	4.209	0.385	-0.061	0
1	68	2013	8	4.505	4.664	-0.159	-0.396	0
1	69	2013	9	4.627	4.501	0.126	-0.179	0
1	70	2013	10	4.711	4.648	0.063	-0.362	0
1	71	2013	11	3.771	3.523	0.248	-0.028	0
1	72	2013	12	3.932	4.038	-0.106	0.181	0
2	73	2014	1	4.322	4.332	-0.010	0.208	0
2	74	2014	2	3.889	4.339	-0.451	0.012	0
2	75	2014	3	3.853	3.849	0.004	-0.049	0
2	76	2014	4	3.907	3.927	-0.020	0.087	0
2	77	2014	5	3.965	3.983	-0.017	0.125	0
2	78	2014	6	4.590	4.595	-0.005	0.207	0
2	79	2014	7	4.827	5.121	-0.294	0.214	0
2	80	2014	8	4.656	4.521	0.135	-0.202	0
2	81	2014	9	4.460	4.517	-0.057	-0.304	0
2	82	2014	10	4.484	4.462	0.022	-0.546	0
2	83	2014	11	3.742	3.382	0.360	-0.015	0
2	84	2014	12	3.975	3.888	0.087	0.266	0
3	85	2015	1	4.267	4.335	-0.069	0.195	0
3	86	2015	2	3.750	3.564	0.185	-0.085	0
3	87	2015	3	3.960	4.104	-0.144	0.100	0
3	88	2015	4	3.563	4.011	-0.448	-0.215	0
3	89	2015	5	3.617	3.858	-0.241	-0.181	0
3	90	2015	6	4.652	4.876	-0.224	0.312	0
3	91	2015	7	4.697	4.439	0.258	0.126	0
3	92	2015	8	4.560	4.471	0.090	-0.256	0
3	93	2015	9	4.548	4.950	-0.402	-0.174	0
3	94	2015	10	4.733	4.667	0.066	-0.255	0
3	95	2015	11	3.751	3.662	0.089	0.037	0
3	96	2015	12	3.695	3.875	-0.179	0.028	0
4	97	2016	1	3.993	3.775	0.218	-0.036	0
4	98	2016	2	3.690	3.703	-0.013	-0.103	0
4	99	2016	3	3.666	3.704	-0.038	-0.152	0
4	100	2016	4	3.882	3.982	-0.100	0.146	0
4	101	2016	5	4.025	3.734	0.290	0.269	0
4	102	2016	6	4.405	4.648	-0.243	0.107	0
4	103	2016	7	4.763	4.762	0.001	0.234	0
4	104	2016	8	4.837	4.828	0.009	0.064	0
4	105	2016	9	4.714	4.832	-0.118	0.034	0
4	106	2016	10	4.852	4.679	0.173	-0.094	0

Kentucky American Water Company
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Period	Obs	Year	Month	Predicted	Actual	Variance	Weather Effect	Billing Adjustments
4	107	2016	11	4.008	4.272	-0.264	0.336	0
4	108	2016	12	3.666	4.018	-0.352	0.041	0
5	109	2017	1	4.215	3.987	0.228	0.228	0
5	110	2017	2	3.459	3.590	-0.131	-0.292	0
5	111	2017	3	3.430	3.432	-0.002	-0.345	0
5	112	2017	4	3.864	3.617	0.247	0.171	0
5	113	2017	5	4.137	3.930	0.206	0.423	0
5	114	2017	6	4.483	4.536	-0.053	0.228	0
5	115	2017	7	4.535	4.526	0.008	0.048	0
5	116	2017	8	4.725	4.572	0.154	-0.006	0
5	117	2017	9	4.377	4.662	-0.285	-0.261	0
5	118	2017	10	4.405	4.128	0.277	-0.498	0
5	119	2017	11	3.616	3.820	-0.204	-0.014	0
5	120	2017	12	3.680	3.637	0.043	0.098	0
6	121	2018	1	4.224	4.258	-0.034	0.279	0
6	122	2018	2	3.625	3.560	0.065	-0.083	0
6	123	2018	3	3.431	3.342	0.089	-0.303	0
6	124	2018	4	3.546	3.536	0.010	-0.105	0
6	125	2018	5	3.793	3.834	-0.041	0.122	0
6	126	2018	6	4.574	4.584	-0.010	0.361	0
6	127	2018	7	4.718	4.362	0.356	0.274	0
6	128	2018	8	4.731	4.428	0.303	0.042	0
6	129	2018	9	4.413	4.087	0.326	-0.182	0
6	130	2018	10	4.218	4.183	0.035	-0.643	0
6	131	2018	11	3.461	3.567	-0.106	-0.127	0
6	132	2018	12	3.750	3.558	0.192	0.210	0
7	133	2019	1	4.036	3.910	0.126	0.134	0
7	134	2019	2	3.520	3.633	-0.113	-0.146	0
7	135	2019	3	3.432	3.573	-0.141	-0.259	0
7	136	2019	4	3.681	3.406	0.276	0.073	0
7	137	2019	5	3.879	3.988	-0.110	0.250	0
7	138	2019	6	4.503	4.327	0.176	0.332	0
7	139	2019	7	4.421	4.213	0.208	0.019	0
7	140	2019	8	4.842	4.844	-0.002	0.195	0
7	141	2019	9	4.816	4.506	0.309	0.263	0
7	142	2019	10	4.973	5.390	-0.417	0.154	0
7	143	2019	11	3.464	3.571	-0.107	-0.081	0
7	144	2019	12	3.698	3.765	-0.067	0.200	0
8	145	2020	1	3.937	4.277	-0.341	0.076	0
8	146	2020	2	3.305	2.918	0.387	-0.319	0
8	147	2020	3	3.531	3.757	-0.226	-0.118	0
8	148	2020	4	3.721	3.911	-0.190	0.008	0
8	149	2020	5	3.862	3.884	-0.021	0.129	0
8	150	2020	6	4.457	4.428	0.029	0.182	0
8	151	2020	7	4.699	5.467	-0.768	0.193	0
8	152	2020	8	4.935	5.031	-0.095	0.184	0

Kentucky American Water Company
Residential

Period	Obs	Year	Month	Predicted	Actual	Variance	Weather Effect	Billing Adjustments
8	153	2020	9	4.550	4.827	-0.277	-0.107	0
8	154	2020	10	4.406	4.319	0.087	-0.518	0
8	155	2020	11	3.614	3.599	0.015	-0.035	0
8	156	2020	12	3.675	3.343	0.332	0.073	0
9	157	2021	1	4.230	4.120	0.110	0.266	0
9	158	2021	2	3.582	3.377	0.204	-0.146	0
9	159	2021	3	3.737	3.546	0.191	-0.016	0
9	160	2021	4	3.721	3.697	0.024	0.051	0
9	161	2021	5	3.959	3.924	0.035	0.268	0
9	162	2021	6	4.383	4.260	0.123	0.150	0
9	163	2021	7	4.490	4.650	-0.160	0.026	0
9	164	2021	8	4.511	4.562	-0.051	-0.197	0
9	165	2021	9	4.395	4.521	-0.125	-0.220	0
9	166	2021	10	4.342	3.910	0.433	-0.539	0
9	167	2021	11	3.554	3.687	-0.133	-0.053	0
9	168	2021	12	3.702	3.464	0.239	0.142	0
10	169	2022	1	3.795	4.077	-0.282	0.019	0
10	170	2022	2	3.510	3.446	0.064	-0.029	0
10	171	2022	3	3.402	3.311	0.090	-0.163	0
10	172	2022	4	3.485	3.397	0.088	0.003	0
10	173	2022	5	3.780	3.889	-0.109	0.278	0
10	174	2022	6	4.453	4.132	0.321	0.409	0
10	175	2022	7	4.698	4.693	0.005	0.423	0
10	176	2022	8	4.653	5.035	-0.382	0.133	0
10	177	2022	9	4.414	3.911	0.503	-0.012	0
10	178	2022	10	4.470	5.209	-0.738	-0.222	0
10	179	2022	11	3.614	3.513	0.101	0.196	0
10	180	2022	12	3.461	3.650	-0.189	0.090	0
11	181	2023	1	3.734				
11	182	2023	2	3.497				
11	183	2023	3	3.522				
11	184	2023	4	3.440				
11	185	2023	5	3.460				
11	186	2023	6	4.002				
11	187	2023	7	4.233				
11	188	2023	8	4.478				
11	189	2023	9	4.384				
11	190	2023	10	4.650				
11	191	2023	11	3.376				
11	192	2023	12	3.329				
12	193	2024	1	3.691				
12	194	2024	2	3.454				
12	195	2024	3	3.480				
12	196	2024	4	3.397				
12	197	2024	5	3.418				
12	198	2024	6	3.960				

Kentucky American Water Company
Residential

Period	Obs	Year	Month	Predicted	Actual	Variance	Weather Effect	Billing Adjustments
12	199	2024	7	4.191				
12	200	2024	8	4.435				
12	201	2024	9	4.342				
12	202	2024	10	4.608				
12	203	2024	11	3.334				
12	204	2024	12	3.287				

Kentucky American Water Company
Residential

REGRESSION MODEL

Period	Obs	Year	Month
1	61	2013	1
1	62	2013	2
1	63	2013	3
1	64	2013	4
1	65	2013	5
1	66	2013	6
1	67	2013	7
1	68	2013	8
1	69	2013	9
1	70	2013	10
1	71	2013	11
1	72	2013	12
2	73	2014	1
2	74	2014	2
2	75	2014	3
2	76	2014	4
2	77	2014	5
2	78	2014	6
2	79	2014	7
2	80	2014	8
2	81	2014	9
2	82	2014	10
2	83	2014	11
2	84	2014	12
3	85	2015	1
3	86	2015	2
3	87	2015	3
3	88	2015	4
3	89	2015	5
3	90	2015	6
3	91	2015	7
3	92	2015	8
3	93	2015	9
3	94	2015	10
3	95	2015	11
3	96	2015	12
4	97	2016	1
4	98	2016	2
4	99	2016	3
4	100	2016	4
4	101	2016	5
4	102	2016	6
4	103	2016	7
4	104	2016	8
4	105	2016	9
4	106	2016	10

SUMMARY OUTPUT

Regression Statistics	
Multiple R	0.8982
R Square	0.8068
Adjusted R Square	0.7768
Standard Error	0.2404
Observations	120

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	16.00	24.8640	1.5540	26.8794	1.25508E-29
Residual	103.00	5.9548	0.0578		
Total	119.00	30.8189			

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*
Intercept	3.5042	0.0921	38.0551	0.0000	3.3215	3.6868
Jan	0.3893	0.1078	3.6101	0.0005	0.1754	0.6032
Feb	-0.1380	0.1078	-1.2808	0.2031	-0.3518	0.0757
Mar	-0.1127	0.1077	-1.0462	0.2979	-0.3264	0.1010
Apr	-0.0251	0.1077	-0.2333	0.8160	-0.2388	0.1885
May	0.1581	0.1077	1.4686	0.1450	-0.0554	0.3717
Jun	0.7624	0.1076	7.0832	0.0000	0.5489	0.9759
Jul	0.9029	0.1076	8.3912	0.0000	0.6895	1.1163
Aug	0.9578	0.1076	8.9036	0.0000	0.7445	1.1712
Sep	0.7972	0.1076	7.4119	0.0000	0.5839	1.0105
Oct	0.8289	0.1075	7.7076	0.0000	0.6156	1.0422
Nov	-0.0675	0.1075	-0.6281	0.5313	-0.2808	0.1457
Trend	-0.0035	0.0008	-4.4724	0.0000	-0.0051	-0.0020
Rain (Diff)	-0.0867	0.0193	-4.4869	0.0000	-0.1250	-0.0484
CDD (Diff)	0.0019	0.0006	3.0794	0.0027	0.0007	0.0031
HDD (Diff)	0.0007	0.0003	2.6611	0.0090	0.0002	0.0013
COVID	0.1464	0.0727	2.0135	0.0467	0.0022	0.2906

-0.507134684

Year	Predicted	Actual	% Change
2019	49.265	49.128	
2020	48.693	49.761	-1.16%
2021	48.607	47.718	-0.18%
2022	47.736	48.263	-1.79%
2023	46.104		-3.42%
2024	45.597		-1.10%

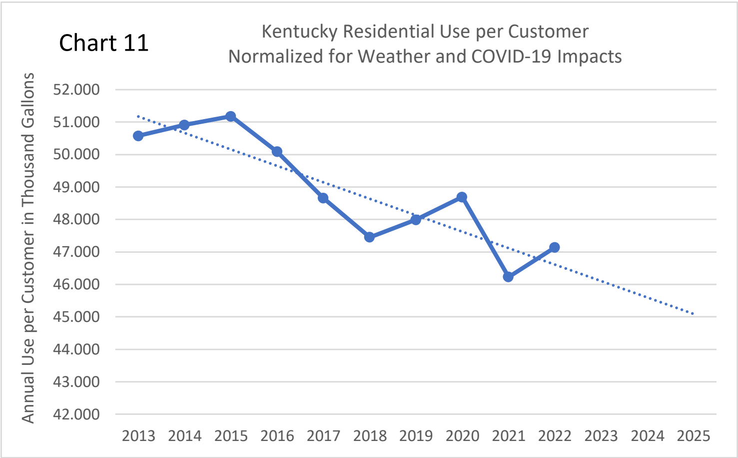
Year	UPC	Weather	COVID	Norm. UPC
2013	49.91	(0.67)	-	50.580

Seasonal toggle

Month	Sum. Wea.	Win. Wea.
1	0	1
2	0	1
3	0	1
4	1	0
5	1	0
6	1	0
7	1	0
8	1	0
9	1	0
10	1	0
11	1	0
12	0	1

Kentucky American Water Company
Residential REGRESSION MODEL

Period	Obs	Year	Month	SUMMARY OUTPUT				
4	107	2016	11	2014	50.92	0.00	-	50.913
4	108	2016	12	2015	50.81	(0.37)	-	51.178
5	109	2017	1	2016	50.94	0.85	-	50.090
5	110	2017	2	2017	48.44	(0.22)	-	48.658
5	111	2017	3	2018	47.30	(0.16)	-	47.455
5	112	2017	4	2019	49.13	1.13	-	47.995
5	113	2017	5	2020	49.76	(0.25)	1.32	48.693
5	114	2017	6	2021	47.72	(0.27)	1.76	46.229
5	115	2017	7	2022	48.26	1.13	-	47.138
5	116	2017	8	2023				
5	117	2017	9	2024				
5	118	2017	10	2025				
5	119	2017	11					
5	120	2017	12					
6	121	2018	1					
6	122	2018	2					
6	123	2018	3					
6	124	2018	4					
6	125	2018	5					
6	126	2018	6					
6	127	2018	7					
6	128	2018	8					
6	129	2018	9					
6	130	2018	10					
6	131	2018	11					
6	132	2018	12					
7	133	2019	1					
7	134	2019	2					
7	135	2019	3					
7	136	2019	4					
7	137	2019	5					
7	138	2019	6					
7	139	2019	7					
7	140	2019	8					
7	141	2019	9					
7	142	2019	10					
7	143	2019	11					
7	144	2019	12					
8	145	2020	1					
8	146	2020	2					
8	147	2020	3					
8	148	2020	4					
8	149	2020	5					
8	150	2020	6					
8	151	2020	7					
8	152	2020	8					



Kentucky American Water Company

Residential REGRESSION MODEL

SUMMARY OUTPUT

Period	Obs	Year	Month
8	153	2020	9
8	154	2020	10
8	155	2020	11
8	156	2020	12
9	157	2021	1
9	158	2021	2
9	159	2021	3
9	160	2021	4
9	161	2021	5
9	162	2021	6
9	163	2021	7
9	164	2021	8
9	165	2021	9
9	166	2021	10
9	167	2021	11
9	168	2021	12
10	169	2022	1
10	170	2022	2
10	171	2022	3
10	172	2022	4
10	173	2022	5
10	174	2022	6
10	175	2022	7
10	176	2022	8
10	177	2022	9
10	178	2022	10
10	179	2022	11
10	180	2022	12
11	181	2023	1
11	182	2023	2
11	183	2023	3
11	184	2023	4
11	185	2023	5
11	186	2023	6
11	187	2023	7
11	188	2023	8
11	189	2023	9
11	190	2023	10
11	191	2023	11
11	192	2023	12
12	193	2024	1
12	194	2024	2
12	195	2024	3
12	196	2024	4
12	197	2024	5
12	198	2024	6

Kentucky American Water Company

Residential REGRESSION MODEL

Period	Obs	Year	Month	SUMMARY OUTPUT
12	199	2024	7	
12	200	2024	8	
12	201	2024	9	
12	202	2024	10	
12	203	2024	11	
12	204	2024	12	

Kentucky American Water Company
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CUSTOMER DATA

Period	Obs	Year	Month	Year	Month	Cust	Growth	Select
1	61	2013	1	2013	1	110286	0	0
1	62	2013	2	2013	2	110430	144	0
1	63	2013	3	2013	3	110601	171	0
1	64	2013	4	2013	4	110770	169	0
1	65	2013	5	2013	5	112842	2072	0
1	66	2013	6	2013	6	112909	67	0
1	67	2013	7	2013	7	112957	48	0
1	68	2013	8	2013	8	113608	651	0
1	69	2013	9	2013	9	113783	175	0
1	70	2013	10	2013	10	113723	-60	0
1	71	2013	11	2013	11	113691	-32	0
1	72	2013	12	2013	12	113777	86	0
2	73	2014	1	2014	1	113816	39	0
2	74	2014	2	2014	2	113795	-21	0
2	75	2014	3	2014	3	113580	-215	0
2	76	2014	4	2014	4	113585	5	0
2	77	2014	5	2014	5	113550	-35	0
2	78	2014	6	2014	6	113659	109	0
2	79	2014	7	2014	7	113591	-68	0
2	80	2014	8	2014	8	114292	701	0
2	81	2014	9	2014	9	114408	116	0
2	82	2014	10	2014	10	114505	97	0
2	83	2014	11	2014	11	114440	-65	0
2	84	2014	12	2014	12	114534	94	0
3	85	2015	1	2015	1	114636	102	0
3	86	2015	2	2015	2	114766	130	0
3	87	2015	3	2015	3	115014	248	0
3	88	2015	4	2015	4	115157	143	0
3	89	2015	5	2015	5	115174	17	0
3	90	2015	6	2015	6	115527	353	0
3	91	2015	7	2015	7	115691	164	0
3	92	2015	8	2015	8	115882	191	0
3	93	2015	9	2015	9	116068	186	0
3	94	2015	10	2015	10	116091	23	0
3	95	2015	11	2015	11	116144	53	0
3	96	2015	12	2015	12	116165	21	0
4	97	2016	1	2016	1	116124	-41	0
4	98	2016	2	2016	2	116263	139	0
4	99	2016	3	2016	3	116397	134	0
4	100	2016	4	2016	4	116599	202	0
4	101	2016	5	2016	5	116819	220	0
4	102	2016	6	2016	6	116944	125	0
4	103	2016	7	2016	7	116893	-51	0
4	104	2016	8	2016	8	117139	246	0
4	105	2016	9	2016	9	117276	137	0
4	106	2016	10	2016	10	117385	109	0

Kentucky American Water Company
Residential

CUSTOMER DATA

Period	Obs	Year	Month	Year	Month	Cust	Growth	Select
4	107	2016	11	2016	11	117324	-61	0
4	108	2016	12	2016	12	117366	42	0
5	109	2017	1	2017	1	117337	-29	1
5	110	2017	2	2017	2	117359	22	1
5	111	2017	3	2017	3	117658	299	1
5	112	2017	4	2017	4	117991	333	1
5	113	2017	5	2017	5	118171	180	1
5	114	2017	6	2017	6	118262	91	1
5	115	2017	7	2017	7	118218	-44	1
5	116	2017	8	2017	8	118378	160	1
5	117	2017	9	2017	9	118437	59	1
5	118	2017	10	2017	10	118485	48	1
5	119	2017	11	2017	11	118442	-43	1
5	120	2017	12	2017	12	118448	6	1
6	121	2018	1	2018	1	118548	100	1
6	122	2018	2	2018	2	119046	498	1
6	123	2018	3	2018	3	119170	124	1
6	124	2018	4	2018	4	119359	189	1
6	125	2018	5	2018	5	119414	55	1
6	126	2018	6	2018	6	119452	38	1
6	127	2018	7	2018	7	119450	-2	1
6	128	2018	8	2018	8	119617	167	1
6	129	2018	9	2018	9	119568	-49	1
6	130	2018	10	2018	10	119588	20	1
6	131	2018	11	2018	11	119609	21	1
6	132	2018	12	2018	12	119500	-109	1
7	133	2019	1	2019	1	119738	238	1
7	134	2019	2	2019	2	120022	284	1
7	135	2019	3	2019	3	119963	-59	1
7	136	2019	4	2019	4	120545	582	1
7	137	2019	5	2019	5	120691	146	1
7	138	2019	6	2019	6	120587	-104	1
7	139	2019	7	2019	7	120926	339	1
7	140	2019	8	2019	8	121087	161	1
7	141	2019	9	2019	9	121179	92	1
7	142	2019	10	2019	10	121312	133	1
7	143	2019	11	2019	11	121224	-88	1
7	144	2019	12	2019	12	121176	-48	1
8	145	2020	1	2020	1	121219	43	1
8	146	2020	2	2020	2	121285	66	1
8	147	2020	3	2020	3	121524	239	1
8	148	2020	4	2020	4	121741	217	1
8	149	2020	5	2020	5	121941	200	1
8	150	2020	6	2020	6	122061	120	1
8	151	2020	7	2020	7	122201	140	1
8	152	2020	8	2020	8	122376	175	1

Kentucky American Water Company
Residential

CUSTOMER DATA

Period	Obs	Year	Month	Year	Month	Cust	Growth	Select
8	153	2020	9	2020	9	122446	70	1
8	154	2020	10	2020	10	122266	-180	1
8	155	2020	11	2020	11	122510	244	1
8	156	2020	12	2020	12	122528	18	1
9	157	2021	1	2021	1	122431	-97	1
9	158	2021	2	2021	2	122325	-106	1
9	159	2021	3	2021	3	122462	137	1
9	160	2021	4	2021	4	122708	246	1
9	161	2021	5	2021	5	122990	282	1
9	162	2021	6	2021	6	123112	122	1
9	163	2021	7	2021	7	123209	97	1
9	164	2021	8	2021	8	123503	294	1
9	165	2021	9	2021	9	123599	96	1
9	166	2021	10	2021	10	123590	-9	1
9	167	2021	11	2021	11	123601	11	1
9	168	2021	12	2021	12	123551	-50	1
10	169	2022	1	2022	1	123618	67	1
10	170	2022	2	2022	2	123624	6	1
10	171	2022	3	2022	3	123753	129	1
10	172	2022	4	2022	4	123900	147	1
10	173	2022	5	2022	5	124047	147	1
10	174	2022	6	2022	6	124070	23	1
10	175	2022	7	2022	7	124025	-45	1
10	176	2022	8	2022	8	124268	243	1
10	177	2022	9	2022	9	124301	33	1
10	178	2022	10	2022	10	124272	-29	1
10	179	2022	11	2022	11	124303	31	1
10	180	2022	12	2022	12	124255	-48	1
11	181	2023	1	2023	1	124309	54	
11	182	2023	2	2023	2	124437	128	
11	183	2023	3	2023	3	124582	145	
11	184	2023	4	2023	4	124868	286	
11	185	2023	5	2023	5	125036	168	
11	186	2023	6	2023	6	125084	48	
11	187	2023	7	2023	7	125165	81	
11	188	2023	8	2023	8	125365	200	
11	189	2023	9	2023	9	125415	50	
11	190	2023	10	2023	10	125412	-3	
11	191	2023	11	2023	11	125442	29	
11	192	2023	12	2023	12	125403	-39	
12	193	2024	1	2024	1	125457	54	
12	194	2024	2	2024	2	125585	128	
12	195	2024	3	2024	3	125730	145	
12	196	2024	4	2024	4	126016	286	
12	197	2024	5	2024	5	126184	168	
12	198	2024	6	2024	6	126232	48	

Month	Avg Growth Last 60 Months
1	54
2	128
3	145
4	286
5	168
6	48
7	81
8	200
9	50
10	-3
11	29
12	-39

Kentucky American Water Company

Residential

CUSTOMER DATA

Period	Obs	Year	Month
12	199	2024	7
12	200	2024	8
12	201	2024	9
12	202	2024	10
12	203	2024	11
12	204	2024	12

Year	Month	Cust	Growth	Select
2024	7	126313	81	
2024	8	126513	200	
2024	9	126563	50	
2024	10	126561	-3	
2024	11	126590	29	
2024	12	126551	-39	

Kentucky American Water Company

Residential WEATHER DATA

Period	Obs	Year	Month	Year	Month	Rain	Rain Lag 1	Rain Lag 2	CDD	CDD Lag 1	HDD	HDD Lag 1	Normalized weight weather ("offset" averages) Rain	CDD	HDD	Actual Wea Rain
1	61	2013	1	2013	1	4.460	6.560	1.760	0	0	911	720	4.028	0	764	4.460
1	62	2013	2	2013	2	1.530	4.460	6.560	0	0	837	911	4.036	0	977	1.530
1	63	2013	3	2013	3	5.350	1.530	4.460	0	0	789	837	4.679	1	790	5.350
1	64	2013	4	2013	4	4.880	5.350	1.530	28	0	300	789	4.623	2	597	4.880
1	65	2013	5	2013	5	5.660	4.880	5.350	120	28	83	300	4.750	21	294	5.660
1	66	2013	6	2013	6	7.540	5.660	4.880	261	120	0	83	5.059	134	96	7.540
1	67	2013	7	2013	7	9.100	7.540	5.660	296	261	0	0	5.287	272	5	9.100
1	68	2013	8	2013	8	5.140	9.100	7.540	310	296	3	0	5.409	363	0	5.140
1	69	2013	9	2013	9	1.630	5.140	9.100	159	310	20	3	4.852	327	0	1.630
1	70	2013	10	2013	10	6.230	1.630	5.140	42	159	269	20	3.985	198	28	6.230
1	71	2013	11	2013	11	2.450	6.230	1.630	0	42	648	269	4.113	48	228	2.450
1	72	2013	12	2013	12	5.580	2.450	6.230	0	0	835	648	3.603	3	583	5.580
2	73	2014	1	2014	1	2.310	5.580	2.450	0	0	1181	835	4.028	0	764	2.310
2	74	2014	2	2014	2	4.730	2.310	5.580	0	0	915	1181	4.036	0	977	4.730
2	75	2014	3	2014	3	2.890	4.730	2.310	0	0	721	915	4.679	1	790	2.890
2	76	2014	4	2014	4	6.000	2.890	4.730	13	0	212	721	4.623	2	597	6.000
2	77	2014	5	2014	5	5.440	6.000	2.890	139	13	92	212	4.750	21	294	5.440
2	78	2014	6	2014	6	5.590	5.440	6.000	297	139	0	92	5.059	134	96	5.590
2	79	2014	7	2014	7	3.230	5.590	5.440	260	297	2	0	5.287	272	5	3.230
2	80	2014	8	2014	8	9.580	3.230	5.590	337	260	0	2	5.409	363	0	9.580
2	81	2014	9	2014	9	4.350	9.580	3.230	161	337	30	0	4.852	327	0	4.350
2	82	2014	10	2014	10	4.480	4.350	9.580	25	161	226	30	3.985	198	28	4.480
2	83	2014	11	2014	11	2.370	4.480	4.350	0	25	764	226	4.113	48	228	2.370
2	84	2014	12	2014	12	3.300	2.370	4.480	0	0	817	764	3.603	3	583	3.300
3	85	2015	1	2015	1	1.850	3.300	2.370	0	0	1049	817	4.028	0	764	1.850
3	86	2015	2	2015	2	3.000	1.850	3.300	0	0	1118	1049	4.036	0	977	3.000
3	87	2015	3	2015	3	7.460	3.000	1.850	0	0	655	1118	4.679	1	790	7.460
3	88	2015	4	2015	4	11.410	7.460	3.000	11	0	265	655	4.623	2	597	11.410
3	89	2015	5	2015	5	2.070	11.410	7.460	152	11	61	265	4.750	21	294	2.070
3	90	2015	6	2015	6	5.640	2.070	11.410	280	152	18	61	5.059	134	96	5.640
3	91	2015	7	2015	7	9.660	5.640	2.070	341	280	0	18	5.287	272	5	9.660
3	92	2015	8	2015	8	2.190	9.660	5.640	247	341	0	0	5.409	363	0	2.190
3	93	2015	9	2015	9	2.720	2.190	9.660	193	247	16	0	4.852	327	0	2.720
3	94	2015	10	2015	10	3.450	2.720	2.190	17	193	242	16	3.985	198	28	3.450
3	95	2015	11	2015	11	3.230	3.450	2.720	3	17	440	242	4.113	48	228	3.230
3	96	2015	12	2015	12	7.220	3.230	3.450	0	3	501	440	3.603	3	583	7.220
4	97	2016	1	2016	1	1.240	7.220	3.230	0	0	1025	501	4.028	0	764	1.240
4	98	2016	2	2016	2	4.460	1.240	7.220	0	0	775	1025	4.036	0	977	4.460
4	99	2016	3	2016	3	2.800	4.460	1.240	2	0	402	775	4.679	1	790	2.800
4	100	2016	4	2016	4	3.310	2.800	4.460	24	2	267	402	4.623	2	597	3.310
4	101	2016	5	2016	5	6.490	3.310	2.800	81	24	142	267	4.750	21	294	6.490
4	102	2016	6	2016	6	4.560	6.490	3.310	305	81	1	142	5.059	134	96	4.560
4	103	2016	7	2016	7	4.980	4.560	6.490	411	305	0	1	5.287	272	5	4.980
4	104	2016	8	2016	8	6.540	4.980	4.560	424	411	0	0	5.409	363	0	6.540
4	105	2016	9	2016	9	1.670	6.540	4.980	265	424	18	0	4.852	327	0	1.670
4	106	2016	10	2016	10	0.830	1.670	6.540	76	265	120	18	3.985	198	28	0.830

Kentucky American Water Company

Residential WEATHER DATA

							Rain	Rain		CDD		HDD	Normalized weight weather ("offset" averages)			Actual Wea
Period	Obs	Year	Month	Year	Month	Rain	Lag 1	Lag 2	CDD	Lag 1	HDD	Lag 1	Rain	CDD	HDD	Rain
4	107	2016	11	2016	11	1.340	0.830	1.670	14	76	458	120	4.113	48	228	1.340
4	108	2016	12	2016	12	6.180	1.340	0.830	0	14	862	458	3.603	3	583	6.180
5	109	2017	1	2017	1	4.720	6.180	1.340	0	0	767	862	4.028	0	764	4.720
5	110	2017	2	2017	2	3.390	4.720	6.180	3	0	511	767	4.036	0	977	3.390
5	111	2017	3	2017	3	3.290	3.390	4.720	5	3	537	511	4.679	1	790	3.290
5	112	2017	4	2017	4	1.850	3.290	3.390	62	5	138	537	4.623	2	597	1.850
5	113	2017	5	2017	5	5.640	1.850	3.290	119	62	102	138	4.750	21	294	5.640
5	114	2017	6	2017	6	5.780	5.640	1.850	235	119	6	102	5.059	134	96	5.780
5	115	2017	7	2017	7	5.240	5.780	5.640	379	235	0	6	5.287	272	5	5.240
5	116	2017	8	2017	8	5.070	5.240	5.780	249	379	0	0	5.409	363	0	5.070
5	117	2017	9	2017	9	3.740	5.070	5.240	140	249	38	0	4.852	327	0	3.740
5	118	2017	10	2017	10	5.760	3.740	5.070	55	140	221	38	3.985	198	28	5.760
5	119	2017	11	2017	11	2.350	5.760	3.740	6	55	535	221	4.113	48	228	2.350
5	120	2017	12	2017	12	2.380	2.350	5.760	0	6	931	535	3.603	3	583	2.380
6	121	2018	1	2018	1	2.090	2.380	2.350	0	0	1052	931	4.028	0	764	2.090
6	122	2018	2	2018	2	10.140	2.090	2.380	7	0	569	1052	4.036	0	977	10.140
6	123	2018	3	2018	3	5.320	10.140	2.090	0	7	680	569	4.679	1	790	5.320
6	124	2018	4	2018	4	4.340	5.320	10.140	7	0	429	680	4.623	2	597	4.340
6	125	2018	5	2018	5	7.500	4.340	5.320	250	7	7	429	4.750	21	294	7.500
6	126	2018	6	2018	6	4.340	7.500	4.340	324	250	0	7	5.059	134	96	4.340
6	127	2018	7	2018	7	4.420	4.340	7.500	370	324	0	0	5.287	272	5	4.420
6	128	2018	8	2018	8	5.210	4.420	4.340	348	370	0	0	5.409	363	0	5.210
6	129	2018	9	2018	9	10.430	5.210	4.420	263	348	18	0	4.852	327	0	10.430
6	130	2018	10	2018	10	7.350	10.430	5.210	123	263	291	18	3.985	198	28	7.350
6	131	2018	11	2018	11	4.830	7.350	10.430	0	123	688	291	4.113	48	228	4.830
6	132	2018	12	2018	12	4.700	4.830	7.350	0	0	733	688	3.603	3	583	4.700
7	133	2019	1	2019	1	4.360	4.700	4.830	0	0	966	733	4.028	0	764	4.360
7	134	2019	2	2019	2	7.390	4.360	4.700	0	0	629	966	4.036	0	977	7.390
7	135	2019	3	2019	3	2.880	7.390	4.360	2	0	685	629	4.679	1	790	2.880
7	136	2019	4	2019	4	4.400	2.880	7.390	25	2	202	685	4.623	2	597	4.400
7	137	2019	5	2019	5	4.370	4.400	2.880	178	25	54	202	4.750	21	294	4.370
7	138	2019	6	2019	6	7.440	4.370	4.400	238	178	12	54	5.059	134	96	7.440
7	139	2019	7	2019	7	3.540	7.440	4.370	427	238	0	12	5.287	272	5	3.540
7	140	2019	8	2019	8	2.160	3.540	7.440	396	427	0	0	5.409	363	0	2.160
7	141	2019	9	2019	9	0.000	2.160	3.540	374	396	0	0	4.852	327	0	0.000
7	142	2019	10	2019	10	7.830	0.000	2.160	73	374	186	0	3.985	198	28	7.830
7	143	2019	11	2019	11	5.730	7.830	0.000	0	73	674	186	4.113	48	228	5.730
7	144	2019	12	2019	12	5.970	5.730	7.830	0	0	655	674	3.603	3	583	5.970
8	145	2020	1	2020	1	3.610	5.970	5.730	0	0	730	655	4.028	0	764	3.610
8	146	2020	2	2020	2	4.870	3.610	5.970	0	0	821	730	4.036	0	977	4.870
8	147	2020	3	2020	3	4.960	4.870	3.610	7	0	481	821	4.679	1	790	4.960
8	148	2020	4	2020	4	4.930	4.960	4.870	2	7	423	481	4.623	2	597	4.930
8	149	2020	5	2020	5	5.120	4.930	4.960	83	2	194	423	4.750	21	294	5.120
8	150	2020	6	2020	6	2.940	5.120	4.930	218	83	7	194	5.059	134	96	2.940
8	151	2020	7	2020	7	4.080	2.940	5.120	408	218	0	7	5.287	272	5	4.080
8	152	2020	8	2020	8	3.570	4.080	2.940	283	408	0	0	5.409	363	0	3.570

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Period	Obs	Year	Month	Year	Month	Rain	Rain Lag 1	Rain Lag 2	CDD	CDD Lag 1	HDD	HDD Lag 1	Normalized weight weather ("offset" averages Rain	CDD	HDD	Actual Wea Rain
8	153	2020	9	2020	9	4.210	3.570	4.080	116	283	61	0	4.852	327	0	4.210
8	154	2020	10	2020	10	4.350	4.210	3.570	9	116	281	61	3.985	198	28	4.350
8	155	2020	11	2020	11	2.310	4.350	4.210	2	9	501	281	4.113	48	228	2.310
8	156	2020	12	2020	12	2.590	2.310	4.350	0	2	913	501	3.603	3	583	2.590
9	157	2021	1	2021	1	4.790	2.590	2.310	0	0	966	913	4.028	0	764	4.790
9	158	2021	2	2021	2	4.570	4.790	2.590	0	0	960	966	4.036	0	977	4.570
9	159	2021	3	2021	3	4.730	4.570	4.790	0	0	511	960	4.679	1	790	4.730
9	160	2021	4	2021	4	2.710	4.730	4.570	9	0	382	511	4.623	2	597	2.710
9	161	2021	5	2021	5	4.790	2.710	4.730	71	9	190	382	4.750	21	294	4.790
9	162	2021	6	2021	6	6.700	4.790	2.710	237	71	9	190	5.059	134	96	6.700
9	163	2021	7	2021	7	4.820	6.700	4.790	297	237	0	9	5.287	272	5	4.820
9	164	2021	8	2021	8	7.490	4.820	6.700	328	297	0	0	5.409	363	0	7.490
9	165	2021	9	2021	9	3.150	7.490	4.820	132	328	33	0	4.852	327	0	3.150
9	166	2021	10	2021	10	6.580	3.150	7.490	49	132	178	33	3.985	198	28	6.580
9	167	2021	11	2021	11	2.080	6.580	3.150	0	49	596	178	4.113	48	228	2.080
9	168	2021	12	2021	12	4.590	2.080	6.580	0	0	577	596	3.603	3	583	4.590
10	169	2022	1	2022	1	5.260	4.590	2.080	0	0	1126	577	4.028	0	764	5.260
10	170	2022	2	2022	2	7.690	5.260	4.590	0	0	760	1126	4.036	0	977	7.690
10	171	2022	3	2022	3	4.270	7.690	5.260	0	0	510	760	4.679	1	790	4.270
10	172	2022	4	2022	4	3.720	4.270	7.690	29	0	326	510	4.623	2	597	3.720
10	173	2022	5	2022	5	3.840	3.720	4.270	149	29	35	326	4.750	21	294	3.840
10	174	2022	6	2022	6	2.110	3.840	3.720	327	149	0	35	5.059	134	96	2.110
10	175	2022	7	2022	7	6.460	2.110	3.840	445	327	0	0	5.287	272	5	6.460
10	176	2022	8	2022	8	4.270	6.460	2.110	349	445	0	0	5.409	363	0	4.270
10	177	2022	9	2022	9	1.500	4.270	6.460	173	349	50	0	4.852	327	0	1.500
10	178	2022	10	2022	10	0.960	1.500	4.270	11	173	265	50	3.985	198	28	0.960
10	179	2022	11	2022	11	2.100	0.960	1.500	4	11	524	265	4.113	48	228	2.100
10	180	2022	12	2022	12	3.460	2.100	0.960	0	4	816	524	3.603	3	583	3.460
11	181	2023	1	2023	1	0.000	3.460	2.100	0	0	0	0	4.028	0	764	4.028
11	182	2023	2	2023	2	0.000	0.000	3.460	0	0	0	0	4.036	0	977	4.036
11	183	2023	3	2023	3	0.000	0.000	0.000	0	0	0	0	4.679	1	790	4.679
11	184	2023	4	2023	4	0.000	0.000	0.000	0	0	0	0	4.623	2	597	4.623
11	185	2023	5	2023	5	0.000	0.000	0.000	0	0	0	0	4.750	21	294	4.750
11	186	2023	6	2023	6	0.000	0.000	0.000	0	0	0	0	5.059	134	96	5.059
11	187	2023	7	2023	7	0.000	0.000	0.000	0	0	0	0	5.287	272	5	5.287
11	188	2023	8	2023	8	0.000	0.000	0.000	0	0	0	0	5.409	363	0	5.409
11	189	2023	9	2023	9	0.000	0.000	0.000	0	0	0	0	4.852	327	0	4.852
11	190	2023	10	2023	10	0.000	0.000	0.000	0	0	0	0	3.985	198	28	3.985
11	191	2023	11	2023	11	0.000	0.000	0.000	0	0	0	0	4.113	48	228	4.113
11	192	2023	12	2023	12	0.000	0.000	0.000	0	0	0	0	3.603	3	583	3.603
12	193	2024	1	2024	1	0.000	0.000	0.000	0	0	0	0	4.028	0	764	4.028
12	194	2024	2	2024	2	0.000	0.000	0.000	0	0	0	0	4.036	0	977	4.036
12	195	2024	3	2024	3	0.000	0.000	0.000	0	0	0	0	4.679	1	790	4.679
12	196	2024	4	2024	4	0.000	0.000	0.000	0	0	0	0	4.623	2	597	4.623
12	197	2024	5	2024	5	0.000	0.000	0.000	0	0	0	0	4.750	21	294	4.750
12	198	2024	6	2024	6	0.000	0.000	0.000	0	0	0	0	5.059	134	96	5.059

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Period	Obs	Year	Month	Year	Month	Rain	Rain Lag 1	Rain Lag 2	CDD	CDD Lag 1	HDD	HDD Lag 1	Normalized weight weather ("offset" averages) Rain	CDD	HDD	Actual Wea Rain
12	199	2024	7	2024	7	0.000	0.000	0.000	0	0	0	0	5.287	272	5	5.287
12	200	2024	8	2024	8	0.000	0.000	0.000	0	0	0	0	5.409	363	0	5.409
12	201	2024	9	2024	9	0.000	0.000	0.000	0	0	0	0	4.852	327	0	4.852
12	202	2024	10	2024	10	0.000	0.000	0.000	0	0	0	0	3.985	198	28	3.985
12	203	2024	11	2024	11	0.000	0.000	0.000	0	0	0	0	4.113	48	228	4.113
12	204	2024	12	2024	12	0.000	0.000	0.000	0	0	0	0	3.603	3	583	3.603

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			ather		
Period	Obs	Year	Month	CDD	HDD
1	61	2013	1	0	911
1	62	2013	2	0	837
1	63	2013	3	0	789
1	64	2013	4	28	300
1	65	2013	5	120	83
1	66	2013	6	261	0
1	67	2013	7	296	0
1	68	2013	8	310	3
1	69	2013	9	159	20
1	70	2013	10	42	269
1	71	2013	11	0	648
1	72	2013	12	0	835
2	73	2014	1	0	1181
2	74	2014	2	0	915
2	75	2014	3	0	721
2	76	2014	4	13	212
2	77	2014	5	139	92
2	78	2014	6	297	0
2	79	2014	7	260	2
2	80	2014	8	337	0
2	81	2014	9	161	30
2	82	2014	10	25	226
2	83	2014	11	0	764
2	84	2014	12	0	817
3	85	2015	1	0	1049
3	86	2015	2	0	1118
3	87	2015	3	0	655
3	88	2015	4	11	265
3	89	2015	5	152	61
3	90	2015	6	280	18
3	91	2015	7	341	0
3	92	2015	8	247	0
3	93	2015	9	193	16
3	94	2015	10	17	242
3	95	2015	11	3	440
3	96	2015	12	0	501
4	97	2016	1	0	1025
4	98	2016	2	0	775
4	99	2016	3	2	402
4	100	2016	4	24	267
4	101	2016	5	81	142
4	102	2016	6	305	1
4	103	2016	7	411	0
4	104	2016	8	424	0
4	105	2016	9	265	18
4	106	2016	10	76	120

