

Exhibit No.:	
Issues:	Depreciation Study
Witness:	Larry E. Kennedy
Exhibit Type:	Direct
Sponsoring Party:	Missouri-American Water Company
Case No.:	WR-2020-0344
	SR-2020-0345
Date:	June 30, 2020

MISSOURI PUBLIC SERVICE COMMISSION

CASE NO. WR-2020-0344
CASE NO. SR-2020-0345

DIRECT TESTIMONY

OF

LARRY E. KENNEDY

ON BEHALF OF

MISSOURI-AMERICAN WATER COMPANY

AFFIDAVIT

I, Larry E. Kennedy, under penalty of perjury, and pursuant to Section 509.030, RSMo, state that I am a Senior Vice President for Concentric Energy Advisors, that the accompanying testimony has been prepared by me or under my direction and supervision; that if inquiries were made as to the facts in said testimony, I would respond as therein set forth; and that the aforesaid testimony is true and correct to the best of my knowledge and belief.



Larry E. Kennedy

June 22, 2020

Dated

**DIRECT TESTIMONY
LARRY E. KENNEDY
MISSOURI-AMERICAN WATER COMPANY
CASE NO. WR-2020-0344
CASE NO. SR-2020-0345**

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DIRECT TESTIMONY

LARRY E. KENNEDY

I. INTRODUCTION

1 **Q. Please state your name and business address.**

2 A. My name is Larry E. Kennedy. My business address is 200 Rivercrest Drive SE, Suite
3 277, Calgary, Alberta, T2C 2X5.

4 **Q. By whom are you employed?**

5 A. I am employed by Concentric Energy Advisors ULC.

6 **Q. What is your position with Concentric Energy Advisors (“Concentric”)?**

7 A. I am employed by Concentric as a Senior Vice President.

8 **Q. On whose behalf are you submitting this Direct Testimony?**

9 A. I am submitting this Direct Testimony before the Missouri
10 Public Service Commission on behalf of Missouri-American Water Company
11 (“MAWC”).

12 **Q. Please state your qualifications.**

13 A. I am a Senior Vice President of Concentric Energy Advisors. I have been employed in
14 the public utility sector in the specialized fields of regulated plant accounting, capital
15 recovery and development of depreciation and capital recovery strategies for 40 years.
16 I have spent the last 20 years in a consulting role and have provided testimony in over
17 100 proceedings on the topics of depreciation, regulatory plant accounting, GAAP
18 accounting related to regulated entities, and stranded cost issues. Additionally, I am a

1 Certified Depreciation Professional and a member of the teaching faculty of the Society
2 of Depreciation Professionals. I have presented to a number of organizations of on the
3 topics of depreciation, utility asset valuation and stranded cost. My C.V. and list of
4 testimony are attached to this evidence as Schedule LEK-1.

5 **Q. What is the purpose of your Testimony?**

6 A. Concentric Energy Advisors (“Concentric”) was retained to complete full and
7 comprehensive depreciation studies on the water and wastewater systems of MAWC.
8 Specifically, Concentric has been retained to review and provide a report that includes:

SECTION 1	Study Highlights presenting a brief summary of the depreciation study and results
SECTION 2	Basis of the Update containing 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	Presentation of the results of the Retirement Rate Analysis
SECTION 7	Presentation of the results of the Net Salvage Study
SECTION 8	Presentation of the results of the Detailed Depreciation Calculations

9

10 **Q. Please provide a brief overview of the recommendations made in this this**
11 **testimony.**

12 A. Based on the completion of the depreciation studies, I recommend that the depreciation
13 accrual rates included in the depreciation studies by adopted by the company for the
14 water and wastewater assets.

15 Concentric’s depreciation study results for water assets results in an annual
16 depreciation expense accrual of \$67.4 million when applied to depreciable plant

1 balances of \$2,667 million, as of March 31, 2019. The report study results are
 2 summarized at an aggregate functional group level as follows:

3 **WATER SYSTEM**

Plant Group / Accounts	Original Cost	Annual Accrual \$	Annual Accrual
Structures and Improvements	\$239,949,715	\$6,114,724	2.55%
Transmission and Distribution	\$2,264,564,433	\$50,484,156	2.23%
General Plant	\$162,940,564	\$10,818,745	6.64%
Total Depreciable Plant	\$2,667,454,713	\$67,417,625	2.53%

4
 5 Additionally, Concentric’s study related to wastewater assets results in an annual
 6 depreciation expense accrual of \$1.6 million when applied to depreciable plant
 7 balances of \$79.7 million, as of March 31, 2019. The report study results are
 8 summarized at an aggregate functional group level as follows:

WASTEWATER SYSTEM

Plant Group / Accounts	Original Cost	Annual Accrual \$	Annual Accrual
Structures and Improvements	\$8,910,969	\$156,065	1.75%
Collecting, Treatment, and General Plant	\$70,820,789	\$1,399,556	1.98%
TOTAL	\$79,731,758	\$1,555,621	1.95%

9
 10 **Q. Did you prepare schedules presenting the results of the Depreciation Studies?**

11 A. Yes. The reports titled “2019 Depreciation Study – Water Assets” and “2019
 12 Depreciation Study – Wastewater Assets”, both dated May 2020 set forth the results of
 13 my Depreciation Studies. The reports have been marked as Schedules LEK-2 and

1 LEK-3 respectfully.

2 **II. DEPRECIATION CONCEPTS**

3 **Q. Please describe the term “Depreciation”.**

4 A. Depreciation in public utility regulation is the loss in service value, not restored by
5 current maintenance, incurred with the consumption or prospective retirement of utility
6 plant in service from causes which are known to be in current operation and against
7 which the utility is not protected by insurance. Among causes to be given consideration
8 include wear and tear, deterioration, action of the elements, inadequacy, obsolescence,
9 changes in the art and the requirements of public authorities.

10 When considering the action of the elements, the average service life and net salvage
11 calculations have considered large catastrophic events that have occurred and impacted
12 the life estimates of utilities across North America. The average service life of utilities
13 has been influenced by events including forest fires, earthquakes, tornadoes, ice storms,
14 wind storms, large scale flooding, fires, intentional actions of third parties and other
15 natural forces of nature.

16 Depreciation, as used in accounting, is a method of distributing fixed capital costs, less
17 net salvage, over a time period by allocating annual amounts to expense. Each annual
18 amount of such depreciation expense is part of that year's total cost of providing water
19 utility service. Normally, the time over which the fixed capital cost is allocated to the
20 cost of service, is equal to the time over which an item renders service - that is the
21 item's service life. The most prevalent method of allocation is to distribute an equal
22 amount of cost to each year of service life. This method is known as the Straight-Line

1 method of depreciation.

2 **Q. Please describe the depreciation methods and procedures used in the calculation**
3 **of the depreciation rates for MAWC.**

4 A. A9. The development of the depreciation calculations requires the input of an
5 Average Service Life, a retirement dispersion curve (“Survivor Curve” or “Iowa
6 curve”), Net Salvage estimates, and Life Span dates for a number of accounts. (the
7 “depreciation parameters”). Additionally, to complete the depreciation calculations,
8 the calculation methods must be established. Specifically, the selection of the
9 depreciation method must establish three types of additional input:

- 10 1. the choice of a depreciation method;
- 11 2. a basis upon which to apply the method, and
- 12 3. in the case of group assets, a procedure to use in grouping the assets.

13 In this study, the depreciation rates for most of the MAWC accounts have been
14 calculated in accordance with the Straight-Line method, the Average Life Group
15 (ALG) procedure and applied using the Remaining Life technique, with any
16 accumulated depreciation variances trued-up over the composite remaining life of each
17 account.

18 However, for General Plant Accounts 339.1, 339.2, 339.3, 339.50, 340.1, 340.2, 340.3,
19 340.31, 340.5, 342.0, 342.98, 343.0, 344.0, 346.1, 346.2, 347.0, and 348.0 for water
20 assets; and Accounts 390, 390.2, 392.0, 393.0, 394.0, 396.0, 397.0 and 398.0 for

1 wastewater assets, I used the straight line method of amortization. Amortization is the
2 gradual extinguishment of an amount in an account by distributing such amount over a
3 fixed period, over the life of the asset or liability to which it applies, or over the period
4 during which it is anticipated the benefit will be realized. Normally, the distribution of
5 the amount is in equal amounts to each year of the amortization period. The annual
6 amortization is based on amortization accounting which distributes the unrecovered
7 cost of fixed capital assets over the remaining amortization period selected for each
8 account and vintage.

9 **Q. Please describe what is meant by the terms “Average Service Life”: and “Iowa**
10 **Curves”.**

11 A. The use of an average service life for a property group implies that the various units in
12 the group have different lives. Thus, the average life may be obtained by determining
13 the separate lives of each of the units, or by constructing a survivor curve by plotting
14 the number of units which survive at successive ages using the “Retirement Rate
15 Method” of analysis. The retirement rate method of analysis results in an “Observed
16 Life Table”, that when plotted forms and original survivor curve. This original survivor
17 curve represents the average survivor patterns experienced by several vintage groups
18 as constructed through the selection of various “Placement” and “Experience” bands
19 that reflect the grouping of installations years and the grouping of transactional
20 retirement years.

21 An interpretation of the original survivor curve is required in order to use the original
22 survivor curve to estimate an average service life. The range of survivor characteristics

1 usually experienced by utility and industrial properties is encompassed by a system of
2 generalized survivor curves known as Iowa type curves. The Iowa curves "...were
3 sorted into three groups according to whether the mode was to the left, approximately
4 coincident with, or to the right of the average-life ordinate. The curves in each of these
5 three groups were then sub-classified in accordance with the height of the mode, taking
6 also into consideration the distance of the mode to the left or right of the average life."¹
7 The Iowa curves are described as L-type (i.e. left-moded), R-type (i.e. right-moded),
8 and S-type (i.e. symmetrical). Further development resulted in the introduction of O-
9 type (i.e. origin-moded curves) where the greatest frequency of retirement occurs at the
10 origin, or immediately after age zero. Individual type curves are further depicted with
11 numerical subscripts which represent the relative heights of the modes of the frequency
12 curves within each family.

13 Section 9 of Schedule LEK-2 and LEK-3 (the depreciation study reports) reports a
14 detailed description of the Estimation of survivor curves.

15 **Q. How do you know which of the Iowa curves to use in the estimation of average**
16 **service life?**

17 A. The program that is used by Concentric for statistical smooth curve fitting utilizes an
18 internal "goodness-of-fit" criterion which is the Residual Measure. This Residual
19 Measure is based on a least squares solution of the differences between the stub curve
20 (or original data points) and smooth survivor curve which also requires a balancing of

¹ Robley Winfrey, Statistical Analyses of Industrial Property Retirements, Bulletin 125 revised (Engineering Research Institute, Iowa State University, 1935) 65

1 the differences above and below the stub curve.

2 The criterion of goodness-of-fit is the mean square of the differences between the points
3 on the stub and fitted smooth survivor curves. The residual measure, or standard error
4 of estimate, shown in the output format is the square root of this mean square. As such,
5 the lower the Residual Measure the better the statistical fit between the analyzed Iowa
6 curve and the observed data points. Concentric follows the widely-used practice of
7 fitting Iowa curves up to 1% of the maximum exposures. This standard practice is
8 utilized to minimize the influence of typically small retirements applied to similarly
9 small exposures which may unduly affect the Iowa curve fitting process. However,
10 Concentric will recognize the observed data points beyond the 1% of maximum
11 exposures if it is determined that the additional data is a valid consideration for life
12 recommendation.

13 The detailed retirement rate analysis and plots of the original and smoothed survivor
14 curves are presented by account in Section 6 of Schedules LEK-2 and LEK-3.

15 **III. SELECTION OF THE AVERAGE SERVICE LIFE ESTIMATES**

16 **Q. What data was provided by MAWC to Concentric for use in the determination of**
17 **average service lives?**

18 **A.** A12. MAWC has provided Concentric with the required information, as of March
19 31, 2019, for all accounts being studied. This information has been compiled from the
20 plant accounting records and includes the following:

21 • current balances by vintage year for each account (aged balances). The

1 balances provide the amount of investment sorted by installation year currently
2 in operation. This file is only inclusive of current plant in service and does not
3 include any retirement information;

- 4 • detailed retirement transactions for all accounts. The transactions include
5 information regarding the transaction year of the retirement, the installation
6 year of the asset being retired, and the original cost of the asset being retired.

7 **Q. Did Concentric perform any reviews or verification of the data provided?**

8 A. A13. Yes. The above data was reviewed and reconciled to Company control
9 schedules to ensure accuracy and reasonableness in use of the calculations developed
10 in this study. These checks include:

- 11 • that the surviving investment by account equals (or can be reconciled to) the
12 Company's gross plant in service and accumulated depreciation ledger
13 balances;
- 14 • that the surviving investment in each vintage is not negative. In other words,
15 this check confirms that the sum of retirements from any given vintage have not
16 exceeded the amount of plant additions to the vintage; and
- 17 • that any adjusting transactions are properly accounted for within the databases.

18 **Q. Please describe the process used by Concentric to select an average service life**
19 **after receipt of the MWAC data.**

20 A. The procedure for estimating service lives consisted of compiling and analyzing

1 historical data using the retirement rate analysis as described above combined with the
2 professional judgement regarding the estimated probable future characteristics. The
3 use of survivor curves to reflect the expected dispersion of retirement provides a
4 consistent method of estimating depreciation for water plant. The service life estimates
5 when based on informed professional judgment which incorporates a review of
6 management's plans, policies and outlook, a general knowledge of the water
7 transmission and distribution industries, and comparisons of the service life estimates
8 from our studies of other water utilities, provides a full spectrum of information upon
9 which to base the average service life estimates. In this manner, the appropriate
10 reliance on historic indications are used in combination with management and
11 operational expectations as determined in staff interviews and reviews of upcoming
12 projects. Lastly, estimates are confirmed to other Water and Wastewater companies to
13 confirm the reasonableness of the average service life recommendations.

14 Detailed written analysis outlining the factors considered in the selection of the average
15 service life and Iowa curve estimates are provided for each account studied in Section
16 3.2 of Schedules LEK-2 and LEK-3.

17 **IV. ESTIMATION OF NET SALVAGE**

18 **Q. What historical data did MWAC provide to you for the purpose of estimation of**
19 **net salvage characteristics.**

20 A. MWAC provided Concentric with detailed cost of removal and gross salvage
21 transactions for all accounts for the period of 1974 through 2019 for the water accounts
22 and from 2008 through 2019 for the wastewater accounts. The transactions include

1 information regarding the transaction year of the retirement, the costs associated with
2 the retirement, and any gross salvage proceeds from the sale or reuse of the property.

3 **Q. Please describe the method used to analyze this data.**

4 A. A16. The net salvage data were analyzed by expressing the net salvage and its two
5 components, cost of removal and gross salvage, as percentages of the original cost
6 retired on annual, three-year moving average, five-year average bases, and life to date
7 averages as at each transaction year. The use of averages smooths the annual
8 fluctuations and assists in identifying underlying trends.

9 The results of the net salvage analyses provided indications of historical net salvage
10 levels. The results of this analysis was combined with the views of operational and
11 management staff, and tested against peer water and wastewater utilities. This process
12 provided Concentric with the ability to make informed consideration of estimates future
13 net salvage requirements.

14 Detailed written analysis outlining the factors considered in the selection of the net
15 salvage estimates are provided for each account studied in Section 3.2 of Schedules
16 LEK-2 and LEK-3. Additionally, the detailed calculations of net salvage are presented
17 in Section 7 of Schedules LEK-2 and LEK-3.

18 **V. CALCULATION OF ANNUAL DEPRECIATION ACCRUAL RATES**

19 **Q. Please describe the calculation method that you used in the determination of the
20 annual accrual rates developed within your reports.**

21 A. I calculated the annual depreciation accrual rates using the straight-line method of

1 depreciation, incorporating the Average Life Group procedure applied on a composite
2 remaining life basis. This is a continuation of the same practices as used and approved
3 in prior depreciation studies.

4 In the Average Life Group procedure (Also known as the Average Service Life
5 procedure), the rate of annual depreciation is based on the average service life of the
6 group - this rate is applied to the surviving balances of the group's cost. A characteristic
7 of this procedure is that the cost of plant retired prior to average life is not fully
8 recouped at the time of retirement, whereas the cost of plant retired after the average
9 life is more than fully recouped. Over the entire life cycle, the portion of cost not
10 recouped prior to average life is balanced by the cost recouped after average life.

11 **Q. Please describe the use of Amortization Accounting for certain general plant**
12 **accounts.**

13 A. Amortization is the gradual extinguishment of an amount in an account by distributing
14 such amount over a fixed period, over the life of the asset or liability to which it applies,
15 or over the period during which it is anticipated the benefit will be realized. Normally,
16 the distribution of the amount is in equal amounts to each year of the amortization
17 period.

18 The calculation of annual and accrued amortization requires the selection of an
19 amortization period. The amortization periods used in this report were based on
20 judgment which incorporated a consideration of the period during which the assets will
21 render most of their service, the amortization period and service lives used by other
22 utilities, and the service life estimates previously used for the asset under depreciation

1 accounting. Amortization accounting is proposed for accounts 339.1, 339.2, 339.3,
2 339.50, 340.1, 340.2, 340.3, 340.31, 340.5, 342.0, 342.98, 343.0, 344.0, 346.1, 346.2,
3 347.0, and 348.0 for water assets; and Accounts 390, 390.2, 392.0, 393.0, 394.0, 396.0,
4 397.0 and 398.0 for wastewater assets.

5 Depreciation accounting is difficult for these assets, inasmuch as periodic inventories
6 are required to properly reflect plant in service. In amortization accounting, units of
7 property are capitalized in the same manner as they are in depreciation accounting.
8 However, retirements are recorded when a vintage is fully amortized rather than as the
9 units are removed from service. That is, there is no dispersion of retirement. All units
10 are retired when the age of the vintage reaches the amortization period.

11 The detailed depreciation calculations for all depreciated and amortized accounts are
12 provided in Section 7 of Schedules LEK-2 and LEK-3.

13 **VI. RECOMMENDATIONS**

14 **Q. Please provide your recommendations for annual depreciation accrual rates for**
15 **the Company.**

16 A. I recommend the use of the depreciation annual accrual rates for accounts and sub-
17 accounts as summarized in Table 1 in Section 5 of Schedules LEK-2 and LEK-3. The
18 recommendations for the annual depreciation accrual rate is summarized for each
19 account and sub-account in Column (7) of Table 1. The detailed calculations supporting
20 the annual depreciation accrual rate are found in Section 8 of Schedules LEK-2 and
21 LEK-3.

1 The calculations as developed in Section 8 of the Schedules LEK-2 and LEK-3 were
2 calculated in accordance with the Average Service life, Iowa curve selection, and net
3 salvage estimates as developed in accordance with this testimony and as provided in
4 Sections 6 and 7 of Schedules LEK-2 and LEK-3.

5 **Q. Does this conclude your Direct Testimony?**

6 **A. Yes, it does.**



Larry E. Kennedy, CDP
Senior Vice President
Concentric Advisors, ULC

TECHNICAL SPECIALTIES

- Public Utility Plant Depreciation
- Public Utility Plant Accounting

PERSONAL INFORMATION

- Diploma, Applied Arts - Business Administration, Northern Alberta Institute of Technology, 1978
- Member, Society of Depreciation Professionals
- Certified Depreciation Professional

EXPERIENCE



Larry E. Kennedy, Senior Vice President, 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, 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 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.

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.
- 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.
- 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. 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.
- Great Plains Natural Gas Co.: Annual updates of depreciation rates and net salvage requirements were calculated and submitted to the Minnesota Department of Commerce in both 2017 and 2018.
- 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 enhancements 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 conversion 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)



SUMMARY OF EVIDENCE AND TESTIMONY

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
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



YEAR	CLIENT	APPLICANT	REGULATORY BOARD	PROCEEDING NUMBER
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
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



YEAR	CLIENT	APPLICANT	REGULATORY BOARD	PROCEEDING NUMBER
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



YEAR	CLIENT	APPLICANT	REGULATORY BOARD	PROCEEDING NUMBER
2010	Gazifere	Gazifere	La Regie de L'Energie	R-3724-2010
2010	Kinder Morgan	Kinder Morgan	National Energy Board of Canada	N/A
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



YEAR	CLIENT	APPLICANT	REGULATORY BOARD	PROCEEDING NUMBER
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	IntraGaz Incorporated	IntraGaz 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
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	Alliance Pipeline LP	Alliance Pipeline LP	Federal Energy and Regulatory Commission	Docket No. RP15-1022
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



YEAR	CLIENT	APPLICANT	REGULATORY BOARD	PROCEEDING NUMBER
2018	Great Plains Natural Gas Co.	Great Plains Natural Gas Co.	Minnesota Department of Commerce	Annual Depreciation Filing
2018	WestCoast Transmission System	WestCoast Transmission System	National Energy Board of Canada	Settled
2018	ATCO Electric	ATCO Electric	Alberta Utilities Commission	Proceeding 24195
2018	Montana-Dakota Utilities	Montana-Dakota Utilities	Montana Public Service Commission	Docket D2019.9
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	Decision Pending
2018	FortisBC Inc.	FortisBC Inc.	British Columbia Utilities Commission	Decision Pending
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	Viking Gas Transmission Company	Viking Gas Transmission Company	Federal Energy Regulatory Commission	RP19-1340
2019	Great Plains Natural Gas Co	Great Plains Natural Gas Co	Minnesota Department of Commerce	Annual Depreciation Filing
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	Cascade Natural Gas Corporation	Cascade Natural Gas Corporation	Oregon Public Utility Commission	Pending

LARRY E. KENNEDY, CDP

SENIOR VICE PRESIDENT





2019 DEPRECIATION STUDY

Prepared for Missouri American Water Company
St. Louis, Missouri

Prepared May, 2020

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Missouri American Water Company
727 Craig Road
St. Louis, Missouri
63141

Attention: Mr. Brian LaGrand

Dear Mr. LaGrand

Pursuant to your request, we have conducted a review and assessment of the water assets for Missouri American Water Company. Our study presents a description of the methods used in the estimation of service life and net salvage, as well as our recommendations for average service life and net salvage estimates.

We gratefully acknowledge the assistance of Missouri American Water Company personnel in the completion of our review.

Should you have any questions or concerns, please do not hesitate to contact me directly at 587.997.6489

Yours truly,

Concentric Advisors, ULC

D R A F T

Larry E. Kennedy
Vice President

LEK/ta
Project no: 03776



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SECTION 1

1 STUDY HIGHLIGHTS

Pursuant to request of Missouri American Water (“MAWC” or the “Company”), Concentric Advisors, ULC (“Concentric”) completed a depreciation study related to the Company’s Water Treatment, Distribution, Transmission 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, 2019.

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. Variances between the calculated accrued depreciation and the book accumulated

depreciation, as of December 31, 2019, are amortized over the composite remaining life of each account within the detailed remaining life calculations.

Concentric recommends the calculated annual depreciation accrual rates set forth herein apply specifically to Water Treatment, Distribution, Transmission and General Plant assets in service, as of December 31, 2019, 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 \$67.4 million when applied to depreciable plant balances of \$2,667 million, as of December 31, 2019. The report study results are summarized at an aggregate functional group level as follows:

SUMMARY OF ORIGINAL COST, ACCRUAL PERCENTAGES AND AMOUNTS

Plant Group / Accounts	Original Cost	Annual Accrual \$	Annual Accrual
Structures and Improvements	\$239,949,715	\$6,114,724	2.55%
Transmission and Distribution	\$2,264,564,433	\$50,484,156	2.23%
General Plant	\$162,940,564	\$10,818,745	6.64%
Total Depreciable Plant	\$2,667,454,713	\$67,417,625	2.53%



SECTION 2

2 BASIS OF THE UPDATE

2.1 Scope

Concentric has been retained by MAWC to develop reasonable and appropriate depreciation rates based on plant in service as of December 31, 2019. This report sets forth the results of the study and describes the process and procedures followed by Concentric in the development of the depreciation rates for the company's Water Treatment, Transmission, Distribution, and General Plant assets. This report also defines the concepts, methods and judgments which underlie the recommended annual depreciation accrual rates, related to the plant in service as of December 31, 2019. The annual depreciation accrual rates and amounts are based on the Straight-Line remaining life method of depreciation.

The Straight-Line method, Average Life Group ("ALG") procedure is a commonly used depreciation calculation procedure that has been widely accepted in jurisdictions throughout North America. Concentric recommends its continued use. Amortization accounting is used for certain accounts because of the disproportionate plant accounting effort required for these accounts. Many regulated utilities in North America have received approval to adopt amortization accounting for these 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	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

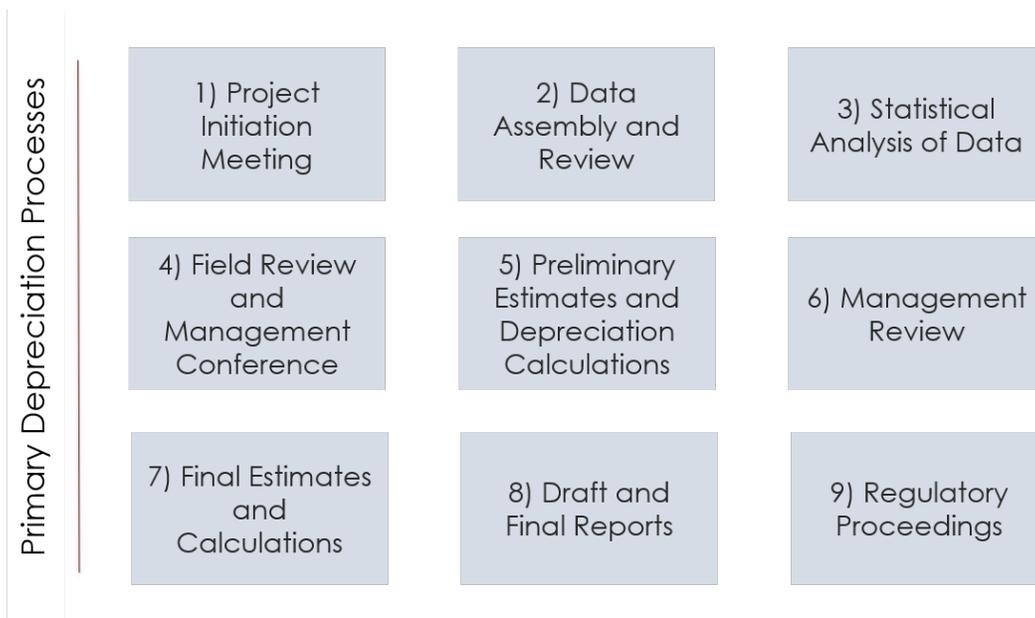


2.3 Depreciation

A full and comprehensive depreciation study includes the following components:

1. fully justified recommendations regarding Average Service Life estimates for each account;
2. fully justified 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.



2.4 Information Provided by MAWC

MAWC has provided Concentric with the required information, as of December 31, 2019, 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;



- 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, 2019 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 MAWC 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 in public utility regulation is the loss in service value, not restored by current maintenance, incurred with the consumption or prospective retirement of utility plant in service from causes which are known to be in current operation and against which the utility is not protected by insurance. Among causes to be given consideration are:

- wear and tear;
- deterioration;
- action of the elements;
- inadequacy;
- obsolescence;
- changes in the art;
- changes in demand; and
- the requirements of public authorities.

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;
- intentional actions of third parties; and
- other natural forces of nature



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 Depreciation Methods & Procedures

This study calculates the annual and accrued depreciation using the Straight-Line method and ALG procedure for most accounts. For certain 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.

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.

3.2 Estimation of Survivor Curves

3.2.1 Survivor Curves

The use of an average service life for 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 by 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 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.*"¹ 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

¹ Robley Winfrey, *Statistical Analyses of Industrial Property Retirements*, Bulletin 125 revised (Engineering Research Institute, Iowa State University, 1935) 65



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 which is 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 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 1% 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 1% 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.

3.2.2 Survivor Curve Judgments

The service life 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 water transmission and distribution industries, and comparisons of the service life estimates from our studies of other water utilities. The use of survivor curves to reflect the expected dispersion of retirement provides a consistent method of estimating depreciation for water 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 and analyzing historical data for the plant accounts using widely accepted techniques and forecasting the survivor characteristics for each depreciable group based on interpretations of the historical data analyses and the probable future. This included discussions of upcoming projects and business cases, and operational staff interviews. The combination of historical experience and the estimated future yielded estimated survivor curves from which the average service lives were derived.

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 304.20 – STRUCTURES AND IMPROVEMENTS – POWER AND PUMPING

Investment \$	Investment %	Previously Approved Curves	Concentric Recommends Curves	Previously Approved Salvage	Concentric Recommends Salvage
\$27,943,395	1.05%	75-R2.5	75-R2	-15%	-20%

The investment in Structures and Improvements – Power and Pumping is approximately \$27.9 million representing 1.04 percent of the total depreciable plant studied. The current approved life parameter for this account is an Iowa 75-R2.5. The retirements, additions and other plant transactions, for the period 1888 through 2019, were analyzed by the retirement rate method. Retirements of \$1,452,449 were recorded for the period 1944 through 2019, resulting in actual observed data points as depicted on page 6-8 of this report. The current Iowa 75-R2.5 has a related Residual Measure of 0.2846. Peer comparison of American water utilities produced a range from 50 to 75 years. The Iowa 75-R2 is a better visual fit but has a slightly worse Residual Measure of 0.2959 due to the influence of lesser statistical fits at the tail end of the plotted observed life table. The Iowa 75-R2 is recommended for this account based on the better visual fit to historic data through ages 10.5 through 45.5, which includes the majority of the significant retirement activity the review of American peer water utilities, and on the professional judgment of Concentric.

As in previous depreciation studies, the net salvage analysis 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 1974. The currently approved net salvage percentage is negative 15 percent. For the period 1974 to 2019, the net salvage ranged from positive 19 percent to negative 250 percent with a cumulative value of negative 40 percent. A three-year band analysis from 1976 forward produced a range from positive seven percent to negative 154 percent. The most recent three-year bands (i.e. 2015-2017, 2016-2018 and 2017-2019) indicate values of negative 56 percent, negative 108 percent and negative 154 percent respectively. The most recent five-year band indicates negative 103 percent. A peer comparison of American utilities indicated a range from negative 15 percent to negative 25 percent. Based on historical indications and the review of peer water utilities, Concentric views that negative 20 percent closer represents the net salvage expectation for the equipment in these accounts.

ACCOUNT 304.30 – STRUCTURES AND IMPROVEMENTS – WATER TREATMENT

Investment \$	Investment %	Previously Approved Curves	Concentric Recommends Curves	Previously Approved Salvage	Concentric Recommends Salvage
\$146,414,312	5.49%	80-R2.5	80-R2.5	-15%	-20%

The investment in Structures and Improvements – Water Treatment is approximately \$146.4 million representing 5.49 percent of the total depreciable plant studied. The current approved life parameter for this account is an Iowa 80-R2.5. The retirements, additions and other plant transactions, for the period 1898 through 2019, were analyzed by the retirement rate method. Retirements of \$5,833,530 were recorded for the period 1898 through 2019, resulting in actual observed data points as depicted on page 6-11 of this report. The current Iowa 80-R2.5 has a related Residual Measure of 0.1256. Peer comparison of American utilities produced a range from 60 to 75 years, resulting in MAWC with the



longest currently approved life. As such, the Iowa 80-R2.5 is recommended for continued use of this account based on the fit to historic data, the review of American peer water utilities, and on the professional judgment of Concentric.

As in previous depreciation studies, the net salvage analysis 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 1974. The currently approved net salvage percentage is negative 15 percent. For the period 1974 to 2019, the net salvage ranged from positive 19 percent to negative 250 percent with a cumulative value of negative 40 percent. A three-year band analysis from 1976 forward produced a range from positive seven percent to negative 154 percent. The most recent three-year bands (i.e. 2015-2017, 2016-2018 and 2017-2019) indicate values of negative 56 percent, negative 108 percent and negative 154 percent respectively. The most recent five-year band indicates negative 103 percent. A peer comparison of American utilities indicated a range from negative 15 percent to negative 25 percent. Based on historical indications and the review of peer water utilities, Concentric views that negative 20 percent better represents the net salvage expectation for the equipment in these accounts.

ACCOUNT 311.00 – ELECTRIC PUMPING EQUIPMENT

Investment \$	Investment %	Previously Approved Curves	Concentric Recommends Curves	Previously Approved Salvage	Concentric Recommends Salvage
\$84,092,783	3.15%	47-R1	55-R0.5	-10%	-15%

The investment in Electric Pumping Equipment is approximately \$84.1 million representing 3.15 percent of the total depreciable plant studied. The current approved life parameter for this account is an Iowa 47-R1. The retirements, additions and other plant transactions, for the period 1888 through 2019, were analyzed by the retirement rate method. Retirements of \$13,163,907 were recorded for the period 1939 through 2019, resulting in actual observed data points as depicted on page 6-48 of this report. The current Iowa 47-R1 has a related Residual Measure of 1.8551, which is not as good of a fit as the Iowa 55-R0.5 with a Residual Measure of 0.8821. Peer comparison of American water utilities produced a range from 30 to 40 years. The Iowa 55-R0.5 is recommended for this account based on the fit to historic data on the professional judgment of Concentric

The first year of recorded net salvage activity for this account is 1974. The currently approved net salvage is negative 10 percent. For the period 1974 to 2019, the net salvage ranged from positive 43 percent to negative 355 percent with a cumulative value of negative 23 percent. A three-year band analysis from 1976 forward produced a range from zero percent to negative 120 percent. The most recent three-year bands (i.e. 2015-2017, 2016-2018 and 2017-2019) indicate values of negative 57 percent, negative 56 percent and negative 120 percent respectively. The most recent five-year band indicates negative 83 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 320.00 – WATER TREATMENT EQUIPMENT

Investment \$	Investment %	Previously Approved Curves	Concentric Recommends Curves	Previously Approved Salvage	Concentric Recommends Salvage
\$159,873,561	5.99%	48-R1.5	50-R1	-25%	-30%

The investment in Water Treatment Equipment is approximately \$159.9 million representing 5.99 percent of the total depreciable plant studied. The current approved life parameter for this account is an Iowa 48-R1.5. The retirements, additions and other plant transactions, for the period 1881 through 2019, were analyzed by the retirement rate method. Retirements of \$25,236,864 were recorded for the period 1939 through 2019, resulting in actual observed data points as depicted on page 6-51 of this report. The current Iowa 48-R1.5 has a related Residual Measure of 0.3906, which does not fit the historical data as well as the Iowa 50-R1 with a Residual Measure of 0.2446. Peer comparison of American utilities produced a range from 25 to 70 years. As such, the Iowa 50-R1 is recommended for this account based on the fit to historic data, the review of American peer water utilities, and on the professional judgment of Concentric.

The first year of recorded net salvage activity for this account is 1974. The currently approved net salvage is negative 25 percent. For the period 1974 to 2019, the net salvage ranged from positive three percent to negative 271 percent with a cumulative value of negative 43 percent. A three-year band analysis from 1976 forward produced a range from positive two percent to negative 125 percent. The most recent three-year bands (i.e. 2015-2017, 2016-2018 and 2017-2019) indicate values of negative 53 percent, negative 68 percent and negative 101 percent respectively. The most recent five-year band indicates negative 76 percent. A peer comparison of American utilities indicated a range from negative 10 percent to negative 25 percent. Based on historical indications, Concentric views that negative 30 percent better represents the net salvage expectation for the equipment in this account.

ACCOUNT 330.00 – DISTRIBUTION RESERVOIRS AND STANDPIPES

Investment \$	Investment %	Previously Approved Curves	Concentric Recommends Curves	Previously Approved Salvage	Concentric Recommends Salvage
\$38,139,270	1.43%	65-R2.5	70-R2.5	-30%	-30%

The investment in Distribution Standpipes and Delivery is approximately \$38.1 million representing 1.43 percent of the total depreciable plant studied. The current approved life parameter for this account is an Iowa 65-R2.5. The retirements, additions and other plant transactions, for the period 1900 through 2019, were analyzed by the retirement rate method. Retirements of \$2,400,009 were recorded for the period 1939 through 2019, resulting in actual observed data points as depicted on page 6-54 of this report. The current Iowa 65-R2.5 has a related Residual Measure of 0.6401, which does not fit the historical data as well as the Iowa 70-R2.5 with a Residual Measure of 0.3818. Peer comparison of American utilities produced a range from 55 to 70 years. As such, the Iowa 70-R2.5 is recommended for this account based on the fit to historic data, the review of American peer water utilities, and on the professional judgment of Concentric.



The first year of recorded net salvage activity for this account is 1974. The currently approved net salvage is negative 30 percent. For the period 1974 to 2019, the net salvage ranged from positive 2 percent to negative 451 percent with a cumulative value of negative 56 percent. The most recent three-year bands (i.e. 2015-2017, 2016-2018 and 2017-2019) indicate values of negative 23 percent, negative 23 percent and negative 41 percent respectively. The most recent five-year band indicates negative 28 percent. A peer comparison of American utilities indicated a range from negative 15 percent to negative 30 percent. Based on historical indications and the review of American water utilities, Concentric views that the currently approved negative 30 percent represents the net salvage expectation for the equipment in this account.

ACCOUNT 331.01 – MAINS – TRANSMISSION AND DISTRIBUTION

Investment \$	Investment %	Previously Approved Curves	Concentric Recommends Curves	Previously Approved Salvage	Concentric Recommends Salvage
\$1,576,196,413	59.09%	90-R2	83-R2	-30%	-35%

The assets in this account relate to all Transmission and Distribution mains in the MAWC system. The current system contains approximately 80 percent cast iron mains, with the remainder a mix of materials. Currently, replacement mains are typically plastic, which began to be used in the 1980s. There is an ongoing pipe replacement program to retire the oldest vintages and replace with plastic. When mains are subject to replacement, the typical method is to lay new pipe and remove the old. It is not common practice for MAWC to insert new pipes inside of retired mains.

The investment in Mains – Transmission and Distribution is approximately \$1,576.2 million representing 59.09 percent of the total depreciable plant studied. The current approved life parameter for this account is an Iowa 90-R2. The retirements, additions and other plant transactions, for the period 1854 through 2019, were analyzed by the retirement rate method. Retirements of \$69,863,162 were recorded for the period 1939 through 2019, resulting in actual observed data points as depicted on page 6-57 of this report. The current Iowa 90-R2 has a related Residual Measure of 0.2966, which does not fit the historical data as well as the Iowa 83-R2 with a Residual Measure of 0.1921. Concentric notes that over the period since the last study (2015 – 2019), this account this account has experienced \$28.3 million of investment retired with a weighted average retirement age of 24.56 years. With this recent retirement trend, the results from the retirement rate analysis indicating a shortening of the average service life are expected Peer comparison of American utilities produced a range from 60 to 105 years. As such, the Iowa 83-R2 is recommended for this account based on the fit to historic data, the review of American peer water utilities, and on the professional judgment of Concentric.

The first year of recorded net salvage activity for this account is 1974. The currently approved net salvage is negative 30 percent. For the period 1974 to 2019, the net salvage ranged from zero percent to negative 306 percent with a cumulative value of negative 56 percent. A three-year band analysis from 1976 forward produced a range from zero percent to negative 175 percent. The most recent three-year bands (i.e. 2015-2017, 2016-2018 and 2017-2019) indicate values of negative 113 percent, negative 175 percent and negative 81 percent respectively. The most recent five-year band indicates negative 93 percent. A peer comparison of American utilities indicated a range from



negative 50 percent to negative 75 percent. Based on historical indications, Concentric views that negative 50 percent best represents the net salvage expectation for the equipment in this account. However, given the size of this account, Concentric recommends a policy of moderation be used in order to avoid a large increase in tolls to toll payers. Consequently, Concentric recommends a rate of negative 35 percent be used in this depreciation study, with further modifications in the net salvage percentages in future studies if the data continues to follow the current trend.

ACCOUNT 333.00 – SERVICES

Investment \$	Investment %	Previously Approved Curves	Concentric Recommends Curves	Previously Approved Salvage	Concentric Recommends Salvage
\$56,384,364	2.11%	65-R2	65-R1.5	-100%	-110%

The investment in Services is approximately \$56.4 million representing 2.11 percent of the total depreciable plant studied. The current approved life parameter for this account is an Iowa 65-R2. The retirements, additions and other plant transactions, for the period 1903 through 2019, were analyzed by the retirement rate method. Retirements of \$3,485,404 were recorded for the period 1939 through 2019, resulting in actual observed data points as depicted on page 6-64 of this report. The current Iowa 65-R2 has a related Residual Measure of 1.0125, which does not fit the historical data as well as the Iowa 65-R1.5 with a Residual Measure of 0.9717. Peer comparison of American utilities produced a range from 60 to 80 years. As such, a small change to the mode of the Iowa curve to the Iowa 65-R1.5 is recommended for this account based on the fit to historic data, the review of American peer water utilities, and on the professional judgment of Concentric.

The first year of recorded net salvage activity for this account is 1974. The currently approved net salvage is negative 100 percent. For the period 1974 to 2019, the net salvage ranged from positive 77 percent to negative 3,126 percent with a cumulative value of negative 110 percent. A three-year band analysis from 1976 forward produced a range from positive 27 percent to negative 532 percent. The most recent three-year bands (i.e. 2015-2017, 2016-2018 and 2017-2019) indicate values of negative 177 percent, negative 146 percent and negative 93 percent respectively. The most recent five-year band indicates negative 110 percent. A peer comparison of American utilities indicated a range from negative 75 percent to negative 150 percent. Based on historical indications and the review of American water utilities, Concentric views that negative 110 percent better represents the net salvage expectation for the equipment in this account.

ACCOUNT 334.00 – METERS AND METER INSTALLATIONS

Investment \$	Investment %	Previously Approved Curves	Concentric Recommends Curves	Previously Approved Salvage	Concentric Recommends Salvage
\$196,978,222	7.38%	42-R1.5	30-L4	-10%	-20%

The investment in Meters and Meter Installations is approximately \$197.0 million representing 7.38 percent of the total depreciable plant studied. The current approved life parameter for this account is an Iowa 42-R1.5. The retirements, additions and other plant transactions, for the period 1899



through 2019, were analyzed by the retirement rate method. Retirements of \$32,219,233 were recorded for the period 1945 through 2019, resulting in actual observed data points as depicted on page 6-68 of this report. In August 2019, the Missouri Code of State Regulations was amended to include the following language:

(37) No water service meter shall be allowed in service which has an incorrect gear ratio or dial train or is mechanically defective or shows an error in measurement in excess of five percent (5%) when registering water at stream flow equivalent to approximately onetenth (1/10) and full normal rating under the average service pressure. When adjustment is necessary, the adjustment shall be made as accurately as practical for average rate of flow under actual conditions of installation. Tests for accuracy shall be made with a suitable testing device in accordance with the best modern water meter practice and at rates of flow which will properly reflect the accuracy of meters over each meter's range of minimum to maximum flow.

(38) Unless otherwise ordered by the commission, each water service meter installed shall be periodically removed, inspected and tested in accordance with the following schedule, or as often as the results obtained may warrant to insure compliance with the provisions of section (37) of this rule: (A) Five-eighths inch (5/8") meter—ten (10) years or two hundred thousand (200,000) cubic feet whichever occurs first; (B) Three-fourths inch (3/4") meter—eight (8) years or three hundred thousand (300,000) cubic feet whichever occurs first; (C) One inch (1") meter—six (6) years or four hundred thousand (400,000) cubic feet whichever occurs first; and (D) All meters above one inch (1")—every four (4) years.

Approximately 90 percent of the \$197.0 million original cost relates to residential meters, which are required by the above language to be removed after ten years. Consequently, the currently approved life of 42 years needs to be dramatically reduced. The Iowa 12-L4 is recommended for this account based on the professional judgment of Concentric to properly account for the change in the regulations. However, a change of that magnitude would cause a dramatic increase in the overall depreciation rate for MAWC which would result in a significant increase in the revenue requirement for toll payers. It is the opinion of Concentric that a moderated change is necessary. An Iowa 30-L4 represents a moderated 29 percent reduction to the average service life. It will be essential to continue to reduce the life of this account in future depreciation studies in order to better reflect the future lives of these assets caused by the requirements noted above. .

The first year of recorded net salvage activity for this account is 1974. The currently approved net salvage is negative ten percent. For the period 1974 to 2019, the net salvage ranged from positive 46 percent to negative 196 percent with a cumulative value of negative 36 percent. The most recent three-year bands (i.e. 2015-2017, 2016-2018 and 2017-2019) indicate values of negative 133 percent, negative 65 percent and negative 39 percent respectively. The most recent five-year band indicates negative 52 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 better represents the net salvage expectation for the equipment in this account.



ACCOUNT 335.00 – FIRE HYDRANTS

Investment \$	Investment %	Previously Approved Curves	Concentric Recommends Curves	Previously Approved Salvage	Concentric Recommends Salvage
\$97,070,443	3.64%	65-R1.5	60-R2	-30%	-40%

The investment in Fire Hydrants is approximately \$97.1 million representing 3.64 percent of the total depreciable plant studied. The current approved life parameter for this account is an Iowa 65-R1.5. The retirements, additions and other plant transactions, for the period 1880 through 2019, were analyzed by the retirement rate method. Retirements of \$12,832,694 were recorded for the period 1939 through 2019, resulting in actual observed data points as depicted on page 6-71 of this report. The current Iowa 65-R1.5 has a related Residual Measure of 0.5566, which does not fit the historical data as well as the Iowa 60-R2 with a Residual Measure of 0.4684. Concentric notes that over the period since the last study (2015 – 2019), this account has experienced \$6.1 million of investment retired with a weighted average retirement age of 35.8 years. With this recent retirement trend, the results from the retirement rate analysis indicating a shortening of the average service life are expected. Peer comparison of American utilities produced a range from 55 to 90 years. As such, the Iowa 60-R2 is recommended for this account based on the fit to historic data, the review of American peer water utilities, and on the professional judgment of Concentric.

The first year of recorded net salvage activity for this account is 1974. The currently approved net salvage is negative 30 percent. For the period 1974 to 2019, the net salvage ranged from positive 20 percent to negative 386 percent with a cumulative value of negative 45 percent. A three-year band analysis from 1976 forward produced a range from zero percent to negative 211 percent. The most recent three-year bands (i.e. 2015-2017, 2016-2018 and 2017-2019) indicate values of negative 211 percent, negative 97 percent and negative 52 percent respectively. The most recent five-year band indicates negative 61 percent. A peer comparison of American utilities indicated a range from negative 50 percent to negative 60 percent. Based on historical indications and the review of American water utilities, Concentric views that negative 40 percent better represents the net salvage expectation for the equipment in this account.

OTHER ACCOUNTS

The above analysis provides the consideration relating to over 89 percent of the depreciable plant. Many of the accounts related to the remaining 11 percent of the depreciable plant studied as of December 31, 2019, 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.

3.2.3 Life Span Dates

Consistent with prior depreciation studies completed for MAWC, the estimation of the physical and economic life characteristics for the structures and equipment included in Accounts 304.2, 304.3 and 306.00 have incorporated the use of a Life Span date. A Life Span date is often incorporated into the calculation of the composite remaining life and the depreciation rate calculations in circumstances where it is considered that the unit of property, or a group of property, such as hydro-electric dams



or buildings housing electrical or control equipment, will all be retired as a group, due to a single large retirement event. In these cases, the life of assets within Accounts 304.2, 304.3 and 306.00 are tied together, because the retirement of one asset causes the retirement of the entire, or a significant portion of the assets within the total facility. While these accounts have an Iowa curve and average service life estimated for the purposes of estimation of interim retirement activity (i.e. retirements estimated to occur prior to the life span date), the interim survivor curve is truncated at the Life Span date rather than gradually curving to zero percent surviving.

The life span estimates used in this study for structures and equipment in Accounts 304.20, 304.30 and 306.00 which represent 6.8 percent of depreciable plant were based on the life span dates as approved in the last depreciation study, and adjusted on the basis of the plant accounting activity at each facility. Physical site visits were not conducted at these facilities, given the travel and access constraints due to the COVID-19 pandemic. However, where large additions and retirement activity have occurred over the period since the last study, Concentric extended the life span date to appropriately recognize the life extension that would result from the capital expenditures.



SECTION 4

4 CALCULATION OF ANNUAL AND ACCRUED DEPRECIATION

4.1 Group Depreciation 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 (Also known as the Average Service Life 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 Life Group procedure has been continued. While the Equal Life Group procedure provides an enhanced matching of depreciation expense to the consumption of service value, the Average Life Group procedure was used in order to conform to past Company practices and prior approvals by the Missouri Public Service Commission.

4.2 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. The accounts and their amortization periods are as follows:



Account	Title	Amortization Period-Years
339.10	Intangible Plant - Other	25
339.20	Source of Supply – Other	25
339.30	Water Treatment – Other	30
339.50	Intangible Plant – Software	30
340.10	Office Furniture	20
340.20	Computer Hardware	5
340.30	Computer Software	10
340.31	Computer Software – BT Initial Investment	7
340.50	Other Equipment	20
342.00	Stores Equipment	25
342.98	Engineered Tank Coatings	20
343.00	Tools, Shop, and Garage Equipment	20
344.00	Laboratory Equipment	15
346.10	Communication Equipment – Non-Telephone	15
346.20	Communication Equipment – Telephone	10
347.00	Miscellaneous Equipment	15
348.00	Other Tangible Property	20

For the purpose of calculating annual amortization amounts, as of December 31, 2019, 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.

4.3 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:



$$\text{Composite Remaining Life} = \frac{\sum \left(\frac{\text{Book Cost}}{\text{Life}} \times \text{Remaining Life} \right)}{\sum \frac{\text{Book Cost}}{\text{Life}}} \quad (1)$$

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:

$$\text{Composite Remaining Life} = \frac{\sum \text{Whole Life Future Accruals}}{\sum \text{Whole Life Annual Accrual}} \quad (2)$$

or

$$\text{Composite Remaining Life} = \frac{\sum \text{Book Cost} - \text{Calc, Reserve}}{\sum \text{Whole Life Annual Accrual}} \quad (3)$$



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, 2019, 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.