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			ather		
Period	Obs	Year	Month	CDD	HDD
4	107	2016	11	14	458
4	108	2016	12	0	862
5	109	2017	1	0	767
5	110	2017	2	3	511
5	111	2017	3	5	537
5	112	2017	4	62	138
5	113	2017	5	119	102
5	114	2017	6	235	6
5	115	2017	7	379	0
5	116	2017	8	249	0
5	117	2017	9	140	38
5	118	2017	10	55	221
5	119	2017	11	6	535
5	120	2017	12	0	931
6	121	2018	1	0	1052
6	122	2018	2	7	569
6	123	2018	3	0	680
6	124	2018	4	7	429
6	125	2018	5	250	7
6	126	2018	6	324	0
6	127	2018	7	370	0
6	128	2018	8	348	0
6	129	2018	9	263	18
6	130	2018	10	123	291
6	131	2018	11	0	688
6	132	2018	12	0	733
7	133	2019	1	0	966
7	134	2019	2	0	629
7	135	2019	3	2	685
7	136	2019	4	25	202
7	137	2019	5	178	54
7	138	2019	6	238	12
7	139	2019	7	427	0
7	140	2019	8	396	0
7	141	2019	9	374	0
7	142	2019	10	73	186
7	143	2019	11	0	674
7	144	2019	12	0	655
8	145	2020	1	0	730
8	146	2020	2	0	821
8	147	2020	3	7	481
8	148	2020	4	2	423
8	149	2020	5	83	194
8	150	2020	6	218	7
8	151	2020	7	408	0
8	152	2020	8	283	0

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			ıther		
Period	Obs	Year	Month	CDD	HDD
8	153	2020	9	116	61
8	154	2020	10	9	281
8	155	2020	11	2	501
8	156	2020	12	0	913
9	157	2021	1	0	966
9	158	2021	2	0	960
9	159	2021	3	0	511
9	160	2021	4	9	382
9	161	2021	5	71	190
9	162	2021	6	237	9
9	163	2021	7	297	0
9	164	2021	8	328	0
9	165	2021	9	132	33
9	166	2021	10	49	178
9	167	2021	11	0	596
9	168	2021	12	0	577
10	169	2022	1	0	1126
10	170	2022	2	0	760
10	171	2022	3	0	510
10	172	2022	4	29	326
10	173	2022	5	149	35
10	174	2022	6	327	0
10	175	2022	7	445	0
10	176	2022	8	349	0
10	177	2022	9	173	50
10	178	2022	10	11	265
10	179	2022	11	4	524
10	180	2022	12	0	816
11	181	2023	1	0	764
11	182	2023	2	0	977
11	183	2023	3	1	790
11	184	2023	4	2	597
11	185	2023	5	21	294
11	186	2023	6	134	96
11	187	2023	7	272	5
11	188	2023	8	363	0
11	189	2023	9	327	0
11	190	2023	10	198	28
11	191	2023	11	48	228
11	192	2023	12	3	583
12	193	2024	1	0	764
12	194	2024	2	0	977
12	195	2024	3	1	790
12	196	2024	4	2	597
12	197	2024	5	21	294
12	198	2024	6	134	96

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			ather		
Period	Obs	Year	Month	CDD	HDD
12	199	2024	7	272	5
12	200	2024	8	363	0
12	201	2024	9	327	0
12	202	2024	10	198	28
12	203	2024	11	48	228
12	204	2024	12	3	583

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					Differences from Normal				10-Year Averages			Differences Lag			Normalized Weight D
Period	Obs	Year	Month	Rain	CDD	HDD		Rain	CDD	HDD	Rain Lag 1	Rain Lag 2	CDD Lag	HDD Lag	Rain	CDD
1	61	2013	1	0.991	0	-66		3.47	0	977	1.963	-1.119	0	-44	0.559	0
1	62	2013	2	-3.647	-1	48		5.18	1	790	0.991	1.963	0	-66	-1.141	-1
1	63	2013	3	0.955	-2	192		4.40	2	597	-3.647	0.991	-1	48	0.284	-1
1	64	2013	4	0.125	7	6		4.76	21	294	0.955	-3.647	-2	192	-0.132	-19
1	65	2013	5	0.568	-14	-13		5.09	134	96	0.125	0.955	7	6	-0.342	-113
1	66	2013	6	2.276	-11	-5		5.26	272	5	0.568	0.125	-14	-13	-0.205	-138
1	67	2013	7	3.547	-67	0		5.55	363	0	2.276	0.568	-11	-5	-0.266	-91
1	68	2013	8	0.018	-17	3		5.12	327	0	3.547	2.276	-67	0	0.287	36
1	69	2013	9	-1.710	-39	-8		3.34	198	28	0.018	3.547	-17	3	1.512	130
1	70	2013	10	1.448	-6	41		4.78	48	228	-1.710	0.018	-39	-8	-0.797	150
1	71	2013	11	-0.429	-3	65		2.88	3	583	1.448	-1.710	-6	41	1.234	45
1	72	2013	12	0.983	0	71		4.60	0	764	-0.429	1.448	-3	65	-0.994	3
2	73	2014	1	-1.159	0	204					0.983	-0.429	0	71	0.559	0
2	74	2014	2	-0.447	-1	126			Rain Lag Calculations		-1.159	0.983	0	204	-1.141	-1
2	75	2014	3	-1.505	-2	124		Rain Lag Ca	CDD Lag	HDD Lag	-0.447	-1.159	-1	126	0.284	-1
2	76	2014	4	1.245	-8	-82	Nov-12	1.76			-1.505	-0.447	-2	124	-0.132	-19
2	77	2014	5	0.348	5	-4	Dec-12	6.56	0	720	1.245	-1.505	-8	-82	-0.342	-113
2	78	2014	6	0.326	25	-5					0.348	1.245	5	-4	-0.205	-138
2	79	2014	7	-2.323	-103	2					0.326	0.348	25	-5	-0.266	-91
2	80	2014	8	4.458	10	0					-2.323	0.326	-103	2	0.287	36
2	81	2014	9	1.010	-37	2					4.458	-2.323	10	0	1.512	130
2	82	2014	10	-0.302	-23	-2					1.010	4.458	-37	2	-0.797	150
2	83	2014	11	-0.509	-3	181					-0.302	1.010	-23	-2	1.234	45
2	84	2014	12	-1.297	0	53					-0.509	-0.302	-3	181	-0.994	3
3	85	2015	1	-1.619	0	72					-1.297	-0.509	0	53	0.559	0
3	86	2015	2	-2.177	-1	329					-1.619	-1.297	0	72	-1.141	-1
3	87	2015	3	3.065	-2	58					-2.177	-1.619	-1	329	0.284	-1
3	88	2015	4	6.655	-10	-29					3.065	-2.177	-2	58	-0.132	-19
3	89	2015	5	-3.022	18	-35					6.655	3.065	-10	-29	-0.342	-113
3	90	2015	6	0.376	8	13					-3.022	6.655	18	-35	-0.205	-138
3	91	2015	7	4.107	-22	0					0.376	-3.022	8	13	-0.266	-91
3	92	2015	8	-2.932	-80	0					4.107	0.376	-22	0	0.287	36
3	93	2015	9	-0.620	-5	-12					-2.932	4.107	-80	0	1.512	130
3	94	2015	10	-1.332	-31	14					-0.620	-2.932	-5	-12	-0.797	150
3	95	2015	11	0.351	0	-143					-1.332	-0.620	-31	14	1.234	45
3	96	2015	12	2.623	0	-263					0.351	-1.332	0	-143	-0.994	3
4	97	2016	1	-2.229	0	48					2.623	0.351	0	-263	0.559	0
4	98	2016	2	-0.717	-1	-15					-2.229	2.623	0	48	-1.141	-1
4	99	2016	3	-1.595	0	-195					-0.717	-2.229	-1	-15	0.284	-1
4	100	2016	4	-1.445	3	-27					-1.595	-0.717	0	-195	-0.132	-19
4	101	2016	5	1.398	-53	46					-1.445	-1.595	3	-27	-0.342	-113
4	102	2016	6	-0.704	33	-4					1.398	-1.445	-53	46	-0.205	-138
4	103	2016	7	-0.573	48	0					-0.704	1.398	33	-4	-0.266	-91
4	104	2016	8	1.418	97	0					-0.573	-0.704	48	0	0.287	36
4	105	2016	9	-1.670	67	-10					1.418	-0.573	97	0	1.512	130
4	106	2016	10	-3.952	28	-108					-1.670	1.418	67	-10	-0.797	150

Kentucky American Water Company
Residential

				Differences from Normal			10-Year Averages			Differences Lag				Normalized Weight D	
Period	Obs	Year	Month	Rain	CDD	HDD	Rain	CDD	HDD	Rain Lag 1	Rain Lag 2	CDD Lag	HDD Lag	Rain	CDD
4	107	2016	11	-1.539	11	-125				-3.952	-1.670	28	-108	1.234	45
4	108	2016	12	1.583	0	98				-1.539	-3.952	11	-125	-0.994	3
5	109	2017	1	1.251	0	-210				1.583	-1.539	0	98	0.559	0
5	110	2017	2	-1.787	2	-279				1.251	1.583	0	-210	-1.141	-1
5	111	2017	3	-1.105	3	-60				-1.787	1.251	2	-279	0.284	-1
5	112	2017	4	-2.905	41	-156				-1.105	-1.787	3	-60	-0.132	-19
5	113	2017	5	0.548	-15	6				-2.905	-1.105	41	-156	-0.342	-113
5	114	2017	6	0.516	-37	1				0.548	-2.905	-15	6	-0.205	-138
5	115	2017	7	-0.313	16	0				0.516	0.548	-37	1	-0.266	-91
5	116	2017	8	-0.052	-78	0				-0.313	0.516	16	0	0.287	36
5	117	2017	9	0.400	-58	10				-0.052	-0.313	-78	0	1.512	130
5	118	2017	10	0.978	7	-7				0.400	-0.052	-58	10	-0.797	150
5	119	2017	11	-0.529	3	-48				0.978	0.400	7	-7	1.234	45
5	120	2017	12	-2.217	0	167				-0.529	0.978	3	-48	-0.994	3
6	121	2018	1	-1.379	0	75				-2.217	-0.529	0	167	0.559	0
6	122	2018	2	4.963	6	-221				-1.379	-2.217	0	75	-1.141	-1
6	123	2018	3	0.925	-2	83				4.963	-1.379	6	-221	0.284	-1
6	124	2018	4	-0.415	-14	135				0.925	4.963	-2	83	-0.132	-19
6	125	2018	5	2.408	116	-89				-0.415	0.925	-14	135	-0.342	-113
6	126	2018	6	-0.924	52	-5				2.408	-0.415	116	-89	-0.205	-138
6	127	2018	7	-1.133	7	0				-0.924	2.408	52	-5	-0.266	-91
6	128	2018	8	0.088	21	0				-1.133	-0.924	7	0	0.287	36
6	129	2018	9	7.090	65	-10				0.088	-1.133	21	0	1.512	130
6	130	2018	10	2.568	75	63				7.090	0.088	65	-10	-0.797	150
6	131	2018	11	1.951	-3	105				2.568	7.090	75	63	1.234	45
6	132	2018	12	0.103	0	-31				1.951	2.568	-3	105	-0.994	3
7	133	2019	1	0.891	0	-11				0.103	1.951	0	-31	0.559	0
7	134	2019	2	2.213	-1	-161				0.891	0.103	0	-11	-1.141	-1
7	135	2019	3	-1.515	0	88				2.213	0.891	-1	-161	0.284	-1
7	136	2019	4	-0.355	4	-92				-1.515	2.213	0	88	-0.132	-19
7	137	2019	5	-0.722	44	-42				-0.355	-1.515	4	-92	-0.342	-113
7	138	2019	6	2.176	-34	7				-0.722	-0.355	44	-42	-0.205	-138
7	139	2019	7	-2.013	64	0				2.176	-0.722	-34	7	-0.266	-91
7	140	2019	8	-2.962	69	0				-2.013	2.176	64	0	0.287	36
7	141	2019	9	-3.340	176	-28				-2.962	-2.013	69	0	1.512	130
7	142	2019	10	3.048	25	-42				-3.340	-2.962	176	-28	-0.797	150
7	143	2019	11	2.851	-3	91				3.048	-3.340	25	-42	1.234	45
7	144	2019	12	1.373	0	-109				2.851	3.048	-3	91	-0.994	3
8	145	2020	1	0.141	0	-247				1.373	2.851	0	-109	0.559	0
8	146	2020	2	-0.307	-1	32				0.141	1.373	0	-247	-1.141	-1
8	147	2020	3	0.565	5	-116				-0.307	0.141	-1	32	0.284	-1
8	148	2020	4	0.175	-19	129				0.565	-0.307	5	-116	-0.132	-19
8	149	2020	5	0.028	-51	98				0.175	0.565	-19	129	-0.342	-113
8	150	2020	6	-2.324	-54	2				0.028	0.175	-51	98	-0.205	-138
8	151	2020	7	-1.473	45	0				-2.324	0.028	-54	2	-0.266	-91
8	152	2020	8	-1.552	-44	0				-1.473	-2.324	45	0	0.287	36

Kentucky American Water Company
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				Differences from Normal			10-Year Averages			Differences Lag				Normalized Weight D	
Period	Obs	Year	Month	Rain	CDD	HDD	Rain	CDD	HDD	Rain Lag 1	Rain Lag 2	CDD Lag	HDD Lag	Rain	CDD
8	153	2020	9	0.870	-82	33				-1.552	-1.473	-44	0	1.512	130
8	154	2020	10	-0.432	-39	53				0.870	-1.552	-82	33	-0.797	150
8	155	2020	11	-0.569	-1	-82				-0.432	0.870	-39	53	1.234	45
8	156	2020	12	-2.007	0	149				-0.569	-0.432	-1	-82	-0.994	3
9	157	2021	1	1.321	0	-11				-2.007	-0.569	0	149	0.559	0
9	158	2021	2	-0.607	-1	171				1.321	-2.007	0	-11	-1.141	-1
9	159	2021	3	0.335	-2	-86				-0.607	1.321	-1	171	0.284	-1
9	160	2021	4	-2.045	-12	88				0.335	-0.607	-2	-86	-0.132	-19
9	161	2021	5	-0.302	-63	94				-2.045	0.335	-12	88	-0.342	-113
9	162	2021	6	1.436	-35	4				-0.302	-2.045	-63	94	-0.205	-138
9	163	2021	7	-0.733	-66	0				1.436	-0.302	-35	4	-0.266	-91
9	164	2021	8	2.368	1	0				-0.733	1.436	-66	0	0.287	36
9	165	2021	9	-0.190	-66	5				2.368	-0.733	1	0	1.512	130
9	166	2021	10	1.798	1	-50				-0.190	2.368	-66	5	-0.797	150
9	167	2021	11	-0.799	-3	13				1.798	-0.190	1	-50	1.234	45
9	168	2021	12	-0.007	0	-187				-0.799	1.798	-3	13	-0.994	3
10	169	2022	1	1.791	0	149				-0.007	-0.799	0	-187	0.559	0
10	170	2022	2	2.513	-1	-30				1.791	-0.007	0	149	-1.141	-1
10	171	2022	3	-0.125	-2	-87				2.513	1.791	-1	-30	0.284	-1
10	172	2022	4	-1.035	8	32				-0.125	2.513	-2	-87	-0.132	-19
10	173	2022	5	-1.252	15	-61				-1.035	-0.125	8	32	-0.342	-113
10	174	2022	6	-3.154	55	-5				-1.252	-1.035	15	-61	-0.205	-138
10	175	2022	7	0.907	82	0				-3.154	-1.252	55	-5	-0.266	-91
10	176	2022	8	-0.852	22	0				0.907	-3.154	82	0	0.287	36
10	177	2022	9	-1.840	-25	22				-0.852	0.907	22	0	1.512	130
10	178	2022	10	-3.822	-37	37				-1.840	-0.852	-25	22	-0.797	150
10	179	2022	11	-0.779	1	-59				-3.822	-1.840	-37	37	1.234	45
10	180	2022	12	-1.137	0	52				-0.779	-3.822	1	-59	-0.994	3
11	181	2023	1	0.559	0	-213				-1.137	-0.779	0	52	0.559	0
11	182	2023	2	-1.141	-1	188				0.559	-1.137	0	-213	-1.141	-1
11	183	2023	3	0.284	-1	192				-1.141	0.559	-1	188	0.284	-1
11	184	2023	4	-0.132	-19	303				0.284	-1.141	-1	192	-0.132	-19
11	185	2023	5	-0.342	-113	198				-0.132	0.284	-19	303	-0.342	-113
11	186	2023	6	-0.205	-138	91				-0.342	-0.132	-113	198	-0.205	-138
11	187	2023	7	-0.266	-91	5				-0.205	-0.342	-138	91	-0.266	-91
11	188	2023	8	0.287	36	0				-0.266	-0.205	-91	5	0.287	36
11	189	2023	9	1.512	130	-28				0.287	-0.266	36	0	1.512	130
11	190	2023	10	-0.797	150	-200				1.512	0.287	130	-28	-0.797	150
11	191	2023	11	1.234	45	-355				-0.797	1.512	150	-200	1.234	45
11	192	2023	12	-0.994	3	-181				1.234	-0.797	45	-355	-0.994	3
12	193	2024	1	0.559	0	-213				-0.994	1.234	3	-181	0.559	0
12	194	2024	2	-1.141	-1	188				0.559	-0.994	0	-213	-1.141	-1
12	195	2024	3	0.284	-1	192				-1.141	0.559	-1	188	0.284	-1
12	196	2024	4	-0.132	-19	303				0.284	-1.141	-1	192	-0.132	-19
12	197	2024	5	-0.342	-113	198				-0.132	0.284	-19	303	-0.342	-113
12	198	2024	6	-0.205	-138	91				-0.342	-0.132	-113	198	-0.205	-138

Kentucky American Water Company
Residential

				Differences from Normal			10-Year Averages			Differences Lag				Normalized Weight D	
Period	Obs	Year	Month	Rain	CDD	HDD	Rain	CDD	HDD	Rain Lag 1	Rain Lag 2	CDD Lag	HDD Lag	Rain	CDD
12	199	2024	7	-0.266	-91	5				-0.205	-0.342	-138	91	-0.266	-91
12	200	2024	8	0.287	36	0				-0.266	-0.205	-91	5	0.287	36
12	201	2024	9	1.512	130	-28				0.287	-0.266	36	0	1.512	130
12	202	2024	10	-0.797	150	-200				1.512	0.287	130	-28	-0.797	150
12	203	2024	11	1.234	45	-355				-0.797	1.512	150	-200	1.234	45
12	204	2024	12	-0.994	3	-181				1.234	-0.797	45	-355	-0.994	3

Kentucky American Water Company
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Period	Obs	Year	Month	ifferences HDD
1	61	2013	1	-213
1	62	2013	2	188
1	63	2013	3	192
1	64	2013	4	303
1	65	2013	5	198
1	66	2013	6	91
1	67	2013	7	5
1	68	2013	8	0
1	69	2013	9	-28
1	70	2013	10	-200
1	71	2013	11	-355
1	72	2013	12	-181
2	73	2014	1	-213
2	74	2014	2	188
2	75	2014	3	192
2	76	2014	4	303
2	77	2014	5	198
2	78	2014	6	91
2	79	2014	7	5
2	80	2014	8	0
2	81	2014	9	-28
2	82	2014	10	-200
2	83	2014	11	-355
2	84	2014	12	-181
3	85	2015	1	-213
3	86	2015	2	188
3	87	2015	3	192
3	88	2015	4	303
3	89	2015	5	198
3	90	2015	6	91
3	91	2015	7	5
3	92	2015	8	0
3	93	2015	9	-28
3	94	2015	10	-200
3	95	2015	11	-355
3	96	2015	12	-181
4	97	2016	1	-213
4	98	2016	2	188
4	99	2016	3	192
4	100	2016	4	303
4	101	2016	5	198
4	102	2016	6	91
4	103	2016	7	5
4	104	2016	8	0
4	105	2016	9	-28
4	106	2016	10	-200

Kentucky American Water Company
Residential

				ifferences
Period	Obs	Year	Month	HDD
4	107	2016	11	-355
4	108	2016	12	-181
5	109	2017	1	-213
5	110	2017	2	188
5	111	2017	3	192
5	112	2017	4	303
5	113	2017	5	198
5	114	2017	6	91
5	115	2017	7	5
5	116	2017	8	0
5	117	2017	9	-28
5	118	2017	10	-200
5	119	2017	11	-355
5	120	2017	12	-181
6	121	2018	1	-213
6	122	2018	2	188
6	123	2018	3	192
6	124	2018	4	303
6	125	2018	5	198
6	126	2018	6	91
6	127	2018	7	5
6	128	2018	8	0
6	129	2018	9	-28
6	130	2018	10	-200
6	131	2018	11	-355
6	132	2018	12	-181
7	133	2019	1	-213
7	134	2019	2	188
7	135	2019	3	192
7	136	2019	4	303
7	137	2019	5	198
7	138	2019	6	91
7	139	2019	7	5
7	140	2019	8	0
7	141	2019	9	-28
7	142	2019	10	-200
7	143	2019	11	-355
7	144	2019	12	-181
8	145	2020	1	-213
8	146	2020	2	188
8	147	2020	3	192
8	148	2020	4	303
8	149	2020	5	198
8	150	2020	6	91
8	151	2020	7	5
8	152	2020	8	0

Kentucky American Water Company
Residential

				ifferences
Period	Obs	Year	Month	HDD
8	153	2020	9	-28
8	154	2020	10	-200
8	155	2020	11	-355
8	156	2020	12	-181
9	157	2021	1	-213
9	158	2021	2	188
9	159	2021	3	192
9	160	2021	4	303
9	161	2021	5	198
9	162	2021	6	91
9	163	2021	7	5
9	164	2021	8	0
9	165	2021	9	-28
9	166	2021	10	-200
9	167	2021	11	-355
9	168	2021	12	-181
10	169	2022	1	-213
10	170	2022	2	188
10	171	2022	3	192
10	172	2022	4	303
10	173	2022	5	198
10	174	2022	6	91
10	175	2022	7	5
10	176	2022	8	0
10	177	2022	9	-28
10	178	2022	10	-200
10	179	2022	11	-355
10	180	2022	12	-181
11	181	2023	1	-213
11	182	2023	2	188
11	183	2023	3	192
11	184	2023	4	303
11	185	2023	5	198
11	186	2023	6	91
11	187	2023	7	5
11	188	2023	8	0
11	189	2023	9	-28
11	190	2023	10	-200
11	191	2023	11	-355
11	192	2023	12	-181
12	193	2024	1	-213
12	194	2024	2	188
12	195	2024	3	192
12	196	2024	4	303
12	197	2024	5	198
12	198	2024	6	91

Kentucky American Water Company

Residential

				ifferences
Period	Obs	Year	Month	HDD
12	199	2024	7	5
12	200	2024	8	0
12	201	2024	9	-28
12	202	2024	10	-200
12	203	2024	11	-355
12	204	2024	12	-181

Kentucky American Water Company
Commercial

Period	Obs	Year	Month	Cust	Sales	UPC	0.4542 Jan	-0.0295 Feb	-0.9856 Mar	0.7407 Apr	1.1147 May	6.3956 Jun	9.2042 Jul	9.7763 Aug	9.9504 Sep	9.3795 Oct
1	61	2013	1	8,864	251,945	28.423	1	0	0	0	0	0	0	0	0	0
1	62	2013	2	8,863	272,502	30.746	0	1	0	0	0	0	0	0	0	0
1	63	2013	3	8,874	268,888	30.301	0	0	1	0	0	0	0	0	0	0
1	64	2013	4	8,893	262,279	29.493	0	0	0	1	0	0	0	0	0	0
1	65	2013	5	8,846	240,263	27.161	0	0	0	0	1	0	0	0	0	0
1	66	2013	6	8,843	365,046	41.281	0	0	0	0	0	1	0	0	0	0
1	67	2013	7	8,854	339,430	38.336	0	0	0	0	0	0	1	0	0	0
1	68	2013	8	8,979	351,075	39.100	0	0	0	0	0	0	0	1	0	0
1	69	2013	9	8,988	332,194	36.960	0	0	0	0	0	0	0	0	1	0
1	70	2013	10	8,957	315,866	35.265	0	0	0	0	0	0	0	0	0	1
1	71	2013	11	8,923	293,449	32.887	0	0	0	0	0	0	0	0	0	0
1	72	2013	12	8,920	266,267	29.851	0	0	0	0	0	0	0	0	0	0
2	73	2014	1	8,917	308,935	34.646	1	0	0	0	0	0	0	0	0	0
2	74	2014	2	8,894	313,008	35.193	0	1	0	0	0	0	0	0	0	0
2	75	2014	3	8,869	273,784	30.870	0	0	1	0	0	0	0	0	0	0
2	76	2014	4	8,872	294,882	33.237	0	0	0	1	0	0	0	0	0	0
2	77	2014	5	8,884	263,329	29.641	0	0	0	0	1	0	0	0	0	0
2	78	2014	6	8,882	343,810	38.709	0	0	0	0	0	1	0	0	0	0
2	79	2014	7	8,884	332,078	37.379	0	0	0	0	0	0	1	0	0	0
2	80	2014	8	8,946	340,803	38.096	0	0	0	0	0	0	0	1	0	0
2	81	2014	9	8,950	337,470	37.706	0	0	0	0	0	0	0	0	1	0
2	82	2014	10	8,927	374,847	41.990	0	0	0	0	0	0	0	0	0	1
2	83	2014	11	8,908	247,863	27.825	0	0	0	0	0	0	0	0	0	0
2	84	2014	12	8,910	266,053	29.860	0	0	0	0	0	0	0	0	0	0
3	85	2015	1	8,902	293,149	32.931	1	0	0	0	0	0	0	0	0	0
3	86	2015	2	8,901	250,618	28.156	0	1	0	0	0	0	0	0	0	0
3	87	2015	3	8,903	286,757	32.209	0	0	1	0	0	0	0	0	0	0
3	88	2015	4	8,902	318,071	35.730	0	0	0	1	0	0	0	0	0	0
3	89	2015	5	8,912	306,489	34.391	0	0	0	0	1	0	0	0	0	0
3	90	2015	6	8,925	359,653	40.297	0	0	0	0	0	1	0	0	0	0
3	91	2015	7	8,945	360,509	40.303	0	0	0	0	0	0	1	0	0	0
3	92	2015	8	8,950	355,492	39.720	0	0	0	0	0	0	0	1	0	0
3	93	2015	9	8,947	380,412	42.518	0	0	0	0	0	0	0	0	1	0
3	94	2015	10	8,937	384,177	42.987	0	0	0	0	0	0	0	0	0	1
3	95	2015	11	8,943	323,138	36.133	0	0	0	0	0	0	0	0	0	0
3	96	2015	12	8,931	272,577	30.520	0	0	0	0	0	0	0	0	0	0
4	97	2016	1	8,942	289,610	32.388	1	0	0	0	0	0	0	0	0	0
4	98	2016	2	8,944	271,968	30.408	0	1	0	0	0	0	0	0	0	0
4	99	2016	3	8,974	287,139	31.997	0	0	1	0	0	0	0	0	0	0
4	100	2016	4	9,000	302,784	33.643	0	0	0	1	0	0	0	0	0	0
4	101	2016	5	9,016	297,687	33.018	0	0	0	0	1	0	0	0	0	0
4	102	2016	6	9,020	335,616	37.208	0	0	0	0	0	1	0	0	0	0
4	103	2016	7	9,030	366,416	40.578	0	0	0	0	0	0	1	0	0	0
4	104	2016	8	9,064	377,696	41.670	0	0	0	0	0	0	0	1	0	0
4	105	2016	9	9,042	393,311	43.498	0	0	0	0	0	0	0	0	1	0
4	106	2016	10	9,022	373,340	41.381	0	0	0	0	0	0	0	0	0	1

4	107	2016	11	9,000	339,859	37.762	0	0	0	0	0	0	0	0	0	0
4	108	2016	12	9,005	300,158	33.332	0	0	0	0	0	0	0	0	0	0
5	109	2017	1	8,996	215,394	23.943	1	0	0	0	0	0	0	0	0	0
5	110	2017	2	9,001	340,140	37.789	0	1	0	0	0	0	0	0	0	0
5	111	2017	3	9,013	263,204	29.203	0	0	1	0	0	0	0	0	0	0
5	112	2017	4	9,072	270,993	29.871	0	0	0	1	0	0	0	0	0	0
5	113	2017	5	9,088	309,894	34.099	0	0	0	0	1	0	0	0	0	0
5	114	2017	6	9,106	356,416	39.141	0	0	0	0	0	1	0	0	0	0
5	115	2017	7	9,111	380,671	41.781	0	0	0	0	0	0	1	0	0	0
5	116	2017	8	9,126	370,939	40.646	0	0	0	0	0	0	0	1	0	0
5	117	2017	9	9,128	388,526	42.564	0	0	0	0	0	0	0	0	1	0
5	118	2017	10	9,103	335,198	36.823	0	0	0	0	0	0	0	0	0	1
5	119	2017	11	9,090	317,267	34.903	0	0	0	0	0	0	0	0	0	0
5	120	2017	12	9,083	274,098	30.177	0	0	0	0	0	0	0	0	0	0
6	121	2018	1	9,075	298,651	32.909	1	0	0	0	0	0	0	0	0	0
6	122	2018	2	9,080	271,150	29.862	0	1	0	0	0	0	0	0	0	0
6	123	2018	3	9,071	257,712	28.411	0	0	1	0	0	0	0	0	0	0
6	124	2018	4	9,086	285,279	31.398	0	0	0	1	0	0	0	0	0	0
6	125	2018	5	9,109	293,694	32.242	0	0	0	0	1	0	0	0	0	0
6	126	2018	6	9,121	353,762	38.785	0	0	0	0	0	1	0	0	0	0
6	127	2018	7	9,117	356,290	39.080	0	0	0	0	0	0	1	0	0	0
6	128	2018	8	9,134	378,743	41.465	0	0	0	0	0	0	0	1	0	0
6	129	2018	9	9,118	359,368	39.413	0	0	0	0	0	0	0	0	1	0
6	130	2018	10	9,100	338,999	37.253	0	0	0	0	0	0	0	0	0	1
6	131	2018	11	9,082	304,450	33.522	0	0	0	0	0	0	0	0	0	0
6	132	2018	12	9,064	267,152	29.474	0	0	0	0	0	0	0	0	0	0
7	133	2019	1	9,053	284,950	31.476	1	0	0	0	0	0	0	0	0	0
7	134	2019	2	9,060	272,440	30.071	0	1	0	0	0	0	0	0	0	0
7	135	2019	3	9,048	255,026	28.186	0	0	1	0	0	0	0	0	0	0
7	136	2019	4	9,087	268,143	29.508	0	0	0	1	0	0	0	0	0	0
7	137	2019	5	9,106	313,500	34.428	0	0	0	0	1	0	0	0	0	0
7	138	2019	6	9,122	343,454	37.651	0	0	0	0	0	1	0	0	0	0
7	139	2019	7	9,143	336,316	36.784	0	0	0	0	0	0	1	0	0	0
7	140	2019	8	9,165	398,499	43.481	0	0	0	0	0	0	0	1	0	0
7	141	2019	9	9,179	389,141	42.395	0	0	0	0	0	0	0	0	1	0
7	142	2019	10	9,208	426,010	46.265	0	0	0	0	0	0	0	0	0	1
7	143	2019	11	9,180	332,217	36.189	0	0	0	0	0	0	0	0	0	0
7	144	2019	12	9,161	296,200	32.333	0	0	0	0	0	0	0	0	0	0
8	145	2020	1	9,176	291,551	31.773	1	0	0	0	0	0	0	0	0	0
8	146	2020	2	9,179	251,012	27.346	0	1	0	0	0	0	0	0	0	0
8	147	2020	3	9,192	274,296	29.841	0	0	1	0	0	0	0	0	0	0
8	148	2020	4	9,173	253,820	27.670	0	0	0	1	0	0	0	0	0	0
8	149	2020	5	9,184	234,769	25.563	0	0	0	0	1	0	0	0	0	0
8	150	2020	6	9,216	270,759	29.379	0	0	0	0	0	1	0	0	0	0
8	151	2020	7	9,230	392,441	42.518	0	0	0	0	0	0	1	0	0	0
8	152	2020	8	9,239	377,524	40.862	0	0	0	0	0	0	0	1	0	0
8	153	2020	9	9,245	383,335	41.464	0	0	0	0	0	0	0	0	1	0
8	154	2020	10	9,239	341,736	36.988	0	0	0	0	0	0	0	0	0	1
8	155	2020	11	9,194	295,889	32.183	0	0	0	0	0	0	0	0	0	0
8	156	2020	12	9,192	255,771	27.825	0	0	0	0	0	0	0	0	0	0

9	157	2021	1	9,195	291,537	31.706	1	0	0	0	0	0	0	0	0	0
9	158	2021	2	9,180	256,712	27.964	0	1	0	0	0	0	0	0	0	0
9	159	2021	3	9,198	262,312	28.518	0	0	1	0	0	0	0	0	0	0
9	160	2021	4	9,233	294,075	31.850	0	0	0	1	0	0	0	0	0	0
9	161	2021	5	9,268	306,781	33.101	0	0	0	0	1	0	0	0	0	0
9	162	2021	6	9,283	316,768	34.123	0	0	0	0	0	1	0	0	0	0
9	163	2021	7	9,307	374,380	40.226	0	0	0	0	0	0	1	0	0	0
9	164	2021	8	9,323	360,155	38.631	0	0	0	0	0	0	0	1	0	0
9	165	2021	9	9,329	382,407	40.991	0	0	0	0	0	0	0	0	1	0
9	166	2021	10	9,311	342,192	36.751	0	0	0	0	0	0	0	0	0	1
9	167	2021	11	9,290	321,936	34.654	0	0	0	0	0	0	0	0	0	0
9	168	2021	12	9,290	296,028	31.865	0	0	0	0	0	0	0	0	0	0
10	169	2022	1	9,289	306,483	32.994	1	0	0	0	0	0	0	0	0	0
10	170	2022	2	9,324	287,806	30.867	0	1	0	0	0	0	0	0	0	0
10	171	2022	3	9,352	274,562	29.359	0	0	1	0	0	0	0	0	0	0
10	172	2022	4	9,368	301,878	32.224	0	0	0	1	0	0	0	0	0	0
10	173	2022	5	9,408	327,147	34.773	0	0	0	0	1	0	0	0	0	0
10	174	2022	6	9,421	326,925	34.702	0	0	0	0	0	1	0	0	0	0
10	175	2022	7	9,414	399,414	42.428	0	0	0	0	0	0	1	0	0	0
10	176	2022	8	9,430	391,479	41.514	0	0	0	0	0	0	0	1	0	0
10	177	2022	9	9,442	372,642	39.466	0	0	0	0	0	0	0	0	1	0
10	178	2022	10	9,442	430,691	45.614	0	0	0	0	0	0	0	0	0	1
10	179	2022	11	9,394	333,577	35.510	0	0	0	0	0	0	0	0	0	0
10	180	2022	12	9,399	304,401	32.387	0	0	0	0	0	0	0	0	0	0
11	181	2023	1	9,397	298,936	31.811	1	0	0	0	0	0	0	0	0	0
11	182	2023	2	9,406	294,700	31.333	0	1	0	0	0	0	0	0	0	0
11	183	2023	3	9,430	286,485	30.382	0	0	1	0	0	0	0	0	0	0
11	184	2023	4	9,438	301,521	31.946	0	0	0	1	0	0	0	0	0	0
11	185	2023	5	9,442	293,440	31.077	0	0	0	0	1	0	0	0	0	0
11	186	2023	6	9,414	338,821	35.993	0	0	0	0	0	1	0	0	0	0
11	187	2023	7	9,414	371,420	39.456	0	0	0	0	0	0	1	0	0	0
11	188	2023	8	9,414	391,051	41.542	0	0	0	0	0	0	0	1	0	0
11	189	2023	9	9,414	401,168	42.616	0	0	0	0	0	0	0	0	1	0
11	190	2023	10	9,414	405,971	43.126	0	0	0	0	0	0	0	0	0	1
11	191	2023	11	9,414	328,783	34.927	0	0	0	0	0	0	0	0	0	0
11	192	2023	12	9,414	295,705	31.413	0	0	0	0	0	0	0	0	0	0
12	193	2024	1	9,414	300,028	31.872	1	0	0	0	0	0	0	0	0	0
12	194	2024	2	9,414	295,523	31.394	0	1	0	0	0	0	0	0	0	0
12	195	2024	3	9,414	286,571	30.443	0	0	1	0	0	0	0	0	0	0
12	196	2024	4	9,414	301,300	32.007	0	0	0	1	0	0	0	0	0	0
12	197	2024	5	9,414	293,116	31.138	0	0	0	0	1	0	0	0	0	0
12	198	2024	6	9,414	339,393	36.054	0	0	0	0	0	1	0	0	0	0
12	199	2024	7	9,414	371,992	39.517	0	0	0	0	0	0	1	0	0	0
12	200	2024	8	9,414	391,624	41.602	0	0	0	0	0	0	0	1	0	0
12	201	2024	9	9,414	401,740	42.677	0	0	0	0	0	0	0	0	1	0
12	202	2024	10	9,414	406,543	43.187	0	0	0	0	0	0	0	0	0	1
12	203	2024	11	9,414	329,356	34.988	0	0	0	0	0	0	0	0	0	0
12	204	2024	12	9,414	296,278	31.474	0	0	0	0	0	0	0	0	0	0

Rain Lag 2	0.0	CDD Lag
Rain Lag 1	0.8	0.8

3.3994	0.0051	-0.3139	0.0166	-1.5805				Weather	Billing
Nov	Trend	Rain (Diff)	CDD (Diff)	COVID	Predicted	Actual	Variance	Effect	Adjustments
0	-119	0.000	0	0	31.203	28.423	2.780	0.000	0
0	-118	0.000	0	0	30.725	30.746	-0.021	0.000	0
0	-117	0.000	0	0	29.774	30.301	-0.527	0.000	0
0	-116	0.789	0	0	31.259	29.493	1.767	-0.079	0
0	-115	0.214	3	0	31.863	27.161	4.702	1.394	0
0	-114	0.910	-14	0	36.659	41.281	-4.621	1.274	0
0	-113	2.530	-22	0	38.818	38.336	0.482	-0.030	0
0	-112	2.841	-57	0	38.719	39.100	-0.380	-2.214	0
0	-111	-0.328	-21	0	40.489	36.960	3.529	-1.520	0
0	-110	-1.078	-32	0	39.982	35.265	4.717	-2.537	0
1	-109	1.073	-5	0	33.773	32.887	0.887	-0.545	0
0	-108	0.000	0	0	30.805	29.851	0.954	0.000	0
0	-107	0.000	0	0	31.264	34.646	-3.381	0.000	0
0	-106	0.000	0	0	30.786	35.193	-4.408	0.000	0
0	-105	0.000	0	0	29.835	30.870	-1.035	0.000	0
0	-104	-0.955	-3	0	31.818	33.237	-1.419	0.419	0
0	-103	1.066	-5	0	31.520	29.641	1.880	0.990	0
0	-102	0.344	9	0	37.269	38.709	-1.440	1.823	0
0	-101	-0.204	-1	0	40.095	37.379	2.715	1.186	0
0	-100	-0.967	-81	0	39.588	38.096	1.493	-1.406	0
0	-99	3.768	1	0	39.628	37.706	1.922	-2.441	0
0	-98	0.748	-34	0	39.439	41.990	-2.551	-3.140	0
1	-97	-0.343	-19	0	34.054	27.825	6.229	-0.326	0
0	-96	0.000	0	0	30.866	29.860	1.006	0.000	0
0	-95	0.000	0	0	31.325	32.931	-1.606	0.000	0
0	-94	0.000	0	0	30.846	28.156	2.690	0.000	0
0	-93	0.000	0	0	29.895	32.209	-2.314	0.000	0
0	-92	3.783	-3	0	30.385	35.730	-5.346	-1.075	0
0	-91	4.720	-4	0	30.451	34.391	-3.940	-0.140	0
0	-90	-2.342	16	0	38.289	40.297	-2.008	2.782	0
0	-89	1.122	2	0	39.782	40.303	-0.521	0.812	0
0	-88	2.699	-34	0	39.273	39.720	-0.447	-1.782	0
0	-87	-2.470	-65	0	40.561	42.518	-1.958	-1.569	0
0	-86	-0.762	-10	0	40.372	42.987	-2.616	-2.268	0
1	-85	-0.995	-25	0	34.223	36.133	-1.910	-0.217	0
0	-84	0.000	0	0	30.927	30.520	0.406	0.000	0
0	-83	0.000	0	0	31.386	32.388	-1.002	0.000	0
0	-82	0.000	0	0	30.907	30.408	0.499	0.000	0
0	-81	0.000	0	0	29.956	31.997	-2.041	0.000	0
0	-80	-1.565	1	0	32.194	33.643	-1.449	0.673	0
0	-79	-0.876	-8	0	32.205	33.018	-0.812	1.554	0
0	-78	0.978	-36	0	36.449	37.208	-0.759	0.882	0
0	-77	-0.678	36	0	40.971	40.578	0.394	1.941	0
0	-76	-0.175	57	0	41.750	41.670	0.080	0.634	0
0	-75	0.800	91	0	42.178	43.498	-1.320	-0.012	0
0	-74	-2.126	60	0	42.010	41.381	0.629	-0.691	0

1	-73	-3.469	25	0	35.879	37.762	-1.884	1.377	0
0	-72	0.000	0	0	30.987	33.332	-2.345	0.000	0
0	-71	0.000	0	0	31.447	23.943	7.503	0.000	0
0	-70	0.000	0	0	30.968	37.789	-6.821	0.000	0
0	-69	0.000	0	0	30.017	29.203	0.814	0.000	0
0	-68	-1.465	11	0	32.389	29.871	2.518	0.807	0
0	-67	-2.214	30	0	33.315	34.099	-0.784	2.603	0
0	-66	0.542	-20	0	36.919	39.141	-2.222	1.290	0
0	-65	0.350	-27	0	39.676	41.781	-2.106	0.585	0
0	-64	-0.261	-3	0	40.834	40.646	0.188	-0.343	0
0	-63	0.038	-74	0	39.746	42.564	-2.818	-2.506	0
0	-62	0.516	-45	0	39.516	36.823	2.693	-3.246	0
1	-61	0.677	6	0	34.333	34.903	-0.570	-0.229	0
0	-60	0.000	0	0	31.048	30.177	0.871	0.000	0
0	-59	0.000	0	0	31.507	32.909	-1.402	0.000	0
0	-58	0.000	0	0	31.029	29.862	1.166	0.000	0
0	-57	0.000	0	0	30.078	28.411	1.667	0.000	0
0	-56	0.657	-4	0	31.535	31.398	0.138	-0.107	0
0	-55	0.150	12	0	32.339	32.242	0.097	1.566	0
0	-54	1.742	103	0	38.633	38.785	-0.152	2.944	0
0	-53	-0.966	43	0	41.299	39.080	2.219	2.147	0
0	-52	-0.889	9	0	41.301	41.465	-0.165	0.063	0
0	-51	1.488	30	0	41.070	39.413	1.657	-1.242	0
0	-50	6.186	67	0	39.651	37.253	2.399	-3.171	0
1	-49	2.445	59	0	34.720	33.522	1.197	0.097	0
0	-48	0.000	0	0	31.109	29.474	1.635	0.000	0
0	-47	0.000	0	0	31.568	31.476	0.092	0.000	0
0	-46	0.000	0	0	31.090	30.071	1.019	0.000	0
0	-45	0.000	0	0	30.139	28.186	1.953	0.000	0
0	-44	-1.283	1	0	32.291	29.508	2.783	0.588	0
0	-43	-0.428	12	0	32.581	34.428	-1.846	1.748	0
0	-42	-0.142	28	0	38.047	37.651	0.395	2.297	0
0	-41	1.338	-15	0	39.686	36.784	2.902	0.473	0
0	-40	-2.203	65	0	42.688	43.481	-0.793	1.390	0
0	-39	-3.038	90	0	43.556	42.395	1.161	1.183	0
0	-38	-2.062	146	0	43.606	46.265	-2.659	0.723	0
1	-37	3.009	19	0	33.941	36.189	-2.248	-0.742	0
0	-36	0.000	0	0	31.170	32.333	-1.163	0.000	0
0	-35	0.000	0	0	31.629	31.773	-0.144	0.000	0
0	-34	0.000	0	0	31.150	27.346	3.804	0.000	0
0	-33	0.000	0	0	30.199	29.841	0.359	0.000	0
0	-32	0.487	1	1	30.206	27.670	2.536	0.022	0
0	-31	0.146	-25	1	30.262	25.563	4.699	0.948	0
0	-30	-0.442	-52	1	35.296	29.379	5.917	1.066	0
0	-29	-2.154	-34	1	38.935	42.518	-3.583	1.241	0
0	-28	-1.489	27	1	40.318	40.862	-0.544	0.540	0
0	-27	-1.068	-52	1	39.066	41.464	-2.398	-1.787	0
0	-26	0.610	-73	1	37.618	36.988	0.629	-3.746	0
1	-25	-0.459	-31	1	32.669	32.183	0.486	-0.495	0
0	-24	0.000	0	1	29.650	27.825	1.825	0.000	0

0	-23	0.000	0	1	30.109	31.706	-1.597	0.000	0
0	-22	0.000	0	1	29.631	27.964	1.666	0.000	0
0	-21	0.000	0	1	28.680	28.518	0.161	0.000	0
0	-20	-0.141	-4	1	30.394	31.850	-1.456	0.150	0
0	-19	-1.696	-22	1	30.954	33.101	-2.147	1.579	0
0	-18	0.046	-58	1	35.108	34.123	0.984	0.817	0
0	-17	1.002	-41	1	37.889	40.226	-2.337	0.135	0
0	-16	-0.113	-53	1	38.625	38.631	-0.005	-1.214	0
0	-15	1.856	-12	1	38.858	40.991	-2.133	-2.056	0
0	-14	0.208	-52	1	38.149	36.751	1.398	-3.275	0
1	-13	1.279	0	1	32.707	34.654	-1.947	-0.517	0
0	-12	0.000	0	1	29.711	31.865	-2.154	0.000	0
0	-11	0.000	0	0	31.751	32.994	-1.244	0.000	0
0	-10	0.000	0	0	31.272	30.867	0.405	0.000	0
0	-9	0.000	0	0	30.321	29.359	0.962	0.000	0
0	-8	-0.307	0	0	32.154	32.224	-0.070	0.268	0
0	-7	-1.078	9	0	32.925	34.773	-1.848	1.909	0
0	-6	-1.632	23	0	38.607	34.702	3.906	2.675	0
0	-5	-2.342	60	0	42.262	42.428	-0.165	2.867	0
0	-4	0.555	70	0	42.087	41.514	0.573	0.607	0
0	-3	-1.050	13	0	41.825	39.466	2.359	-0.730	0
0	-2	-2.236	-27	0	40.975	45.614	-4.639	-2.090	0
1	-1	-3.213	-29	0	35.269	35.510	-0.241	0.403	0
0	0	0.000	0	0	31.352	32.387	-1.034	0.000	0
0	1	0.000	0	0	31.811				
0	2	0.000	0	0	31.333				
0	3	0.000	0	0	30.382				
0	4	-0.288	-16	0	31.946				
0	5	-0.270	-91	0	31.077				
0	6	-0.138	-110	0	35.993				
0	7	-0.231	-73	0	39.456				
0	8	0.345	29	0	41.542				
0	9	1.426	104	0	42.616				
0	10	-1.154	120	0	43.126				
1	11	1.522	36	0	34.927				
0	12	0.000	0	0	31.413				
0	13	0.000	0	0	31.872				
0	14	0.000	0	0	31.394				
0	15	0.000	0	0	30.443				
0	16	-0.288	-16	0	32.007				
0	17	-0.270	-91	0	31.138				
0	18	-0.138	-110	0	36.054				
0	19	-0.231	-73	0	39.517				
0	20	0.345	29	0	41.602				
0	21	1.426	104	0	42.677				
0	22	-1.154	120	0	43.187				
1	23	1.522	36	0	34.988				
0	24	0.000	0	0	31.474				

REGRESSION MODEL

SUMMARY OUTPUT

Regression Statistics	
Multiple R	0.8792
R Square	0.7730
Adjusted R Square	0.7402
Standard Error	2.5440
Observations	120

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	15.00	2292.0020	152.8001	23.6088	7.58753E-27
Residual	104.00	673.1063	6.4722		
Total	119.00	2965.1083			

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*
Intercept	31.3521	0.9731	32.2197	0.0000	29.4225	33.2817
Jan	0.4542	1.1406	0.3982	0.6913	-1.8077	2.7160
Feb	-0.0295	1.1403	-0.0259	0.9794	-2.2907	2.2317
Mar	-0.9856	1.1400	-0.8645	0.3893	-3.2463	1.2751
Apr	0.7407	1.1397	0.6499	0.5172	-1.5193	3.0006
May	1.1147	1.1392	0.9785	0.3301	-1.1444	3.3738
Jun	6.3956	1.1388	5.6160	0.0000	4.1373	8.6539
Jul	9.2042	1.1385	8.0846	0.0000	6.9465	11.4618
Aug	9.7763	1.1382	8.5891	0.0000	7.5191	12.0334
Sep	9.9504	1.1380	8.7437	0.0000	7.6937	12.2071
Oct	9.3795	1.1379	8.2432	0.0000	7.1231	11.6360
Nov	3.3994	1.1378	2.9878	0.0035	1.1432	5.6556
Trend	0.0051	0.0083	0.6130	0.5412	-0.0113	0.0215
Rain (Diff)	-0.3139	0.1643	-1.9104	0.0588	-0.6398	0.0119
CDD (Diff)	0.0166	0.0074	2.2300	0.0279	0.0018	0.0313
COVID	-1.5805	0.7765	-2.0354	0.0444	-3.1204	-0.0407

0.729574198

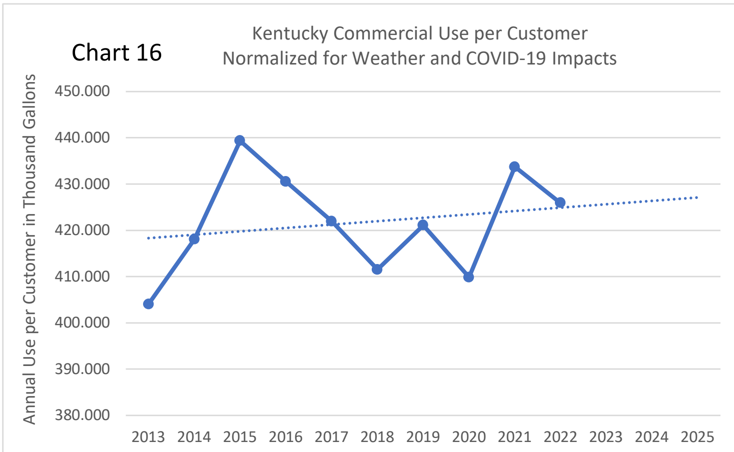
Year	Predicted	Actual	% Change
2019	430.362	428.766	
2020	406.998	393.413	-5.43%
2021	400.815	410.382	-1.52%
2022	430.801	431.838	7.48%
2023	425.622		-1.20%
2024	426.352		0.17%

Year	UPC	Weather	COVID	Norm. UPC
2013	399.80	(4.26)	-	404.059

Seasonal toggle

Month	Sum. Wea.	Win. Wea.
1	0	1
2	0	1
3	0	1
4	1	0
5	1	0
6	1	0
7	1	0
8	1	0
9	1	0
10	1	0
11	1	0
12	0	0

2014	415.15	(2.90)	-	418.047
2015	435.90	(3.46)	-	439.354
2016	436.88	6.36	-	430.525
2017	420.94	(1.04)	-	421.979
2018	413.81	2.30	-	411.517
2019	428.77	7.66	-	421.108
2020	393.41	(2.21)	(14.22)	409.849
2021	410.38	(4.38)	(18.97)	433.730
2022	431.84	5.91	-	425.930
2023				
2024				
2025				



CUSTOMER DATA

Year	Month	Cust	Growth	Select
2013	1	8864	0	0
2013	2	8863	-1	0
2013	3	8874	11	0
2013	4	8893	19	0
2013	5	8846	-47	0
2013	6	8843	-3	0
2013	7	8854	11	0
2013	8	8979	125	0
2013	9	8988	9	0
2013	10	8957	-31	0
2013	11	8923	-34	0
2013	12	8920	-3	0
2014	1	8917	-3	0
2014	2	8894	-23	0
2014	3	8869	-25	0
2014	4	8872	3	0
2014	5	8884	12	0
2014	6	8882	-2	0
2014	7	8884	2	0
2014	8	8946	62	0
2014	9	8950	4	0
2014	10	8927	-23	0
2014	11	8908	-19	0
2014	12	8910	2	0
2015	1	8902	-8	0
2015	2	8901	-1	0
2015	3	8903	2	0
2015	4	8902	-1	0
2015	5	8912	10	0
2015	6	8925	13	0
2015	7	8945	20	0
2015	8	8950	5	0
2015	9	8947	-3	0
2015	10	8937	-10	0
2015	11	8943	6	0
2015	12	8931	-12	0
2016	1	8942	11	0
2016	2	8944	2	0
2016	3	8974	30	0
2016	4	9000	26	0
2016	5	9016	16	0
2016	6	9020	4	0
2016	7	9030	10	0
2016	8	9064	34	0
2016	9	9042	-22	0
2016	10	9022	-20	0

2016	11	9000	-22	0
2016	12	9005	5	0
2017	1	8996	-9	1
2017	2	9001	5	1
2017	3	9013	12	1
2017	4	9072	59	1
2017	5	9088	16	1
2017	6	9106	18	1
2017	7	9111	5	1
2017	8	9126	15	1
2017	9	9128	2	1
2017	10	9103	-25	1
2017	11	9090	-13	1
2017	12	9083	-7	1
2018	1	9075	-8	1
2018	2	9080	5	1
2018	3	9071	-9	1
2018	4	9086	15	1
2018	5	9109	23	1
2018	6	9121	12	1
2018	7	9117	-4	1
2018	8	9134	17	1
2018	9	9118	-16	1
2018	10	9100	-18	1
2018	11	9082	-18	1
2018	12	9064	-18	1
2019	1	9053	-11	1
2019	2	9060	7	1
2019	3	9048	-12	1
2019	4	9087	39	1
2019	5	9106	19	1
2019	6	9122	16	1
2019	7	9143	21	1
2019	8	9165	22	1
2019	9	9179	14	1
2019	10	9208	29	1
2019	11	9180	-28	1
2019	12	9161	-19	1
2020	1	9176	15	1
2020	2	9179	3	1
2020	3	9192	13	1
2020	4	9173	-19	1
2020	5	9184	11	1
2020	6	9216	32	1
2020	7	9230	14	1
2020	8	9239	9	1
2020	9	9245	6	1
2020	10	9239	-6	1
2020	11	9194	-45	1
2020	12	9192	-2	1

2021	1	9195	3	1
2021	2	9180	-15	1
2021	3	9198	18	1
2021	4	9233	35	1
2021	5	9268	35	1
2021	6	9283	15	1
2021	7	9307	24	1
2021	8	9323	16	1
2021	9	9329	6	1
2021	10	9311	-18	1
2021	11	9290	-21	1
2021	12	9290	0	1
2022	1	9289	-1	1
2022	2	9324	35	1
2022	3	9352	28	1
2022	4	9368	16	1
2022	5	9408	40	1
2022	6	9421	13	1
2022	7	9414	-7	1
2022	8	9430	16	1
2022	9	9442	12	1
2022	10	9442	0	1
2022	11	9394	-48	1
2022	12	9399	5	1
2023	1	9397	-2	
2023	2	9406	8	
2023	3	9430	24	
2023	4	9438	9	
2023	5	9442	4	
2023	6	9414	-29	
2023	7	9414	0	
2023	8	9414	0	
2023	9	9414	0	
2023	10	9414	0	
2023	11	9414	0	
2023	12	9414	0	
2024	1	9414	0	
2024	2	9414	0	
2024	3	9414	0	
2024	4	9414	0	
2024	5	9414	0	
2024	6	9414	0	
2024	7	9414	0	
2024	8	9414	0	
2024	9	9414	0	
2024	10	9414	0	
2024	11	9414	0	
2024	12	9414	0	

Month	Avg Growth Last 60 Months
1	-2
2	7
3	8
4	24
5	24
6	18
7	9
8	16
9	4
10	-6
11	-29
12	-7

WEATHER DATA

Year	Month	Rain	Rain Lag 1	Rain Lag 2	CDD	CDD Lag 1	HDD	HDD Lag 1
2013	1	4.460	6.560	1.760	0	0		
2013	2	1.530	4.460	6.560	0	0		
2013	3	5.350	1.530	4.460	0	0		
2013	4	4.880	5.350	1.530	28	0		
2013	5	5.660	4.880	5.350	120	28		
2013	6	7.540	5.660	4.880	261	120		
2013	7	9.100	7.540	5.660	296	261		
2013	8	5.140	9.100	7.540	310	296		
2013	9	1.630	5.140	9.100	159	310		
2013	10	6.230	1.630	5.140	42	159		
2013	11	2.450	6.230	1.630	0	42		
2013	12	5.580	2.450	6.230	0	0		
2014	1	2.310	5.580	2.450	0	0		
2014	2	4.730	2.310	5.580	0	0		
2014	3	2.890	4.730	2.310	0	0		
2014	4	6.000	2.890	4.730	13	0		
2014	5	5.440	6.000	2.890	139	13		
2014	6	5.590	5.440	6.000	297	139		
2014	7	3.230	5.590	5.440	260	297		
2014	8	9.580	3.230	5.590	337	260		
2014	9	4.350	9.580	3.230	161	337		
2014	10	4.480	4.350	9.580	25	161		
2014	11	2.370	4.480	4.350	0	25		
2014	12	3.300	2.370	4.480	0	0		
2015	1	1.850	3.300	2.370	0	0		
2015	2	3.000	1.850	3.300	0	0		
2015	3	7.460	3.000	1.850	0	0		
2015	4	11.410	7.460	3.000	11	0		
2015	5	2.070	11.410	7.460	152	11		
2015	6	5.640	2.070	11.410	280	152		
2015	7	9.660	5.640	2.070	341	280		
2015	8	2.190	9.660	5.640	247	341		
2015	9	2.720	2.190	9.660	193	247		
2015	10	3.450	2.720	2.190	17	193		
2015	11	3.230	3.450	2.720	3	17		
2015	12	7.220	3.230	3.450	0	3		
2016	1	1.240	7.220	3.230	0	0		
2016	2	4.460	1.240	7.220	0	0		
2016	3	2.800	4.460	1.240	2	0		
2016	4	3.310	2.800	4.460	24	2		
2016	5	6.490	3.310	2.800	81	24		
2016	6	4.560	6.490	3.310	305	81		
2016	7	4.980	4.560	6.490	411	305		
2016	8	6.540	4.980	4.560	424	411		
2016	9	1.670	6.540	4.980	265	424		
2016	10	0.830	1.670	6.540	76	265		

2016	11	1.340	0.830	1.670	14	76
2016	12	6.180	1.340	0.830	0	14
2017	1	4.720	6.180	1.340	0	0
2017	2	3.390	4.720	6.180	3	0
2017	3	3.290	3.390	4.720	5	3
2017	4	1.850	3.290	3.390	62	5
2017	5	5.640	1.850	3.290	119	62
2017	6	5.780	5.640	1.850	235	119
2017	7	5.240	5.780	5.640	379	235
2017	8	5.070	5.240	5.780	249	379
2017	9	3.740	5.070	5.240	140	249
2017	10	5.760	3.740	5.070	55	140
2017	11	2.350	5.760	3.740	6	55
2017	12	2.380	2.350	5.760	0	6
2018	1	2.090	2.380	2.350	0	0
2018	2	10.140	2.090	2.380	7	0
2018	3	5.320	10.140	2.090	0	7
2018	4	4.340	5.320	10.140	7	0
2018	5	7.500	4.340	5.320	250	7
2018	6	4.340	7.500	4.340	324	250
2018	7	4.420	4.340	7.500	370	324
2018	8	5.210	4.420	4.340	348	370
2018	9	10.430	5.210	4.420	263	348
2018	10	7.350	10.430	5.210	123	263
2018	11	4.830	7.350	10.430	0	123
2018	12	4.700	4.830	7.350	0	0
2019	1	4.360	4.700	4.830	0	0
2019	2	7.390	4.360	4.700	0	0
2019	3	2.880	7.390	4.360	2	0
2019	4	4.400	2.880	7.390	25	2
2019	5	4.370	4.400	2.880	178	25
2019	6	7.440	4.370	4.400	238	178
2019	7	3.540	7.440	4.370	427	238
2019	8	2.160	3.540	7.440	396	427
2019	9	0.000	2.160	3.540	374	396
2019	10	7.830	0.000	2.160	73	374
2019	11	5.730	7.830	0.000	0	73
2019	12	5.970	5.730	7.830	0	0
2020	1	3.610	5.970	5.730	0	0
2020	2	4.870	3.610	5.970	0	0
2020	3	4.960	4.870	3.610	7	0
2020	4	4.930	4.960	4.870	2	7
2020	5	5.120	4.930	4.960	83	2
2020	6	2.940	5.120	4.930	218	83
2020	7	4.080	2.940	5.120	408	218
2020	8	3.570	4.080	2.940	283	408
2020	9	4.210	3.570	4.080	116	283
2020	10	4.350	4.210	3.570	9	116
2020	11	2.310	4.350	4.210	2	9
2020	12	2.590	2.310	4.350	0	2

2021	1	4.790	2.590	2.310	0	0
2021	2	4.570	4.790	2.590	0	0
2021	3	4.730	4.570	4.790	0	0
2021	4	2.710	4.730	4.570	9	0
2021	5	4.790	2.710	4.730	71	9
2021	6	6.700	4.790	2.710	237	71
2021	7	4.820	6.700	4.790	297	237
2021	8	7.490	4.820	6.700	328	297
2021	9	3.150	7.490	4.820	132	328
2021	10	6.580	3.150	7.490	49	132
2021	11	2.080	6.580	3.150	0	49
2021	12	4.590	2.080	6.580	0	0
2022	1	5.260	4.590	2.080	0	0
2022	2	7.690	5.260	4.590	0	0
2022	3	4.270	7.690	5.260	0	0
2022	4	3.720	4.270	7.690	29	0
2022	5	3.840	3.720	4.270	149	29
2022	6	2.110	3.840	3.720	327	149
2022	7	6.460	2.110	3.840	445	327
2022	8	4.270	6.460	2.110	349	445
2022	9	1.500	4.270	6.460	173	349
2022	10	0.960	1.500	4.270	11	173
2022	11	2.100	0.960	1.500	4	11
2022	12	3.460	2.100	0.960	0	4
2023	1	0.000	3.460	2.100	0	0
2023	2	0.000	0.000	3.460	0	0
2023	3	0.000	0.000	0.000	0	0
2023	4	0.000	0.000	0.000	0	0
2023	5	0.000	0.000	0.000	0	0
2023	6	0.000	0.000	0.000	0	0
2023	7	0.000	0.000	0.000	0	0
2023	8	0.000	0.000	0.000	0	0
2023	9	0.000	0.000	0.000	0	0
2023	10	0.000	0.000	0.000	0	0
2023	11	0.000	0.000	0.000	0	0
2023	12	0.000	0.000	0.000	0	0
2024	1	0.000	0.000	0.000	0	0
2024	2	0.000	0.000	0.000	0	0
2024	3	0.000	0.000	0.000	0	0
2024	4	0.000	0.000	0.000	0	0
2024	5	0.000	0.000	0.000	0	0
2024	6	0.000	0.000	0.000	0	0
2024	7	0.000	0.000	0.000	0	0
2024	8	0.000	0.000	0.000	0	0
2024	9	0.000	0.000	0.000	0	0
2024	10	0.000	0.000	0.000	0	0
2024	11	0.000	0.000	0.000	0	0
2024	12	0.000	0.000	0.000	0	0

Normalized weight weather ("offset" averages)			Actual Weather			Differences from Normal		
Rain	CDD	HDD	Rain	CDD	HDD	Rain	CDD	HDD
4.371	0		4.460	0		0.991	0	
3.811	0		1.530	0		-3.647	-1	
5.021	1		5.350	0		0.955	-2	
4.467	5		4.880	28		0.125	7	
4.822	44		5.660	120		0.568	-14	
5.126	162		7.540	261		2.276	-11	
5.322	290		9.100	296		3.547	-67	
5.467	356		5.140	310		0.018	-17	
4.766	301		1.630	159		-1.710	-39	
3.628	168		6.230	42		1.448	-6	
4.401	39		2.450	0		-0.429	-3	
3.223	2		5.580	0		0.983	0	
4.371	0		2.310	0		-1.159	0	
3.811	0		4.730	0		-0.447	-1	
5.021	1		2.890	0		-1.505	-2	
4.467	5		6.000	13		1.245	-8	
4.822	44		5.440	139		0.348	5	
5.126	162		5.590	297		0.326	25	
5.322	290		3.230	260		-2.323	-103	
5.467	356		9.580	337		4.458	10	
4.766	301		4.350	161		1.010	-37	
3.628	168		4.480	25		-0.302	-23	
4.401	39		2.370	0		-0.509	-3	
3.223	2		3.300	0		-1.297	0	
4.371	0		1.850	0		-1.619	0	
3.811	0		3.000	0		-2.177	-1	
5.021	1		7.460	0		3.065	-2	
4.467	5		11.410	11		6.655	-10	
4.822	44		2.070	152		-3.022	18	
5.126	162		5.640	280		0.376	8	
5.322	290		9.660	341		4.107	-22	
5.467	356		2.190	247		-2.932	-80	
4.766	301		2.720	193		-0.620	-5	
3.628	168		3.450	17		-1.332	-31	
4.401	39		3.230	3		0.351	0	
3.223	2		7.220	0		2.623	0	
4.371	0		1.240	0		-2.229	0	
3.811	0		4.460	0		-0.717	-1	
5.021	1		2.800	2		-1.595	0	
4.467	5		3.310	24		-1.445	3	
4.822	44		6.490	81		1.398	-53	
5.126	162		4.560	305		-0.704	33	
5.322	290		4.980	411		-0.573	48	
5.467	356		6.540	424		1.418	97	
4.766	301		1.670	265		-1.670	67	
3.628	168		0.830	76		-3.952	28	

10-Year Averages

Rain	CDD	HDD
3.47	0	
5.18	1	
4.40	2	
4.76	21	
5.09	134	
5.26	272	
5.55	363	
5.12	327	
3.34	198	
4.78	48	
2.88	3	
4.60	0	

Rain Lag Calculations

	Rain Lag Ca	CDD Lag	HDD Lag
Nov-12	1.76		
Dec-12	6.56	0	

4.401	39	1.340	14	-1.539	11
3.223	2	6.180	0	1.583	0
4.371	0	4.720	0	1.251	0
3.811	0	3.390	3	-1.787	2
5.021	1	3.290	5	-1.105	3
4.467	5	1.850	62	-2.905	41
4.822	44	5.640	119	0.548	-15
5.126	162	5.780	235	0.516	-37
5.322	290	5.240	379	-0.313	16
5.467	356	5.070	249	-0.052	-78
4.766	301	3.740	140	0.400	-58
3.628	168	5.760	55	0.978	7
4.401	39	2.350	6	-0.529	3
3.223	2	2.380	0	-2.217	0
4.371	0	2.090	0	-1.379	0
3.811	0	10.140	7	4.963	6
5.021	1	5.320	0	0.925	-2
4.467	5	4.340	7	-0.415	-14
4.822	44	7.500	250	2.408	116
5.126	162	4.340	324	-0.924	52
5.322	290	4.420	370	-1.133	7
5.467	356	5.210	348	0.088	21
4.766	301	10.430	263	7.090	65
3.628	168	7.350	123	2.568	75
4.401	39	4.830	0	1.951	-3
3.223	2	4.700	0	0.103	0
4.371	0	4.360	0	0.891	0
3.811	0	7.390	0	2.213	-1
5.021	1	2.880	2	-1.515	0
4.467	5	4.400	25	-0.355	4
4.822	44	4.370	178	-0.722	44
5.126	162	7.440	238	2.176	-34
5.322	290	3.540	427	-2.013	64
5.467	356	2.160	396	-2.962	69
4.766	301	0.000	374	-3.340	176
3.628	168	7.830	73	3.048	25
4.401	39	5.730	0	2.851	-3
3.223	2	5.970	0	1.373	0
4.371	0	3.610	0	0.141	0
3.811	0	4.870	0	-0.307	-1
5.021	1	4.960	7	0.565	5
4.467	5	4.930	2	0.175	-19
4.822	44	5.120	83	0.028	-51
5.126	162	2.940	218	-2.324	-54
5.322	290	4.080	408	-1.473	45
5.467	356	3.570	283	-1.552	-44
4.766	301	4.210	116	0.870	-82
3.628	168	4.350	9	-0.432	-39
4.401	39	2.310	2	-0.569	-1
3.223	2	2.590	0	-2.007	0

4.371	0	4.790	0	1.321	0
3.811	0	4.570	0	-0.607	-1
5.021	1	4.730	0	0.335	-2
4.467	5	2.710	9	-2.045	-12
4.822	44	4.790	71	-0.302	-63
5.126	162	6.700	237	1.436	-35
5.322	290	4.820	297	-0.733	-66
5.467	356	7.490	328	2.368	1
4.766	301	3.150	132	-0.190	-66
3.628	168	6.580	49	1.798	1
4.401	39	2.080	0	-0.799	-3
3.223	2	4.590	0	-0.007	0
4.371	0	5.260	0	1.791	0
3.811	0	7.690	0	2.513	-1
5.021	1	4.270	0	-0.125	-2
4.467	5	3.720	29	-1.035	8
4.822	44	3.840	149	-1.252	15
5.126	162	2.110	327	-3.154	55
5.322	290	6.460	445	0.907	82
5.467	356	4.270	349	-0.852	22
4.766	301	1.500	173	-1.840	-25
3.628	168	0.960	11	-3.822	-37
4.401	39	2.100	4	-0.779	1
3.223	2	3.460	0	-1.137	0
4.371	0	4.371	0	0.902	0
3.811	0	3.811	0	-1.366	-1
5.021	1	5.021	1	0.626	0
4.467	5	4.467	5	-0.288	-16
4.822	44	4.822	44	-0.270	-91
5.126	162	5.126	162	-0.138	-110
5.322	290	5.322	290	-0.231	-73
5.467	356	5.467	356	0.345	29
4.766	301	4.766	301	1.426	104
3.628	168	3.628	168	-1.154	120
4.401	39	4.401	39	1.522	36
3.223	2	3.223	2	-1.374	2
4.371	0	4.371	0	0.902	0
3.811	0	3.811	0	-1.366	-1
5.021	1	5.021	1	0.626	0
4.467	5	4.467	5	-0.288	-16
4.822	44	4.822	44	-0.270	-91
5.126	162	5.126	162	-0.138	-110
5.322	290	5.322	290	-0.231	-73
5.467	356	5.467	356	0.345	29
4.766	301	4.766	301	1.426	104
3.628	168	3.628	168	-1.154	120
4.401	39	4.401	39	1.522	36
3.223	2	3.223	2	-1.374	2

Differences Lag				Normalized Weight Differences		
Rain Lag 1	Rain Lag 2	CDD Lag	HDD Lag	Rain	CDD	HDD
1.963	-1.119	0		0.902	0	
0.991	1.963	0		-1.366	-1	
-3.647	0.991	-1		0.626	0	
0.955	-3.647	-2		-0.288	-16	
0.125	0.955	7		-0.270	-91	
0.568	0.125	-14		-0.138	-110	
2.276	0.568	-11		-0.231	-73	
3.547	2.276	-67		0.345	29	
0.018	3.547	-17		1.426	104	
-1.710	0.018	-39		-1.154	120	
1.448	-1.710	-6		1.522	36	
-0.429	1.448	-3		-1.374	2	
0.983	-0.429	0		0.902	0	
-1.159	0.983	0		-1.366	-1	
-0.447	-1.159	-1		0.626	0	
-1.505	-0.447	-2		-0.288	-16	
1.245	-1.505	-8		-0.270	-91	
0.348	1.245	5		-0.138	-110	
0.326	0.348	25		-0.231	-73	
-2.323	0.326	-103		0.345	29	
4.458	-2.323	10		1.426	104	
1.010	4.458	-37		-1.154	120	
-0.302	1.010	-23		1.522	36	
-0.509	-0.302	-3		-1.374	2	
-1.297	-0.509	0		0.902	0	
-1.619	-1.297	0		-1.366	-1	
-2.177	-1.619	-1		0.626	0	
3.065	-2.177	-2		-0.288	-16	
6.655	3.065	-10		-0.270	-91	
-3.022	6.655	18		-0.138	-110	
0.376	-3.022	8		-0.231	-73	
4.107	0.376	-22		0.345	29	
-2.932	4.107	-80		1.426	104	
-0.620	-2.932	-5		-1.154	120	
-1.332	-0.620	-31		1.522	36	
0.351	-1.332	0		-1.374	2	
2.623	0.351	0		0.902	0	
-2.229	2.623	0		-1.366	-1	
-0.717	-2.229	-1		0.626	0	
-1.595	-0.717	0		-0.288	-16	
-1.445	-1.595	3		-0.270	-91	
1.398	-1.445	-53		-0.138	-110	
-0.704	1.398	33		-0.231	-73	
-0.573	-0.704	48		0.345	29	
1.418	-0.573	97		1.426	104	
-1.670	1.418	67		-1.154	120	

-3.952	-1.670	28	1.522	36
-1.539	-3.952	11	-1.374	2
1.583	-1.539	0	0.902	0
1.251	1.583	0	-1.366	-1
-1.787	1.251	2	0.626	0
-1.105	-1.787	3	-0.288	-16
-2.905	-1.105	41	-0.270	-91
0.548	-2.905	-15	-0.138	-110
0.516	0.548	-37	-0.231	-73
-0.313	0.516	16	0.345	29
-0.052	-0.313	-78	1.426	104
0.400	-0.052	-58	-1.154	120
0.978	0.400	7	1.522	36
-0.529	0.978	3	-1.374	2
-2.217	-0.529	0	0.902	0
-1.379	-2.217	0	-1.366	-1
4.963	-1.379	6	0.626	0
0.925	4.963	-2	-0.288	-16
-0.415	0.925	-14	-0.270	-91
2.408	-0.415	116	-0.138	-110
-0.924	2.408	52	-0.231	-73
-1.133	-0.924	7	0.345	29
0.088	-1.133	21	1.426	104
7.090	0.088	65	-1.154	120
2.568	7.090	75	1.522	36
1.951	2.568	-3	-1.374	2
0.103	1.951	0	0.902	0
0.891	0.103	0	-1.366	-1
2.213	0.891	-1	0.626	0
-1.515	2.213	0	-0.288	-16
-0.355	-1.515	4	-0.270	-91
-0.722	-0.355	44	-0.138	-110
2.176	-0.722	-34	-0.231	-73
-2.013	2.176	64	0.345	29
-2.962	-2.013	69	1.426	104
-3.340	-2.962	176	-1.154	120
3.048	-3.340	25	1.522	36
2.851	3.048	-3	-1.374	2
1.373	2.851	0	0.902	0
0.141	1.373	0	-1.366	-1
-0.307	0.141	-1	0.626	0
0.565	-0.307	5	-0.288	-16
0.175	0.565	-19	-0.270	-91
0.028	0.175	-51	-0.138	-110
-2.324	0.028	-54	-0.231	-73
-1.473	-2.324	45	0.345	29
-1.552	-1.473	-44	1.426	104
0.870	-1.552	-82	-1.154	120
-0.432	0.870	-39	1.522	36
-0.569	-0.432	-1	-1.374	2

-2.007	-0.569	0	0.902	0
1.321	-2.007	0	-1.366	-1
-0.607	1.321	-1	0.626	0
0.335	-0.607	-2	-0.288	-16
-2.045	0.335	-12	-0.270	-91
-0.302	-2.045	-63	-0.138	-110
1.436	-0.302	-35	-0.231	-73
-0.733	1.436	-66	0.345	29
2.368	-0.733	1	1.426	104
-0.190	2.368	-66	-1.154	120
1.798	-0.190	1	1.522	36
-0.799	1.798	-3	-1.374	2
-0.007	-0.799	0	0.902	0
1.791	-0.007	0	-1.366	-1
2.513	1.791	-1	0.626	0
-0.125	2.513	-2	-0.288	-16
-1.035	-0.125	8	-0.270	-91
-1.252	-1.035	15	-0.138	-110
-3.154	-1.252	55	-0.231	-73
0.907	-3.154	82	0.345	29
-0.852	0.907	22	1.426	104
-1.840	-0.852	-25	-1.154	120
-3.822	-1.840	-37	1.522	36
-0.779	-3.822	1	-1.374	2
-1.137	-0.779	0	0.902	0
0.902	-1.137	0	-1.366	-1
-1.366	0.902	-1	0.626	0
0.626	-1.366	0	-0.288	-16
-0.288	0.626	-16	-0.270	-91
-0.270	-0.288	-91	-0.138	-110
-0.138	-0.270	-110	-0.231	-73
-0.231	-0.138	-73	0.345	29
0.345	-0.231	29	1.426	104
1.426	0.345	104	-1.154	120
-1.154	1.426	120	1.522	36
1.522	-1.154	36	-1.374	2
-1.374	1.522	2	0.902	0
0.902	-1.374	0	-1.366	-1
-1.366	0.902	-1	0.626	0
0.626	-1.366	0	-0.288	-16
-0.288	0.626	-16	-0.270	-91
-0.270	-0.288	-91	-0.138	-110
-0.138	-0.270	-110	-0.231	-73
-0.231	-0.138	-73	0.345	29
0.345	-0.231	29	1.426	104
1.426	0.345	104	-1.154	120
-1.154	1.426	120	1.522	36
1.522	-1.154	36	-1.374	2

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DU Year	Month	Normal	DATE	CLDD	PRCP	HTDD	HTDD Lag	CLDD Lag	PRCP Lag	PRCP Lag2
			Update historical and new months							
2008	1	0	2008.01	0	4.42	1015	0	0	0.000	0.000
2008	2	0	2008.02	0	5.76	856	1015	0	4.420	0.000
2008	3	0	2008.03	0	6.30	647	856	0	5.760	4.420
2008	4	0	2008.04	13	5.90	326	647	0	6.300	5.760
2008	5	0	2008.05	31	4.41	146	326	13	5.900	6.300
2008	6	0	2008.06	266	3.59	0	146	31	4.410	5.900
2008	7	0	2008.07	328	3.42	0	0	266	3.590	4.410
2008	8	0	2008.08	295	2.18	0	0	328	3.420	3.590
2008	9	0	2008.09	196	1.42	2	0	295	2.180	3.420
2008	10	0	2008.10	38	1.54	280	2	196	1.420	2.180
2008	11	0	2008.11	0	2.53	665	280	38	1.540	1.420
2008	12	0	2008.12	0	6.04	905	665	0	2.530	1.540
2009	1	0	2009.01	0	4.33	1134	905	0	6.040	2.530
2009	2	0	2009.02	0	2.54	763	1134	0	4.330	6.040
2009	3	0	2009.03	0	2.39	528	763	0	2.540	4.330
2009	4	0	2009.04	38	4.78	322	528	0	2.390	2.540
2009	5	0	2009.05	78	6.03	92	322	38	4.780	2.390
2009	6	0	2009.06	268	5.19	10	92	78	6.030	4.780
2009	7	0	2009.07	219	7.57	4	10	268	5.190	6.030
2009	8	0	2009.08	257	4.54	3	4	219	7.570	5.190
2009	9	0	2009.09	133	5.90	29	3	257	4.540	7.570
2009	10	0	2009.10	6	5.78	373	29	133	5.900	4.540
2009	11	0	2009.11	0	0.96	510	373	6	5.780	5.900
2009	12	0	2009.12	0	4.03	926	510	0	0.960	5.780
2010	1	0	2010.01	0	3.02	1137	926	0	4.030	0.960
2010	2	0	2010.02	0	1.61	1013	1137	0	3.020	4.030
2010	3	0	2010.03	0	1.14	567	1013	0	1.610	3.020
2010	4	0	2010.04	36	2.31	202	567	0	1.140	1.610
2010	5	0	2010.05	130	9.95	73	202	36	2.310	1.140
2010	6	0	2010.06	348	4.59	0	73	130	9.950	2.310
2010	7	0	2010.07	403	6.06	0	0	348	4.590	9.950
2010	8	0	2010.08	406	0.58	0	0	403	6.060	4.590
2010	9	0	2010.09	201	0.61	31	0	406	0.580	6.060
2010	10	0	2010.10	17	1.24	212	31	201	0.610	0.580
2010	11	0	2010.11	0	4.46	544	212	17	1.240	0.610
2010	12	0	2010.12	0	2.50	1163	544	0	4.460	1.240
2011	1	0	2011.01	0	2.04	1132	1163	0	2.500	4.460
2011	2	0	2011.02	0	6.23	744	1132	0	2.040	2.500
2011	3	0	2011.03	4	4.69	575	744	0	6.230	2.040
2011	4	0	2011.04	21	12.70	225	575	4	4.690	6.230
2011	5	0	2011.05	115	6.45	150	225	21	12.700	4.690
2011	6	0	2011.06	251	3.20	0	150	115	6.450	12.700
2011	7	0	2011.07	443	4.93	0	0	251	3.200	6.450
2011	8	0	2011.08	317	3.64	0	0	443	4.930	3.200
2011	9	0	2011.09	109	5.98	86	0	317	3.640	4.930
2011	10	0	2011.10	5	4.41	326	86	109	5.980	3.640
2011	11	0	2011.11	0	7.68	456	326	5	4.410	5.980
2011	12	0	2011.12	0	4.43	753	456	0	7.680	4.410
2012	1	0	2012.01	0	3.54	857	753	0	4.430	7.680
2012	2	0	2012.02	0	3.10	724	857	0	3.540	4.430
2012	3	0	2012.03	32	3.31	303	724	0	3.100	3.540
2012	4	0	2012.04	15	2.30	288	303	32	3.310	3.100
2012	5	0	2012.05	148	3.61	34	288	15	2.300	3.310
2012	6	0	2012.06	240	1.61	18	34	148	3.610	2.300
2012	7	0	2012.07	479	8.02	0	18	240	1.610	3.610
2012	8	0	2012.08	286	2.15	0	0	479	8.020	1.610
2012	9	0	2012.09	121	5.41	77	0	286	2.150	8.020
2012	10	0	2012.10	5	1.28	337	77	121	5.410	2.150
2012	11	0	2012.11	0	1.76	668	337	5	1.280	5.410
2012	12	0	2012.12	0	6.56	720	668	0	1.760	1.280
2013	1	1	2013.01	0	4.46	911	720	0	6.560	1.760
2013	2	1	2013.02	0	1.53	837	911	0	4.460	6.560
2013	3	1	2013.03	0	5.35	789	837	0	1.530	4.460
2013	4	1	2013.04	28	4.88	300	789	0	5.350	1.530

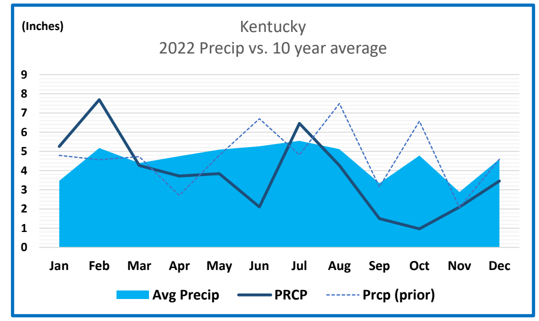
	NORMAL	NORMAL	NORMAL
	Act.	Act.	Act.
Month	CLDD	PRCP	HTDD
1	0	3.469	977
2	1	5.177	790
3	2	4.395	597
4	21	4.755	294
5	134	5.092	96
6	272	5.264	5
7	363	5.553	0
8	327	5.122	0
9	198	3.340	28
10	48	4.782	228
11	3	2.879	583
12	0	4.597	764

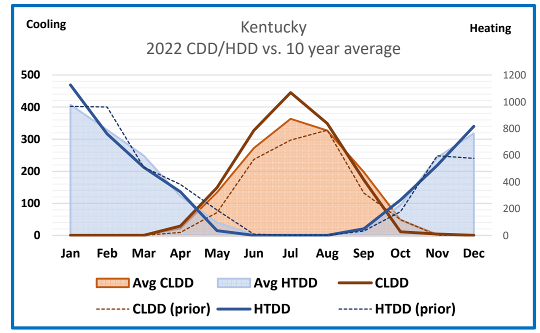
Normal Start: 2013.01
Normal End 2022.12

	NORMAL	NORMAL	NORMAL
Lag1 Norm	Act.	Act.	Act.
Month	CLDD	PRCP	HTDD
1	0	4.597	764
2	0	3.469	977
3	1	5.177	790
4	2	4.395	597
5	21	4.755	294
6	134	5.092	96
7	272	5.264	5
8	363	5.553	0
9	327	5.122	0
10	198	3.340	28
11	48	4.782	228
12	3	2.879	583

	NORMAL	NORMAL	NORMAL
Lag2 Norm	Act.	Act.	Act.
Month	CLDD	PRCP	HTDD
1	3	2.879	583
2	0	4.597	764
3	0	3.469	977
4	1	5.177	790
5	2	4.395	597
6	21	4.755	294
7	134	5.092	96
8	272	5.264	5
9	363	5.553	0
10	327	5.122	0
11	198	3.340	28
12	48	4.782	228