Missouri American Water

TABLE 1 - ESTIMATED SURVIVOR CURVE, ORIGINAL COST, BOOK DEPRECIATION RESERVE AND CALCULATED ANNUAL DEPRECIATION ACCRUALS RELATED TO UTILITY PLANT AS OF DECEMBER 31, 2019 DEPRECIATION RELATED TO RECOVERY OF ORIGINAL COST OF INVESTMENT

Account	Account Description	Survivor Curve	Net Salvage	Truncation Date	Original Cost as of Dec. 31, 2019	Book Depreciation Reserve	Future Accruals	Calculated Annual Accrual Amount	Calculated Annual Accrual Rate	Composite Remaining Life
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	8.00	9.00
DEPRECIABLE PLANT STUDIED										
Structures and Improvements										
304.1	Source of Supply	65-R2.5	-30		19,846,697	5,622,679	20,178,027	385,043	1.94	51.90
304.2	Power and Pumping									
	Corporate	75-R2	-20	2038	231,918	66,737	211,565	11,631	5.02	18.19
	St. Louis	75-R2	-20	2041	17,012,445	4,898,297	15,516,637	756,553	4.45	20.39
	St. Joseph	75-R2	-20	2063	4,100,992	1,180,103	3,741,088	93,299	2.28	39.77
	Warrensburg	75-R2	-20	2031	285,549	82,170	260,489	23,072	8.08	11.28
	Brunswick	75-R2	-20	2040	49,479	14,238	45,137	2,284	4.62	19.76
	St. Charles	75-R2	-20	2042	1,770,025	509,343	1,614,687	75,534	4.27	21.35
	Mexico	75-R2	-20	2031	51,275	14,755	46,775	4,293	8.37	10.89
	Joplin	75-R2	-20	2073	2,498,221	718,889	2,278,976	46,970	1.88	47.17
	Jefferson	75-R2	-20	2054	1,549,248	445,812	1,413,285	43,739	2.82	32.22
	Rankin Acres	75-R2	-20	2030	5,108	1,470	4,659	452	8.84	10.32
	Spring Valley	75-R2	-20	2035	6,513	1,874	5,941	391	6.00	15.21
	Whitebranch	75-R2	-20	2030	1,719	495	1,568	152	8.84	10.32
	Ozark Mountain	75-R2	-20	2035	43,699	12,575	39,864	2,622	6.00	15.20
	Maple/River/Stone	75-R2	-20	2030	76,115	21,903	69,435	6,703	8.81	10.36
	Saddlebrooke	75-R2	-20	2033	10,305	2,965	9,401	711	6.90	13.22
	Tri-States	75-R2	-20	2027	12,295	3,538	11,216	1,519	12.36	7.38
	Parkville	75-R2	-20	2067	238,490	68,628	217,560	4,918	2.06	43.67
	Total Power and Pumping				27,943,395	8,043,791	25,488,283	1,074,842	3.85	
304.3	Water Treatment									
	Corporate	80-R2.5	-20	2038	418,278	113,109	388,825	21,225	5.07	18.31
	St. Louis	80-R2.5	-20	2067	87,074,052	23,546,228	80,942,634	1,884,849	2.16	42.43
	St. Joseph	80-R2.5	-20	2078	18,726,492	5,063,946	17,407,845	349,132	1.86	49.85
	Warrensburg	80-R2.5	-20	2055	1,004,248	271,565	933,533	27,751	2.76	33.62
	Brunswick	80-R2.5	-20	2040	202,891	54,865	188,604	9,470	4.67	19.88
	St. Charles	80-R2.5	-20	2043	5,849	1,582	5,437	237	4.05	22.96
	Mexico	80-R2.5	-20	2065	3,225,265	872,164	2,998,154	71,667	2.22	41.79
	Joplin	80-R2.5	-20	2073	6,570,020	1,776,639	6,107,385	125,193	1.91	48.60
	Jefferson	80-R2.5	-20	2054	3,443,667	931,223	3,201,178	97,622	2.83	32.62
	Maple/River/Stone	80-R2.5	-20	2030	2,042,902	552,434	1,899,048	181,840	8.90	10.44
	Saddlebrooke	80-R2.5	-20	2033	17,866	4,831	16,608	1,238	6.93	13.42
	Tri-States	80-R2.5	-20	2027	76,297	20,632	70,924	9,495	12.44	7.47
	Parkville	80-R2.5	-20	2067	23,606,484	6,383,574	21,944,207	483,939	2.05	45.23
	Total Water Treatment				146,414,312	39,592,792	136,104,383	3,263,656	2.23	
304.4	Transmission and Distribution	55-R2.5	-20		14,766,257	5,134,749	12,584,760	290,150	1.96	41.77
304.53	Leasehold Improvements	25-R4	-20		13,756,691	1,072,078	15,435,951	665,950	4.84	23.18
304.61	Office Buildings	45-S0	-20		8,583,889	965,108	9,335,559	244,997	2.85	38.78
304.7	Shop and Garage	55-R2.5	-20		4,917,560	1,230,931	4,670,140	92,579	1.88	49.80
304.8	Miscellaneous	50-R2.5	-20		3,720,914	1,410,306	3,054,792	97,507	2.62	31.82
	Total Structures and Improvements				239,949,715	63,072,433	226,851,895	6,114,724	2.55	

Missouri American Water

TABLE 1 - ESTIMATED SURVIVOR CURVE, ORIGINAL COST, BOOK DEPRECIATION RESERVE AND CALCULATED ANNUAL DEPRECIATION ACCRUALS RELATED TO UTILITY PLANT AS OF DECEMBER 31, 2019 DEPRECIATION RELATED TO RECOVERY OF ORIGINAL COST OF INVESTMENT

Account	Account Description	Survivor Curve	Net Salvage	Truncation Date	Original Cost as of Dec. 31, 2019	Book Depreciation Reserve	Future Accruals	Calculated Annual Accrual Amount	Calculated Annual Accrual Rate	Composite Remaining Life
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	8.00	9.00
Transmission and Distribution										
305	Collecting and Impounding Reservoirs	90-R4	0		119,689	99,604	20,086	352	0.29	41.60
306	Lake, River, and Other Intakes									
	St. Louis	60-L1	-20	2053	674,459	119,493	689,858	22,835	3.39	30.21
	St. Joseph	60-L1	-20	2063	5,103	904	5,219	170	3.32	30.77
	Mexico	60-L1	-20	2065	10,775	1,909	11,021	315	2.92	35.03
	Joplin	60-L1	-20	2073	562,749	99,700	575,599	14,945	2.66	38.64
	Jefferson	60-L1	-20	2054	6,487,020	1,149,279	6,635,145	223,343	3.44	29.71
	Total Lake, River, and Other Intakes				7,740,106	1,371,285	7,916,843	261,607	3.38	
307	Wells and Springs	60-R1	-10		9,736,669	2,484,423	8,225,913	164,133	1.69	48.42
308	Infiltration Galleries and Tunnels	60-R3.5	0		1,804	408	1,396	32	1.76	43.88
309	Supply Mains	82-R3.5	-30		22,289,903	8,192,144	20,784,730	345,413	1.55	59.83
310.1	Power Generation Equipment	37-R3	-10		12,765,611	1,140,962	12,901,211	395,037	3.09	32.86
311	Electric Pumping Equipment	55-R0.5	-15		84,092,783	28,432,748	68,273,953	1,408,430	1.67	45.73
320	Water Treatment Equipment	50-R1	-30		159,873,561	42,176,622	165,659,008	3,883,644	2.43	41.68
330	Distribution Reservoirs and Standpipes	70-R2.5	-30		38,139,270	14,126,627	35,454,424	689,904	1.81	50.86
331.01	Mains- Transmission and Distribution	83-R2	-35		1,576,196,413	233,455,439	1,894,409,718	27,230,630	1.73	70.55
332	Mains - Fire	85-S1.5	-35		595,477	153,585	650,309	10,093	1.69	64.69
333	Services	65-R1.5	-110		56,384,364	9,118,112	109,289,052	2,012,989	3.57	55.43
334	Meters and Meter Installations	30-L4	-20		196,978,222	32,311,292	204,062,575	11,418,168	5.80	7.17
335	Fire Hydrants	60-R2	-40		97,070,443	18,989,480	116,909,139	2,598,087	2.68	47.06
339	Miscellaneous Property									
	Intangible Plant - Other	25-SQ	0		3,421	306,586	-303,165	0	0.00	7.48
	Source of Supply - Other	25-SQ	0		1,730	889	840	34	1.94	9.50
	Water Treatment - Other	30-SQ	0		1,473,221	591,225	881,996	29,400	2.00	12.41
	Transmission and Distribution - Other	55-R3	0		38,643	15,407	23,236	767	1.98	31.69
	Intangible Plant - Software	30-SQ	0		1,063,104	0	1,063,104	35,437	3.33	15.52
	Total Miscellaneous Property				2,580,119	914,107	1,666,011	65,637	2.54	
Total Transmission and Distribution					2,264,564,433	392,966,835	2,646,224,368	50,484,156	2.23	
340.1	Office Furniture	20-SQ	0		2,025,804	1,223,861	801,943	40,097	1.98	14.34
340.2	Computer Hardware	5-SQ	0		6,969,440	4,069,951	2,899,489	579,898	8.32	2.25
340.3	Computer Software	10-SQ	0		34,590,346	13,425,268	21,165,078	2,116,508	6.12	7.01
340.31	Computer Software - BT Initial Investment	7-SQ	0		46,360,757	15,716,706	30,644,051	4,377,722	9.44	0.35
340.5	Other Equipment	20-SQ	0		15,666	-19,368	35,034	1,752	11.18	12.31
	Total Account 340				89,962,013	34,416,417	55,545,596	7,115,976	7.91	

Missouri American Water

TABLE 1 - ESTIMATED SURVIVOR CURVE, ORIGINAL COST, BOOK DEPRECIATION RESERVE AND CALCULATED ANNUAL DEPRECIATION ACCRUALS RELATED TO UTILITY PLANT AS OF DECEMBER 31, 2019 DEPRECIATION RELATED TO RECOVERY OF ORIGINAL COST OF INVESTMENT

Account	Account Description	Survivor Curve	Net Salvage	Truncation Date	Original Cost as of Dec. 31, 2019	Book Depreciation Reserve	Future Accruals	Calculated Annual Accrual Amount	Calculated Annual Accrual Rate	Composite Remaining Life
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Transportation Equipment										
341.1	Light Trucks	11-L1.5	20		14,913,559	2,523,175	9,407,673	1,059,098	7.10	8.85
341.2	Heavy Trucks	10-L1.5	20		12,704,071	5,044,401	5,118,856	570,177	4.49	7.46
341.3	Autos	6-L1.5	20		1,061,274	2,471,322	-1,622,303	0	0.00	1.52
341.4	Other	17-R3	5		16,302,559	2,777,010	12,710,421	953,913	5.85	13.42
Total Transportation Equipmet					44,981,463	12,815,908	25,614,646	2,583,187	5.74	
342	Stores Equipment	25-SQ	0		830,051	-76,419	906,471	36,259	4.37	15.53
342.98	Engineered Tank Coatings	20-SQ	0		0	0	0	0	5.00	
343	Tools, Shop, and Garage Equipment	20-SQ	0		8,641,510	3,743,100	4,898,411	244,921	2.83	13.23
344	Laboratory Equipment	15-SQ	0		1,933,696	784,954	1,148,742	76,583	3.96	9.06
345	Power Operated Equipment	10-L1.5	25		1,746,119	2,068,081	-758,492	0	0.00	4.87
346.1	Communication Equipment - Non-Telephone	15-SQ	0		9,157,637	2,277,598	6,880,039	458,669	5.01	11.18
346.2	Communication Equipment - Telephone	10-SQ	0		41,965	97,257	-55,292	0	0.00	2.99
347	Miscellaneous Equipment	15-SQ	0		5,614,170	1,313,493	4,300,677	286,712	5.11	10.25
348	Other Tangible Property	20-SQ	0		31,940	-296,829	328,769	16,438	51.47	5.52
Total General Plant					162,940,564	57,143,560	98,809,566	10,818,745	6.64	
Total Depreciable Plant					2,667,454,713	513,182,828	2,971,885,829	67,417,625	2.53	
Non Depreciable Plant										
301	Organization				249,500	2,933				
302	Franchises and Consents				43,698					
303.2	Land and Land Rights - Source of Supply				1,686,667	2,400				
303.3	Land and Land Rights - Pumping				472,629	472				
303.4	Land and Land Rights - Water Treatment				3,339,935					
303.5	Land and Land Rights - Transmission and Distribution				5,351,275	7				
303.6	Land and Land Rights - Administrative				615,276	-1,059				
Total Non Depreciable Plant					11,758,980	4,753				
TOTAL PLANT					2,679,213,693	513,187,581	2,971,885,829	67,417,625	2.52	



SECTION 6

6 RETIREMENT RATE ANALYSIS

Missouri American Water

Account 30410 - Source of Supply - Structures and Improvements

RETIREMENT RATE ANALYSIS

Age at Begin of Interval	Exposures at Beginning of Age Interval	Retirements During Age Interval	Retmt Ratio	Survivor Ratio	% Surviving
0	25,170,397	0	0.00000	1.00000	100.00
0.5	23,264,143	0	0.00000	1.00000	100.00
1.5	19,693,801	3,667	0.00019	0.99981	100.00
2.5	18,076,641	6,195	0.00034	0.99966	99.98
3.5	18,065,630	6,346	0.00035	0.99965	99.95
4.5	16,379,277	9,304	0.00057	0.99943	99.92
5.5	16,248,725	3,756	0.00023	0.99977	99.86
6.5	16,022,709	41,403	0.00258	0.99742	99.84
7.5	15,958,408	3,280	0.00021	0.99979	99.58
8.5	14,475,709	163,595	0.01130	0.98870	99.56
9.5	14,206,145	26,110	0.00184	0.99816	98.43
10.5	14,172,228	183,335	0.01294	0.98706	98.25
11.5	13,955,007	48,165	0.00345	0.99655	96.98
12.5	10,364,949	20,310	0.00196	0.99804	96.65
13.5	9,941,251	22,445	0.00226	0.99774	96.46
14.5	9,918,805	45,048	0.00454	0.99546	96.24
15.5	9,133,367	31,358	0.00343	0.99657	95.80
16.5	6,268,310	12,265	0.00196	0.99804	95.47
17.5	6,057,408	5,198	0.00086	0.99914	95.28
18.5	6,035,750	2,081	0.00034	0.99966	95.20
19.5	6,032,236	12,769	0.00212	0.99788	95.17
20.5	5,995,078	19,940	0.00333	0.99667	94.97
21.5	5,940,599	0	0.00000	1.00000	94.65
22.5	5,670,656	93,702	0.01652	0.98348	94.65
23.5	5,565,900	1,103	0.00020	0.99980	93.09
24.5	5,518,940	22,995	0.00417	0.99583	93.07
25.5	5,197,394	15,813	0.00304	0.99696	92.68
26.5	2,124,365	580	0.00027	0.99973	92.40
27.5	2,094,333	6,618	0.00316	0.99684	92.38
28.5	2,078,648	700	0.00034	0.99966	92.09
29.5	2,025,881	11,779	0.00581	0.99419	92.06
30.5	2,004,765	854	0.00043	0.99957	91.53
31.5	2,003,125	175	0.00009	0.99991	91.49
32.5	2,002,950	1,981	0.00099	0.99901	91.48
33.5	2,000,969	4,227	0.00211	0.99789	91.39
34.5	1,996,742	2,478	0.00124	0.99876	91.20
35.5	1,974,164	2,879	0.00146	0.99854	91.09
36.5	1,968,566	10,651	0.00541	0.99459	90.96
37.5	1,957,915	66	0.00003	0.99997	90.47
38.5	1,956,284	26,039	0.01331	0.98669	90.47
39.5	1,930,245	23,378	0.01211	0.98789	89.27

Missouri American Water

Account 30410 - Source of Supply - Structures and Improvements

RETIREMENT RATE ANALYSIS

Age at Begin of Interval	Exposures at Beginning of Age Interval	Retirements During Age Interval	Retmt Ratio	Survivor Ratio	% Surviving
40.5	1,904,446	11,572	0.00608	0.99392	88.19
41.5	1,844,311	1,101	0.00060	0.99940	87.65
42.5	1,553,317	533	0.00034	0.99966	87.60
43.5	1,545,362	4,389	0.00284	0.99716	87.57
44.5	1,540,162	16,252	0.01055	0.98945	87.32
45.5	1,513,538	1,157	0.00076	0.99924	86.40
46.5	1,366,847	16,558	0.01211	0.98789	86.33
47.5	1,334,550	12,021	0.00901	0.99099	85.28
48.5	968,041	355	0.00037	0.99963	84.51
49.5	964,130	789	0.00082	0.99918	84.48
50.5	953,212	2,253	0.00236	0.99764	84.41
51.5	555,011	477	0.00086	0.99914	84.21
52.5	554,534	448	0.00081	0.99919	84.14
53.5	554,086	0	0.00000	1.00000	84.07
54.5	553,976	0	0.00000	1.00000	84.07
55.5	420,773	0	0.00000	1.00000	84.07
56.5	418,594	585	0.00140	0.99860	84.07
57.5	418,009	0	0.00000	1.00000	83.95
58.5	418,009	4,465	0.01068	0.98932	83.95
59.5	413,544	982	0.00237	0.99763	83.05
60.5	391,143	3,023	0.00773	0.99227	82.85
61.5	388,120	12,604	0.03247	0.96753	82.21
62.5	375,517	4,004	0.01066	0.98934	79.54
63.5	366,590	959	0.00262	0.99738	78.69
64.5	33,299	0	0.00000	1.00000	78.48
65.5	32,374	2	0.00006	0.99994	78.48
66.5	32,372	923	0.02851	0.97149	78.48
67.5	31,450	3,435	0.10922	0.89078	76.24
68.5	28,015	13,162	0.46982	0.53018	67.91
69.5	14,853	3,802	0.25597	0.74403	36.00
70.5	11,052	1,289	0.11664	0.88336	26.79
71.5	9,763	0	0.00000	1.00000	23.67
72.5	9,763	355	0.03636	0.96364	23.67
73.5	9,407	0	0.00000	1.00000	22.81
74.5	9,407	0	0.00000	1.00000	22.81
75.5	9,407	0	0.00000	1.00000	22.81
76.5	9,407	0	0.00000	1.00000	22.81
77.5	9,407	994	0.10566	0.89434	22.81
78.5	8,413	567	0.06739	0.93261	20.40
79.5	7,846	0	0.00000	1.00000	19.03
80.5	7,846	0	0.00000	1.00000	19.03

Missouri American Water

Account 30410 - Source of Supply - Structures and Improvements

RETIREMENT RATE ANALYSIS

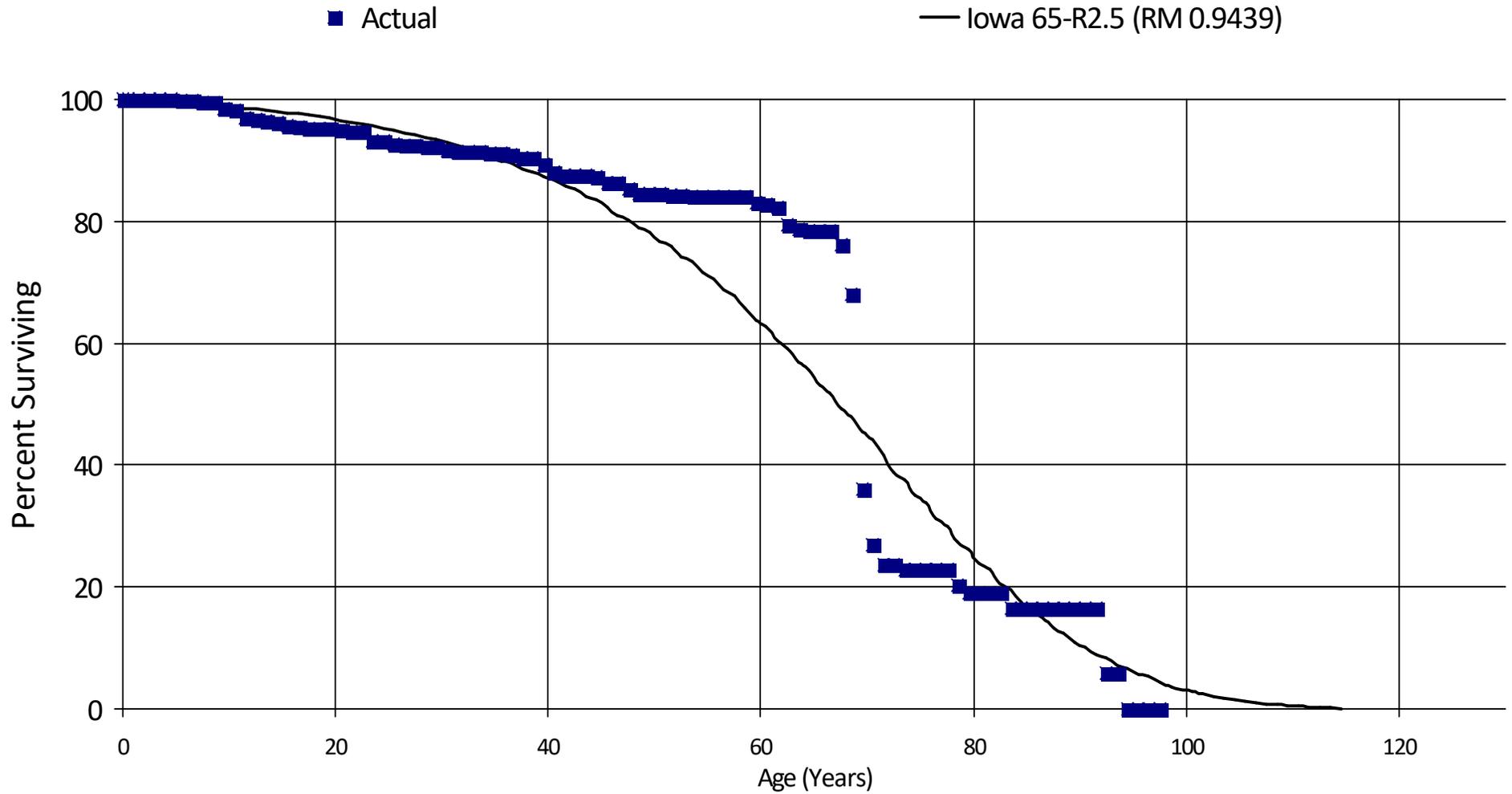
Age at Begin of Interval	Exposures at Beginning of Age Interval	Retirements During Age Interval	Retmt Ratio	Survivor Ratio	% Surviving
81.5	7,846	0	0.00000	1.00000	19.03
82.5	7,846	995	0.12682	0.87318	19.03
83.5	6,851	0	0.00000	1.00000	16.62
84.5	6,851	0	0.00000	1.00000	16.62
85.5	6,851	0	0.00000	1.00000	16.62
86.5	6,851	0	0.00000	1.00000	16.62
87.5	6,851	0	0.00000	1.00000	16.62
88.5	6,851	0	0.00000	1.00000	16.62
89.5	6,851	0	0.00000	1.00000	16.62
90.5	6,851	0	0.00000	1.00000	16.62
91.5	6,851	4,453	0.65001	0.34999	16.62
92.5	2,398	0	0.00000	1.00000	5.82
93.5	2,398	2,347	0.97890	0.02110	5.82
94.5	51	0	0.00000	1.00000	0.12
95.5	51	0	0.00000	1.00000	0.12
96.5	51	0	0.00000	1.00000	0.12
97.5	0	0	0.00000	0.00000	0.12
Totals:	373,120,619	1,019,439			

Missouri American Water

Account 30410 - Source of Supply - Structures and Improvements

Placement Band - 1920 - 2019 Experience Band - 1939 - 2019

Actual and Smooth Survivor Curves



Missouri American Water

Account 30420 - Pumping Plant - Structures and Improvements

RETIREMENT RATE ANALYSIS

Age at Begin of Interval	Exposures at Beginning of Age Interval	Retirements During Age Interval	Retmt Ratio	Survivor Ratio	% Surviving
0	31,013,829	1,240	0.00004	0.99996	100.00
0.5	29,818,007	7,661	0.00026	0.99974	100.00
1.5	23,328,321	1,913	0.00008	0.99992	99.97
2.5	20,799,310	2,938	0.00014	0.99986	99.96
3.5	19,412,341	17,059	0.00088	0.99912	99.95
4.5	19,159,256	8,550	0.00045	0.99955	99.86
5.5	19,125,731	24,023	0.00126	0.99874	99.82
6.5	19,101,708	13,691	0.00072	0.99928	99.69
7.5	18,545,926	37,270	0.00201	0.99799	99.62
8.5	17,424,396	15,224	0.00087	0.99913	99.42
9.5	17,270,920	35,604	0.00206	0.99794	99.33
10.5	17,090,298	21,549	0.00126	0.99874	99.13
11.5	16,396,598	25,251	0.00154	0.99846	99.01
12.5	15,491,037	16,967	0.00110	0.99890	98.86
13.5	15,220,420	14,336	0.00094	0.99906	98.75
14.5	15,166,142	47,565	0.00314	0.99686	98.66
15.5	15,067,299	16,983	0.00113	0.99887	98.35
16.5	15,050,315	32,931	0.00219	0.99781	98.24
17.5	14,303,765	72,822	0.00509	0.99491	98.02
18.5	14,230,943	54,776	0.00385	0.99615	97.52
19.5	13,848,649	172,262	0.01244	0.98756	97.14
20.5	13,266,303	84,109	0.00634	0.99366	95.93
21.5	8,174,342	23,723	0.00290	0.99710	95.32
22.5	6,985,013	12,152	0.00174	0.99826	95.04
23.5	6,929,818	7,963	0.00115	0.99885	94.87
24.5	6,789,910	38,559	0.00568	0.99432	94.76
25.5	6,674,766	19,300	0.00289	0.99711	94.22
26.5	5,827,908	31,346	0.00538	0.99462	93.95
27.5	5,796,562	33,766	0.00583	0.99417	93.44
28.5	4,681,977	61,829	0.01321	0.98679	92.90
29.5	4,379,699	18,439	0.00421	0.99579	91.67
30.5	3,670,835	28,823	0.00785	0.99215	91.28
31.5	3,456,350	62,734	0.01815	0.98185	90.56
32.5	3,273,594	10,811	0.00330	0.99670	88.92
33.5	2,741,729	17,706	0.00646	0.99354	88.63
34.5	2,664,204	7,526	0.00282	0.99718	88.06
35.5	2,590,010	26,972	0.01041	0.98959	87.81
36.5	2,550,611	5,708	0.00224	0.99776	86.90
37.5	2,480,063	38,198	0.01540	0.98460	86.71
38.5	2,404,209	7,077	0.00294	0.99706	85.37
39.5	2,299,246	5,082	0.00221	0.99779	85.12

Missouri American Water

Account 30420 - Pumping Plant - Structures and Improvements

RETIREMENT RATE ANALYSIS

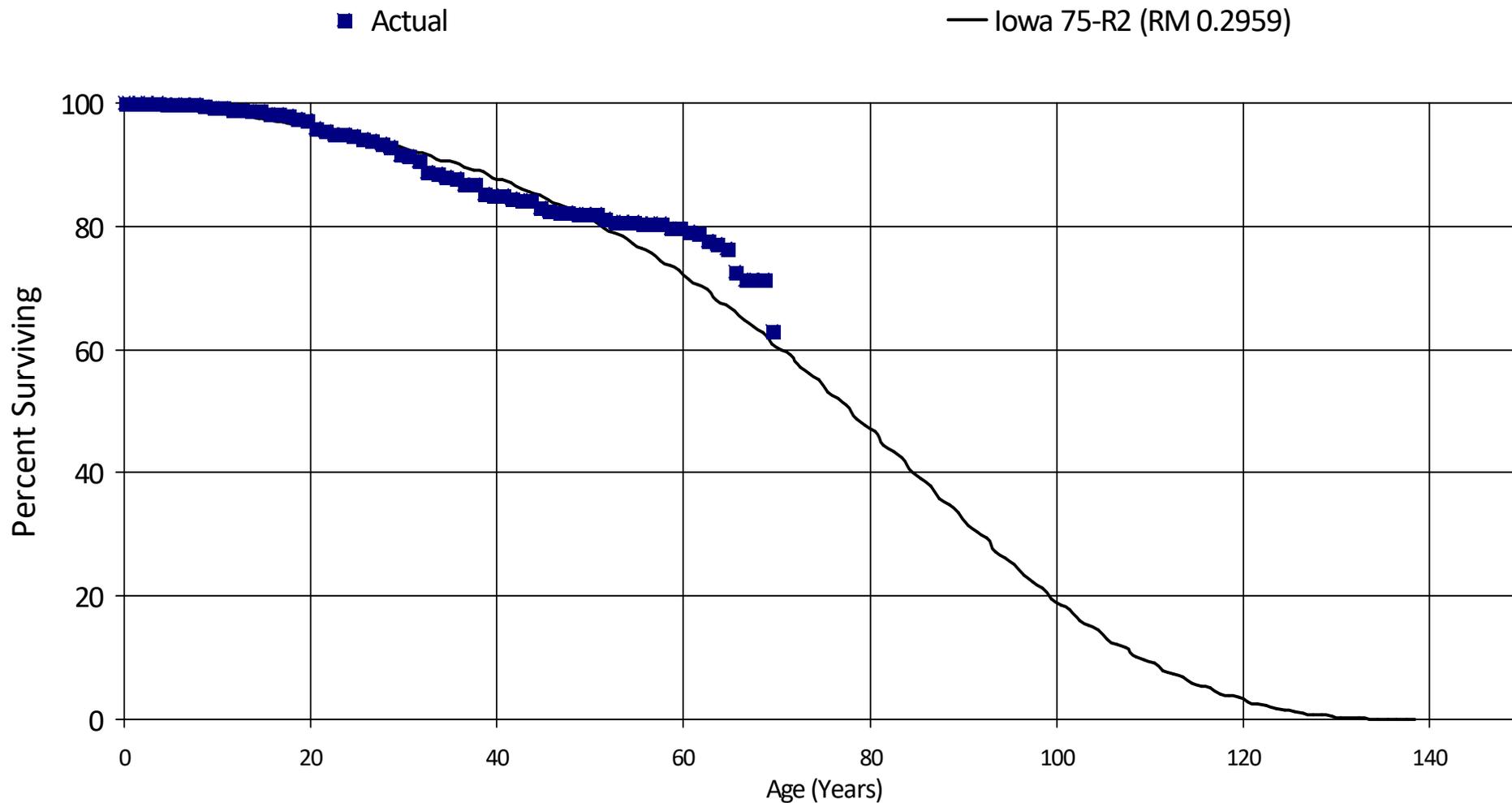
Age at Begin of Interval	Exposures at Beginning of Age Interval	Retirements During Age Interval	Retmt Ratio	Survivor Ratio	% Surviving
40.5	2,172,715	8,459	0.00389	0.99611	84.93
41.5	2,119,721	5,707	0.00269	0.99731	84.60
42.5	2,113,714	1,236	0.00058	0.99942	84.37
43.5	2,106,483	32,743	0.01554	0.98446	84.32
44.5	2,029,977	11,168	0.00550	0.99450	83.01
45.5	2,002,625	4,762	0.00238	0.99762	82.55
46.5	1,955,919	2,092	0.00107	0.99893	82.35
47.5	1,947,473	3,695	0.00190	0.99810	82.26
48.5	1,943,778	1,076	0.00055	0.99945	82.10
49.5	1,937,064	2,521	0.00130	0.99870	82.05
50.5	1,903,589	15,150	0.00796	0.99204	81.94
51.5	1,819,753	10,450	0.00574	0.99426	81.29
52.5	1,783,339	726	0.00041	0.99959	80.82
53.5	1,756,714	3,353	0.00191	0.99809	80.79
54.5	1,723,521	1,545	0.00090	0.99910	80.64
55.5	1,714,324	1,836	0.00107	0.99893	80.57
56.5	1,688,450	1,062	0.00063	0.99937	80.48
57.5	1,673,053	14,604	0.00873	0.99127	80.43
58.5	1,632,083	359	0.00022	0.99978	79.73
59.5	1,549,488	8,346	0.00539	0.99461	79.71
60.5	1,538,550	8,367	0.00544	0.99456	79.28
61.5	1,525,970	23,414	0.01534	0.98466	78.85
62.5	1,473,979	6,870	0.00466	0.99534	77.64
63.5	1,245,893	14,861	0.01193	0.98807	77.28
64.5	492,661	24,529	0.04979	0.95021	76.36
65.5	406,850	6,793	0.01670	0.98330	72.56
66.5	396,217	236	0.00060	0.99940	71.35
67.5	395,981	578	0.00146	0.99854	71.31
68.5	368,939	42,374	0.11485	0.88515	71.21
69.5	320,043	11,099	0.03468	0.96532	63.03
Totals:	530,241,229	1,452,449			

Missouri American Water

Account 30420 - Pumping Plant - Structures and Improvements

Placement Band - 1888 - 2019 Experience Band - 1888 - 2019

Actual and Smooth Survivor Curves



Missouri American Water

Account 30430 - Water Treatment Plant - Structures and Improvements

RETIREMENT RATE ANALYSIS

Age at Begin of Interval	Exposures at Beginning of Age Interval	Retirements During Age Interval	Retmt Ratio	Survivor Ratio	% Surviving
0	170,551,989	747	0.00000	1.00000	100.00
0.5	167,778,685	6,679	0.00004	0.99996	100.00
1.5	149,187,061	216,414	0.00145	0.99855	100.00
2.5	119,985,997	9,016	0.00008	0.99992	99.86
3.5	119,853,549	29,582	0.00025	0.99975	99.85
4.5	116,652,429	97,451	0.00084	0.99916	99.83
5.5	114,239,276	67,790	0.00059	0.99941	99.75
6.5	113,661,739	74,689	0.00066	0.99934	99.69
7.5	112,627,385	169,020	0.00150	0.99850	99.62
8.5	110,714,791	141,954	0.00128	0.99872	99.47
9.5	109,684,363	160,919	0.00147	0.99853	99.34
10.5	108,298,717	277,894	0.00257	0.99743	99.19
11.5	88,909,371	148,814	0.00167	0.99833	98.94
12.5	82,717,699	58,547	0.00071	0.99929	98.77
13.5	81,919,848	410,268	0.00501	0.99499	98.70
14.5	80,804,349	122,136	0.00151	0.99849	98.21
15.5	80,023,745	273,271	0.00341	0.99659	98.06
16.5	78,435,215	362,880	0.00463	0.99537	97.73
17.5	71,061,502	87,496	0.00123	0.99877	97.28
18.5	68,609,396	141,956	0.00207	0.99793	97.16
19.5	63,780,962	41,152	0.00065	0.99935	96.96
20.5	61,989,562	332,177	0.00536	0.99464	96.90
21.5	37,861,569	99,760	0.00263	0.99737	96.38
22.5	37,761,809	72,777	0.00193	0.99807	96.13
23.5	36,696,271	146,459	0.00399	0.99601	95.94
24.5	33,687,086	115,381	0.00343	0.99657	95.56
25.5	31,662,940	383,167	0.01210	0.98790	95.23
26.5	20,819,420	65,307	0.00314	0.99686	94.08
27.5	20,484,239	20,320	0.00099	0.99901	93.78
28.5	20,031,436	66,740	0.00333	0.99667	93.69
29.5	19,840,412	15,838	0.00080	0.99920	93.38
30.5	17,842,798	46,764	0.00262	0.99738	93.31
31.5	16,912,835	32,503	0.00192	0.99808	93.07
32.5	16,622,236	123,364	0.00742	0.99258	92.89
33.5	15,750,557	63,417	0.00403	0.99597	92.20
34.5	13,479,804	39,191	0.00291	0.99709	91.83
35.5	13,408,428	122,683	0.00915	0.99085	91.56
36.5	13,280,240	60,469	0.00455	0.99545	90.72
37.5	13,207,391	30,973	0.00235	0.99765	90.31
38.5	13,176,418	36,883	0.00280	0.99720	90.10
39.5	13,083,709	9,670	0.00074	0.99926	89.85

Missouri American Water

Account 30430 - Water Treatment Plant - Structures and Improvements

RETIREMENT RATE ANALYSIS

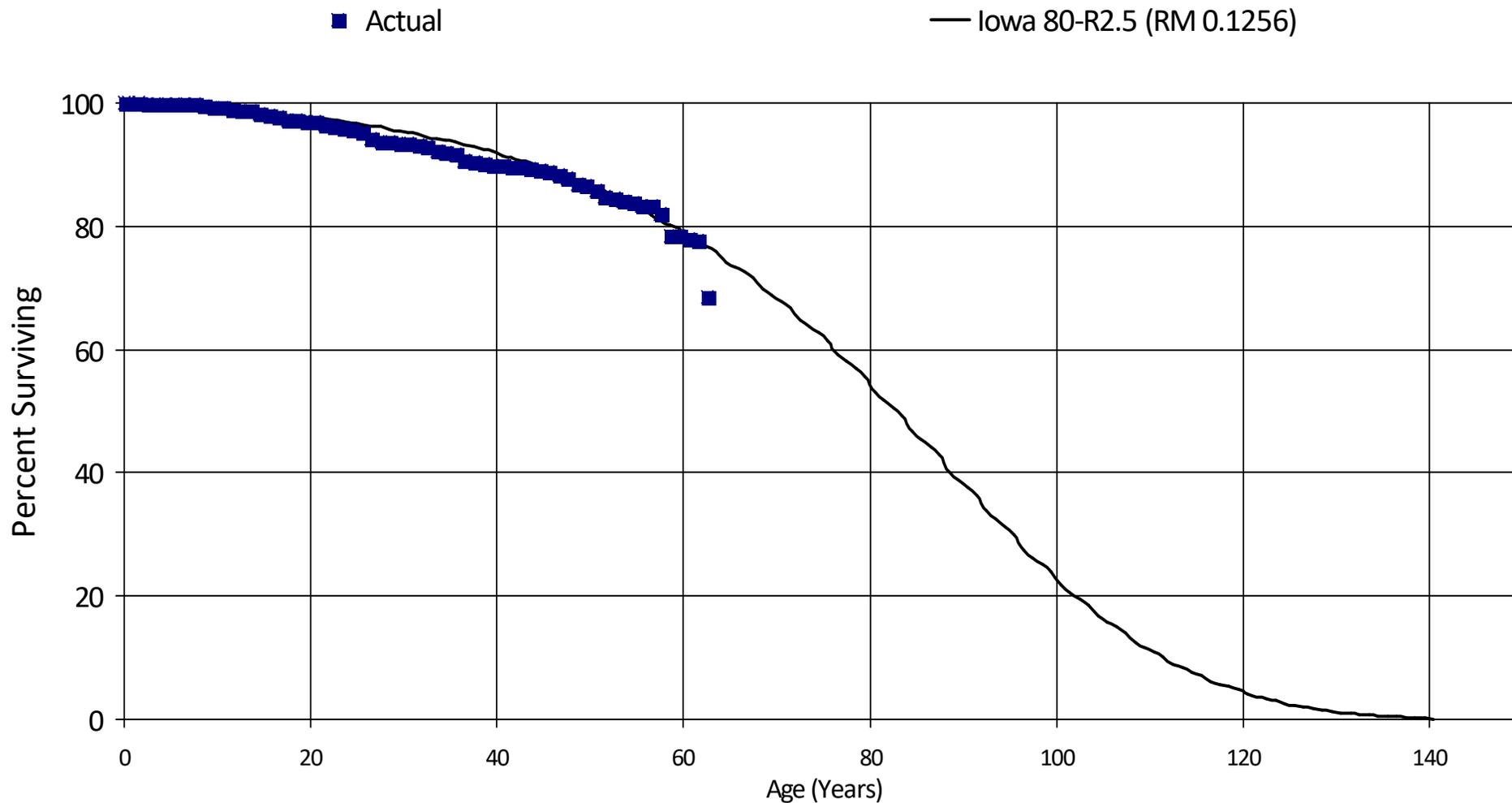
Age at Begin of Interval	Exposures at Beginning of Age Interval	Retirements During Age Interval	Retmt Ratio	Survivor Ratio	% Surviving
40.5	13,028,347	11,844	0.00091	0.99909	89.78
41.5	11,722,262	28,941	0.00247	0.99753	89.70
42.5	11,693,320	19,988	0.00171	0.99829	89.48
43.5	11,673,332	15,957	0.00137	0.99863	89.33
44.5	11,652,580	44,661	0.00383	0.99617	89.21
45.5	11,561,741	68,162	0.00590	0.99410	88.87
46.5	11,234,882	55,379	0.00493	0.99507	88.35
47.5	11,179,503	146,073	0.01307	0.98693	87.91
48.5	6,551,335	13,920	0.00212	0.99788	86.76
49.5	6,339,643	65,279	0.01030	0.98970	86.58
50.5	6,274,365	66,028	0.01052	0.98948	85.69
51.5	3,544,148	12,334	0.00348	0.99652	84.79
52.5	3,530,813	25,220	0.00714	0.99286	84.49
53.5	3,504,933	3,850	0.00110	0.99890	83.89
54.5	3,443,979	22,941	0.00666	0.99334	83.80
55.5	2,530,089	2,892	0.00114	0.99886	83.24
56.5	2,527,197	33,376	0.01321	0.98679	83.15
57.5	2,491,761	109,405	0.04391	0.95609	82.05
58.5	2,382,356	1,141	0.00048	0.99952	78.45
59.5	2,156,978	15,676	0.00727	0.99273	78.41
60.5	2,048,008	7,344	0.00359	0.99641	77.84
61.5	2,039,342	237,102	0.11626	0.88374	77.56
62.5	1,802,240	43,499	0.02414	0.97586	68.54
Totals:	2,822,010,385	5,833,530			

Missouri American Water

Account 30430 - Water Treatment Plant - Structures and Improvements

Placement Band - 1898 - 2019 Experience Band - 1898 - 2019

Actual and Smooth Survivor Curves



Account 30440 - Transmission and Distribution Plant - Structures and Improvements

RETIREMENT RATE ANALYSIS

Age at Begin of Interval	Exposures at Beginning of Age Interval	Retirements During Age Interval	Retmt Ratio	Survivor Ratio	% Surviving
0	17,052,329	0	0.00000	1.00000	100.00
0.5	16,538,884	15,488	0.00094	0.99906	100.00
1.5	12,012,053	1,321	0.00011	0.99989	99.91
2.5	10,461,277	7,594	0.00073	0.99927	99.90
3.5	10,453,683	1,219	0.00012	0.99988	99.83
4.5	8,918,036	22,529	0.00253	0.99747	99.82
5.5	8,869,852	3,843	0.00043	0.99957	99.57
6.5	8,853,692	23,245	0.00263	0.99737	99.53
7.5	8,830,447	11,856	0.00134	0.99866	99.27
8.5	8,809,376	3,383	0.00038	0.99962	99.14
9.5	8,803,192	7,785	0.00088	0.99912	99.10
10.5	8,426,591	12,732	0.00151	0.99849	99.01
11.5	8,162,002	4,200	0.00051	0.99949	98.86
12.5	7,650,959	6,687	0.00087	0.99913	98.81
13.5	7,644,272	1,690	0.00022	0.99978	98.72
14.5	7,625,308	3,139	0.00041	0.99959	98.70
15.5	7,622,169	4,909	0.00064	0.99936	98.66
16.5	6,768,461	22,208	0.00328	0.99672	98.60
17.5	4,912,438	22,588	0.00460	0.99540	98.28
18.5	4,874,296	26,777	0.00549	0.99451	97.83
19.5	4,801,631	32,753	0.00682	0.99318	97.29
20.5	4,710,638	10,214	0.00217	0.99783	96.63
21.5	4,666,421	183,359	0.03929	0.96071	96.42
22.5	4,469,387	8,338	0.00187	0.99813	92.63
23.5	4,428,946	5,127	0.00116	0.99884	92.46
24.5	3,566,016	2,535	0.00071	0.99929	92.35
25.5	3,371,696	3,758	0.00111	0.99889	92.28
26.5	3,031,399	12,039	0.00397	0.99603	92.18
27.5	3,019,360	12,278	0.00407	0.99593	91.81
28.5	2,953,229	31,804	0.01077	0.98923	91.44
29.5	2,894,230	166,439	0.05751	0.94249	90.46
30.5	2,714,190	3,975	0.00146	0.99854	85.26
31.5	2,684,292	0	0.00000	1.00000	85.14
32.5	2,684,292	12,658	0.00472	0.99528	85.14
33.5	2,636,950	8,920	0.00338	0.99662	84.74
34.5	2,628,031	516	0.00020	0.99980	84.45
35.5	2,627,515	397	0.00015	0.99985	84.43
36.5	2,626,037	0	0.00000	1.00000	84.42
37.5	2,623,683	2,045	0.00078	0.99922	84.42
38.5	2,620,414	0	0.00000	1.00000	84.35
39.5	2,620,309	13,888	0.00530	0.99470	84.35

Account 30440 - Transmission and Distribution Plant - Structures and Improvements

RETIREMENT RATE ANALYSIS

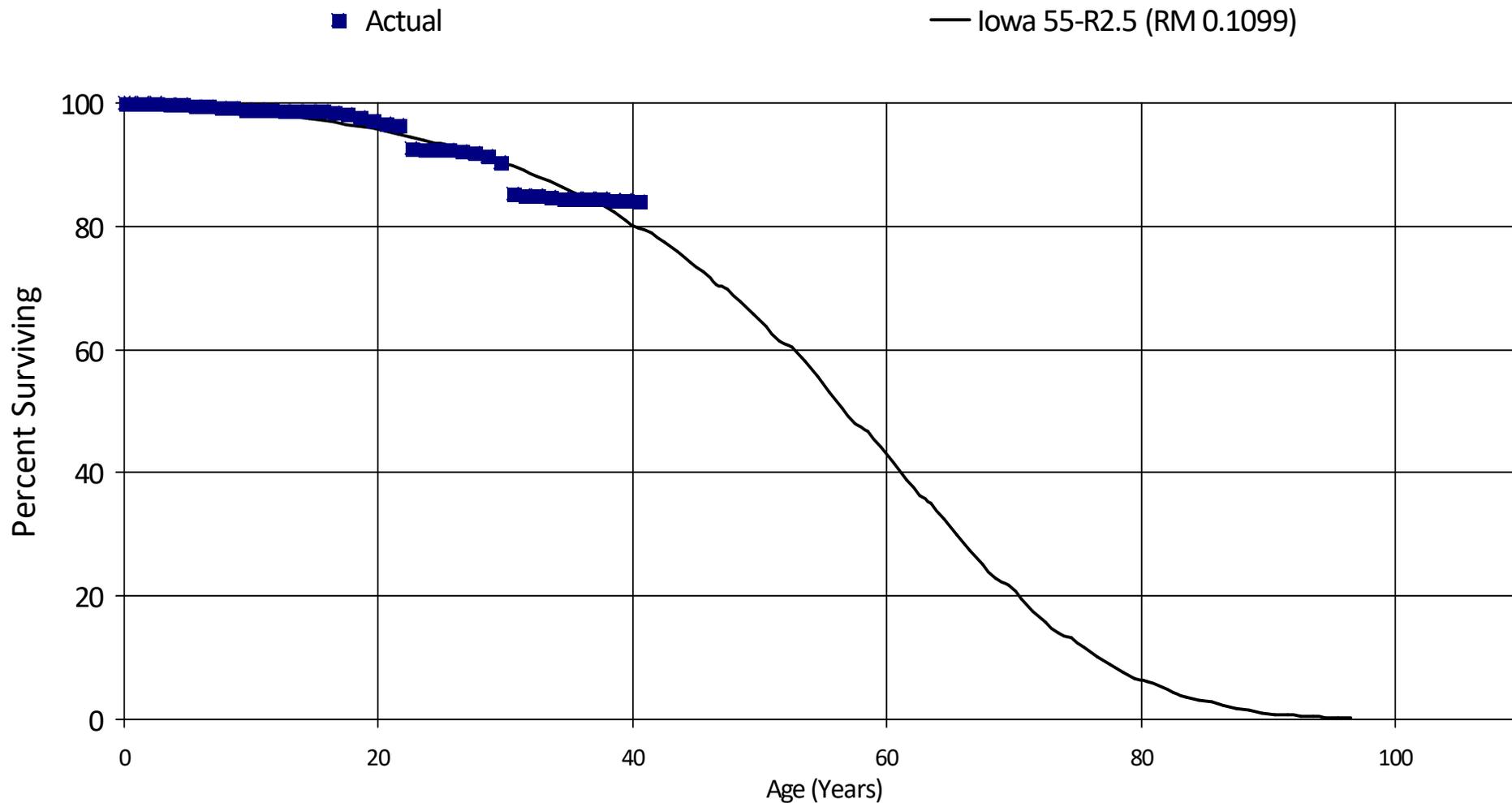
Age at Begin of Interval	Exposures at Beginning of Age Interval	Retirements During Age Interval	Retmt Ratio	Survivor Ratio	% Surviving
40.5	2,584,082	0	0.00000	1.00000	83.90
Totals:	254,252,067	714,236			

Missouri American Water

Account 30440 - Transmission and Distribution Plant - Structures and Improvements

Placement Band - 1938 - 2019 Experience Band - 1939 - 2019

Actual and Smooth Survivor Curves



Missouri American Water

Account 30461 - General Plant - Structures - Office Buildings

RETIREMENT RATE ANALYSIS

Age at Begin of Interval	Exposures at Beginning of Age Interval	Retirements During Age Interval	Retmt Ratio	Survivor Ratio	% Surviving
0	18,326,057	945	0.00005	0.99995	100.00
0.5	16,430,631	0	0.00000	1.00000	100.00
1.5	15,398,399	21,731	0.00141	0.99859	100.00
2.5	13,419,889	7,808	0.00058	0.99942	99.86
3.5	13,412,081	2,325	0.00017	0.99983	99.80
4.5	13,046,439	34,022	0.00261	0.99739	99.78
5.5	11,426,008	46,386	0.00406	0.99594	99.52
6.5	9,897,158	35,901	0.00363	0.99637	99.12
7.5	8,429,165	150,083	0.01781	0.98219	98.76
8.5	7,533,415	137,814	0.01829	0.98171	97.00
9.5	7,141,995	8,714	0.00122	0.99878	95.23
10.5	6,960,673	50,614	0.00727	0.99273	95.11
11.5	2,483,130	58,839	0.02370	0.97630	94.42
12.5	1,021,828	9,862	0.00965	0.99035	92.18
13.5	962,290	8,886	0.00923	0.99077	91.29
14.5	941,333	882	0.00094	0.99906	90.45
15.5	935,581	25,833	0.02761	0.97239	90.36
16.5	887,645	4,767	0.00537	0.99463	87.87
17.5	882,878	12,098	0.01370	0.98630	87.40
18.5	864,952	4,939	0.00571	0.99429	86.20
19.5	851,415	16,816	0.01975	0.98025	85.71
20.5	796,683	16,026	0.02012	0.97988	84.02
21.5	780,657	9,000	0.01153	0.98847	82.33
22.5	768,964	3,227	0.00420	0.99580	81.38
23.5	729,417	2,516	0.00345	0.99655	81.04
24.5	722,364	6,340	0.00878	0.99122	80.76
25.5	698,353	19,607	0.02808	0.97192	80.05
26.5	652,128	1,660	0.00255	0.99745	77.80
27.5	641,815	24,685	0.03846	0.96154	77.60
28.5	615,333	38,010	0.06177	0.93823	74.62
29.5	379,074	0	0.00000	1.00000	70.01
30.5	379,074	5,708	0.01506	0.98494	70.01
31.5	359,708	19,350	0.05379	0.94621	68.96
32.5	340,358	1,759	0.00517	0.99483	65.25
33.5	297,462	8,378	0.02816	0.97184	64.91
34.5	286,659	23,872	0.08328	0.91672	63.08
35.5	262,639	61	0.00023	0.99977	57.83
36.5	260,379	0	0.00000	1.00000	57.82
37.5	226,542	0	0.00000	1.00000	57.82
38.5	225,618	6,769	0.03000	0.97000	57.82
39.5	218,849	0	0.00000	1.00000	56.09