Kentucky





2013	5	1	2013.05	120	5.66	83	300	28	4.880	5.350
2013	6	1	2013.06	261	7.54	0	83	120	5.660	4.880
2013	7	1	2013.07	296	9.10	0	0	261	7.540	5.660
2013	8	1	2013.08	310	5.14	3	0	296	9.100	7.540
2013	9	1	2013.09	159	1.63	20	3	310	5.140	9.100
2013	10	1	2013.10	42	6.23	269	20	159	1.630	5.140
2013	11	1	2013.11	0	2.45	648	269	42	6.230	1.630
2013	12	1	2013.12	0	5.58	835	648	0	2.450	6.230
2014	1	1	2014.01	0	2.31	1181	835	0	5.580	2.450
2014	2	1	2014.02	0	4.73	915	1181	0	2.310	5.580
2014	3	1	2014.03	0	2.89	721	915	0	4.730	2.310
2014	4	1	2014.04	13	6.00	212	721	0	2.890	4.730
2014	5	1	2014.05	139	5.44	92	212	13	6.000	2.890
2014	6	1	2014.06	297	5.59	0	92	139	5.440	6.000
2014	7	1	2014.07	260	3.23	2	0	297	5.590	5.440
2014	8	1	2014.08	337	9.58	0	2	260	3.230	5.590
2014	9	1	2014.09	161	4.35	30	0	337	9.580	3.230
2014	10	1	2014.10	25	4.48	226	30	161	4.350	9.580
2014	11	1	2014.11	0	2.37	764	226	25	4.480	4.350
2014	12	1	2014.12	0	3.30	817	764	0	2.370	4.480
2015	1	1	2015.01	0	1.85	1049	817	0	3.300	2.370
2015	2	1	2015.02	0	3.00	1118	1049	0	1.850	3.300
2015	3	1	2015.03	0	7.46	655	1118	0	3.000	1.850
2015	4	1	2015.04	11	11.41	265	655	0	7.460	3.000
2015	5	1	2015.05	152	2.07	61	265	11	11.410	7.460
2015	6	1	2015.06	280	5.64	18	61	152	2.070	11.410
2015	7	1	2015.07	341	9.66	0	18	280	5.640	2.070
2015	8	1	2015.08	247	2.19	0	0	341	9.660	5.640
2015	9	1	2015.09	193	2.72	16	0	247	2.190	9.660
2015	10	1	2015.10	17	3.45	242	16	193	2.720	2.190
2015	11	1	2015.11	3	3.23	440	242	17	3.450	2.720
2015	12	1	2015.12	0	7.22	501	440	3	3.230	3.450
2016	1	1	2016.01	0	1.24	1025	501	0	7.220	3.230
2016	2	1	2016.02	0	4.46	775	1025	0	1.240	7.220
2016	3	1	2016.03	2	2.80	402	775	0	4.460	1.240
2016	4	1	2016.04	24	3.31	267	402	2	2.800	4.460
2016	5	1	2016.05	81	6.49	142	267	24	3.310	2.800
2016	6	1	2016.06	305	4.56	1	142	81	6.490	3.310
2016	7	1	2016.07	411	4.98	0	1	305	4.560	6.490
2016	8	1	2016.08	424	6.54	0	0	411	4.980	4.560
2016	9	1	2016.09	265	1.67	18	0	424	6.540	4.980
2016	10	1	2016.10	76	0.83	120	18	265	1.670	6.540
2016	11	1	2016.11	14	1.34	458	120	76	0.830	1.670
2016	12	1	2016.12	0	6.18	862	458	14	1.340	0.830
2017	1	1	2017.01	0	4.72	767	862	0	6.180	1.340
2017	2	1	2017.02	3	3.39	511	767	0	4.720	6.180
2017	3	1	2017.03	5	3.29	537	511	3	3.390	4.720
2017	4	1	2017.04	62	1.85	138	537	5	3.290	3.390
2017	5	1	2017.05	119	5.64	102	138	62	1.850	3.290
2017	6	1	2017.06	235	5.78	6	102	119	5.640	1.850
2017	7	1	2017.07	379	5.24	0	6	235	5.780	5.640
2017	8	1	2017.08	249	5.07	0	0	379	5.240	5.780
2017	9	1	2017.09	140	3.74	38	0	249	5.070	5.240
2017	10	1	2017.10	55	5.76	221	38	140	3.740	5.070
2017	11	1	2017.11	6	2.35	535	221	55	5.760	3.740
2017	12	1	2017.12	0	2.38	931	535	6	2.350	5.760
2018	1	1	2018.01	0	2.09	1052	931	0	2.380	2.350
2018	2	1	2018.02	7	10.14	569	1052	0	2.090	2.380
2018	3	1	2018.03	0	5.32	680	569	7	10.140	2.090
2018	4	1	2018.04	7	4.34	429	680	0	5.320	10.140
2018	5	1	2018.05	250	7.50	7	429	7	4.340	5.320
2018	6	1	2018.06	324	4.34	0	7	250	7.500	4.340
2018	7	1	2018.07	370	4.42	0	0	324	4.340	7.500
2018	8	1	2018.08	348	5.21	0	0	370	4.420	4.340
2018	9	1	2018.09	263	10.43	18	0	348	5.210	4.420
2018	10	1	2018.10	123	7.35	291	18	263	10.430	5.210
2018	11	1	2018.11	0	4.83	688	291	123	7.350	10.430
2018	12	1	2018.12	0	4.70	733	688	0	4.830	7.350

2019	1	1	2019.01	0	4.36	966	733	0	4.700	4.830
2019	2	1	2019.02	0	7.39	629	966	0	4.360	4.700
2019	3	1	2019.03	2	2.88	685	629	0	7.390	4.360
2019	4	1	2019.04	25	4.40	202	685	2	2.880	7.390
2019	5	1	2019.05	178	4.37	54	202	25	4.400	2.880
2019	6	1	2019.06	238	7.44	12	54	178	4.370	4.400
2019	7	1	2019.07	427	3.54	0	12	238	7.440	4.370
2019	8	1	2019.08	396	2.16	0	0	427	3.540	7.440
2019	9	1	2019.09	374	0.00	0	0	396	2.160	3.540
2019	10	1	2019.10	73	7.83	186	0	374	0.000	2.160
2019	11	1	2019.11	0	5.73	674	186	73	7.830	0.000
2019	12	1	2019.12	0	5.97	655	674	0	5.730	7.830
2020	1	1	2020.01	0	3.61	730	655	0	5.970	5.730
2020	2	1	2020.02	0	4.87	821	730	0	3.610	5.970
2020	3	1	2020.03	7	4.96	481	821	0	4.870	3.610
2020	4	1	2020.04	2	4.93	423	481	7	4.960	4.870
2020	5	1	2020.05	83	5.12	194	423	2	4.930	4.960
2020	6	1	2020.06	218	2.94	7	194	83	5.120	4.930
2020	7	1	2020.07	408	4.08	0	7	218	2.940	5.120
2020	8	1	2020.08	283	3.57	0	0	408	4.080	2.940
2020	9	1	2020.09	116	4.21	61	0	283	3.570	4.080
2020	10	1	2020.10	9	4.35	281	61	116	4.210	3.570
2020	11	1	2020.11	2	2.31	501	281	9	4.350	4.210
2020	12	1	2020.12	0	2.59	913	501	2	2.310	4.350
2021	1	1	2021.01	0	4.79	966	913	0	2.590	2.310
2021	2	1	2021.02	0	4.57	960	966	0	4.790	2.590
2021	3	1	2021.03	0	4.73	511	960	0	4.570	4.790
2021	4	1	2021.04	9	2.71	382	511	0	4.730	4.570
2021	5	1	2021.05	71	4.79	190	382	9	2.710	4.730
2021	6	1	2021.06	237	6.70	9	190	71	4.790	2.710
2021	7	1	2021.07	297	4.82	0	9	237	6.700	4.790
2021	8	1	2021.08	328	7.49	0	0	297	4.820	6.700
2021	9	1	2021.09	132	3.15	33	0	328	7.490	4.820
2021	10	1	2021.10	49	6.58	178	33	132	3.150	7.490
2021	11	1	2021.11	0	2.08	596	178	49	6.580	3.150
2021	12	1	2021.12	0	4.59	577	596	0	2.080	6.580
2022	1	1	2022.01	0	5.26	1126	577	0	4.590	2.080
2022	2	1	2022.02	0	7.69	760	1126	0	5.260	4.590
2022	3	1	2022.03	0	4.27	510	760	0	7.690	5.260
2022	4	1	2022.04	29	3.72	326	510	0	4.270	7.690
2022	5	1	2022.05	149	3.84	35	326	29	3.720	4.270
2022	6	1	2022.06	327	2.11	0	35	149	3.840	3.720
2022	7	1	2022.07	445	6.46	0	0	327	2.110	3.840
2022	8	1	2022.08	349	4.27	0	0	445	6.460	2.110
2022	9	1	2022.09	173	1.50	50	0	349	4.270	6.460
2022	10	1	2022.10	11	0.96	265	50	173	1.500	4.270
2022	11	1	2022.11	4	2.10	524	265	11	0.960	1.500
2022	12	1	2022.12	0	3.46	816	524	4	2.100	0.960

			avg use (hyp 2021)			avg use (hyp 2021)			avg use (hyp 2021)			
			Res	Res	Res	Com	Com	Com	OPA	OPA	OPA	
Obs	DU Year	Month	Cust	Sales	Adjust	Cust	Sales	Adjust	Cust	Sales	Adjust	COVID
1	2008	1	106,086	480,523		8,586	293,186		489	86,381		0
2	2008	2	106,072	479,531		8,579	308,863		494	112,488		0
3	2008	3	106,293	423,595		8,574	273,046		497	107,987		0
4	2008	4	106,292	427,034		8,739	285,176		495	134,623		0
5	2008	5	106,529	486,806		8,749	328,985		497	121,034		0
6	2008	6	106,581	560,973		8,747	348,645		499	136,108		0
7	2008	7	106,814	618,820		8,741	385,002		503	147,595		0
8	2008	8	107,224	718,147		8,778	475,002		503	185,254		0
9	2008	9	107,195	685,000		8,793	434,480		505	196,831		0
10	2008	10	107,161	627,618		8,788	408,662		505	169,219		0
11	2008	11	107,082	511,454		8,766	348,298		505	147,578		0
12	2008	12	106,913	450,080		8,741	272,722		504	109,069		0
13	2009	1	106,914	518,666		8,731	299,134		504	110,958		0
14	2009	2	106,974	451,117		8,716	292,818		503	106,675		0
15	2009	3	107,009	425,317		8,722	270,719		501	93,814		0
16	2009	4	107,178	460,127		8,769	299,767		501	100,896		0
17	2009	5	107,311	457,125		8,793	300,658		503	110,615		0
18	2009	6	107,362	534,248		8,810	330,056		514	119,812		0
19	2009	7	107,379	601,846		8,801	375,128		518	137,231		0
20	2009	8	107,642	559,318		8,797	373,756		515	152,595		0
21	2009	9	107,598	547,107		8,809	351,819		519	143,691		0
22	2009	10	107,654	503,632		8,794	341,095		518	138,179		0
23	2009	11	107,596	445,416		8,749	287,454		519	108,844		0
24	2009	12	107,500	462,586		8,760	280,930		519	99,080		0
25	2010	1	107,578	496,208		8,716	293,784		522	107,780		0
26	2010	2	107,757	417,139		8,700	260,798		524	106,261		0
27	2010	3	107,860	424,449		8,717	263,667		529	108,589		0
28	2010	4	108,117	494,117		8,741	325,570		532	108,278		0
29	2010	5	108,241	458,240		8,769	301,446		532	127,410		0
30	2010	6	108,223	521,307		8,797	369,379		532	115,236		0
31	2010	7	108,325	616,630		8,798	390,880		529	151,742		0
32	2010	8	108,424	581,015		8,805	381,942		532	174,107		0
33	2010	9	108,472	663,809		8,814	457,201		533	195,263		0
34	2010	10	108,347	625,130		8,800	395,602		531	184,193		0
35	2010	11	108,291	509,493		8,780	337,398		525	132,563		0
36	2010	12	108,389	417,678		8,766	306,830		524	96,981		0
37	2011	1	108,446	537,690		8,757	305,980		528	96,365		0
38	2011	2	108,390	414,342		8,722	265,364		525	87,920		0
39	2011	3	108,590	410,416		8,717	263,461		526	91,817		0
40	2011	4	108,838	439,334		8,739	287,371		528	98,639		0
41	2011	5	109,038	440,770		8,754	284,422		527	105,746		0
42	2011	6	109,020	535,835		8,777	320,484		527	114,637		0
43	2011	7	109,105	592,652		8,784	381,325		531	147,160		0
44	2011	8	109,295	548,956		8,784	370,420		532	153,892		0
45	2011	9	109,354	603,405		8,778	406,635		534	164,768		0
46	2011	10	109,302	477,737		8,767	316,467		532	127,106		0

47	2011	11	109,207	421,793	8,757	282,188	530	102,158		0
48	2011	12	109,071	432,483	8,735	263,942	532	94,442		0
49	2012	1	109,285	462,037	8,718	269,823	531	83,801		0
50	2012	2	109,508	410,877	8,704	266,899	531	84,100		0
51	2012	3	109,782	413,697	8,709	264,838	529	77,388		0
52	2012	4	110,019	432,461	8,758	278,195	531	96,323		0
53	2012	5	110,165	455,249	8,786	300,959	533	104,191		0
54	2012	6	110,453	622,767	8,813	369,936	533	146,952		0
55	2012	7	110,556	724,137	8,834	428,411	534	168,995		0
56	2012	8	110,784	658,716	8,833	436,207	535	172,668		0
57	2012	9	110,879	532,256	8,842	386,630	534	189,246		0
58	2012	10	111,366	506,468	8,902	347,453	546	130,439		0
59	2012	11	111,417	461,480	8,897	314,825	547	119,201		0
60	2012	12	111,457	415,717	8,872	260,756	545	100,246		0
61	2013	1	110,286	466,325	8,864	251,945	544	90,760		0
62	2013	2	110,430	434,074	8,863	272,502	545	98,673		0
63	2013	3	110,601	405,078	8,874	268,888	545	84,146		0
64	2013	4	110,770	418,930	8,893	262,279	548	96,467		0
65	2013	5	112,842	455,956	8,846	240,263	523	101,416		0
66	2013	6	112,909	528,796	8,843	365,046	524	129,054		0
67	2013	7	112,957	475,444	8,854	339,430	525	127,906		0
68	2013	8	113,608	529,828	8,979	351,075	534	139,717		0
69	2013	9	113,783	512,147	8,988	332,194	533	136,971		0
70	2013	10	113,723	528,595	8,957	315,866	531	99,468		0
71	2013	11	113,691	400,534	8,923	293,449	531	132,753		0
72	2013	12	113,777	459,418	8,920	266,267	530	77,241		0
73	2014	1	113,816	493,103	8,917	308,935	531	132,314	(40,000)	0
74	2014	2	113,795	493,795	8,894	313,008	531	39,936	40,000	0
75	2014	3	113,580	437,161	8,869	273,784	531	80,019		0
76	2014	4	113,585	446,063	8,872	294,882	530	79,257		0
77	2014	5	113,550	452,219	8,884	263,329	531	98,596		0
78	2014	6	113,659	522,245	8,882	343,810	531	117,987		0
79	2014	7	113,591	581,709	8,884	332,078	530	124,511		0
80	2014	8	114,292	516,761	8,946	340,803	531	136,078		0
81	2014	9	114,408	516,726	8,950	337,470	532	134,783		0
82	2014	10	114,505	510,909	8,927	374,847	528	132,080		0
83	2014	11	114,440	386,993	8,908	247,863	528	100,097		0
84	2014	12	114,534	445,274	8,910	266,053	528	92,383		0
85	2015	1	114,636	496,999	8,902	293,149	528	78,290		0
86	2015	2	114,766	409,081	8,901	250,618	529	80,732		0
87	2015	3	115,014	472,025	8,903	286,757	527	75,043		0
88	2015	4	115,157	461,866	8,902	318,071	544	98,622		0
89	2015	5	115,174	444,309	8,912	306,489	544	98,045		0
90	2015	6	115,527	563,334	8,925	359,653	548	123,398		0
91	2015	7	115,691	513,500	8,945	360,509	550	125,046		0
92	2015	8	115,882	518,053	8,950	355,492	552	130,472		0
93	2015	9	116,068	574,523	8,947	380,412	554	140,376		0
94	2015	10	116,091	541,831	8,937	384,177	553	139,260		0
95	2015	11	116,144	425,337	8,943	323,138	548	101,487		0
96	2015	12	116,165	450,092	8,931	272,577	548	88,689		0

97	2016	1	116,124	438,318	8,942	289,610	548	85,426		0
98	2016	2	116,263	430,536	8,944	271,968	548	77,618		0
99	2016	3	116,397	431,088	8,974	287,139	548	75,946		0
100	2016	4	116,599	464,312	9,000	302,784	548	91,224		0
101	2016	5	116,819	436,240	9,016	297,687	552	92,400		0
102	2016	6	116,944	543,599	9,020	335,616	553	118,760		0
103	2016	7	116,893	556,625	9,030	366,416	551	137,948		0
104	2016	8	117,139	565,559	9,064	377,696	551	145,005		0
105	2016	9	117,276	566,648	9,042	393,311	551	167,795		0
106	2016	10	117,385	549,271	9,022	373,340	548	137,037		0
107	2016	11	117,324	501,169	9,000	339,859	550	108,360		0
108	2016	12	117,366	471,584	9,005	300,158	549	96,081		0
109	2017	1	117,337	467,875	8,996	215,394	549	71,758		0
110	2017	2	117,359	421,264	9,001	340,140	550	76,307		0
111	2017	3	117,658	403,788	9,013	263,204	709	69,758		0
112	2017	4	117,991	426,740	9,072	270,993	714	88,406		0
113	2017	5	118,171	464,428	9,088	309,894	719	93,059		0
114	2017	6	118,262	536,481	9,106	356,416	721	114,148		0
115	2017	7	118,218	535,084	9,111	380,671	723	131,132		0
116	2017	8	118,378	541,171	9,126	370,939	724	130,842		0
117	2017	9	118,437	552,157	9,128	388,526	724	133,240		0
118	2017	10	118,485	489,137	9,103	335,198	722	104,327		0
119	2017	11	118,442	452,419	9,090	317,267	719	98,442		0
120	2017	12	118,448	430,850	9,083	274,098	721	76,048		0
121	2018	1	118,548	504,760	9,075	298,651	725	90,363		0
122	2018	2	119,046	423,817	9,080	271,150	726	85,098		0
123	2018	3	119,170	398,240	9,071	257,712	721	75,677		0
124	2018	4	119,359	422,111	9,086	285,279	720	84,037		0
125	2018	5	119,414	457,844	9,109	293,694	720	87,893		0
126	2018	6	119,452	547,569	9,121	353,762	730	128,799		0
127	2018	7	119,450	521,015	9,117	356,290	748	110,224		0
128	2018	8	119,617	529,667	9,134	378,743	748	110,698		0
129	2018	9	119,568	488,661	9,118	359,368	748	173,947		0
130	2018	10	119,588	500,289	9,100	338,999	745	98,329		0
131	2018	11	119,609	426,610	9,082	304,450	745	80,895		0
132	2018	12	119,500	425,196	9,064	267,152	744	81,491		0
133	2019	1	119,738	468,191	9,053	284,950	750	63,529		0
134	2019	2	120,022	436,030	9,060	272,440	751	101,226	(40,000)	0
135	2019	3	119,963	428,647	9,048	255,026	750	79,193	(10,000)	0
136	2019	4	120,545	410,551	9,087	268,143	754	(21,561)	90,000	0
137	2019	5	120,691	481,374	9,106	313,500	754	106,378	(40,000)	0
138	2019	6	120,587	521,838	9,122	343,454	755	121,686		0
139	2019	7	120,926	509,428	9,143	336,316	755	107,907		0
140	2019	8	121,087	586,546	9,165	398,499	758	156,611		0
141	2019	9	121,179	546,087	9,179	389,141	758	149,550		0
142	2019	10	121,312	653,878	9,208	426,010	757	149,224		0
143	2019	11	121,224	432,935	9,180	332,217	753	99,860		0
144	2019	12	121,176	456,248	9,161	296,200	750	79,497		0
145	2020	1	121,219	518,497	9,176	291,551	751	74,746		0
146	2020	2	121,285	353,896	9,179	251,012	750	70,488		0

147	2020	3	121,524	456,507	9,192	274,296	750	71,000	0
148	2020	4	121,741	476,155	9,173	253,820	748	66,555	1
149	2020	5	121,941	473,588	9,184	234,769	748	63,182	1
150	2020	6	122,061	540,514	9,216	270,759	748	72,471	1
151	2020	7	122,201	668,078	9,230	392,441	748	107,754	1
152	2020	8	122,376	615,613	9,239	377,524	749	139,639	1
153	2020	9	122,446	591,081	9,245	383,335	749	108,731	1
154	2020	10	122,266	528,076	9,239	341,736	748	89,423	1
155	2020	11	122,510	440,961	9,194	295,889	748	75,890	1
156	2020	12	122,528	409,614	9,192	255,771	746	67,065	1
157	2021	1	122,431	504,369	9,195	291,537	747	75,446	1
158	2021	2	122,325	413,144	9,180	256,712	747	62,683	1
159	2021	3	122,462	434,249	9,198	262,312	749	68,724	1
160	2021	4	122,708	453,677	9,233	294,075	751	85,485	1
161	2021	5	122,990	482,580	9,268	306,781	753	88,931	1
162	2021	6	123,112	524,487	9,283	316,768	754	100,433	1
163	2021	7	123,209	572,926	9,307	374,380	755	122,985	1
164	2021	8	123,503	563,482	9,323	360,155	756	125,360	1
165	2021	9	123,599	558,747	9,329	382,407	755	118,461	1
166	2021	10	123,590	483,181	9,311	342,192	755	114,231	1
167	2021	11	123,601	455,774	9,290	321,936	754	91,630	1
168	2021	12	123,551	427,962	9,290	296,028	753	81,631	1
169	2022	1	123,618	503,978	9,289	306,483	753	80,392	1
170	2022	2	123,624	426,017	9,324	287,806	772	68,644	1
171	2022	3	123,753	409,766	9,352	274,562	774	83,766	1
172	2022	4	123,900	420,915	9,368	301,878	774	71,199	1
173	2022	5	124,047	482,359	9,408	327,147	774	98,309	1
174	2022	6	124,070	512,695	9,421	326,925	771	102,434	1
175	2022	7	124,025	582,053	9,414	399,414	771	137,577	1
176	2022	8	124,268	625,686	9,430	391,479	771	125,163	1
177	2022	9	124,301	486,180	9,442	372,642	764	120,847	1
178	2022	10	124,272	647,287	9,442	430,691	764	136,147	1
179	2022	11	124,303	436,664	9,394	333,577	760	85,896	1
180	2022	12	124,255	453,574	9,399	304,401	770	94,076	1

Kentucky American Water Company
Water Division

			Residential			Commercial			Industrial			Public Authority		
Obs	Year	Month	Customer Count	Billed Usage	Average Use /Customer	Customer Count	Billed Usage	Average Use /Customer	Customer Count	Billed Usage	Average Use /Customer	Customer Count	Billed Usage	Average Use /Customer
1	2008	1	106,086	480,523	4.530	8,586	293,186	34.147	21	42,439	2,020.911	489	86,381	176.648
2	2008	2	106,072	479,531	4.521	8,579	308,863	36.002	21	50,172	2,389.130	494	112,488	227.709
3	2008	3	106,293	423,595	3.985	8,574	273,046	31.846	21	47,650	2,269.051	497	107,987	217.277
4	2008	4	106,292	427,034	4.018	8,739	285,176	32.633	21	48,780	2,322.839	495	134,623	271.967
5	2008	5	106,529	486,806	4.570	8,749	328,985	37.603	21	59,445	2,830.694	497	121,034	243.529
6	2008	6	106,581	560,973	5.263	8,747	348,645	39.859	21	40,475	1,927.369	499	136,108	272.762
7	2008	7	106,814	618,820	5.793	8,741	385,002	44.046	21	63,782	3,037.228	503	147,595	293.430
8	2008	8	107,224	718,147	6.698	8,778	475,002	54.113	21	57,515	2,738.827	503	185,254	368.298
9	2008	9	107,195	685,000	6.390	8,793	434,480	49.412	21	61,522	2,929.619	505	196,831	389.765
10	2008	10	107,161	627,618	5.857	8,788	408,662	46.502	22	56,431	2,565.031	505	169,219	335.088
11	2008	11	107,082	511,454	4.776	8,766	348,298	39.733	22	50,378	2,289.888	505	147,578	292.234
12	2008	12	106,913	450,080	4.210	8,741	272,722	31.200	22	41,933	1,906.032	504	109,069	216.407
13	2009	1	106,914	518,666	4.851	8,731	299,134	34.261	22	33,851	1,538.704	504	110,958	220.155
14	2009	2	106,974	451,117	4.217	8,716	292,818	33.596	22	33,722	1,532.822	503	106,675	212.077
15	2009	3	107,009	425,317	3.975	8,722	270,719	31.039	22	36,876	1,676.176	501	93,814	187.253
16	2009	4	107,178	460,127	4.293	8,769	299,767	34.185	22	35,694	1,622.451	501	100,896	201.389
17	2009	5	107,311	457,125	4.260	8,793	300,658	34.193	21	36,901	1,757.170	503	110,615	219.910
18	2009	6	107,362	534,248	4.976	8,810	330,056	37.464	22	37,630	1,710.451	514	119,812	233.097
19	2009	7	107,379	601,846	5.605	8,801	375,128	42.623	22	54,192	2,463.257	518	137,231	264.926
20	2009	8	107,642	559,318	5.196	8,797	373,756	42.487	22	51,017	2,318.966	515	152,595	296.302
21	2009	9	107,598	547,107	5.085	8,809	351,819	39.939	22	53,150	2,415.886	519	143,691	276.861
22	2009	10	107,654	503,632	4.678	8,794	341,095	38.787	22	55,114	2,505.171	518	138,179	266.754
23	2009	11	107,596	445,416	4.140	8,749	287,454	32.856	21	46,430	2,210.964	519	108,844	209.718
24	2009	12	107,500	462,586	4.303	8,760	280,930	32.070	22	38,477	1,748.932	519	99,080	190.906
25	2010	1	107,578	496,208	4.613	8,716	293,784	33.706	23	48,088	2,090.772	522	107,780	206.474
26	2010	2	107,757	417,139	3.871	8,700	260,798	29.977	23	34,345	1,493.250	524	106,261	202.788
27	2010	3	107,860	424,449	3.935	8,717	263,667	30.247	23	38,147	1,658.544	529	108,589	205.272
28	2010	4	108,117	494,117	4.570	8,741	325,570	37.246	23	45,961	1,998.294	532	108,278	203.530
29	2010	5	108,241	458,240	4.234	8,769	301,446	34.376	23	46,397	2,017.239	532	127,410	239.493
30	2010	6	108,223	521,307	4.817	8,797	369,379	41.989	23	43,418	1,887.717	532	115,236	216.609
31	2010	7	108,325	616,630	5.692	8,798	390,880	44.428	23	59,719	2,596.467	529	151,742	286.846
32	2010	8	108,424	581,015	5.359	8,805	381,942	43.378	22	57,982	2,635.534	532	174,107	327.269
33	2010	9	108,472	663,809	6.120	8,814	457,201	51.872	23	59,306	2,578.533	533	195,263	366.346
34	2010	10	108,347	625,130	5.770	8,800	395,602	44.955	23	50,753	2,206.663	531	184,193	346.880
35	2010	11	108,291	509,493	4.705	8,780	337,398	38.428	23	42,375	1,842.391	525	132,563	252.501
36	2010	12	108,389	417,678	3.854	8,766	306,830	35.002	22	40,937	1,860.784	524	96,981	185.078
37	2011	1	108,446	537,690	4.958	8,757	305,980	34.941	22	29,902	1,359.171	528	96,365	182.510
38	2011	2	108,390	414,342	3.823	8,722	265,364	30.425	22	37,290	1,695.000	525	87,920	167.467
39	2011	3	108,590	410,416	3.780	8,717	263,461	30.224	22	35,547	1,615.773	526	91,817	174.556
40	2011	4	108,838	439,334	4.037	8,739	287,371	32.884	23	39,599	1,721.674	528	98,639	186.817
41	2011	5	109,038	440,770	4.042	8,754	284,422	32.491	23	32,567	1,415.967	527	105,746	200.656
42	2011	6	109,020	535,835	4.915	8,777	320,484	36.514	23	31,495	1,369.337	527	114,637	217.527
43	2011	7	109,105	592,652	5.432	8,784	381,325	43.411	23	48,410	2,104.761	531	147,160	277.137

44	2011	8	109,295	548,956	5.023	8,784	370,420	42.170	23	50,902	2,213.120	532	153,892	289.270
45	2011	9	109,354	603,405	5.518	8,778	406,635	46.324	23	55,152	2,397.913	534	164,768	308.553
46	2011	10	109,302	477,737	4.371	8,767	316,467	36.098	23	43,127	1,875.065	532	127,106	238.920
47	2011	11	109,207	421,793	3.862	8,757	282,188	32.224	23	38,820	1,687.826	530	102,158	192.750
48	2011	12	109,071	432,483	3.965	8,735	263,942	30.217	23	37,607	1,635.065	532	94,442	177.523
49	2012	1	109,285	462,037	4.228	8,718	269,823	30.950	23	37,349	1,623.880	531	83,801	157.816
50	2012	2	109,508	410,877	3.752	8,704	266,899	30.664	23	40,715	1,770.228	531	84,100	158.380
51	2012	3	109,782	413,697	3.768	8,709	264,838	30.410	23	40,547	1,762.924	529	77,388	146.291
52	2012	4	110,019	432,461	3.931	8,758	278,195	31.765	24	44,777	1,865.719	531	96,323	181.398
53	2012	5	110,165	455,249	4.132	8,786	300,959	34.254	24	42,251	1,760.438	533	104,191	195.480
54	2012	6	110,453	622,767	5.638	8,813	369,936	41.976	24	48,716	2,029.844	533	146,952	275.707
55	2012	7	110,556	724,137	6.550	8,834	428,411	48.496	25	56,117	2,244.690	534	168,995	316.471
56	2012	8	110,784	658,716	5.946	8,833	436,207	49.384	25	55,729	2,229.150	535	172,668	322.744
57	2012	9	110,879	532,256	4.800	8,842	386,630	43.727	25	61,499	2,459.970	534	189,246	354.393
58	2012	10	111,366	506,468	4.548	8,902	347,453	39.031	26	42,091	1,618.875	546	130,439	238.898
59	2012	11	111,417	461,480	4.142	8,897	314,825	35.386	25	44,002	1,760.070	547	119,201	217.917
60	2012	12	111,457	415,717	3.730	8,872	260,756	29.391	24	41,671	1,736.281	545	100,246	183.937
61	2013	1	110,286	466,325	4.228	8,864	251,945	28.423	24	34,616	1,442.344	544	90,760	166.838
62	2013	2	110,430	434,074	3.931	8,863	272,502	30.746	24	41,222	1,717.594	545	98,673	181.051
63	2013	3	110,601	405,078	3.663	8,874	268,888	30.301	24	38,369	1,598.719	545	84,146	154.397
64	2013	4	110,770	418,930	3.782	8,893	262,279	29.493	24	42,171	1,757.125	548	96,467	176.035
65	2013	5	112,842	455,956	4.041	8,846	240,263	27.161	24	42,131	1,755.452	523	101,416	193.912
66	2013	6	112,909	528,796	4.683	8,843	365,046	41.281	24	43,266	1,802.742	524	129,054	246.286
67	2013	7	112,957	475,444	4.209	8,854	339,430	38.336	25	57,085	2,283.405	525	127,906	243.630
68	2013	8	113,608	529,828	4.664	8,979	351,075	39.100	24	49,729	2,072.023	534	139,717	261.643
69	2013	9	113,783	512,147	4.501	8,988	332,194	36.960	24	52,680	2,195.006	533	136,971	256.981
70	2013	10	113,723	528,595	4.648	8,957	315,866	35.265	24	47,497	1,979.021	531	99,468	187.323
71	2013	11	113,691	400,534	3.523	8,923	293,449	32.887	24	42,616	1,775.658	531	132,753	250.005
72	2013	12	113,777	459,418	4.038	8,920	266,267	29.851	24	36,034	1,501.423	530	77,241	145.739
73	2014	1	113,816	493,103	4.333	8,917	308,935	34.646	25	43,908	1,756.304	531	132,314	249.180
74	2014	2	113,795	493,795	4.339	8,894	313,008	35.193	25	39,488	1,579.537	531	39,936	75.210
75	2014	3	113,580	437,161	3.849	8,869	273,784	30.870	25	38,562	1,542.466	531	80,019	150.695
76	2014	4	113,585	446,063	3.927	8,872	294,882	33.237	25	41,025	1,640.992	530	79,257	149.541
77	2014	5	113,550	452,219	3.983	8,884	263,329	29.641	25	44,676	1,787.032	531	98,596	185.680
78	2014	6	113,659	522,245	4.595	8,882	343,810	38.709	25	50,713	2,028.516	531	117,987	222.197
79	2014	7	113,591	581,709	5.121	8,884	332,078	37.379	25	55,725	2,229.010	530	124,511	234.927
80	2014	8	114,292	516,761	4.521	8,946	340,803	38.096	25	54,550	2,182.006	531	136,078	256.268
81	2014	9	114,408	516,726	4.517	8,950	337,470	37.706	25	59,402	2,376.067	532	134,783	253.351
82	2014	10	114,505	510,909	4.462	8,927	374,847	41.990	25	47,235	1,889.388	528	132,080	250.152
83	2014	11	114,440	386,993	3.382	8,908	247,863	27.825	25	45,816	1,832.660	528	100,097	189.577
84	2014	12	114,534	445,274	3.888	8,910	266,053	29.860	25	47,137	1,885.499	528	92,383	174.968
85	2015	1	114,636	496,999	4.335	8,902	293,149	32.931	26	45,229	1,739.589	528	78,290	148.277
86	2015	2	114,766	409,081	3.565	8,901	250,618	28.156	25	44,724	1,788.947	529	80,732	152.613
87	2015	3	115,014	472,025	4.104	8,903	286,757	32.209	25	42,619	1,704.752	527	75,043	142.397
88	2015	4	115,157	461,866	4.011	8,902	318,071	35.730	25	46,953	1,878.138	544	98,622	181.291
89	2015	5	115,174	444,309	3.858	8,912	306,489	34.391	26	52,608	2,023.398	544	98,045	180.230
90	2015	6	115,527	563,334	4.876	8,925	359,653	40.297	26	53,419	2,054.583	548	123,398	225.178
91	2015	7	115,691	513,500	4.439	8,945	360,509	40.303	25	64,499	2,579.942	550	125,046	227.356
92	2015	8	115,882	518,053	4.471	8,950	355,492	39.720	25	60,204	2,408.141	552	130,472	236.362
93	2015	9	116,068	574,523	4.950	8,947	380,412	42.518	24	60,577	2,524.039	554	140,376	253.387

94	2015	10	116,091	541,831	4.667	8,937	384,177	42.987	26	53,286	2,049.442	553	139,260	251.826
95	2015	11	116,144	425,337	3.662	8,943	323,138	36.133	26	56,179	2,160.742	548	101,487	185.196
96	2015	12	116,165	450,092	3.875	8,931	272,577	30.520	27	49,754	1,842.745	548	88,689	161.841
97	2016	1	116,124	438,318	3.775	8,942	289,610	32.388	27	44,792	1,658.973	548	85,426	155.887
98	2016	2	116,263	430,536	3.703	8,944	271,968	30.408	27	47,730	1,767.784	548	77,618	141.639
99	2016	3	116,397	431,088	3.704	8,974	287,139	31.997	27	50,239	1,860.700	548	75,946	138.588
100	2016	4	116,599	464,312	3.982	9,000	302,784	33.643	27	53,820	1,993.326	548	91,224	166.467
101	2016	5	116,819	436,240	3.734	9,016	297,687	33.018	27	50,764	1,880.140	552	92,400	167.391
102	2016	6	116,944	543,599	4.648	9,020	335,616	37.208	27	52,301	1,937.079	553	118,760	214.756
103	2016	7	116,893	556,625	4.762	9,030	366,416	40.578	27	65,040	2,408.876	551	137,948	250.359
104	2016	8	117,139	565,559	4.828	9,064	377,696	41.670	26	63,826	2,454.853	551	145,005	263.167
105	2016	9	117,276	566,648	4.832	9,042	393,311	43.498	28	72,430	2,586.787	551	167,795	304.527
106	2016	10	117,385	549,271	4.679	9,022	373,340	41.381	28	65,489	2,338.889	548	137,037	250.068
107	2016	11	117,324	501,169	4.272	9,000	339,859	37.762	28	56,249	2,008.896	550	108,360	197.018
108	2016	12	117,366	471,584	4.018	9,005	300,158	33.332	28	52,165	1,863.025	549	96,081	175.011
109	2017	1	117,337	467,875	3.987	8,996	215,394	23.943	30	46,735	1,557.840	549	71,758	130.707
110	2017	2	117,359	421,264	3.590	9,001	340,140	37.789	30	48,878	1,629.274	550	76,307	138.740
111	2017	3	117,658	403,788	3.432	9,013	263,204	29.203	30	48,143	1,604.777	709	69,758	98.390
112	2017	4	117,991	426,740	3.617	9,072	270,993	29.871	30	56,205	1,873.501	714	88,406	123.819
113	2017	5	118,171	464,428	3.930	9,088	309,894	34.099	30	51,395	1,713.172	719	93,059	129.428
114	2017	6	118,262	536,481	4.536	9,106	356,416	39.141	30	58,362	1,945.388	721	114,148	158.319
115	2017	7	118,218	535,084	4.526	9,111	380,671	41.781	30	61,884	2,062.800	723	131,132	181.371
116	2017	8	118,378	541,171	4.572	9,126	370,939	40.646	30	55,688	1,856.274	724	130,842	180.721
117	2017	9	118,437	552,157	4.662	9,128	388,526	42.564	30	69,622	2,320.740	724	133,240	184.034
118	2017	10	118,485	489,137	4.128	9,103	335,198	36.823	30	56,960	1,898.668	722	104,327	144.497
119	2017	11	118,442	452,419	3.820	9,090	317,267	34.903	30	54,712	1,823.721	719	98,442	136.915
120	2017	12	118,448	430,850	3.638	9,083	274,098	30.177	30	49,336	1,644.535	721	76,048	105.475
121	2018	1	118,548	504,760	4.258	9,075	298,651	32.909	30	46,193	1,539.753	725	90,363	124.638
122	2018	2	119,046	423,817	3.560	9,080	271,150	29.862	31	46,736	1,507.619	726	85,098	117.215
123	2018	3	119,170	398,240	3.342	9,071	257,712	28.411	31	65,096	2,099.877	721	75,677	104.961
124	2018	4	119,359	422,111	3.537	9,086	285,279	31.398	31	48,666	1,569.877	720	84,037	116.718
125	2018	5	119,414	457,844	3.834	9,109	293,694	32.242	30	49,350	1,645.010	720	87,893	122.074
126	2018	6	119,452	547,569	4.584	9,121	353,762	38.786	30	62,006	2,066.853	730	128,799	176.437
127	2018	7	119,450	521,015	4.362	9,117	356,290	39.080	30	69,120	2,304.000	748	110,224	147.358
128	2018	8	119,617	529,667	4.428	9,134	378,743	41.465	30	56,033	1,867.773	748	110,698	147.992
129	2018	9	119,568	488,661	4.087	9,118	359,368	39.413	31	67,106	2,164.694	748	173,947	232.550
130	2018	10	119,588	500,289	4.183	9,100	338,999	37.253	31	57,605	1,858.226	745	98,329	131.985
131	2018	11	119,609	426,610	3.567	9,082	304,450	33.522	31	49,005	1,580.803	745	80,895	108.584
132	2018	12	119,500	425,196	3.558	9,064	267,152	29.474	31	48,531	1,565.503	744	81,491	109.532
133	2019	1	119,738	468,191	3.910	9,053	284,950	31.476	31	45,264	1,460.123	750	63,529	84.705
134	2019	2	120,022	436,030	3.633	9,060	272,440	30.071	31	47,431	1,530.019	751	101,226	134.789
135	2019	3	119,963	428,647	3.573	9,048	255,026	28.186	31	45,992	1,483.607	750	79,193	105.591
136	2019	4	120,545	410,551	3.406	9,087	268,143	29.508	31	43,338	1,398.000	754	(21,561)	(28.596)
137	2019	5	120,691	481,374	3.989	9,106	313,500	34.428	31	49,031	1,581.642	754	106,378	141.085
138	2019	6	120,587	521,838	4.328	9,122	343,454	37.651	31	55,592	1,793.303	755	121,686	161.173
139	2019	7	120,926	509,428	4.213	9,143	336,316	36.784	31	41,197	1,328.945	755	107,907	142.923
140	2019	8	121,087	586,546	4.844	9,165	398,499	43.481	31	57,555	1,856.623	758	156,611	206.611
141	2019	9	121,179	546,087	4.507	9,179	389,141	42.395	31	71,471	2,305.500	758	149,550	197.295
142	2019	10	121,312	653,878	5.390	9,208	426,010	46.265	27	62,961	2,331.904	757	149,224	197.126
143	2019	11	121,224	432,935	3.571	9,180	332,217	36.189	26	68,196	2,622.912	753	99,860	132.616

144	2019	12	121,176	456,248	3.765	9,161	296,200	32.333	26	36,550	1,405.777	750	79,497	105.996
145	2020	1	121,219	518,497	4.277	9,176	291,551	31.773	26	49,688	1,911.058	751	74,746	99.529
146	2020	2	121,285	353,896	2.918	9,179	251,012	27.346	26	48,346	1,859.477	750	70,488	93.984
147	2020	3	121,524	456,507	3.757	9,192	274,296	29.841	26	49,714	1,912.094	750	71,000	94.667
148	2020	4	121,741	476,155	3.911	9,173	253,820	27.670	26	41,711	1,604.273	748	66,555	88.977
149	2020	5	121,941	473,588	3.884	9,184	234,769	25.563	25	16,995	679.792	748	63,182	84.468
150	2020	6	122,061	540,514	4.428	9,216	270,759	29.379	25	29,271	1,170.848	748	72,471	96.886
151	2020	7	122,201	668,078	5.467	9,230	392,441	42.518	26	54,643	2,101.662	748	107,754	144.057
152	2020	8	122,376	615,613	5.031	9,239	377,524	40.862	26	60,706	2,334.839	749	139,639	186.433
153	2020	9	122,446	591,081	4.827	9,245	383,335	41.464	26	59,225	2,277.889	749	108,731	145.168
154	2020	10	122,266	528,076	4.319	9,239	341,736	36.989	26	52,145	2,005.562	748	89,423	119.549
155	2020	11	122,510	440,961	3.599	9,194	295,889	32.183	25	46,369	1,854.752	748	75,890	101.457
156	2020	12	122,528	409,614	3.343	9,192	255,771	27.825	26	41,720	1,604.631	746	67,065	89.899
157	2021	1	122,431	504,369	4.120	9,195	291,537	31.706	26	40,485	1,557.128	747	75,446	100.999
158	2021	2	122,325	413,144	3.377	9,180	256,712	27.964	26	37,369	1,437.278	747	62,683	83.913
159	2021	3	122,462	434,249	3.546	9,198	262,312	28.518	26	39,812	1,531.224	749	68,724	91.754
160	2021	4	122,708	453,677	3.697	9,233	294,075	31.850	26	40,921	1,573.886	751	85,485	113.828
161	2021	5	122,990	482,580	3.924	9,268	306,781	33.101	26	44,772	1,722.008	753	88,931	118.102
162	2021	6	123,112	524,487	4.260	9,283	316,768	34.123	26	49,327	1,897.202	754	100,433	133.201
163	2021	7	123,209	572,926	4.650	9,307	374,380	40.226	26	60,907	2,342.568	755	122,985	162.894
164	2021	8	123,503	563,482	4.563	9,323	360,155	38.631	26	55,252	2,125.073	756	125,360	165.820
165	2021	9	123,599	558,747	4.521	9,329	382,407	40.991	26	62,734	2,412.845	755	118,461	156.903
166	2021	10	123,590	483,181	3.910	9,311	342,192	36.751	26	43,286	1,664.835	755	114,231	151.299
167	2021	11	123,601	455,774	3.688	9,290	321,936	34.654	26	43,815	1,685.184	754	91,630	121.525
168	2021	12	123,551	427,962	3.464	9,290	296,028	31.865	26	47,221	1,816.206	753	81,631	108.408
169	2022	1	123,618	503,978	4.077	9,289	306,483	32.994	26	41,407	1,592.580	753	80,392	106.763
170	2022	2	123,624	426,017	3.446	9,324	287,806	30.867	26	37,138	1,428.366	772	68,644	88.917
171	2022	3	123,753	409,766	3.311	9,352	274,562	29.359	26	34,655	1,332.898	774	83,766	108.224
172	2022	4	123,900	420,915	3.397	9,368	301,878	32.224	26	50,905	1,957.897	774	71,199	91.989
173	2022	5	124,047	482,359	3.889	9,408	327,147	34.773	26	44,161	1,698.493	774	98,309	127.014
174	2022	6	124,070	512,695	4.132	9,421	326,925	34.702	26	42,306	1,627.170	771	102,434	132.858
175	2022	7	124,025	582,053	4.693	9,414	399,414	42.428	26	59,110	2,273.445	771	137,577	178.439
176	2022	8	124,268	625,686	5.035	9,430	391,479	41.514	26	49,726	1,912.546	771	125,163	162.339
177	2022	9	124,301	486,180	3.911	9,442	372,642	39.467	26	57,233	2,201.274	764	120,847	158.177
178	2022	10	124,272	647,287	5.209	9,442	430,691	45.614	26	50,146	1,928.706	764	136,147	178.203
179	2022	11	124,303	436,664	3.513	9,394	333,577	35.510	26	42,368	1,629.543	760	85,896	113.021
180	2022	12	124,255	453,574	3.650	9,399	304,401	32.387	26	37,248	1,432.602	770	94,076	122.177
181	2023	1	-		-			-			-			-
182	2023	2	-		-			-			-			-
183	2023	3	-		-			-			-			-
184	2023	4	-		-			-			-			-
185	2023	5	-		-			-			-			-
186	2023	6	-		-			-			-			-
187	2023	7	-		-			-			-			-
188	2023	8	-		-			-			-			-
189	2023	9	-		-			-			-			-
190	2023	10	-		-			-			-			-
191	2023	11	-		-			-			-			-
192	2023	12	-		-			-			-			-
193	2024	1	-		-			-			-			-