Account 30461 - General Plant - Structures - Office Buildings

RETIREMENT RATE ANALYSIS

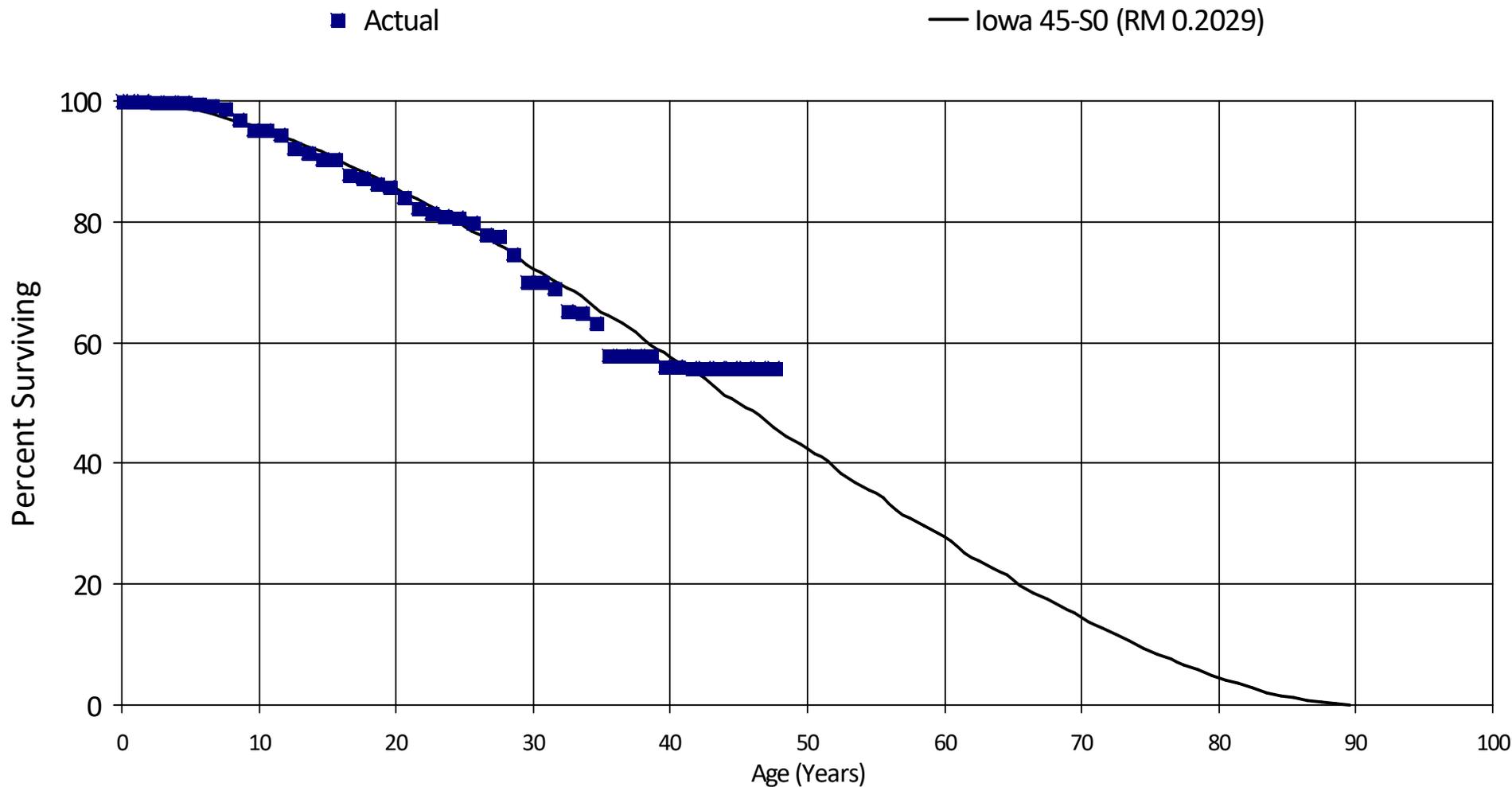
Age at Begin of Interval	Exposures at Beginning of Age Interval	Retirements During Age Interval	Retmt Ratio	Survivor Ratio	% Surviving
40.5	213,307	917	0.00430	0.99570	56.09
41.5	212,390	0	0.00000	1.00000	55.85
42.5	212,390	0	0.00000	1.00000	55.85
43.5	212,390	0	0.00000	1.00000	55.85
44.5	211,963	229	0.00108	0.99892	55.85
45.5	211,733	0	0.00000	1.00000	55.79
46.5	210,198	0	0.00000	1.00000	55.79
47.5	210,198	0	0.00000	1.00000	55.79
Totals:	162,589,607	827,379			

Missouri American Water

Account 30461 - General Plant - Structures - Office Buildings

Placement Band - 1888 - 2019 Experience Band - 1939 - 2019

Actual and Smooth Survivor Curves



Missouri American Water

Account 30470 - General Plant - Structures and Improvements - Shop and Garage

RETIREMENT RATE ANALYSIS

Age at Begin of Interval	Exposures at Beginning of Age Interval	Retirements During Age Interval	Retmt Ratio	Survivor Ratio	% Surviving
0	5,193,134	4,695	0.00090	0.99910	100.00
0.5	5,038,984	0	0.00000	1.00000	99.91
1.5	4,865,843	0	0.00000	1.00000	99.91
2.5	2,849,401	0	0.00000	1.00000	99.91
3.5	2,849,401	0	0.00000	1.00000	99.91
4.5	2,691,069	0	0.00000	1.00000	99.91
5.5	2,690,992	16,244	0.00604	0.99396	99.91
6.5	2,671,868	14,615	0.00547	0.99453	99.31
7.5	1,802,844	256,902	0.14250	0.85750	98.77
8.5	1,537,000	112	0.00007	0.99993	84.70
9.5	1,344,032	12,170	0.00905	0.99095	84.69
10.5	1,313,766	1,188	0.00090	0.99910	83.92
11.5	663,077	564	0.00085	0.99915	83.84
12.5	607,229	2,556	0.00421	0.99579	83.77
13.5	592,548	0	0.00000	1.00000	83.42
14.5	592,548	54,389	0.09179	0.90821	83.42
15.5	500,943	37,626	0.07511	0.92489	75.76
16.5	380,785	1,612	0.00423	0.99577	70.07
17.5	378,268	4,160	0.01100	0.98900	69.77
18.5	374,108	34	0.00009	0.99991	69.00
19.5	352,660	4,942	0.01401	0.98599	68.99
20.5	342,060	10,161	0.02971	0.97029	68.02
21.5	331,833	429	0.00129	0.99871	66.00
22.5	325,899	425	0.00130	0.99870	65.91
23.5	317,462	695	0.00219	0.99781	65.82
24.5	306,328	7,405	0.02417	0.97583	65.68
25.5	298,923	2,617	0.00875	0.99125	64.09
26.5	291,284	11,443	0.03928	0.96072	63.53
27.5	278,794	0	0.00000	1.00000	61.03
28.5	271,534	15,585	0.05740	0.94260	61.03
29.5	255,950	2,256	0.00881	0.99119	57.53
30.5	250,012	2,645	0.01058	0.98942	57.02
31.5	247,367	3,653	0.01477	0.98523	56.42
32.5	243,714	344	0.00141	0.99859	55.59
33.5	243,370	2,705	0.01111	0.98889	55.51
34.5	235,503	1,036	0.00440	0.99560	54.89
35.5	232,672	3,390	0.01457	0.98543	54.65
36.5	227,633	121	0.00053	0.99947	53.85
37.5	225,979	227	0.00100	0.99900	53.82
38.5	210,210	0	0.00000	1.00000	53.77
39.5	210,210	79	0.00038	0.99962	53.77

Missouri American Water

Account 30470 - General Plant - Structures and Improvements - Shop and Garage

RETIREMENT RATE ANALYSIS

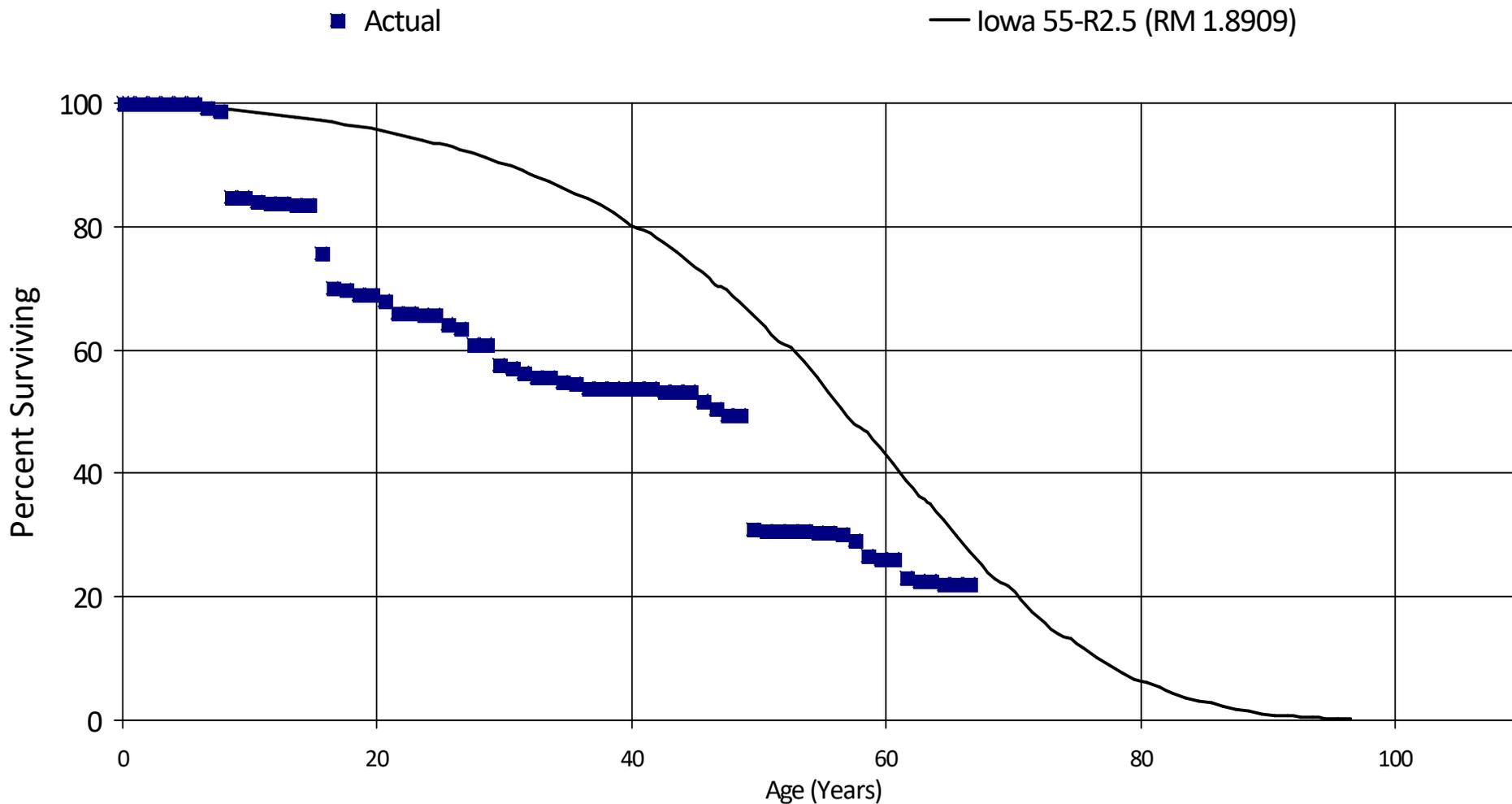
Age at Begin of Interval	Exposures at Beginning of Age Interval	Retirements During Age Interval	Retmt Ratio	Survivor Ratio	% Surviving
40.5	208,363	0	0.00000	1.00000	53.75
41.5	196,426	1,326	0.00675	0.99325	53.75
42.5	195,100	0	0.00000	1.00000	53.39
43.5	195,100	654	0.00335	0.99665	53.39
44.5	194,446	5,154	0.02651	0.97349	53.21
45.5	179,278	4,408	0.02459	0.97541	51.80
46.5	174,870	3,545	0.02027	0.97973	50.53
47.5	171,325	0	0.00000	1.00000	49.51
48.5	171,325	64,042	0.37381	0.62619	49.51
49.5	107,282	673	0.00627	0.99373	31.00
50.5	106,609	0	0.00000	1.00000	30.81
51.5	106,609	284	0.00266	0.99734	30.81
52.5	106,326	0	0.00000	1.00000	30.73
53.5	106,326	761	0.00716	0.99284	30.73
54.5	105,564	0	0.00000	1.00000	30.51
55.5	100,659	666	0.00662	0.99338	30.51
56.5	96,212	3,887	0.04040	0.95960	30.31
57.5	89,788	7,485	0.08336	0.91664	29.09
58.5	82,303	1,463	0.01778	0.98222	26.67
59.5	80,840	0	0.00000	1.00000	26.20
60.5	80,840	9,229	0.11416	0.88584	26.20
61.5	71,535	1,568	0.02192	0.97808	23.21
62.5	64,312	0	0.00000	1.00000	22.70
63.5	64,312	1,543	0.02399	0.97601	22.70
64.5	62,769	0	0.00000	1.00000	22.16
65.5	62,769	0	0.00000	1.00000	22.16
66.5	62,769	10,115	0.16115	0.83885	22.16
Totals:	47,881,294	593,828			

Missouri American Water

Account 30470 - General Plant - Structures and Improvements - Shop and Garage

Placement Band - 1897 - 2019 Experience Band - 1967 - 2019

Actual and Smooth Survivor Curves



Missouri American Water

Account 30480 - General Plant - Miscellaneous Structures

RETIREMENT RATE ANALYSIS

Age at Begin of Interval	Exposures at Beginning of Age Interval	Retirements During Age Interval	Retmt Ratio	Survivor Ratio	% Surviving
0	4,067,492	0	0.00000	1.00000	100.00
0.5	3,992,886	690	0.00017	0.99983	100.00
1.5	3,992,197	1,647	0.00041	0.99959	99.98
2.5	3,990,550	510	0.00013	0.99987	99.94
3.5	3,990,040	10	0.00000	1.00000	99.93
4.5	3,990,030	2,025	0.00051	0.99949	99.93
5.5	3,988,005	55,305	0.01387	0.98613	99.88
6.5	3,932,700	1,496	0.00038	0.99962	98.49
7.5	3,931,204	62,402	0.01587	0.98413	98.45
8.5	3,868,802	24,148	0.00624	0.99376	96.89
9.5	3,844,654	4,742	0.00123	0.99877	96.29
10.5	3,839,912	7,909	0.00206	0.99794	96.17
11.5	3,832,003	211	0.00006	0.99994	95.97
12.5	3,748,006	18,178	0.00485	0.99515	95.96
13.5	3,595,735	29,162	0.00811	0.99189	95.49
14.5	3,526,345	1,242	0.00035	0.99965	94.72
15.5	3,525,103	2,426	0.00069	0.99931	94.69
16.5	3,473,506	20,755	0.00598	0.99402	94.62
17.5	3,443,335	23,803	0.00691	0.99309	94.05
18.5	3,088,724	320	0.00010	0.99990	93.40
19.5	1,258,403	5,990	0.00476	0.99524	93.39
20.5	1,252,413	261	0.00021	0.99979	92.95
21.5	1,252,152	951	0.00076	0.99924	92.93
22.5	1,250,224	297	0.00024	0.99976	92.86
23.5	1,249,927	0	0.00000	1.00000	92.84
24.5	1,245,853	5,486	0.00440	0.99560	92.84
25.5	90,497	0	0.00000	1.00000	92.43
26.5	90,497	12	0.00013	0.99987	92.43
27.5	90,485	215	0.00238	0.99762	92.42
28.5	90,269	30	0.00033	0.99967	92.20
29.5	90,239	1,754	0.01944	0.98056	92.17
30.5	88,486	17,511	0.19790	0.80210	90.38
31.5	70,974	0	0.00000	1.00000	72.49
32.5	70,974	150	0.00211	0.99789	72.49
33.5	70,824	0	0.00000	1.00000	72.34
34.5	69,824	0	0.00000	1.00000	72.34
35.5	69,824	106	0.00152	0.99848	72.34
36.5	69,718	0	0.00000	1.00000	72.23
37.5	49,988	4,370	0.08742	0.91258	72.23
38.5	45,592	0	0.00000	1.00000	65.92
39.5	45,592	0	0.00000	1.00000	65.92

Missouri American Water

Account 30480 - General Plant - Miscellaneous Structures

RETIREMENT RATE ANALYSIS

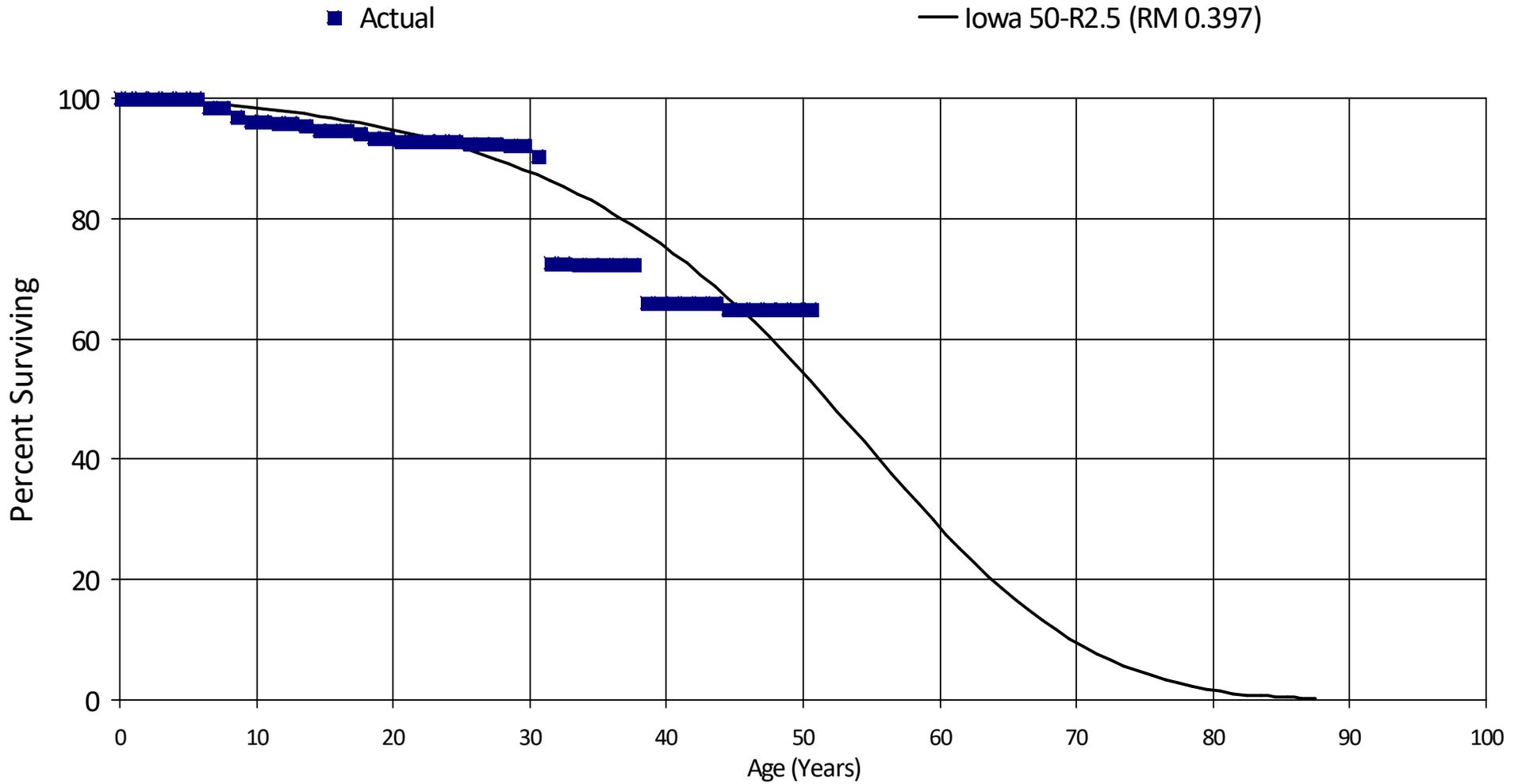
Age at Begin of Interval	Exposures at Beginning of Age Interval	Retirements During Age Interval	Retmt Ratio	Survivor Ratio	% Surviving
40.5	45,592	0	0.00000	1.00000	65.92
41.5	45,592	0	0.00000	1.00000	65.92
42.5	45,592	0	0.00000	1.00000	65.92
43.5	45,592	602	0.01320	0.98680	65.92
44.5	44,990	0	0.00000	1.00000	65.05
45.5	44,990	0	0.00000	1.00000	65.05
46.5	44,990	0	0.00000	1.00000	65.05
47.5	44,990	0	0.00000	1.00000	65.05
48.5	44,990	0	0.00000	1.00000	65.05
49.5	44,990	0	0.00000	1.00000	65.05
50.5	44,990	7,692	0.17097	0.82903	65.05
Totals:	84,771,286	302,408			

Missouri American Water

Account 30480 - General Plant - Miscellaneous Structures

Placement Band - 1902 - 2019 Experience Band - 1939 - 2019

Actual and Smooth Survivor Curves



Missouri American Water

Account 30500 - Source of Supply - Collection & Impound Reservoirs

RETIREMENT RATE ANALYSIS

Age at Begin of Interval	Exposures at Beginning of Age Interval	Retirements During Age Interval	Retmt Ratio	Survivor Ratio	% Surviving
0	123,614	0	0.00000	1.00000	100.00
0.5	123,614	0	0.00000	1.00000	100.00
1.5	123,614	0	0.00000	1.00000	100.00
2.5	123,614	0	0.00000	1.00000	100.00
3.5	123,614	0	0.00000	1.00000	100.00
4.5	123,614	0	0.00000	1.00000	100.00
5.5	123,614	0	0.00000	1.00000	100.00
6.5	123,614	0	0.00000	1.00000	100.00
7.5	112,682	0	0.00000	1.00000	100.00
8.5	112,682	0	0.00000	1.00000	100.00
9.5	112,682	0	0.00000	1.00000	100.00
10.5	112,682	0	0.00000	1.00000	100.00
11.5	112,682	0	0.00000	1.00000	100.00
12.5	111,066	0	0.00000	1.00000	100.00
13.5	111,066	0	0.00000	1.00000	100.00
14.5	111,066	0	0.00000	1.00000	100.00
15.5	111,066	0	0.00000	1.00000	100.00
16.5	111,066	0	0.00000	1.00000	100.00
17.5	111,066	0	0.00000	1.00000	100.00
18.5	111,066	0	0.00000	1.00000	100.00
19.5	111,066	0	0.00000	1.00000	100.00
20.5	111,066	0	0.00000	1.00000	100.00
21.5	111,066	0	0.00000	1.00000	100.00
22.5	111,066	0	0.00000	1.00000	100.00
23.5	111,066	0	0.00000	1.00000	100.00
24.5	110,400	0	0.00000	1.00000	100.00
25.5	110,400	0	0.00000	1.00000	100.00
26.5	110,400	0	0.00000	1.00000	100.00
27.5	110,400	0	0.00000	1.00000	100.00
28.5	110,400	0	0.00000	1.00000	100.00
29.5	110,400	0	0.00000	1.00000	100.00
30.5	110,400	0	0.00000	1.00000	100.00
31.5	110,400	0	0.00000	1.00000	100.00
32.5	110,400	0	0.00000	1.00000	100.00
33.5	110,400	0	0.00000	1.00000	100.00
34.5	110,400	0	0.00000	1.00000	100.00
35.5	110,400	0	0.00000	1.00000	100.00
36.5	110,400	0	0.00000	1.00000	100.00
37.5	110,400	0	0.00000	1.00000	100.00
38.5	110,400	0	0.00000	1.00000	100.00
39.5	110,400	0	0.00000	1.00000	100.00

Missouri American Water

Account 30500 - Source of Supply - Collection & Impound Reservoirs

RETIREMENT RATE ANALYSIS

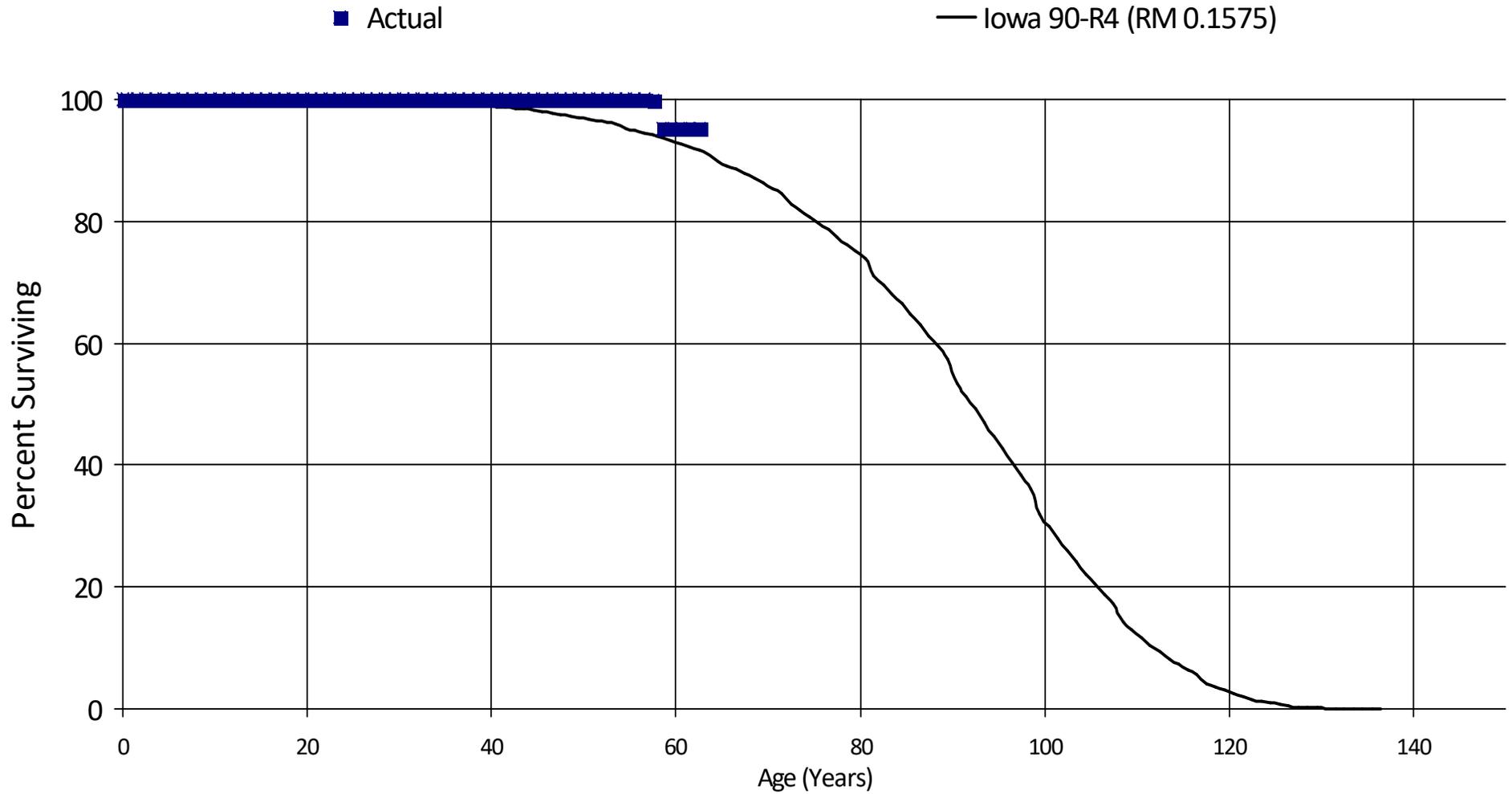
Age at Begin of Interval	Exposures at Beginning of Age Interval	Retirements During Age Interval	Retmt Ratio	Survivor Ratio	% Surviving
40.5	110,400	0	0.00000	1.00000	100.00
41.5	110,400	0	0.00000	1.00000	100.00
42.5	110,400	0	0.00000	1.00000	100.00
43.5	107,967	0	0.00000	1.00000	100.00
44.5	107,967	0	0.00000	1.00000	100.00
45.5	107,967	0	0.00000	1.00000	100.00
46.5	80,487	0	0.00000	1.00000	100.00
47.5	80,487	0	0.00000	1.00000	100.00
48.5	80,487	0	0.00000	1.00000	100.00
49.5	80,487	0	0.00000	1.00000	100.00
50.5	80,487	0	0.00000	1.00000	100.00
51.5	80,487	0	0.00000	1.00000	100.00
52.5	80,487	0	0.00000	1.00000	100.00
53.5	80,487	0	0.00000	1.00000	100.00
54.5	80,487	0	0.00000	1.00000	100.00
55.5	80,487	0	0.00000	1.00000	100.00
56.5	80,487	183	0.00227	0.99773	100.00
57.5	80,304	3,741	0.04659	0.95341	99.77
58.5	17,167	0	0.00000	1.00000	95.12
59.5	17,167	0	0.00000	1.00000	95.12
60.5	17,167	0	0.00000	1.00000	95.12
61.5	17,167	0	0.00000	1.00000	95.12
62.5	16,590	0	0.00000	1.00000	95.12
Totals:	6,357,538	3,924			

Missouri American Water

Account 30500 - Source of Supply - Collection & Impound Reservoirs

Placement Band - 1956 - 2019 Experience Band - 2014 - 2019

Actual and Smooth Survivor Curves



Missouri American Water

Account 30600 - Source of Supply - Lake, River, & Other Intakes

RETIREMENT RATE ANALYSIS

Age at Begin of Interval	Exposures at Beginning of Age Interval	Retirements During Age Interval	Retmt Ratio	Survivor Ratio	% Surviving
0	7,920,684	11	0.00000	1.00000	100.00
0.5	7,920,674	0	0.00000	1.00000	100.00
1.5	7,920,674	1,811	0.00023	0.99977	100.00
2.5	7,453,259	1,900	0.00025	0.99975	99.98
3.5	7,451,359	11,144	0.00150	0.99850	99.96
4.5	7,440,215	0	0.00000	1.00000	99.81
5.5	7,440,215	21,193	0.00285	0.99715	99.81
6.5	7,419,022	553	0.00007	0.99993	99.53
7.5	7,418,469	0	0.00000	1.00000	99.52
8.5	972,522	0	0.00000	1.00000	99.52
9.5	972,522	3,502	0.00360	0.99640	99.52
10.5	969,021	0	0.00000	1.00000	99.16
11.5	969,021	473	0.00049	0.99951	99.16
12.5	479,570	3,268	0.00681	0.99319	99.11
13.5	476,302	6,790	0.01426	0.98574	98.44
14.5	469,512	0	0.00000	1.00000	97.04
15.5	166,554	0	0.00000	1.00000	97.04
16.5	166,554	0	0.00000	1.00000	97.04
17.5	166,554	0	0.00000	1.00000	97.04
18.5	166,554	0	0.00000	1.00000	97.04
19.5	166,554	1,884	0.01131	0.98869	97.04
20.5	164,670	0	0.00000	1.00000	95.94
21.5	164,670	3,240	0.01968	0.98032	95.94
22.5	161,430	0	0.00000	1.00000	94.05
23.5	161,430	0	0.00000	1.00000	94.05
24.5	155,104	34,435	0.22201	0.77799	94.05
25.5	120,669	34,435	0.28537	0.71463	73.17
26.5	86,234	0	0.00000	1.00000	52.29
27.5	86,234	3,635	0.04215	0.95785	52.29
28.5	82,599	0	0.00000	1.00000	50.09
29.5	82,599	0	0.00000	1.00000	50.09
30.5	82,599	147	0.00178	0.99822	50.09
31.5	82,451	784	0.00951	0.99049	50.00
32.5	81,667	1,617	0.01980	0.98020	49.52
33.5	80,050	0	0.00000	1.00000	48.54
34.5	80,050	0	0.00000	1.00000	48.54
35.5	80,050	7,268	0.09079	0.90921	48.54
36.5	72,782	100	0.00137	0.99863	44.13
37.5	72,682	954	0.01313	0.98687	44.07
38.5	71,728	0	0.00000	1.00000	43.49
39.5	71,728	0	0.00000	1.00000	43.49

Missouri American Water

Account 30600 - Source of Supply - Lake, River, & Other Intakes

RETIREMENT RATE ANALYSIS

Age at Begin of Interval	Exposures at Beginning of Age Interval	Retirements During Age Interval	Retmt Ratio	Survivor Ratio	% Surviving
40.5	71,728	0	0.00000	1.00000	43.49
41.5	71,728	1,000	0.01394	0.98606	43.49
42.5	70,728	0	0.00000	1.00000	42.88
43.5	70,728	0	0.00000	1.00000	42.88
44.5	70,728	0	0.00000	1.00000	42.88
45.5	70,728	0	0.00000	1.00000	42.88
46.5	70,728	0	0.00000	1.00000	42.88
47.5	70,728	0	0.00000	1.00000	42.88
48.5	70,728	166	0.00235	0.99765	42.88
49.5	70,562	0	0.00000	1.00000	42.78
50.5	70,562	0	0.00000	1.00000	42.78
51.5	70,562	2,183	0.03094	0.96906	42.78
52.5	68,379	0	0.00000	1.00000	41.46
53.5	68,379	0	0.00000	1.00000	41.46
54.5	68,379	0	0.00000	1.00000	41.46
55.5	68,379	0	0.00000	1.00000	41.46
56.5	68,379	13,985	0.20452	0.79548	41.46
57.5	54,394	0	0.00000	1.00000	32.98
58.5	54,394	3,755	0.06903	0.93097	32.98
59.5	50,639	3,288	0.06493	0.93507	30.70
60.5	47,351	0	0.00000	1.00000	28.71
61.5	47,351	0	0.00000	1.00000	28.71
62.5	20,358	0	0.00000	1.00000	28.71
63.5	20,358	0	0.00000	1.00000	28.71
64.5	20,358	0	0.00000	1.00000	28.71
65.5	20,358	0	0.00000	1.00000	28.71
66.5	20,358	0	0.00000	1.00000	28.71
67.5	20,358	2,036	0.10001	0.89999	28.71
68.5	18,322	830	0.04530	0.95470	25.84
69.5	17,492	0	0.00000	1.00000	24.67
70.5	17,492	1,989	0.11371	0.88629	24.67
71.5	15,503	0	0.00000	1.00000	21.86
72.5	15,503	0	0.00000	1.00000	21.86
73.5	15,503	82	0.00529	0.99471	21.86
74.5	15,421	0	0.00000	1.00000	21.74
75.5	15,421	0	0.00000	1.00000	21.74
76.5	15,421	0	0.00000	1.00000	21.74
77.5	15,421	0	0.00000	1.00000	21.74
78.5	15,421	0	0.00000	1.00000	21.74
79.5	15,421	0	0.00000	1.00000	21.74
80.5	15,421	0	0.00000	1.00000	21.74

Missouri American Water

Account 30600 - Source of Supply - Lake, River, & Other Intakes

RETIREMENT RATE ANALYSIS

Age at Begin of Interval	Exposures at Beginning of Age Interval	Retirements During Age Interval	Retmt Ratio	Survivor Ratio	% Surviving
81.5	15,421	0	0.00000	1.00000	21.74
82.5	15,421	0	0.00000	1.00000	21.74
83.5	15,421	0	0.00000	1.00000	21.74
84.5	15,421	0	0.00000	1.00000	21.74
85.5	15,421	0	0.00000	1.00000	21.74
86.5	15,421	0	0.00000	1.00000	21.74
87.5	15,421	992	0.06433	0.93567	21.74
88.5	14,429	0	0.00000	1.00000	20.34
89.5	14,429	0	0.00000	1.00000	20.34
90.5	14,429	399	0.02765	0.97235	20.34
91.5	14,030	983	0.07006	0.92994	19.78
92.5	13,048	0	0.00000	1.00000	18.39
93.5	13,048	0	0.00000	1.00000	18.39
94.5	13,048	0	0.00000	1.00000	18.39
95.5	13,048	0	0.00000	1.00000	18.39
96.5	13,048	0	0.00000	1.00000	18.39
97.5	13,048	1,508	0.11557	0.88443	18.39
98.5	11,540	0	0.00000	1.00000	16.26
99.5	11,540	34	0.00295	0.99705	16.26
100.5	11,506	0	0.00000	1.00000	16.21
101.5	11,506	29	0.00252	0.99748	16.21
102.5	11,476	232	0.02022	0.97978	16.17
103.5	11,043	3,769	0.34129	0.65871	15.84
104.5	7,274	212	0.02914	0.97086	10.43
105.5	7,062	22	0.00312	0.99688	10.13
106.5	7,040	0	0.00000	1.00000	10.10
107.5	7,040	0	0.00000	1.00000	10.10
108.5	7,040	0	0.00000	1.00000	10.10
109.5	7,040	709	0.10071	0.89929	10.10
110.5	6,331	0	0.00000	1.00000	9.08
111.5	6,331	380	0.06002	0.93998	9.08
112.5	5,951	0	0.00000	1.00000	8.54
113.5	5,951	0	0.00000	1.00000	8.54
114.5	5,951	10	0.00168	0.99832	8.54
115.5	5,941	0	0.00000	1.00000	8.53
116.5	5,941	167	0.02811	0.97189	8.53
117.5	2,684	0	0.00000	1.00000	8.29
118.5	2,684	0	0.00000	1.00000	8.29
119.5	2,684	0	0.00000	1.00000	8.29
120.5	2,684	0	0.00000	1.00000	8.29
121.5	2,684	2,112	0.78686	0.21314	8.29

Account 30600 - Source of Supply - Lake, River, & Other Intakes

RETIREMENT RATE ANALYSIS

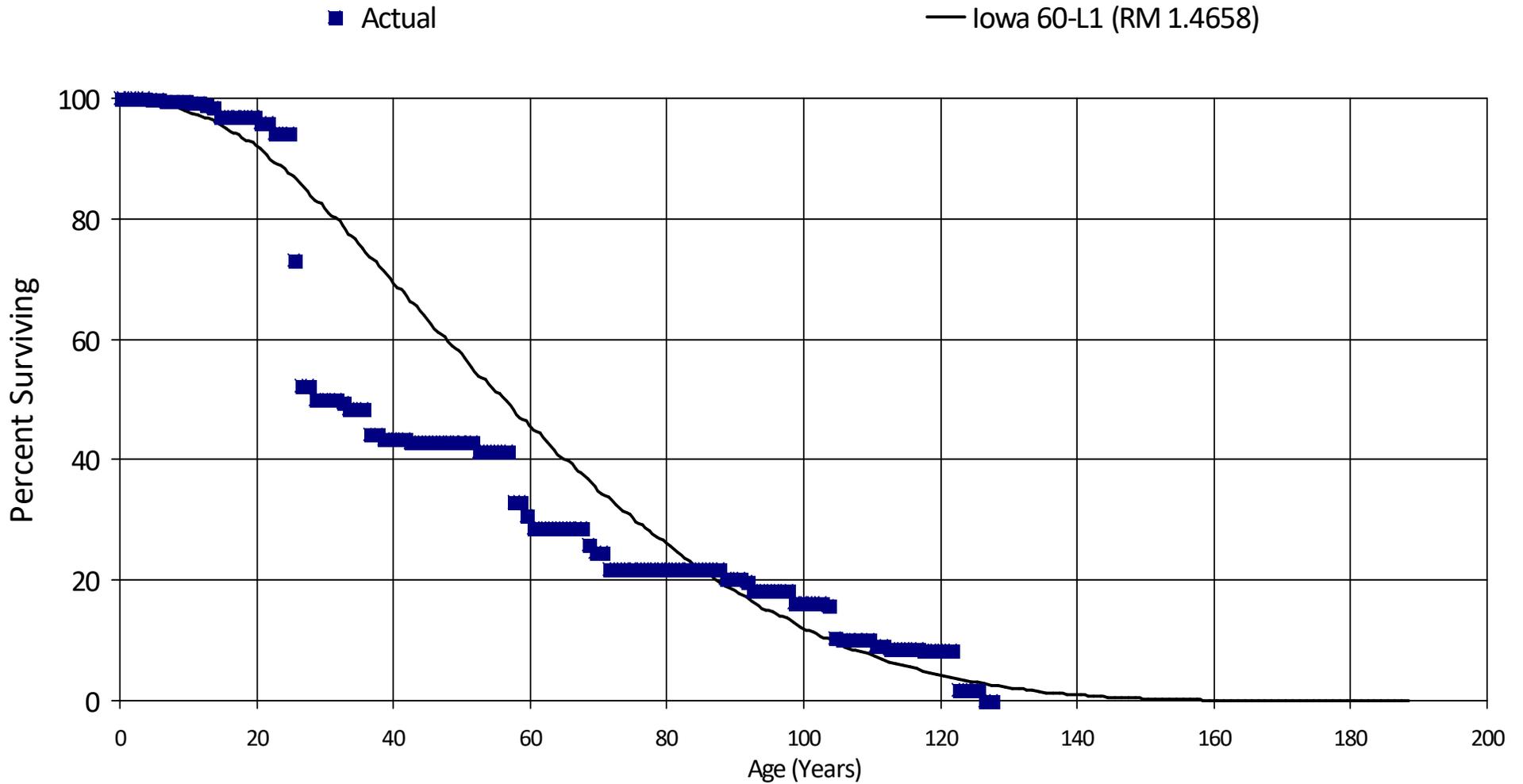
Age at Begin of Interval	Exposures at Beginning of Age Interval	Retirements During Age Interval	Retmt Ratio	Survivor Ratio	% Surviving
122.5	572	0	0.00000	1.00000	1.77
123.5	572	0	0.00000	1.00000	1.77
124.5	572	0	0.00000	1.00000	1.77
125.5	572	561	0.98113	0.01887	1.77
126.5	11	0	0.00000	1.00000	0.03
127.5	0	0	0.00000	0.00000	0.03
Totals:	78,756,179	180,577			

Missouri American Water

Account 30600 - Source of Supply - Lake, River, & Other Intakes

Placement Band - 1880 - 2019 Experience Band - 1939 - 2019

Actual and Smooth Survivor Curves



Missouri American Water

Account 30700 - Source of Supply - Wells & Springs

RETIREMENT RATE ANALYSIS

Age at Begin of Interval	Exposures at Beginning of Age Interval	Retirements During Age Interval	Retmt Ratio	Survivor Ratio	% Surviving
0	10,809,451	0	0.00000	1.00000	100.00
0.5	9,957,987	0	0.00000	1.00000	100.00
1.5	8,724,668	36,139	0.00414	0.99586	100.00
2.5	8,043,539	39,088	0.00486	0.99514	99.59
3.5	8,004,451	22,282	0.00278	0.99722	99.11
4.5	7,982,169	5,743	0.00072	0.99928	98.83
5.5	7,940,995	45,128	0.00568	0.99432	98.76
6.5	7,757,856	25,214	0.00325	0.99675	98.20
7.5	7,591,122	1,288	0.00017	0.99983	97.88
8.5	7,532,145	76,018	0.01009	0.98991	97.86
9.5	7,252,046	56,225	0.00775	0.99225	96.87
10.5	7,166,701	26,213	0.00366	0.99634	96.12
11.5	7,029,785	61,786	0.00879	0.99121	95.77
12.5	6,355,653	109,289	0.01720	0.98280	94.93
13.5	5,235,265	248,192	0.04741	0.95259	93.30
14.5	4,898,397	72,702	0.01484	0.98516	88.88
15.5	4,413,517	3,510	0.00080	0.99920	87.56
16.5	4,410,007	7,487	0.00170	0.99830	87.49
17.5	3,548,984	18,370	0.00518	0.99482	87.34
18.5	3,530,614	49,260	0.01395	0.98605	86.89
19.5	2,527,945	1,044	0.00041	0.99959	85.68
20.5	2,196,424	5,264	0.00240	0.99760	85.64
21.5	2,116,637	19,132	0.00904	0.99096	85.43
22.5	1,887,821	7,740	0.00410	0.99590	84.66
23.5	1,761,052	0	0.00000	1.00000	84.31
24.5	1,701,900	46,042	0.02705	0.97295	84.31
25.5	1,655,858	103	0.00006	0.99994	82.03
26.5	1,585,791	2,670	0.00168	0.99832	82.03
27.5	1,580,417	795	0.00050	0.99950	81.89
28.5	1,570,060	0	0.00000	1.00000	81.85
29.5	1,368,378	0	0.00000	1.00000	81.85
30.5	1,031,371	3,483	0.00338	0.99662	81.85
31.5	1,027,338	19,818	0.01929	0.98071	81.57
32.5	942,711	0	0.00000	1.00000	80.00
33.5	942,711	0	0.00000	1.00000	80.00
34.5	942,346	0	0.00000	1.00000	80.00
35.5	709,345	0	0.00000	1.00000	80.00
36.5	706,279	7,793	0.01103	0.98897	80.00
37.5	625,056	0	0.00000	1.00000	79.12
38.5	618,957	0	0.00000	1.00000	79.12
39.5	569,740	0	0.00000	1.00000	79.12

Missouri American Water

Account 30700 - Source of Supply - Wells & Springs

RETIREMENT RATE ANALYSIS

Age at Begin of Interval	Exposures at Beginning of Age Interval	Retirements During Age Interval	Retmt Ratio	Survivor Ratio	% Surviving
40.5	569,740	0	0.00000	1.00000	79.12
41.5	569,740	0	0.00000	1.00000	79.12
42.5	569,740	109	0.00019	0.99981	79.12
43.5	543,456	0	0.00000	1.00000	79.10
44.5	543,456	0	0.00000	1.00000	79.10
45.5	541,406	0	0.00000	1.00000	79.10
46.5	541,406	0	0.00000	1.00000	79.10
47.5	541,406	0	0.00000	1.00000	79.10
48.5	541,406	0	0.00000	1.00000	79.10
49.5	541,406	0	0.00000	1.00000	79.10
50.5	541,406	6	0.00001	0.99999	79.10
51.5	516,187	241	0.00047	0.99953	79.10
52.5	515,946	322	0.00062	0.99938	79.06
53.5	515,583	0	0.00000	1.00000	79.01
54.5	515,583	0	0.00000	1.00000	79.01
55.5	515,583	0	0.00000	1.00000	79.01
56.5	515,583	0	0.00000	1.00000	79.01
57.5	410,804	19,005	0.04626	0.95374	79.01
58.5	391,799	0	0.00000	1.00000	75.35
59.5	387,819	0	0.00000	1.00000	75.35
60.5	343,455	0	0.00000	1.00000	75.35
61.5	343,455	0	0.00000	1.00000	75.35
62.5	343,455	0	0.00000	1.00000	75.35
63.5	299,684	0	0.00000	1.00000	75.35
64.5	299,684	0	0.00000	1.00000	75.35
65.5	299,684	0	0.00000	1.00000	75.35
66.5	299,684	0	0.00000	1.00000	75.35
67.5	292,932	0	0.00000	1.00000	75.35
68.5	280,342	0	0.00000	1.00000	75.35
69.5	280,342	0	0.00000	1.00000	75.35
70.5	280,342	0	0.00000	1.00000	75.35
71.5	280,342	0	0.00000	1.00000	75.35
72.5	280,342	0	0.00000	1.00000	75.35
73.5	280,342	0	0.00000	1.00000	75.35
74.5	280,342	0	0.00000	1.00000	75.35
75.5	280,342	0	0.00000	1.00000	75.35
76.5	280,342	0	0.00000	1.00000	75.35
77.5	280,342	0	0.00000	1.00000	75.35
78.5	280,342	0	0.00000	1.00000	75.35
79.5	280,342	0	0.00000	1.00000	75.35
80.5	280,342	0	0.00000	1.00000	75.35

Missouri American Water

Account 30700 - Source of Supply - Wells & Springs

RETIREMENT RATE ANALYSIS

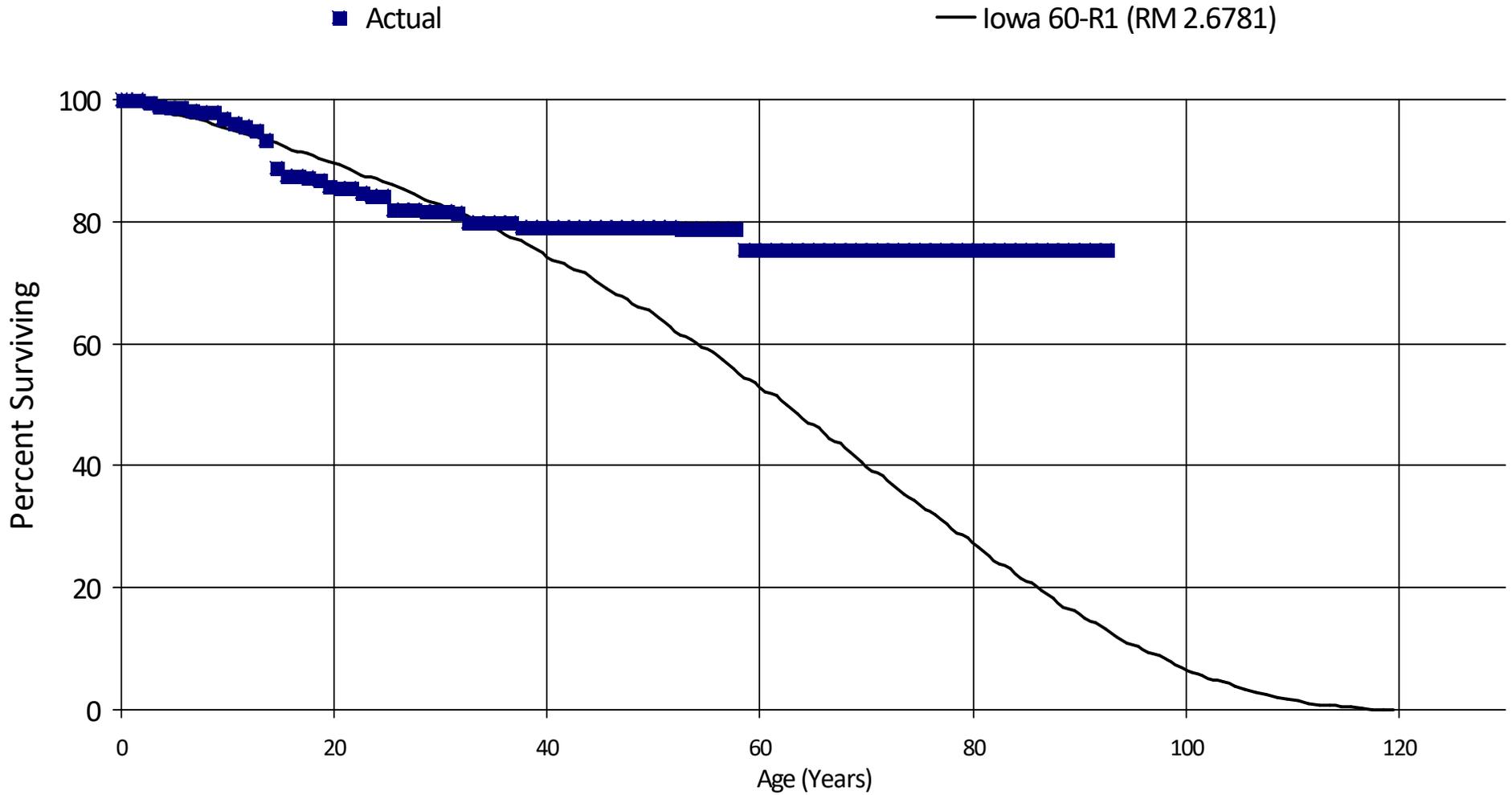
Age at Begin of Interval	Exposures at Beginning of Age Interval	Retirements During Age Interval	Retmt Ratio	Survivor Ratio	% Surviving
81.5	280,342	0	0.00000	1.00000	75.35
82.5	280,342	0	0.00000	1.00000	75.35
83.5	280,342	0	0.00000	1.00000	75.35
84.5	280,342	0	0.00000	1.00000	75.35
85.5	280,342	0	0.00000	1.00000	75.35
86.5	277,849	0	0.00000	1.00000	75.35
87.5	277,849	0	0.00000	1.00000	75.35
88.5	277,849	0	0.00000	1.00000	75.35
89.5	277,849	0	0.00000	1.00000	75.35
90.5	249,196	0	0.00000	1.00000	75.35
91.5	249,196	0	0.00000	1.00000	75.35
92.5	249,196	0	0.00000	1.00000	75.35
Totals:	186,010,126	1,037,501			