194	2024	2	-	-	-	-	-
195	2024	3	-	-	-	-	-
196	2024	4	-	-	-	-	-
197	2024	5	-	-	-	-	-
198	2024	6	-	-	-	-	-
199	2024	7	-	-	-	-	-
200	2024	8	-	-	-	-	-
201	2024	9	-	-	-	-	-
202	2024	10	-	-	-	-	-
203	2024	11	-	-	-	-	-
204	2024	12	-	-	-	-	-

	Residential			Commercial			Industrial			Public Authority		
	Average Customer Count	Total Billed Usage	Yearly Average Use /Customer	Average Customer Count	Total Billed Usage	Yearly Average Use /Customer	Average Customer Count	Total Billed Usage	Yearly Average Use /Customer	Average Customer Count	Total Billed Usage	Yearly Average Use /Customer
2008	106,687	6,469,580	60.641	8,715	4,162,069	477.571	21	620,520	29,200.939	500	1,654,168	3,310.544
2009	107,343	5,966,504	55.583	8,771	3,803,335	433.630	22	513,053	23,498.598	511	1,422,389	2,782.632
2010	108,169	6,225,215	57.551	8,767	4,084,497	465.899	23	567,426	24,850.774	529	1,608,401	3,041.893
2011	108,971	5,855,415	53.734	8,756	3,748,058	428.060	23	480,416	21,117.165	529	1,384,648	2,615.833
2012	110,473	6,095,861	55.180	8,806	3,924,929	445.728	24	555,464	22,905.742	536	1,473,548	2,750.439
2013	112,448	5,615,124	49.935	8,900	3,559,203	399.895	24	527,416	21,899.613	534	1,314,573	2,459.827
2014	113,980	5,802,958	50.912	8,904	3,696,861	415.211	25	568,237	22,729.476	530	1,268,042	2,391.779
2015	115,526	5,870,951	50.819	8,925	3,891,043	435.979	26	630,051	24,707.868	544	1,279,460	2,353.030
2016	116,877	5,954,950	50.950	9,005	3,935,585	437.048	27	674,845	24,764.938	550	1,333,599	2,425.827
2017	118,099	5,721,394	48.446	9,076	3,822,737	421.173	30	657,921	21,930.689	691	1,187,467	1,717.855
2018	119,360	5,645,780	47.300	9,096	3,765,249	413.927	31	665,446	21,758.462	735	1,207,451	1,642.790
2019	120,704	5,931,753	49.143	9,126	3,915,895	429.092	30	624,578	20,935.572	754	1,193,100	1,582.885
2020	122,008	6,072,579	49.772	9,205	3,622,902	393.583	26	550,533	21,379.936	749	1,006,943	1,345.132
2021	123,090	5,874,579	47.726	9,267	3,805,284	410.616	26	565,901	21,765.437	752	1,135,999	1,509.800
2022	124,036	5,987,176	48.270	9,390	4,057,006	432.044	26	546,404	21,015.522	768	1,204,450	1,567.954

Sales For Resale			Miscellaneous		Fire		Total Water				
Customer Count	Billed Usage	Average Use /Customer	Customer Count	Billed Usage	Customer Count	Billed Usage	Customer Count	Billed Usage	System Delivery	Non-Revenue Water	12 Mo Rolling NRW %
11	31,039	2,821.716	-	-	-	-	115,193	933,569	1,203,182	269,613	
11	35,328	3,211.655	-	-	-	-	115,177	986,382	1,108,067	121,685	
11	33,767	3,069.729	-	-	-	-	115,396	886,045	1,167,746	281,701	
11	31,895	2,899.515	-	-	-	-	115,558	927,508	1,163,768	236,260	
11	32,996	2,999.619	-	-	-	-	115,807	1,029,265	1,272,502	243,236	
11	38,362	3,487.416	-	-	-	-	115,859	1,124,563	1,407,839	283,276	
11	46,371	4,215.541	-	-	-	-	116,090	1,261,570	1,561,583	300,014	
11	55,988	5,089.808	-	-	-	-	116,537	1,491,906	1,655,969	164,063	
11	59,134	5,375.818	-	-	-	-	116,525	1,436,967	1,561,945	124,978	
12	63,485	5,290.407	-	-	-	-	116,488	1,325,415	1,375,898	50,483	
12	62,747	5,228.941	-	-	-	-	116,387	1,120,455	1,073,781	(46,674)	
12	33,190	2,765.794	-	-	-	-	116,192	906,994	1,089,970	182,976	14.14%
12	38,572	3,214.314	-	-	-	-	116,183	1,001,181	1,127,811	126,629	13.29%
12	35,003	2,916.899	-	-	-	-	116,227	919,335	1,013,035	93,700	13.19%
12	34,846	2,903.871	-	-	-	-	116,266	861,572	1,066,007	204,435	12.77%
12	28,290	2,357.481	-	-	-	-	116,482	924,773	1,082,831	158,058	12.33%
12	34,327	2,860.547	-	-	-	-	116,640	939,625	1,218,204	278,580	12.61%
12	40,921	3,410.053	-	-	-	-	116,720	1,062,667	1,286,679	224,013	12.32%
12	55,179	4,598.271	-	-	-	-	116,732	1,223,576	1,358,623	135,047	11.38%
12	47,459	3,954.875	-	-	-	-	116,988	1,184,145	1,330,299	146,154	11.51%
12	40,937	3,411.375	-	-	-	-	116,960	1,136,702	1,262,504	125,801	11.75%
12	41,442	3,453.500	-	-	-	-	117,000	1,079,461	1,131,550	52,089	11.97%
12	34,495	2,874.563	-	-	-	-	116,897	922,638	1,019,185	96,547	13.04%
12	35,559	2,963.250	-	-	-	-	116,813	916,632	1,007,837	91,206	12.46%
12	40,256	3,354.688	-	-	-	-	116,851	986,116	1,086,727	100,611	12.31%
12	34,311	2,859.250	-	-	-	-	117,016	852,854	977,801	124,947	12.56%
12	32,852	2,737.625	-	-	-	-	117,141	867,703	1,043,813	176,110	12.38%
12	35,162	2,930.125	-	-	-	-	117,425	1,009,088	1,139,993	130,905	12.13%
12	33,468	2,789.000	-	-	-	-	117,577	966,960	1,216,075	249,115	11.92%
12	37,784	3,148.625	-	-	-	-	117,587	1,087,123	1,303,853	216,731	11.85%
12	47,261	3,938.375	-	-	-	-	117,687	1,266,230	1,419,526	153,295	11.93%
12	43,922	3,660.188	-	-	-	-	117,795	1,238,968	1,569,880	330,912	13.04%
12	53,576	4,464.625	-	-	-	-	117,854	1,429,155	1,496,578	67,423	12.42%
12	55,510	4,625.813	-	-	-	-	117,713	1,311,188	1,376,226	65,038	12.30%
12	55,549	4,629.063	-	-	-	-	117,631	1,077,377	1,083,673	6,295	11.63%
12	16,382	1,365.188	-	-	-	-	117,713	878,808	1,103,234	224,426	12.46%
12	40,779	3,398.250	-	-	-	-	117,765	1,010,716	1,092,741	82,025	12.33%
12	29,750	2,479.125	-	-	-	-	117,671	834,666	980,304	145,638	12.46%
12	28,012	2,334.313	-	-	-	-	117,867	829,252	1,039,414	210,162	12.70%
12	31,137	2,594.750	-	-	-	-	118,140	896,080	1,025,148	129,067	12.78%
12	28,593	2,382.750	-	-	-	-	118,354	892,098	1,134,545	242,447	12.81%
12	49,649	4,137.375	-	-	-	-	118,359	1,052,099	1,356,271	304,172	13.36%
12	38,277	3,189.750	-	-	-	-	118,455	1,207,823	1,399,417	191,594	13.64%

12	46,501	3,875.063	-	-	-	-	118,646	1,170,670	1,405,570	234,899	13.13%
13	53,333	4,102.558	-	-	-	-	118,702	1,283,292	1,183,951	(99,342)	12.25%
13	34,361	2,643.115	-	-	-	-	118,637	998,797	1,143,970	145,173	13.02%
13	30,854	2,373.346	-	-	-	-	118,530	875,812	1,011,987	136,175	14.03%
13	30,134	2,318.019	-	-	-	-	118,374	858,608	1,012,173	153,565	13.61%
13	34,949	2,688.346	-	-	-	-	118,570	887,958	1,032,857	144,899	14.12%
13	30,264	2,328.000	-	-	-	-	118,779	832,855	947,518	114,664	13.93%
13	29,350	2,257.673	-	-	-	-	119,056	825,820	1,027,573	201,754	13.88%
13	26,986	2,075.827	-	-	-	-	119,345	878,741	1,064,873	186,132	14.26%
13	31,382	2,413.962	-	-	-	-	119,521	934,031	1,299,598	365,567	14.97%
13	46,218	3,555.231	-	-	-	-	119,836	1,234,589	1,506,866	272,277	14.59%
13	39,683	3,052.558	-	-	-	-	119,962	1,417,344	1,541,553	124,209	13.96%
13	68,254	5,250.289	-	-	-	-	120,190	1,391,573	1,502,234	110,661	13.00%
13	52,232	4,017.865	-	-	-	-	120,293	1,221,863	1,247,282	25,418	13.81%
13	33,118	2,547.519	-	-	-	-	120,853	1,059,568	1,171,128	111,560	13.55%
13	37,755	2,904.231	-	-	-	-	120,899	977,262	1,035,447	58,185	12.99%
13	29,716	2,285.827	-	-	-	-	120,911	848,105	1,016,599	168,494	13.09%
13	27,885	2,145.000	-	-	-	-	119,731	871,531	1,045,648	174,117	13.28%
13	32,253	2,481.000	-	-	-	-	119,875	878,725	948,318	69,593	12.97%
12	26,999	2,249.938	-	-	-	-	120,056	823,480	1,042,725	219,245	13.07%
12	27,403	2,283.563	-	-	-	-	120,247	847,249	1,030,244	182,995	13.08%
12	30,123	2,510.248	-	-	-	-	122,247	869,888	1,134,062	264,174	12.52%
12	51,267	4,272.264	-	-	-	-	122,312	1,117,429	1,184,200	66,771	11.33%
12	26,932	2,244.374	-	-	-	-	122,373	1,026,797	1,212,740	185,943	12.06%
12	34,638	2,886.532	-	-	-	-	123,157	1,104,987	1,271,974	166,986	12.69%
12	37,799	3,149.953	-	-	-	-	123,340	1,071,791	1,274,570	202,779	14.00%
12	32,954	2,746.157	-	-	-	-	123,247	1,024,380	1,159,862	135,482	14.19%
12	33,424	2,785.365	-	-	-	-	123,181	902,775	1,011,569	108,793	14.59%
12	16,679	1,389.909	-	-	-	-	123,263	855,639	1,031,967	176,328	14.63%
13	36,358	2,796.772	-	-	-	-	123,302	1,014,618	1,197,065	182,447	14.53%
13	21,674	1,667.235	-	-	-	-	123,258	907,902	1,062,924	155,022	15.04%
13	55,259	4,250.711	-	-	-	-	123,018	884,784	1,077,176	192,392	14.80%
13	22,664	1,743.358	-	-	-	-	123,025	883,890	1,073,542	189,652	14.80%
13	34,458	2,650.624	-	-	-	-	123,003	893,278	1,210,615	317,338	15.11%
13	35,560	2,735.379	-	-	-	-	123,110	1,070,314	1,277,142	206,827	16.02%
13	58,076	4,467.401	-	-	-	-	123,043	1,152,099	1,417,978	265,878	16.35%
14	37,569	2,683.503	-	-	-	-	123,808	1,085,762	1,326,706	240,945	16.81%
15	46,227	3,081.810	-	-	-	-	123,930	1,094,607	1,223,123	128,516	16.34%
15	39,065	2,604.337	-	-	-	-	124,000	1,104,137	1,145,861	41,724	15.69%
15	68,277	4,551.829	-	-	-	-	123,916	849,046	1,014,639	165,593	16.09%
15	8,633	575.511	-	-	-	-	124,012	859,480	999,458	139,978	15.87%
15	31,873	2,124.869	-	-	-	-	124,107	945,540	1,063,665	118,126	15.56%
15	27,881	1,858.730	-	-	-	-	124,236	813,036	1,029,579	216,543	16.04%
15	33,893	2,259.509	-	-	-	-	124,484	910,337	1,119,475	209,138	16.11%
15	31,740	2,115.992	-	-	-	-	124,643	957,253	1,069,046	111,793	15.56%
15	29,680	1,978.660	-	-	-	-	124,671	931,132	1,287,562	356,430	15.75%
15	47,435	3,162.345	-	-	-	-	125,041	1,147,238	1,297,976	150,738	15.33%
15	43,864	2,924.281	-	-	-	-	125,226	1,107,417	1,252,239	144,822	14.64%
15	39,349	2,623.236	-	-	-	-	125,424	1,103,570	1,411,272	307,702	15.03%
15	49,263	3,284.169	-	-	-	-	125,608	1,205,151	1,417,007	211,856	15.41%

15	47,440	3,162.644	-	-	-	-	125,622	1,165,993	1,217,527	51,534	15.40%
15	35,540	2,369.315	-	-	-	-	125,676	941,681	1,069,321	127,640	15.08%
15	30,958	2,063.882	-	-	-	-	125,686	892,071	1,057,593	165,523	15.20%
15	34,749	2,316.606	26	-	2,248	-	127,930	892,895	1,133,388	240,492	15.97%
15	32,508	2,167.205	25	-	2,250	-	128,072	860,360	1,055,950	195,590	15.80%
15	30,000	2,000.002	25	-	2,249	-	128,235	874,412	1,080,447	206,035	15.82%
15	36,682	2,445.461	26	-	2,250	-	128,465	948,821	1,149,139	200,317	16.35%
15	33,118	2,207.847	29	-	2,251	-	128,709	910,208	1,203,359	293,151	16.00%
15	39,598	2,639.842	28	-	2,249	-	128,836	1,089,874	1,377,603	287,729	16.86%
15	51,651	3,443.393	27	-	2,248	-	128,791	1,177,678	1,433,211	255,533	17.41%
15	44,756	2,983.722	29	-	2,244	-	129,068	1,196,843	1,433,633	236,790	16.90%
15	54,839	3,655.965	32	-	2,244	-	129,188	1,255,024	1,431,574	176,550	16.64%
15	51,287	3,419.129	32	-	2,252	-	129,282	1,176,425	1,349,122	172,698	17.31%
15	47,162	3,144.164	32	-	2,259	-	129,208	1,052,800	1,157,367	104,567	17.06%
15	44,022	2,934.799	29	-	2,258	-	129,250	964,010	1,129,836	165,826	16.98%
15	36,089	2,405.910	31	-	2,256	-	129,214	837,851	1,129,833	291,982	17.32%
15	33,947	2,263.148	29	-	2,265	-	129,249	920,537	994,746	74,209	16.58%
15	29,001	1,933.375	31	-	2,269	-	129,725	813,895	1,104,240	290,345	17.12%
15	33,215	2,214.355	32	-	2,272	-	130,126	875,560	1,132,661	257,102	17.52%
15	33,385	2,225.637	32	-	2,280	-	130,335	952,160	1,271,554	319,394	17.62%
15	50,784	3,385.612	34	-	2,308	-	130,476	1,116,191	1,355,291	239,100	17.32%
15	49,304	3,286.952	32	-	2,335	-	130,464	1,158,075	1,507,965	349,890	17.86%
15	47,623	3,174.877	32	-	2,336	-	130,641	1,146,263	1,458,060	311,797	18.33%
15	49,854	3,323.623	34	-	2,336	-	130,704	1,193,399	1,288,316	94,917	17.96%
15	34,850	2,323.308	37	-	2,338	-	130,730	1,020,471	1,275,049	254,577	18.60%
15	35,864	2,390.957	36	-	2,339	-	130,671	958,704	1,115,942	157,239	19.01%
15	31,999	2,133.285	34	-	2,336	-	130,667	862,330	1,138,698	276,367	19.75%
15	36,994	2,466.253	34	(16)	2,349	648	130,776	977,593	1,253,375	275,782	19.47%
15	33,753	2,250.180	35	977	2,348	789	131,281	862,321	1,031,475	169,154	20.06%
15	31,441	2,096.053	33	182	2,350	637	131,391	828,984	1,131,684	302,701	20.11%
14	34,452	2,460.864	36	410	2,352	613	131,598	875,568	1,131,912	256,344	20.10%
14	31,641	2,260.064	36	192	2,354	601	131,677	921,216	1,341,188	419,972	20.68%
14	46,462	3,318.729	43	557	2,354	281	131,744	1,139,437	1,345,274	205,837	20.47%
14	42,390	3,027.850	42	172	2,354	579	131,755	1,099,790	1,439,958	340,168	20.50%
14	46,542	3,324.436	38	1,056	2,361	386	131,942	1,123,125	1,395,087	271,961	20.32%
14	56,483	4,034.493	43	1,303	2,359	1,715	131,881	1,148,582	1,317,226	168,645	20.77%
14	37,758	2,697.014	43	461	2,359	491	131,880	1,033,932	1,268,249	234,317	20.65%
14	37,006	2,643.314	43	1,449	2,359	536	131,883	899,950	1,136,652	236,702	21.15%
13	23,725	1,824.977	43	501	2,368	744	131,763	847,340	1,125,835	278,495	21.18%
14	32,750	2,339.314	39	(709)	2,380	830	132,005	894,804	1,149,089	254,285	21.19%
14	23,394	1,671.007	39	344	2,385	987	132,302	881,852	1,071,797	189,945	21.27%
14	52,663	3,761.614	73	216	2,377	692	132,256	862,428	1,164,919	302,491	21.22%
15	30,948	2,063.207	44	596	2,381	599	132,857	732,614	1,174,303	441,689	22.40%
14	33,268	2,376.314	44	1,496	2,380	(529)	133,020	984,519	1,343,085	358,566	21.99%
15	35,265	2,350.980	47	733	2,382	(762)	132,939	1,077,805	1,292,039	214,234	22.12%
15	23,089	1,539.287	46	(463)	2,389	577	133,305	1,018,052	1,468,815	450,763	22.82%
15	20,107	1,340.473	44	762	2,392	584	133,492	1,220,664	1,551,229	330,565	22.97%
15	21,128	1,408.507	44	1,695	2,397	523	133,603	1,179,594	1,641,547	461,953	24.40%
15	16,166	1,077.700	48	1,014	2,398	964	133,765	1,310,216	1,385,450	75,234	23.19%
15	17,082	1,138.780	45	6,440	2,409	760	133,652	957,490	1,139,776	182,286	22.83%

15	15,040	1,002.680	43	(3,926)	2,407	661	133,578	880,269	1,151,794	271,525	22.75%
16	16,320	1,019.994	43	436	2,408	559	133,639	951,796	1,138,208	186,412	22.33%
16	372	23.256	43	990	2,405	457	133,704	725,561	1,061,824	336,263	23.28%
16	28,664	1,791.519	45	(1,111)	2,410	549	133,963	879,621	1,118,897	239,276	22.94%
16	15,759	984.906	47	14	2,408	549	134,159	854,561	1,047,150	192,589	21.51%
17	17,686	1,040.371	47	210	2,407	135	134,369	806,565	1,151,944	345,379	21.69%
17	18,342	1,078.924	48	473	2,412	538	134,527	932,366	1,347,845	415,479	22.94%
17	26,418	1,553.988	48	685	2,411	262	134,681	1,250,281	1,546,730	296,449	21.81%
17	28,731	1,690.053	47	1,150	2,408	338	134,862	1,223,700	1,442,027	218,327	21.23%
17	25,530	1,501.771	45	808	2,413	235	134,941	1,168,946	1,297,819	128,873	19.48%
16	22,303	1,393.919	46	464	2,425	218	134,766	1,034,364	1,246,162	211,797	20.59%
16	19,567	1,222.944	43	391	2,425	682	134,961	879,749	1,110,667	230,919	20.96%
16	20,335	1,270.925	43	300	2,423	428	134,974	795,232	1,169,527	374,295	21.64%
16	21,717	1,357.338	42	164	2,429	838	134,886	934,558	1,203,897	269,339	22.10%
16	18,878	1,179.854	43	154	2,431	787	134,768	789,727	1,120,666	330,939	21.98%
16	21,831	1,364.444	43	298	2,433	703	134,927	827,929	1,188,471	360,542	22.69%
16	24,453	1,528.337	43	664	2,439	690	135,216	899,965	1,152,456	252,491	22.93%
16	21,613	1,350.829	44	1,244	2,443	44	135,540	945,965	1,298,568	352,603	22.76%
16	22,549	1,409.320	46	219	2,463	175	135,700	1,013,959	1,317,674	303,715	22.06%
16	24,890	1,555.637	47	510	2,471	359	135,831	1,156,956	1,399,466	242,510	21.92%
16	25,288	1,580.502	46	1,107	2,468	368	136,138	1,131,012	1,452,707	321,695	22.59%
16	23,415	1,463.466	47	528	2,474	411	136,246	1,146,704	1,307,351	160,648	22.79%
16	20,853	1,303.335	48	668	2,475	344	136,221	1,004,756	1,261,265	256,509	23.07%
16	23,824	1,489.027	49	338	2,476	1,049	136,212	938,366	1,128,320	189,954	22.77%
15	22,425	1,495.012	45	261	2,487	645	136,167	876,173	1,141,610	265,437	22.08%
15	22,432	1,495.498	43	429	2,487	257	136,231	955,380	1,142,791	187,412	21.62%
16	25,459	1,591.188	44	608	2,487	799	136,293	846,470	1,070,706	224,236	20.98%
16	18,127	1,132.922	45	517	2,492	531	136,458	821,924	1,172,423	350,499	20.93%
16	25,686	1,605.393	50	815	2,494	465	136,628	871,864	1,169,767	297,903	21.22%
16	22,407	1,400.437	48	805	2,512	494	136,831	975,682	1,325,120	349,438	21.16%
16	24,658	1,541.121	52	1,326	2,512	327	136,868	1,010,671	1,507,657	496,986	22.17%
16	34,536	2,158.482	58	673	2,512	393	136,822	1,213,755	1,569,072	355,317	22.66%
16	44,369	2,773.054	60	2,060	2,530	402	137,101	1,238,885	1,436,412	197,527	21.87%
16	29,214	1,825.846	62	1,172	2,536	447	137,147	1,067,736	1,418,476	350,739	22.95%
17	30,205	1,776.762	65	816	2,537	850	137,123	1,296,143	1,400,944	104,802	21.77%
17	16,160	950.586	61	686	2,539	847	137,100	916,197	1,200,731	284,534	22.27%
17	16,882	993.041	61	2,711	2,537	1,030	137,065	909,921	1,299,265	389,344	22.84%
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Sales For Resale			Misc-Fire Usage)		Misc-Fire Usage)		Total Water				
Average Customer Count	Total Billed Usage	Yearly Average Use /Customer	Average Customer Count	Total Billed Usage	Average Customer Count	Total Billed Usage	Average Customer Count	Total Billed Usage	System Delivery	Non-Revenue Water	NRW %
11	524,301	46,604.504	-	-	-	-	115,934	13,430,638	15,642,249	2,211,611	14.14%
12	467,028	38,918.998	-	-	-	-	116,659	12,172,308	13,904,566	1,732,258	12.46%
12	486,031	40,502.563	-	-	-	-	117,499	12,971,570	14,817,379	1,845,809	12.46%
12	441,378	35,787.405	-	-	-	-	118,292	11,909,914	13,785,489	1,875,576	13.61%
13	459,905	35,377.327	-	-	-	-	119,851	12,509,707	14,393,527	1,883,820	13.09%
12	378,358	31,097.887	-	-	-	-	121,919	11,394,673	13,347,879	1,953,205	14.63%
14	463,821	33,732.406	-	-	-	-	123,452	11,799,918	14,026,229	2,226,311	15.87%
15	448,914	29,927.630	-	-	-	-	125,035	12,120,419	14,292,262	2,171,843	15.20%
15	500,372	33,358.135	28	-	2,250	-	128,753	12,399,350	14,934,629	2,535,279	16.98%
15	465,916	31,061.039	33	-	2,306	-	130,250	11,855,435	14,772,355	2,916,920	19.75%
14	458,647	32,375.061	39	7,244	2,356	8,021	131,631	11,757,837	14,917,915	3,160,078	21.18%
15	320,900	21,879.525	46	8,197	2,390	5,884	133,065	12,000,307	15,533,843	3,533,536	22.75%
16	240,026	14,620.886	45	4,809	2,413	4,948	134,462	11,502,741	14,678,800	3,176,059	21.64%
16	271,739	17,072.580	45	6,155	2,457	6,414	135,654	11,666,070	14,972,451	3,306,381	22.08%
16	310,134	19,183.557	54	12,617	2,515	6,840	136,806	12,124,626	15,713,364	3,588,738	22.84%

COMMONWEALTH OF KENTUCKY
BEFORE THE PUBLIC SERVICE COMMISSION

IN THE MATTER OF:

ELECTRONIC APPLICATION OF KENTUCKY-AMERICAN WATER COMPANY FOR AN ADJUSTMENT OF RATES, A CERTIFICATE OF PUBLIC CONVENIENCE AND NECESSITY FOR INSTALLATION OF ADVANCED METERING INFRASTRUCTURE, APPROVAL OF CERTAIN REGULATORY AND ACCOUNTING TREATMENTS, AND TARIFF REVISIONS	**)**	**CASE NO. 2023-00191**

DIRECT TESTIMONY OF MELISSA SCHWARZELL

June 30, 2023

Q. Please state your name and business address.

A. My name is Melissa Schwarzell. My business address is 1 Water Street, Camden, NJ, 08102.

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

A. I am employed by the American Water Works Service Company, Inc. ("AWWSC"). My title is Senior Principal, Finance.

Q. Have you previously testified before the Kentucky Public Service Commission?

A. Yes. I testified as a witness in Case No. 2012-00520, Case No. 2018-00358, and Case No. 2022-00299 which were all Kentucky-American Water Company ("KAWC") cases.

Q. Have you previously filed testimony before any other regulatory commissions?

A. Yes. I have also sponsored testimony before the utility regulatory bodies in Tennessee and Ohio for Tennessee-American Water Company and Ohio American Water, respectively.

Q. Please state your educational and professional background.

A. I received a Bachelor of Science degree from Ohio State University in 2001 and a Master of Business Administration, with a concentration in Finance, from Temple University in 2020. I have completed NARUC Utility Rate School and the IPU Advanced Regulatory Program.

I have been employed by Service Company since 2009. Prior to my current role, I served as Senior Director Rates and Regulatory from January 2017 through June of 2019, leading a team focused on developing testimony, exhibits and work papers in support of various regulatory filings for the regulated subsidiaries of American Water. I also served as Interim Director of Rates for Kentucky and Tennessee from late 2018 through June of 2019, providing leadership and support on rate and regulatory matters to those states. From February 2016 to January 2017, I served as Director of Investor Relations. In this role, I supported American Water's relationship with its shareholders, by developing public disclosures and communicating with institutional investors and equity analysts. From December 2014 to February 2016, I served as Manager of Regulatory Policy, providing research, communications, and business support on key water service issues and policy solutions. From February 2011 to December 2014, I held increasing levels of responsibility for rates and regulatory service to American Water's subsidiaries as a Financial Analyst Rates I, Financial Analyst Rates II, and Rates and Regulatory Analyst III. Prior to this, I began my career at American Water working as Executive Assistant to the Eastern Division Vice President of Finance. In this role, I provided labor budgeting, as well as analysis of labor costs, Service Company, revenues, and the general ledger.

Prior to joining American Water, I worked for the Bluegrass Area Agency on Aging, supporting social services programs for senior citizens in Central Kentucky. From 2001 to 2003, I worked as a Financial and Administrative Assistant, supporting bookkeeping, website, and database development. In 2004 I was promoted to Program Specialist.

Q. What are your current employment responsibilities?

A. My duties as Senior Principal, Finance include the development of financial models to support forecasts and strategic decision making for a variety of stakeholders in the business. I also support select financial planning and analysis processes.

Q. What is the purpose of your direct testimony in this proceeding?

A. The purpose of my testimony is to introduce and support the Cost Benefit Analysis included in the Company's application for a Certificate of Public Convenience and Necessity ("CPCN") for Advanced Metering Infrastructure ("AMI").

Q. Please identify the analysis you are sponsoring and for which you will be providing testimony.

A. Attached to the Application as Exhibit A is a comprehensive document, titled Kentucky-American Water Advanced Metering Infrastructure Deployment Plan, which supports KAWC's request for a CPCN for AMI. I am responsible for the Cost Benefit Analysis ("CBA") portion of that Exhibit.

Q. Did you prepare the Cost Benefit Analysis ("CBA")?

A. I did.

Q. What kind of information did you gather for the CBA?

To prepare the CBA, I collected information on a variety of topics. These included information on KAWC's metering equipment, labor workforce, service orders, and fleet.

- Metering equipment: The Company's installed meter inventory was obtained as of May 23, 2023, with details on meter size, location, brand, and endpoint type. For the purposes of the CBA, only meters 2" and smaller were examined, as these are the meters replaced periodically when testing is required. Current prices for metering equipment and meter installation were also obtained.

- Labor: Current meter reading employee counts, recent service order volumes & times, recent historic wages for meter readers and field service representatives ("FSRs") as well as recent historic labor-related costs and overhead factors were all obtained. Average wages, wage growth rates, and overhead factors were assessed. Details are shown in Figure 10 of Exhibit A.

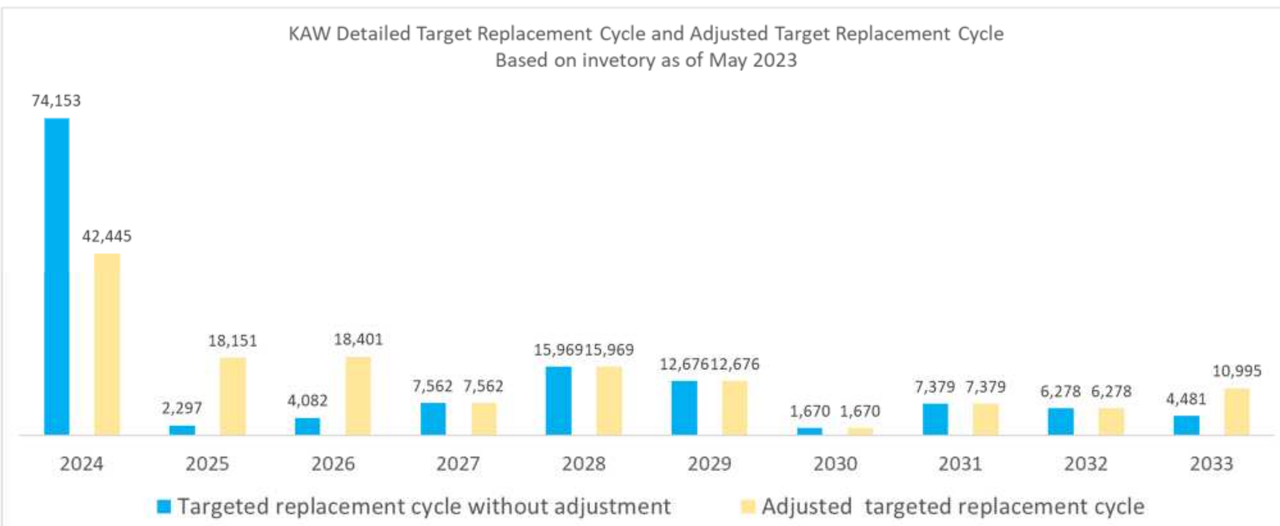
- Data on the Company's fleet, especially light trucks (used by meter readers and FSRs), was also obtained, including quantity of vehicles, net book value, average mileage and average miles per gallon. Details are shown in Figure 11 of Exhibit A

- Material and installation labor pricing: Current material prices were obtained for meters, AMI endpoints, AMR endpoints and lids. Fixed network pricing is somewhat variable, depending on the cost of installation, but recent estimates and contract rates where available were used. Growth rates for the cost of goods were assessed based on the Bureau of Labor Statistics Consumer Price Index for all goods, using a 10-year compound annual growth rate ("CAGR"), ending with the period December 2022, which equaled 2.6%. All starting prices are shown in Figure 8 of Exhibit A.

Q. How did you assess the meter and endpoint replacement quantities and timing for the model?

A. I assessed the quantities and timing by examining the records and through collaboration with the engineering and operations teams.

First, the meter inventory was compared with the Company's targeted cycle for scheduled meter replacement. For just under 98% of the meters examined (the 5/8" and 1" meters), the target is a 10-year cycle. For the remaining 2% of meters (the 1.5" and 2"), a replacement was targeted within 4 years for the purposes of the analysis. Without adjustment, following this cycle strictly would have resulted in the replacement of approximately 74,000 meters in 2024, as these were at or past the 10-year mark, followed by just a few thousand replacements in 2025 and 2026. Based on guidance from the operations teams, this quantity of meter replacement in a single year was deemed to be infeasible, and the initial batch of meter replacements was spread out instead, with a little more than half completed in 2024, and the remaining volume spread into 2025 and 2026. Additionally, adjustments were made for additional 5/8" meter replacement work still expected in 2023. The quantities before and after adjustment are shown in the chart below. The adjusted quantities were used in the CBA.



Q. How did you determine the lid replacement quantities for the CBA model?

A. Based on consultation with operations, new lids were presumed to be required for AMI meter installations, so one lid is included for each meter in the first replacement cycle.[1]

[1] For the purposes of cost / benefit modeling, a conservative assumption is made that lids are replaced 1 to 1 with applicable meter replacements. In reality, many meter pits in Kentucky are dual set, meaning there are two meters in one pit. In these instances, only one lid would need to be purchased.

For Automated Meter Reading ("AMR") installations, new lids were expected to be required when Mueller (Hersey) brand meters were being replaced. There are approximately 35,000 of these meters currently installed, and they are expected to be replaced in 2024, so for AMR scenarios, these investments are accounted for. Charts that compare modeled meter and lid replacements, in thousands, can be found in Figures 6 and 7 in Exhibit A.

Q. For the Hybrid AMI model, how did you determine the quantity and coverage of collectors?

A. The quantity and coverage of collectors was determined based on a propagation study completed by [redacted] The propagation study determined how many collectors would be required, if installed on the Company's existing assets, in order to achieve coverage. The best view [redacted] provided was that 50 collectors would be required in order to provide just 24% daily coverage of the Company's meters, approximately 75% of which had a [redacted] AMR endpoint capable of delivering a read to the collector. It was presumed that these 50 collectors could be installed over a period of 3 years, to create AMI enabled coverage for approximately 18% of meters (24% x 75%).

Q. How did you determine the method for calculating benefits?

A. Before discussing labor benefits, it's important to note that the Company is measuring the financial benefit of reduced demand for certain kinds of labor. This measured benefit does not necessarily equate to a reduced workforce because it is expected that resources can be redeployed to other high value work, such as achieving meter reading and other service orders targets in the near term, accommodating the demands of a growing customer base in the long term, and on a continual basis, seeking operational and customer service improvements.

That said, based on consultation with the operations team, assumptions were made that the demand for full-time meter reading positions would eventually go away, once AMI was fully implemented. So, the full meter reading benefit is based on the eventual elimination of the current seven full time meter reading positions. Because the program will follow a periodic replacement schedule, as opposed to targeting certain routes for replacement, the meter reading benefits are not modeled to begin until the system would be almost fully converted to AMI, beginning in year 10 (2033).

The operations team was likewise consulted to assess potential improvements to service order demand based on new technology. KAWC anticipates that it will see significantly reduced demand for service orders that are solely related to obtaining a meter reading (such as when customers are moving into or out of a premise, or to confirm or reattempt a read for billing purposes). KAWC also expects that AMI can reduce the frequency of consecutive estimate type orders, given the increased opportunities to obtain a read prior to the close of the billing window. Finally, KAWC also expects reductions in the generation of field service orders aimed at investigating reads, consumption patterns, problems with meters, checking for leaks, and examining zero usage incidences, given the opportunities to complete this work without a truck roll. Unlike meter reading benefits, which KAWC expects may require nearly complete AMI saturation of meter reading routes to be achieved, field service work benefits are expected to increase in real time, with every meter installed. Consequently, these benefits increase in the CBA model in line with the increases in AMI enabled meters.

Q. What other key cost drivers were used for calculating the CBA?

A. Other cost drivers include the property tax rate, the pre-tax rate of return on the investment, the gross ups for uncollectibles and utility regulatory assessment fees, and the pace at which the cost of the investment is recognized over time (depreciation). A property tax rate of 1.39% was used on the balance of net plant. This is designed to align with the Company's forecasted property tax expense rate in this proceeding. Likewise, the pre-tax rate of return used in the CBA is based on the forecasted capital structure and rates of return shown on Exhibit 37 J (52.45% common equity ratio, 10.75% cost of equity, 47.55% debt and preferred stock ratio, at a composite 4.69% rate.) Income tax rates for gross up were assumed to be 21% for federal tax and 5% for state tax. Lastly, uncollectible expense and utility regulatory assessment fees were calculated using a 0.75% rate, similar to the revenue gross ups found in Exhibit 37 H. For recognizing the cost of the investment over time, a 10% depreciation rate was used for the CBA, in order to match the costs of the investment over time with the benefits generated by the investment. To avoid undue refinement, this rate was applied to the entire capital investment, and no breakout was made to allocate portions of investment to cost of removal (which does not depreciate) vs. Utility Plant in Service ("UPIS").

Q. Are there other methodologies that are noteworthy and relevant to the calculation of the CBA?

A. A few additional notes can be made about the CBA calculation. A half year or averaging principle was used for calculating annual costs and benefits in the model. Depreciation expense was calculated in net of presumed retired property, which is generally consistent in all scenarios for the first 10 years, except for the retirement of lids, and which after the first 10 years is based on the value of the first 10 years' investment. Deferred taxes are calculated based on life vs. book depreciation and are included in the rate base. Rate base values reflect starting balances of UPIS and accumulated depreciation for meter infrastructure and are common to all scenarios, thus they do not produce differences in the findings.

Q. Nominal dollars are sometimes described in Exhibit A. Can you explain this?

A. Yes. All calculations were made in nominal dollars. This means that the future prices for labor and materials do reflect inflation over time. The figures represent the actual expected cost or benefits in future periods, at prices and wages that are higher than today's. This can be helpful to see the expected cost benefit relationship at any given point in time.

Q. Net present value is also sometimes described in Exhibit A. Can you explain this?

A. Yes. "Net Present Value" or "NPV" is a method of attempting to determine the value of a future sum of money to an investor today. It involves discounting future cash flows based on an assumed rate of expected return.

In this case, we are using a utility customer type view of costs and benefits, by spreading the cost of the investment over time and recognizing annual expense-type benefits as they would occur (much like would happen in a revenue requirement calculation). To derive an NPV, each year's net costs and benefits to customers are discounted using the utilities' proposed rate of return, to arrive at 2024 present value. This makes early costs and benefits more impactful and later costs and benefits less impactful.

Q. What were the findings of the financial analysis?

A. There are several findings:

1) AMI for each brand evaluated is generally more capital intensive, especially in early years when lids are required, relative to the same brand's AMR / Existing Tech solution.

2) AMI creates benefits relative to the current state for KAWC operations, whereas AMR / Existing Tech is the current state for KAWC and isn't anticipated to produce operational or customer service benefits.

3) When costs and benefits are netted, AMI [redacted] becomes the least cost solution after year 11, once AMI meter reading benefits begin in full. It is modeled to remain least costly in the years that follow. This can be seen in Figure 12 of Exhibit A

4) When costs and benefits are netted in the first 10 years, AMR / Existing Tech [redacted] is least cost, followed by AMI [redacted] and AMR/ Existing Tech [redacted] This can be seen in Figure 12 of Exhibit A.

5) On a net present value basis, AMR / Existing Tech [redacted] has the lowest cost net of benefits, followed by AMI [redacted] then AMR / Existing Tech [redacted] AMI [redacted] and AMI [redacted] Hybrid. These can be seen in Figure 13 of Exhibit A. On a net present value basis, the difference between AMI [redacted] and the lowest figure (AMR [redacted] is $3.1mm over the course of 20 years, or approximately $150,000 / year. This is not particularly material. For context, $150,000 is just

over 1/10 of a percent of the company's revenue requirement of $142mm, as shown in Exhibit 37A.

Q. Do these findings fully capture all of the potential benefits of AMI?

A. No. The CBA focuses on the largest and most measurable financial benefits related to utility operations (meter-reading labor, field service labor and vehicle costs). Other expected AMI benefits not measured in the CBA include:

- Reduced call handling costs, given increased customer access to usage data through online tools;
- Identification of hidden customer-side leaks or plumbing failures more rapidly, which should reduce costs associated with:
    - production expenses (e.g. chemicals and fuel & power)
    - leak adjustments
    - high bills
    - property damage from burst pipes;
- Reduced greenhouse gas emissions due to fewer truck rolls and less water production; and
- Increased employee and public safety, which has more value than can be adequately expressed in dollars and cents.

Q. Should cost net of benefits be the only consideration in the CPCN?

A. No. Consistent with previous Kentucky Public Service Commission findings, selection of a proposal that ultimately costs more than an alternative does not necessarily result in wasteful duplication,[2] and this is especially true when the "next to least cost" alternative is only marginally more expensive than that alternative.

Q. What is your recommendation?

A. The findings of the CBA support the approval of the CPCN. The cost benefit relationship offered by [redacted] AMI delivers a solution that is among the least cost of the reasonable alternatives evaluated by KAWC and only marginally more expensive than AMR [redacted] And beyond the benefits measured in the CBA, AMI unlocks the potential for a variety of additional customers service, safety, operational and financial benefits.

It is also clear given the deployment approach, whereby cellular AMI will be installed for normal, scheduled, periodic replacements or in instances of damaged or broken equipment, that there is a need for the investment and no wasteful duplication. Unlike other AMI deployments in the state, KAWC is not planning to accelerate the replacement of all meter reading equipment regardless of its age or condition. Rather, KAWC is merely planning to transition to an updated technology for meter reading equipment as it completes meter and endpoint replacements in the normal course of business. My recommendation is that the CPCN be approved.

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[2] September 22, 2021 order in Case No. 2021-00095, page 4.

Q. Does this conclude your direct testimony?

A. Yes.

CONFIDENTIAL INFORMATION REDACTED

VERIFICATION

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

The undersigned, Melissa Schwarzell, being duly sworn, deposes and says that she is the Senior Principal, Finance, for American Water Works Service Company, Inc., that she has personal knowledge of the matters set forth in the accompanying the accompanying testimony for which she is identified as the responsible witness, and that the answers contained therein are true and correct to the best of her information, knowledge and belief.

Melissa Schwarzell

Subscribed and sworn to before me, a Notary Public in and before said County and State, this 23 day of June, 2023.

Notary Public

My Commission Expires:
4/15/2025

ANN G. ALFANO
NOTARY PUBLIC OF NEW JERSEY
COMMISSION # 50014130
MY COMMISSION EXPIRES 4/15/2025

COMMONWEALTH OF KENTUCKY
BEFORE THE PUBLIC SERVICE COMMISSION

IN THE MATTER OF:

ELECTRONIC APPLICATION OF KENTUCKY-	**)**	
AMERICAN WATER COMPANY FOR AN	**)**	
ADJUSTMENT OF RATES, A CERTIFICATE	**)**	
OF PUBLIC CONVENIENCE AND NECESSITY	**)**	**CASE NO. 2023-00191**
FOR INSTALLATION OF ADVANCED METERING	**)**	
INFRASTRUCTURE, APPROVAL OF CERTAIN	**)**	
REGULATORY AND ACCOUNTING	**)**	
TREATMENTS, AND TARIFF REVISIONS	**)**	

DIRECT TESTIMONY OF WESLEY E. SELINGER

June 30, 2023

Q. Please state your name and business address.

A. My name is Wesley E. Selinger. 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 Director of Regulatory Services.

Q. Have you previously filed testimony before this or any other commission?

A. I have not sponsored testimony before the Kentucky Public Service Commission. I have sponsored testimony before the Missouri Public Service Commission on multiple occasions, as well as the Illinois Commerce Commission and the West Virginia Public Service Commission.