Missouri American Water

Account 30700 - Source of Supply - Wells & Springs

Placement Band - 1920 - 2019 Experience Band - 1920 - 2019

Actual and Smooth Survivor Curves



Missouri American Water

Account 30800 - Source of Supply - Infiltration Galleries & Tunnels

RETIREMENT RATE ANALYSIS

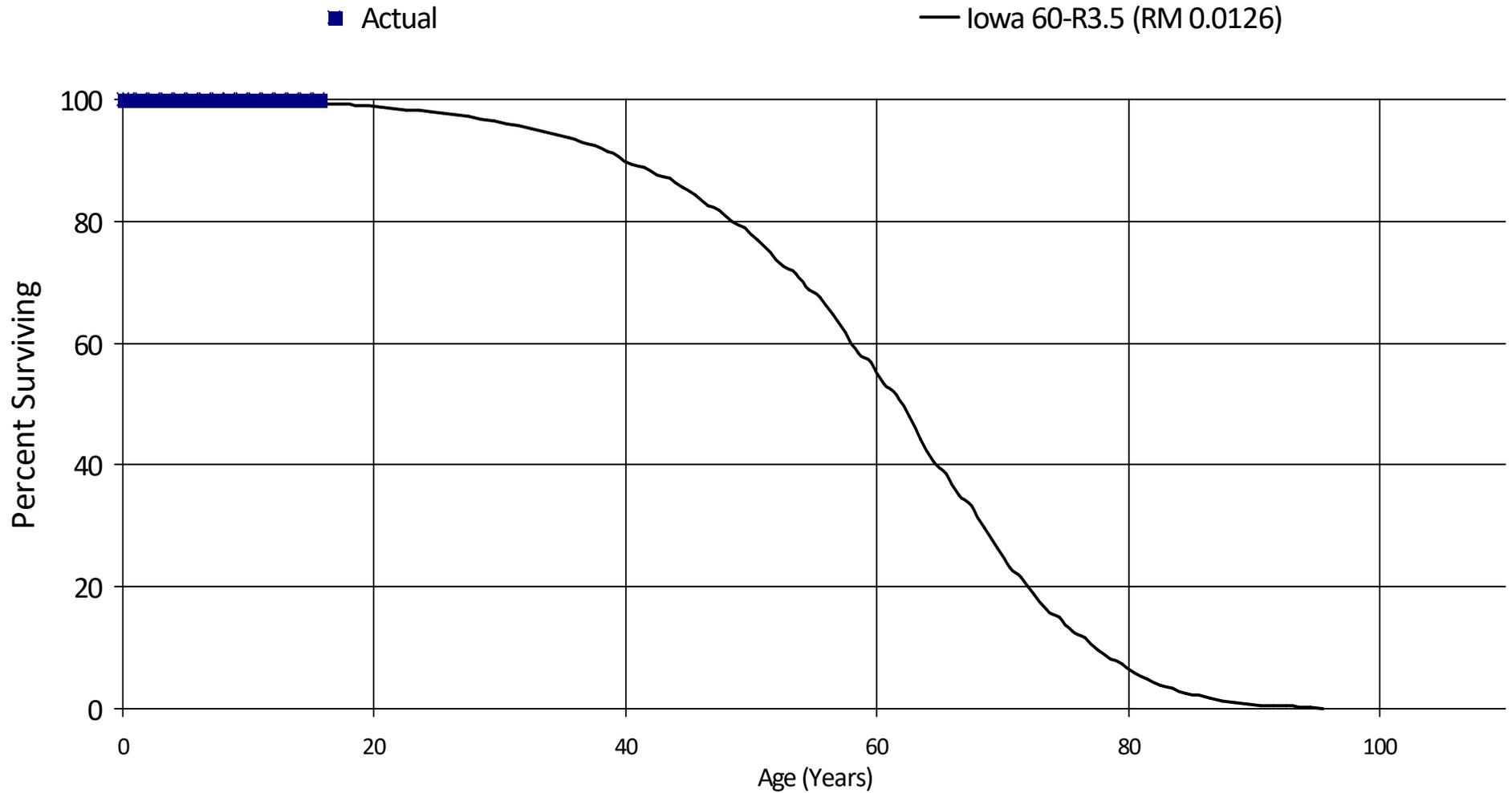
Age at Begin of Interval	Exposures at Beginning of Age Interval	Retirements During Age Interval	Retmt Ratio	Survivor Ratio	% Surviving
0	1,804	0	0.00000	1.00000	100.00
0.5	1,804	0	0.00000	1.00000	100.00
1.5	1,804	0	0.00000	1.00000	100.00
2.5	1,804	0	0.00000	1.00000	100.00
3.5	1,804	0	0.00000	1.00000	100.00
4.5	1,804	0	0.00000	1.00000	100.00
5.5	1,804	0	0.00000	1.00000	100.00
6.5	1,804	0	0.00000	1.00000	100.00
7.5	1,804	0	0.00000	1.00000	100.00
8.5	1,804	0	0.00000	1.00000	100.00
9.5	1,804	0	0.00000	1.00000	100.00
10.5	1,804	0	0.00000	1.00000	100.00
11.5	1,804	0	0.00000	1.00000	100.00
12.5	1,804	0	0.00000	1.00000	100.00
13.5	1,804	0	0.00000	1.00000	100.00
14.5	1,804	0	0.00000	1.00000	100.00
15.5	1,804	0	0.00000	1.00000	100.00
Totals:	30,665	0			

Missouri American Water

Account 30800 - Source of Supply - Infiltration Galleries & Tunnels

Placement Band - 2003 - 2019 Experience Band - 2019 - 2019

Actual and Smooth Survivor Curves



Missouri American Water

Account 30900 - Source of Supply - Supply Mains

RETIREMENT RATE ANALYSIS

Age at Begin of Interval	Exposures at Beginning of Age Interval	Retirements During Age Interval	Retmt Ratio	Survivor Ratio	% Surviving
0	22,924,524	846	0.00004	0.99996	100.00
0.5	22,900,544	0	0.00000	1.00000	100.00
1.5	22,900,544	134	0.00001	0.99999	100.00
2.5	22,900,410	1,157	0.00005	0.99995	100.00
3.5	22,781,414	2,250	0.00010	0.99990	100.00
4.5	22,779,164	840	0.00004	0.99996	99.99
5.5	22,659,631	5,982	0.00026	0.99974	99.99
6.5	22,640,273	13,110	0.00058	0.99942	99.96
7.5	22,627,164	30,763	0.00136	0.99864	99.90
8.5	21,589,467	11,476	0.00053	0.99947	99.76
9.5	21,546,713	26,892	0.00125	0.99875	99.71
10.5	21,290,309	9	0.00000	1.00000	99.59
11.5	21,162,918	16,824	0.00079	0.99921	99.59
12.5	17,284,812	900	0.00005	0.99995	99.51
13.5	17,280,779	983	0.00006	0.99994	99.51
14.5	17,254,922	2,157	0.00013	0.99987	99.50
15.5	17,252,061	27,178	0.00158	0.99842	99.49
16.5	17,199,172	3,685	0.00021	0.99979	99.33
17.5	17,076,746	9,709	0.00057	0.99943	99.31
18.5	17,067,037	12,057	0.00071	0.99929	99.25
19.5	7,169,807	9,535	0.00133	0.99867	99.18
20.5	7,156,868	2,948	0.00041	0.99959	99.05
21.5	7,090,906	1,124	0.00016	0.99984	99.01
22.5	7,058,727	7,617	0.00108	0.99892	98.99
23.5	7,050,196	3,032	0.00043	0.99957	98.88
24.5	7,002,063	1,611	0.00023	0.99977	98.84
25.5	7,000,451	2,219	0.00032	0.99968	98.82
26.5	4,491,877	4,613	0.00103	0.99897	98.79
27.5	4,451,293	10,138	0.00228	0.99772	98.69
28.5	4,170,641	2,709	0.00065	0.99935	98.46
29.5	4,118,253	0	0.00000	1.00000	98.40
30.5	3,975,160	862	0.00022	0.99978	98.40
31.5	3,932,393	1,000	0.00025	0.99975	98.38
32.5	3,802,345	296	0.00008	0.99992	98.36
33.5	3,771,033	2,866	0.00076	0.99924	98.35
34.5	2,966,166	0	0.00000	1.00000	98.28
35.5	2,633,673	1,114	0.00042	0.99958	98.28
36.5	2,630,676	0	0.00000	1.00000	98.24
37.5	2,626,371	1,000	0.00038	0.99962	98.24
38.5	2,625,371	985	0.00038	0.99962	98.20
39.5	2,555,973	157,513	0.06163	0.93837	98.16

Missouri American Water

Account 30900 - Source of Supply - Supply Mains

RETIREMENT RATE ANALYSIS

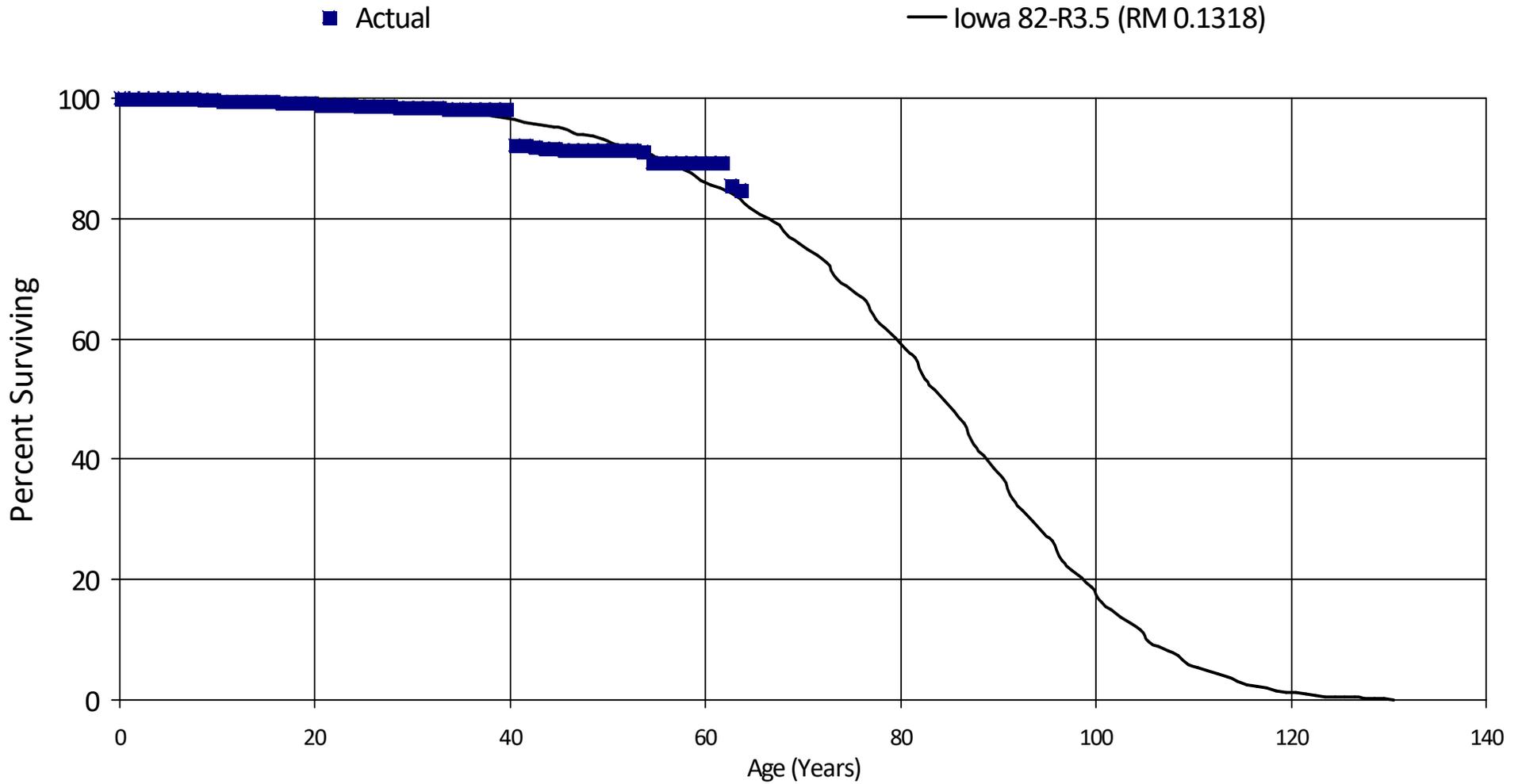
Age at Begin of Interval	Exposures at Beginning of Age Interval	Retirements During Age Interval	Retmt Ratio	Survivor Ratio	% Surviving
40.5	2,391,427	998	0.00042	0.99958	92.11
41.5	2,390,046	4,998	0.00209	0.99791	92.07
42.5	2,299,234	4,026	0.00175	0.99825	91.88
43.5	2,288,908	3,490	0.00152	0.99848	91.72
44.5	2,284,419	3,031	0.00133	0.99867	91.58
45.5	2,274,570	210	0.00009	0.99991	91.46
46.5	2,068,544	1,834	0.00089	0.99911	91.45
47.5	2,024,758	0	0.00000	1.00000	91.37
48.5	1,562,059	38	0.00002	0.99998	91.37
49.5	1,560,179	366	0.00023	0.99977	91.37
50.5	1,559,034	0	0.00000	1.00000	91.35
51.5	1,109,765	356	0.00032	0.99968	91.35
52.5	1,090,397	2,236	0.00205	0.99795	91.32
53.5	1,088,160	21,053	0.01935	0.98065	91.13
54.5	1,067,047	0	0.00000	1.00000	89.37
55.5	963,026	102	0.00011	0.99989	89.37
56.5	946,714	0	0.00000	1.00000	89.36
57.5	946,714	0	0.00000	1.00000	89.36
58.5	707,104	91	0.00013	0.99987	89.36
59.5	644,919	0	0.00000	1.00000	89.35
60.5	566,678	0	0.00000	1.00000	89.35
61.5	563,687	23,519	0.04172	0.95828	89.35
62.5	536,131	5,138	0.00958	0.99042	85.62
63.5	330,015	0	0.00000	1.00000	84.80
Totals:	542,662,378	449,620			

Missouri American Water

Account 30900 - Source of Supply - Supply Mains

Placement Band - 1880 - 2019 Experience Band - 1936 - 2019

Actual and Smooth Survivor Curves



Missouri American Water

Account 31010 - Pumping Plant - Power Generation Equipment

RETIREMENT RATE ANALYSIS

Age at Begin of Interval	Exposures at Beginning of Age Interval	Retirements During Age Interval	Retmt Ratio	Survivor Ratio	% Surviving
0	13,831,234	0	0.00000	1.00000	100.00
0.5	12,823,203	3,107	0.00024	0.99976	100.00
1.5	10,171,844	0	0.00000	1.00000	99.98
2.5	3,044,938	0	0.00000	1.00000	99.98
3.5	2,884,842	2,397	0.00083	0.99917	99.98
4.5	2,881,723	29,970	0.01040	0.98960	99.90
5.5	2,698,648	5,906	0.00219	0.99781	98.86
6.5	2,644,758	0	0.00000	1.00000	98.64
7.5	2,639,165	15,168	0.00575	0.99425	98.64
8.5	2,578,913	4,999	0.00194	0.99806	98.07
9.5	2,528,307	18,627	0.00737	0.99263	97.88
10.5	2,501,956	142,192	0.05683	0.94317	97.16
11.5	581,450	8,942	0.01538	0.98462	91.64
12.5	328,894	0	0.00000	1.00000	90.23
13.5	328,556	0	0.00000	1.00000	90.23
14.5	328,556	0	0.00000	1.00000	90.23
15.5	323,230	0	0.00000	1.00000	90.23
16.5	323,230	0	0.00000	1.00000	90.23
17.5	323,230	0	0.00000	1.00000	90.23
18.5	323,230	0	0.00000	1.00000	90.23
19.5	317,346	0	0.00000	1.00000	90.23
20.5	317,346	0	0.00000	1.00000	90.23
21.5	317,346	0	0.00000	1.00000	90.23
22.5	67,334	0	0.00000	1.00000	90.23
23.5	67,334	57	0.00085	0.99915	90.23
24.5	67,277	0	0.00000	1.00000	90.15
25.5	67,277	0	0.00000	1.00000	90.15
26.5	67,277	7,500	0.11148	0.88852	90.15
27.5	59,777	0	0.00000	1.00000	80.10
28.5	59,777	0	0.00000	1.00000	80.10
29.5	59,777	14,434	0.24146	0.75854	80.10
30.5	45,343	0	0.00000	1.00000	60.76
31.5	45,343	0	0.00000	1.00000	60.76
32.5	45,343	0	0.00000	1.00000	60.76
33.5	45,343	6,013	0.13261	0.86739	60.76
34.5	38,430	541	0.01408	0.98592	52.70
35.5	30,069	0	0.00000	1.00000	51.96
36.5	30,069	0	0.00000	1.00000	51.96
37.5	30,069	0	0.00000	1.00000	51.96
38.5	30,069	0	0.00000	1.00000	51.96
39.5	30,069	0	0.00000	1.00000	51.96

Missouri American Water

Account 31010 - Pumping Plant - Power Generation Equipment

RETIREMENT RATE ANALYSIS

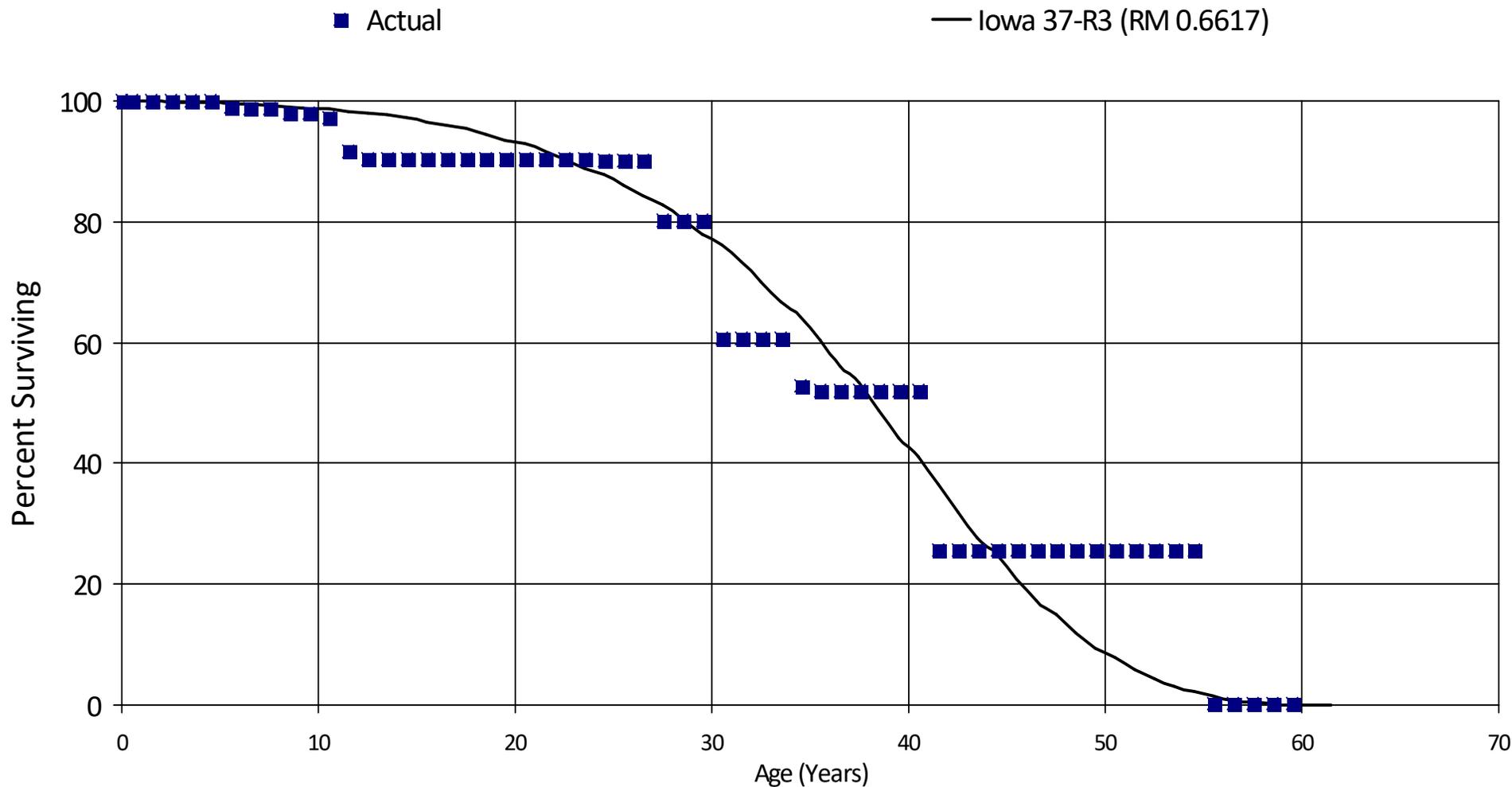
Age at Begin of Interval	Exposures at Beginning of Age Interval	Retirements During Age Interval	Retmt Ratio	Survivor Ratio	% Surviving
40.5	30,069	15,240	0.50684	0.49316	51.96
41.5	14,829	0	0.00000	1.00000	25.62
42.5	14,829	0	0.00000	1.00000	25.62
43.5	14,829	0	0.00000	1.00000	25.62
44.5	14,829	0	0.00000	1.00000	25.62
45.5	14,829	0	0.00000	1.00000	25.62
46.5	14,829	0	0.00000	1.00000	25.62
47.5	14,829	0	0.00000	1.00000	25.62
48.5	14,829	0	0.00000	1.00000	25.62
49.5	14,829	0	0.00000	1.00000	25.62
50.5	14,829	0	0.00000	1.00000	25.62
51.5	14,829	0	0.00000	1.00000	25.62
52.5	14,829	0	0.00000	1.00000	25.62
53.5	14,829	0	0.00000	1.00000	25.62
54.5	14,829	14,730	0.99333	0.00667	25.62
55.5	99	0	0.00000	1.00000	0.17
56.5	99	0	0.00000	1.00000	0.17
57.5	99	0	0.00000	1.00000	0.17
58.5	99	0	0.00000	1.00000	0.17
59.5	99	0	0.00000	1.00000	0.17
Totals:	66,166,087	289,823			

Missouri American Water

Account 31010 - Pumping Plant - Power Generation Equipment

Placement Band - 1959 - 2019 Experience Band - 1959 - 2019

Actual and Smooth Survivor Curves



Missouri American Water

Account 31100 - Pumping Plant - Steam Pumping Equipment

RETIREMENT RATE ANALYSIS

Age at Begin of Interval	Exposures at Beginning of Age Interval	Retirements During Age Interval	Retmt Ratio	Survivor Ratio	% Surviving
0	113,726,587	22,615	0.00020	0.99980	100.00
0.5	107,685,600	101,316	0.00094	0.99906	99.98
1.5	93,456,723	333,415	0.00357	0.99643	99.89
2.5	82,338,008	307,333	0.00373	0.99627	99.53
3.5	80,946,017	205,676	0.00254	0.99746	99.16
4.5	69,161,674	444,813	0.00643	0.99357	98.91
5.5	67,257,236	343,102	0.00510	0.99490	98.27
6.5	66,132,712	487,207	0.00737	0.99263	97.77
7.5	65,502,320	383,041	0.00585	0.99415	97.05
8.5	62,708,607	618,531	0.00986	0.99014	96.48
9.5	60,606,501	419,241	0.00692	0.99308	95.53
10.5	58,800,983	217,520	0.00370	0.99630	94.87
11.5	54,379,857	300,831	0.00553	0.99447	94.52
12.5	47,404,879	278,209	0.00587	0.99413	94.00
13.5	45,607,382	941,009	0.02063	0.97937	93.45
14.5	44,551,130	354,598	0.00796	0.99204	91.52
15.5	43,757,893	823,951	0.01883	0.98117	90.79
16.5	42,677,854	263,307	0.00617	0.99383	89.08
17.5	41,648,286	271,839	0.00653	0.99347	88.53
18.5	40,266,072	331,506	0.00823	0.99177	87.95
19.5	34,731,462	451,725	0.01301	0.98699	87.23
20.5	32,686,053	215,219	0.00658	0.99342	86.10
21.5	31,245,686	249,484	0.00798	0.99202	85.53
22.5	28,628,007	301,172	0.01052	0.98948	84.85
23.5	27,521,640	202,024	0.00734	0.99266	83.96
24.5	26,570,362	285,208	0.01073	0.98927	83.34
25.5	25,250,094	102,786	0.00407	0.99593	82.45
26.5	22,531,731	228,131	0.01012	0.98988	82.11
27.5	21,755,929	214,549	0.00986	0.99014	81.28
28.5	17,578,024	100,849	0.00574	0.99426	80.48
29.5	17,017,758	397,233	0.02334	0.97666	80.02
30.5	14,608,617	76,005	0.00520	0.99480	78.15
31.5	13,955,668	156,020	0.01118	0.98882	77.74
32.5	13,406,390	61,351	0.00458	0.99542	76.87
33.5	11,995,417	145,357	0.01212	0.98788	76.52
34.5	10,938,035	70,814	0.00647	0.99353	75.59
35.5	10,212,857	198,310	0.01942	0.98058	75.10
36.5	9,845,818	257,530	0.02616	0.97384	73.64
37.5	9,101,770	275,024	0.03022	0.96978	71.71
38.5	8,669,576	133,327	0.01538	0.98462	69.54
39.5	8,427,758	113,471	0.01346	0.98654	68.47

Missouri American Water

Account 31100 - Pumping Plant - Steam Pumping Equipment

RETIREMENT RATE ANALYSIS

Age at Begin of Interval	Exposures at Beginning of Age Interval	Retirements During Age Interval	Retmt Ratio	Survivor Ratio	% Surviving
40.5	8,095,701	144,801	0.01789	0.98211	67.55
41.5	7,810,257	50,005	0.00640	0.99360	66.34
42.5	7,334,617	71,660	0.00977	0.99023	65.92
43.5	7,045,449	131,487	0.01866	0.98134	65.28
44.5	6,854,888	135,561	0.01978	0.98022	64.06
45.5	6,694,703	82,568	0.01233	0.98767	62.79
46.5	6,199,117	119,139	0.01922	0.98078	62.02
47.5	5,902,186	28,837	0.00489	0.99511	60.83
48.5	5,205,056	38,353	0.00737	0.99263	60.53
49.5	4,921,009	130,594	0.02654	0.97346	60.08
50.5	4,719,329	2,910	0.00062	0.99938	58.49
51.5	3,737,274	13,667	0.00366	0.99634	58.45
52.5	3,484,677	46,178	0.01325	0.98675	58.24
53.5	3,394,838	14,601	0.00430	0.99570	57.47
54.5	3,302,426	14,001	0.00424	0.99576	57.22
55.5	3,010,972	6,961	0.00231	0.99769	56.98
56.5	3,004,011	20,649	0.00687	0.99313	56.85
57.5	2,900,005	59,363	0.02047	0.97953	56.46
58.5	2,652,792	41,657	0.01570	0.98430	55.30
59.5	2,416,317	21,933	0.00908	0.99092	54.43
60.5	2,388,358	14,462	0.00606	0.99394	53.94
61.5	2,363,965	12,573	0.00532	0.99468	53.61
62.5	2,322,608	1,448	0.00062	0.99938	53.32
63.5	2,036,620	59,048	0.02899	0.97101	53.29
64.5	1,262,071	2,086	0.00165	0.99835	51.75
65.5	1,047,275	56,679	0.05412	0.94588	51.66
66.5	723,417	29,194	0.04036	0.95964	48.86
67.5	693,878	245	0.00035	0.99965	46.89
68.5	486,172	3,326	0.00684	0.99316	46.87
69.5	467,146	12,461	0.02667	0.97333	46.55
70.5	415,122	819	0.00197	0.99803	45.31
71.5	359,983	61	0.00017	0.99983	45.22
72.5	337,322	1,653	0.00490	0.99510	45.21
73.5	286,542	2,015	0.00703	0.99297	44.99
74.5	284,527	4,005	0.01408	0.98592	44.67
75.5	280,052	15,116	0.05398	0.94602	44.04
76.5	264,738	1,209	0.00457	0.99543	41.66
77.5	263,093	694	0.00264	0.99736	41.47
78.5	262,103	341	0.00130	0.99870	41.36
79.5	261,548	40	0.00015	0.99985	41.31
80.5	219,768	300	0.00137	0.99863	41.30

Missouri American Water

Account 31100 - Pumping Plant - Steam Pumping Equipment

RETIREMENT RATE ANALYSIS

Age at Begin of Interval	Exposures at Beginning of Age Interval	Retirements During Age Interval	Retmt Ratio	Survivor Ratio	% Surviving
81.5	146,473	529	0.00361	0.99639	41.24
82.5	145,747	78,352	0.53759	0.46241	41.09
83.5	66,758	0	0.00000	1.00000	19.00
84.5	66,633	0	0.00000	1.00000	19.00
85.5	65,654	0	0.00000	1.00000	19.00
86.5	56,375	0	0.00000	1.00000	19.00
87.5	55,708	0	0.00000	1.00000	19.00
88.5	27,635	0	0.00000	1.00000	19.00
89.5	27,635	0	0.00000	1.00000	19.00
90.5	27,635	37	0.00134	0.99866	19.00
91.5	27,598	0	0.00000	1.00000	18.97
92.5	17,951	0	0.00000	1.00000	18.97
93.5	8,438	0	0.00000	1.00000	18.97
94.5	8,438	0	0.00000	1.00000	18.97
95.5	8,438	0	0.00000	1.00000	18.97
96.5	8,438	0	0.00000	1.00000	18.97
97.5	8,438	0	0.00000	1.00000	18.97
98.5	8,438	0	0.00000	1.00000	18.97
99.5	8,438	0	0.00000	1.00000	18.97
100.5	8,438	0	0.00000	1.00000	18.97
101.5	8,438	0	0.00000	1.00000	18.97
102.5	8,438	1,099	0.13024	0.86976	18.97
103.5	7,339	2,589	0.35276	0.64724	16.50
104.5	4,750	0	0.00000	1.00000	10.68
105.5	4,750	0	0.00000	1.00000	10.68
106.5	4,750	0	0.00000	1.00000	10.68
107.5	4,750	0	0.00000	1.00000	10.68
108.5	4,750	0	0.00000	1.00000	10.68
109.5	4,341	1,626	0.37454	0.62546	10.68
110.5	2,602	0	0.00000	1.00000	6.68
111.5	2,602	0	0.00000	1.00000	6.68
112.5	2,602	2,326	0.89400	0.10600	6.68
113.5	276	0	0.00000	1.00000	0.71
114.5	276	0	0.00000	1.00000	0.71
115.5	276	0	0.00000	1.00000	0.71
116.5	71	0	0.00000	1.00000	0.71
117.5	71	0	0.00000	1.00000	0.71
118.5	71	0	0.00000	1.00000	0.71
119.5	71	0	0.00000	1.00000	0.71
120.5	71	0	0.00000	1.00000	0.71
121.5	71	0	0.00000	1.00000	0.71

Missouri American Water

Account 31100 - Pumping Plant - Steam Pumping Equipment

RETIREMENT RATE ANALYSIS

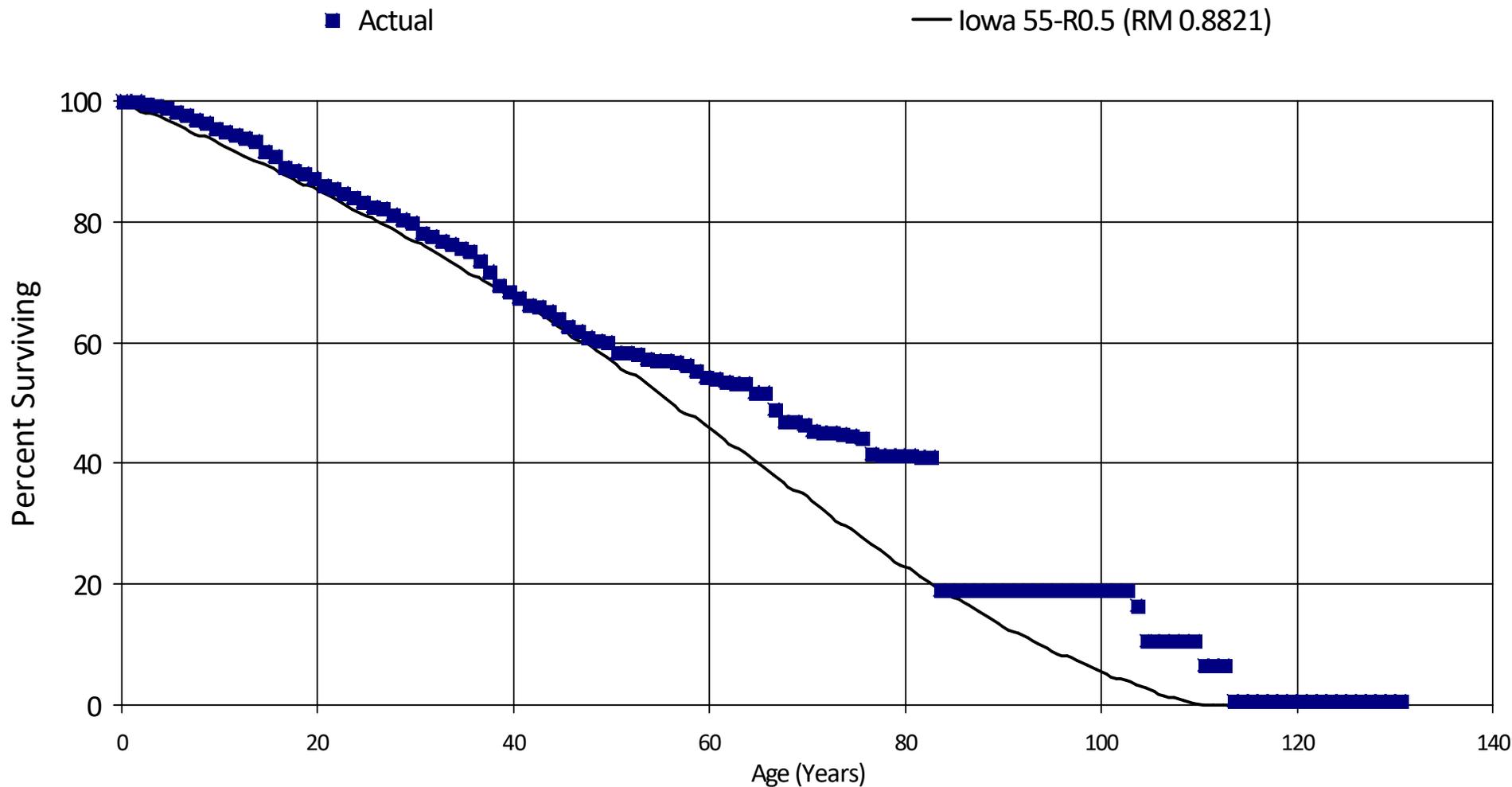
Age at Begin of Interval	Exposures at Beginning of Age Interval	Retirements During Age Interval	Retmt Ratio	Survivor Ratio	% Surviving
122.5	71	0	0.00000	1.00000	0.71
123.5	71	0	0.00000	1.00000	0.71
124.5	71	0	0.00000	1.00000	0.71
125.5	71	0	0.00000	1.00000	0.71
126.5	71	0	0.00000	1.00000	0.71
127.5	71	0	0.00000	1.00000	0.71
128.5	71	0	0.00000	1.00000	0.71
129.5	71	0	0.00000	1.00000	0.71
130.5	71	0	0.00000	1.00000	0.71
Totals:	1,801,868,222	13,163,907			

Missouri American Water

Account 31100 - Pumping Plant - Steam Pumping Equipment

Placement Band - 1888 - 2019 Experience Band - 1939 - 2019

Actual and Smooth Survivor Curves



Missouri American Water

Account 32000 - Water Treatment Plant - Equipment

RETIREMENT RATE ANALYSIS

Age at Begin of Interval	Exposures at Beginning of Age Interval	Retirements During Age Interval	Retmt Ratio	Survivor Ratio	% Surviving
0	214,674,863	8,168	0.00004	0.99996	100.00
0.5	205,118,769	87,654	0.00043	0.99957	100.00
1.5	178,069,098	319,380	0.00179	0.99821	99.96
2.5	139,893,333	307,466	0.00220	0.99780	99.78
3.5	138,367,481	172,908	0.00125	0.99875	99.56
4.5	130,494,990	300,251	0.00230	0.99770	99.44
5.5	128,313,739	372,014	0.00290	0.99710	99.21
6.5	126,898,761	866,322	0.00683	0.99317	98.92
7.5	122,900,617	1,665,103	0.01355	0.98645	98.24
8.5	120,192,623	1,500,328	0.01248	0.98752	96.91
9.5	117,340,894	1,135,151	0.00967	0.99033	95.70
10.5	114,926,306	1,117,289	0.00972	0.99028	94.77
11.5	87,664,730	795,982	0.00908	0.99092	93.85
12.5	82,769,713	738,110	0.00892	0.99108	93.00
13.5	81,202,510	513,256	0.00632	0.99368	92.17
14.5	79,890,287	525,849	0.00658	0.99342	91.59
15.5	79,016,711	1,586,881	0.02008	0.97992	90.99
16.5	77,059,407	873,757	0.01134	0.98866	89.16
17.5	75,621,790	588,160	0.00778	0.99222	88.15
18.5	74,606,523	450,738	0.00604	0.99396	87.46
19.5	69,441,666	430,542	0.00620	0.99380	86.93
20.5	65,982,689	1,725,312	0.02615	0.97385	86.39
21.5	41,697,338	500,599	0.01201	0.98799	84.13
22.5	38,919,103	353,039	0.00907	0.99093	83.12
23.5	36,722,578	237,466	0.00647	0.99353	82.37
24.5	35,185,698	866,719	0.02463	0.97537	81.84
25.5	32,679,742	64,604	0.00198	0.99802	79.82
26.5	22,748,594	302,014	0.01328	0.98672	79.66
27.5	21,864,651	222,566	0.01018	0.98982	78.60
28.5	19,864,903	674,855	0.03397	0.96603	77.80
29.5	18,737,256	338,488	0.01806	0.98194	75.16
30.5	17,070,739	793,270	0.04647	0.95353	73.80
31.5	15,725,930	249,015	0.01583	0.98417	70.37
32.5	15,259,914	138,529	0.00908	0.99092	69.26
33.5	15,121,386	601,678	0.03979	0.96021	68.63
34.5	13,529,166	72,517	0.00536	0.99464	65.90
35.5	13,213,083	149,502	0.01131	0.98869	65.55
36.5	13,063,581	180,980	0.01385	0.98615	64.81
37.5	12,846,058	96,808	0.00754	0.99246	63.91
38.5	12,607,238	69,312	0.00550	0.99450	63.43
39.5	12,498,048	66,400	0.00531	0.99469	63.08

Missouri American Water

Account 32000 - Water Treatment Plant - Equipment

RETIREMENT RATE ANALYSIS

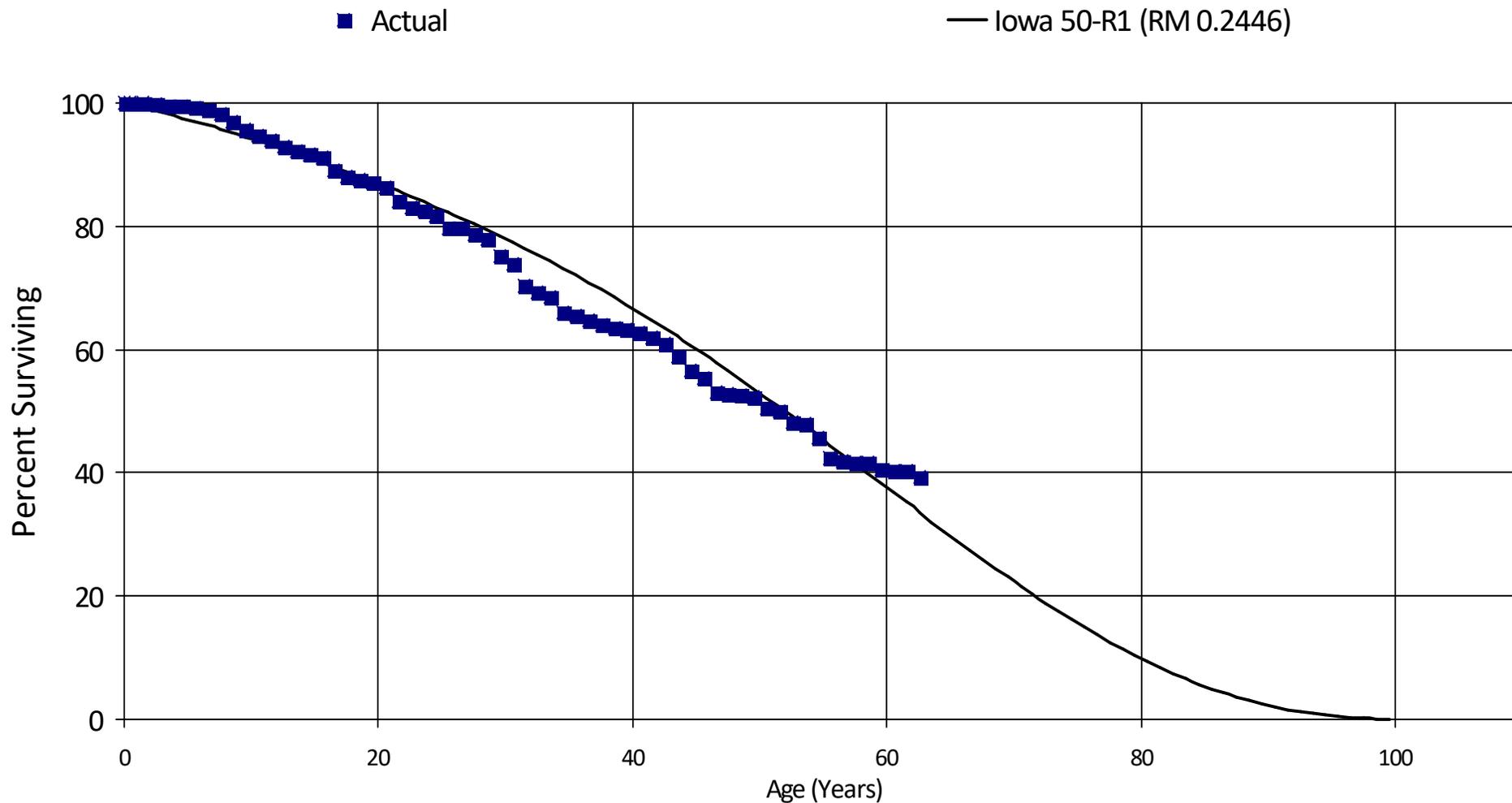
Age at Begin of Interval	Exposures at Beginning of Age Interval	Retirements During Age Interval	Retmt Ratio	Survivor Ratio	% Surviving
40.5	12,225,964	179,791	0.01471	0.98529	62.75
41.5	12,015,065	159,996	0.01332	0.98668	61.83
42.5	10,599,356	365,537	0.03449	0.96551	61.01
43.5	10,221,380	387,983	0.03796	0.96204	58.91
44.5	9,814,888	210,465	0.02144	0.97856	56.67
45.5	9,578,908	402,404	0.04201	0.95799	55.45
46.5	8,619,372	41,276	0.00479	0.99521	53.12
47.5	8,359,347	47,230	0.00565	0.99435	52.87
48.5	6,567,411	26,365	0.00401	0.99599	52.57
49.5	6,427,146	238,280	0.03707	0.96293	52.36
50.5	6,188,866	39,439	0.00637	0.99363	50.42
51.5	5,586,919	205,474	0.03678	0.96322	50.10
52.5	5,381,445	22,685	0.00422	0.99578	48.26
53.5	5,333,616	252,401	0.04732	0.95268	48.06
54.5	4,666,660	338,270	0.07249	0.92751	45.79
55.5	3,809,660	57,941	0.01521	0.98479	42.47
56.5	3,745,173	12,458	0.00333	0.99667	41.82
57.5	3,712,108	15,990	0.00431	0.99569	41.68
58.5	3,683,349	84,929	0.02306	0.97694	41.50
59.5	3,396,569	4,667	0.00137	0.99863	40.54
60.5	2,838,380	15,459	0.00545	0.99455	40.48
61.5	2,735,086	67,046	0.02451	0.97549	40.26
62.5	2,622,563	1,796	0.00068	0.99932	39.27
Totals:	3,067,931,737	25,236,864			

Missouri American Water

Account 32000 - Water Treatment Plant - Equipment

Placement Band - 1881 - 2019 Experience Band - 1939 - 2019

Actual and Smooth Survivor Curves



Account 33000 - Transmission and Distribution - Reservoirs & Standpipes

RETIREMENT RATE ANALYSIS

Age at Begin of Interval	Exposures at Beginning of Age Interval	Retirements During Age Interval	Retmt Ratio	Survivor Ratio	% Surviving
0	37,812,016	0	0.00000	1.00000	100.00
0.5	36,703,350	3,839	0.00010	0.99990	100.00
1.5	36,479,331	10,889	0.00030	0.99970	99.99
2.5	35,991,374	19,868	0.00055	0.99945	99.96
3.5	35,883,020	7,875	0.00022	0.99978	99.91
4.5	31,583,387	82,838	0.00262	0.99738	99.89
5.5	31,351,335	54,715	0.00175	0.99825	99.63
6.5	31,288,300	20,536	0.00066	0.99934	99.46
7.5	31,126,416	38,710	0.00124	0.99876	99.39
8.5	31,055,030	139,725	0.00450	0.99550	99.27
9.5	30,675,296	62,643	0.00204	0.99796	98.82
10.5	30,357,524	16,524	0.00054	0.99946	98.62
11.5	30,152,349	222,492	0.00738	0.99262	98.57
12.5	26,942,254	26,595	0.00099	0.99901	97.84
13.5	26,562,115	27,849	0.00105	0.99895	97.74
14.5	24,698,032	128,553	0.00520	0.99480	97.64
15.5	24,492,855	57,904	0.00236	0.99764	97.13
16.5	22,713,763	5,370	0.00024	0.99976	96.90
17.5	19,237,603	20,855	0.00108	0.99892	96.88
18.5	18,855,994	13,460	0.00071	0.99929	96.78
19.5	18,363,294	13,808	0.00075	0.99925	96.71
20.5	18,035,768	41,117	0.00228	0.99772	96.64
21.5	17,115,218	281,465	0.01645	0.98355	96.42
22.5	14,806,262	53,511	0.00361	0.99639	94.83
23.5	13,786,835	48,094	0.00349	0.99651	94.49
24.5	12,730,007	100,697	0.00791	0.99209	94.16
25.5	12,629,310	73,868	0.00585	0.99415	93.42
26.5	12,453,003	21,116	0.00170	0.99830	92.87
27.5	12,192,154	29,816	0.00245	0.99755	92.71
28.5	11,291,283	41,252	0.00365	0.99635	92.48
29.5	10,122,759	2,543	0.00025	0.99975	92.14
30.5	9,031,610	58,176	0.00644	0.99356	92.12
31.5	8,677,149	18,317	0.00211	0.99789	91.53
32.5	7,924,459	892	0.00011	0.99989	91.34
33.5	7,829,126	57,742	0.00738	0.99262	91.33
34.5	7,738,795	16,448	0.00213	0.99787	90.66
35.5	7,722,347	40,390	0.00523	0.99477	90.47
36.5	7,650,311	57,891	0.00757	0.99243	90.00
37.5	7,592,419	3,297	0.00043	0.99957	89.32
38.5	7,081,004	8,210	0.00116	0.99884	89.28
39.5	6,782,285	14,077	0.00208	0.99792	89.18