Q. Please state your educational and professional background.

A. I received a Bachelor's degree in Economics from the University of Illinois at Springfield in 2013 and a Master's degree in Public Administration from the University of Illinois in 2016.

I have been employed by the Service Company since May 2021. Prior to joining American Water, from June 2012 through September 2013, I was employed by the Center for Business and Regulation at the University of Illinois as an assistant to the Director. From September 2013 to September of 2017, I was employed by Vectren Corporation, now Centerpoint Energy, an electric and natural gas utility located in Evansville, Indiana in the positions of Rates Analyst and Senior Regulatory Policy Analyst. From September 2017 to May of 2021, I was employed by Spire Missouri, a natural gas local distribution company serving customers in St. Louis and Western Missouri in the positions of Manager, Rates and Planning and Director of Rates and Regulatory.

Q. What are your duties as Director of Regulatory Services?

A. My duties in this position consist of reviewing, preparing, and assisting in regulatory filings and related activities for the regulated subsidiaries of American Water Works Company, Inc. ("American Water"), including Kentucky-American Water Company ("KAWC" or "the Company"). My responsibilities include the preparation of written testimony, exhibits and work papers in support of rate applications and other regulatory filings as well as responses to data requests for Kentucky-American and its regulated utility affiliates.

Q. What is the purpose of your direct testimony in this proceeding?

A. The scope of my testimony will include the following topics:

- Rate Base
- Cost of Service Study

RATE BASE

Q. What is Rate Base?

A. Rate Base measures the Company's net investment in the provision of water service. This investment includes the facilities and property for sourcing, treating, pumping, and distributing potable water for consumption, sanitation, and fire protection, as well as assets to support customer accounting, customer service and basic business operations. The additions to rate base include items such as:

- Utility Plant in Service ("UPIS"), Construction Work in Progress ("CWIP"), Utility Plant Acquisition Adjustments ("UPAA") and
- Working Capital, Deferred Maintenance, and Deferred Debits;

Deductions from rate base include:

- Accumulated Depreciation
- Contributions in Aid of Construction ("CIAC") and Customer Advances
- Accumulated Deferred Income Taxes ("ADIT"), and
- Other Rate Base Elements

Each of these Rate Base components is described in my testimony below.

Q. Has the Company changed the methodology for calculating rate base from the approach advocated in its last case?

A. No. The Company utilized a thirteen-month average rate base calculation for the forecasted test year, as shown on Schedule B-1. Most of the rate base elements shown on this schedule were forecasted from actual per books data as of March 31, 2023, adjusted for changes expected through January 31, 2025. Total rate base for the base year (twelve months ended September 2023) is $549,086,904, as shown on Schedule B-1, page 1 of 2. Total average rate base for the forecasted test year is $588,397,566, as shown on Schedule B-1, page 2 of 2.

Q. Please describe each of the components of rate base.

A. Each component of rate base is described below:

UPIS

UPIS includes the original cost of all land, land rights, easements, structures, improvements, and other equipment that is used for the provision of water utility service. The rate case forecast begins with the UPIS balance per books as of March 31, 2023. The forecasted monthly UPIS balances were then calculated through January 31, 2025, by adding forecasted plant additions as they are placed into service and deducting forecasted plant retirements. Plant additions are addressed in greater detail in the testimony of KAWC witness Shelley Porter. The 13-month average UPIS balance from January 31, 2024, through January 31, 2025, was then calculated, to arrive at the average value for the forecasted test year. The thirteen-month average UPIS in the forecasted test year is $992,189,917. Supporting schedules and analysis can be found on Schedule B-1 and B-2.

CWIP

CWIP is the value of utility plant that is under construction, but which has not yet been placed into service. The forecast for CWIP begins with the actual balance as of March 31, 2023. This balance is then forecasted monthly through January 2025 by adding estimated construction expenditures and deducting estimated transfers to UPIS. The 13-month average CWIP is determined by totaling the monthly balances for January 31, 2024, to January 31, 2025, and dividing by 13 months. The 13-month average CWIP balance in the forecasted test year as reflected on Schedule B-1, page 2 of 2, is $21,980,639. Further support can also be found on Schedule B-4.

WORKING CAPITAL AND OTHER WORKING CAPITAL

Working Capital and Other Working Capital are included in a utility's rate base to recognize the cost of funding the lag between the time utility service is rendered to the customer and the time it takes to collect revenues from the customer to pay for that service. In other words, investors had to provide "upfront" capital to fund the daily operations of the business before customers pay their bills. The Working Capital calculations can also properly reflect the impact of any difference in time between when expenses are accrued, and the associated cash is disbursed. Working Capital is calculated through two separate processes. The first process measures average Materials and Supplies balances, the result of which is shown as "Other Working Capital" on Exhibit 37, Schedule B-1. The second process is a Lead / Lag Study, the result of which is shown as "Working Capital" on Exhibit 37, Schedule B-1.

Materials and Supplies are calculated for the forecasted test year by averaging 13 months of recent actual balances in the Materials and Supplies account. The average in this case is $5,058,174 and this is used to estimate the thirteen-month average for the forecasted test year. This is shown as "Other Working Capital" on Exhibit 37, Schedule B-1 and as "Materials and Supplies" on Exhibit 37, Schedule B-5.

The second process, the Lead/Lag Study, was performed based on historical data for the twelve months ended December 31, 2022, and used the same methodology as in the prior case.

The determination of the amount of Lead/Lag working cash for a specific item is a complex calculation. As more fully explained in the Direct Testimony of KAWC witness Walker, the daily Lead/Lag Factor is calculated by starting with Revenue Lag Days, subtracting

Expense Lag Days and Check Clear Time Days for each expense category to arrive at the Net Interval. This Net Interval is then multiplied by the daily amount of forecasted operating funds. The total Lead Lag Working Capital was calculated to be $3,141,000 and is shown as "Working Capital" on Exhibit 37, Schedule B-1. More detailed information is also shown on Exhibit 37, Schedule B-5.

DEFERRED MAINTENANCE

This item is calculated as an average of the thirteen-month balance of deferred maintenance projects based upon both actual and forecasted projects. These projects include the repainting and repairs of system water storage tanks, and other major repairs as shown in the workpapers that support Schedule B. These types of deferred maintenance expenses have been afforded rate base treatment by the Commission in past proceedings. Based upon these actual expenditures and the forecasted expenditures for January 2024 through January 2025, as adjusted for amortizations, the Company has developed a thirteen-month average of these deferred maintenance items totaling $11,733,076. Amortization of the balances are set at 15 years.

DEFERRED DEBITS

The Company is requesting a rate base addition of $937,064 for Deferred Debits. This is for Source of Supply cost and was approved for rate base treatment and a 40-year amortization in Case No. 2000-00120. The unamortized balance is included in rate base and is offset by applicable deferred taxes. The Deferred Debit balance is shown on Exhibit 37, Schedule B-1.

UPAA

The Company is proposing to include a UPAA amount of $72,387 in rate base in this proceeding associated with the North Middletown Water acquisition. The forecasted test year amount is shown on Exhibit 37, Schedule B-1.

ACCUMULATED DEPRECIATION

The accumulated depreciation component of rate base includes both accumulated life depreciation and accumulated cost of removal. The accumulated depreciation forecast begins with the actual balances as of March 31, 2023, less the accumulated depreciation of the allowance for funds used during construction ("AFUDC") regulatory asset. Accumulated depreciation and accumulated cost of removal balances were then calculated by month through the end of the forecasted test period utilizing the depreciation rates proposed in the depreciation study in this case sponsored by witness Kennedy.

Additional monthly adjustments were made to the accumulated depreciation to account for plant retirements, salvage credits, and the cost of removals. Under utility plant accounting, when an asset is retired, the UPIS is reduced by the original cost of the asset and the accumulated depreciation account is reduced by an equal amount. When scrap value is obtained from retired plant, the salvage amount is added to the depreciation liability. The cost of removal is based on an average of the past three years and these expenditures reduce the liability.

The forecasted test year accumulated depreciation was then calculated by averaging the month end balances from March 31, 2023, to January 31, 2025. The 13-month average forecast for Accumulated Depreciation is calculated at ($246,429,780), as shown on Schedule B-1. Additional detail can be found on Exhibit 37, Schedule B-3.

CIAC

CIAC reflects non-refundable money or physical property that is received from third parties, and thus is not considered to be investor supplied capital. An example would be a portion of main that was relocated to accommodate road alignment changes and the relocation was funded by the Kentucky Transportation Cabinet or a local municipality. Tap fees paid by new Kentucky-American customers are another example.

With the enactment of the Tax Cuts and Jobs Act in 2017, all contributions are taxable. Consequently, all CIAC receipts are forecasted to be grossed up for income tax, which offsets the cost of the corresponding tax assets to the general customer base.

CIAC balances are calculated monthly by increasing the actual March 31, 2023, balance for forecasted grossed-up contribution, less amortization of the contributed funds. The thirteen month-end balances for the forecasted test year ending January 31, 2025, are averaged to arrive at the forecasted test year amount of ($79,333,094). CIAC is shown on Exhibit 37, Schedules B-1 and B-6.

CUSTOMER ADVANCES

Customer advances are a reduction to rate base to recognize money collected, typically from developers, for the installation of new mains. The funds are held in an account and refunded to the contributor / developer as new customers tap onto the extended main. By having a developer pay for the initial main extension investment, KAWC avoids the cost of financing speculative developments until new customers materialize. Like other rate base components, the forecasted test year customer advances amount is developed starting with the March 31, 2023 balance, then forecasting monthly by adding forecasted receipts from developers, and deducting forecasted refunds.

Like CIAC, Customer Advances are taxable due to the Tax Cuts and Jobs Act. KAWC collects additional funds from developers to recognize the taxability of funds received. The forecast is consistent with this practice and includes gross-up on all expected Customer Advances. This offsets the cost of the corresponding tax assets to the general customer base.

The thirteen-month end balances from January 2024 through January 2025 are then averaged, yielding a value of ($15,444,246). Customer advances are shown on Exhibit 37, Schedules B-1 and B-6.

ADIT

The Company included ($105,461,959) of accumulated deferred income taxes in its requested rate base in this case. This includes both the forecasted ADIT balance, as well as the forecasted balance of excess ADIT, which is a regulatory liability associated with changes in tax rates. The largest portion of this excess ADIT is associated with the TCJA. The value of ADIT (including excess ADIT) in the Company's forecasted rate base is reflected on Exhibit 37, Schedules B-1, and B-6.

UNAMORTIZED ITC

This item is calculated as an average of the thirteen-month end balance of unamortized 3% investment tax credits ("ITCs") for the forecasted test year ending January 31, 2025. The Company also has 4% and 10% investment tax credits on its books, and these are reflected in the Company's capital structure, as discussed in the testimony of Company witness Nicholas Furia. This rate base treatment of 3% ITC is consistent with previous rate cases. The thirteen-month average amount in the forecasted test year of 3% ITC is $2. The values may be seen on Exhibit 37, Schedules B-1 and B-6.

<u>OTHER RATE BASE ELEMENTS</u>

In Case No. 2010-00036, the Commission adjusted rate base for Contract Retentions, Unclaimed Extension Deposit Refunds, Retirement Work in Progress, and Accrued Pension. The Company has included Unclaimed Checks as "Other Rate Base" deductions in this proceeding. Contract retentions has a $0 value in the forecasted test year. The Company used a 13-month average of Unclaimed Checks from March 2022 to March 2023, and has forecasted that the ($45,612) average is appropriate for the forecasted test year. The total Other Rate Base deduction in this proceeding is thus ($45,612). This may be seen on Exhibit 37, Schedules B-1.

DEPRECIATION AND AMORTIZATION

Q. Could you please describe the depreciation expense requested for recovery in this case?

A. Depreciation expense was calculated for the forecasted test year by multiplying the forecasted UPIS balances for each plant account by the life depreciation rates and cost of removal accrual rates found reasonable for those accounts in the depreciation study sponsored by KAWC witness Kennedy This is offset by CIAC amortization, which is similarly calculated by multiplying gross CIAC balances by their amortization rates. The

CIAC amortization essentially offsets the depreciation expense resulting from assets funded by CIAC. Depreciation expense is shown on Exhibit 37, Schedule C.1.

Q. Could you please describe the amortization expense requested for recovery in this case?

A. Amortization expense is adjusted from the base year to remove disallowed items (some previous UPAA amortization and a regulatory asset amortization), and to make slight adjustments to align the forecast for amortized property losses and AFUDC. Amortization expenses are shown on Exhibit 37, Schedule C.1.

CLASS COST OF SERVICE STUDY

Q. What is a class cost of service study?

A. A class cost of service study ("COSS") is an analysis that calculates the total investment and operating costs incurred by a utility to provide service to various customer groups, or service classes. The resulting cost determination process is based on the allocation of costs to defined customer groups is called a cost-of-service study. Because the analysis is completed by customer class, the study is often referred to as a "class cost of service study."

Q. Is the Company filing a COSS for water service in this proceeding?

A. Yes. The Company's COSS for water service is provided in Exhibit 36.

Q. Does the American Water Works Association ("AWWA") provide guidance on the appropriate methods to be used in conducting cost of service studies?

A. Yes. The AWWA M1 Manual, titled "Principles of Water Rates, Fees, and Charges," provides guidance on the appropriate allocation methodologies to use in allocating different types of costs to customer classes.

Q. Has the Company relied on the recommendations made in the AWWA M1 Manual in conducting its COSS submitted in this case?

A. Yes. Specifically, the AWWA M1 Manual outlines the use of the Base/Extra capacity method to allocate production and distribution costs to customer classes. The Company uses this Base/Extra capacity method in its COSS as I describe later in my Direct Testimony.

Q. Please describe the Company's COSS study.

A. The Company's COSS allocates the total revenue requirement for its water operations to the various cost categories listed below. The revenue requirement for each of these cost categories is then allocated to the various customer classes it serves, with different cost categories allocated to customer classes using a class allocation factor that differs depending on the nature of the costs. In this study, the Company's aggregated cost of water service was allocated to the following customer classifications:

- Residential
- Commercial
- Industrial
- Other Public Authorities
- Sales for Resale
- Miscellaneous

- Private Fire
- Public Fire

The study was performed in accordance with generally accepted principles and procedures and results in the relative cost responsibilities of each class of customers. The allocated cost of service provides one input to designing customer rates under the Company's proposed rate design to produce the revenues that will yield the proposed revenue requirement in this case.

Q. How is the Company's COSS organized?

A. The Company's COSS is organized into five different tabs, or sections:

- The "Summary" tab allocates the revenue requirement for each cost category to customer class and summarizes the results of the cost allocations by customer class and business function to get a total revenue requirement by class and business function. The "Summary" tab also compares the revenue requirements by customer class to Test-Year revenues under Current Rates;
- The "Account Detail" tab contains rate base, depreciation, and operations and maintenance ("O&M") balances by account and allocates each account to a cost category;
- The "Usage Statistics" tab contains usage information by customer class and other information necessary to calculate class allocation factors for the "Account Detail" tab;
- The "Class Allocators" tab provides detailed calculations of all class allocation factors used in the COSS; and

- The "Allocation Summary" tab provides a summary of the class allocation factors and the allocation factors used to allocate costs to cost categories.

Q. What are the various cost categories that the Company uses to group individual accounts?

A. The cost categories that the Company assigns to specific classes are as follows:

- Variable cost
- Capacity (Fixed) costs
- Source of Supply
- Water Power and Pumping Expenses
- Water Treatment
- Transmission Mains
- Distribution Mains
- Storage Costs
- Metering Cost
- Service Line Costs
- Customer Related Costs
- Hydrants

Q. Please describe how the individual accounts that make up the Company's revenue requirement are assigned to a cost category.

A. Most of the accounts that make up the Company's revenue requirement are directly assigned to a single cost category. Examples of this include net plant for metering equipment, fuel and power for water pumping, and water treatment labor expenses. Accounts not directly assignable to a single cost category are allocated among cost categories based on appropriate allocation factors. Examples of this include general and intangible plant, miscellaneous rate base deductions, administrative and general ("A&G") expenses, and payroll taxes. These accounts are allocated to cost categories based on net plant, O&M, or labor dollars associated with each cost element depending on the account.

Variable Costs

Q. Please describe what variable costs are and how variable costs are allocated to customer classes.

A. Variable costs are costs that tend to vary directly with the amount of water produced and consumed and are allocated to customer classes in direct proportion to each class's annual water consumption. Variable costs refer to purchased water, purchased fuel and electric power, treatment chemicals and waste disposal costs.

Capacity Costs - General

Q. Please describe what capacity costs are and how capacity costs are allocated to customer classes.

A. Capacity costs refer to the costs of owning, operating, and maintaining the Company's water production, pumping, and distribution system that do not vary directly with the amount of water consumed. These costs are allocated to customer classes in a variety of ways as described below.

<u>Capacity Costs – Source of Supply</u>

Q. Please describe how source of supply costs are allocated to customer classes.

A. Source of Supply costs not included in the variable cost section described above are allocated to customer classes using a methodology known as the Base/Extra capacity method.

Q. Please describe the Base/Extra capacity method.

A. The Base/Extra capacity method is explained in detail in the AWWA M1 Manual. It is generally accepted as a sound method for allocating the cost of water service to customer classes and was used by the Company in previous cases. In short, the Base/Extra capacity methodology relies upon a combination of the average water consumption across the year for each customer class and each class's estimated maximum daily consumption for the year to allocate the fixed costs of the water production and distribution system to customer classes. The Base/Extra capacity allocator is a two-part allocator, the first part being the "Base" component and the second part being the "Extra" component.

The Base component for each class is simply the average daily consumption for the year (total annual sales divided by 365 days). For each class, the "Base" allocation component is each class's average consumption divided by the total sum of average consumption for all classes. The “Extra” component is the difference between the estimated maximum daily consumption for a given class and the average daily consumption for that class. For each class, the “Extra” allocator is each class’s extra demand value divided by the total sum of the extra demand values for all customer classes.

For each such class, the Base/Extra allocator is calculated as a weighted average of the Base and Extra allocators. The Base component is weighted by the total system load factor expressed as a percentage (average daily system production divided by maximum day production), and the Extra component is weighted by one minus the system load factor.

Q. Please describe how the maximum daily consumption values for each class were estimated.

A. Maximum daily consumption values for each customer class are estimated based on daily and hourly consumption data collected via Advanced Metering Infrastructure (“AMI”) meter data. These samples, which are selected by customer class and subgroups within each class, are chosen such that the customers in each customer class sample have monthly usage characteristics that are nearly identical to monthly usage characteristics for KAWC customers, thus providing consistency between the usage characteristics of the customers in each sample and the usage characteristics of KAWC customers in total.

<u>Capacity Costs – Water Pumping Costs</u>

Q. Please describe how water pumping costs are allocated to customer classes.

A. Similar to Source of Supply expenses, water pumping costs not included in the variable cost section described above are allocated to customer classes based on the Base/Extra capacity methodology. Unlike source of supply costs, water pumping costs are also allocated to fire service customers. The methodology for determining fire service requirements for the purposes of cost allocation is described later in my testimony.

<u>Capacity Costs – Water Treatment Costs</u>

Q. Please describe how water treatment costs are allocated to customer classes.

A. Water treatment costs not included in the variable cost section described above are allocated to customer classes based on the Base/Extra capacity methodology.

<u>Capacity Costs – Transmission Costs</u>

Q. How does the Company distinguish between transmission mains and distribution mains?

A. Generally, for cost allocation purposes, mains 10 inches and larger are classified as serving a transmission function and mains smaller than 10 inches are classified as serving a distribution function.

Q. Are transmission mains costs allocated to all customer groups?

A. Yes. All customer groups are considered to take service from the Company's transmission system and therefore transmission costs are allocated to all customer classes, including fire service.

Q. Please describe how costs associated with transmission mains are allocated to customer classes.

A. Costs associated with transmission mains are allocated to each customer class based on the Base/Extra capacity method with fire service included.

<u>Capacity Costs – Distribution Costs</u>

Q. Are distribution costs allocated to all customer groups?

A. No. It is often the case that for large industrial, other public authority, and sales for resale customers, service is taken directly from the transmission system (10 inches and above) and therefore it would not be appropriate to allocate costs related to the smaller diameter distribution system to these customers. For each customer class, a calculation is done to estimate the percentage of water sales served to that class directly from the transmission system. The portion of sales in each class that is estimated to be served directly from the transmission system is not subject to an allocation of distribution costs. It is only the distribution-level sales in each class that are allocated distribution-related costs, and that relative level of sales is different for different customer classes.

Q. Please describe how costs associated with distribution mains are allocated to customer classes.

A. After removing usage served at the transmission level, costs associated with distribution mains are allocated to customer classes based on the previously defined Base/Extra capacity method that is modified to include a component that recognizes maximum hourly demand (at the distribution level) instead of maximum daily demand. This is appropriate because the transmission main system functions as a conduit from production facilities to the distribution system and is sized to accommodate aggregated water demands from customers that take service at the distribution level. Sizing at the distribution level needs to accommodate higher demands for shorter periods of time for smaller groups of customers whose demands have less diversity than aggregated demands at the transmission level. It is therefore appropriate to consider maximum hourly consumption requirements for distribution mains allocation, as opposed to maximum daily requirements.

Q. Aside from the differences between maximum hourly consumption and maximum daily consumption, does the Base/Extra allocator work the same way as you have previously described?

A. Yes. In this case, the Base component for each class is the average hourly consumption for the year (total annual sales divided by 8,760 hours). The "Extra" component is calculated as the difference between the maximum hourly consumption for a given class and the average hourly consumption for that class. For each class, the Base/Extra allocator is calculated as a weighted average of the Base and Extra allocators. The Base component is weighted by the total system load factor expressed as a percentage defined this time as average hourly system consumption divided by estimated maximum hourly system consumption, and the Extra component is weighted by one minus the system load factor.

Q. Please describe how the maximum hourly consumption values are calculated.

A. The process for estimating maximum hourly consumption values by class is similar to the process used to estimate maximum daily consumption values by customer class. Maximum hourly consumption values for each customer class are estimated from the same samples used to estimate maximum daily consumption to ensure that there is consistency in usage patterns.

<u>Capacity Costs – Storage Costs</u>

Q. Please describe how the Company allocates the revenue requirements associated with storage costs to customer classes.

A. Storage costs are allocated to customer classes based on the Base/Extra allocator using hourly estimated peak demand for the extra component, like the allocator used to allocate distribution mains costs. For the storage allocator, it is assumed that all fire service capacity requirements are served first from the Company's storage capacity, and the remaining capacity is allocated to non-fire service classes using the Base/Extra hourly allocator.

<u>Customer-Related Costs – Metering Costs</u>

Q. Please describe how the Company allocates the revenue requirements associated with metering costs to customer classes.

A. Metering costs are allocated to customer classes based on a weighted number of customers calculation. Meter equivalent weightings in each class are based on AWWA standard meter equivalents by meter size.

<u>Customer-Related Costs – Service Line Costs</u>

Q. Please describe how the Company allocates the revenue requirements associated with service line costs to customer classes.

A. Service line costs are allocated to customer classes based on a weighted number of customers calculation like that for metering costs. Service line size weightings are the same as those used in the prior KAWC water service rate case.

<u>Customer-Related Costs – Customer Service Costs</u>

Q. Please describe how the Company allocates the revenue requirements associated with customer service costs to customer classes.

A. Customer service costs are allocated to customer classes based on the total number of customers in each class.

<u>Fire Service Costs</u>

Q. How is fire service maximum day usage considered in the Company's cost of service analysis?

A. Fire service maximum day usage requirements are determined through a combination of information on firefighting requirements provided by the American Insurance Association. This information relates firefighting requirements in terms of maximum gallons per minute and the duration of time those requirements are needed to general population levels. Given the population of the KAWC service territory, a firefighting demand of 12,000 gallons per minute for 6 hours was used in the Company's cost of service analysis. This firefighting demand was split between private fire and public fire customer groups based on the relative potential water demand for each class, which is in turn based on the number and size of service lines and hydrants in each class.

Q. How is the fire service requirement used in the Company's cost of service study?

A. The fire service requirement is used as an add-on level of demand to the maximum daily and hourly demands for the other customer classes in the study and it is used in the

Base/Extra allocation of capacity costs for water pumping, transmission, distribution, and storage costs.

Q. How is the revenue requirement for hydrants allocated to customer classes?

A. The Company has proposed a revenue increase to public fire consistent with the overall revenue increase requested in this case. Any additional revenue requirement for fire hydrants that is over and above that level has been allocated back to other customer classes on the same basis as the revenue requirement for the metering cost category.

<u>Other Allocation Factors</u>

Q. How are Administrative and General costs and cash working capital costs allocated to cost categories and customer classes?

A. A&G costs are generally allocated to cost categories and customer classes on the same basis that direct costs were allocated. For most A&G expenses, costs are allocated the same way that non-A&G direct O&M costs are allocated. A&G costs that are associated with employee costs, however, are allocated directly based on labor expenses. A&G costs that are associated with customer service are directly assigned to the customer service cost category. Cash working capital is allocated based on total O&M expense.

Q. How are depreciation costs allocated to cost categories and customer classes?

A. Annual depreciation accruals are allocated based on the function of the facilities represented by the depreciation expense for each depreciable plant account. The original cost less depreciation of utility plant in service was similarly allocated for the purpose of developing factors for allocating items such as income taxes and operating income. These factors are based on the result of allocating other costs and are computed internally in the cost allocation model.

Q. How are income taxes and other operating income requirements allocated to cost categories and customer classes?

A. Income taxes and operating income requirements are allocated to cost categories and customer classes based on the amount of total rate base allocated to each customer class which is largely made up of net plant items described, but also contain adjustments to rate base such as accumulated deferred income taxes.

Q. Please summarize the results of the Company's cost of service analysis.

A. The following table provides a summary of the Company's cost of service analysis and shows total current revenues, cost of service, and the difference between the two by customer class:

Customer Class	Revenue at Present Rates		Cost of Service		Difference
Residential	$	61,978,034	$	73,793,458	19.1%
Commericial	$	29,876,720	$	35,002,834	17.2%
Industrial	$	2,876,520	$	3,976,171	38.2%
Other Public Authority	$	7,475,823	$	12,291,728	64.4%
Sales for Resale	$	1,282,287	$	2,484,801	93.8%
Public Fire	$	4,907,201	$	6,040,017	23.1%
Private Fire	$	3,532,895	$	4,171,346	18.1%
Miscellaneous	$	106,174	$	138,468	30.4%
Total	$	112,035,654	$	137,898,823	23.1%

Q. Does this conclude your direct testimony?

A. Yes.

VERIFICATION

STATE OF ILLINOIS)
) **SS:**
COUNTY OF SANGAMON)

The undersigned, Wesley Selinger, being duly sworn, deposes and says that he is the Director of Rates and Regulatory for American Water Works Service Company, Inc., that he has personal knowledge of the matters set forth in the accompanying testimony for which he is identified as the responsible witness, and that the answers contained therein are true and correct to the best of his information, knowledge and belief.

Wesley Selinger

Subscribed and sworn to before me, a Notary Public in and before said County and State, this 22nd day of June, 2023.

Notary Public

My Commission Expires:
10-12-24

OFFICIAL SEAL
MARK S BEANBLOSSOM
NOTARY PUBLIC - STATE OF ILLINOIS
MY COMMISSION EXPIRES:10/12/24

KENTUCKY-AMERICAN WATER COMPANY, INC.

DOCKET NO. 2023-00191

DIRECT TESTIMONY

OF

HAROLD WALKER, III

ON BEHALF OF

KENTUCKY-AMERICAN WATER COMPANY

June 30, 2023

DIRECT TESTIMONY
HAROLD WALKER, III
KENTUCKY-AMERICAN WATER COMPANY
DOCKET NO. 2023-00191

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DIRECT TESTIMONY

HAROLD WALKER, III

I. INTRODUCTION

Q. Please state your name and address.

A. My name is Harold Walker, III. My business address is 1010 Adams Avenue, Audubon, Pennsylvania, 19403.

Q. By whom are you employed?

A. I am employed by Gannett Fleming Valuation and Rate Consultants, LLC as Manager, Financial Studies.

Q. What is your educational background and employment experience?

A. My educational background, business experience and qualifications are attached hereto as Appendix A.

II. SCOPE OF TESTIMONY

Q. What is the purpose of your testimony?

A. The purpose of my testimony is to recommend appropriate cash working capital allowances for inclusion in Kentucky-American Water Company's (KAWC or the Company) rate base. My recommendations are based upon the results of a lead-lag study that was performed under my direct supervision.

Q. Have you prepared an exhibit presenting the results of your studies?

A. Yes. I have prepared Exhibit HW-1 which contains the 33 Schedules identified as Schedule HW-1 through Schedule HW-33 summarizing the Company's cash working capital claim in this proceeding.

III. SUMMARY OF WORKING CAPITAL CLAIM

Q. What are the components of the Company's working capital claims?

A. KAWC's working capital claim is comprised of cash (lead/lag), materials and supplies, and prepayments. My testimony presents the cash (lead/lag) component of the Company's working capital claim. The materials and supplies element of KAWC's working capital claim are discussed in the Direct Testimony of KAWC witness Selinger, and are shown as "Other Working Capital" on the Exhibit 37, Schedule B-1.

The cash component of the Company's working capital requirements is summarized on Schedule HW-1. Schedule HW-1 is the source information for the lead days and lag days data that is also shown on the Company's filing Exhibit 37, Schedule B-5.2, Working Capital - Lead/Lag Study. The Base Year at September 30, 2023 is shown on pages 1 through 3 of Schedule HW-1 ("Base Year Results") and the Forecast Year at January 31, 2025 is shown on pages 4 through 6 of Schedule HW-1 ("Forecast Year Results").

Q. What is the Company's cash component of their working capital requirement based on the Base Year Results?

As shown on page 1 of Schedule HW-1, the amount of working capital required to finance the recovery of the total operating funds based on the Base Year Results is $3,067,000.

Q. What is the Company's cash component of their working capital requirement based on the Forecast Year Results?

A. As shown on page 4 of Schedule HW-1, the amount of working capital required to finance the recovery of the total operating funds based on the Forecast Year Results is $3,146,000. This is shown as "Working Capital" on Exhibit 37, Schedule B-1.

IV. PRINCIPLES OF CASH WORKING CAPITAL

Q. What is cash working capital?

A. Cash working capital is the amount of funds necessary to finance the day-to-day operations of the Company.

Q. How is cash working capital treated for ratemaking purposes?

A. It is included in the determination of a utility's rate base.

Q. Why is cash working capital included as an element of rate base?

A. Cash working capital bridges the gap between the time when funds are provided to the Company by investors to allow the Company to provide service to customers, and the time revenues are received from customers as reimbursement for these services. Working capital is included in rate base to compensate investors for the use of their funds over and above their investment in plant, and to provide investors with a return on the funds required by the Company for daily operations.

Q. How was the cash working capital requirement determined?

A. I conducted a lead-lag study to determine the timing of KAWC's cash inflows and outflows and analyze the level of funding required to operate on a day-to-day basis. In

Kentucky, a utility's cash working capital is measured by calculating: (1) the amount of time elapsed between when the Company provides a service to its customers and when the Company receives payments from its customers; and (2) the amount of time elapsed between when the Company receives goods and services and when the Company pays its suppliers for those goods and services. The difference between these two elapsed periods of time is known as the "net lag."

The net lag is multiplied by the average daily operating funds (cost of service or revenue requirement) to determine the cash working capital requirement.

Q. Please describe the components of a cash working capital analysis.

A. The two primary components of a cash working capital analysis are revenue lags and expense leads. The revenue lag is the elapsed time between the delivery of a company's product to its customers and when a company receives payment for the delivery of the product. Investor-provided funds are required to keep a company running during the revenue lag time period, when the revenue stream is temporarily insufficient to finance daily operational needs.

The expense lead is the elapsed time between when a good or service is provided to a company and when a company pays its supplier for the good or service. During the expense lead time period, cash received from customers may temporarily exceed a company's payments to its suppliers for goods or services, and the excess may be used to repay investor-provided funds.

The net difference between the revenue lag and expense lead determines a company's cash working capital requirement.

Q. Generally speaking, how did you calculate the revenue lag?

A. The revenue lag is the sum of three distinct components: the service period lag, the billing lag, and the collection lag.

Q. What is the service period lag?

A. The service period lag is the average time between meter readings. The average, or mid-point, between meter readings, based on monthly meter readings, is roughly 15 days. The mid-point service period lag is produced by dividing the service period of roughly 30 days by two.

Q. What is the billing lag?

A. The billing lag is the time from the meter reading date to the date the customer is billed. On the customer billing date, the bill is mailed to the customer, and the total billing amount for the cycle is recorded to KAWC's accounts receivable. The bills are prepared and mailed roughly 4 days after meters are read.

Q. What is the collection lag?

A. The collection lag is the average number of days from the date the bills are mailed to customers to the date payments are received by KAWC. This was determined by summing the daily accounts receivable balance during the 12 months ended December 31, 2022 and dividing by the sum of the daily receipts for the same period.

Q. Generally speaking, how did you calculate the expense lead?

A. The expense lead is the sum of two distinct components: the service lead and the payment lead. The service lead is the average time that a service or good was provided to the Company. If a service or good was provided for 20 days, the 20-day service period is divided by two to produce a midpoint of 10 days for the service period lead. The payment lead is the number of days from the end of the service period to the payment date for the service or good. If payment for the service or good was provided on the 30th day and the end of the service period was the 20th day, the payment lead is 10 days (30 days – 20 days). KAWC's expenses can be separated into five major sub-accounts: operating and maintenance expense, depreciation expense, taxes other than income taxes, income taxes, and after-tax operating income. In each of these sub-accounts, the lead days were calculated for each invoice or account by adding the midpoints of the service periods (the service lead) to the date the Company paid the invoices or accounts (the payment lead).

Q. Why are midpoints used in cash working capital analysis?

A. Midpoints are used to determine the average period during which a service or good is rendered or provided, prior to, or subsequent to, payment for the service. The midpoint assumes that service is provided evenly over the service and payment period. For example, if a service is provided over a 30-day period, then on average, 30 days of service was provided evenly for 15 days (30÷2) of the service period. Mathematically, the midpoint is the weighted average number of days that the full service period number of days *(e.g.,* 30 days) was provided.

Q. What data set did you utilize in your lead-lag study?

A. The data sets were selected after developing an understanding of the Company's collections, payment policies, and procedures. I requested representative data sets from the Company. Once the requested raw data had been provided, data validation was performed by comparing an actual invoice or a bill with data from the utility's systems to ensure accuracy.

The revenue lag data set for the Company was based on an accounts receivable analysis of the beginning balance, the daily charges to this balance as bills were processed and mailed, and the daily receipts for all the days of the year during the 12 months ended December 31, 2022. The revenue lag data set for the Company also included an analysis of the cycle billing, the beginning and ending service dates (meter read dates), the total amount of billings (revenues), and the date bills were mailed (or posted).

The expense lead data set was based on information generated from the Company's central accounts payable system. The expense lead data sets for the 12 months ended December 31, 2022 were analyzed to develop the service beginning and ending dates, the amount purchased, and the date of payment. Generally speaking, sampling was randomly done for the invoices within each expense and tax category. In instances where there were large differences in the dollar amount of the invoices in a single expense category, sampling was focused on the largest invoices within the expense category. For example, the larger electric accounts were sampled instead of the smaller electric accounts. The samples analyzed averaged 88% of the Company's total expense and tax dollars.[1]

Q. What time period does your lead-lag study encompass?

A. The lead-lag study in this case analyzed the net revenues and the associated net cost of service during the 12 months ended December 31, 2022, to derive the lag (lead) days. While the lead and lag days were calculated from December 31, 2022 overall per books results, the operating funds that they were applied to are for Base Year Results (Schedule HW-1, page 1) and Forecast Year Results (Schedule HW-1, page 4).

V. RESULTS OF THE LEAD-LAG STUDY

Q. What are the results of the lead-lag study?

A. Schedule HW-1 sets forth the results of the lead-lag study. The amount of working capital required to finance the recovery of the operating funds based on the Base Year Results shown on page 1 of Schedule HW-1 is $3,067,000. The amount of working capital required to finance the recovery of the operating funds based on the Forecast Year Results shown on page 4 of Schedule HW-1 is $3,146,000.

Q. Please describe the development of the Base Year's net interval days shown on page 1 of Schedule HW-1.

A. The net interval days (or net lag days) requirement is based on the net difference between the dollar weighted revenue lag days and the dollar weighted operating funds (or cost of service) lead days. The net interval days (or net lag days) calculation use

[1] Sampling for the total expense and tax dollars paid totaled 88% and reflected a range of sampling from 2% to over 100% of the total line-item dollars (or expenses). Sampling of total line-item dollars greater than 100% of the expense occurred for those line items which included the capital portion, employee contributions, or deferred amounts.

revenue lag days and the operating funds (or cost of service) lead days to determine the appropriate net lag day which was multiplied by the average operating funds (or cost of service) per day (*e.g.*, expenses / 365 days) line item. The product of multiplying the net interval days by the average daily operating funds produces the Company's Base Year working capital requirement.

The Company's revenue lag days for the receipt of the Base Year revenue is developed on page 3 of Schedule HW-1. The inputs to Company's revenue lag days were developed in the lead-lag study shown on Schedule HW-2. The lead days for the payments of the Base Year operating funds (or cost of service) are developed on page 2 of Schedule HW-1. The inputs to Company's operating funds (or cost of service) lead days were developed in the lead-lag study shown on Schedules HW-4 through HW-33 and the schedule references for the operating funds lead days for the operating funds (or cost of service) line items are shown on page 1 of HW-3.

Q. How was the Company's Forecast Year working capital requirement determined?

A. The Company's Forecast Year working capital requirement was determined on pages 4 through 6 of Schedule HW-1. The Company's Forecast Year working capital requirement was developed using the identical procedure described above for the Base Year working capital requirement.

Q. Please explain the procedures used to determine the revenue lag days.

A. Schedule HW-2 summarizes the development of the 37.7-day revenue lag days determined in the lead-lag study during the 12 months ended December 31, 2022. for revenue lag for the Company. Company. The Company's 37.7-day revenue lag is developed on page 1 of Schedule HW-2. The revenue lags reflect the Company's service, billings, and collections frequencies.

Q. Please explain the procedures used to determine the service period and the billing lag days for customer revenues.

A. The lag days for the service period and the billing lag are developed on page 2 of Schedule HW-2. As mentioned previously, the service period lag was measured from the midpoint of the service period to the meter reading date, and the billing lag was measured from the meter reading date to the billing date.

A weighted average service period lag of 13.5 days is shown on page 2 of Schedule HW-2. KAWC's bills are prepared, mailed, and recorded to accounts receivable 4.4 days after meters are read. Adding the service period lag to the billing lag produces a combined 17.9-day service period and billing lag (13.5 days + 4.4 days = 17.9 days) as shown on page 2 of Schedule HW-2.

Q. Please describe the procedure used to calculate the collection lag.

A. As mentioned previously, the collection lag is the average number of days from the date the bills were mailed to the date payments are received and was determined by summing the daily accounts receivable balance during the test year and dividing by the sum of the daily test year receipts. This results in an average collection lag of 19.8 days as shown on page 3 of Schedule HW-2.

Q. Please summarize the total revenue lag.

A. The total revenue lag of 37.7 lag days is the result of adding the 17.9-day service period and billing lag and an average collection lag of 19.8 days as shown on page 1 of Schedule HW-2.

Q. Please explain the calculation of lead days for the operating funds or cost of service expenses shown on Schedule HW-1.

A. For each cost of service expense item that is shown, the lead days were calculated for each invoice or account based on the midpoints of the service periods to the dates the Company paid the invoices or accounts. Page 1 of Schedule HW-3 shows the schedule references for the operating funds or cost of service lead days for the Company.

Q. How were the lead days determined for the operating and maintenance expenses sub-account line items shown on Schedule HW-1?

A. For the operating and maintenance expense sub-accounts line items shown, the lead days were determined for each invoice or account sampled based on the midpoints of the service periods to the dates the Company paid the invoices or accounts. As explained previously, sampling was randomly done for the invoices within each expense and tax category.

For example, the weighted average lead days for fuel and power equal 24.6 days (see Schedule HW-5). The lead days for fuel, power and electric expenses were calculated for each invoice examined based on the midpoints of the service periods to the dates the Company paid the invoices. In total, 89% of the fuel, power and electric expenses were sampled. Similar analyses were conducted for salaries and wages (see Schedule HW-4), chemicals (see Schedule HW-6), purchased water (see Schedule HW-7), waste disposal (see Schedule HW-8), service company expense (see Schedule HW-9), contracted services (see Schedule HW-10), group insurance (see Schedule HW-11), OPEB (see Schedule HW-12), other benefits (see Schedule HW-13), pensions (see Schedule HW-14), insurance other than group (see Schedule HW-15), rents (see Schedule HW-16), maintenance service and supplies (see Schedule HW-17), office supplies and services (see Schedule HW-18), employee related expense (see Schedule HW-19), building maintenance and services (see Schedule HW-20), postage printing and stationary (see Schedule HW-21), telecommunication (see Schedule HW-22), miscellaneous expense (see Schedule HW-23), transportation (see Schedule HW-24), and customer accounting (see Schedule HW-25). A zero lead has been assigned for regulatory expenses and amortization to recognize the full revenue lag related to these expenses. Similarly, for uncollectables expense, a zero lead has been assigned to recognize the full revenue lag related to this expense.

Q. How were the lead days determined for the depreciation and amortization expense sub-account line items shown on Schedule HW-1item?

A. For the depreciation and amortization expense line item, a zero lead has been assigned because the full amount of the depreciation expense is deducted from rate base when the expense is recorded.

Q. Please explain in more detail why a zero lead day should be assigned to the depreciation and amortization line item?

A. A zero lag has been assigned because accumulated depreciation, the contra account for the depreciation expense, has been deducted from rate base. The accumulated depreciation account balance always includes an uncollected amount of depreciation expense that is equal to the revenue requirement lag days (i.e., 37.7 days). Assigning a zero lag recognizes that investor funding occurred but it has not yet been recovered from customers.

Q. How were the lead days determined for the taxes other than income taxes sub-account line items shown on Schedule HW-1?

A. For most of the taxes other than income taxes sub-account line items shown, the lead days were calculated based on the midpoint of the tax liability period to the payment date, weighted by the actual amount paid. The exception to this was payroll taxes, where the lead days were calculated based on the midpoint of the tax liability period to the payment date. These tax sub-accounts are shown on Schedules HW-26 through HW-28. These taxes include property taxes (see Schedule HW-26), utility tax (see Schedule HW-27), and payroll taxes (see Schedule HW-28).

Q. How were the lead days determined for the income taxes sub-account line items shown on Schedule HW-1?

A. For the federal taxes (current) and state taxes (current) sub-account line items shown, the lead days were calculated based on the midpoint of the tax period to the payment date, weighted by the percent of the payment required. The derivation of the federal taxes (current) 28.8 lead days is shown on Schedule HW-29 and the derivation of the state taxes (current) 28.8 lead days is shown on Schedule HW-30.

A zero lead has been assigned for deferred taxes because they are deducted from rate base, as they are recorded as part of accumulated deferred taxes.

Q. Please explain in more detail why zero expense lead days should be assigned to the deferred taxes line item.

A. A zero lead has been assigned to deferred taxes because accumulated deferred taxes have been deducted from rate base as a source of cost-free funds. The deferred taxes account balance always includes an uncollected amount of deferred tax expense that is equal to the revenue requirement lag days (*i.e.*, 37.7 days). Therefore, the recorded amount of accumulated deferred taxes deducted from rate base overstates the actual amount of available cost-free capital by an amount equal to the revenue requirement lag days. Assigning a zero lead recognizes that a portion of these cost-free funds have not been collected from customers. That is, KAWC collects cash associated with its deferred tax liability from customers in the same way it collects all other revenues – with a revenue lag of 37.7 days. Mathematically, the recorded amount of deferred taxes that is subtracted from rate base is overstated by a portion of the uncollected revenue requirement related to deferred taxes, because, like all other revenues, it is uncollected from customers for 37.7 days.

Q. How were the lead days determined for the after-tax operating income sub-account line items shown on Schedule HW-1?

A. For the interest expense sub-account line items, the lead days were calculated based on the midpoint of the interest period to the payment date. The derivation of the interest expense lead days is shown on Schedules HW-31 through HW-32 and the preferred stock expense lead days is shown on Schedule HW-33. I assigned a zero lead day to net income, or return on invested capital, because net income is the property of investors when it is earned. Further, net income is earned when service is provided. However, when service is provided, the net income is not collected simultaneously as is evidenced by the existence of the revenue requirement lag days. This situation is remedied by assigning a zero lead day to net income in recognition that these earnings have not been recovered from customers.

Q. Please summarize your determination of the working capital requirement shown on Schedule HW-1.

A. The amount of working capital required to finance the recovery of the total operating funds based on the Base Year Results is $3,067,000 as shown on page 1 of Schedule HW-1. The amount of working capital required to finance the recovery of the total operating funds based on the Forecast Year Results is $3,146,000, shown on page 4 of Schedule HW-1.

Q. Does this conclude your direct testimony?

A. Yes, it does.

VERIFICATION

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

The undersigned, Harold Walker, III, being duly sworn, deposes and says that he is the Manager Financial Studies for Gannett Fleming Valuation and Rate Consultants, LLC, that he has personal knowledge of the matters set forth in the accompanying testimony for which he is identified as the responsible witness, and that the answers contained therein are true and correct to the best of his information, knowledge, and belief.

____
Harold Walker, III

Subscribed and sworn to before me, a Notary Public in and before said County and State, this 30 day of June, 2023.

____
Notary Public

My Commission Expires:
August 28, 2026

ROBERT A. FERGUSON
Notary Public
State of New Jersey
My Commission Expires Aug. 28, 2026
I.D.# 50169468

Professional Qualifications

of

Harold Walker, III

Manager, Financial Studies

Gannett Fleming Valuation and Rate Consultants, LLC.

EDUCATION

Mr. Walker graduated from Pennsylvania State University in 1984 with a Bachelor of Science Degree in Finance. His studies concentrated on securities analysis and portfolio management with an emphasis on economics and quantitative business analysis. He has also completed the regulation and the rate-making process courses presented by the College of Business Administration and Economics Center for Public Utilities at New Mexico State University. Additionally, he has attended programs presented by The Institute of Chartered Financial Analysts (CFA).

Mr. Walker was awarded the professional designation “Certified Rate of Return Analyst” (CRRA) by the Society of Utility and Regulatory Financial Analysts. This designation is based upon education, experience, and the successful completion of a comprehensive examination. He is also a member of the Society of Utility and Regulatory Financial Analysts (SURFA) and has attended numerous financial forums sponsored by the Society. The SURFA forums are recognized by the Association for Investment Management and Research (AIMR) and the National Association of State Boards of Accountancy for continuing education credits.

Mr. Walker obtained a license as a Municipal Advisor Representative (Series 50) by Municipal Securities Rulemaking Board (MSRB) and Financial Industry Regulatory Authority (FINRA).

BUSINESS EXPERIENCE

Prior to joining Gannett Fleming Valuation and Rate Consultants, LLC., Mr. Walker was employed by AUS Consultants - Utility Services. He held various positions during his eleven years with AUS, concluding his employment there as a Vice President. His duties included providing and supervising financial and economic studies on behalf of investor owned and municipally owned water, wastewater, electric, natural gas distribution and transmission, oil pipeline and telephone utilities as well as resource recovery companies.

In 1996, Mr. Walker joined Gannett Fleming Valuation and Rate Consultants, LLC. In his capacity as Manager, Financial Studies and for the past twenty-five years, he has continuously studied rates of return requirements for regulated firms. In this regard, he supervised the preparation of rate of return studies in connection with his testimony and in the past, for other individuals. He also assisted and/or developed dividend policy studies, nuclear prudence studies, calculated fixed charge rates for avoided costs involving cogeneration projects, financial decision studies for capital budgeting purposes and developed financial models for determining future capital requirements and the effect of those requirements on investors and ratepayers, valued utility property for acquisition and divestiture, and assisted in the private placement of fixed capital securities for public utilities.

Head, Gannett Fleming GASB 34 Task Force responsible for developing Governmental Accounting Standards Board (GASB) 34 services and educating Gannett Fleming personnel and Gannett Fleming clients on GASB 34 and how it may affect them. The GASB 34 related services include inventory of assets, valuation of assets, salvage estimation, annual depreciation rate determination, estimation of depreciation reserve, asset service life determination, asset condition assessment, condition assessment documentation, maintenance estimate for asset preservation, establishment of condition level index, geographic information system (GIS) and data management services, management discussion and analysis (MD&A) reporting, required supplemental information (RSI) reporting, auditor interface, and GASB 34 compliance review.

In 2004, Mr. Walker was elected to serve on the Board of Directors of SURFA. Previously, he served as an ex officio director as an advisor to SURFA's existing President. In 2000, Mr. Walker was elected President of SURFA for the 2001-2002 term. Prior to that, he was elected to serve on the Board of Directors of SURFA during the period 1997-1998 and 1999-2000. He also previously served on the Pennsylvania Municipal Authorities Association, Electric Deregulation Committee.

EXPERT TESTIMONY

Mr. Walker has submitted testimony or been deposed on several topics before regulatory commissions and courts in 26 states including: Arizona, California, Colorado, Connecticut, Delaware, Hawaii, Idaho, Illinois, Indiana, Kentucky, Maryland, Massachusetts, Michigan, Missouri, New Hampshire, Nevada, New Jersey, New York, North Carolina, Oklahoma, Pennsylvania, Rhode Island, South Carolina, Vermont, Virginia, and West Virginia. His testimonies covered various subjects including lead-lag studies, fair rate of return, fair market value, the taking of natural resources, benchmarking, appropriate capital structure and fixed capital cost rates, depreciation, purchased water adjustments, synchronization of interest charges for income tax purposes, valuation, cash working capital, financial analyses of investment alternatives, and fair value. The following tabulation provides a listing of the electric power, natural gas distribution, telephone, wastewater, and water service utility cases in which he has been involved as a witness.

Client	Docket No.
Alpena Power Company	U-10020
Armstrong Telephone Company - Northern Division	92-0884-T-42T
Armstrong Telephone Company - Northern Division	95-0571-T-42T
Artesian Water Company, Inc.	90 10
Artesian Water Company, Inc.	06 158
Aqua Illinois Consolidated Water Divisions and Consolidated Sewer Divisions	11-0436
Aqua Illinois Hawthorn Woods Wastewater Division	07 0620/07 0621/08 0067
Aqua Illinois Hawthorn Woods Water Division	07 0620/07 0621/08 0067
Aqua Illinois Kankakee Water Division	10-0194
Aqua Illinois Kankakee Water Division	14-0419
Aqua Illinois Vermilion Division	07 0620/07 0621/08 0067
Aqua Illinois Willowbrook Wastewater Division	07 0620/07 0621/08 0067
Aqua Illinois Willowbrook Water Division	07 0620/07 0621/08 0067
Aqua Pennsylvania, Inc	A-2022-3034143
Aqua Pennsylvania Wastewater Inc	A-2016-2580061
Aqua Pennsylvania Wastewater Inc	A-2017-2605434

Aqua Pennsylvania Wastewater Inc	A-2018-3001582
Aqua Pennsylvania Wastewater Inc	A-2019-3008491
Aqua Pennsylvania Wastewater Inc	A-2019-3009052
Aqua Pennsylvania Wastewater Inc	A-2019-3015173
Aqua Pennsylvania Wastewater Inc	A-2021-3024267
Aqua Pennsylvania Wastewater Inc	A-2021-3026132
Aqua Pennsylvania Wastewater Inc	A-2021-3027268
Aqua Virginia - Alpha Water Corporation	Pue-2009-00059
Aqua Virginia - Blue Ridge Utility Company, Inc.	Pue-2009-00059
Aqua Virginia - Caroline Utilities, Inc. (Wastewater)	Pue-2009-00059
Aqua Virginia - Caroline Utilities, Inc. (Water)	Pue-2009-00059
Aqua Virginia - Earlysville Forest Water Company	Pue-2009-00059
Aqua Virginia - Heritage Homes of Virginia	Pue-2009-00059
Aqua Virginia - Indian River Water Company	Pue-2009-00059
Aqua Virginia - James River Service Corp.	Pue-2009-00059
Aqua Virginia - Lake Holiday Utilities, Inc. (Wastewater)	Pue-2009-00059
Aqua Virginia - Lake Holiday Utilities, Inc. (Water)	Pue-2009-00059
Aqua Virginia - Lake Monticello Services Co. (Wastewater)	Pue-2009-00059
Aqua Virginia - Lake Monticello Services Co. (Water)	Pue-2009-00059
Aqua Virginia - Lake Shawnee	Pue-2009-00059
Aqua Virginia - Land'or Utility Company (Wastewater)	Pue-2009-00059
Aqua Virginia - Land'or Utility Company (Water)	Pue-2009-00059
Aqua Virginia - Mountainview Water Company, Inc.	Pue-2009-00059
Aqua Virginia - Powhatan Water Works, Inc.	Pue-2009-00059
Aqua Virginia - Rainbow Forest Water Corporation	Pue-2009-00059
Aqua Virginia - Shawnee Land	Pue-2009-00059
Aqua Virginia - Sydnor Water Corporation	Pue-2009-00059
Aqua Virginia - Water Distributors, Inc.	Pue-2009-00059
Atlantic City Sewerage Company	WR21071006
Berkshire Gas Company	18-40
Berkshire Gas Company	22-20
Borough of Brentwood	A-2021-3024058
Borough of Hanover	R-2009-2106908
Borough of Hanover	R-2012-2311725

Borough of Hanover	R-2014-242830
Borough of Hanover	R-2021-3026116
Borough of Hanover	P-2021-3026854
Borough of Royersford	A-2020-3019634
Butler Area Sewer Authority	A-2020-3019634
Chaparral City Water Company	W 02113a 04 0616
California-American Water Company	CIVCV156413
Connecticut-American Water Company	99-08-32
Connecticut Water Company	06 07 08
Citizens Utilities Company	
Colorado Gas Division	-
Citizens Utilities Company	
Vermont Electric Division	5426
Citizens Utilities Home Water Company	R 901664
Citizens Utilities Water Company	
of Pennsylvania	R 901663
City of Beaver Falls	A-2022-3033138
City of Bethlehem - Bureau of Water	R-00984375
City of Bethlehem - Bureau of Water	R 00072492
City of Bethlehem - Bureau of Water	R-2013-2390244
City of Bethlehem - Bureau of Water	R-2020-3020256
City of Dubois – Bureau of Water	R-2013-2350509
City of Dubois – Bureau of Water	R-2016-2554150
City of Lancaster Sewer Fund	R-00005109
City of Lancaster Sewer Fund	R-00049862
City of Lancaster Sewer Fund	R-2012-2310366
City of Lancaster Sewer Fund	R-2019-3010955
City of Lancaster Sewer Fund	R-2019-3010955
City of Lancaster Water Fund	R-00984567
City of Lancaster Water Fund	R-00016114
City of Lancaster Water Fund	R 00051167
City of Lancaster Water Fund	R-2010-2179103
City of Lancaster Water Fund	R-2014-2418872
City of Lancaster Water Fund	R-2021-3026682
City of Lancaster Water Fund	P-2022-3035591
Coastland Corporation	15-cvs-216
Consumers Pennsylvania Water Company	

Roaring Creek Division	R-00973869
Consumers Pennsylvania Water Company	
Shenango Valley Division	R-00973972
Country Knolls Water Works, Inc.	90 W 0458
East Resources, Inc. - West Virginia Utility	06 0445 G 42T
Elizabethtown Water Company	WR06030257
Forest Park, Inc.	19-W-0168 & 19-W-0269
Hampton Water Works Company	DW 99-057
Hidden Valley Utility Services, LP	R-2018-3001306
Hidden Valley Utility Services, LP	R-2018-3001307
Illinois American Water Company	16-0093
Illinois American Water Company	22-0210
Indian Rock Water Company	R-911971
Indiana Natural Gas Corporation	38891
Jamaica Water Supply Company	-
Kane Borough Authority	A-2019-3014248
Kentucky American Water Company, Inc.	2007 00134
Middlesex Water Company	WR 89030266J
Millcreek Township Water Authority	55 198 Y 00021 11
Missouri-American Water Company	WR 2000-281
Missouri-American Water Company	SR 2000-282
Missouri-American Water Company	WR-2022-0303
Mount Holly Water Company	WR06030257
Nevada Power Company d/b/a NV Energy	20-06003
New Jersey American Water Company	WR 89080702J
New Jersey American Water Company	WR 90090950J
New Jersey American Water Company	WR 03070511
New Jersey American Water Company	WR-06030257
New Jersey American Water Company	WR08010020
New Jersey American Water Company	WR10040260
New Jersey American Water Company	WR11070460
New Jersey American Water Company	WR15010035
New Jersey American Water Company	WR17090985
New Jersey American Water Company	WR19121516
New Jersey American Water Company	WR22010019
New Jersey Natural Gas Company	GR19030420
New Jersey Natural Gas Company	GR21030679

Newtown Artesian Water Company	R-911977
Newtown Artesian Water Company	R-00943157
Newtown Artesian Water Company	R-2009-2117550
Newtown Artesian Water Company	R-2011-2230259
Newtown Artesian Water Company	R-2017-2624240
Newtown Artesian Water Company	R-2019-3006904
North Maine Utilities	14-0396
Northern Indiana Fuel & Light Company	38770
Oklahoma Natural Gas Company	PUD-940000477
Palmetto Utilities, Inc.	2020-281-S
Palmetto Wastewater Reclamation, LLC	2018-82-S
Pennichuck Water Works, Inc.	DW 04 048
Pennichuck Water Works, Inc.	DW 06 073
Pennichuck Water Works, Inc.	DW 08 073
Pennsylvania Gas & Water Company (Gas)	R-891261
Pennsylvania Gas & Water Co. (Water)	R 901726
Pennsylvania Gas & Water Co. (Water)	R-911966
Pennsylvania Gas & Water Co. (Water)	R-22404
Pennsylvania Gas & Water Co. (Water)	R-00922482
Pennsylvania Gas & Water Co. (Water)	R-00932667
Philadelphia Gas Works	R-2020-3017206
Public Service Company of North Carolina, Inc.	G-5, Sub 565
Public Service Electric and Gas Company	ER181010029
Public Service Electric and Gas Company	GR18010030
Presque Isle Harbor Water Company	U-9702
Sierra Pacific Power Company d/b/a NV Energy	19-06002
Sierra Pacific Power Company d/b/a NV Energy	22-06014
St. Louis County Water Company	WR-2000-844
Suez Water Delaware, Inc.	19-0615
Suez Water Idaho, Inc.	SUZ-W-20-02
Suez Water New Jersey, Inc.	WR18050593
Suez Water New Jersey, Inc.	WR20110729
Suez Water Owego-Nichols, Inc.	17-W-0528
Suez Water Pennsylvania, Inc.	R-2018-3000834
Suez Water Pennsylvania, Inc.	A-2018-3003519
Suez Water Pennsylvania, Inc.	A-2018-3003517
Suez Water Rhode Island, Inc.	Docket No. 4800

Suez Water Owego-Nichols, Inc.	19-W-0168 & 19-W-0269
Suez Water New York, Inc.	19-W-0168 & 19-W-0269
Suez Westchester, Inc.	19-W-0168 & 19-W-0269
Town of North East Water Fund	9190
Township of Exeter	A-2018-3004933
United Water New Rochelle	W-95-W-1168
United Water Toms River	WR-95050219
Upper Pottsgrove Township	A-2020-3021460
Valley Township (water)	A-2020-3019859
Valley Township (wastewater)	A-2020-3020178
Valley Water Systems, Inc.	06 10 07
Virginia American Water Company	PUR-2018-00175
Virginia American Water Company	PUR-2021-00255
West Virginia-American Water Company	15-0676-W-42T
West Virginia-American Water Company	15-0675-S-42T
Wilmington Suburban Water Corporation	94-149
York Water Company	R-901813
York Water Company	R-922168
York Water Company	R-943053
York Water Company	R-963619
York Water Company	R-994605
York Water Company	R-00016236
Young Brothers, LLC	2019-0117

Exhibit HW-1

KENTUCKY AMERICAN WATER COMPANY, INC.

CASE NO. 2023-00191

TO ACCOMPANY THE DIRECT TESTIMONY OF

HAROLD WALKER, III

ON LEAD-LAG STUDY - WORKING CAPITAL

Lead-Lag Schedules

Schedule HW-1 Through Schedule HW-33

Kentucky-American Water Company

Calculation of Cash Working Capital Requirements
Based on Lead-Lag Study For the Twelve Months Ended December 31, 2022

Index to Schedules

Schedules	Schedule Subject
Schedule HW-1, Page 1	Summary of Base Year Working Capital - Lead-Lag Study
Schedule HW-1, Page 2	Summary of Base Year Weighted Net Operating Funds Lead Days
Schedule HW-1, Page 3	Summary of Base Year Weighted Revenue Lag Days
Schedule HW-1, Page 4	Summary of Forecast Year Working Capital - Lead-Lag Study
Schedule HW-1, Page 5	Summary of Forecast Year Weighted Net Operating Funds Lead Days
Schedule HW-1, Page 6	Summary of Forecast Year Weighted Revenue Lag Days
Schedule HW-2, Page 1	Summary of Total Revenue Lag Days
Schedule HW-2, Page 2	Service Period and Billing Lag Days
Schedule HW-2, Page 3	Calculation of Collection Lag Days
Schedule HW-3, Page 1	Summary of Operating Funds Lead Days
Schedule HW-3, Page 2	Operating Expenses & Taxes Sample Sizes Used In the Lead-Lag Study
Schedule HW-4	Salaries and Wages Lead Days
Schedule HW-5	Fuel, Power and Electric Lead Days
Schedule HW-6	Chemicals Lead Days
Schedule HW-7	Purchased Water Lead Days
Schedule HW-8	Waste Disposal Lead Days
Schedule HW-9	Service Company Expense Lead Days
Schedule HW-10	Contracted Services Lead Days
Schedule HW-11	Group Insurance Lead Days
Schedule HW-12	OPEB Lead Days
Schedule HW-13	Other Benefits Lead Days
Schedule HW-14	Pensions Lead Days
Schedule HW-15	Insurance Other than Group Lead Days
Schedule HW-16	Rents Lead Days
Schedule HW-17	Maintenance Service and Supplies Lead Days
Schedule HW-18	Office Supplies and Services Lead Days
Schedule HW-19	Employee Related Expense Lead Days
Schedule HW-20	Building Maintenance and Services Lead Days
Schedule HW-21	Postage Printing and Stationary Lead Days
Schedule HW-22	Telecommunication Lead Days
Schedule HW-23	Miscellaneous Expense Lead Days
Schedule HW-24	Transportation Lead Days
Schedule HW-25	Customer Accounting Lead Days
Schedule HW-26	Property Taxes Lead Days
Schedule HW-27	Utility Tax Lead Days
Schedule HW-28	Payroll Taxes Lead Days
Schedule HW-29	State Income Taxes (Current) Lead Days
Schedule HW-30	Federal Income Taxes (Current) Lead Days
Schedule HW-31	Long-Term Debt Interest Expense Lead Days
Schedule HW-32	Short-Term Debt Interest Expense Lead Days
Schedule HW-33	Preferred Dividends Lead Days

Kentucky-American Water Company
Supporting Calculations for Company's Exhibit 37, Schedule B-5.2
Summary of Base Year Working Capital - Lead-Lag Study
Base Year at September 30, 2023

Line No.	Description	Days	Amount
1			
2			
3	Total Operating Funds		$117,329,255
4			
5	Average Daily Operating Funds		321,450
6			
7	Composite Average Days Interval Between:		
8			
9	(A) Date Service Furnished and Date Collections Deposited	37.75	
10			
11	(B) Date Expenses Incurred and Date of Payment	28.21	
12			
13	(C) Net Interval	9.54	
14			
15	Total Working Capital		$3,066,633
16			
17			
18	Use		$3,067,000

Kentucky-American Water Company
Supporting Calculations for Company's Exhibit 37, Schedule B-5.2
Summary of Base Year Weighted Net Operating Funds Lead Days
Base Year at September 30, 2023

Line No.	Description	Amount	Post Payment or (Lead) Days	Dollar Days
1				
2				
3	Salaries & Wages	8,933,356	11.50	$102,733,594
4	Fuel, Power and Electric	5,363,786	24.60	131,949,145
5	Chemicals	4,498,283	28.50	128,201,075
6	Purchased Water	379,970	44.00	16,718,667
7	Waste Disposal	459,292	75.70	34,768,431
8	Service Company Charges	11,996,359	(5.30)	(63,580,703)
9	Contracted Services	1,226,754	25.60	31,404,890
10	Group Insurance	1,412,762	10.50	14,834,002
11	Opeb	(698,945)	(97.50)	68,147,163
12	Other Benefits	733,653	16.00	11,738,451
13	Pensions	30,661	(4.20)	(128,775)
14	Insurance Other than Group	1,416,883	(90.70)	(128,511,288)
15	Rents	37,581	24.30	913,220
16	Regulatory Expense	224	0.00	0
17	Maintenance Service & Supplies	1,185,104	50.30	59,610,711
18	Amortization	1,225,864	0.00	0
19	Uncollectibles	488,418	0.00	0
20	Office Supplies & Services	283,848	31.80	9,026,367
21	Employee Related Exp, Travel & Ent	160,214	59.50	9,532,752
22	Building Maintenance & Services	844,101	31.40	26,504,769
23	Postage Printing & Stationary	14,087	28.20	397,249
24	Telecommunication	217,280	36.20	7,865,549
25	Miscellaneous Expense	708,688	9.50	6,732,538
26	Transportation	603,279	46.90	28,293,806
27	Other Customer Accounting	126,998	65.00	8,254,869
28	Total O & M Expenses	41,648,501		505,406,482
29				
30	Depreciation and Amortization	21,443,374	0.00	0
31	Property Taxes	7,990,143	238.40	1,904,850,067
32	Utility Tax	160,006	(152.00)	(24,320,850)
33	Payroll Taxes	667,039	11.50	7,670,945
34	Income Taxes - Current - SIT	(15,044)	28.80	(433,254)
35	Income Taxes - Current - FIT	564,538	28.80	16,258,686
36	Deferred Income Taxes	5,715,449	0.00	0
37	Interest Expense - Long - Term Debt	9,910,508	89.30	885,008,394
38	Interest Expense - Short - Term Debt	818,755	14.50	11,871,950
39	Preferred Dividends	190,575	15.60	2,972,970
40	Net Income	28,235,410	0.00	0
41				
42	Net Operating Funds	$117,329,255		$3,309,285,390
43				
44				
45	Average Days Interval between Date Expenses are Incurred and Date of Payment			28.21

Kentucky-American Water Company
Supporting Calculations for Company's Exhibit 37, Schedule B-5.2
Summary of Base Year Weighted Revenue Lag Days
Base Year at September 30, 2023

Line No.		Revenues Amount	Median Service Days	Dollar Days
1				
2				
3	Monthly - Arrears Full Bills	$101,952,217	13.40	$1,366,159,711
4				
5	Other Revenues	2,455,328	13.40	32,901,390
6				
7	Fire Service	8,069,228	15.50	125,073,034
8				
9	Total	112,476,773		$1,524,134,135
10				
11				
12				
13				
14				
15				
16				
17				
18				
19	Average Median Service Days		13.55	
20				
21	Number of Days between the Reading Date and the			
22	Billing Date		4.40	
23				
24	Number of Days between the Billing Date and the			
25	Date the Bills are Paid		19.80	
26				
27	Total Average Days' Interval between Number of Days			
28	from Date Services are Furnished to Date Collections			
29	are Received		37.75	

Kentucky-American Water Company
Supporting Calculations for Company's Exhibit 37, Schedule B-5.2
Summary of Forecast Year Working Capital - Lead-Lag Study
Forecast Year at January 31, 2025

Line No.	Description	Days	Amount
1			
2			
3	Total Operating Funds		$142,126,847
4			
5	Average Daily Operating Funds		389,389
6			
7	Composite Average Days Interval Between:		
8			
9	(A) Date Service Furnished and Date Collections Deposited	37.75	
10			
11	(B) Date Expenses Incurred and Date of Payment	29.67	
12			
13	(C) Net Interval	8.08	
14			
15	Total Working Capital		$3,146,263
16			
17			
18	Use		$3,146,000

Kentucky-American Water Company
Supporting Calculations for Company's Exhibit 37, Schedule B-5.2
Summary of Forecast Year Weighted Net Operating Funds Lead Days
Forecast Year at January 31, 2025

Line No.	DESCRIPTION	Amount	Post Payment or (Lead) Days	Dollar Days
1				
2				
3	Salaries & Wages	8,967,621	11.50	103,127,642
4	Fuel, Power and Electric	5,664,614	24.60	139,349,504
5	Chemicals	5,624,592	28.50	160,300,881
6	Purchased Water	368,973	44.00	16,234,823
7	Waste Disposal	679,404	75.70	51,430,895
8	Service Company Charges	12,519,428	(5.30)	(66,352,970)
9	Contracted Services	1,437,684	25.60	36,804,703
10	Group Insurance	1,572,674	10.50	16,513,077
11	Opeb	(600,315)	(97.50)	58,530,713
12	Other Benefits	775,907	16.00	12,414,519
13	Pensions	136,903	(4.20)	(574,993)
14	Insurance Other than Group	1,653,304	(90.70)	(149,954,673)
15	Rents	47,180	24.30	1,146,463
16	Regulatory Expense	660,519	0.00	0
17	Maintenance Service & Supplies	1,309,065	50.30	65,845,983
18	Amortization	1,416,156	0.00	0
19	Uncollectibles	676,694	0.00	0
20	Office Supplies & Services	239,411	31.80	7,613,272
21	Employee Related Exp, Travel & Ent	176,764	59.50	10,517,484
22	Building Maintenance & Services	911,837	31.40	28,631,679
23	Postage Printing & Stationary	12,087	28.20	340,856
24	Telecommunication	275,049	36.20	9,956,774
25	Miscellaneous Expense	807,314	9.50	7,669,481
26	Transportation	654,298	46.90	30,686,583
27	Other Customer Accounting	478,972	65.00	31,133,180
28	Total O & M Expenses	46,466,136		571,365,876
29				
30	Depreciation and Amortization	28,872,589	0.00	0
31	Property Taxes	9,813,711	238.40	2,339,588,702
32	Utility Tax	171,010	(152.00)	(25,993,520)
33	Payroll Taxes	666,852	11.50	7,668,798
34	Income Taxes - Current - SIT	1,148,704	28.80	33,082,677
35	Income Taxes - Current - FIT	5,212,821	28.80	150,129,243
36	Deferred Income Taxes	3,470,120	0.00	0
37	Interest Expense - Long - Term Debt	12,708,843	89.30	1,134,899,680
38	Interest Expense - Short - Term Debt	235,349	14.50	3,412,561
39	Preferred Dividends	176,512	15.60	2,753,587
40	Net Income	33,184,200	0.00	0
41				
42	Net Operating Funds	$142,126,847		$4,216,907,604
43				
44				
45	Average Days Interval between Date Expenses are Incurred and Date of Payment			29.67

Kentucky-American Water Company
Supporting Calculations for Company's Exhibit 37, Schedule B-5.2
Summary of Forecast Year Weighted Revenue Lag Days
Forecast Year at January 31, 2025

Line No.		Revenues Amount	Median Service Days	Dollar Days
3	Monthly - Arrears Full Bills	$103,595,558	13.40	$1,388,180,481
5	Other Revenues	2,505,392	13.40	$33,572,255
7	Fire Service	8,440,096	15.50	130,821,488
9	Total	$114,541,046		$1,552,574,224
19	Average Median Service Days		13.55	
21	Number of Days between the Reading Date and the			
22	Billing Date		4.40	
24	Number of Days between the Billing Date and the			
25	Date the Bills are Paid		19.80	
27	Total Average Days' Interval between Number of Days			
28	from Date Services are Furnished to Date Collections			
29	are Received		37.75	

Kentucky-American Water Company
Calculation of Total Revenue Lag Days
Based on Lead-Lag Study For the Twelve Months Ended December 31, 2022

Description		Total Company
Service Period & Billing Lag Days: (From mid-point of service period to A/R Posting Date. See page 2 of this Schedule)		17.9
Collection Lag: (Sum of daily accounts receivable balance divided by the sum of daily receipts. See page 3 of this Schedule)	+	19.8
Total Revenue Lag Days		37.7

Kentucky-American Water Company

Calculation of Service Period and Billing Lag Days

Description	Total Company	Monthly - Arrears Full Bills	Other Revenues	Fire Service
Weighted Service Lag (November 2022)		$ 103,035,482		9,958,963
Billing Total (November 2022)		7,674,733		643,548
Service Lag Days	13.5	13.4	13.4	15.5
Weighted Billing Lag (November 2022)		33,393,528		2,724,376
Billing Total (November 2022)		7,674,733		643,548
Billing Lag Days	4.4	4.4	4.4	4.2
Service Period & Billing Lag Days:	17.9			
Test Year Revenues	$ 110,109,334	$ 99,835,722	$ 2,288,521	$ 7,985,091

Kentucky-American Water Company

Calculation of Collection Lag Days

Description		Total Company
Sum of Daily Accounts Receivable Balance in a Year		$ 2,131,139,408
Plus:		
Uncollectibles Deducted From A/R Balance	+	368,859
Total Adjusted A/R Daily Balances		2,131,508,267
Divided By the Sum of Daily Test Year Billed Revenues	÷	107,455,455
Total Service Period Collection Lag Days		19.8

Kentucky-American Water Company
Summary of Operating Funds Lead Days
Determined in the Lead-Lag Study For the Twelve Months Ended December 31, 2022

Description	Schedule Reference	Amount	Weighted Amount	Lead Days
(1)	(2)	(3)	(4)	(5)=(4)/(3)
Operating Funds*				
Salaries and Wages	Schedule HW-4	7,391,860	85,006,391	11.5
Fuel, Power and Electric	Schedule HW-5	4,716,065	116,188,308	24.6
Chemicals	Schedule HW-6	2,824,306	80,483,664	28.5
Purchased Water	Schedule HW-7	372,555	16,395,510	44.0
Waste Disposal	Schedule HW-8	394,214	29,834,001	75.7
Service Company Expense	Schedule HW-9	12,151,134	(64,743,292)	(5.3)
Contracted Services	Schedule HW-10	488,648	12,513,831	25.6
Group Insurance	Schedule HW-11	3,000,182	31,501,915	10.5
OPEB	Schedule HW-12	269,022	(26,220,376)	(97.5)
Other Benefits	Schedule HW-13	835,103	13,389,911	16.0
Pensions	Schedule HW-14	419,520	(1,777,260)	(4.2)
Insurance Other than Group	Schedule HW-15	1,286,737	(116,761,487)	(90.7)
Rents	Schedule HW-16	34,825	846,589	24.3
Regulatory Expense**				0.0
Maintenance Service and Supplies	Schedule HW-17	41,643	2,093,007	50.3
Amortization**				0.0
Uncollectibles**				0.0
Office Supplies and Services	Schedule HW-18	102,634	3,268,389	31.8
Employee Related Expense	Schedule HW-19	207,736	12,364,420	59.5
Building Maintenance and Services	Schedule HW-20	421,800	13,253,294	31.4
Postage Printing and Stationary	Schedule HW-21	11,646	327,878	28.2
Telecommunication	Schedule HW-22	168,519	6,102,635	36.2
Miscellaneous Expense	Schedule HW-23	674,186	6,417,171	9.5
Transportation	Schedule HW-24	459,977	21,570,974	46.9
Customer Accounting	Schedule HW-25	116,406	7,563,595	65.0
Depreciation and Amortization**				0.0
Property Taxes	Schedule HW-26	4,979,320	1,187,149,949	238.4
Utility Tax	Schedule HW-27	153,973	(23,403,911)	(152.0)
Payroll Taxes	Schedule HW-28	961,788	11,060,566	11.5
State Income Taxes (Current)	Schedule HW-29			28.8
Federal Income Taxes (Current)	Schedule HW-30			28.8
Deferred Income Taxes**				0.0
Long-Term Debt Interest Expense	Schedule HW-31	9,719,244	868,318,998	89.3
Short-Term Debt Interest Expense	Schedule HW-32	305,589	4,443,785	14.5
Preferred Dividends	Schedule HW-33	190,575	2,977,734	15.6
Net Income**				0.0

* Lead days for expenses are calculated from the mid-point of the service period to the payment date. (See Schedules 4 - 33.)

** Lag days are assumed to be 0.

Kentucky-American Water Company
Operating Expenses & Taxes Sample Sizes Used In the
Lead-Lag Study For the Twelve Months Ended December 31, 2022

Description	Per Books	Sample Size	Percentage Sampled	
(1)	(2)	(3)	(4)=(3)/(2)	
Expenses & Taxes				
1. Salaries and Wages	$8,663,944	$7,391,860	85%	
2. Fuel, Power and Electric	5,324,133	4,716,065	89%	
3. Chemicals	3,252,663	2,824,306	87%	
4. Purchased Water	378,619	372,555	98%	
5. Waste Disposal	484,151	394,214	81%	
6. Service Company Expense	12,020,268	12,151,134	101%	(1)
7. Contracted Services	973,565	488,648	50%	
8. Group Insurance	272,076	3,000,182	1103%	(2)
9. OPEB	38,542	269,022	698%	(2)
10. Other Benefits	756,200	835,103	110%	(2)
11. Pensions	(697,669)	419,520	-60%	(3)
12. Insurance Other than Group	1,248,696	1,286,737	103%	(2)
13. Rents	43,742	34,825	80%	
14. Maintenance Service and Supplies	2,262,628	41,643	2%	
15. Office Supplies and Services	296,290	102,634	35%	
16. Employee Related Expense	346,803	207,736	60%	
17. Building Maintenance and Services	888,094	421,800	47%	
18. Postage Printing and Stationary	12,087	11,646	96%	
19. Telecommunication	258,486	168,519	65%	
20. Miscellaneous Expense	752,247	674,186	90%	
21. Transportation	546,881	459,977	84%	
22. Customer Accounting	121,729	116,406	96%	
23. Property Taxes	5,503,860	4,979,320	90%	
24. Utility Tax	177,608	153,973	87%	
25. Payroll Taxes	645,218	961,788	149%	(2)
26. State Income Taxes (Current)	79,754	79,754	100%	
27. Federal Income Taxes (Current)	1,375,374	1,375,374	100%	
28. Long-Term Debt Interest Expense	9,954,929	9,719,244	98%	
29. Short-Term Debt Interest Expense	305,589	305,589	100%	
30. Preferred Dividends	190,575	190,575	100%	
	$56,477,082	$49,514,180	88%	(4)

Notes (1) Sample amount is greater than 100% of expense because sampling based on cash payment, not accrual expense amount.
(2) Sample amount is greater than 100% of expense because sampling excludes CAP credits.
(3) CAP credits explain the higher sampled amount.
(4) Totals exclude subline expense items and sampled amount adjusted to 100% if the actual sampled amount was greater than 100%.

Kentucky-American Water Company

Calculation of Lead Days For Salaries and Wages

Based on Lead-Lag Study For the Twelve Months Ended December 31, 2022

Facts	(Lead)/ Lag Days	Amount	Weighted Amount
(1)	(2)	(3)	(4)
All company employees are paid for a two week period (i.e., Days 1 through 14).			
Pay date is five days following the end of the payroll period (i.e., Day 19, where 19 = 14 + 5).			
Non-Union Salaries (5 days) LEAD [19 - 7.5 = 11.5; where 19 = 14 + 5; and 7.5 = (1 + 14 = 15 ÷ 2 = 7.5)]	11.5	$3,526,818.21	$40,558,409.42
Union Labor (5 days) LEAD [19 - 7.5 = 11.5; where 19 = 14 + 5; and 7.5 = (1 + 14 = 15 ÷ 2 = 7.5)]	11.5	3,865,041.92	44,447,982.08
Total Salaries and Wages	11.5	$7,391,860.13	$85,006,391.50

Kentucky-American Water Company

Calculation of Lead Days For Fuel, Power and Electric

Based on Lead-Lag Study For the Twelve Months Ended December 31, 2022

Month of Payment	Lead/ (Lag) Days	Amount	Weighted Amount
(1)	(2)	(3)	(4)
January-22	27.3	$136,951.16	$3,733,117.87
February-22	22.8	359,112.38	8,188,128.51
March-22	20.7	633,425.06	13,128,380.41
April-22	19.8	356,517.83	7,056,360.45
May-22	30.1	115,235.26	3,464,619.02
June-22	31.9	389,011.92	12,405,707.02
July-22	28.8	398,433.34	11,487,440.39
August-22	21.6	776,694.14	16,744,855.58
September-22	27.9	459,401.73	12,798,368.36
October-22	24.1	164,525.75	3,966,325.08
November-22	25.6	516,775.02	13,229,342.71
December-22	24.4	409,981.52	9,985,663.04
Total Fuel, Power and Electric	24.6	$4,716,065.11	$116,188,308.41

Kentucky-American Water Company

Calculation of Lead Days For Chemicals

Based on Lead-Lag Study For the Twelve Months Ended December 31, 2022

Month of Payment	Lead/ (Lag) Days	Amount	Weighted Amount
(1)	(2)	(3)	(4)
January-22	4.6	$33,414.62	$153,583.90
February-22	22.9	88,866.73	2,030,894.14
March-22	27.2	145,810.21	3,970,649.30
April-22	27.4	130,779.11	3,581,978.12
May-22	25.2	211,625.32	5,331,284.45
June-22	31.2	346,525.38	10,808,116.34
July-22	27.4	289,969.94	7,949,715.14
August-22	23.3	321,915.28	7,502,407.30
September-22	29.6	375,308.17	11,103,477.23
October-22	30.0	390,393.34	11,717,742.10
November-22	28.5	202,697.13	5,767,263.72
December-22	36.8	287,001.26	10,566,551.92
Total Chemicals	28.5	$2,824,306.49	$80,483,663.66

Kentucky-American Water Company

Calculation of Lead Days For Purchased Water

Based on Lead-Lag Study For the Twelve Months Ended December 31, 2022

Month of Payment	Lead/ (Lag) Days	Amount	Weighted Amount
(1)	(2)	(3)	(4)
January-22	42.5	$26,565.78	$1,129,427.63
February-22	46.2	35,123.61	1,622,316.83
March-22	39.2	42,629.79	1,673,194.24
April-22	41.5	25,254.25	1,047,536.63
May-22	43.5	32,756.53	1,425,999.92
June-22	41.1	29,660.66	1,219,756.69
July-22	43.1	24,572.64	1,059,100.11
August-22	45.4	33,737.77	1,530,192.75
September-22	42.7	28,198.51	1,204,651.42
October-22	45.0	28,755.15	1,292,826.54
November-22	48.1	25,957.30	1,247,574.73
December-22	49.4	39,342.51	1,942,932.54
Total Purchased Water	44.0	$372,554.50	$16,395,510.00

Kentucky-American Water Company

Calculation of Lead Days For Waste Disposal

Based on Lead-Lag Study For the Twelve Months Ended December 31, 2022

Month of Payment	Lead/ (Lag) Days	Amount	Weighted Amount
(1)	(2)	(3)	(4)
November-22	47.2	$159,413.51	$7,528,001.15
December-22	95.0	234,800.00	22,306,000.00
Total Waste Disposal	75.7	$394,213.51	$29,834,001.15

Kentucky-American Water Company

Calculation of Lead Days For Service Company Expense

Based on Lead-Lag Study For the Twelve Months Ended December 31, 2022

Month of Payment	Lead/ (Lag) Days	Amount	Weighted Amount
(1)	(2)	(3)	(4)
January-22	(5.0)	$1,220,764.68	-$6,103,823.40
February-22	(3.5)	969,026.03	-3,391,591.11
March-22	(7.0)	1,134,658.14	-7,942,606.98
April-22	(8.5)	1,309,990.19	-11,134,916.62
May-22	(5.0)	684,150.74	-3,420,753.70
June-22	(2.5)	996,266.20	-2,490,665.50
July-22	(5.0)	1,189,304.03	-5,946,520.15
August-22	(5.0)	899,573.88	-4,497,869.40
September-22	(3.5)	882,646.64	-3,089,263.24
October-22	(5.0)	985,250.17	-4,926,250.85
November-22	(4.5)	924,856.22	-4,161,852.99
December-22	(8.0)	954,647.24	-7,637,177.92
Total Service Company Expense	(5.3)	$12,151,134.16	-$64,743,291.85

Kentucky-American Water Company

Calculation of Lead Days For Contracted Services

Based on Lead-Lag Study For the Twelve Months Ended December 31, 2022

Month of Payment	Lead/ (Lag) Days	Amount	Weighted Amount
(1)	(2)	(3)	(4)
January-22	83.1	$47,660.77	$3,959,041.13
February-22	40.5	50,548.12	2,049,020.98
March-22	38.5	67,506.38	2,596,405.76
April-22	(41.6)	54,674.70	-2,275,188.64
May-22	20.6	20,913.51	430,186.16
June-22	35.0	61,128.30	2,139,247.69
July-22	35.3	41,125.87	1,451,123.75
August-22	42.5	25,580.68	1,086,252.56
September-22	(21.5)	48,598.05	-1,042,817.07
October-22	48.3	9,322.54	450,449.30
November-22	20.6	45,814.05	946,013.10
December-22	45.9	15,775.03	724,096.78
Total Contracted Services	25.6	$488,648.00	$12,513,831.49

Kentucky-American Water Company

Calculation of Lead Days For Group Insurance

Based on Lead-Lag Study For the Twelve Months Ended December 31, 2022

Month of Payment	Lead/ (Lag) Days	Amount	Weighted Amount
(1)	(2)	(3)	(4)
January-22	10.5	$230,647.78	$2,421,801.69
February-22	10.5	230,647.78	2,421,801.69
March-22	10.5	232,035.89	2,436,376.85
April-22	10.5	233,516.86	2,451,927.03
May-22	10.5	232,948.68	2,445,961.14
June-22	10.5	347,607.79	3,649,881.80
July-22	10.5	229,726.25	2,412,125.63
August-22	10.5	227,933.00	2,393,296.50
September-22	10.5	227,317.18	2,386,830.39
October-22	10.5	229,219.71	2,406,806.96
November-22	10.5	344,616.61	3,618,474.41
December-22	10.5	233,964.89	2,456,631.35
Total Group Insurance	10.5	$3,000,182.42	$31,501,915.41

Kentucky-American Water Company

Calculation of Lead Days For OPEB

Based on Lead-Lag Study For the Twelve Months Ended December 31, 2022

Month of Payment	Lead/ (Lag) Days	Amount	Weighted Amount
(1)	(2)	(3)	(4)
March-22	(107.0)	$240,522.21	-$25,735,876.47
June-22	(17.0)	28,500.00	-484,500.00
Total OPEB	(97.5)	$269,022.21	-$26,220,376.47