Missouri American Water

Account 33000 - Transmission and Distribution - Reservoirs & Standpipes

RETIREMENT RATE ANALYSIS

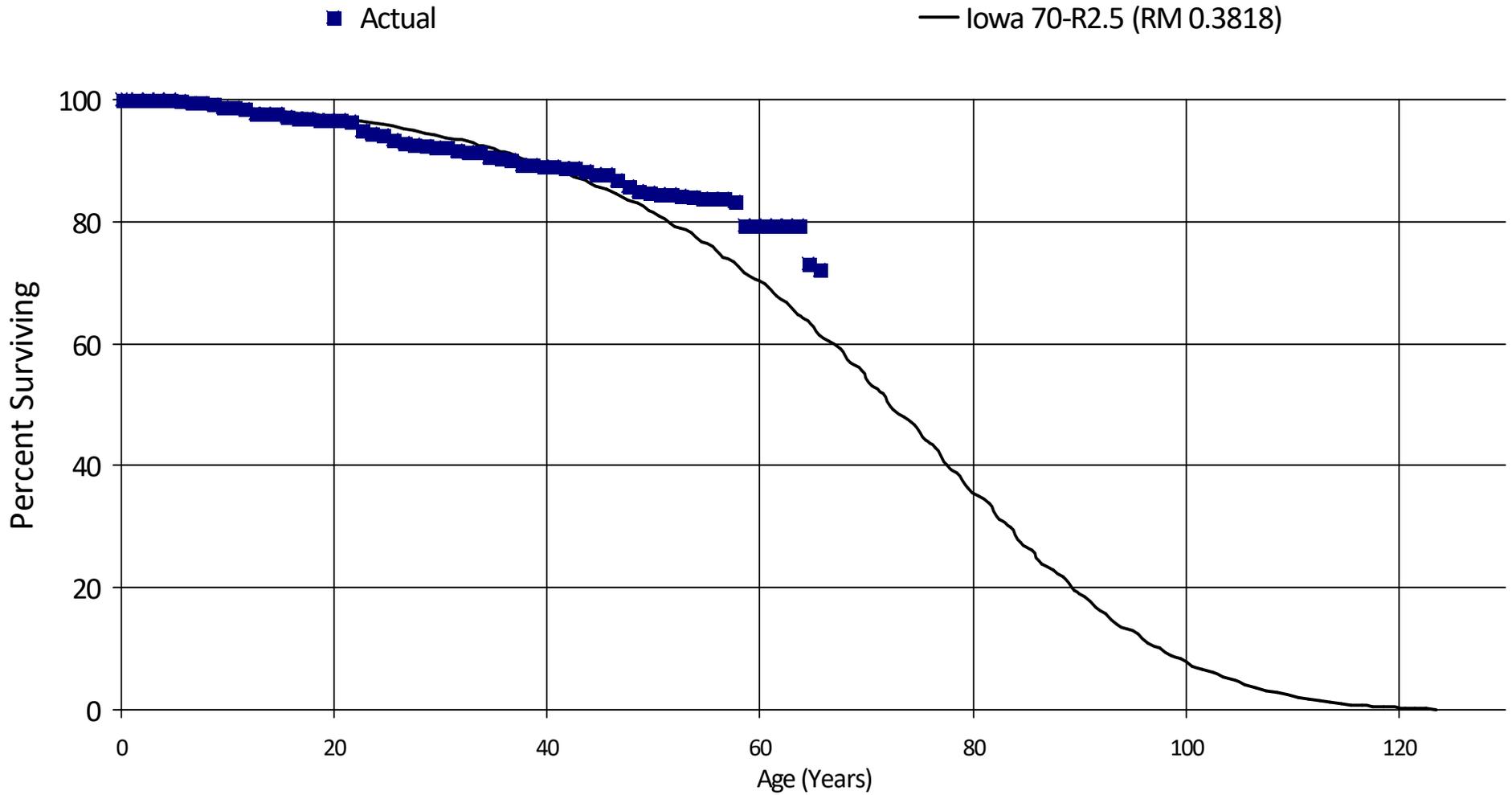
Age at Begin of Interval	Exposures at Beginning of Age Interval	Retirements During Age Interval	Retmt Ratio	Survivor Ratio	% Surviving
40.5	6,244,306	7,220	0.00116	0.99884	88.99
41.5	5,762,849	7,035	0.00122	0.99878	88.89
42.5	5,712,596	22,929	0.00401	0.99599	88.78
43.5	5,679,584	32,394	0.00570	0.99430	88.42
44.5	5,277,768	9,654	0.00183	0.99817	87.92
45.5	5,268,114	51,620	0.00980	0.99020	87.76
46.5	5,187,839	65,332	0.01259	0.98741	86.90
47.5	5,095,344	47,497	0.00932	0.99068	85.81
48.5	4,671,190	17,433	0.00373	0.99627	85.01
49.5	4,258,300	8,371	0.00197	0.99803	84.69
50.5	4,112,824	2,095	0.00051	0.99949	84.52
51.5	3,534,253	7,673	0.00217	0.99783	84.48
52.5	3,218,126	11,406	0.00354	0.99646	84.30
53.5	2,724,593	5,562	0.00204	0.99796	84.00
54.5	2,037,685	2,875	0.00141	0.99859	83.83
55.5	2,034,810	0	0.00000	1.00000	83.71
56.5	1,891,521	7,606	0.00402	0.99598	83.71
57.5	1,473,311	67,570	0.04586	0.95414	83.37
58.5	931,101	0	0.00000	1.00000	79.55
59.5	841,856	0	0.00000	1.00000	79.55
60.5	841,856	210	0.00025	0.99975	79.55
61.5	840,629	0	0.00000	1.00000	79.53
62.5	702,381	673	0.00096	0.99904	79.53
63.5	609,614	48,141	0.07897	0.92103	79.45
64.5	513,082	7,945	0.01548	0.98452	73.18
65.5	232,760	24,801	0.10655	0.89345	72.05
Totals:	905,215,032	2,400,009			

Missouri American Water

Account 33000 - Transmission and Distribution - Reservoirs & Standpipes

Placement Band - 1900 - 2019 Experience Band - 1939 - 2019

Actual and Smooth Survivor Curves



Missouri American Water

Account 33101 - Transmission and Distribution - Mains

RETIREMENT RATE ANALYSIS

Age at Begin of Interval	Exposures at Beginning of Age Interval	Retirements During Age Interval	Retmt Ratio	Survivor Ratio	% Surviving
0	1,904,005,406	743,053	0.00039	0.99961	100.00
0.5	1,751,889,622	2,412,334	0.00138	0.99862	99.96
1.5	1,547,492,770	1,557,823	0.00101	0.99899	99.82
2.5	1,394,688,373	1,898,999	0.00136	0.99864	99.72
3.5	1,292,307,723	1,817,651	0.00141	0.99859	99.58
4.5	1,208,004,974	2,218,959	0.00184	0.99816	99.44
5.5	1,114,246,685	1,929,443	0.00173	0.99827	99.26
6.5	1,057,432,122	2,384,504	0.00225	0.99775	99.09
7.5	971,860,380	2,897,774	0.00298	0.99702	98.87
8.5	922,355,071	2,655,001	0.00288	0.99712	98.58
9.5	855,700,300	3,594,812	0.00420	0.99580	98.30
10.5	800,262,779	3,268,467	0.00408	0.99592	97.89
11.5	731,599,775	3,045,140	0.00416	0.99584	97.49
12.5	673,848,147	1,246,769	0.00185	0.99815	97.08
13.5	616,077,780	1,806,366	0.00293	0.99707	96.90
14.5	606,173,133	1,046,696	0.00173	0.99827	96.62
15.5	588,972,896	1,117,583	0.00190	0.99810	96.45
16.5	562,673,984	726,264	0.00129	0.99871	96.27
17.5	512,420,563	2,381,887	0.00465	0.99535	96.15
18.5	435,803,887	1,473,420	0.00338	0.99662	95.70
19.5	402,158,428	586,237	0.00146	0.99854	95.38
20.5	385,426,766	725,207	0.00188	0.99812	95.24
21.5	365,528,959	1,004,747	0.00275	0.99725	95.06
22.5	340,189,557	774,021	0.00228	0.99772	94.80
23.5	321,852,615	650,059	0.00202	0.99798	94.58
24.5	307,477,585	623,460	0.00203	0.99797	94.39
25.5	292,062,338	1,093,646	0.00374	0.99626	94.20
26.5	277,636,306	406,668	0.00146	0.99854	93.85
27.5	268,112,353	540,673	0.00202	0.99798	93.71
28.5	250,646,158	497,350	0.00198	0.99802	93.52
29.5	238,445,988	434,167	0.00182	0.99818	93.33
30.5	221,725,412	478,696	0.00216	0.99784	93.16
31.5	204,964,237	339,785	0.00166	0.99834	92.96
32.5	190,729,715	292,570	0.00153	0.99847	92.81
33.5	177,788,378	393,026	0.00221	0.99779	92.67
34.5	164,171,292	544,319	0.00332	0.99668	92.47
35.5	156,811,922	427,827	0.00273	0.99727	92.16
36.5	151,091,749	576,008	0.00381	0.99619	91.91
37.5	146,540,401	410,036	0.00280	0.99720	91.56
38.5	141,387,040	448,984	0.00318	0.99682	91.30
39.5	135,621,796	569,116	0.00420	0.99580	91.01

Missouri American Water

Account 33101 - Transmission and Distribution - Mains

RETIREMENT RATE ANALYSIS

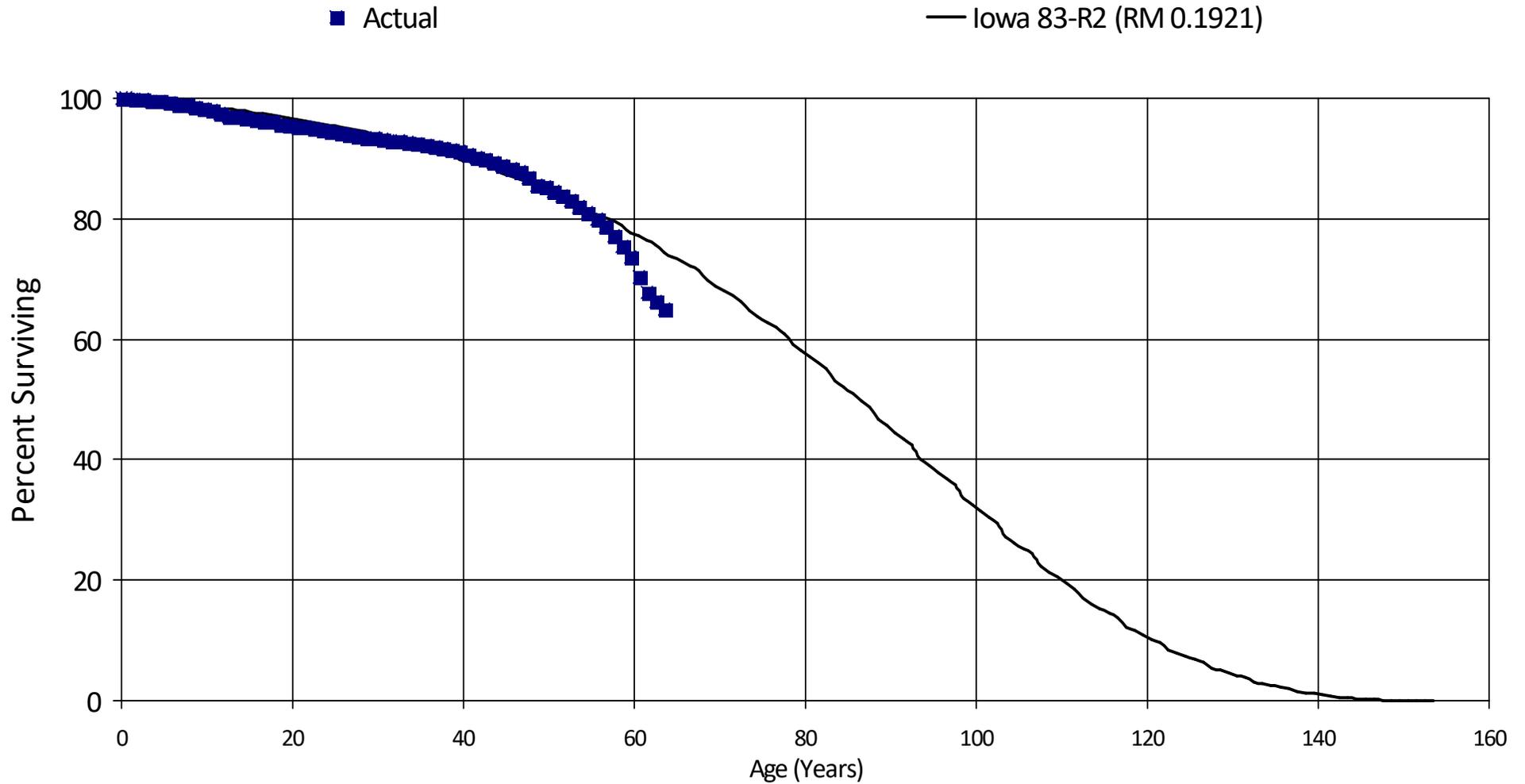
Age at Begin of Interval	Exposures at Beginning of Age Interval	Retirements During Age Interval	Retmt Ratio	Survivor Ratio	% Surviving
40.5	127,119,713	570,411	0.00449	0.99551	90.63
41.5	117,873,563	616,730	0.00523	0.99477	90.22
42.5	111,574,083	536,292	0.00481	0.99519	89.75
43.5	106,611,230	543,540	0.00510	0.99490	89.32
44.5	101,866,483	619,689	0.00608	0.99392	88.86
45.5	95,683,967	587,668	0.00614	0.99386	88.32
46.5	91,197,145	1,127,921	0.01237	0.98763	87.78
47.5	86,343,234	1,034,813	0.01198	0.98802	86.69
48.5	80,907,597	449,850	0.00556	0.99444	85.65
49.5	77,365,131	604,392	0.00781	0.99219	85.17
50.5	72,582,843	590,161	0.00813	0.99187	84.50
51.5	68,128,334	730,509	0.01072	0.98928	83.81
52.5	63,903,067	701,896	0.01098	0.98902	82.91
53.5	58,744,216	683,255	0.01163	0.98837	82.00
54.5	53,918,136	707,568	0.01312	0.98688	81.05
55.5	48,960,060	735,538	0.01502	0.98498	79.99
56.5	45,542,077	1,014,137	0.02227	0.97773	78.79
57.5	42,394,971	871,230	0.02055	0.97945	77.04
58.5	39,362,995	981,241	0.02493	0.97507	75.46
59.5	35,393,893	1,524,265	0.04307	0.95693	73.58
60.5	30,989,302	1,116,357	0.03602	0.96398	70.41
61.5	27,667,120	682,952	0.02468	0.97532	67.87
62.5	25,269,700	430,152	0.01702	0.98298	66.19
63.5	22,539,509	363,048	0.01611	0.98389	65.06
Totals:	26,320,123,734	69,863,162			

Missouri American Water

Account 33101 - Transmission and Distribution - Mains

Placement Band - 1854 - 2019 Experience Band - 1939 - 2019

Actual and Smooth Survivor Curves



Missouri American Water

Account 33200 - Transmission and Distribution - Fire Mains

RETIREMENT RATE ANALYSIS

Age at Begin of Interval	Exposures at Beginning of Age Interval	Retirements During Age Interval	Retmt Ratio	Survivor Ratio	% Surviving
0	643,895	0	0.00000	1.00000	100.00
0.5	643,895	0	0.00000	1.00000	100.00
1.5	643,895	0	0.00000	1.00000	100.00
2.5	643,895	0	0.00000	1.00000	100.00
3.5	643,895	0	0.00000	1.00000	100.00
4.5	643,895	0	0.00000	1.00000	100.00
5.5	643,389	0	0.00000	1.00000	100.00
6.5	643,389	0	0.00000	1.00000	100.00
7.5	643,389	0	0.00000	1.00000	100.00
8.5	643,389	0	0.00000	1.00000	100.00
9.5	631,299	0	0.00000	1.00000	100.00
10.5	596,073	0	0.00000	1.00000	100.00
11.5	556,095	688	0.00124	0.99876	100.00
12.5	530,381	1,709	0.00322	0.99678	99.88
13.5	484,420	0	0.00000	1.00000	99.56
14.5	462,490	0	0.00000	1.00000	99.56
15.5	446,182	0	0.00000	1.00000	99.56
16.5	428,769	0	0.00000	1.00000	99.56
17.5	408,202	0	0.00000	1.00000	99.56
18.5	372,441	0	0.00000	1.00000	99.56
19.5	316,798	0	0.00000	1.00000	99.56
20.5	298,024	578	0.00194	0.99806	99.56
21.5	280,536	5,010	0.01786	0.98214	99.37
22.5	229,270	0	0.00000	1.00000	97.60
23.5	220,979	0	0.00000	1.00000	97.60
24.5	192,385	0	0.00000	1.00000	97.60
25.5	170,836	0	0.00000	1.00000	97.60
26.5	150,339	0	0.00000	1.00000	97.60
27.5	140,589	0	0.00000	1.00000	97.60
28.5	112,542	394	0.00350	0.99650	97.60
29.5	101,994	0	0.00000	1.00000	97.26
30.5	93,791	0	0.00000	1.00000	97.26
31.5	83,251	0	0.00000	1.00000	97.26
32.5	67,868	491	0.00723	0.99277	97.26
33.5	54,633	81	0.00148	0.99852	96.56
34.5	43,549	0	0.00000	1.00000	96.42
35.5	25,043	0	0.00000	1.00000	96.42
36.5	25,043	0	0.00000	1.00000	96.42
37.5	23,004	0	0.00000	1.00000	96.42
38.5	22,235	0	0.00000	1.00000	96.42

Missouri American Water

Account 33200 - Transmission and Distribution - Fire Mains

RETIREMENT RATE ANALYSIS

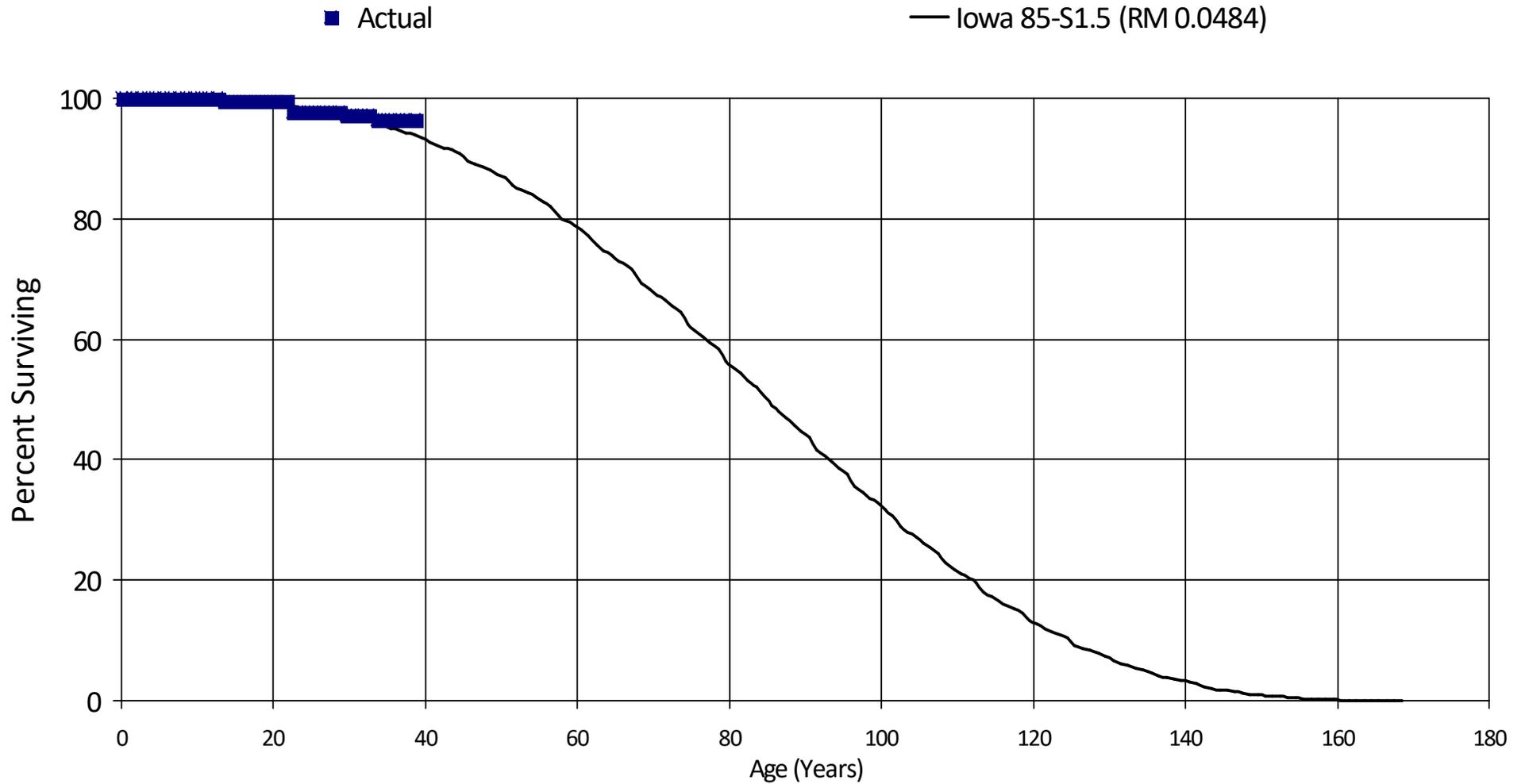
Age at Begin of Interval	Exposures at Beginning of Age Interval	Retirements During Age Interval	Retmt Ratio	Survivor Ratio	% Surviving
Totals:	14,005,988	8,951			

Missouri American Water

Account 33200 - Transmission and Distribution - Fire Mains

Placement Band - 1935 - 2019 Experience Band - 1970 - 2019

Actual and Smooth Survivor Curves



Missouri American Water

Account 33300 - Transmission and Distribution - Services

RETIREMENT RATE ANALYSIS

Age at Begin of Interval	Exposures at Beginning of Age Interval	Retirements During Age Interval	Retmt Ratio	Survivor Ratio	% Surviving
0	68,863,726	13,197	0.00019	0.99981	100.00
0.5	61,446,365	42,118	0.00069	0.99931	99.98
1.5	54,648,135	43,404	0.00079	0.99921	99.91
2.5	49,279,062	55,563	0.00113	0.99887	99.83
3.5	46,431,400	62,945	0.00136	0.99864	99.72
4.5	42,756,147	41,205	0.00096	0.99904	99.58
5.5	40,146,052	53,540	0.00133	0.99867	99.48
6.5	37,923,415	70,743	0.00187	0.99813	99.35
7.5	35,695,882	240,162	0.00673	0.99327	99.16
8.5	33,554,486	147,903	0.00441	0.99559	98.49
9.5	30,882,285	255,445	0.00827	0.99173	98.06
10.5	27,776,604	214,877	0.00774	0.99226	97.25
11.5	26,028,780	147,427	0.00566	0.99434	96.50
12.5	23,879,013	43,218	0.00181	0.99819	95.95
13.5	21,924,155	149,153	0.00680	0.99320	95.78
14.5	21,476,425	151,755	0.00707	0.99293	95.13
15.5	21,286,954	99,804	0.00469	0.99531	94.46
16.5	21,104,279	98,712	0.00468	0.99532	94.02
17.5	19,626,321	88,537	0.00451	0.99549	93.58
18.5	18,274,840	249,351	0.01364	0.98636	93.16
19.5	16,806,032	84,352	0.00502	0.99498	91.89
20.5	11,915,791	110,184	0.00925	0.99075	91.43
21.5	10,892,587	137,526	0.01263	0.98737	90.58
22.5	9,841,311	66,097	0.00672	0.99328	89.44
23.5	8,793,339	28,266	0.00321	0.99679	88.84
24.5	8,147,004	37,216	0.00457	0.99543	88.55
25.5	7,418,708	57,186	0.00771	0.99229	88.15
26.5	6,635,132	25,366	0.00382	0.99618	87.47
27.5	6,000,973	42,175	0.00703	0.99297	87.14
28.5	5,486,086	40,161	0.00732	0.99268	86.53
29.5	5,055,979	37,405	0.00740	0.99260	85.90
30.5	4,744,350	32,654	0.00688	0.99312	85.26
31.5	4,347,326	33,348	0.00767	0.99233	84.67
32.5	3,930,647	34,445	0.00876	0.99124	84.02
33.5	3,493,500	29,614	0.00848	0.99152	83.28
34.5	3,166,249	31,954	0.01009	0.98991	82.57
35.5	2,936,886	29,523	0.01005	0.98995	81.74
36.5	2,751,344	21,990	0.00799	0.99201	80.92
37.5	2,623,551	14,637	0.00558	0.99442	80.27
38.5	2,509,809	23,038	0.00918	0.99082	79.82
39.5	2,376,690	28,832	0.01213	0.98787	79.09

Missouri American Water

Account 33300 - Transmission and Distribution - Services

RETIREMENT RATE ANALYSIS

Age at Begin of Interval	Exposures at Beginning of Age Interval	Retirements During Age Interval	Retmt Ratio	Survivor Ratio	% Surviving
40.5	2,189,935	31,156	0.01423	0.98577	78.13
41.5	2,032,677	22,839	0.01124	0.98876	77.02
42.5	1,892,333	31,623	0.01671	0.98329	76.15
43.5	1,767,262	7,318	0.00414	0.99586	74.88
44.5	1,699,774	7,702	0.00453	0.99547	74.57
45.5	1,614,168	11,754	0.00728	0.99272	74.23
46.5	1,507,600	3,865	0.00256	0.99744	73.69
47.5	1,399,672	9,095	0.00650	0.99350	73.50
48.5	1,298,007	5,670	0.00437	0.99563	73.02
49.5	1,172,519	5,278	0.00450	0.99550	72.70
50.5	1,114,880	6,638	0.00595	0.99405	72.37
51.5	1,072,750	2,966	0.00276	0.99724	71.94
52.5	1,011,507	2,481	0.00245	0.99755	71.74
53.5	945,529	2,892	0.00306	0.99694	71.56
54.5	884,188	3,701	0.00419	0.99581	71.34
55.5	794,717	15,374	0.01935	0.98065	71.04
56.5	716,743	2,804	0.00391	0.99609	69.67
57.5	669,114	2,082	0.00311	0.99689	69.40
58.5	629,738	3,003	0.00477	0.99523	69.18
59.5	593,313	2,188	0.00369	0.99631	68.85
60.5	532,749	8,938	0.01678	0.98322	68.60
61.5	478,858	9,382	0.01959	0.98041	67.45
62.5	426,835	2,908	0.00681	0.99319	66.13
63.5	381,392	5,364	0.01406	0.98594	65.68
64.5	327,002	1,642	0.00502	0.99498	64.76
65.5	289,812	2,072	0.00715	0.99285	64.43
66.5	258,916	1,592	0.00615	0.99385	63.97
67.5	232,475	2,156	0.00927	0.99073	63.58
68.5	209,843	492	0.00234	0.99766	62.99
69.5	190,329	1,628	0.00855	0.99145	62.84
70.5	173,360	585	0.00337	0.99663	62.30
71.5	156,901	1,493	0.00952	0.99048	62.09
72.5	138,349	1,237	0.00894	0.99106	61.50
73.5	117,412	714	0.00608	0.99392	60.95
74.5	110,078	1,435	0.01304	0.98696	60.58
75.5	108,343	904	0.00834	0.99166	59.79
76.5	106,750	597	0.00559	0.99441	59.29
77.5	102,881	1,025	0.00996	0.99004	58.96
78.5	95,690	2,143	0.02240	0.97760	58.37
79.5	84,984	3,477	0.04091	0.95909	57.06
80.5	76,012	3,104	0.04084	0.95916	54.73

Missouri American Water

Account 33300 - Transmission and Distribution - Services

RETIREMENT RATE ANALYSIS

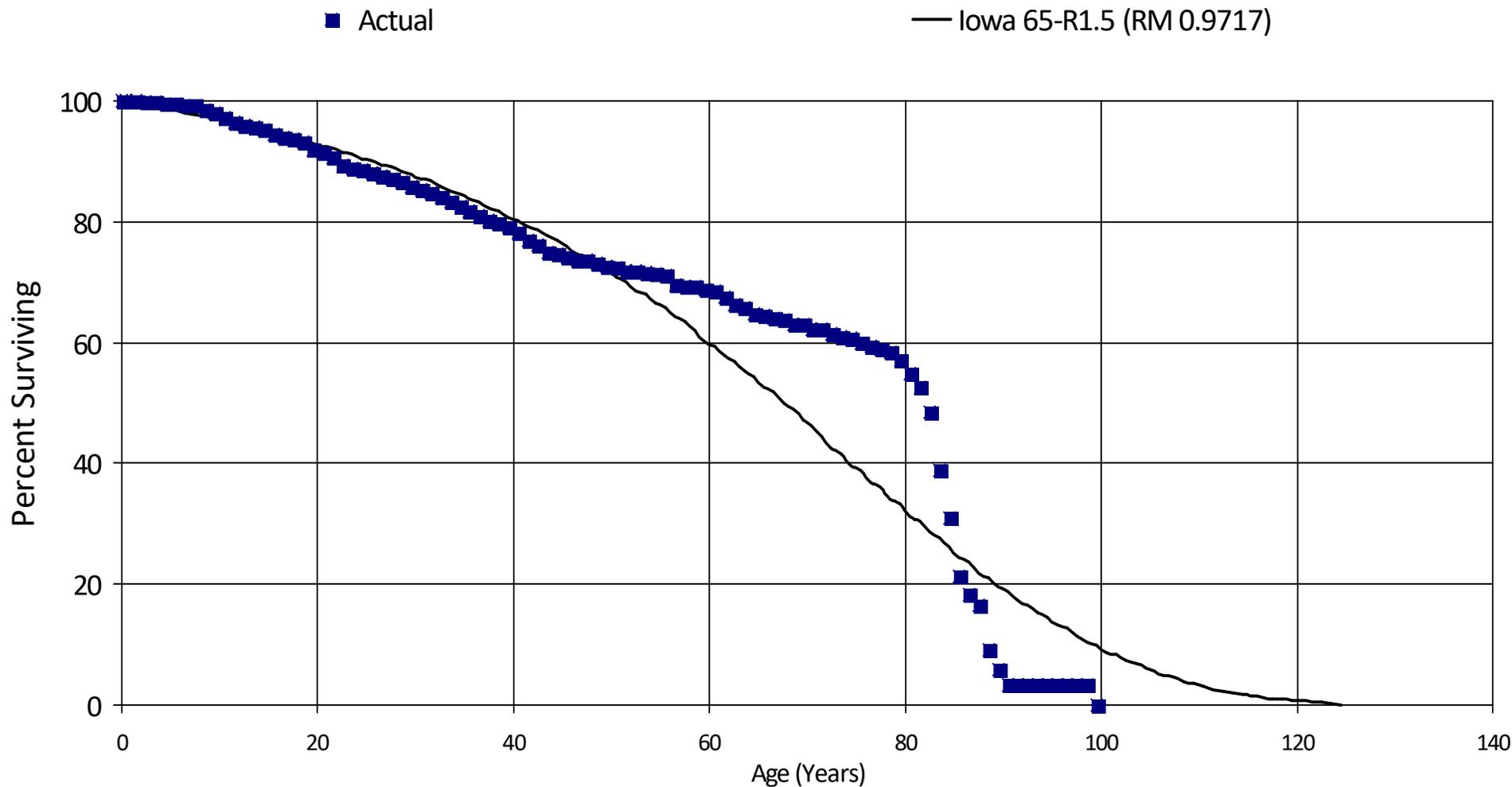
Age at Begin of Interval	Exposures at Beginning of Age Interval	Retirements During Age Interval	Retmt Ratio	Survivor Ratio	% Surviving
81.5	66,353	5,014	0.07557	0.92443	52.49
82.5	55,370	11,031	0.19922	0.80078	48.52
83.5	35,253	7,118	0.20191	0.79809	38.85
84.5	16,215	5,022	0.30971	0.69029	31.01
85.5	9,687	1,432	0.14783	0.85217	21.41
86.5	8,067	740	0.09173	0.90827	18.24
87.5	7,326	3,320	0.45320	0.54680	16.57
88.5	4,006	1,427	0.35625	0.64375	9.06
89.5	2,554	1,139	0.44605	0.55395	5.83
90.5	1,364	0	0.00000	1.00000	3.23
91.5	1,164	0	0.00000	1.00000	3.23
92.5	1,105	0	0.00000	1.00000	3.23
93.5	991	0	0.00000	1.00000	3.23
94.5	991	0	0.00000	1.00000	3.23
95.5	871	0	0.00000	1.00000	3.23
96.5	816	0	0.00000	1.00000	3.23
97.5	816	0	0.00000	1.00000	3.23
98.5	816	816	1.00038	-0.00038	3.23
99.5	0	0	0.00000	0.00000	0.00
Totals:	862,696,782	3,485,404			

Missouri American Water

Account 33300 - Transmission and Distribution - Services

Placement Band - 1903 - 2019 Experience Band - 1939 - 2019

Actual and Smooth Survivor Curves



Missouri American Water

Account 33400 - Transmission and Distribution - Meters

RETIREMENT RATE ANALYSIS

Age at Begin of Interval	Exposures at Beginning of Age Interval	Retirements During Age Interval	Retmt Ratio	Survivor Ratio	% Surviving
0	259,999,513	236,218	0.00091	0.99909	100.00
0.5	234,696,167	123,258	0.00053	0.99947	99.91
1.5	196,552,419	1,034,167	0.00526	0.99474	99.86
2.5	162,764,472	982,189	0.00603	0.99397	99.33
3.5	142,231,713	1,112,421	0.00782	0.99218	98.73
4.5	131,129,932	1,273,338	0.00971	0.99029	97.96
5.5	123,444,468	1,377,276	0.01116	0.98884	97.01
6.5	114,805,338	1,545,979	0.01347	0.98653	95.93
7.5	107,720,036	1,865,857	0.01732	0.98268	94.64
8.5	100,945,383	1,298,260	0.01286	0.98714	93.00
9.5	93,857,498	3,871,448	0.04125	0.95875	91.80
10.5	65,562,424	1,156,672	0.01764	0.98236	88.01
11.5	63,797,028	4,716,153	0.07392	0.92608	86.46
12.5	54,688,530	649,049	0.01187	0.98813	80.07
13.5	51,374,726	626,152	0.01219	0.98781	79.12
14.5	50,700,021	741,241	0.01462	0.98538	78.16
15.5	47,061,576	1,097,925	0.02333	0.97667	77.02
16.5	45,360,094	356,504	0.00786	0.99214	75.22
17.5	42,689,407	396,652	0.00929	0.99071	74.63
18.5	39,287,968	226,390	0.00576	0.99424	73.94
19.5	37,310,369	173,950	0.00466	0.99534	73.51
20.5	31,247,629	282,891	0.00905	0.99095	73.17
21.5	29,798,405	181,987	0.00611	0.99389	72.51
22.5	27,835,917	247,973	0.00891	0.99109	72.07
23.5	25,910,330	220,543	0.00851	0.99149	71.43
24.5	24,031,751	194,427	0.00809	0.99191	70.82
25.5	21,202,408	195,272	0.00921	0.99079	70.25
26.5	19,912,128	144,321	0.00725	0.99275	69.60
27.5	18,828,474	128,979	0.00685	0.99315	69.10
28.5	17,870,126	101,907	0.00570	0.99430	68.63
29.5	16,929,084	82,337	0.00486	0.99514	68.24
30.5	16,134,403	99,254	0.00615	0.99385	67.91
31.5	15,157,950	80,511	0.00531	0.99469	67.49
32.5	14,355,947	86,713	0.00604	0.99396	67.13
33.5	13,488,896	63,062	0.00468	0.99532	66.72
34.5	12,648,056	72,888	0.00576	0.99424	66.41
35.5	11,993,999	89,296	0.00745	0.99255	66.03
36.5	11,359,712	158,090	0.01392	0.98608	65.54
37.5	10,877,616	350,577	0.03223	0.96777	64.63
38.5	10,067,830	62,585	0.00622	0.99378	62.55
39.5	9,524,184	70,285	0.00738	0.99262	62.16

Missouri American Water

Account 33400 - Transmission and Distribution - Meters

RETIREMENT RATE ANALYSIS

Age at Begin of Interval	Exposures at Beginning of Age Interval	Retirements During Age Interval	Retmt Ratio	Survivor Ratio	% Surviving
40.5	8,934,108	374,020	0.04186	0.95814	61.70
41.5	8,060,785	471,130	0.05845	0.94155	59.12
42.5	7,317,035	360,812	0.04931	0.95069	55.66
43.5	6,499,369	491,709	0.07565	0.92435	52.92
44.5	5,667,626	373,395	0.06588	0.93412	48.92
45.5	4,983,344	157,737	0.03165	0.96835	45.70
46.5	4,422,004	330,049	0.07464	0.92536	44.25
47.5	3,883,704	424,112	0.10920	0.89080	40.95
48.5	3,314,322	179,673	0.05421	0.94579	36.48
49.5	3,032,886	314,862	0.10382	0.89618	34.50
50.5	2,614,916	184,331	0.07049	0.92951	30.92
51.5	2,339,583	188,089	0.08039	0.91961	28.74
52.5	2,081,945	140,557	0.06751	0.93249	26.43
53.5	1,863,990	92,326	0.04953	0.95047	24.65
54.5	1,687,111	44,778	0.02654	0.97346	23.43
55.5	1,566,585	42,601	0.02719	0.97281	22.81
56.5	1,462,481	36,049	0.02465	0.97535	22.19
57.5	1,376,681	24,484	0.01778	0.98222	21.64
58.5	1,306,126	20,132	0.01541	0.98459	21.26
59.5	1,225,540	20,850	0.01701	0.98299	20.93
60.5	1,134,647	20,246	0.01784	0.98216	20.57
61.5	1,033,088	16,703	0.01617	0.98383	20.20
62.5	946,138	59,295	0.06267	0.93733	19.87
63.5	815,441	8,307	0.01019	0.98981	18.62
64.5	701,625	8,726	0.01244	0.98756	18.43
65.5	607,534	6,004	0.00988	0.99012	18.20
66.5	474,108	4,265	0.00900	0.99100	18.02
67.5	403,214	9,031	0.02240	0.97760	17.86
68.5	331,321	2,020	0.00610	0.99390	17.46
69.5	279,898	1,511	0.00540	0.99460	17.35
70.5	229,023	1,559	0.00681	0.99319	17.26
71.5	196,856	8,472	0.04304	0.95696	17.14
72.5	171,573	991	0.00578	0.99422	16.40
73.5	155,655	555	0.00357	0.99643	16.31
74.5	149,161	915	0.00613	0.99387	16.25
75.5	145,481	838	0.00576	0.99424	16.15
76.5	141,803	269	0.00190	0.99810	16.06
77.5	135,941	218	0.00160	0.99840	16.03
78.5	124,724	3,305	0.02650	0.97350	16.00
79.5	110,509	828	0.00749	0.99251	15.58
80.5	101,024	1,457	0.01442	0.98558	15.46

Missouri American Water

Account 33400 - Transmission and Distribution - Meters

RETIREMENT RATE ANALYSIS

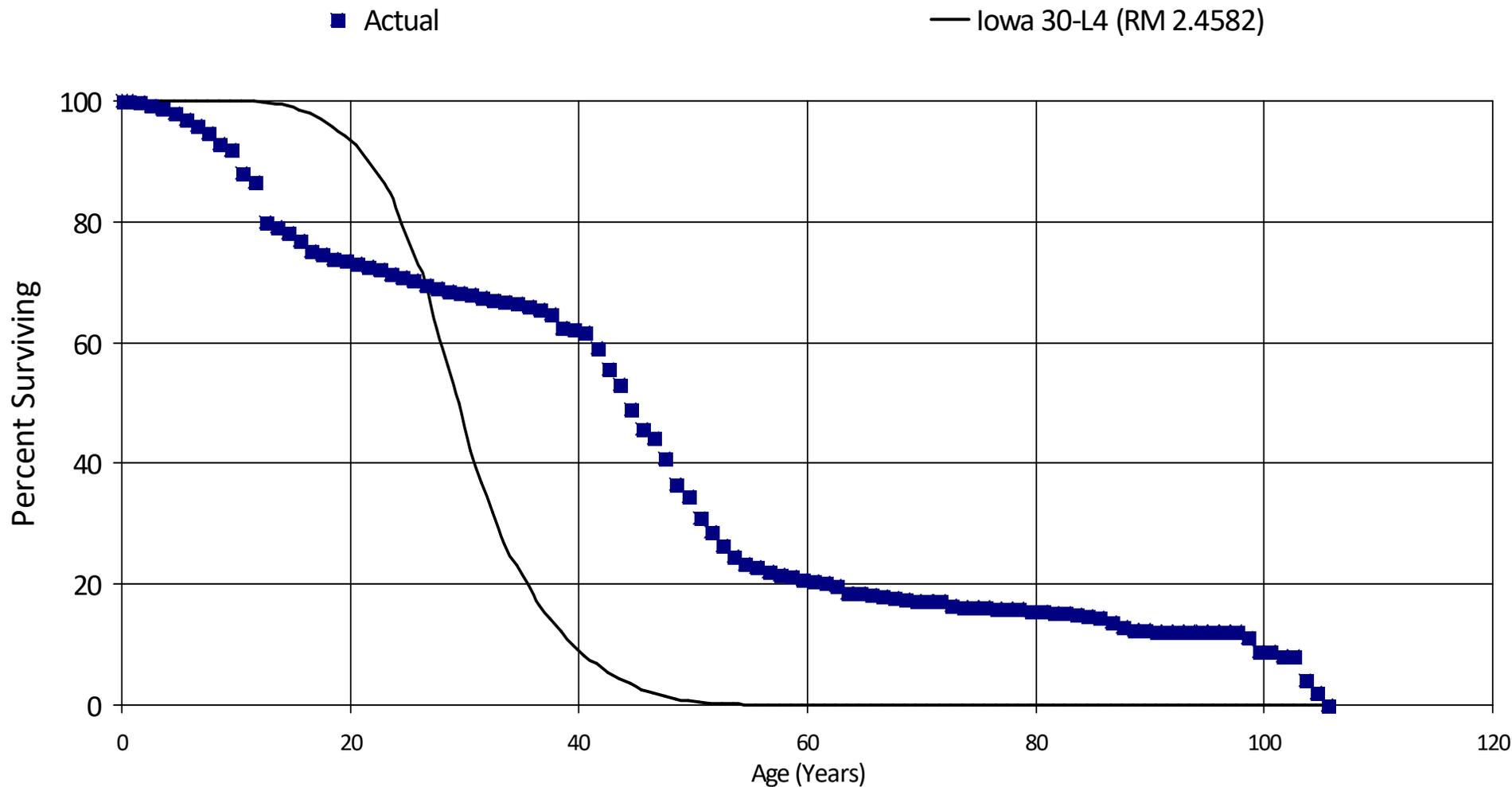
Age at Begin of Interval	Exposures at Beginning of Age Interval	Retirements During Age Interval	Retmt Ratio	Survivor Ratio	% Surviving
81.5	98,773	163	0.00165	0.99835	15.24
82.5	91,971	920	0.01000	0.99000	15.21
83.5	85,216	2,512	0.02948	0.97052	15.06
84.5	78,614	961	0.01222	0.98778	14.62
85.5	72,401	3,073	0.04244	0.95756	14.44
86.5	67,235	4,490	0.06678	0.93322	13.83
87.5	60,369	2,322	0.03846	0.96154	12.91
88.5	53,663	436	0.00812	0.99188	12.41
89.5	48,185	42	0.00087	0.99913	12.31
90.5	42,101	194	0.00461	0.99539	12.30
91.5	32,657	73	0.00224	0.99776	12.24
92.5	25,350	75	0.00296	0.99704	12.21
93.5	18,727	19	0.00101	0.99899	12.17
94.5	10,475	20	0.00191	0.99809	12.16
95.5	5,884	18	0.00306	0.99694	12.14
96.5	3,170	7	0.00221	0.99779	12.10
97.5	1,731	136	0.07856	0.92144	12.07
98.5	1,595	308	0.19310	0.80690	11.12
99.5	1,256	0	0.00000	1.00000	8.97
100.5	1,256	128	0.10191	0.89809	8.97
101.5	1,128	0	0.00000	1.00000	8.06
102.5	1,128	550	0.48747	0.51253	8.06
103.5	578	287	0.49651	0.50349	4.13
104.5	291	291	0.99852	0.00148	2.08
105.5	0	0	0.00000	0.00000	0.00
Totals:	2,607,986,582	32,219,233			

Missouri American Water

Account 33400 - Transmission and Distribution - Meters

Placement Band - 1899 - 2019 Experience Band - 1945 - 2019

Actual and Smooth Survivor Curves



Missouri American Water

Account 33500 - Transmission and Distribution - Hydrants

RETIREMENT RATE ANALYSIS

Age at Begin of Interval	Exposures at Beginning of Age Interval	Retirements During Age Interval	Retmt Ratio	Survivor Ratio	% Surviving
0	126,457,347	148,887	0.00118	0.99882	100.00
0.5	115,400,195	345,054	0.00299	0.99701	99.88
1.5	102,447,833	488,841	0.00477	0.99523	99.58
2.5	90,979,949	648,434	0.00713	0.99287	99.11
3.5	85,130,611	656,172	0.00771	0.99229	98.40
4.5	80,455,656	644,626	0.00801	0.99199	97.64
5.5	76,064,725	486,562	0.00640	0.99360	96.86
6.5	71,911,544	490,164	0.00682	0.99318	96.24
7.5	67,132,064	403,512	0.00601	0.99399	95.58
8.5	63,801,798	452,826	0.00710	0.99290	95.01
9.5	60,183,744	570,794	0.00948	0.99052	94.34
10.5	56,018,710	520,567	0.00929	0.99071	93.45
11.5	52,396,197	267,361	0.00510	0.99490	92.58
12.5	50,212,847	146,804	0.00292	0.99708	92.11
13.5	47,543,892	150,792	0.00317	0.99683	91.84
14.5	46,418,289	133,002	0.00287	0.99713	91.55
15.5	44,653,604	115,042	0.00258	0.99742	91.29
16.5	43,019,264	141,622	0.00329	0.99671	91.05
17.5	41,085,573	127,714	0.00311	0.99689	90.75
18.5	38,472,258	126,088	0.00328	0.99672	90.47
19.5	37,012,425	117,396	0.00317	0.99683	90.17
20.5	36,336,705	106,081	0.00292	0.99708	89.88
21.5	34,923,037	130,604	0.00374	0.99626	89.62
22.5	33,118,055	97,288	0.00294	0.99706	89.28
23.5	31,558,048	86,158	0.00273	0.99727	89.02
24.5	29,888,833	121,395	0.00406	0.99594	88.78
25.5	28,389,247	93,642	0.00330	0.99670	88.42
26.5	26,862,240	77,362	0.00288	0.99712	88.13
27.5	25,965,157	98,788	0.00380	0.99620	87.88
28.5	24,760,954	74,403	0.00300	0.99700	87.55
29.5	23,283,335	88,802	0.00381	0.99619	87.29
30.5	21,897,125	76,999	0.00352	0.99648	86.96
31.5	20,281,702	85,301	0.00421	0.99579	86.65
32.5	18,628,406	71,290	0.00383	0.99617	86.29
33.5	17,213,082	69,151	0.00402	0.99598	85.96
34.5	15,986,466	88,783	0.00555	0.99445	85.61
35.5	14,863,510	85,597	0.00576	0.99424	85.13
36.5	14,077,621	88,723	0.00630	0.99370	84.64
37.5	13,406,369	72,578	0.00541	0.99459	84.11
38.5	12,669,811	97,504	0.00770	0.99230	83.65
39.5	11,900,990	107,426	0.00903	0.99097	83.01

Missouri American Water

Account 33500 - Transmission and Distribution - Hydrants

RETIREMENT RATE ANALYSIS

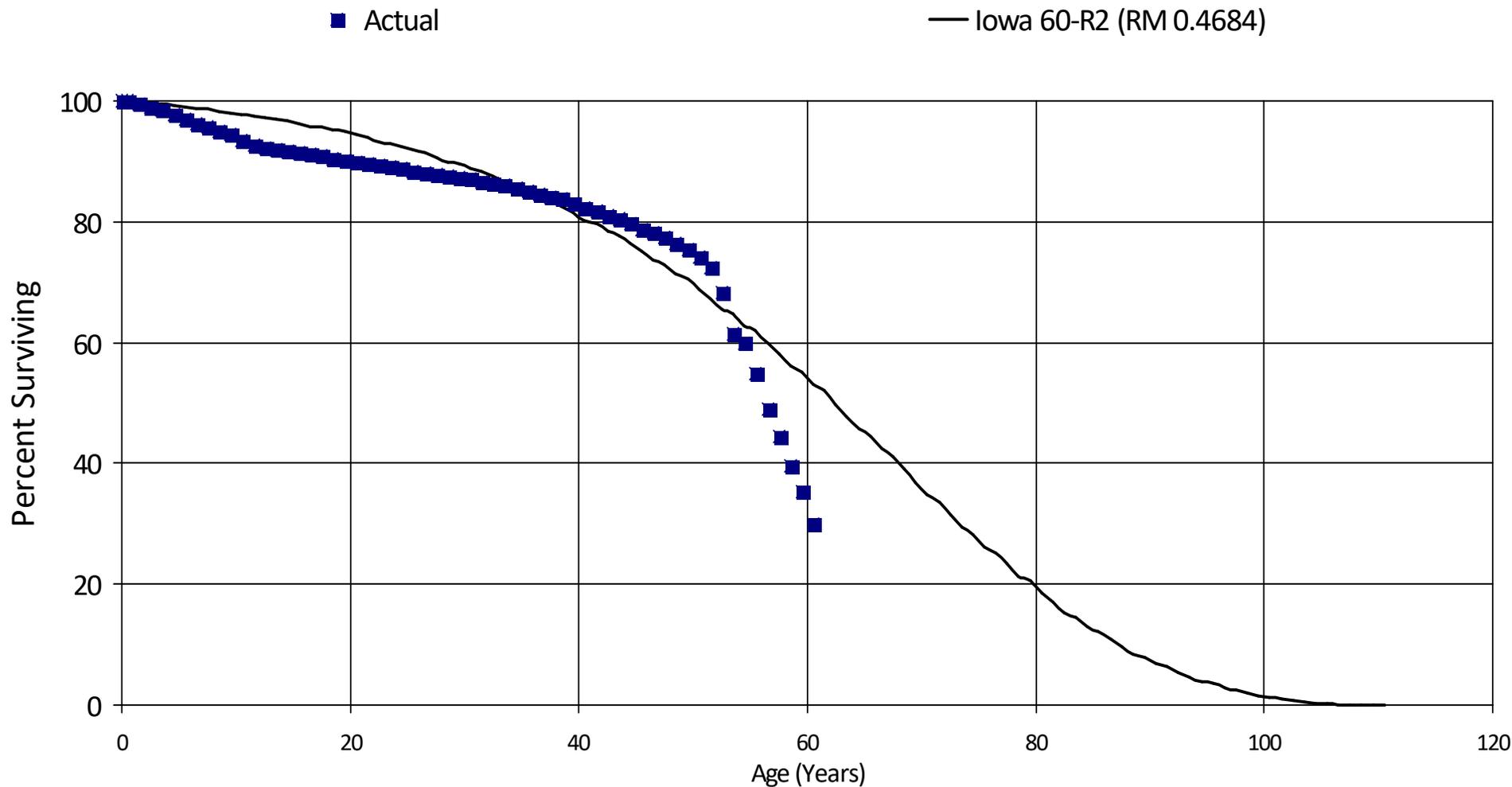
Age at Begin of Interval	Exposures at Beginning of Age Interval	Retirements During Age Interval	Retmt Ratio	Survivor Ratio	% Surviving
40.5	10,946,444	88,230	0.00806	0.99194	82.26
41.5	10,071,172	72,712	0.00722	0.99278	81.60
42.5	9,285,830	69,373	0.00747	0.99253	81.01
43.5	8,593,401	70,366	0.00819	0.99181	80.40
44.5	7,959,434	95,630	0.01201	0.98799	79.74
45.5	7,314,770	58,304	0.00797	0.99203	78.78
46.5	6,755,274	67,924	0.01005	0.98995	78.15
47.5	6,318,156	69,249	0.01096	0.98904	77.36
48.5	5,914,282	80,266	0.01357	0.98643	76.51
49.5	5,612,265	93,789	0.01671	0.98329	75.47
50.5	5,204,586	134,829	0.02591	0.97409	74.21
51.5	4,833,533	272,660	0.05641	0.94359	72.29
52.5	4,524,178	454,976	0.10057	0.89943	68.21
53.5	3,992,535	88,848	0.02225	0.97775	61.35
54.5	3,841,707	333,170	0.08672	0.91328	59.98
55.5	3,444,119	361,988	0.10510	0.89490	54.78
56.5	3,009,043	280,757	0.09330	0.90670	49.02
57.5	2,675,495	298,244	0.11147	0.88853	44.45
58.5	2,320,936	249,280	0.10740	0.89260	39.50
59.5	1,980,625	304,010	0.15349	0.84651	35.26
60.5	1,613,082	287,954	0.17851	0.82149	29.85
Totals:	1,969,020,085	12,832,694			