Kentucky-American Water Company

Calculation of Lead Days For Other Benefits

Based on Lead-Lag Study For the Twelve Months Ended December 31, 2022

Month of Payment	Lead/ (Lag) Days	Amount	Weighted Amount
(1)	(2)	(3)	(4)
January-22	16.5	$61,529.79	$1,015,241.54
February-22	16.5	60,473.50	997,812.75
March-22	15.5	96,446.37	1,499,458.77
April-22	16.0	63,241.46	1,011,907.45
May-22	16.5	64,050.75	1,057,588.25
June-22	16.5	64,709.44	1,067,705.76
July-22	16.5	65,334.75	1,077,614.41
August-22	15.8	96,722.18	1,531,307.05
September-22	15.5	64,751.15	1,002,033.61
October-22	16.0	64,525.68	1,032,400.10
November-22	16.0	65,414.06	1,046,942.08
December-22	15.5	67,904.34	1,049,899.36
Total Other Benefits	16.0	$835,103.47	$13,389,911.10

Kentucky-American Water Company

Calculation of Lead Days For Pensions

Based on Lead-Lag Study For the Twelve Months Ended December 31, 2022

Month of Payment	Lead/ (Lag) Days	Amount	Weighted Amount
(1)	(2)	(3)	(4)
February-22	(137.0)	$106,020.00	-$14,524,740.00
May-22	(51.0)	106,020.00	-5,407,020.00
August-22	44.0	103,740.00	4,564,560.00
November-22	131.0	103,740.00	13,589,940.00
Total Pensions	(4.2)	$419,520.00	-$1,777,260.00

Kentucky-American Water Company

Calculation of Lead Days For Insurance Other than Group

Based on Lead-Lag Study For the Twelve Months Ended December 31, 2022

Month of Payment	Lead/ (Lag) Days	Amount	Weighted Amount
(1)	(2)	(3)	(4)
January-22	(111.1)	$349,922.40	-$38,860,571.21
February-22	(124.5)	502,263.15	-62,529,865.39
April-22	(32.3)	133,885.30	-4,329,819.60
May-22	(161.5)	10,512.83	-1,697,822.05
June-22	(155.5)	12,124.94	-1,885,428.17
July-22	(22.4)	133,885.30	-2,995,774.07
September-22	(198.5)	4,773.78	-947,595.33
October-22	(25.2)	139,369.51	-3,514,611.30
Total Insurance Other than Group	(90.7)	$1,286,737.21	-$116,761,487.11

Kentucky-American Water Company

Calculation of Lead Days For Rents

Based on Lead-Lag Study For the Twelve Months Ended December 31, 2022

Month of Payment	Lead/ (Lag) Days	Amount	Weighted Amount
(1)	(2)	(3)	(4)
February-22	(168.0)	$588.73	-$98,906.64
March-22	118.6	11,441.68	1,357,123.84
April-22	(31.6)	561.73	-17,749.43
May-22	(248.0)	269.02	-66,716.96
June-22	(26.7)	3,898.44	-104,213.24
July-22	104.0	4,227.30	439,714.10
August-22	(118.3)	1,178.55	-139,448.38
September-22	(68.5)	5,815.07	-398,230.72
October-22	(101.3)	3,185.19	-322,514.94
November-22	66.9	1,698.40	113,695.35
December-22	42.8	1,961.06	83,835.62
Total Rents	24.3	$34,825.17	$846,588.60

Kentucky-American Water Company

Calculation of Lead Days For Maintenance Service and Supplies

Based on Lead-Lag Study For the Twelve Months Ended December 31, 2022

Month of Payment	Lead/ (Lag) Days	Amount	Weighted Amount
(1)	(2)	(3)	(4)
March-22	65.5	$9,454.11	$619,244.21
June-22	24.8	5,399.46	133,969.14
August-22	16.0	674.44	10,791.04
September-22	18.0	1,245.12	22,412.16
November-22	52.5	24,870.00	1,306,590.00
Total Maintenance Service and Supplies	50.3	$41,643.13	$2,093,006.55

Kentucky-American Water Company

Calculation of Lead Days For Office Supplies and Services

Based on Lead-Lag Study For the Twelve Months Ended December 31, 2022

Month of Payment	Lead/ (Lag) Days	Amount	Weighted Amount
(1)	(2)	(3)	(4)
January-22	25.9	$519.85	$13,443.06
February-22	43.9	3,228.60	141,708.79
March-22	56.5	9,075.02	512,873.13
April-22	40.4	6,975.03	281,971.18
May-22	47.4	3,347.60	158,630.58
June-22	47.4	4,720.13	223,715.91
July-22	36.2	8,786.13	317,852.47
August-22	32.5	5,295.12	171,871.96
September-22	(50.1)	15,344.28	-767,992.21
October-22	46.1	22,429.99	1,034,091.34
November-22	31.0	9,873.03	305,644.48
December-22	67.1	13,038.84	874,578.43
Total Office Supplies and Services	31.8	$102,633.62	$3,268,389.12

Kentucky-American Water Company

Calculation of Lead Days For Employee Related Expense

Based on Lead-Lag Study For the Twelve Months Ended December 31, 2022

Month of Payment	Lead/ (Lag) Days	Amount	Weighted Amount
(1)	(2)	(3)	(4)
January-22	33.2	$3,585.17	$119,105.55
February-22	34.9	3,850.09	134,551.66
March-22	34.6	3,860.14	133,648.90
April-22	33.6	8,989.69	302,109.98
May-22	41.1	7,071.29	290,861.61
June-22	41.3	6,294.46	260,188.51
July-22	34.5	17,672.60	610,158.99
August-22	77.6	113,368.87	8,801,238.09
September-22	40.4	6,938.29	280,640.14
October-22	43.8	10,998.95	481,436.45
November-22	36.8	9,707.43	357,712.68
December-22	38.5	15,399.02	592,767.00
Total Employee Related Expense	59.5	$207,736.00	$12,364,419.56

Kentucky-American Water Company

Calculation of Lead Days For Building Maintenance and Services

Based on Lead-Lag Study For the Twelve Months Ended December 31, 2022

Month of Payment	Lead/ (Lag) Days	Amount	Weighted Amount
(1)	(2)	(3)	(4)
January-22	25.3	$24,707.70	$625,319.08
February-22	32.6	46,815.51	1,527,184.36
March-22	26.8	58,004.37	1,553,693.92
April-22	32.0	39,210.60	1,253,511.45
May-22	32.7	24,002.69	784,732.28
June-22	38.9	37,337.55	1,450,812.67
July-22	29.5	32,678.44	965,045.42
August-22	24.9	38,337.81	954,612.34
September-22	33.5	27,496.30	921,674.85
October-22	33.2	29,671.39	986,299.83
November-22	41.3	30,531.48	1,260,057.01
December-22	29.4	33,006.47	970,350.94
Total Building Maintenance and Services	31.4	$421,800.31	$13,253,294.12

Kentucky-American Water Company

Calculation of Lead Days For Postage Printing and Stationary

Based on Lead-Lag Study For the Twelve Months Ended December 31, 2022

Month of Payment	Lead/ (Lag) Days	Amount	Weighted Amount
(1)	(2)	(3)	(4)
January-22	22.3	$886.96	$19,808.57
February-22	23.2	769.54	17,880.98
March-22	26.5	723.01	19,178.22
April-22	19.2	1,505.24	28,943.41
May-22	21.9	974.97	21,391.78
June-22	31.7	532.09	16,864.97
July-22	25.8	1,421.56	36,671.68
August-22	28.9	804.62	23,271.89
September-22	39.0	582.21	22,718.21
October-22	42.0	504.35	21,183.71
November-22	42.6	1,453.36	61,913.28
December-22	25.6	1,487.66	38,051.05
Total Postage Printing and Stationary	28.2	$11,645.57	$327,877.75

Kentucky-American Water Company

Calculation of Lead Days For Telecommunication

Based on Lead-Lag Study For the Twelve Months Ended December 31, 2022

Month of Payment	Lead/ (Lag) Days	Amount	Weighted Amount
(1)	(2)	(3)	(4)
January-22	33.9	$13,440.86	$455,560.52
February-22	16.7	5,794.02	96,636.41
March-22	38.2	19,521.93	745,499.68
April-22	37.1	14,799.88	549,618.24
May-22	32.3	15,812.78	510,542.75
June-22	28.2	13,071.38	368,309.45
July-22	30.0	13,243.93	396,874.81
August-22	21.5	8,673.16	186,099.03
September-22	47.6	13,408.03	637,764.17
October-22	33.4	12,480.21	416,327.68
November-22	23.3	7,295.49	169,946.29
December-22	50.7	30,976.89	1,569,455.75
Total Telecommunication	36.2	$168,518.56	$6,102,634.76

Kentucky-American Water Company

Calculation of Lead Days For Miscellaneous Expense

Based on Lead-Lag Study For the Twelve Months Ended December 31, 2022

Month of Payment	Lead/ (Lag) Days	Amount	Weighted Amount
(1)	(2)	(3)	(4)
January-22	15.8	$25,403.18	$401,085.44
February-22	18.5	37,998.47	701,471.80
March-22	41.4	45,264.43	1,874,544.78
April-22	36.5	52,770.12	1,928,698.16
May-22	24.2	56,264.64	1,359,058.64
June-22	22.9	58,110.41	1,332,175.68
July-22	30.9	36,948.62	1,143,554.60
August-22	30.9	87,335.75	2,695,642.47
September-22	36.5	46,186.09	1,685,304.96
October-22	(93.4)	102,915.72	-9,611,218.36
November-22	3.2	67,103.26	215,798.66
December-22	46.5	57,885.16	2,691,054.35
Total Miscellaneous Expense	9.5	$674,185.85	$6,417,171.16

Kentucky-American Water Company

Calculation of Lead Days For Transportation

Based on Lead-Lag Study For the Twelve Months Ended December 31, 2022

Month of Payment	Lead/ (Lag) Days	Amount	Weighted Amount
(1)	(2)	(3)	(4)
February-22	37.0	$54,893.60	$2,031,063.20
April-22	59.1	79,717.77	4,707,804.65
June-22	52.4	72,268.85	3,789,376.21
August-22	44.7	84,052.18	3,753,071.74
October-22	54.0	43,856.74	2,368,263.96
November-22	42.5	63,791.87	2,711,154.48
December-22	36.0	61,395.55	2,210,239.80
Total Transportation	46.9	$459,976.56	$21,570,974.03

Kentucky-American Water Company

Calculation of Lead Days For Customer Accounting

Based on Lead-Lag Study For the Twelve Months Ended December 31, 2022

Month of Payment	Lead/ (Lag) Days	Amount	Weighted Amount
(1)	(2)	(3)	(4)
January-22	65.0	$8,144.92	$529,764.58
February-22	69.3	11,680.65	808,939.35
March-22	52.8	14,277.97	754,017.83
April-22	62.3	5,963.27	371,500.87
May-22	59.1	10,978.49	648,421.38
June-22	63.8	8,782.68	559,978.02
July-22	58.9	10,095.12	594,731.49
August-22	62.0	9,757.41	604,630.96
September-22	66.3	6,087.97	403,652.75
October-22	71.0	6,776.73	481,147.83
November-22	76.1	12,357.19	940,512.16
December-22	75.3	11,503.53	866,298.14
Total Customer Accounting	65.0	$116,405.93	$7,563,595.35

Kentucky-American Water Company

Calculation of Lead Days For Property Taxes

Based on Lead-Lag Study For the Twelve Months Ended December 31, 2022

Month of Payment	Lead/ (Lag) Days	Amount	Weighted Amount
(1)	(2)	(3)	(4)
January-22	201.7	$3,516,630.31	$709,363,516.18
February-22	230.0	37,629.28	8,654,734.40
March-22	265.0	71,374.11	18,914,139.15
May-22	318.0	71.58	22,762.44
October-22	115.0	145.42	16,723.30
November-22	507.9	673,421.83	342,050,543.22
December-22	159.0	680,047.36	108,127,530.24
Total Property Taxes	238.4	$4,979,319.89	$1,187,149,948.93

Kentucky-American Water Company

Calculation of Lead Days For Utility Tax

Based on Lead-Lag Study For the Twelve Months Ended December 31, 2022

Month of Payment	Lead/ (Lag) Days	Amount	Weighted Amount
(1)	(2)	(3)	(4)
July-22	(152.0)	$153,973.10	-$23,403,911.20
Total Utility Tax	(152.0)	$153,973.10	-$23,403,911.20

Kentucky-American Water Company

Calculation of Lead Days For Payroll Taxes

Based on Lead-Lag Study For the Twelve Months Ended December 31, 2022

Facts	(Lead)/ Lag Days	Amount	Weighted Amount
(1)	(2)	(3)	(4)
All company employees are paid for a two week period (i.e., Days 1 through 14).			
Pay date is five days following the end of the payroll period (i.e., Day 19, where 19 = 14 + 5).			
FUTA			
LEAD [19 - 7.5 = 11.5; where 19 = 14 + 5; and 7.5 = (1 + 14 = 15 ÷ 2 = 7.5)]	11.5	$6,738.40	$77,491.60
FICA			
LEAD [19 - 7.5 = 11.5; where 19 = 14 + 5; and 7.5 = (1 + 14 = 15 ÷ 2 = 7.5)]	11.5	923,507.59	10,620,337.29
SUTA			
LEAD [19 - 7.5 = 11.5; where 19 = 14 + 5; and 7.5 = (1 + 14 = 15 ÷ 2 = 7.5)]	11.5	31,542.37	362,737.26
Total Payroll Taxes	11.5	$961,788.36	$11,060,566.14

Kentucky-American Water Company

Calculation of Lead Days For State Income Taxes (Current)

Based on Lead-Lag Study For the Twelve Months Ended December 31, 2022

Service Period		Payment	(Lead)/		Weighted
From	To	Date	Lag Days	Amount	Amount
(1)	(2)	(3)	(4)	(5)	(6)
State Income Taxes (Current)					
1/1/22	12/31/22	3/15/22	(109.0)	25%	(27.3)
1/1/22	12/31/22	6/15/22	(17.0)	25%	(4.3)
1/1/22	12/31/22	9/15/22	75.0	25%	18.8
1/1/22	12/31/22	12/15/22	166.0	25%	41.5
Total State Income Taxes (Current)			28.8	100%	28.8

Kentucky-American Water Company

Calculation of Lead Days For Federal Income Taxes (Current)

Based on Lead-Lag Study For the Twelve Months Ended December 31, 2022

Service Period From	Service Period To	Payment Date	(Lead)/ Lag Days	Amount	Weighted Amount
(1)	(2)	(3)	(4)	(5)	(6)
Federal Income Taxes (Current)					
1/1/22	12/31/22	3/15/22	(109.0)	25%	(27.3)
1/1/22	12/31/22	6/15/22	(17.0)	25%	(4.3)
1/1/22	12/31/22	9/15/22	75.0	25%	18.8
1/1/22	12/31/22	12/15/22	166.0	25%	41.5
Total Federal Income Taxes (Current)			28.8	100%	28.8

Kentucky-American Water Company

Calculation of Lead Days For Long-Term Debt Interest Expense

Based on Lead-Lag Study For the Twelve Months Ended December 31, 2022

Month of Payment	Lead/ (Lag) Days	Amount	Weighted Amount
(1)	(2)	(3)	(4)
February-22	92.0	$268,125.00	$24,667,500.00
March-22	90.5	184,750.00	16,719,875.00
April-22	91.0	3,086,062.50	280,831,687.50
June-22	75.5	1,201,400.00	90,705,700.00
August-22	90.5	268,125.00	24,265,312.50
September-22	92.0	184,750.00	16,997,000.00
October-22	91.5	3,086,062.50	282,374,718.75
December-22	91.5	1,439,969.44	131,757,203.76
Total Long-Term Debt Interest Expense	89.3	$9,719,244.44	$868,318,997.51

Kentucky-American Water Company

Calculation of Lead Days For Short-Term Debt Interest Expense

Based on Lead-Lag Study For the Twelve Months Ended December 31, 2022

Month of Payment	Lead/ (Lag) Days	Amount	Weighted Amount
(1)	(2)	(3)	(4)
February-22	19.6	$3,272.79	$64,097.04
March-22	15.0	6,133.39	92,000.85
April-22	14.5	10,305.40	149,428.30
May-22	15.0	19,753.58	296,303.70
June-22	14.5	15,152.54	219,711.83
July-22	13.0	32,077.99	417,013.87
August-22	15.0	41,675.13	625,126.95
September-22	14.5	39,215.55	568,625.48
October-22	15.0	64,781.97	971,729.55
November-22	14.5	29,309.16	424,982.82
December-22	14.0	43,911.79	614,765.06
Total Short-Term Debt Interest Expense	14.5	$305,589.29	$4,443,785.45

Kentucky-American Water Company

Calculation of Lead Days For Preferred Dividends

Based on Lead-Lag Study For the Twelve Months Ended December 31, 2022

Month of Payment	Lead/ (Lag) Days	Amount	Weighted Amount
(1)	(2)	(3)	(4)
March-22	14.5	$47,643.75	$690,834.38
June-22	16.0	47,643.75	762,300.00
September-22	16.5	47,643.75	786,121.88
December-22	15.5	47,643.75	738,478.13
Total Preferred Dividends	15.6	$190,575.00	$2,977,734.38

COMMONWEALTH OF KENTUCKY
BEFORE THE PUBLIC SERVICE COMMISSION

IN THE MATTER OF:

ELECTRONIC APPLICATION OF KENTUCKY-	**)**	
AMERICAN WATER COMPANY FOR AN	**)**	
ADJUSTMENT OF RATES, A CERTIFICATE	**)**	
OF PUBLIC CONVENIENCE AND NECESSITY	**)**	**CASE NO. 2023-00191**
FOR INSTALLATION OF ADVANCED METERING	**)**	
INFRASTRUCTURE, APPROVAL OF CERTAIN	**)**	
REGULATORY AND ACCOUNTING	**)**	
TREATMENTS, AND TARIFF REVISIONS	**)**	

DIRECT TESTIMONY OF JOHN M. WATKINS

June 30, 2023

Q. Please state your name and business address.

A. My name is John M. Watkins. My business address is 1 Water Street, Camden, NJ 08102.

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

A. I am employed by American Water Works Service Company (the "Service Company") as Senior Director Regulatory Services.

Q. Please state your educational and professional background.

A. I am a graduate of Trenton State College with a Bachelor of Science Degree in Finance and minors in Mathematics and Economics. I received a Masters in Business Administration, with a concentration in Accounting, from Drexel University. I have 25 years of experience serving utilities with regulated operations in multiple states. I have been employed by American Water Works Service Company since November of 1998. Before coming to American Water, I was employed as a Staff Accountant for an eye glass manufacturer.

Q. What are your current employment responsibilities?

A. My duties consist of reviewing, preparing and assisting in regulatory filings and related activities for all of the regulated subsidiaries of American Water Works Company, Inc. ("American Water"). My responsibilities include the preparation of written testimony, exhibits and work papers in support of rate applications and other regulatory filings as well as responses to data requests for Kentucky-American Water Company ("Kentucky-American" or "the Company") and its regulated utility affiliates.

Q. Have you previously filed testimony before this or any other commission?

A. Yes. I have testified before regulatory commissions in California (Application 22-07-001), Connecticut (Case 99-08-32), Massachusetts (DTE 00-105), Missouri (Cases Nos. WR-2000-281, WR-2015-0301, WR-2017-0285, WR-2020-0344 and WR-2022-0303), New Jersey (WR03070511, WR06030257, WR08010020, WR10020149, WR10040260 and WR-

19121516), New York (Case 04-W-0577, Case 07-W-0508 and Case 11-W-0200), Illinois (Docket No 16-0093), Indiana (Cause No. 45032), Iowa (RPU-2016-002) and Virginia (PUR-2021-00255).

Q. What is the purpose of your testimony in this proceeding?

A. The purpose of my Direct Testimony is to support and explain the Company expense levels in several areas. I will discuss the level of expenses associated with labor and related, pension, Other Post-Employment Benefits ("OPEBs"), production expenses, Service Company, Insurance Other than Group ("IOTG"), Uncollectibles, Transportation, Postage, Telecommunication, Building Maintenance and Services, Maintenance and Income Taxes.

Q. What level of O&M expense is the Company seeking in this case?

A. Kentucky-American is seeking recovery of approximately $46.5 million in O&M expense for the forecasted test period, which represents the forecasted expense levels for the twelve months ending January 2025, which represents about a 6.21% percent annual increase from 2020 levels and about a 2.33% annual increase from 2010 levels, both of which are below the corresponding rate of inflation over the same period. Further, on a per customer basis the Company is only seeing compounded annual increase of 1.2% from 2010 through January 2025 and 5.3% from 2020 through 2025, again both of which are below the corresponding rate of inflation.[1] Below is a visual of the per customer comparison.

[1] The rate of inflation over the same two periods is 1.9% and 6.3%, respectively.

As further discussed by Kentucky-American witness Mr. Lewis, the requested increases in O&M expense over these periods support the Company's efforts to continue providing high quality water service in the most cost-effective way to our customers in the long-term.

Labor and Related

Q. Please describe KAWC's labor and related expenses.

A. Kentucky-American's labor and labor related expenses are associated with local employees who support Kentucky-American exclusively. The Compay's labor force produces high quality drinking water, maintains the production facilities and distribution systems, monitors water quality, provides engineering services, and supports the efficient management of local operations. Kentucky-American witness William A. Lewis discusses the employee levels and staffing more fully in his Direct Testimony.

There are three classifications of employees at Kentucky-American: union hourly employees, non-union hourly employees, and exempt employees. Union hourly employees receive base pay, overtime pay, and in some cases other compensation (such as wage premiums) and are eligible for performance pay. Non-union hourly employees receive base pay, overtime pay, and are eligible for performance pay. Exempt employees receive base pay and are eligible for performance pay. Therefore, total salaries and wages for each classification of employees includes fixed pay (base pay) and variable pay.

The costs associated with Company labor that are discussed in my testimony include:

1. Salaries and Wages
2. Group Insurance
3. Other Benefits, including:
    a. 401k
    b. Defined Contribution Plan ("DCP")
    c. Retiree Medical Expense
    d. Employee Stock Purchase Plan ("ESPP")
    e. Other Benefits
4. Payroll Taxes
5. Pension and Other Post-Employment Benefits (OPEBs)

The pro forma fully forecasted test period labor and related expense can be found in the Company's Filing Exhibit 37, Schedules C, D and G.

Q. Please describe the overall approach to calculating labor and related expenses.

A. The forecasted test period labor and related expenses were calculated on a position-by-position basis, based on 156 full-time positions. Company witness Lewis provides additional information regarding the Company's employee levels.

Forecasted test period labor expense is based on the planned staffing level at hourly rates per contract for union employees and wage rates for non-union employees that reflect forecasted pay increases. Because some labor and labor related costs are capitalized with capital projects and programs, a capitalization percentage is used to assist in calculating net expense as described below. An adjustment is also made to remove costs appropriately charged to wastewater operations, as also further discussed below. As a result, O&M labor expense, as reflected in the filing, represents costs related to water operations that are charged to expense on the Company's income statement.

Q. Please describe how the various components of pro forma Salaries and Wages were calculated.

A. Salaries and wages expense is composed of four components: 1) base pay, 2) overtime expense, 3) wage premiums required by union contract, and 4) annual and long-term performance compensation for eligible employees.

<u>Base Pay</u> - To calculate the gross regular-time cost, wage rates projected to be in effect for each month of the forecasted test period were applied to the working hours for each month, for a total of 2,088 base hours for all full-time hourly employees. Wage rates for union employees were based on collective bargaining agreements ("CBAs") for each month of the forecasted test period. Forecasted test period wages for non-union employees were based on actual rates effective as of April 1, 2023, with a prorated increase of 3.15% estimated for April 2024.

<u>Overtime</u> - The second component of the labor expense is overtime expense. Overtime hours are based on the forecasted overtime per the Company's most recent forecast for each eligible position using a 3-year average of hours incurred for each position 2020-2022. Overtime hours are paid at three different multiples to base rates (1.5x, 2.0x, or 2.5x) which are determined based on the timing of the work performed (normal overtime, weekend, holiday, etc.). The overtime multiplier for the forecast is based on a three-year average 2020-2022. Each employee's overtime gross expense is calculated by multiplying the employee's hourly rate of pay by the overtime multiplier, then by the overtime hours.

Wage Premiums – Union employees' CBAs include provisions for certain wage premiums for work completed on second or third shifts, per the negotiated CBA. The average annual gross shift premium for groups of positions was calculated over the three years 2020-2022 and allocated by position according to payroll history.

Performance Pay – The last component of labor expense is the annual and long-term performance compensation expense. Performance pay was calculated on a position-by-position basis for each employee. It was based on each position's target percent for both the Annual Performance Plan ("APP") and Long-Term Performance Plan ("LTPP"). The target percent was multiplied by each eligible employee's pro forma base salary in the forecasted test period to determine APP and LTPP costs for that period.

Q. Once the gross costs are calculated, how is the forecasted test period operations and maintenance ("O&M") Salaries & Wages expense derived?

A. To derive O&M Water Salaries & Wages, each position's gross costs are multiplied by both a "Water percentage" and an "O&M percentage." The "Water percentage" is assessed by position and is based on the average payroll charges to water operations over the three years 2020-2022. Applying this percent has the effect of excluding projected labor utilized in support of the wastewater operations. Because some labor and labor related costs are capitalized through capital projects and programs, a capitalization percentage is also used to calculate net expense, as applied based on the position type. The O&M percentage (calculated as one minus the capitalization percentage) is based on the average ratio of dollars charged to capital versus O&M for each position type over the three years 2020-2022. This eliminates from expenses the labor and labor related costs which are appropriately charged to capital projects and programs. In other words, the total cost deducts the capitalized dollars to determine the O&M labor and related expenses. The allocation of management's salaries to wastewater operations was based on the 0.985% factor that was determined in Case No. 2018-

00358. To summarize: the total forecasted expense is derived by the gross costs which are netted for Water percentage, O&M percentage (one minus the capitalization percentage), and the management allocation percentage.

<u>Group Insurance</u>

Q. Please describe the components of group insurance.

A. Group insurance includes certain coverages that Kentucky-American provides its employees. These can be grouped into two primary categories: 1) basic life, short-term disability, long-term disability and "AD&D" (accidental death and disability) insurance and 2) medical, dental, and vision insurance.

Q. Please describe the forecasted test period calculation for group insurance expense.

A. Calculations are performed by position based on full-time positions, using the latest available premium rates. Following a methodology similar to labor, each employee's group insurance costs are multiplied by their Water percentage and O&M percentage (one minus the capitalization percentage) to arrive at Water O&M-related expense for each employee.

- <u>Basic life, short- and long-term disability and AD&D</u>. The 2023 rates are applied on a position-by-position basis, according to the insurance plans for both union and non-union positions.

- <u>Medical, dental, and vision insurance</u>. This category of insurance involves a Company cost net of employee contributions. The costs and contributions vary by plan type (e.g. family, employee, or employee plus spouse). Costs and contributions are calculated on a position-by-position basis, taking into account actual employee plan selections using actual premium rates for 2023.

The forecast test period group insurance expense can be found in Exhibit 37, Schedules C, D and G.

Other Benefits

Q. Please describe the components of Other Benefits and how they were calculated.

A. Other Benefits expense includes savings programs such as 401k, DCP, Retiree Medical and the ESPP. It also includes other employee-related costs such as tuition aid and training. The 401k, DCP, Retiree Medical and ESPP costs were calculated on a position-by-position basis. Following a methodology similar to labor, each employee's gross benefits costs are multiplied by their Water percentage and O&M percentage (one minus the capitalization percentage) to arrive at Water O&M-related expense for each employee. The calculations are described in further detail below. The forecasted test period expense for each can be found in Exhibit 37, Schedules C, D and G.

401k - Kentucky-American incurs 401k expense when it matches employee contributions to 401k retirement accounts. The matching amounts are determined by each employee's benefit group or hire date. For union employees hired before 2001 and non-union employees hired before 2006, the Company matches 50% of the first 5% of the employee's contribution (for a maximum of 2.5%). For the remaining employees, the Company matches 100% of the first 3%, and 50% of the next 2% of the employee's contributions (for a maximum of 4%). Pro forma 401k costs were calculated for each position based on forecasted test period wages, current employee contribution levels, and the level of match for the benefit group.

DCP – The Defined Contribution Plan is a retirement savings program for employees not eligible for the defined benefit pension program. Under the DCP, Kentucky-American contributes an amount equal to 5.25% of an employee's base pay into a retirement account. The pro forma DCP expense was calculated by multiplying the forecasted test period regular time pay of each eligible position by 5.25%.

Retiree Medical Expense - Union employees who are not eligible for OPEBs are entitled to Company-provided retiree medical benefits. A trust (referred to as the Voluntary Employee Benefits Association, or VEBA) exists to fund this benefit in the amount of $600 per eligible employee.

ESPP – Expense for the Employee Stock Purchase Plan relates to the Company funded discount on American Water stock purchases made by participating employees through voluntary payroll deductions. Under the ESPP, participants currently acquire shares of American Water common stock at a 15% discount. The pro forma expense was calculated based on the forecasted test period base wages for each employee who participates in the ESPP, times their individual contribution amount, applied to the fifteen percent company discount.

Other Benefits – Various other expenses (e.g., training, tuition assistance, etc.) are forecasted based upon a three-year average (2020-2022) level of actual expenses.

Payroll Taxes

Q. Please discuss the adjustment to general tax expense for payroll taxes.

A. Payroll taxes are related to Salaries and Wages. Taxes must be paid to fund the Federal Insurance Contributions Act, which is divided into two pieces: Old Age Survivors & Disability Insurance ("OASDI," or more commonly "FICA"), and Hospital Insurance (or more commonly "FICA Medicare"). Payroll taxes must also be paid for Federal Unemployment Tax ("FUTA") and State Unemployment Tax ("SUTA"). Forecasted test period payroll taxes were calculated on a position-by-position basis, using pro forma wages and 2023 tax rates. Following a methodology similar to labor, each employee's gross payroll taxes are multiplied by their Water percentage and O&M percentage (one minus the capitalization percentage) to arrive at water O&M payroll tax expense for each employee. The pro forma payroll tax can be found in Exhibit 37, Schedules C, D and G.

Pension and OPEBs

Q. Please describe the adjustment to operating expenses related to pension expense.

A. Generally, Union employees hired before January 1, 2001 and non-union employees hired before January 1, 2006 are eligible for pension benefits. Pension expense is recorded according to Financial Accounting Standards Board ("FASB") Accounting Standards Codification Topic 715 or "ASC 715" (formerly Statement of Financial Accounting Standards 87). ASC 715 cost is forecasted by the Company's professional third party actuary, Willis Towers Watson. As of January 2023, the annual service cost for Kentucky-American is $184,197. A portion of the service cost is capitalized accordingly to the Company's pro forma capitalization percentage. The non-service costs for Kentucky-American are $18,943. The Company's pro forma cost for the twelve months ending January 31, 2025 was calculated by using the 2023 actuals after applying the capitalization percentage to the service costs. The Company expects to have an update for the 2024 actual pension expense in January 2024.

Q. Please describe the adjustment to operating expenses related to OPEB expense.

A. OPEBs, such as retiree medical benefits, are offered to some Kentucky-American employees. Generally, this includes union employees hired before January 1, 2006 and non-union employees hired before January 1, 2002. OPEB expense is recorded according to ASC 715 (formerly Statement of Financial Accounting Standards 106). The OPEB cost is forecasted by the Company's professional third party actuary, Willis Towers Watson. As of late January 2023, the annual service cost for Kentucky-American is $35,576. A portion of the service cost is capitalized accordingly to the Company's pro forma capitalization percentage. The non-service costs for Kentucky-American are ($623,098). The Company's pro forma service cost for the twelve months ending January 31, 2025 was calculated by using the current 2023 actuals after applying the capitalization percentage to the service costs. The Company expects to have an update for the 2024 actual OPEB expense in January 2024.

Production Expenses

Q. Please explain which operating expenses are considered production expenses.

A. Production expenses are those expenses that vary depending on the amount of water produced by the Company's treatment plants. These costs include fuel and power, chemicals, waste disposal, and purchased water.

Q. Please explain the system delivery impact on production costs.

A. System delivery is the amount of treated water that the Company's treatment plants produce. Water sales as well as other factors impact the amount of water produced by the plants, which in turn impacts expenses associated with treating that water. The Company has proposed pro forma sales adjustments in the direct testimony of Company witness Rea. The Company's pro forma system delivery number was used in the projected expense calculation for fuel and power and chemicals.

Q. Please describe the purchased power expense.

A. Purchased power and fuel expense is composed of the energy costs associated with treating, pumping and delivering water. Electrical costs are the driving force in this expense category as the costs for backup generator diesel fuel is negligible. In order to calculate the base period expense, the Company used actual fuel and purchased power invoices by vendor for the 6 month period ending March 2023 and included projected expense amounts for April 2023 through September 2023. In order to forecast purchased power expense for the forecasted test period of February 2024 through January 2025, the Company used the 12 month period ended March 2023 normalized expense and system delivery to calculate the expense per system delivery rate. This expense rate was then adjusted for expected inflation and multiplied by the forecasted system delivery for the future test period. An adjustment was also made to account for the new ultraviolet ("UV") processes. The Owen interruptable demand credit was removed since it has ended. The forecasted test period fuel and power expense can be found on Exhibit 37, Schedules C and D.

Q. Please describe the operating expense related to chemicals.

A. The Company uses chemicals for water treatment. The amount of chemicals utilized by the Company can vary depending on the season and other external factors. In order to calculate the base period expense the Company used chemical usage and related expense for the 6 month period ended March 2023 and included projected expense amounts for April 2023 through September 2023. In order to calculate the forecasted test period expense level for chemicals the Company used a two year average of the quantity for each chemical from the 12 months ended March 31, 2022 and 2023, including adjustments based on operations experience. The Company then calculated a usage per system delivery by dividing this normalized usage by the average system delivery for the same time period. This normalized usage per system delivery rate was applied to the anticipated system delivery for the forecasted test period ending January 1, 2025 to calculate the future test period usage. The Company used current 2023 cost per chemical, adjusted for anticipated 2024 and 2025 pricing changes to determine the expected prices for the forecasted test period. These prices were applied to the forecasted test period usage to calculate the total expense. The dramatic price increases for chemicals and their recent volatility is addressed by Company Witness O'Drain. The forecasted test period chemical expense can be found in Exhibit 37, Schedules C and D.

Q. Please explain the adjustment for waste disposal.

A. The Company incurs water waste disposal costs as a result of the need to beneficially reuse sludge and other by-products resulting from water treatment. The Company incurs monthly charges for chemical costs used in waste removal as well as a monthly accrual for anticipated costs associated with periodic cleaning of lagoons based on cycles that range from 12 to 24 months. The cleaning schedule is based on the amount of waste and size of lagoon, consistent with United States Environmental Protection Agency ("EPA") standards. In order to calculate the base period expense the Company used actual waste disposal expenses for the 6 month period ended March 2023 and included projected expense amounts for April 2023 through September 2023. The forecasted test period of February 2024 through January 2025 includes accruals for the anticiplated costs of cleaning the lagoons as well as chemical costs related to waste disposal. Adjustments include the normalization and annualization of 12 months of cleanout expense, cleanout expense increases including additional expense for the backlog cleanout of the Richmond Road Station, and expected price increases of chemicals for treatment. The forecasted test period waste disposal expense can be found on Exhibit 37, Schedules C & D.

Q. Please explain the adjustment for purchased water.

A. The purchased water expense includes the costs for purchasing water from other utilities. The Company has water connections with seven neighboring utilities from which the Company can buy water: Jackson County Water Association, City of Livingston Municipal Water, City of Mt. Vernon Water Works, Carroll County Water District #1, Gallatin County Water District, City of Georgetown Municipal Utilities and City of Paris Water Works. In order to calculate the base period expense, the Company used actual purchased water expenses by vendor for the 6 month period ended March 2023 and included projected expense amounts for April 2023 through September 2023. The adjustment is to forecast expenses, based on a three year average usage and current rates, for the time period of February 2024 through January of 2025. The forecasted test period purchased water expense can be found on Exhibit 37, Schedules C and D.

Service Company

Q. What services does Kentucky-American obtain from the Service Company?

A. The services provided by the Service Company include customer service, water quality testing, innovation and environmental stewardship, human resources, communications, information technology, finance, accounting, payroll, tax, legal, engineering, accounts payable, supply chain, and risk management services. The Service Company's customer service organization handles customer calls, billing, and collection activities for the Company and its regulated utility affiliates. The customer service organization responds to customer inquiries and correspondence, and processes service order requests. In addition, the Service Company operates Field Resource Coordination Centers responsible for tracking and dispatching service orders for our field representatives and distribution crews. The Service Company also operates the Central Laboratory, located in Belleville, Illinois.

Q. How do Kentucky-American's customers benefit from the services you described from Service Company?

A. The Service Company provides Kentucky-American with access to highly trained professionals who possess expertise in various specialized areas, whose background, experience and training are focused on water utility operations, and who work exclusively for American Water's subsidiaries. Furthermore, the size of the Service Company and the scope of its operations have enabled it to assemble a uniquely qualified group of professionals who, through the Service Company, have a platform for sharing their extensive knowledge, expertise, experience and best practices across the American Water system to the benefit of all of American Water's state-regulated utilities and their customers. The Company benefits from these services and expertise of the Service Company's personnel at cost. The Company also benefits from the size and breadth of American Water, which affords the Company increased purchasing power that it could not obtain on its own, and provides access to discounts on equipment and supplies needed for utility operations, including, for example, pipe, fittings, and water treatment chemicals. In this way, Kentucky-American achieves costs savings that it could not obtain otherwise.

Q. How are Service Company expenses charged to Kentucky-American?

A. The Service Company provides its services to Kentucky-American at cost and issues monthly invoices. Service Company expenses are charged to the Company in two ways: 1) directly to the Company at 100% of the cost; or 2) a percentage allocation based on factors such as a per customer allocation across the American Water regulated subsidiaries. The Direct Testimony of Company witness Patrick Baryenbruch demonstrates the reasonableness of Service Company costs that are charged to the Company.

Q. How were the Service Company expenses calculated?

A. The expenses are categorized into labor & related, and other costs. The base period expenses have been adjusted to annualize a salary increase effective March 31, 2023. A three-year average merit increase of 3.14% for non-union, and actual contract rate increases for union employees is then applied to derive the 2024 labor expense levels. Similarly, an average merit increase of 3.14% for non-union, and actual contract rate increases for union employees is then applied to 2024 to derive the 2025 expense. Certain other costs pertaining to lobbying, advertising, community relations, and charitable contributions have been removed from the base period expenses, and therefore are not included in the pro forma expense. The expenses pertaining to severance have also been removed from the base period expenses. Additional adjustments were made for pension and OPEB expense, increased customer service employees, depreciation, CPI inflation and capital lease interest. Finally, a 0.06% allocation of sewer costs were removed from the end of the forecasted test year.

Insurance Other than Group ("IOTG")

Q. Please explain the adjustment for IOTG.

A. Kentucky-American incurs costs related to several types of IOTG insurance, including general liability, worker's compensation, auto liability, and property. The Company's property insurance premiums are based on the total insured value of the Company's assets. The Company's general liability, Auto Liability, and worker's compensation premiums are based upon a combination of loss experience (50%) and exposure (50%). The loss experience is generally based upon a five-year average of historical loss experience. This five-year average is used to normalize losses in the event Kentucky-American suffers an anomalous year of claims. This is consistent with the commercial insurance market underwriting practice.

Q. Please describe the IOTG pro forma adjustments to operating expenses.

A. The majority of the Company's IOTG premiums renew on January 1 of each year (Directors & Officers Liability, Crime, Employment Practices, Fiduciary, Lawyers and Travel insurances renew in April of each year, Aircraft Hull Liability-Drones insurance renews in September of each year). Development of the pro forma expense begins with the annual premiums as of 2023 for auto liability, general liability, worker's compensation, excess liability, and other insurances. Monthly pro forma amounts are then adjusted by applying specific policy escalation factors for each policy group at their corresponding renewal dates. The costs of the annual policies are allocated for water based on the water/wastewater customer count allocation percentage. The worker's compensation premiums are multiplied by the labor capitalization rate to eliminate the portion of that cost that would be capitalized.

Uncollectibles

Q. Please explain the adjustment for uncollectible expense.

A. Uncollectible expenses are those costs associated with bad debt. A forecasted uncollectible percentage of revenue was developed utilizing historical uncollectible dollars to revenue ratio from 2020, 2021, and 2022 to determine an average uncollectible percentage. This percentage was then applied to pro forma revenue for the forecasted test period to arrive at the total uncollectible account expense. The forecasted test period uncollectible expense can be found in Exhibit 37, Schedules D-2.3.

Transportation

Q. Please describe the operating expenses related to transportation.

A. Transportation expense includes vehicle operation and maintenance and fuel costs. The forecasted test period transportation expense can be found in Exhibit 37, Schedules D-2.3.

Postage

Q. Please describe the operating expenses related to postage, printing and stationary.

A. The operating expense for postage and printing is inclusive of expenses related to certain shipping and mailings and postage expense, other than those included in the customer accounting expense. The forecasted test period postage expense can be found in Exhibit 37, Schedules C and D.

Telecommunications

Q. Please explain the adjustment for telecommincations.

A. The telecommunication expense includes those expenses associated with office phone and wireless services used by the Company. Expense for the forecasted test period is based on the three year average expense and expected increases for service for new iPads for operators and vehicle telematics service. The forecasted test period telecommunications expense can be found in Exhibit 37, Schedules C and D.

Building Maintenance and Services

Q. Please explain the adjustment for building maintenance and services.

A. The operating expense for building maintenance and services includes the cost of electricity and heating for office facilities, groundskeeping, janitorial services, building security, trash, and water and wastewater services. The building maintenance and services expense is based on the base period expense increased for expected inflation. The forecasted test period building maintenance and services expense can be found in Exhibit 37, Schedules C and D.

Maintenance

Q. Please explain the adjustment for maintenance supplies and services.

A. The operating expense associated with maintenance supplies and services are those expenses such as plant maintenance, main breaks expense, and the amortization of deferred maintenance costs, including the painting and rehabilitation of intakes, strorage tanks, and hydrotreators. Expense for the forecasted test period for maintenance expense can be found in Exhibit 37, Schedules C and D. The majority of this adjustment is due to the Company's proposed amortizations associated with tank maintenance, inspection, rehabilitation, hydrant painting, and intake structure maintenance. A fifteen-year amortization is requested for the projects going into service, consistent with the amortization term for these types of projects from prior cases. The remaining portion of the adjustment reflects the Company's most recent forecast of other costs based on the base period expense increased for expected inflation.

Income Tax

Q. Please explain the Company's request for Income Taxes.

A. Schedule E-1.1 and E-1.2 calculates the current and deferred income expenses. Schedules E-1.3 and E-1.4 calculates the current and deferred income taxes at proposed rates. Current Tax Expense is calculated as pro forma Operating Revenues less pro forma Tax Deductions. The tax deductions include permanent, non-deductible items and temporary differences for book and tax depreciation differences, tax repairs, and other plant related adjustments. Deferred Tax Expense is equal to the temporary differences times the federal statutory tax rate of 21% and the state statutory rate of 5%. Deferred Tax Expense was also adjusted for the following amortizations: excess deferred tax liabilities under the Reverse South Georgia method, excess deferred taxes associated with the Tax Cut and Jobs Act, and flow through of income tax regulatory assets.

Q. Does this conclude your direct testimony?

A. Yes.

VERIFICATION

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

The undersigned, John M. Watkins, being duly sworn, deposes and says that he is the Senior Director of Regulatory Services for American Water Works Service Company, Inc., that he has personal knowledge of the matters set forth in the accompanying testimony for which he is identified as the responsible witness, and that the answers contained therein are true and correct to the best of his information, knowledge and belief.

John M. Watkins

John M. Watkins

Subscribed and sworn to before me, a Notary Public in and before said County and State, this 26th day of June, 2023.

Debra Nichols

Notary Public

My Commission Expires:

6/2/27

DEBRA NICHOLS
Notary Public, State of New Jersey
Comm. # 50196656
My Commission Expires 6/2/2027