Missouri American Water

Account 33500 - Transmission and Distribution - Hydrants

Placement Band - 1880 - 2019 Experience Band - 1939 - 2019

Actual and Smooth Survivor Curves



Missouri American Water

Account 33950 - Transmission and Distribution - Other

RETIREMENT RATE ANALYSIS

Age at Begin of Interval	Exposures at Beginning of Age Interval	Retirements During Age Interval	Retmt Ratio	Survivor Ratio	% Surviving
0	43,913	0	0.00000	1.00000	100.00
0.5	43,913	0	0.00000	1.00000	100.00
1.5	43,913	0	0.00000	1.00000	100.00
2.5	43,913	0	0.00000	1.00000	100.00
3.5	43,913	0	0.00000	1.00000	100.00
4.5	43,913	41	0.00093	0.99907	100.00
5.5	43,872	0	0.00000	1.00000	99.91
6.5	43,872	0	0.00000	1.00000	99.91
7.5	43,872	41	0.00093	0.99907	99.91
8.5	43,831	0	0.00000	1.00000	99.82
9.5	43,806	41	0.00094	0.99906	99.82
10.5	35,423	208	0.00587	0.99413	99.73
11.5	35,149	41	0.00117	0.99883	99.14
12.5	35,040	65	0.00186	0.99814	99.02
13.5	20,423	0	0.00000	1.00000	98.84
14.5	20,423	140	0.00686	0.99314	98.84
15.5	20,283	0	0.00000	1.00000	98.16
16.5	20,283	0	0.00000	1.00000	98.16
17.5	20,283	41	0.00202	0.99798	98.16
18.5	20,242	41	0.00203	0.99797	97.96
19.5	20,201	0	0.00000	1.00000	97.76
20.5	20,201	41	0.00203	0.99797	97.76
21.5	20,160	0	0.00000	1.00000	97.56
22.5	20,160	0	0.00000	1.00000	97.56
23.5	20,160	0	0.00000	1.00000	97.56
24.5	20,160	776	0.03849	0.96151	97.56
25.5	19,384	0	0.00000	1.00000	93.80
26.5	19,384	0	0.00000	1.00000	93.80
27.5	19,384	0	0.00000	1.00000	93.80
28.5	19,384	387	0.01997	0.98003	93.80
29.5	18,997	387	0.02037	0.97963	91.93
30.5	18,610	0	0.00000	1.00000	90.06
31.5	18,610	0	0.00000	1.00000	90.06
32.5	18,610	0	0.00000	1.00000	90.06
33.5	18,609	0	0.00000	1.00000	90.06
34.5	18,609	0	0.00000	1.00000	90.06
35.5	18,609	0	0.00000	1.00000	90.06
36.5	17,919	47	0.00262	0.99738	90.06
37.5	17,872	66	0.00369	0.99631	89.82
38.5	17,806	3,898	0.21892	0.78108	89.49
39.5	13,908	0	0.00000	1.00000	69.90

Missouri American Water

Account 33950 - Transmission and Distribution - Other

RETIREMENT RATE ANALYSIS

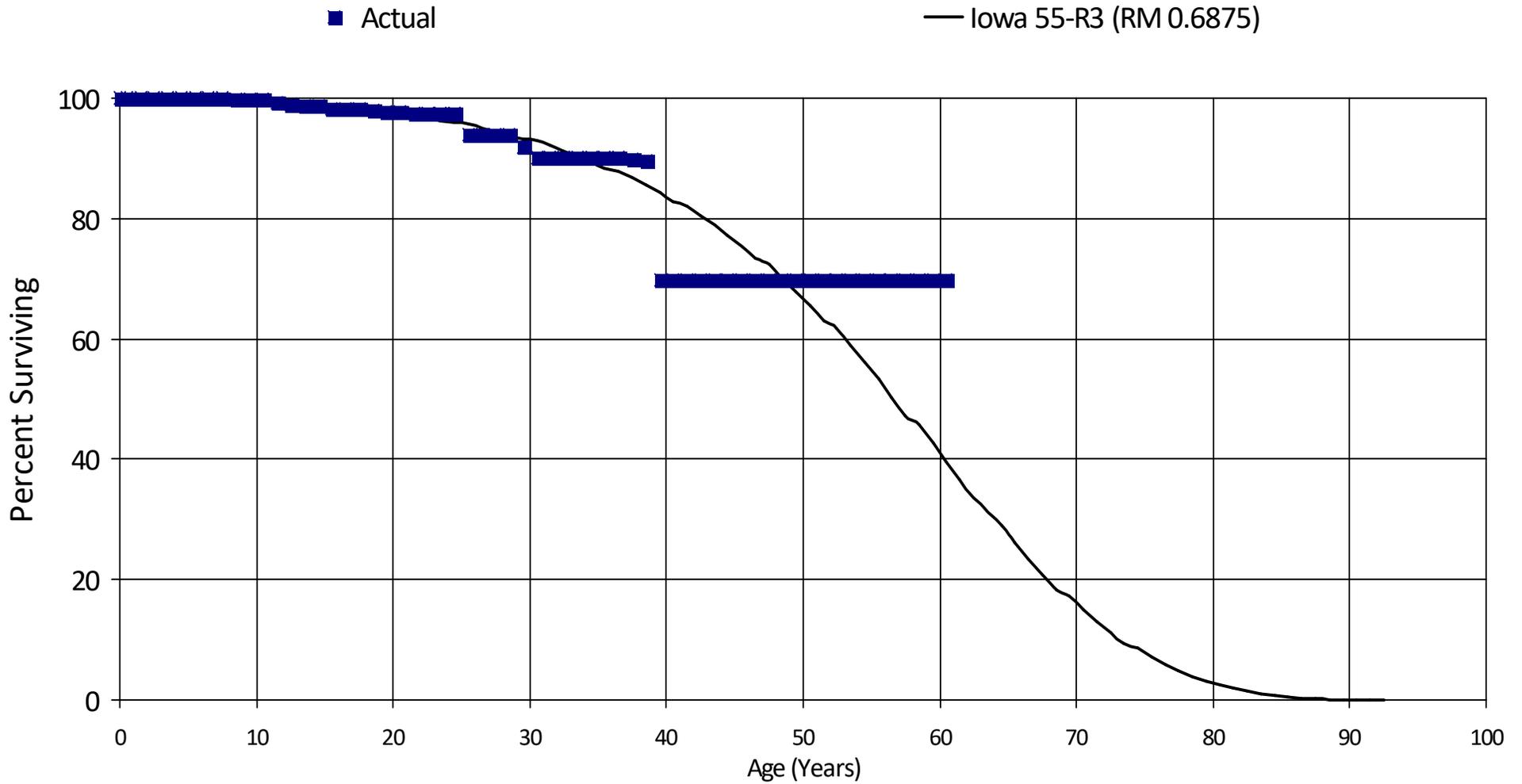
Age at Begin of Interval	Exposures at Beginning of Age Interval	Retirements During Age Interval	Retmt Ratio	Survivor Ratio	% Surviving
40.5	13,908	0	0.00000	1.00000	69.90
41.5	13,908	0	0.00000	1.00000	69.90
42.5	13,801	0	0.00000	1.00000	69.90
43.5	13,801	0	0.00000	1.00000	69.90
44.5	13,801	0	0.00000	1.00000	69.90
45.5	13,801	0	0.00000	1.00000	69.90
46.5	13,801	0	0.00000	1.00000	69.90
47.5	13,801	0	0.00000	1.00000	69.90
48.5	13,203	0	0.00000	1.00000	69.90
49.5	10,565	0	0.00000	1.00000	69.90
50.5	8,832	0	0.00000	1.00000	69.90
51.5	7,325	0	0.00000	1.00000	69.90
52.5	5,741	0	0.00000	1.00000	69.90
53.5	4,934	0	0.00000	1.00000	69.90
54.5	4,934	0	0.00000	1.00000	69.90
55.5	3,611	0	0.00000	1.00000	69.90
56.5	3,433	0	0.00000	1.00000	69.90
57.5	2,509	0	0.00000	1.00000	69.90
58.5	1,608	0	0.00000	1.00000	69.90
59.5	1,336	0	0.00000	1.00000	69.90
60.5	994	0	0.00000	1.00000	69.90
Totals:	1,286,663	6,261			

Missouri American Water

Account 33950 - Transmission and Distribution - Other

Placement Band - 1956 - 2019 Experience Band - 1956 - 2019

Actual and Smooth Survivor Curves



Account 34110 - General Plant - Transportation Equipment - Light Trucks

RETIREMENT RATE ANALYSIS

Age at Begin of Interval	Exposures at Beginning of Age Interval	Retirements During Age Interval	Retmt Ratio	Survivor Ratio	% Surviving
0	20,170,987	312	0.00002	0.99998	100.00
0.5	16,192,084	23,071	0.00142	0.99858	100.00
1.5	15,492,535	72,771	0.00470	0.99530	99.86
2.5	5,659,314	222,351	0.03929	0.96071	99.39
3.5	5,436,962	167,440	0.03080	0.96920	95.48
4.5	3,543,344	279,840	0.07898	0.92102	92.54
5.5	3,221,723	189,559	0.05884	0.94116	85.23
6.5	3,032,164	270,870	0.08933	0.91067	80.22
7.5	2,014,063	305,014	0.15144	0.84856	73.05
8.5	1,578,875	188,119	0.11915	0.88085	61.99
9.5	1,051,074	130,203	0.12388	0.87612	54.60
10.5	920,872	86,213	0.09362	0.90638	47.84
11.5	661,271	175,167	0.26489	0.73511	43.36
12.5	486,104	97,280	0.20012	0.79988	31.87
13.5	370,816	105,237	0.28380	0.71620	25.49
14.5	265,578	37,860	0.14256	0.85744	18.26
15.5	227,718	20,667	0.09076	0.90924	15.66
16.5	207,052	58,750	0.28375	0.71625	14.24
17.5	147,590	29,484	0.19977	0.80023	10.20
18.5	118,106	66,677	0.56455	0.43545	8.16
19.5	51,329	0	0.00000	1.00000	3.55
20.5	51,329	0	0.00000	1.00000	3.55
21.5	51,329	429	0.00836	0.99164	3.55
22.5	50,900	4,644	0.09124	0.90876	3.52
23.5	46,256	0	0.00000	1.00000	3.20
24.5	42,808	189	0.00442	0.99558	3.20
25.5	42,619	12,302	0.28865	0.71135	3.19
26.5	23,447	1,950	0.08317	0.91683	2.27
27.5	21,497	0	0.00000	1.00000	2.08
28.5	21,021	2,221	0.10565	0.89435	2.08
29.5	18,800	0	0.00000	1.00000	1.86
30.5	18,800	5,885	0.31303	0.68697	1.86
31.5	3,256	0	0.00000	1.00000	1.28
32.5	3,256	1	0.00031	0.99969	1.28
33.5	3,255	0	0.00000	1.00000	1.28
34.5	3,255	0	0.00000	1.00000	1.28
35.5	3,255	0	0.00000	1.00000	1.28
36.5	3,255	588	0.18066	0.81934	1.28
37.5	2,667	0	0.00000	1.00000	1.05
38.5	2,582	0	0.00000	1.00000	1.05
39.5	2,582	0	0.00000	1.00000	1.05

Missouri American Water

Account 34110 - General Plant - Transportation Equipment - Light Trucks

RETIREMENT RATE ANALYSIS

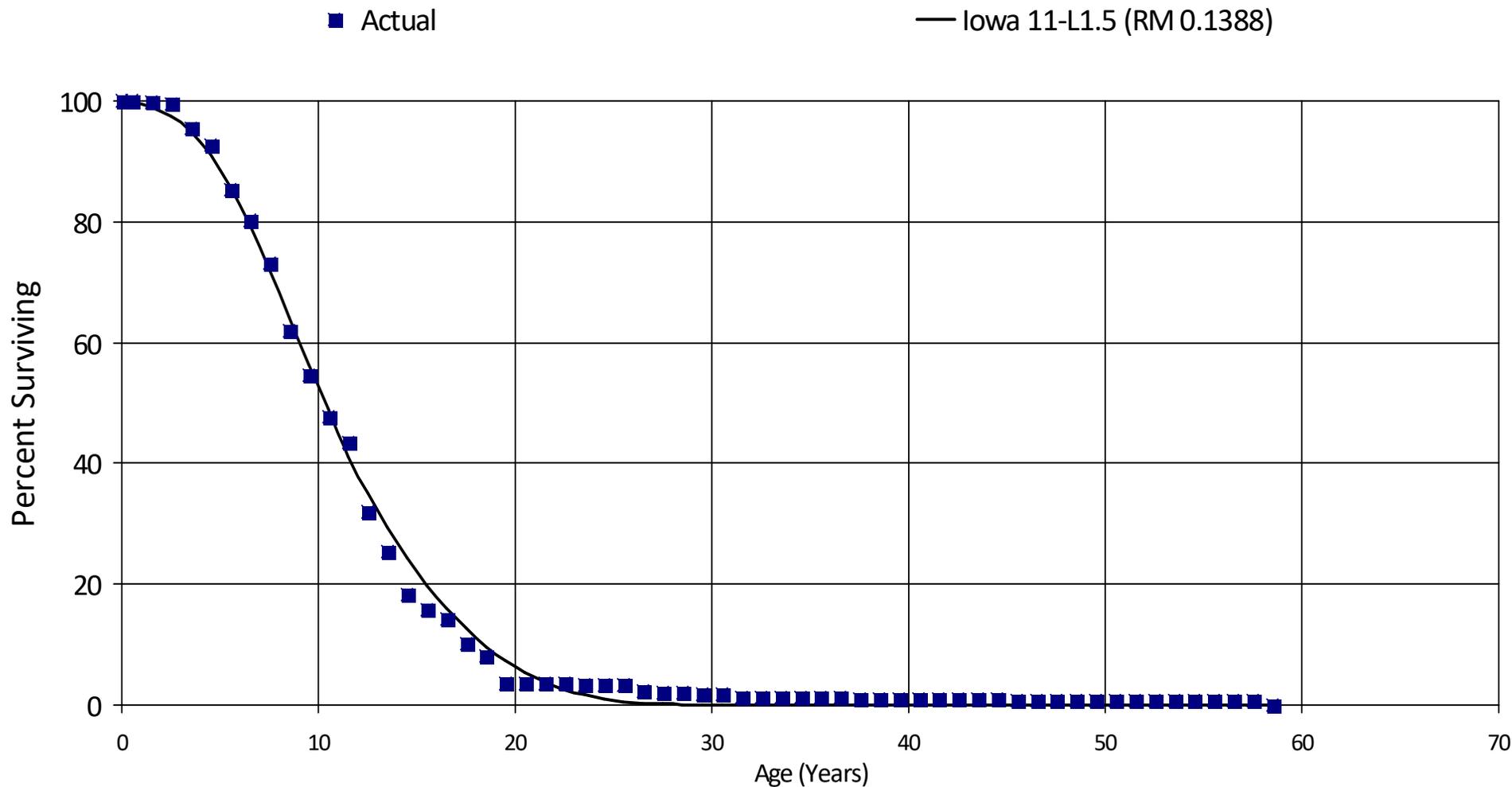
Age at Begin of Interval	Exposures at Beginning of Age Interval	Retirements During Age Interval	Retmt Ratio	Survivor Ratio	% Surviving
40.5	2,582	0	0.00000	1.00000	1.05
41.5	2,582	0	0.00000	1.00000	1.05
42.5	2,582	0	0.00000	1.00000	1.05
43.5	2,582	0	0.00000	1.00000	1.05
44.5	2,582	475	0.18394	0.81606	1.05
45.5	2,107	0	0.00000	1.00000	0.86
46.5	2,107	0	0.00000	1.00000	0.86
47.5	2,107	0	0.00000	1.00000	0.86
48.5	2,107	0	0.00000	1.00000	0.86
49.5	2,107	0	0.00000	1.00000	0.86
50.5	2,107	0	0.00000	1.00000	0.86
51.5	2,107	0	0.00000	1.00000	0.86
52.5	2,107	0	0.00000	1.00000	0.86
53.5	2,107	0	0.00000	1.00000	0.86
54.5	1,414	0	0.00000	1.00000	0.86
55.5	1,414	0	0.00000	1.00000	0.86
56.5	1,414	159	0.11243	0.88757	0.86
57.5	1,255	1,154	0.91971	0.08029	0.76
58.5	101	101	1.00000		0.06
Totals:	81,303,206	2,556,983			

Missouri American Water

Account 34110 - General Plant - Transportation Equipment - Light Trucks

Placement Band - 1955 - 2019 Experience Band - 1955 - 2019

Actual and Smooth Survivor Curves



Missouri American Water

Account 34120 - General Plant - Transportation Equipment - Heavy Trucks

RETIREMENT RATE ANALYSIS

Age at Begin of Interval	Exposures at Beginning of Age Interval	Retirements During Age Interval	Retmt Ratio	Survivor Ratio	% Surviving
0	27,579,693	7,999	0.00029	0.99971	100.00
0.5	22,262,252	4,527	0.00020	0.99980	99.97
1.5	21,109,057	25,976	0.00123	0.99877	99.95
2.5	19,398,803	471,780	0.02432	0.97568	99.83
3.5	18,927,023	1,909,063	0.10086	0.89914	97.40
4.5	14,841,744	1,922,321	0.12952	0.87048	87.58
5.5	11,829,996	1,104,985	0.09341	0.90659	76.24
6.5	10,725,011	1,076,862	0.10041	0.89959	69.12
7.5	8,820,176	975,969	0.11065	0.88935	62.18
8.5	7,529,191	620,946	0.08247	0.91753	55.30
9.5	5,927,501	1,331,301	0.22460	0.77540	50.74
10.5	4,583,469	559,370	0.12204	0.87796	39.34
11.5	3,320,379	241,173	0.07263	0.92737	34.54
12.5	3,079,207	349,342	0.11345	0.88655	32.03
13.5	2,700,741	292,102	0.10816	0.89184	28.40
14.5	2,408,639	292,532	0.12145	0.87855	25.33
15.5	2,116,107	587,354	0.27756	0.72244	22.25
16.5	1,528,753	161,600	0.10571	0.89429	16.07
17.5	1,367,152	76,671	0.05608	0.94392	14.37
18.5	1,290,365	596,561	0.46232	0.53768	13.56
19.5	639,028	202,743	0.31727	0.68273	7.29
20.5	436,284	51,987	0.11916	0.88084	4.98
21.5	384,297	67,685	0.17613	0.82387	4.39
22.5	313,002	101,039	0.32281	0.67719	3.62
23.5	209,208	80,204	0.38337	0.61663	2.45
24.5	129,005	778	0.00603	0.99397	1.51
25.5	128,226	4,476	0.03491	0.96509	1.50
26.5	123,750	209	0.00169	0.99831	1.45
27.5	123,541	1,669	0.01351	0.98649	1.45
28.5	121,873	0	0.00000	1.00000	1.43
29.5	121,873	0	0.00000	1.00000	1.43
30.5	120,942	0	0.00000	1.00000	1.43
31.5	113,495	0	0.00000	1.00000	1.43
32.5	103,640	0	0.00000	1.00000	1.43
33.5	57,397	0	0.00000	1.00000	1.43
34.5	34,397	0	0.00000	1.00000	1.43
35.5	15,015	0	0.00000	1.00000	1.43
36.5	15,015	476	0.03170	0.96830	1.43
37.5	14,538	0	0.00000	1.00000	1.38
38.5	14,538	0	0.00000	1.00000	1.38
39.5	14,538	0	0.00000	1.00000	1.38

Account 34120 - General Plant - Transportation Equipment - Heavy Trucks

RETIREMENT RATE ANALYSIS

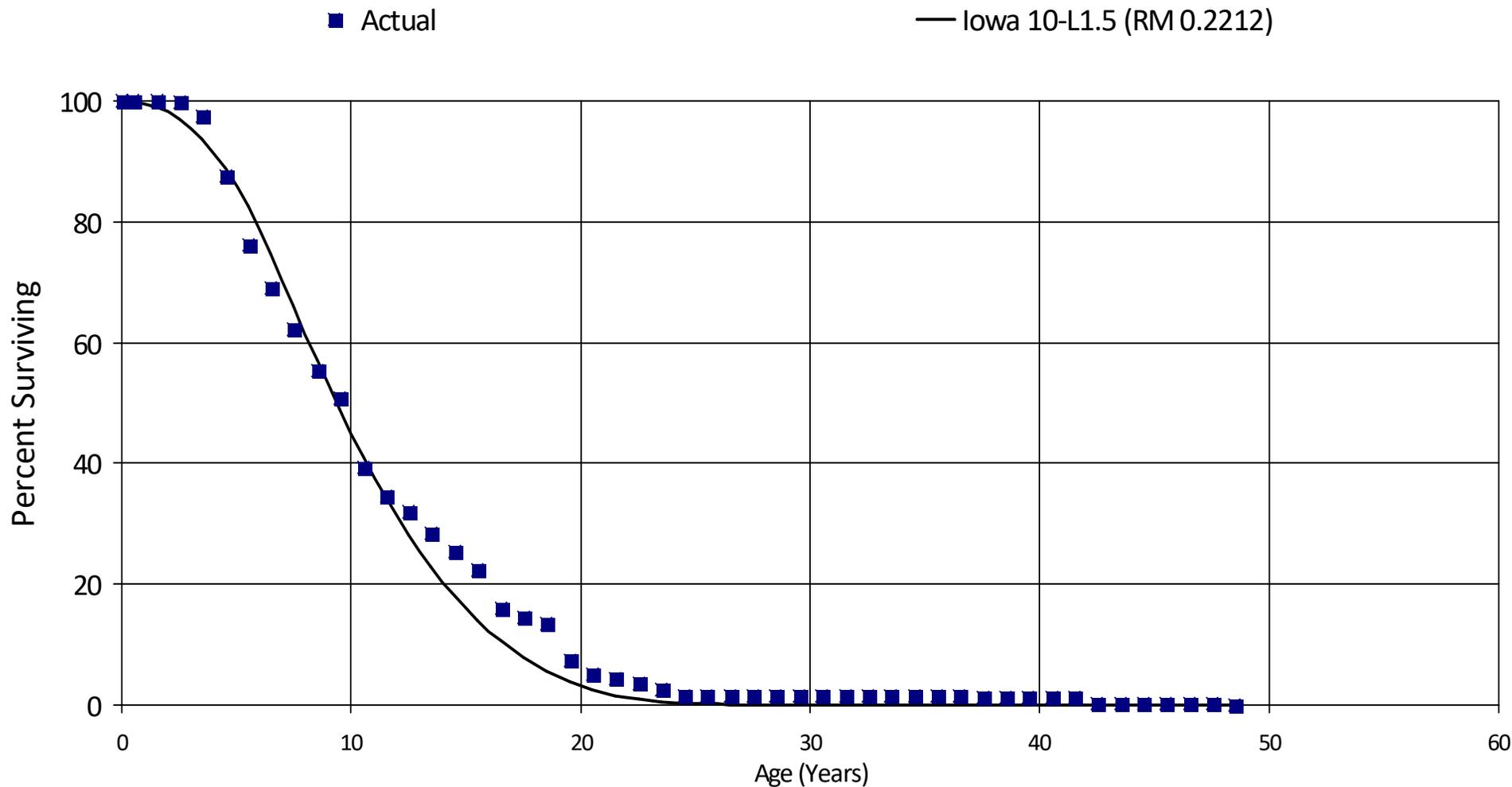
Age at Begin of Interval	Exposures at Beginning of Age Interval	Retirements During Age Interval	Retmt Ratio	Survivor Ratio	% Surviving
40.5	14,538	0	0.00000	1.00000	1.38
41.5	14,538	11,327	0.77912	0.22088	1.38
42.5	3,211	0	0.00000	1.00000	0.30
43.5	3,211	0	0.00000	1.00000	0.30
44.5	3,211	0	0.00000	1.00000	0.30
45.5	3,211	0	0.00000	1.00000	0.30
46.5	3,211	0	0.00000	1.00000	0.30
47.5	3,211	3,211	1.00001	-0.00001	0.30
48.5	0	0	0.00000	0.00000	0.00
Totals:	194,627,203	13,134,238			

Missouri American Water

Account 34120 - General Plant - Transportation Equipment - Heavy Trucks

Placement Band - 1936 - 2019 Experience Band - 1956 - 2019

Actual and Smooth Survivor Curves



Missouri American Water

Account 34130 - General Plant - Transportation Equipment - Autos

RETIREMENT RATE ANALYSIS

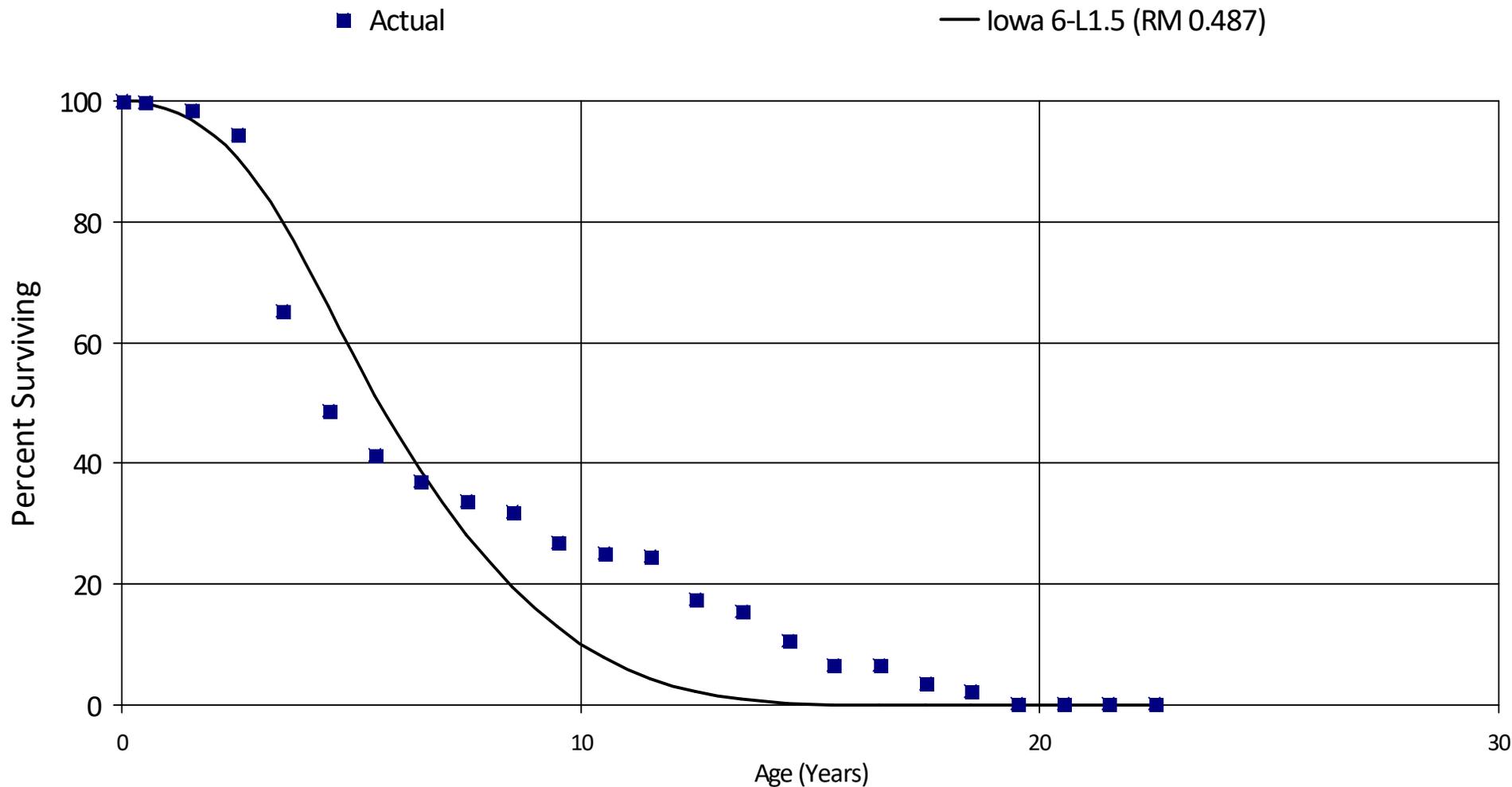
Age at Begin of Interval	Exposures at Beginning of Age Interval	Retirements During Age Interval	Retmt Ratio	Survivor Ratio	% Surviving
0	5,049,030	11,612	0.00230	0.99770	100.00
0.5	5,037,418	69,825	0.01386	0.98614	99.77
1.5	4,967,593	206,707	0.04161	0.95839	98.39
2.5	4,760,886	1,463,270	0.30735	0.69265	94.30
3.5	3,297,616	831,883	0.25227	0.74773	65.32
4.5	2,465,733	371,735	0.15076	0.84924	48.84
5.5	2,071,709	220,811	0.10658	0.89342	41.48
6.5	1,848,700	168,597	0.09120	0.90880	37.06
7.5	1,602,783	75,607	0.04717	0.95283	33.68
8.5	1,437,722	233,839	0.16265	0.83735	32.09
9.5	1,115,203	68,953	0.06183	0.93817	26.87
10.5	1,046,250	27,342	0.02613	0.97387	25.21
11.5	342,928	97,869	0.28539	0.71461	24.55
12.5	202,876	24,611	0.12131	0.87869	17.54
13.5	137,725	43,523	0.31601	0.68399	15.41
14.5	94,202	36,168	0.38394	0.61606	10.54
15.5	58,034	0	0.00000	1.00000	6.49
16.5	58,034	25,102	0.43254	0.56746	6.49
17.5	32,933	13,150	0.39930	0.60070	3.68
18.5	19,783	17,655	0.89244	0.10756	2.21
19.5	2,128	0	0.00000	1.00000	0.24
20.5	1,143	0	0.00000	1.00000	0.24
21.5	791	0	0.00000	1.00000	0.24
22.5	0	0	0.00000	0.00000	0.24
Totals:	35,651,222	4,008,259			

Missouri American Water

Account 34130 - General Plant - Transportation Equipment - Autos

Placement Band - 1959 - 2019 Experience Band - 1962 - 2019

Actual and Smooth Survivor Curves



Account 34140 - General Plant - Transportation Equipment - Other

RETIREMENT RATE ANALYSIS

Age at Begin of Interval	Exposures at Beginning of Age Interval	Retirements During Age Interval	Retmt Ratio	Survivor Ratio	% Surviving
0	22,054,900	0	0.00000	1.00000	100.00
0.5	19,943,426	993	0.00005	0.99995	100.00
1.5	19,942,433	0	0.00000	1.00000	100.00
2.5	7,172,890	0	0.00000	1.00000	100.00
3.5	7,172,890	37,085	0.00517	0.99483	100.00
4.5	3,421,800	190,589	0.05570	0.94430	99.48
5.5	1,408,234	0	0.00000	1.00000	93.94
6.5	1,402,289	7,519	0.00536	0.99464	93.94
7.5	851,076	5,010	0.00589	0.99411	93.44
8.5	740,820	381	0.00051	0.99949	92.89
9.5	430,960	675	0.00157	0.99843	92.84
10.5	419,632	0	0.00000	1.00000	92.69
11.5	169,637	0	0.00000	1.00000	92.69
12.5	116,033	51,325	0.44233	0.55767	92.69
13.5	64,708	2,067	0.03194	0.96806	51.69
14.5	62,640	535	0.00854	0.99146	50.04
15.5	62,105	0	0.00000	1.00000	49.61
16.5	11,467	0	0.00000	1.00000	49.61
17.5	11,467	860	0.07499	0.92501	49.61
18.5	10,608	0	0.00000	1.00000	45.89
19.5	10,608	0	0.00000	1.00000	45.89
20.5	10,608	9,812	0.92498	0.07502	45.89
21.5	796	0	0.00000	1.00000	3.44
22.5	796	0	0.00000	1.00000	3.44
23.5	796	0	0.00000	1.00000	3.44
24.5	796	0	0.00000	1.00000	3.44
25.5	796	0	0.00000	1.00000	3.44
26.5	796	0	0.00000	1.00000	3.44
27.5	796	0	0.00000	1.00000	3.44
28.5	796	0	0.00000	1.00000	3.44
29.5	796	0	0.00000	1.00000	3.44
30.5	796	0	0.00000	1.00000	3.44
31.5	796	0	0.00000	1.00000	3.44
32.5	796	0	0.00000	1.00000	3.44
33.5	796	0	0.00000	1.00000	3.44
34.5	796	0	0.00000	1.00000	3.44
35.5	796	0	0.00000	1.00000	3.44
36.5	796	366	0.46004	0.53996	3.44
37.5	430	0	0.00000	1.00000	1.86
38.5	430	0	0.00000	1.00000	1.86
39.5	430	0	0.00000	1.00000	1.86

Missouri American Water

Account 34140 - General Plant - Transportation Equipment - Other

RETIREMENT RATE ANALYSIS

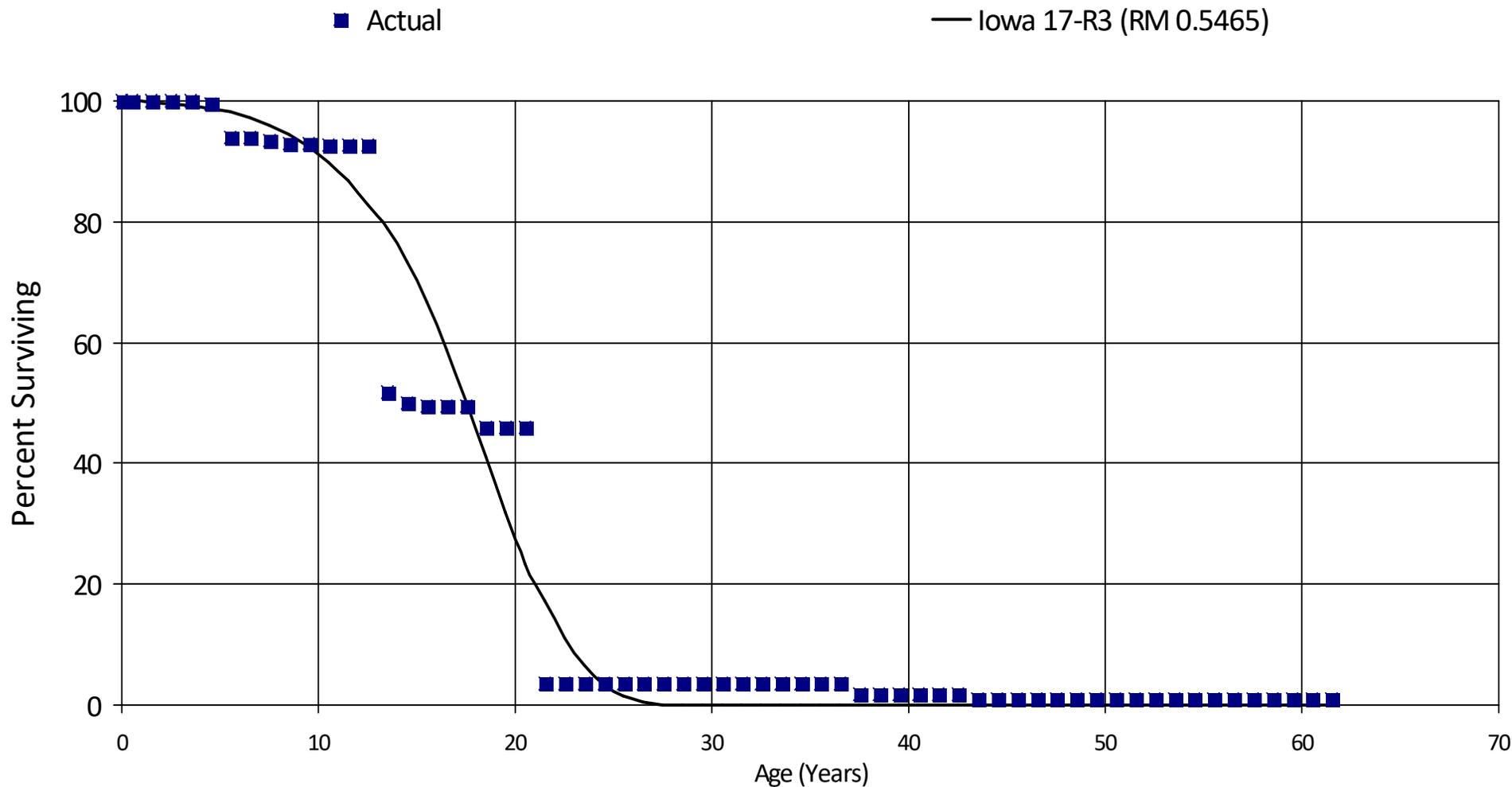
Age at Begin of Interval	Exposures at Beginning of Age Interval	Retirements During Age Interval	Retmt Ratio	Survivor Ratio	% Surviving
40.5	430	0	0.00000	1.00000	1.86
41.5	430	0	0.00000	1.00000	1.86
42.5	430	209	0.48650	0.51350	1.86
43.5	221	0	0.00000	1.00000	0.96
44.5	221	0	0.00000	1.00000	0.96
45.5	221	0	0.00000	1.00000	0.96
46.5	221	0	0.00000	1.00000	0.96
47.5	221	0	0.00000	1.00000	0.96
48.5	221	0	0.00000	1.00000	0.96
49.5	221	0	0.00000	1.00000	0.96
50.5	221	0	0.00000	1.00000	0.96
51.5	221	0	0.00000	1.00000	0.96
52.5	221	0	0.00000	1.00000	0.96
53.5	221	0	0.00000	1.00000	0.96
54.5	221	0	0.00000	1.00000	0.96
55.5	221	0	0.00000	1.00000	0.96
56.5	221	0	0.00000	1.00000	0.96
57.5	221	0	0.00000	1.00000	0.96
58.5	221	0	0.00000	1.00000	0.96
59.5	221	0	0.00000	1.00000	0.96
60.5	221	0	0.00000	1.00000	0.96
61.5	0	0	0.00000	0.00000	0.96
Totals:	85,510,511	307,426			

Missouri American Water

Account 34140 - General Plant - Transportation Equipment - Other

Placement Band - 1957 - 2019 Experience Band - 1957 - 2019

Actual and Smooth Survivor Curves



Missouri American Water

Account 34500 - General Plant - Power Operated Equipment

RETIREMENT RATE ANALYSIS

Age at Begin of Interval	Exposures at Beginning of Age Interval	Retirements During Age Interval	Retmt Ratio	Survivor Ratio	% Surviving
0	4,704,882	860	0.00018	0.99982	100.00
0.5	4,704,022	1,059	0.00023	0.99977	99.98
1.5	4,702,962	205,605	0.04372	0.95628	99.96
2.5	4,497,357	205,592	0.04571	0.95429	95.59
3.5	4,291,765	506,891	0.11811	0.88189	91.22
4.5	3,784,874	929,437	0.24557	0.75443	80.45
5.5	2,855,437	669,955	0.23462	0.76538	60.69
6.5	2,185,482	380,411	0.17406	0.82594	46.45
7.5	1,805,071	47,223	0.02616	0.97384	38.36
8.5	1,757,849	74,750	0.04252	0.95748	37.36
9.5	1,683,099	143,556	0.08529	0.91471	35.77
10.5	1,539,543	177,105	0.11504	0.88496	32.72
11.5	1,362,437	161,104	0.11825	0.88175	28.96
12.5	1,201,334	71,006	0.05911	0.94089	25.54
13.5	1,130,328	165,629	0.14653	0.85347	24.03
14.5	964,699	93,203	0.09661	0.90339	20.51
15.5	871,495	62,804	0.07206	0.92794	18.53
16.5	808,691	107,600	0.13305	0.86695	17.19
17.5	701,091	66,743	0.09520	0.90480	14.90
18.5	634,348	8,944	0.01410	0.98590	13.48
19.5	625,405	144,911	0.23171	0.76829	13.29
20.5	480,494	40,395	0.08407	0.91593	10.21
21.5	440,099	34,393	0.07815	0.92185	9.35
22.5	405,706	64,764	0.15963	0.84037	8.62
23.5	340,942	631	0.00185	0.99815	7.24
24.5	340,311	75,923	0.22310	0.77690	7.23
25.5	264,388	22,282	0.08428	0.91572	5.62
26.5	242,106	24,151	0.09975	0.90025	5.15
27.5	217,955	48,541	0.22271	0.77729	4.64
28.5	169,414	16,764	0.09895	0.90105	3.61
29.5	152,650	86,125	0.56420	0.43580	3.25
30.5	66,525	0	0.00000	1.00000	1.42
31.5	66,525	621	0.00933	0.99067	1.42
32.5	65,904	17,468	0.26505	0.73495	1.41
33.5	48,436	0	0.00000	1.00000	1.04
34.5	48,436	0	0.00000	1.00000	1.04
35.5	48,436	0	0.00000	1.00000	1.04
36.5	48,436	0	0.00000	1.00000	1.04
37.5	48,436	3	0.00006	0.99994	1.04
38.5	48,433	22,056	0.45539	0.54461	1.04
39.5	26,378	14,177	0.53746	0.46254	0.57

Missouri American Water

Account 34500 - General Plant - Power Operated Equipment

RETIREMENT RATE ANALYSIS

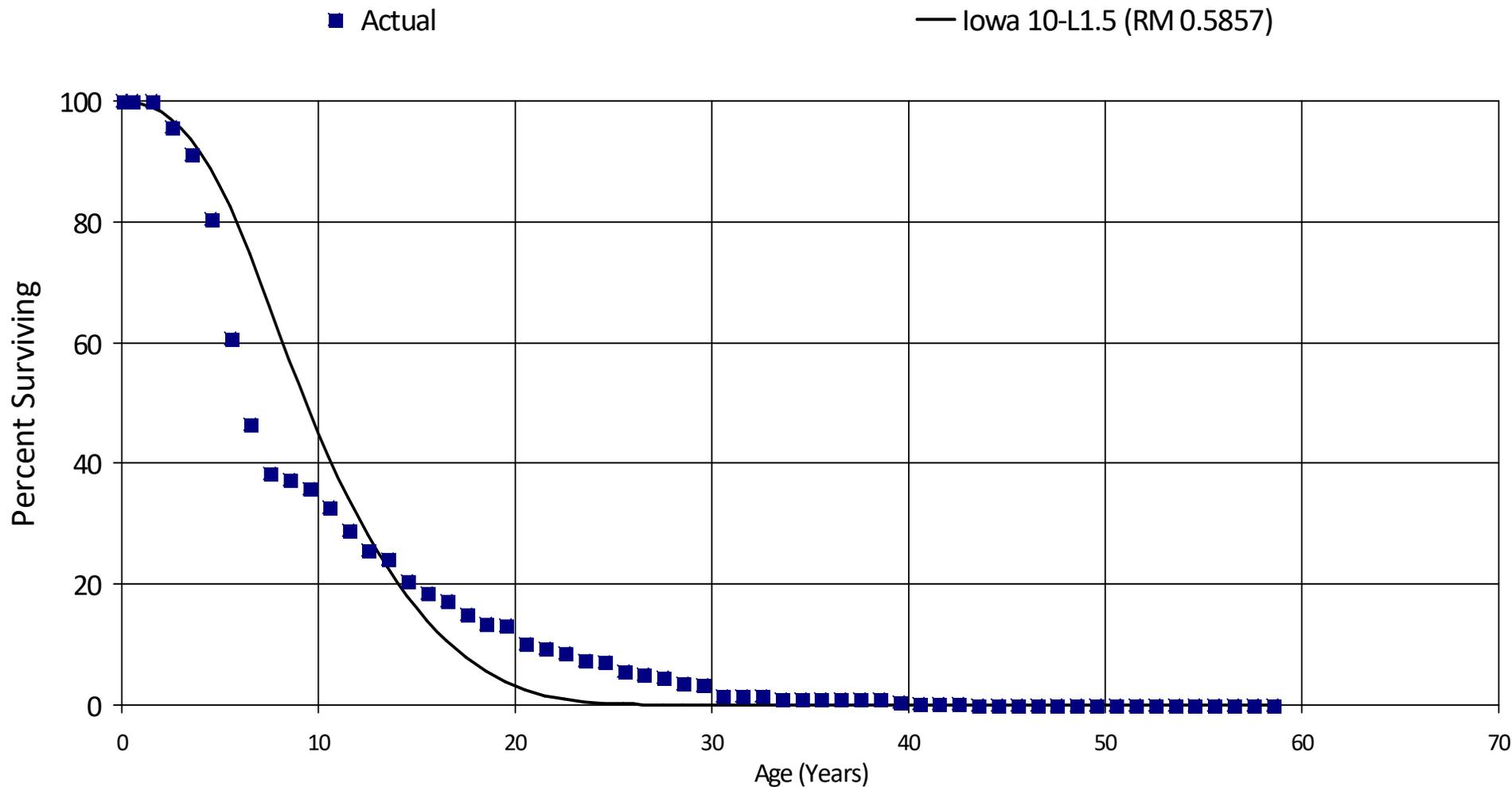
Age at Begin of Interval	Exposures at Beginning of Age Interval	Retirements During Age Interval	Retmt Ratio	Survivor Ratio	% Surviving
40.5	12,201	438	0.03590	0.96410	0.26
41.5	11,763	0	0.00000	1.00000	0.25
42.5	11,763	9,672	0.82222	0.17778	0.25
43.5	2,091	0	0.00000	1.00000	0.04
44.5	2,091	0	0.00000	1.00000	0.04
45.5	2,091	0	0.00000	1.00000	0.04
46.5	2,091	0	0.00000	1.00000	0.04
47.5	2,091	0	0.00000	1.00000	0.04
48.5	2,091	0	0.00000	1.00000	0.04
49.5	2,091	0	0.00000	1.00000	0.04
50.5	2,091	0	0.00000	1.00000	0.04
51.5	2,091	0	0.00000	1.00000	0.04
52.5	2,091	1,443	0.68997	0.31003	0.04
53.5	648	0	0.00000	1.00000	0.01
54.5	648	401	0.61870	0.38130	0.01
55.5	247	0	0.00000	1.00000	0.00
56.5	247	0	0.00000	1.00000	0.00
57.5	247	247	1.00146	-0.00146	0.00
58.5	0	0	0.00000	0.00000	0.00
Totals:	50,440,858	4,704,883			

Missouri American Water

Account 34500 - General Plant - Power Operated Equipment

Placement Band - 1930 - 2019 Experience Band - 1939 - 2019

Actual and Smooth Survivor Curves





SECTION 7

7 NET SALVAGE STUDY

MISSOURI AMERICAN WATER
ACCOUNT 30410 STRUCTURES - SOURCE OF 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
1977	175		0		0								0
1978													0
1979	3,692		0		0			0	0				0
1980	355	(306)	(86)		0	(306)	(86)	(102)	(8)			(77)	(7)
1981						0		(102)	(8)	(61)	(7)	(77)	(7)
1982						0		(102)	(86)	(61)	(8)	(77)	(7)
1983	66	(153)	(232)		0	(153)	(232)	(51)	(232)	(92)	(11)	(92)	(11)
1984	1,886		0		0	0		(51)	(8)	(92)	(20)	(92)	(7)
1985						0		(51)	(8)	(31)	(8)	(92)	(7)
1986						0		0	0	(31)	(8)	(92)	(7)
1987						0		0	0	(31)	(8)	(92)	(7)
1988	632	(2,095)	(331)		0	(2,095)	(331)	(698)	(331)	(419)	(83)	(426)	(38)
1989						0		(698)	(331)	(419)	(331)	(426)	(38)
1990	21,921	(5,763)	(26)		0	(5,763)	(26)	(2,619)	(35)	(1,572)	(35)	(1,188)	(29)
1991						0		(1,921)	(26)	(1,572)	(35)	(1,188)	(29)
1992	758	(1,500)	(198)		0	(1,500)	(198)	(2,421)	(32)	(1,872)	(40)	(1,227)	(33)
1993	150,450	(55,992)	(37)		0	(55,992)	(37)	(19,164)	(38)	(12,651)	(37)	(7,312)	(37)
1994	8,240	(5,309)	(64)	6,346	77	1,037	13	(18,818)	(35)	(12,444)	(34)	(6,477)	(34)
1995				831		831		(18,041)	(34)	(11,125)	(35)	(5,813)	(34)
1996								623	23	(11,125)	(35)	(5,328)	(34)
1997								277	0	(10,825)	(34)	(4,919)	(34)
1998								0	0	374	23	(4,567)	(34)
1999								0	0	166	0	(4,263)	(34)
2000								0	0	0	0	(3,996)	(34)
2001								0	0	0	0	(3,761)	(34)
2002								0	0	0	0	(3,552)	(34)
2003								0	0	0	0	(3,365)	(34)
2004								0	0	0	0	(3,197)	(34)
2005								0	0	0	0	(3,045)	(34)
2006								0	0	0	0	(2,906)	(34)
2007	230		0		0			0	0	0	0	(2,780)	(34)
2008	6,259		0		0			0	0	0	0	(2,664)	(33)
2009	1,961	(4,600)	(235)		0	(4,600)	(235)	(1,533)	(54)	(920)	(54)	(2,742)	(35)
2010	28,744		0	55	0	55		(1,515)	(12)	(909)	(12)	(2,634)	(30)

MISSOURI AMERICAN WATER

**ACCOUNT 30410 STRUCTURES - SOURCE OF 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
2011	2,268	(233)	(10)		0	(233)	(10)	(1,593)	(14)	(956)	(12)	(2,545)	(30)
2012	2,478	(142)	(6)		0	(142)	(6)	(107)	(1)	(984)	(12)	(2,459)	(30)
2013	6,240	(29,360)	(471)	2,732	44	(26,628)	(427)	(9,001)	(246)	(6,310)	(76)	(3,293)	(40)
2014	213,628	(19,601)	(9)	208	0	(19,393)	(9)	(15,388)	(21)	(9,268)	(18)	(3,829)	(26)
2015	88,949	(25,178)	(28)		0	(25,178)	(28)	(23,733)	(23)	(14,315)	(23)	(4,518)	(26)
2016	222,432	(114,528)	(51)	263	0	(114,265)	(51)	(52,945)	(30)	(37,121)	(35)	(7,948)	(33)
2017	117,307	(75,942)	(65)	432	0	(75,510)	(64)	(71,651)	(50)	(52,195)	(40)	(9,995)	(38)
2018	93,105	(50,735)	(54)		0	(50,735)	(54)	(80,170)	(56)	(57,016)	(39)	(11,193)	(39)
2019	35,138	(224,111)	(638)		0	(224,111)	(638)	(116,785)	(143)	(97,960)	(88)	(17,277)	(60)

TOTAL 1,006,913 (615,548) (61.13) 10,867 1.08 -604,681 (60.05)

Previously Approved -25
Recommended -30

MISSOURI AMERICAN WATER

**ACCOUNT 30420 and 30430 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
1974	10,603	(573)	(5)	119	1	(454)	-4					-454	-4
1975	937	0	0		0	0	0					-454	-4
1976	8,173	(165)	(2)		0	(165)	-2	-206	-3			-310	-3
1977	6,502	(611)	(9)	1,873	29	1,262	19	366	7			214	2
1978	10,875	(880)	(8)	200	2	(680)	-6	139	2	-7	0	-9	0
1979	17,953	(936)	(5)	466	3	(470)	-3	37	0	-11	0	-101	-1
1980	19,892	(8,984)	(45)		0	(8,984)	-45	-3,378	-21	-1,807	-14	-1,582	-13
1981	2,298	(19)	(1)		0	(19)	-1	-3,158	-24	-1,778	-15	-1,359	-12
1982	2,995	(619)	(21)		0	(619)	-21	-3,207	-38	-2,154	-20	-1,266	-13
1983	6,215	(1,058)	(17)		0	(1,058)	-17	-565	-15	-2,230	-23	-1,243	-13
1984	21,490	(7,558)	(35)	161	1	(7,397)	-34	-3,025	-30	-3,615	-34	-1,858	-17
1985	10,377	(1,100)	(11)	23	0	(1,077)	-10	-3,177	-25	-2,034	-23	-1,787	-17
1986	8,050	(2,690)	(33)	301	4	(2,389)	-30	-3,621	-27	-2,508	-26	-1,838	-17
1987	11,424	(10,987)	(96)	631	6	(10,356)	-91	-4,607	-46	-4,455	-39	-2,493	-24
1988	27,391	(3,560)	(13)		0	(3,560)	-13	-5,435	-35	-4,956	-31	-2,569	-22
1989	22,365	(16,291)	(73)		0	(16,291)	-73	-10,069	-49	-6,735	-42	-3,484	-28
1990	50,404	(24,712)	(49)		0	(24,712)	-49	-14,854	-44	-11,462	-48	-4,811	-32
1991	75,895	(12,606)	(17)		0	(12,606)	-17	-17,870	-36	-13,505	-36	-5,269	-29
1992	35,893	(41,022)	(114)		0	(41,022)	-114	-26,113	-48	-19,638	-46	-7,255	-37
1993	335,044	(144,971)	(43)		0	(144,971)	-43	-66,200	-44	-47,920	-46	-14,504	-40
1994	199,102	(25,494)	(13)		0	(25,494)	-13	-70,496	-37	-49,761	-36	-15,053	-34
1995	42,058	(25,961)	(62)	210	0	(25,751)	-61	-65,405	-34	-49,969	-36	-15,563	-35
1996	56,923	(51,328)	(90)		0	(51,328)	-90	-34,191	-34	-57,713	-43	-17,188	-38
1997	81,045	(120,571)	(149)		0	(120,571)	-149	-65,883	-110	-73,623	-52	-21,683	-47
1998	25,529	(50,464)	(198)		0	(50,464)	-198	-74,121	-136	-54,722	-68	-22,882	-50
1999	9,319	(6,532)	(70)		0	(6,532)	-70	-59,189	-153	-50,929	-119	-22,228	-51
2000	839,686	(152,189)	(18)		0	(152,189)	-18	-69,728	-24	-76,217	-38	-27,227	-37
2001	112,723	(32,000)	(28)		0	(32,000)	-28	-63,574	-20	-72,351	-34	-27,404	-36
2002	4,753	(1,247)	(26)		0	(1,247)	-26	-61,812	-19	-48,486	-24	-26,469	-36
2003	7,134	0	0	360	5	360	5	-10,962	-26	-38,322	-20	-25,544	-36
2004	73,589	0	0		0	0	0	-296	-1	-37,015	-18	-25,544	-35
2005	1,726	0	0		0	0	0	120	0	-6,577	-16	-25,544	-35
2006	11,177	0	0		0	0	0	0	0	-177	-1	-25,544	-34
2007	9,717	0	0		0	0	0	0	0	72	0	-25,544	-34

MISSOURI AMERICAN WATER

ACCOUNT 30420 and 30430 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
2008	66,476	(32,375)	(49)		0	(32,375)	-49	-10,792	-37	-6,475	-20	-25,772	-35
2009	19,435	(3,469)	(18)		0	(3,469)	-18	-11,948	-37	-7,169	-33	-25,053	-35
2010	93,616	(17,596)	(19)	47	0	(17,549)	-19	-17,798	-30	-10,679	-27	-24,818	-34
2011	69,444	(10,073)	(15)		0	(10,073)	-15	-10,364	-17	-12,693	-25	-24,371	-33
2012	155,869	(98,787)	(63)	387	0	(98,400)	-63	-42,007	-40	-32,373	-40	-26,549	-35
2013	176,453	(25,236)	(14)	1,249	1	(23,987)	-14	-44,153	-33	-30,696	-30	-26,475	-34
2014	2,267,199	(69,063)	(3)	180,413	8	111,350	5	-3,679	0	-7,732	-1	-22,647	-16
2015	190,328	(75,588)	(40)	1,670	1	(73,918)	-39	4,482	1	-19,006	-3	-24,033	-17
2016	759,521	(413,755)	(54)	538	0	(413,217)	-54	-125,262	-12	-99,634	-14	-34,274	-22
2017	248,679	(192,057)	(77)	4,127	2	(187,930)	-76	-225,022	-56	-117,541	-16	-38,214	-24
2018	339,968	(854,892)	(251)	3,394	1	(851,498)	-250	-484,215	-108	-283,043	-37	-58,546	-36
2019	358,255	(423,634)	(118)	5,976	2	(417,658)	-117	-485,695	-154	-388,844	-103	-67,305	-40
TOTAL	6,904,500	(2,961,653)	(42.89)	202,144	2.93	-2,759,509	(39.97)						

Previously Approved -15
Recommended -20

MISSOURI AMERICAN WATER

ACCOUNT 30440, 30460, 30470, & 30480 STRUCTURES AND IMPROVEMENTS - 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
1974	12,160	(893.00)	(7)	96	1	(797)	-7					-797	-7
1975	1,102	(46.00)	(4)		0	(46)	-4					-422	-6
1976	1,730	(236.00)	(14)		0	(236)	-14	-360	-7			-360	-7
1977	4,500	(548.00)	(12)	1,500	33	952	21	223	9			-32	-1
1978	404,883	(26,100.00)	(6)	262,600	65	236,500	58	79,072	58	47,275	56	47,275	56
1979	250	-	0	188	75	188	75	79,213	58	47,472	58	39,427	56
1980	3,119	(434.00)	(14)	23	1	(411)	-13	78,759	58	47,399	57	33,736	55
1981	23,335	(3,543.00)	(15)		0	(3,543)	-15	-1,255	-14	46,737	54	29,076	52
1982	5,025	(119.00)	(2)	2	0	(117)	-2	-1,357	-13	46,523	53	25,832	51
1983	1,018,298	(55,889.00)	(5)	927,976	91	872,087	86	289,476	83	173,641	83	110,458	75
1984						0	0	290,657	85	173,603	83	110,458	75
1985						0	0	290,696	86	173,685	83	110,458	75
1986						0	0	0	0	174,394	85	110,458	75
1987	2,827	-	0		0	0	0	0	0	174,417	85	110,458	75
1988	21,238	(3,115.00)	(15)		0	(3,115)	-15	-1,038	-13	-623	-13	100,133	74
1989	7,432	(2,000.00)	(27)		0	(2,000)	-27	-1,705	-16	-1,023	-16	91,622	73
1990	32,754	-	0		0	0	0	-1,705	-8	-1,023	-8	91,622	71
1991	19,211	(250.00)	(1)		0	(250)	-1	-750	-4	-1,073	-6	84,555	71
1992	8,319	(5,120.00)	(62)		0	(5,120)	-62	-1,790	-9	-2,097	-12	78,149	70
1993	25,272	-	0		0	0	0	-1,790	-10	-1,474	-8	78,149	69
1994	44,971	(7,608.00)	(17)	500	1	(7,108)	-16	-4,076	-16	-2,496	-10	72,466	66
1995	58,566	(3,250.00)	(6)	500	1	(2,750)	-5	-3,286	-8	-3,046	-10	67,765	64
1996	13,279	(1,000.00)	(8)		0	(1,000)	-8	-3,619	-9	-3,196	-11	63,720	63
1997	1,100	(223.00)	(20)		0	(223)	-20	-1,324	-5	-2,216	-8	60,167	63
1998	14,023	(180.00)	(1)	6	0	(174)	-1	-466	-5	-2,251	-9	56,991	63
1999	6,817	-	0		0	0	0	-132	-2	-829	-4	56,991	63
2000	43,459	(2,853.00)	(7)		0	(2,853)	-7	-1,009	-5	-850	-5	53,999	61
2001	65,159	(12,489.00)	(19)		0	(12,489)	-19	-5,114	-13	-3,148	-12	50,833	58
2002	33,884	(28,648.00)	(85)		0	(28,648)	-85	-14,663	-31	-8,833	-27	47,220	55
2003	127,854	(2,186.00)	(2)		0	(2,186)	-2	-14,441	-19	-9,235	-17	45,072	52
2004	4,000	-	0		0	0	0	-10,278	-19	-9,235	-17	45,072	52
2005						0	0	-729	-2	-8,665	-19	45,072	52
2006	36,122	-	0		0	0	0	0	0	-6,167	-15	45,072	51
2007	33,224	-	0		0	0	0	0	0	-437	-1	45,072	50

MISSOURI AMERICAN WATER

ACCOUNT 30440, 30460, 30470, & 30480 STRUCTURES AND IMPROVEMENTS - 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
2008	9,129	(23,628.00)	(259)		0	(23,628)	-259	-7,876	-30	-4,726	-29	42,210	49
2009	29,901	(5,830.00)	(19)		0	(5,830)	-19	-9,819	-41	-5,892	-27	40,288	48
2010	32,353	(6,715.00)	(21)	109	0	(6,606)	-20	-12,021	-51	-7,213	-26	38,485	47
2011	22,472	(988.00)	(4)		0	(988)	-4	-4,475	-16	-7,410	-29	37,023	46
2012	33,339	(65,032.00)	(195)		0	(65,032)	-195	-24,209	-82	-20,417	-80	33,378	42
2013	92,989	(4,849.00)	(5)		0	(4,849)	-5	-23,623	-48	-16,661	-39	32,060	41
2014	301,575	(54,405.00)	(18)	755	0	(53,650)	-18	-41,177	-29	-26,225	-27	29,203	34
2015	73,424	(136.90)	(0)	0	0	(137)	(0.19)	-19,545	-13	-24,931	-24	28,256	33
2016	944,268	(19,490.58)	(2)	-	0	(19,491)	(2.06)	-24,426	-6	-28,632	-10	26,764	24
2017	15,998	(68,614.79)	(429)	105,632	660	37,017	231.39	5,797	2	-8,222	-3	27,075	25
2018	499,932	(108,552.55)	(22)	293	0	(108,260)	(21.65)	-30,244	-6	-28,904	-8	23,094	19
2019	127,186	(123,048.30)	(97)	-	0	(123,048)	(96.75)	-64,764	-30	-42,784	-13	18,919	16
TOTAL	4,256,480	(638,020)	(14.99)	1,300,180	30.55	662,160	15.56						

Previoulsy Approved -20
Recommended -20

MISSOURI AMERICAN WATER
ACCOUNT 30600 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
1989	2,016	(1,991.00)	(99)		0	(1,991.00)	-99					-1,991	-99
1990	12,888	(5,417.00)	(42)		0	(5,417.00)	-42					-3,704	-50
1991	553		0		0	-	0	-2,469	-48			-3,704	-48
1992						-	0	-1,806	-40			-3,704	-48
1993	3,240		0		0	-	0	0	0	-1,482	-40	-3,704	-40
1994	100		0		0	-	0	0	0	-1,083	-32	-3,704	-39
1995	752		0		0	-	0	0	0	0	0	-3,704	-38
1996	21,193		0		0	-	0	0	0	0	0	-3,704	-18
1997						-	0	0	0	0	0	-3,704	-18
1998	6,326	(933.00)	(15)		0	(933.00)	-15	-311	-3	-187	-3	-2,780	-18
1999						-		-311	-15	-187	-3	-2,780	-18
2000						-		-311	-15	-187	-3	-2,780	-18
2001						-		0	0	-187	-15	-2,780	-18
2002						-		0	0	-187	-15	-2,780	-18
2003						-		0	0	0	0	-2,780	-18
2004						-		0	0	0	0	-2,780	-18
2005						-		0	0	0	0	-2,780	-18
2006						-		0	0	0	0	-2,780	-18
2007						-		0	0	0	0	-2,780	-18
2008	22	(180.00)	(818)		0	(180.00)	-818	-60	-818	-36	-818	-2,130	-18
2009	167	-	0		0	-	0	-60	-95	-36	-95	-2,130	-18
2010						-	0	-60	-95	-36	-95	-2,130	-18
2011						-	0	0	0	-36	-95	-2,130	-18
2012						-	0	0	0	-36	-95	-2,130	-18
2013	34,435	(35,843.00)	(104)	845.00	2	(34,998.00)	-102	-11,666	-102	-7,000	-101	-8,704	-53
2014	69,897	-	0		0	-	0	-11,666	-34	-7,000	-34	-8,704	-29
2015						-		-11,666	-34	-7,000	-34	-8,704	-29
2016						-		0	0	-7,000	-34	-8,704	-29
2017	6,811	(31,706.09)	(466)		0	(31,706.09)	(465.52)	-10,569	-466	-13,341	-60	-12,538	-47
2018								-10,569	-466	-6,341	-41	-10,746	-47
2019								-10,569	-466	-6,341	-466	-9,403	-47
TOTAL	158,400	(76,070)	(48.02)	845	0.53	-75,225	(47.49)						

Previously Approved -20
Recommended -20

MISSOURI AMERICAN WATER
ACCOUNT 30700 WELLS AND SPRINGS
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
1991	1,044	0	0		0	0	0						0
1992	103	(200)	(194)		0	(200)	(194)					-200	-17
1993						0		-67	-17			-200	-17
1994						0		-67	-194			-200	-17
1995						0		0	0	-40	-17	-200	-17
1996						0		0	0	-40	-194	-200	-17
1997						0		0	0	0	0	-200	-17
1998						0		0	0	0	0	-200	-17
1999						0		0	0	0	0	-200	-17
2000						0		0	0	0	0	-200	-17
2001	20,939	0	0		0	0	0	0	0	0	0	-200	-1
2002	42,031	(1,085)	(3)		0	(1,085)	(3)	-362	-2	-217	-2	-643	-2
2003	25,000		0		0	0	0	-362	-1	-217	-1	-643	-1
2004	1,545		0		0	0	0	-362	-2	-217	-1	-643	-1
2005						0		0	0	-217	-1	-643	-1
2006						0		0	0	-217	-2	-643	-1
2007						0		0	0	0	0	-643	-1
2008	34,007		0		0	0	0	0	0	0	0	-643	-1
2009	7,800	0	0		0	0	0	0	0	0	0	-643	-1
2010	12,584	(8,586)	(68)		0	(8,586)	(68)	-2,862	-16	-1,717	-16	-3,290	-7
2011	66,093	(17,285)	(26)		0	(17,285)	(26)	-8,624	-30	-5,174	-21	-6,789	-13
2012	3,854	(8,355)	(217)		0	(8,355)	(217)	-11,409	-41	-6,845	-28	-7,102	-17
2013	79,071	(236)	(0)	845	1	609	1	-8,344	-17	-6,723	-20	-5,817	-12
2014	445,648	(6,505)	(1)		0	(6,505)	(1)	-4,750	-3	-8,024	-7	-5,915	-6
2015	48,913	(8,317)	(17)		0	(8,317)	(17)	-4,738	-2	-7,971	-6	-6,216	-6
2016	64,397	(9,009)	(14)		0	(9,009)	(14)	-7,944	-4	-6,316	-5	-6,526	-7
2017	7,843	(3,836)	(49)		0	(3,836)	(49)	-7,054	-17	-5,412	-4	-6,257	-7
2018	49,959	(92,744)	(186)		0	(92,744)	(186)	-35,197	-86	-24,082	-20	-14,119	-17
2019	23,991	(11,168)	(47)		0	(11,168)	(47)	-35,916	-132	-25,015	-64	-13,874	-18
TOTAL	934,823	(167,327)	(17.90)	845	0.09	-166,482	(17.81)						

Previously Approved -5
Recommended -10

MISSOURI AMERICAN WATER
ACCOUNT 30900 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
1974	2,756	(8,604)	(312)		0	(8,604)	(312)					-8,604	-312
1975						0						-8,604	-312
1976						0		-2,868	-312			-8,604	-312
1977	2,020	(272)	(13)		0	(272)	(13)	-91	-13			-4,438	-186
1978						0		-91	-13	-1,775	-186	-4,438	-186
1979						0		-91	-13	-54	-13	-4,438	-186
1980	900		0		0	0	0	0	0	-54	-9	-4,438	-156
1981						0		0	0	-54	-9	-4,438	-156
1982	80		0		0	0	0	0	0	0	0	-4,438	-154
1983	3,945	(267)	(7)		0	(267)	(7)	-89	-7	-53	-5	-3,048	-94
1984	33,352	(8,124)	(24)		0	(8,124)	(24)	-2,797	-22	-1,678	-22	-4,317	-40
1985						0		-2,797	-22	-1,678	-22	-4,317	-40
1986	860	(804)	(93)		0	(804)	(93)	-2,976	-26	-1,839	-24	-3,614	-41
1987	10,907	(3,432)	(31)		0	(3,432)	(31)	-1,412	-36	-2,525	-26	-3,584	-39
1988	7,400	(2,625)	(35)		0	(2,625)	(35)	-2,287	-36	-2,997	-29	-3,447	-39
1989						0		-2,019	-33	-1,372	-36	-3,447	-39
1990						0		-875	-35	-1,372	-36	-3,447	-39
1991						0		0	0	-1,211	-33	-3,447	-39
1992	1,000	(513)	(51)		0	(513)	(51)	-171	-51	-628	-37	-3,080	-39
1993	258,414	(63,198)	(24)		0	(63,198)	(24)	-21,237	-25	-12,742	-25	-9,760	-27
1994	4,044	(251)	(6)		0	(251)	(6)	-21,321	-24	-12,792	-24	-8,809	-27
1995	32,596	(6,985)	(21)		0	(6,985)	(21)	-23,478	-24	-14,189	-24	-8,643	-27
1996						0		-2,412	-20	-14,189	-24	-8,643	-27
1997						0		-2,328	-21	-14,087	-24	-8,643	-27
1998	2,611	(470)	(18)		0	(470)	(18)	-157	-18	-1,541	-20	-7,962	-26
1999	271	(452)	(167)		0	(452)	(167)	-307	-32	-1,581	-22	-7,384	-27
2000	9,660	(594)	(6)		0	(594)	(6)	-505	-12	-303	-12	-6,899	-26
2001	2,926		0		0	0	0	-349	-8	-303	-10	-6,899	-26
2002						0		-198	-5	-303	-10	-6,899	-26
2003						0		0	0	-209	-8	-6,899	-26
2004	16,670		0		0	0	0	0	0	-119	-2	-6,899	-25
2005						0		0	0	0	0	-6,899	-25
2006						0		0	0	0	0	-6,899	-25
2007	2,994		0		0	0	0	0	0	0	0	-6,899	-25

MISSOURI AMERICAN WATER
ACCOUNT 30900 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
2008	8,490	(4,629)	(55)		0	(4,629)	(55)	-1,543	-40	-926	-16	-6,748	-25
2009	3,210	(329)	(10)		0	(329)	(10)	-1,653	-34	-992	-34	-6,347	-25
2010	7,042	(6,754)	(96)	477	7	(6,277)	(89)	-3,745	-60	-2,247	-52	-6,343	-26
2011	7,896	(4,949)	(63)	256	3	(4,693)	(59)	-3,766	-62	-3,186	-54	-6,251	-27
2012	3,712	(9,775)	(263)		0	(9,775)	(263)	-6,915	-111	-5,141	-85	-6,437	-29
2013	2,873	(2,339)	(81)		0	(2,339)	(81)	-5,602	-116	-4,683	-95	-6,232	-29
2014	32,035	(165)	(1)		0	(165)	(1)	-4,093	-32	-4,650	-43	-5,943	-27
2015	4,136	(23)	(1)		0	(23)	(1)	-842	-6	-3,399	-34	-5,674	-27
2016		(14,894)				(14,894)		-5,028	-42	-5,439	-64	-6,075	-30
2017	1,022	(16,777)	(1,641)		0	(16,777)	(1,641)	-10,565	-614	-6,840	-85	-6,521	-34
2018	3,958	(2,360)	(60)		0	(2,360)	(60)	-11,344	-683	-6,844	-83	-6,354	-34
2019	3,369	(2,070)	(61)		0	(2,070)	(61)	-7,069	-254	-7,225	-289	-6,189	-34
TOTAL	471,149	(161,656)	(34.31)	733	0.16	-160,923	(34.16)						

Previously Approved -25
Recommended -30

MISSOURI AMERICAN WATER

ACCOUNT 31010 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
2008	3,705		0		0		0						0
2009						0							0
2010						0		0	0				0
2011		(2,309)				(2,309)		-770	0			-1,155	-62
2012						0		-770	0	-462	-62	-1,155	-62
2013	29,970	(5,219)	(17)		0	(5,219)	(17)	-2,509	-25	-1,506	-25	-2,509	-22
2014	69,603		0		0	0	0	-1,740	-5	-1,506	-8	-2,509	-7
2015	5,154	(805)	(16)		0	(805)	(16)	-2,008	-6	-1,667	-8	-2,083	-8
2016	8,332	(5,778)	(69)		0	(5,778)	(69)	-2,194	-8	-2,360	-10	-2,822	-12
2017	2,000	(42)	(2)		0	(42)	(2)	-2,209	-43	-2,369	-10	-2,359	-12
2018	164,878	(51,131)	(31)	5,334	3	(45,796)	(28)	-17,206	-29	-10,484	-21	-8,564	-21
2019	3,617	(12,132)	(335)	0	0	(12,132)	(335)	-19,324	-34	-12,911	-35	-9,010	-25
TOTAL	287,259	(77,417)	(26.95)	5,334	1.86	-72,082	(25.09)						

Previously Approved -5
Recommended -10

MISSOURI AMERICAN WATER

**ACCOUNT 31100 ELECTRIC 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
1974	66,724	(4,336)	(6)	421	1	(3,915)	-6					-3,915	-6
1975	11,504	(2,970)	(26)	684	6	(2,286)	-20					-3,101	-8
1976	140,150	(21,285)	(15)	217	0	(21,068)	-15	-9,090	-12			-9,090	-12
1977	22,432	(2,594)	(12)	103	0	(2,491)	-11	-8,615	-15			-7,440	-12
1978	39,996	(12,499)	(31)	996	2	(11,503)	-29	-11,687	-17	-8,253	-15	-8,253	-15
1979	274,672	(9,715)	(4)	2,338	1	(7,377)	-3	-7,124	-6	-8,945	-9	-8,107	-9
1980	14,912	(2,274)	(15)		0	(2,274)	-15	-7,051	-6	-8,943	-9	-7,273	-9
1981	132,030	(13,142)	(10)	10,216	8	(2,926)	-2	-4,192	-3	-5,314	-5	-6,730	-8
1982	148,510	(14,689)	(10)	6,150	4	(8,539)	-6	-4,580	-5	-6,524	-5	-6,931	-7
1983	76,546	(11,193)	(15)	100	0	(11,093)	-14	-7,519	-6	-6,442	-5	-7,347	-8
1984	225,626	(24,369)	(11)	24,774	11	405	0	-6,409	-4	-4,885	-4	-6,642	-6
1985	248,390	(24,934)	(10)	921	0	(24,013)	-10	-11,567	-6	-9,233	-6	-8,090	-7
1986	517,609	(56,710)	(11)	7,442	1	(49,268)	-10	-24,292	-7	-18,502	-8	-11,258	-8
1987	190,372	(23,900)	(13)	9,871	5	(14,029)	-7	-29,103	-9	-19,600	-8	-11,456	-8
1988	282,411	(42,880)	(15)	1,273	0	(41,607)	-15	-34,968	-11	-25,702	-9	-13,466	-8
1989	316,927	(22,837)	(7)		0	(22,837)	-7	-26,158	-10	-30,351	-10	-14,051	-8
1990	392,591	(38,456)	(10)		0	(38,456)	-10	-34,300	-10	-33,239	-10	-15,487	-8
1991	685,659	(107,072)	(16)		0	(107,072)	-16	-56,122	-12	-44,800	-12	-20,575	-10
1992	239,023	(48,792)	(20)	16,200	7	(32,592)	-14	-59,373	-14	-48,513	-13	-21,207	-10
1993	1,076,932	(110,681)	(10)	250	0	(110,431)	-10	-83,365	-12	-62,278	-11	-25,669	-10
1994	294,816	(78,606)	(27)	203,903	69	125,297	43	-5,909	-1	-32,651	-6	-18,480	-7
1995	262,547	(98,133)	(37)	29	0	(98,104)	-37	-27,746	-5	-44,580	-9	-22,099	-9
1996	185,029	(41,585)	(22)		0	(41,585)	-22	-4,797	-2	-31,483	-8	-22,946	-9
1997	139,311	(31,027)	(22)		0	(31,027)	-22	-56,905	-29	-31,170	-8	-23,283	-9
1998	438,927	(83,959)	(19)		0	(83,959)	-19	-52,190	-21	-25,876	-10	-25,710	-10
1999	226,264	(41,236)	(18)	1,082	0	(40,154)	-18	-51,713	-19	-58,966	-24	-26,266	-10
2000	1,368,195	(2,488)	(0)		0	(2,488)	0	-42,200	-6	-39,843	-8	-25,385	-9
2001	156,150	(29,469)	(19)		0	(29,469)	-19	-24,037	-4	-37,419	-8	-25,531	-9
2002	4,599	0	0		0	0	0	-10,652	-2	-31,214	-7	-25,531	-9
2003	64,751	(20,324)	(31)	723	1	(19,601)	-30	-16,357	-22	-18,342	-5	-25,326	-9
2004	193,740		0		0		0	-6,534	-7	-10,312	-3	-24,482	-9
2005	29,867		0		0		0	-6,534	-7	-9,814	-11	-23,692	-9
2006	101,517		0		0		0	0	0	-3,920	-5	-22,952	-9
2007	43,293		0		0		0	0	0	-3,920	-5	-22,256	-9

MISSOURI AMERICAN WATER

ACCOUNT 31100 ELECTRIC 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
2008	358,624	(152,190)	(42)		0	(152,190)	-42	-50,730	-30	-30,438	-21	-26,078	-10
2009	318,642	(87,714)	(28)	46	0	(87,760)	-28	-79,983	-33	-47,990	-28	-27,840	-10
2010	139,727	(68,495)	(49)	319	0	(68,814)	-49	-102,921	-38	-61,753	-32	-28,979	-11
2011	142,904	(17,969)	(13)	755	1	(18,724)	-13	-58,433	-29	-65,498	-33	-28,701	-11
2012	56,547	(94,793)	(168)	1,804	3	(96,597)	-171	-61,378	-54	-84,817	-42	-30,488	-12
2013	125,891	(73,997)	(59)	16,090	13	(90,087)	-72	-68,469	-63	-72,396	-46	-32,016	-13
2014	3,955,961	(49,498)	(1)	2,462	0	(51,960)	-1	-79,548	-6	-65,236	-7	-32,515	-9
2015	406,107	(223,216)	(55)	113	0	(223,330)	(54.99)	-121,792	-8	-96,140	-10	-37,169	-11
2016	1,032,743	(402,564)	(39)	6,168	1	(408,732)	(39.58)	-228,007	-13	-174,141	-16	-46,016	-13
2017	214,169	(307,983)	(144)	989	0	(308,972)	(144.27)	-313,678	-57	-216,616	-19	-52,131	-15
2018	1,052,940	(558,864)	(53)	4,139	0	(563,003)	(53.47)	-426,902	-56	-311,199	-23	-63,742	-17
2019	275,531	(969,764)	(352)	7,119	3	(976,883)	(354.55)	-616,286	-120	-496,184	-83	-84,034	-23
TOTAL	16,691,807	(4,029,202)	(24.14)	327,697	1.96	-3,781,513	(22.65)						

Previously Approved -10
Recommended -15

MISSOURI AMERICAN WATER
ACCOUNT 32000 WATER TREATMENT 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
1974	18,073	(5,853)	(32)	523	3	(5,330)	(29)					-5,330	-29
1975	56,281	(1,193)	(2)		0	(1,193)	(2)					-3,262	-9
1976	19,376	(1,310)	(7)	104	1	(1,206)	(6)	-2,576	-8			-2,576	-8
1977	19,055	(1,416)	(7)	438	2	(978)	(5)	-1,126	-4			-2,177	-8
1978	41,887	(6,556)	(16)		0	(6,556)	(16)	-2,913	-11	-3,053	-10	-3,053	-10
1979	32,180	(6,200)	(19)		0	(6,200)	(19)	-4,578	-15	-3,227	-10	-3,577	-11
1980	66,222	(7,635)	(12)		0	(7,635)	(12)	-6,797	-15	-4,515	-13	-4,157	-11
1981	32,072	(4,926)	(15)		0	(4,926)	(15)	-6,254	-14	-5,259	-14	-4,253	-12
1982	19,553	(6,872)	(35)		0	(6,872)	(35)	-6,478	-16	-6,438	-17	-4,544	-13
1983	77,999	(6,906)	(9)	375	0	(6,531)	(8)	-6,110	-14	-6,433	-14	-4,743	-12
1984	66,059	(10,099)	(15)	11,921	18	1,822	3	-3,860	-7	-4,828	-9	-4,146	-10
1985	73,929	(39,245)	(53)	502	1	(38,743)	(52)	-14,484	-20	-11,050	-20	-7,029	-16
1986	110,994	(20,572)	(19)	250	0	(20,322)	(18)	-19,081	-23	-14,129	-20	-8,052	-17
1987	49,592	(10,230)	(21)	1	0	(10,229)	(21)	-23,098	-30	-14,801	-20	-8,207	-17
1988	114,392	(9,080)	(8)		0	(9,080)	(8)	-13,210	-14	-15,310	-18	-8,265	-16
1989	31,543	(6,923)	(22)	268	1	(6,655)	(21)	-8,655	-13	-17,006	-22	-8,165	-16
1990	83,728	(30,492)	(36)		0	(30,492)	(36)	-15,409	-20	-15,356	-20	-9,478	-18
1991	172,694	(25,193)	(15)		0	(25,193)	(15)	-20,780	-22	-16,330	-18	-10,351	-17
1992	217,071	(18,961)	(9)		0	(18,961)	(9)	-24,882	-16	-18,076	-15	-10,804	-16
1993	1,043,307	(326,484)	(31)		0	(326,484)	(31)	-123,546	-26	-81,557	-26	-26,588	-23
1994	250,931	(37,073)	(15)		0	(37,073)	(15)	-127,506	-25	-87,641	-25	-27,087	-22
1995	162,945	(165,390)	(102)	398	0	(164,992)	(101)	-176,183	-36	-114,541	-31	-33,356	-27
1996	220,821	(175,667)	(80)		0	(175,667)	(80)	-125,911	-60	-144,635	-38	-39,543	-31
1997	212,526	(316,918)	(149)		0	(316,918)	(149)	-219,192	-110	-204,227	-54	-51,101	-38
1998	68,819	(31,742)	(46)		0	(31,742)	(46)	-174,776	-104	-145,278	-79	-50,326	-39
1999	11,493	(17,977)	(156)		0	(17,977)	(156)	-122,212	-125	-141,459	-105	-49,082	-39
2000	598,442	0	0		0	0	0	-16,573	-7	-108,461	-49	-49,082	-33
2001	27,352	(38,178)	(140)		0	(38,178)	(140)	-18,718	-9	-80,963	-44	-48,678	-34
2002	29,232	(79,169)	(271)		0	(79,169)	(271)	-39,116	-18	-33,413	-23	-49,767	-35
2003	250,204	(39,973)	(16)		0	(39,973)	(16)	-52,440	-51	-35,059	-19	-49,429	-34
2004	592,827	15,403	3		0	15,403	3	-34,580	-12	-28,383	-9	-47,268	-30
2005	115,652	0	0		0	0	0	-8,190	-3	-28,383	-14	-47,268	-29
2006	48,666	0	0		0	0	0	5,134	2	-20,748	-10	-47,268	-29
2007	4,607	0	0		0	0	0	0	0	-4,914	-2	-47,268	-29

MISSOURI AMERICAN WATER
ACCOUNT 32000 WATER TREATMENT 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
2008	275,651	(186,955)	(68)		0	(186,955)	(68)	-62,318	-57	-34,310	-17	-51,774	-31
2009	288,011	(113,454)	(39)	4,977	2	(108,477)	(38)	-98,477	-52	-59,086	-40	-53,546	-31
2010	341,034	(272,516)	(80)	447	0	(272,069)	(80)	-189,167	-63	-113,500	-59	-60,168	-34
2011	604,435	(522,328)	(86)	318	0	(522,010)	(86)	-300,852	-73	-217,902	-72	-73,752	-39
2012	260,317	(303,197)	(116)	1,604	1	(301,593)	(116)	-365,224	-91	-278,221	-79	-80,262	-42
2013	499,593	(226,965)	(45)	2,825	1	(224,140)	(45)	-349,248	-77	-285,658	-72	-84,258	-42
2014	6,423,850	(504,725)	(8)	206,792	3	(297,933)	(5)	-274,555	-11	-323,549	-20	-90,033	-24
2015	895,925	(361,401)	(40)	5,947	1	(355,454)	(40)	-292,509	-11	-340,226	-20	-97,018	-25
2016	2,499,074	(1,108,987)	(44)	1,654	0	(1,107,333)	(44)	-586,907	-18	-457,291	-22	-122,923	-28
2017	669,895	(687,327)	(103)	3,078	0	(684,249)	(102)	-715,679	-53	-533,822	-24	-136,957	-31
2018	2,320,365	(1,961,154)	(85)	11,075	0	(1,950,080)	(84)	-1,247,221	-68	-879,010	-34	-181,179	-37
2019	1,508,413	(1,920,823)	(127)	16,230	1	(1,904,593)	(126)	-1,512,974	-101	-1,200,342	-76	-222,213	-43
TOTAL	21,527,088	(9,602,662)	(44.61)	269,727	1.25	-9,332,935	(43.35)						

Previously Approved -25
Recommended -30

MISSOURI AMERICAN WATER

ACCOUNT 33000 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
1974	3,219	0	0		0	0	0						0
1975	34,312	(650)	(2)		0	(650)	(2)					-650	-2
1976	1,341	0	0		0	0	0	-217	-2			-650	-2
1977	46,872	(2,905)	(6)		0	(2,905)	(6)	-1,185	-4			-1,778	-4
1978	21,700	(1,187)	(5)		0	(1,187)	(5)	-1,364	-6	-948	-4	-1,581	-4
1979	221,759	(38,440)	(17)	3,000	1	(35,440)	(16)	-13,177	-14	-8,036	-12	-10,046	-12
1980	96,319	(37,405)	(39)	1,556	2	(35,849)	(37)	-24,159	-21	-15,076	-19	-15,206	-18
1981	41,687	(40)	(0)		0	(40)	(0)	-23,776	-20	-15,084	-18	-12,679	-16
1982	50	0	0		0	0	0	-11,963	-26	-14,503	-19	-12,679	-16
1983	32,390	(201)	(1)		0	(201)	(1)	-80	0	-14,306	-18	-10,896	-15
1984						0		-67	-1	-7,218	-21	-10,896	-15
1985						0		-67	-1	-48	0	-10,896	-15
1986						0		0	0	-40	-1	-10,896	-15
1987	39,732	(6,310)	(16)		0	(6,310)	(16)	-2,103	-16	-1,302	-9	-10,323	-15
1988	5,100	0	0		0	0	0	-2,103	-14	-1,262	-14	-10,323	-15
1989	18,111	(3,514)	(19)		0	(3,514)	(19)	-3,275	-16	-1,965	-16	-9,566	-15
1990	50,774	(152,910)	(301)	1,339	3	(151,571)	(299)	-51,695	-210	-32,279	-142	-23,767	-39
1991	387,103	(556,164)	(144)		0	(556,164)	(144)	-237,083	-156	-143,512	-143	-72,166	-79
1992	13,484	(9,358)	(69)		0	(9,358)	(69)	-239,031	-159	-144,121	-152	-66,932	-79
1993	3,791	0	0		0	0	0	-188,507	-140	-144,121	-152	-66,932	-79
1994	2,524	(30)	(1)		0	(30)	(1)	-3,129	-47	-143,425	-157	-61,786	-79
1995	83,105	(74,478)	(90)		0	(74,478)	(90)	-24,836	-83	-128,006	-131	-62,693	-80
1996	2,837	(147)	(5)		0	(147)	(5)	-24,885	-84	-16,803	-79	-58,523	-79
1997	885	(1,950)	(220)		0	(1,950)	(220)	-25,525	-88	-15,321	-82	-54,987	-79
1998	194,360	(419,180)	(216)		0	(419,180)	(216)	-140,426	-213	-99,157	-175	-76,410	-100
1999	91,630	(122,160)	(133)		0	(122,160)	(133)	-181,097	-189	-123,583	-166	-78,952	-102
2000	11,560	0	0		0	0	0	-180,447	-182	-108,687	-180	-78,952	-101
2001	30,448	0	0		0	0	0	-40,720	-91	-108,658	-165	-78,952	-99
2002	1,115	0	0		0	0	0	0	0	-108,268	-164	-78,952	-99
2003	10,202	(46,000)	(451)		0	(46,000)	(451)	-15,333	-110	-33,632	-116	-77,218	-101
2004				30,371		30,371	0	-5,210	-138	-3,126	-29	-71,838	-99
2005						0		-5,210	-153	-3,126	-37	-71,838	-99
2006	6,174	0	0		0	0	0	10,124	492	-3,126	-89	-71,838	-99
2007	923	0	0		0	0	0	0	0	-3,126	-90	-71,838	-99

MISSOURI AMERICAN WATER

ACCOUNT 33000 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
2008	30,858	(6,409)	(21)		0	(6,409)	(21)	-2,136	-17	4,792	63	-68,722	-97
2009	2,687	(514)	(19)		0	(514)	(19)	-2,308	-20	-1,385	-17	-65,622	-97
2010	10,065	(4,817)	(48)		0	(4,817)	(48)	-3,913	-27	-2,348	-23	-62,978	-97
2011	93,736	(30,844)	(33)		0	(30,844)	(33)	-12,058	-34	-8,517	-31	-61,639	-93
2012	3,087	(10,767)	(349)		0	(10,767)	(349)	-15,476	-43	-10,670	-38	-59,605	-93
2013	21,536	(5,982)	(28)		0	(5,982)	(28)	-15,864	-40	-10,585	-40	-57,542	-93
2014	914,187	(29,534)	(3)	43,414	5	13,880	2	-956	0	-7,706	-4	-54,897	-59
2015	33,059	0	0		0	0	0	2,633	1	-6,743	-3	-54,897	-58
2016	51,964	(9,325)	(18)	0	0	(9,325)	(18)	1,518	0	-2,439	-1	-53,269	-57
2017	64,405	(26,062)	(40)	1,187	2	(24,875)	(39)	-11,400	-23	-5,261	-2	-52,290	-57
2018	35,482	(787)	(2)	0	0	(787)	(2)	-11,662	-23	-4,221	-2	-50,573	-56
2019	7,350	(18,374)	(250)	0	0	(18,374)	(250)	-14,679	-41	-10,672	-28	-49,535	-56
TOTAL	2,721,923	(1,616,445)	(59.39)	80,867	2.97	-1,535,578	(56.42)						

Previously Approved -30
Recommended -30

MISSOURI AMERICAN WATER

ACCOUNT 33100 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
1974	56,556	(16,980)	(30)	3,409	6	(13,571)	(24)					-13,571	-24
1975	39,930	(20,063)	(50)	3,213	8	(16,850)	(42)					-15,211	-32
1976	37,968	(15,960)	(42)	2,218	6	(13,742)	(36)	-14,721	-33			-14,721	-33
1977	40,815	(25,200)	(62)	3,220	8	(21,980)	(54)	-17,524	-44			-16,536	-38
1978	89,098	(19,967)	(22)	2,429	3	(17,538)	(20)	-17,753	-32	-16,736	-32	-16,736	-32
1979	121,708	(37,588)	(31)	2,761	2	(34,827)	(29)	-24,782	-30	-20,987	-32	-19,751	-31
1980	88,338	(63,046)	(71)	10,985	12	(52,061)	(59)	-34,809	-35	-28,030	-37	-24,367	-36
1981	229,655	(62,924)	(27)	4,244	2	(58,680)	(26)	-48,523	-33	-37,017	-32	-28,656	-33
1982	114,613	(49,020)	(43)	5,052	4	(43,968)	(38)	-51,570	-36	-41,415	-32	-30,357	-33
1983	297,327	(76,705)	(26)	2,715	1	(73,990)	(25)	-58,879	-28	-52,705	-31	-34,721	-31
1984	123,212	(66,618)	(54)	3,308	3	(63,310)	(51)	-60,423	-34	-58,402	-34	-37,320	-33
1985	337,250	(97,814)	(29)	6,079	2	(91,735)	(27)	-76,345	-30	-66,337	-30	-41,854	-32
1986	156,938	(81,591)	(52)	2,660	2	(78,931)	(50)	-77,992	-38	-70,387	-34	-44,706	-34
1987	329,690	(164,284)	(50)	3,427	1	(160,857)	(49)	-110,508	-40	-93,765	-38	-53,003	-36
1988	418,887	(152,959)	(37)	7,293	2	(145,666)	(35)	-128,485	-43	-108,100	-40	-59,180	-36
1989	480,746	(179,075)	(37)	19,166	4	(159,909)	(33)	-155,477	-38	-127,420	-37	-65,476	-35
1990	372,647	(155,997)	(42)	2,503	1	(153,494)	(41)	-153,023	-36	-139,771	-40	-70,653	-36
1991	598,747	(198,583)	(33)	2,778	0	(195,805)	(33)	-169,736	-35	-163,146	-37	-77,606	-36
1992	398,614	(228,613)	(57)	9,265	2	(219,348)	(55)	-189,549	-42	-174,844	-39	-85,066	-37
1993	909,929	(362,412)	(40)	6,844	1	(355,568)	(39)	-256,907	-40	-216,825	-39	-98,592	-38
1994	522,281	(378,525)	(72)	36,042	7	(342,483)	(66)	-305,800	-50	-253,340	-45	-110,205	-40
1995	436,187	(384,195)	(88)	4,862	1	(379,333)	(87)	-359,128	-58	-298,507	-52	-122,438	-43
1996	691,879	(427,704)	(62)	8,960	1	(418,744)	(61)	-380,187	-69	-343,095	-58	-135,321	-45
1997	496,435	(330,656)	(67)	4,943	1	(325,713)	(66)	-374,597	-69	-364,368	-60	-143,254	-47
1998	1,386,437	(664,022)	(48)	24,186	2	(639,836)	(46)	-461,431	-54	-421,222	-60	-163,118	-46
1999	1,486,634	(463,688)	(31)	299,986	20	(163,702)	(11)	-376,417	-34	-385,466	-43	-163,140	-41
2000	126,009	(25,724)	(20)	1,669	1	(24,055)	(19)	-275,864	-28	-314,410	-38	-157,989	-41
2001	2,795,226	(828,808)	(30)	7,226	0	(821,582)	(29)	-336,446	-23	-394,978	-31	-181,689	-39
2002	1,819,510	(1,064,198)	(58)		0	(1,064,198)	(58)	-636,612	-40	-542,675	-36	-212,120	-41
2003	1,272,575	(577,209)	(45)	(1,475)	(0)	(578,684)	(45)	-821,488	-42	-530,444	-35	-224,339	-41
2004	1,479,188	(8,449)	(1)		0	(8,449)	(1)	-550,444	-36	-499,394	-33	-217,374	-38
2005	1,865,307	0	0		0	0	0	-195,711	-13	-494,583	-27	-217,374	-34
2006	1,046,485	0	0		0	0	0	-2,816	0	-330,266	-22	-217,374	-33
2007	577,409	0	0		0	0	0	0	0	-117,427	-9	-217,374	-32

MISSOURI AMERICAN WATER

ACCOUNT 33100 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
2008	5,781,111	(65,415)	(1)	894	0	(64,521)	(1)	-21,507	-1	-14,594	-1	-212,598	-25
2009	2,637,693	(102,846)	(4)	3,611	0	(99,235)	(4)	-54,585	-2	-32,751	-1	-209,163	-23
2010	2,400,196	(790,762)	(33)	2,775	0	(787,987)	(33)	-317,248	-9	-190,349	-8	-226,187	-24
2011	5,012,751	(1,369,195)	(27)	2,745	0	(1,366,450)	(27)	-751,224	-22	-463,639	-14	-258,766	-24
2012	3,525,428	(2,353,756)	(67)	2,726	0	(2,351,030)	(67)	-1,501,822	-41	-933,845	-24	-316,884	-28
2013	3,450,562	(2,012,421)	(58)	600	0	(2,011,821)	(58)	-1,909,767	-48	-1,323,305	-39	-362,693	-30
2014	1,091,793	(1,101,506)	(101)	15,181	1	(1,086,325)	(99)	-1,816,392	-68	-1,520,723	-49	-381,736	-32
2015	4,742,809	(2,015,766)	(43)	33,364	1	(1,982,403)	(42)	-1,693,516	-55	-1,759,606	-49	-422,779	-33
2016	2,303,139	(7,087,723)	(308)	31,358	1	(7,056,365)	(306)	-3,375,031	-124	-2,897,589	-96	-588,619	-45
2017	3,018,319	(2,374,109)	(79)	19,676	1	(2,354,434)	(78)	-3,797,734	-113	-2,898,269	-99	-631,687	-47
2018	4,771,951	(8,222,975)	(172)	12,584	0	(8,210,391)	(172)	-5,873,730	-175	-4,137,984	-130	-812,133	-57
2019	13,511,772	(6,736,042)	(50)	29,056	0	(6,706,986)	(50)	-5,757,270	-81	-5,262,116	-93	-949,222	-56
TOTAL	73,491,754	(41,461,094)	(56.42)	644,537	0.88	-40,816,557	(55.54)						

Previously Approved -30
Recommended -35

MISSOURI AMERICAN WATER
ACCOUNT 33200 FIRE 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
2007	578		0										0
2008	5,698		0										0
2009	394	(6)	(2)			(6)		-2	0			-2	0
2010		(3,858)				(3,858)		-1,288	-63			-966	-58
2011						0		-1,288	-981	-773	-58	-966	-58
2012						0		-1,286	0	-773	-63	-966	-58
2013	18		0			0	0	0	0	-773	-938	-966	-58
2014	573	4,270	745			4,270	745	1,423	723	82	70	81	6
2015						0		1,423	723	854	723	81	6
2016						0		1,423	745	854	723	81	6
2017						0		0	0	854	723	81	6
2018						0		0	0	854	745	81	6
2019						0		0	0	0	0	81	6
TOTAL	7,261	406	5.59	0	0.00	406	5.59						
	Previously Approved		-30										
	Recommended		-35										

MISSOURI AMERICAN WATER
ACCOUNT 33300 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
1974	264	(169)	(64)	37	14	(132)	(50)					-132	-50
1975		0				0						-132	-50
1976	688	(517)	(75)	76	11	(441)	(64)	-191	-60			-287	-60
1977						0		-147	-64			-287	-60
1978						0		-147	-64	-115	-60	-287	-60
1979						0		0	0	-88	-64	-287	-60
1980	204	(20)	(10)		0	(20)	(10)	-7	-10	-92	-52	-198	-51
1981						0		-7	-10	-4	-10	-198	-51
1982						0		-7	-10	-4	-10	-198	-51
1983	2,533	(101)	(4)		0	(101)	(4)	-34	-4	-24	-4	-174	-19
1984						0		-34	-4	-24	-4	-174	-19
1985						0		-34	-4	-20	-4	-174	-19
1986						0		0	0	-20	-4	-174	-19
1987	6,818	(6,290)	(92)		0	(6,290)	(92)	-2,097	-92	-1,278	-68	-1,397	-66
1988	10,560	(5,622)	(53)	381	4	(5,241)	(50)	-3,844	-66	-2,306	-66	-2,038	-58
1989	10,990	(12,364)	(113)		0	(12,364)	(113)	-7,965	-84	-4,779	-84	-3,513	-77
1990	18,943	(5,212)	(28)		0	(5,212)	(28)	-7,606	-56	-5,821	-62	-3,725	-58
1991	28,454	(12,046)	(42)		0	(12,046)	(42)	-9,874	-51	-8,231	-54	-4,650	-53
1992	23,403	(5,432)	(23)		0	(5,432)	(23)	-7,563	-32	-8,059	-44	-4,728	-46
1993	37,907	(8,602)	(23)	750	2	(7,852)	(21)	-8,443	-28	-8,581	-36	-5,012	-39
1994	22,559	(9,029)	(40)		0	(9,029)	(40)	-7,438	-27	-7,914	-30	-5,347	-39
1995	21,475	(7,932)	(37)	1,700	8	(6,232)	(29)	-7,704	-28	-8,118	-30	-5,415	-38
1996	43,363	(32,845)	(76)	3,459	8	(29,386)	(68)	-14,882	-51	-11,586	-39	-7,127	-44
1997	29,525	(47,521)	(161)		0	(47,521)	(161)	-27,713	-88	-20,004	-65	-9,820	-57
1998	30,752	(30,926)	(101)		0	(30,926)	(101)	-35,944	-104	-24,619	-83	-11,139	-62
1999	8,556	(80,642)	(943)	3,345	39	(77,297)	(903)	-51,915	-226	-38,272	-143	-15,031	-86
2000	18,985	(127,129)	(670)	9,507	50	(117,622)	(620)	-75,282	-387	-60,550	-231	-20,730	-118
2001	61,575	(120,680)	(196)	3,812	6	(116,868)	(190)	-103,929	-350	-78,047	-261	-25,790	-130
2002	4,796	(150,711)	(3,142)	795	17	(149,916)	(3,126)	-128,135	-450	-98,526	-395	-31,996	-167
2003	16,350	(175,161)	(1,071)	1,500	9	(173,661)	(1,062)	-146,815	-532	-127,073	-576	-38,742	-204
2004	40,944	(8,171)	(20)	9,022	22	851	2	-107,575	-520	-111,443	-391	-36,943	-185
2005	4,327	0	0	3,322	77	3,322	77	-56,496	-275	-87,254	-341	-35,192	-182
2006	12,105	0	0	5,049	42	5,049	42	3,074	16	-62,871	-400	-33,515	-176
2007	14,092	0	0		0	0	0	2,790	27	-32,888	-187	-33,515	-171

MISSOURI AMERICAN WATER
ACCOUNT 33300 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
2008	616,903	(159,262)	(26)		0	(159,262)	(26)	-51,404	-24	-30,008	-22	-38,545	-89
2009	286,483	(66,252)	(23)	2,458	1	(63,794)	(22)	-74,352	-24	-42,937	-23	-39,516	-75
2010	50,318	(103,200)	(205)	640	1	(102,560)	(204)	-108,539	-34	-64,113	-33	-41,851	-79
2011	60,973	(198,750)	(326)	5,219	9	(193,531)	(317)	-119,962	-90	-103,829	-50	-47,268	-89
2012	37,085	(250,959)	(677)	175	0	(250,784)	(676)	-182,292	-369	-153,986	-73	-54,286	-103
2013	134,757	(217,563)	(161)	118	0	(217,445)	(161)	-220,587	-284	-165,623	-145	-59,725	-108
2014	184,897	(233,970)	(127)	1,603	1	(232,367)	(126)	-233,532	-196	-199,337	-213	-65,294	-110
2015	115,598	(305,414)	(264)		0	(305,414)	(264)	-251,742	-174	-239,908	-225	-72,798	-119
2016	344,293	(379,205)	(110)	0	0	(379,205)	(110)	-305,662	-142	-277,043	-170	-82,083	-118
2017	117,900	(335,321)	(284)	0	0	(335,321)	(284)	-339,980	-177	-293,950	-164	-89,531	-126
2018	181,584	(225,209)	(124)	1,805	1	(223,404)	(123)	-312,643	-146	-295,142	-156	-93,356	-126
2019	761,086	(422,846)	(56)	0	0	(422,846)	(56)	-327,190	-93	-333,238	-110	-102,508	-110
TOTAL	3,362,044	(3,745,073)	(111.39)	54,773	1.63	-3,690,300	(109.76)						

Previously Approved -100
Recommended -110

MISSOURI AMERICAN WATER
ACCOUNT 33400 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
1974	29,055	(1,206)	(4)	13,096	45	11,890	41					11,890	41
1975	30,543	(1,534)	(5)	11,190	37	9,656	32					10,773	36
1976	34,298	(1,452)	(4)	1,306	4	(146)	(0)	7,133	23			7,133	23
1977	27,843	(2,230)	(8)	9,255	33	7,025	25	5,512	18			7,106	23
1978	51,453	(3,761)	(7)	15,354	30	11,593	23	6,157	16	8,004	23	8,004	23
1979	45,951	(5,986)	(13)	21,012	46	15,026	33	11,215	27	8,631	23	9,174	25
1980	47,161	(4,168)	(9)	17,122	36	12,954	27	13,191	27	9,290	22	9,714	26
1981	30,480	(4,300)	(14)	12,140	40	7,840	26	11,940	29	10,888	27	9,480	26
1982	33,104	(4,493)	(14)	9,455	29	4,962	15	8,585	23	10,475	25	8,978	24
1983	24,065	(4,442)	(18)	7,393	31	2,951	12	5,251	18	8,747	24	8,375	24
1984	21,174	(4,215)	(20)	125	1	(4,090)	(19)	1,274	5	4,923	16	7,242	21
1985	19,809	(2,184)	(11)	4,663	24	2,479	13	447	2	2,828	11	6,845	21
1986	23,325	(2,383)	(10)	4,797	21	2,414	10	268	1	1,743	7	6,504	20
1987	176,508	(11,370)	(6)	16,563	9	5,193	3	3,362	5	1,789	3	6,411	15
1988	156,233	(11,002)	(7)	13,043	8	2,041	1	3,216	3	1,607	2	6,119	12
1989	170,981	(12,727)	(7)	15,522	9	2,795	2	3,343	2	2,984	3	5,911	10
1990	179,941	(15,806)	(9)	29,359	16	13,553	8	6,130	4	5,199	4	6,361	10
1991	215,854	(22,009)	(10)	23,973	11	1,964	1	6,104	3	5,109	3	6,117	8
1992	218,302	(18,369)	(8)	34,965	16	16,596	8	10,704	5	7,390	4	6,668	8
1993	345,768	(12,344)	(4)	33,732	10	21,388	6	13,316	5	11,259	5	7,404	8
1994	240,277	(20,950)	(9)	19,178	8	(1,772)	(1)	12,071	5	10,346	4	6,967	7
1995	295,466	(20,202)	(7)	33,742	11	13,540	5	11,052	4	10,343	4	7,266	7
1996	383,320	(33,563)	(9)	33,052	9	(511)	(0)	3,752	1	9,848	3	6,928	6
1997	415,177	(27,075)	(7)	30,026	7	2,951	1	5,327	1	7,119	2	6,762	5
1998	347,568	(27,613)	(8)	28,412	8	799	0	1,080	0	3,001	1	6,524	5
1999	221,045	(13,404)	(6)	23,123	10	9,719	4	4,490	1	5,300	2	6,647	5
2000	73,018	1	0		0	1	0	3,506	2	2,592	1	6,400	4
2001	52,634	(4,061)	(8)	20,233	38	16,172	31	8,631	7	5,928	3	6,749	5
2002	765,044	(536)	(0)	24,951	3	24,415	3	13,529	5	10,221	4	7,359	5
2003	1,033,741	(371)	(0)	9,336	1	8,965	1	16,517	3	11,854	3	7,412	4
2004	689,607	0	0	22,078	3	22,078	3	18,486	2	14,326	3	7,885	4
2005	217,728	0	0	21,286	10	21,286	10	17,443	3	18,583	3	8,304	4
2006	635,415	0	0	51,610	8	51,610	8	31,658	6	25,671	4	9,616	4
2007	314,184	0	0	71,755	23	71,755	23	48,217	12	35,139	6	11,444	5

MISSOURI AMERICAN WATER
ACCOUNT 33400 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
2008	1,669,285	(15,292)	(1)	36,599	2	21,307	1	48,224	6	37,607	5	11,726	4
2009	933,193	(75,481)	(8)	505,970	54	430,489	46	174,517	18	119,289	16	23,358	8
2010	775,319	(127,671)	(16)	127,253	16	(418)	(0)	150,459	13	114,949	13	22,715	8
2011	866,618	(1,262,765)	(146)	153,531	18	(1,109,234)	(128)	-226,388	-26	-117,220	-13	-7,073	-2
2012	1,015,097	(1,003,130)	(99)	162,473	16	(840,657)	(83)	-650,103	-73	-299,703	-28	-28,447	-9
2013	737,926	(673,285)	(91)	96,545	13	(576,740)	(78)	-842,210	-96	-419,312	-48	-42,154	-12
2014	969,634	(1,122,517)	(116)	191,773	20	(930,744)	(96)	-782,714	-86	-691,559	-79	-63,827	-18
2015	943,960	(935,696)	(99)	131,516	14	(804,180)	(85)	-770,555	-87	-852,311	-94	-81,454	-22
2016	2,234,328	(2,767,248)	(124)	165,424	7	(2,601,824)	(116)	-1,445,583	-105	-1,150,829	-98	-140,068	-34
2017	1,283,704	(2,668,731)	(208)	153,904	12	(2,514,827)	(196)	-1,973,611	-133	-1,485,663	-120	-194,039	-45
2018	6,856,257	(1,769,274)	(26)	184,012	3	(1,585,261)	(23)	-2,233,971	-65	-1,687,367	-69	-224,956	-39
2019	4,867,818	(1,111,979)	(23)	178,237	4	(933,742)	(19)	-1,677,944	-39	-1,687,967	-52	-240,364	-36
TOTAL	30,719,211	(13,826,824)	(45.01)	2,770,084	9.02	-11,056,740	(35.99)						

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Recommended -20

MISSOURI AMERICAN WATER
ACCOUNT 33500 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
1974	34,923	(13,390)	(38)	10,537	30	(2,853)	(8)					-2,853	-8
1975	27,286	(15,952)	(58)	9,205	34	(6,747)	(25)					-4,800	-15
1976	18,047	(9,690)	(54)	5,881	33	(3,809)	(21)	-4,470	-17			-4,470	-17
1977	30,195	(18,939)	(63)	11,516	38	(7,423)	(25)	-5,993	-24			-5,208	-19
1978	29,980	(15,697)	(52)	6,864	23	(8,833)	(29)	-6,688	-26	-5,933	-21	-5,933	-21
1979	22,142	(13,705)	(62)	5,327	24	(8,378)	(38)	-8,211	-30	-7,038	-28	-6,341	-23
1980	27,564	(17,785)	(65)	9,489	34	(8,296)	(30)	-8,502	-32	-7,348	-29	-6,620	-24
1981	50,878	(25,618)	(50)	16,262	32	(9,356)	(18)	-8,677	-26	-8,457	-26	-6,962	-23
1982	31,808	(27,752)	(87)	8,343	26	(19,409)	(61)	-12,354	-34	-10,854	-33	-8,345	-28
1983	50,237	(27,807)	(55)	8,944	18	(18,863)	(38)	-15,876	-36	-12,860	-35	-9,397	-29
1984	56,839	(24,500)	(43)	13,847	24	(10,653)	(19)	-16,308	-35	-13,315	-31	-9,511	-28
1985	47,528	(44,542)	(94)	10,614	22	(33,928)	(71)	-21,148	-41	-18,442	-39	-11,546	-32
1986	41,091	(28,826)	(70)	10,173	25	(18,653)	(45)	-21,078	-43	-20,301	-45	-12,092	-34
1987	76,991	(74,723)	(97)	17,523	23	(57,200)	(74)	-36,594	-66	-27,859	-51	-15,314	-39
1988	93,984	(60,869)	(65)	16,236	17	(44,633)	(47)	-40,162	-57	-33,013	-52	-17,269	-41
1989	96,775	(53,495)	(55)	22,778	24	(30,717)	(32)	-44,183	-50	-37,026	-52	-18,109	-39
1990	67,619	(65,264)	(97)	16,619	25	(48,645)	(72)	-41,332	-48	-39,970	-53	-19,906	-42
1991	126,720	(67,165)	(53)	18,068	14	(49,097)	(39)	-42,820	-44	-46,058	-50	-21,527	-42
1992	50,826	(55,972)	(110)	10,097	20	(45,875)	(90)	-47,872	-59	-43,793	-50	-22,809	-44
1993	117,535	(96,526)	(82)	14,989	13	(81,537)	(69)	-58,836	-60	-51,174	-56	-25,745	-47
1994	71,742	(69,593)	(97)	13,693	19	(55,900)	(78)	-61,104	-76	-56,211	-65	-27,181	-49
1995	96,860	(92,356)	(95)	18,265	19	(74,091)	(76)	-70,509	-74	-61,300	-66	-29,313	-51
1996	96,927	(89,680)	(93)	17,393	18	(72,287)	(75)	-67,426	-76	-65,938	-76	-31,182	-53
1997	137,821	(62,984)	(46)	19,017	14	(43,967)	(32)	-63,448	-57	-65,556	-63	-31,715	-51
1998	195,548	(95,185)	(49)	25,575	13	(69,610)	(36)	-61,955	-43	-63,171	-53	-33,230	-49
1999	230,021	(72,094)	(31)	16,542	7	(55,552)	(24)	-56,376	-30	-63,101	-42	-34,089	-46
2000	15,128	(7,566)	(50)	10,659	70	3,093	20	-40,690	-28	-47,665	-35	-32,712	-45
2001	470,084	(119,173)	(25)	10,480	2	(108,693)	(23)	-53,717	-23	-54,946	-26	-35,425	-41
2002	521,830	(72,865)	(14)	4,041	1	(68,824)	(13)	-58,141	-17	-59,917	-21	-36,577	-36
2003	472,321	(55,134)	(12)	41	0	(55,093)	(12)	-77,537	-16	-57,014	-17	-37,194	-33
2004	372,438	(12,456)	(3)		0	(12,456)	(3)	-45,458	-10	-48,395	-13	-36,396	-30
2005	347,581	0	0		0	0	0	-22,516	-6	-49,013	-11	-36,396	-27
2006	390,133	0	0		0	0	0	-4,152	-1	-27,275	-6	-36,396	-25
2007	225,555	0	0		0	0	0	0	0	-13,510	-4	-36,396	-24

MISSOURI AMERICAN WATER
ACCOUNT 33500 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
2008	464,682	(19,725)	(4)	11	0	(19,714)	(4)	-6,571	-2	-6,434	-2	-35,875	-22
2009	365,498	(36,378)	(10)	3,092	1	(33,286)	(9)	-17,667	-5	-10,600	-3	-35,797	-21
2010	301,204	(92,658)	(31)		0	(92,658)	(31)	-48,553	-13	-29,132	-8	-37,469	-22
2011	393,551	(204,180)	(52)		0	(204,180)	(52)	-110,041	-31	-69,968	-20	-42,232	-24
2012	265,993	(295,633)	(111)		0	(295,633)	(111)	-197,490	-62	-129,094	-36	-49,271	-27
2013	341,837	(261,292)	(76)		0	(261,292)	(76)	-253,702	-76	-177,410	-53	-55,001	-30
2014	159,987	(110,605)	(69)	123	0	(110,482)	(69)	-222,469	-87	-192,849	-66	-56,461	-30
2015	316,626	(226,725)	(72)	1,695.66	1	(225,029)	(71)	-198,934	-73	-219,323	-74	-60,784	-32
2016	304,368	(675,311)	(222)	5,155	2	(670,156)	(220)	-335,222	-129	-312,518	-113	-76,018	-40
2017	235,481	(923,525)	(392)	14,222	6	(909,303)	(386)	-601,496	-211	-435,252	-160	-96,342	-50
2018	1,895,458	(801,387)	(42)	29,211	2	(772,176)	(41)	-783,878	-97	-537,429	-92	-112,433	-48
2019	3,356,573	(1,205,259)	(36)	43,668	1	(1,161,591)	(35)	-947,690	-52	-747,651	-61	-136,832	-45
TOTAL	13,144,215	(6,359,981)	(48.39)	476,196	3.62	-5,883,786	(44.76)						

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MISSOURI AMERICAN WATER

ACCOUNT 34110, 34120, & 34130 TRANSPORTATION 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
1974	92,812	(347)	(0)	25,992	28	25,645	28					25,645	28
1975	83,861	(41)	(0)	27,149	32	27,108	32					26,377	30
1976	71,097		0	26,543	37	26,543	37	26,432	32			26,432	32
1977	66,585		0	25,590	38	25,590	38	26,414	36			26,222	33
1978	123,376	(109)	(0)	32,089	26	31,980	26	28,038	32	27,373	31	27,373	31
1979	210,203	(69)	(0)	50,566	24	50,497	24	36,022	27	32,344	29	31,227	29
1980	155,150	(113)	(0)	36,665	24	36,552	24	39,676	24	34,232	27	31,988	28
1981	145,264		0	40,896	28	40,896	28	42,648	25	37,103	26	33,101	28
1982	162,619		0	60,448	37	60,448	37	45,965	30	44,075	28	36,140	29
1983	96,484		0	29,337	30	29,337	30	43,560	32	43,546	28	35,460	29
1984	204,033		0	70,150	34	70,150	34	53,312	35	47,477	31	38,613	30
1985	199,386		0	55,953	28	55,953	28	51,813	31	51,357	32	40,058	30
1986	214,282		0	62,949	29	62,949	29	63,017	31	55,767	32	41,819	30
1987	303,161	(676)	(0)	86,321	28	85,645	28	68,182	29	60,807	30	44,950	30
1988	194,722	(1,113)	(1)	39,477	20	38,364	20	62,319	26	62,612	28	44,510	29
1989	444,524	(163)	(0)	97,857	22	97,694	22	73,901	24	68,121	25	47,834	28
1990	480,135		0	100,181	21	100,181	21	78,746	21	76,967	24	50,914	27
1991	505,462	(120)	(0)	118,208	23	118,088	23	105,321	22	87,994	23	54,646	26
1992	443,435	(197)	(0)	121,683	27	121,486	27	113,252	24	95,163	23	58,163	26
1993	398,324	(219)	(0)	133,875	34	133,656	34	124,410	28	114,221	25	61,938	27
1994	801,693	(378)	(0)	299,968	37	299,590	37	184,911	34	154,600	29	73,255	29
1995	768,620	(263)	(0)	211,301	27	211,038	27	214,761	33	176,772	30	79,518	28
1996	565,145	(498)	(0)	196,230	35	195,732	35	235,453	33	192,300	32	84,571	29
1997	601,593	(123)	(0)	223,731	37	223,608	37	210,126	33	212,725	34	90,364	30
1998	545,495	(3,902)	(1)	162,149	30	158,247	29	192,529	34	217,643	33	93,079	30
1999	204,858	(236)	(0)	54,030	26	53,794	26	145,216	32	168,484	31	91,568	29
2000	118,071		0	7,205	6	7,205	6	73,082	25	127,717	31	88,444	29
2001	308,921	(446)	(0)	216,359	70	215,913	70	92,304	44	131,753	37	92,996	31
2002	907,525	27,133	3	144,335	16	171,468	19	131,529	30	121,325	29	95,702	29
2003	91,725	(8,907)	(10)	4,440	5	(4,467)	(5)	127,638	29	88,783	27	92,363	29
2004	674,909		0	14,140	2	14,140	2	60,380	11	80,852	19	89,840	27
2005	590,628		0	35,588	6	35,588	6	15,087	3	86,528	17	88,144	26
2006	951,331		0	13,396	1	13,396	1	21,041	3	46,025	7	85,879	24
2007	17,913		0	2,307	13	2,307	13	17,097	3	12,193	3	83,421	24

MISSOURI AMERICAN WATER

**ACCOUNT 34110, 34120, & 34130 TRANSPORTATION 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
2008	1,210,032	173	0	158,895	13	159,068	13	58,257	8	44,900	7	85,583	23
2009	814,027	(14,011)	(2)	184,148	23	170,137	21	110,504	16	76,099	11	87,931	23
2010	275,733	(8,440)	(3)	39,029	14	30,589	11	119,931	16	75,099	11	86,381	23
2011	36,577		0	49,678	136	49,678	136	83,468	22	82,356	17	85,416	23
2012	5,000		0	3,165	63	3,165	63	27,811	26	82,527	18	83,307	23
2013	79,570		0	47,787	60	47,787	60	33,543	83	60,271	25	82,419	23
2014	2,650,606	21,191	1	141,112	5	162,303	6	71,085	8	58,704	10	84,367	21
2015	197,395	0	0	80,291.68	41	80,292	41	96,794	10	68,645	12	84,270	21
2016	26,407	(898)	(3)	56,138	213	55,240	209	99,278	10	69,757	12	83,595	21
2017	342,290		0	126,864	37	126,864	37	87,465	46	94,497	14	84,578	21
2018	0					0		60,701	49	84,940	13	84,578	21
2019	106,494	(200)	(0)	120,915	114	120,715	113	82,526	55	76,622	57	85,381	22
TOTAL	17,487,473	7,028	0.04	3,835,130	21.93	3,842,158	21.97						

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MISSOURI AMERICAN WATER

ACCOUNT 34140 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
2000	756		0	1,074	142	1,074	142					1,074	142
2001	675		0		0	0	0					1,074	75
2002						0		358	75			1,074	75
2003				2,500		2,500		833	370			1,787	250
2004						0		833	0	715	250	1,787	250
2005						0		833	0	500	370	1,787	250
2006	10,347		0		0	0	0	0	0	500	24	1,787	30
2007						0		0	0	500	24	1,787	30
2008	8,307		0	624	8	624	8	208	3	125	3	1,399	21
2009				1,074		1,074		566	20	340	9	1,318	26
2010		7				7		568	21	341	9	1,056	26
2011						0		360	0	341	21	1,056	26
2012						0		2	0	341	21	1,056	26
2013						0		0	0	216	0	1,056	26
2014	54,458		0	2,312	4	2,312	4	771	4	464	4	1,265	10
2015	8,176		0	1,291.05	16	1,291	16	1,201	6	721	6	1,269	11
2016	49,844	(1)	(0)	13,169	26	13,168	26	5,590	15	3,354	15	2,756	17
2017	174,864		0		0	0	0	4,820	6	3,354	6	2,756	7
2018						0		4,389	6	3,354	6	2,756	7
2019				10,735		10,735		3,578	6	5,039	11	3,643	11
TOTAL	307,427	6	0.00	32,778	10.66	32,785	10.66						

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MISSOURI AMERICAN WATER
ACCOUNT 34500 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
1974	104,335		0	53,287	51	53,287	51					53,287	51
1975	592		0		0	0	0					53,287	51
1976						0		17,762	51			53,287	51
1977						0		0	0			53,287	51
1978	41,870		0	14,576	35	14,576	35	4,859	35	13,573	46	33,932	46
1979	91,295	(38)	(0)	36,201	40	36,163	40	16,913	38	10,148	38	34,675	44
1980	40,846		0	19,600	48	19,600	48	23,446	40	14,068	40	30,907	44
1981	238,332	(62)	(0)	91,300	38	91,238	38	49,000	40	32,315	39	42,973	42
1982	132,157		0	75,400	57	75,400	57	62,079	45	47,395	44	48,377	45
1983	109,351		0	40,625	37	40,625	37	69,088	43	52,605	43	47,270	44
1984	63,151		0	12,109	19	12,109	19	42,711	42	47,794	41	42,875	42
1985	74,553		0	31,695	43	31,695	43	28,143	34	50,213	41	41,633	42
1986	126,091		0	45,000	36	45,000	36	29,601	34	40,966	41	41,969	41
1987	110,242		0	300	0	300	0	25,665	25	25,946	27	38,181	37
1988	54,304		0	36,100	66	36,100	66	27,133	28	25,041	29	38,008	38
1989	166,117		0	80,199	48	80,199	48	38,866	35	38,659	36	41,253	40
1990	159,435			61,873	39	61,873	39	59,391	47	44,694	36	42,726	40
1991	118,560		0	60,042	51	60,042	51	67,371	46	47,703	39	43,880	40
1992	108,498		0	35,251	32	35,251	32	52,389	41	54,693	45	43,341	40
1993	153,427		0	48,355	32	48,355	32	47,883	38	57,144	40	43,636	39
1994	268,801	(69)	(0)	91,505	34	91,436	34	58,347	33	59,391	37	46,292	39
1995	258,942		0	10,468	4	10,468	4	50,086	22	49,110	27	44,406	35
1996	227,536		0	14,855	7	14,855	7	38,920	15	40,073	20	42,929	32
1997	124,143	(820)	(1)		0	(820)	(1)	8,168	4	32,859	16	40,845	31
1998	136,293		0		0	0	0	4,678	3	23,188	11	40,845	29
1999	68,804		0	55,867	81	55,867	81	18,349	17	16,074	10	41,528	31
2000	45,690		0		0	0	0	18,622	22	13,980	12	41,528	30
2001	43,816		0		0	0	0	18,622	35	11,009	13	41,528	30
2002	18,972		0	2,231	12	2,231	12	744	2	11,620	19	39,820	30
2003	736		0		0	0	0	744	4	11,620	33	39,820	30
2004	1,384		0		0	0	0	744	11	446	2	39,820	30
2005						0		0	0	446	3	39,820	30
2006	103,085		0		0	0	0	0	0	446	2	39,820	29
2007						0		0	0	0	0	39,820	29

MISSOURI AMERICAN WATER
ACCOUNT 34500 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
2008	66,100		0		0	0	0	0	0	0	0	39,820	28
2009						0		0	0	0	0	39,820	28
2010				1,633		1,633		544	2	327	1	38,228	28
2011	103,132		0	9,005	9	9,005	9	3,546	10	2,128	6	37,060	28
2012						0		3,546	10	2,128	6	37,060	28
2013	4,614		0	36	1	36	1	3,014	8	2,135	10	35,636	28
2014	398,622	(1,947)	(0)	46,470	12	44,523	11	14,853	11	11,039	11	35,965	26
2015	45,837	0	0			0		14,853	10	10,713	10	35,965	25
2016		(286)		187,287		187,001		77,175	52	46,312	52	41,359	30
2017	83,693	(105)	(0)	18,859	23	18,754	22	68,585	159	50,063	47	40,579	30
2018		(50,921)		0		(50,921)		51,611	185	39,871	38	37,529	29
2019	19,866	(48,276)	(243)	3	0	(48,273)	(243)	-26,813	-78	21,312	71	34,762	28
TOTAL	3,913,222	(102,524)	(2.62)	1,180,132	30.16	1,077,608	27.54						

Previously Approved 20
Recommended 25



SECTION 8

8 DETAILED DEPRECIATION CALCULATIONS

ALG - Remaining Life
Survivor Curve: R2.5
ASL: 65
Net Salvage: -30%
Truncation Year:

Missouri American Water

Account #: 304.1000 - Structures and Improvements - Source of Supply

CALCULATED ANNUAL ACCRUAL AND ACCRUED DEPRECIATION
BASED ON ORIGINAL COST AS OF DECEMBER 31, 2019

Year	Original Cost	Calculated Accumulated Depreciation	Allocated Actual Booked Amount	Accumulated Depreciation Factor	Net Book Value	ALG Remaining Life	Annual Accrual	Average Age
1922	50.87	60	65	1.2798	1	5.82	0	97.5
1954	924.30	919	993	1.0747	208	15.31	14	65.5
1955	330,648.68	325,593	352,069	1.0648	77,775	15.76	4,934	64.5
1956	4,922.95	4,801	5,192	1.0546	1,208	16.24	74	63.5
1959	21,418.49	20,248	21,894	1.0222	5,950	17.73	336	60.5
1963	2,179.00	1,965	2,125	0.9751	708	19.91	36	56.5
1964	133,202.82	118,589	128,232	0.9627	44,931	20.49	2,193	55.5
1965	110.43	97	105	0.9500	39	21.07	2	54.5
1968	395,948.53	333,389	360,498	0.9105	154,235	22.90	6,735	51.5
1969	10,128.43	8,400	9,083	0.8968	4,084	23.53	174	50.5
1970	3,965.30	3,238	3,501	0.8830	1,654	24.17	68	49.5
1971	358,783.28	288,290	311,732	0.8689	154,686	24.82	6,231	48.5
1972	11,034.79	8,721	9,430	0.8546	4,915	25.48	193	47.5
1973	145,533.90	113,062	122,256	0.8401	66,938	26.16	2,559	46.5
1974	10,371.86	7,917	8,560	0.8254	4,923	26.84	183	45.5
1975	811.39	608	658	0.8104	397	27.53	14	44.5
1976	7,422.33	5,459	5,903	0.7954	3,746	28.22	133	43.5
1977	289,893.34	209,129	226,134	0.7801	150,727	28.93	5,210	42.5
1978	48,562.47	34,339	37,131	0.7646	26,000	29.64	877	41.5
1979	2,421.22	1,677	1,813	0.7489	1,334	30.37	44	40.5
1980	339.87	230	249	0.7331	193	31.10	6	39.5
1981	1,225.17	813	879	0.7171	714	31.84	22	38.5
1983	2,719.29	1,722	1,862	0.6847	1,673	33.34	50	36.5
1984	20,099.50	12,420	13,430	0.6682	12,700	34.10	372	35.5
1988	786.00	437	472	0.6006	550	37.23	15	31.5
1989	9,337.55	5,038	5,447	0.5834	6,691	38.02	176	30.5

ALG - Remaining Life
Survivor Curve: R2.5
ASL: 65
Net Salvage: -30%
Truncation Year:

Missouri American Water

Account #: 304.1000 - Structures and Improvements - Source of Supply

CALCULATED ANNUAL ACCRUAL AND ACCRUED DEPRECIATION

BASED ON ORIGINAL COST AS OF DECEMBER 31, 2019

Year	Original Cost	Calculated Depreciation	Accumulated Depreciation	Allocated Actual Booked Amount	Actual Depreciation Factor	Net Book Value	ALG Remaining Life	Annual Accrual	Average Age
1990	52,067.06	27,252	29,468	29,468	0.5660	38,219	38.83	984	29.5
1991	9,068.10	4,599	4,973	4,973	0.5484	6,815	39.64	172	28.5
1992	29,452.23	14,456	15,631	15,631	0.5307	22,657	40.46	560	27.5
1993	2,268,874.66	1,076,189	1,163,698	1,163,698	0.5129	1,785,839	41.28	43,258	26.5
1994	298,550.14	136,650	147,761	147,761	0.4949	240,354	42.11	5,707	25.5
1995	45,857.07	20,222	21,866	21,866	0.4768	37,748	42.95	879	24.5
1996	11,055.00	4,689	5,070	5,070	0.4586	9,302	43.79	212	23.5
1997	269,942.56	109,903	118,840	118,840	0.4402	232,085	44.64	5,199	22.5
1998	102,887.17	40,131	43,394	43,394	0.4218	90,359	45.50	1,986	21.5
1999	24,389.71	9,093	9,833	9,833	0.4032	21,874	46.36	472	20.5
2000	1,432.89	509	551	551	0.3844	1,312	47.22	28	19.5
2001	16,461.03	5,566	6,018	6,018	0.3656	15,381	48.09	320	18.5
2002	167,842.19	53,807	58,183	58,183	0.3467	160,012	48.97	3,267	17.5
2003	2,842,553.36	861,152	931,176	931,176	0.3276	2,764,143	49.85	55,446	16.5
2004	746,204.30	212,838	230,145	230,145	0.3084	739,921	50.74	14,583	15.5
2006	403,388.98	100,642	108,826	108,826	0.2698	415,580	52.53	7,912	13.5
2007	2,269,712.01	525,409	568,132	568,132	0.2503	2,382,493	53.43	44,595	12.5
2008	33,886.14	7,231	7,819	7,819	0.2307	36,233	54.33	667	11.5
2009	18,155.23	3,544	3,833	3,833	0.2111	19,769	55.24	358	10.5
2010	105,968.87	18,753	20,278	20,278	0.1914	117,482	56.15	2,092	9.5
2011	1,479,419.13	234,685	253,768	253,768	0.1715	1,669,477	57.07	29,254	8.5
2012	22,897.66	3,211	3,472	3,472	0.1516	26,295	57.99	453	7.5
2013	222,286.62	27,062	29,262	29,262	0.1316	259,711	58.91	4,408	6.5
2014	142,362.95	14,690	15,884	15,884	0.1116	169,188	59.84	2,827	5.5
2015	61,790.85	5,225	5,650	5,650	0.0914	74,678	60.77	1,229	4.5
2016	244,284.29	16,093	17,402	17,402	0.0712	300,168	61.71	4,864	3.5

ALG - Remaining Life
Survivor Curve: R2.5
ASL: 65
Net Salvage: -30%
Truncation Year:

Missouri American Water

Account #: 304.1000 - Structures and Improvements - Source of Supply

CALCULATED ANNUAL ACCRUAL AND ACCRUED DEPRECIATION
BASED ON ORIGINAL COST AS OF DECEMBER 31, 2019

Year	Original Cost	Calculated Accumulated Depreciation	Allocated Actual Booked Amount	Accumulated Depreciation Factor	Net Book Value	ALG Remaining Life	Annual Accrual	Average Age
2017	1,032,032.28	48,643	52,599	0.0510	1,289,043	62.64	20,577	2.5
2018	3,291,860.63	93,242	100,824	0.0306	4,178,595	63.58	65,718	1.5
2019	1,819,172.13	17,212	18,612	0.0102	2,346,312	64.53	36,362	0.5
TOTAL	19,846,697.00	5,199,859	5,622,679		20,178,027		385,043	

COMPOSITE ANNUAL ACCRUAL RATE	1.94%
THEORETICAL ACCUMULATED DEPRECIATION FACTOR	0.28
COMPOSITE AVERAGE AGE (YEARS)	14.86
DIRECTED WEIGHTED ALG COMPOSITE REMAINING LIFE (YEARS)	51.90

ALG - Remaining Life
Survivor Curve: R2
ASL: 75
Net Salvage: -20%
Truncation Year: 2038

Missouri American Water

Account #: 304.2001 - Structures and Improvements - Power and Pumping - Corporate

CALCULATED ANNUAL ACCRUAL AND ACCRUED DEPRECIATION
BASED ON ORIGINAL COST AS OF DECEMBER 31, 2019

Year	Original Cost	Calculated Accumulated Depreciation	Allocated Actual Booked Amount	Accumulated Depreciation Factor	Net Book Value	ALG Remaining Life	Annual Accrual	Average Age
2015	62,070.79	14,522	32,443	0.5227	42,042	18.16	2,316	4.5
2018	169,847.68	15,351	34,294	0.2019	169,523	18.20	9,316	1.5
TOTAL	231,918.47	29,873	66,737		211,565		11,631	

COMPOSITE ANNUAL ACCRUAL RATE	5.02%
THEORETICAL ACCUMULATED DEPRECIATION FACTOR	0.29
COMPOSITE AVERAGE AGE (YEARS)	2.30
DIRECTED WEIGHTED ALG COMPOSITE REMAINING LIFE (YEARS)	18.19

ALG - Remaining Life

Survivor Curve: R2

ASL: 75

Net Salvage: -20%

Truncation Year: 2041

Missouri American Water

Account #: 304.2002 - Structures and Improvements - Power and Pumping - St. Louis

CALCULATED ANNUAL ACCRUAL AND ACCRUED DEPRECIATION

BASED ON ORIGINAL COST AS OF DECEMBER 31, 2019

Year	Original Cost	Calculated Accumulated Depreciation	Allocated Actual Booked Amount	Accumulated Depreciation Factor	Net Book Value	ALG Remaining Life	Annual Accrual	Average Age
1903	4,019.66	4,423	3,024	0.7524	1,799	6.23	289	116.5
1912	28.42	30	21	0.7252	13	8.71	1	107.5
1915	49.43	52	35	0.7171	24	9.46	3	104.5
1921	4,787.04	4,916	3,361	0.7022	2,383	10.82	220	98.5
1926	7,446.17	7,521	5,143	0.6907	3,793	11.87	320	93.5
1929	597.84	598	409	0.6838	309	12.48	25	90.5
1931	118,404.77	117,594	80,408	0.6791	61,678	12.88	4,790	88.5
1932	1,143.35	1,132	774	0.6767	598	13.07	46	87.5
1933	1,297.02	1,279	875	0.6744	682	13.27	51	86.5
1935	43.26	42	29	0.6696	23	13.66	2	84.5
1936	273.84	267	183	0.6672	146	13.85	11	83.5
1937	173.12	168	115	0.6648	93	14.04	7	82.5
1938	3,788.76	3,670	2,509	0.6623	2,037	14.23	143	81.5
1939	127.65	123	84	0.6599	69	14.42	5	80.5
1940	0.16	0	0	0.6574	0	14.60	0	79.5
1941	2,152.11	2,061	1,410	0.6549	1,173	14.78	79	78.5
1942	797.24	761	520	0.6525	437	14.97	29	77.5
1943	2,501.81	2,378	1,626	0.6499	1,376	15.14	91	76.5
1944	9,936.85	9,408	6,433	0.6474	5,491	15.32	358	75.5
1945	16,507.07	15,568	10,645	0.6449	9,164	15.49	591	74.5
1946	2,059.93	1,935	1,323	0.6423	1,149	15.66	73	73.5
1947	4,485.03	4,196	2,869	0.6397	2,513	15.83	159	72.5
1948	30,904.18	28,794	19,689	0.6371	17,396	16.00	1,087	71.5
1949	1,949.71	1,809	1,237	0.6345	1,103	16.16	68	70.5
1950	1,258.75	1,163	795	0.6318	715	16.32	44	69.5
1951	197.35	182	124	0.6291	113	16.48	7	68.5

ALG - Remaining Life

Survivor Curve: R2

ASL: 75

Net Salvage: -20%

Truncation Year: 2041

Missouri American Water

Account #: 304.2002 - Structures and Improvements - Power and Pumping - St. Louis

CALCULATED ANNUAL ACCRUAL AND ACCRUED DEPRECIATION

BASED ON ORIGINAL COST AS OF DECEMBER 31, 2019

Year	Original Cost	Calculated Accumulated Depreciation	Allocated Actual Booked Amount	Accumulated Depreciation Factor	Net Book Value	ALG Remaining Life	Annual Accrual	Average Age
1953	3,839.08	3,501	2,394	0.6236	2,213	16.78	132	66.5
1954	57,933.28	52,602	35,968	0.6208	33,552	16.93	1,982	65.5
1955	724,955.51	655,265	448,053	0.6180	421,894	17.07	24,711	64.5
1956	199,549.83	179,534	122,761	0.6152	116,699	17.21	6,779	63.5
1957	28,899.09	25,878	17,695	0.6123	16,984	17.35	979	62.5
1958	4,038.89	3,599	2,461	0.6094	2,385	17.48	136	61.5
1959	2,592.40	2,299	1,572	0.6064	1,539	17.62	87	60.5
1960	82,482.16	72,787	49,770	0.6034	49,209	17.74	2,773	59.5
1961	25,558.78	22,440	15,344	0.6003	15,326	17.87	858	58.5
1962	14,334.45	12,520	8,561	0.5972	8,640	17.99	480	57.5
1963	11,295.64	9,814	6,710	0.5941	6,844	18.10	378	56.5
1964	5,842.53	5,049	3,452	0.5908	3,559	18.22	195	55.5
1965	29,862.71	25,661	17,546	0.5876	18,289	18.33	998	54.5
1966	25,280.48	21,600	14,769	0.5842	15,567	18.44	844	53.5
1967	25,964.30	22,055	15,080	0.5808	16,077	18.54	867	52.5
1968	24,194.42	20,428	13,968	0.5773	15,065	18.64	808	51.5
1969	1,155.56	970	663	0.5738	724	18.74	39	50.5
1970	1,239.63	1,034	707	0.5701	781	18.84	41	49.5
1972	2,003.90	1,649	1,127	0.5626	1,277	19.02	67	47.5
1974	16,057.63	13,026	8,907	0.5547	10,362	19.19	540	45.5
1975	35,066.60	28,236	19,307	0.5506	22,773	19.27	1,182	44.5
1976	2,917.04	2,331	1,594	0.5464	1,907	19.35	99	43.5
1977	298.89	237	162	0.5420	197	19.42	10	42.5
1978	19,387.50	15,242	10,422	0.5376	12,843	19.50	659	41.5
1979	89,720.97	69,936	47,821	0.5330	59,844	19.57	3,058	40.5
1980	22,582.60	17,447	11,930	0.5283	15,170	19.64	773	39.5

ALG - Remaining Life

Survivor Curve: R2

ASL: 75

Net Salvage: -20%

Truncation Year: 2041

Missouri American Water

Account #: 304.2002 - Structures and Improvements - Power and Pumping - St. Louis

CALCULATED ANNUAL ACCRUAL AND ACCRUED DEPRECIATION

BASED ON ORIGINAL COST AS OF DECEMBER 31, 2019

Year	Original Cost	Calculated Accumulated Depreciation	Allocated Actual Booked Amount	Accumulated Depreciation Factor	Net Book Value	ALG Remaining Life	Annual Accrual	Average Age
1981	37,656.53	28,824	19,709	0.5234	25,479	19.70	1,293	38.5
1982	21,518.72	16,313	11,155	0.5184	14,668	19.77	742	37.5
1983	9,684.50	7,268	4,970	0.5132	6,651	19.83	335	36.5
1984	8,223.54	6,107	4,176	0.5078	5,692	19.89	286	35.5
1985	59,805.85	43,932	30,040	0.5023	41,727	19.95	2,092	34.5
1986	493,017.11	358,025	244,808	0.4966	346,813	20.00	17,339	33.5
1987	120,022.21	86,117	58,884	0.4906	85,142	20.06	4,245	32.5
1988	185,661.88	131,544	89,946	0.4845	132,848	20.11	6,607	31.5
1989	610,511.68	426,852	291,871	0.4781	440,743	20.16	21,864	30.5
1990	126,235.15	87,036	59,513	0.4714	91,969	20.21	4,551	29.5
1991	1,326,610.40	901,315	616,296	0.4646	975,637	20.25	48,169	28.5
1993	780,082.68	513,317	350,993	0.4499	585,107	20.34	28,760	26.5
1994	62,403.19	40,354	27,593	0.4422	47,291	20.39	2,320	25.5
1995	123,492.45	78,395	53,605	0.4341	94,586	20.43	4,630	24.5
1996	41,859.63	26,055	17,816	0.4256	32,416	20.47	1,584	23.5
1997	225,343.12	137,352	93,918	0.4168	176,494	20.51	8,607	22.5
1998	687,782.25	409,913	280,288	0.4075	545,051	20.54	26,532	21.5
1999	374,897.64	218,125	149,149	0.3978	300,729	20.58	14,613	20.5
2000	295,553.90	167,572	114,581	0.3877	240,083	20.61	11,647	19.5
2001	75,568.87	41,667	28,491	0.3770	62,192	20.65	3,012	18.5
2002	134,502.92	71,957	49,202	0.3658	112,201	20.68	5,426	17.5
2004	8,934.69	4,463	3,052	0.3416	7,670	20.74	370	15.5
2005	22,746.91	10,927	7,471	0.3285	19,825	20.77	954	14.5
2007	321,234.65	140,886	96,334	0.2999	289,147	20.83	13,884	12.5
2008	632,337.37	262,919	179,777	0.2843	579,028	20.85	27,768	11.5
2009	116,906.82	45,778	31,302	0.2678	108,986	20.88	5,220	10.5

ALG - Remaining Life

Survivor Curve: R2

ASL: 75

Net Salvage: -20%

Truncation Year: 2041

Missouri American Water

Account #: 304.2002 - Structures and Improvements - Power and Pumping - St. Louis

CALCULATED ANNUAL ACCRUAL AND ACCRUED DEPRECIATION
BASED ON ORIGINAL COST AS OF DECEMBER 31, 2019

Year	Original Cost	Calculated Accumulated Depreciation	Allocated Actual Booked Amount	Accumulated Depreciation Factor	Net Book Value	ALG Remaining Life	Annual Accrual	Average Age
2010	83,234.37	30,447	20,819	0.2501	79,062	20.90	3,782	9.5
2011	128,690.38	43,536	29,769	0.2313	124,659	20.93	5,957	8.5
2012	364,591.07	112,627	77,011	0.2112	360,498	20.95	17,208	7.5
2014	195,204.31	47,548	32,512	0.1666	201,733	20.99	9,609	5.5
2015	4,007,830.74	830,216	567,680	0.1416	4,241,717	21.01	201,850	4.5
2016	286,527.07	48,076	32,873	0.1147	310,959	21.03	14,783	3.5
2017	1,769,239.98	221,422	151,403	0.0856	1,971,685	21.05	93,651	2.5
2018	519,545.72	40,943	27,996	0.0539	595,459	21.07	28,258	1.5
2019	1,083,002.10	30,577	20,908	0.0193	1,278,695	21.09	60,629	0.5
TOTAL	17,012,444.79	7,163,619	4,898,297		15,516,637		756,553	

COMPOSITE ANNUAL ACCRUAL RATE	4.45%
THEORETICAL ACCUMULATED DEPRECIATION FACTOR	0.29
COMPOSITE AVERAGE AGE (YEARS)	17.85
DIRECTED WEIGHTED ALG COMPOSITE REMAINING LIFE (YEARS)	20.39

ALG - Remaining Life

Survivor Curve: R2

ASL: 75

Net Salvage: -20%

Truncation Year: 2063

Missouri American Water

Account #: 304.2003 - Structures and Improvements - Power and Pumping - St. Joseph

CALCULATED ANNUAL ACCRUAL AND ACCRUED DEPRECIATION

BASED ON ORIGINAL COST AS OF DECEMBER 31, 2019

Year	Original Cost	Calculated Accumulated Depreciation	Allocated Actual Booked Amount	Accumulated Depreciation Factor	Net Book Value	ALG Remaining Life	Annual Accrual	Average Age
1909	70.78	76	85	1.2000	0	7.97	0	110.5
1950	4,031.09	3,375	4,542	1.1267	295	22.66	13	69.5
1955	10,093.47	8,085	10,881	1.0780	1,232	24.77	50	64.5
1956	77.73	62	83	1.0680	10	25.19	0	63.5
1969	21,341.62	14,786	19,900	0.9324	5,710	30.36	188	50.5
1973	207.32	137	184	0.8881	65	31.79	2	46.5
1980	24,421.53	14,625	19,682	0.8059	9,624	34.04	283	39.5
1989	4,000.00	2,044	2,751	0.6878	2,049	36.44	56	30.5
1992	521.60	250	336	0.6438	290	37.12	8	27.5
1993	1,462.59	683	919	0.6285	836	37.33	22	26.5
1998	1,440,302.51	584,750	786,952	0.5464	941,411	38.31	24,571	21.5
2002	14,851.33	5,214	7,016	0.4724	10,805	39.00	277	17.5
2006	941.42	272	366	0.3892	763	39.61	19	13.5
2008	32,411.82	8,272	11,132	0.3435	27,762	39.88	696	11.5
2009	4,457.01	1,058	1,423	0.3194	3,925	40.02	98	10.5
2016	2,539,702.87	233,067	313,660	0.1235	2,733,984	40.83	66,958	3.5
2017	2,097.61	142	191	0.0908	2,327	40.93	57	2.5
TOTAL	4,100,992.30	876,896	1,180,103		3,741,088		93,299	

COMPOSITE ANNUAL ACCRUAL RATE 2.28%

THEORETICAL ACCUMULATED DEPRECIATION FACTOR 0.29

COMPOSITE AVERAGE AGE (YEARS) 10.66

DIRECTED WEIGHTED ALG COMPOSITE REMAINING LIFE (YEARS) 39.77

ALG - Remaining Life
Survivor Curve: R2
ASL: 75
Net Salvage: -20%
Truncation Year: 2031

Missouri American Water

Account #: 304.2004 - Structures and Improvements - Power and Pumping - Warrensburg

CALCULATED ANNUAL ACCRUAL AND ACCRUED DEPRECIATION
BASED ON ORIGINAL COST AS OF DECEMBER 31, 2019

Year	Original Cost	Calculated Accumulated Depreciation	Allocated Actual Booked Amount	Accumulated Depreciation Factor	Net Book Value	ALG Remaining Life	Annual Accrual	Average Age
1963	7,838.26	7,740	3,701	0.4722	5,705	10.60	538	56.5
1973	6,001.71	5,722	2,736	0.4559	4,466	10.88	411	46.5
1974	125.76	119	57	0.4539	94	10.90	9	45.5
1978	319.73	298	142	0.4454	241	10.98	22	41.5
1983	1,151.48	1,042	498	0.4327	883	11.07	80	36.5
1984	179.64	162	77	0.4299	138	11.09	12	35.5
1990	15,559.19	13,333	6,375	0.4097	12,296	11.17	1,101	29.5
1991	37,832.40	32,107	15,352	0.4058	30,047	11.18	2,687	28.5
1995	8,452.26	6,854	3,277	0.3877	6,865	11.23	611	24.5
2006	104,469.72	67,303	32,181	0.3080	93,183	11.33	8,228	13.5
2007	55,929.42	34,757	16,619	0.2971	50,496	11.33	4,456	12.5
2019	47,689.05	2,413	1,154	0.0242	56,073	11.40	4,919	0.5
TOTAL	285,548.62	171,850	82,170		260,489		23,072	

COMPOSITE ANNUAL ACCRUAL RATE	8.08%
THEORETICAL ACCUMULATED DEPRECIATION FACTOR	0.29
COMPOSITE AVERAGE AGE (YEARS)	16.34
DIRECTED WEIGHTED ALG COMPOSITE REMAINING LIFE (YEARS)	11.28

ALG - Remaining Life
Survivor Curve: R2
ASL: 75
Net Salvage: -20%
Truncation Year: 2040

Missouri American Water

Account #: 304.2005 - Structures and Improvements - Power and Pumping - Brunswick

CALCULATED ANNUAL ACCRUAL AND ACCRUED DEPRECIATION
BASED ON ORIGINAL COST AS OF DECEMBER 31, 2019

Year	Original Cost	Calculated Accumulated Depreciation	Allocated Actual Booked Amount	Accumulated Depreciation Factor	Net Book Value	ALG Remaining Life	Annual Accrual	Average Age
2000	33,563.59	19,500	10,307	0.3071	29,970	19.70	1,521	19.5
2003	3,847.81	2,045	1,081	0.2810	3,536	19.79	179	16.5
2004	3,982.70	2,044	1,081	0.2713	3,699	19.82	187	15.5
2006	2,772.54	1,313	694	0.2503	2,633	19.87	133	13.5
2007	385.04	174	92	0.2388	370	19.90	19	12.5
2010	4,927.25	1,862	984	0.1997	4,929	19.96	247	9.5
TOTAL	49,478.93	26,939	14,238		45,137		2,284	

COMPOSITE ANNUAL ACCRUAL RATE	4.62%
THEORETICAL ACCUMULATED DEPRECIATION FACTOR	0.29
COMPOSITE AVERAGE AGE (YEARS)	17.56
DIRECTED WEIGHTED ALG COMPOSITE REMAINING LIFE (YEARS)	19.76

ALG - Remaining Life

Survivor Curve: R2

ASL: 75

Net Salvage: -20%

Truncation Year: 2042

Missouri American Water

Account #: 304.2006 - Structures and Improvements - Power and Pumping - St. Charles

CALCULATED ANNUAL ACCRUAL AND ACCRUED DEPRECIATION

BASED ON ORIGINAL COST AS OF DECEMBER 31, 2019

Year	Original Cost	Calculated Accumulated Depreciation	Allocated Actual Booked Amount	Accumulated Depreciation Factor	Net Book Value	ALG Remaining Life	Annual Accrual	Average Age
1951	26,041.79	23,769	12,610	0.4842	18,640	16.99	1,097	68.5
1968	44,491.48	37,116	19,692	0.4426	33,698	19.34	1,742	51.5
1975	8,697.24	6,907	3,664	0.4213	6,772	20.03	338	44.5
1978	23,283.47	18,037	9,570	0.4110	18,371	20.28	906	41.5
1979	31,728.69	24,363	12,926	0.4074	25,149	20.36	1,235	40.5
1983	1,591.73	1,175	624	0.3917	1,287	20.65	62	36.5
1989	73,390.28	50,373	26,726	0.3642	61,343	21.01	2,919	30.5
1990	20,022.99	13,547	7,188	0.3590	16,840	21.07	799	29.5
1991	307.17	205	109	0.3536	260	21.12	12	28.5
1993	44,877.84	28,942	15,355	0.3422	38,498	21.22	1,814	26.5
1994	4,079.83	2,585	1,371	0.3361	3,525	21.27	166	25.5
1997	823,414.06	490,931	260,463	0.3163	727,634	21.40	34,006	22.5
1998	28,428.80	16,565	8,788	0.3091	25,326	21.44	1,181	21.5
2002	9,784.12	5,105	2,709	0.2768	9,032	21.59	418	17.5
2006	211,272.91	94,526	50,151	0.2374	203,377	21.72	9,363	13.5
2007	290,758.72	123,911	65,741	0.2261	283,170	21.75	13,018	12.5
2008	5,609.55	2,264	1,201	0.2142	5,530	21.78	254	11.5
2010	50,089.70	17,755	9,420	0.1881	50,688	21.84	2,321	9.5
2019	72,155.02	1,955	1,037	0.0144	85,549	22.04	3,881	0.5

ALG - Remaining Life
Survivor Curve: R2
ASL: 75
Net Salvage: -20%
Truncation Year: 2042

Missouri American Water

Account #: 304.2006 - Structures and Improvements - Power and Pumping - St. Charles

CALCULATED ANNUAL ACCRUAL AND ACCRUED DEPRECIATION BASED ON ORIGINAL COST AS OF DECEMBER 31, 2019

Year	Original Cost	Calculated Accumulated Depreciation	Allocated Actual Booked Amount	Accumulated Depreciation Factor	Net Book Value	ALG Remaining Life	Annual Accrual	Average Age
TOTAL	1,770,025.39	960,030	509,343		1,614,687		75,534	
COMPOSITE ANNUAL ACCRUAL RATE				4.27%				
THEORETICAL ACCUMULATED DEPRECIATION FACTOR				0.29				
COMPOSITE AVERAGE AGE (YEARS)				21.06				
DIRECTED WEIGHTED ALG COMPOSITE REMAINING LIFE (YEARS)				21.35				

ALG - Remaining Life
Survivor Curve: R2
ASL: 75
Net Salvage: -20%
Truncation Year: 2031

Missouri American Water

Account #: 304.2007 - Structures and Improvements - Power and Pumping - Mexico

CALCULATED ANNUAL ACCRUAL AND ACCRUED DEPRECIATION
BASED ON ORIGINAL COST AS OF DECEMBER 31, 2019

Year	Original Cost	Calculated Accumulated Depreciation	Allocated Actual Booked Amount	Accumulated Depreciation Factor	Net Book Value	ALG Remaining Life	Annual Accrual	Average Age
1956	18,831.71	18,948	6,472	0.3437	16,126	10.34	1,560	63.5
1978	1,544.01	1,438	491	0.3182	1,362	10.98	124	41.5
1984	9,423.33	8,472	2,894	0.3071	8,414	11.09	759	35.5
1986	5,832.61	5,169	1,766	0.3027	5,234	11.12	471	33.5
1996	1,183.79	947	324	0.2733	1,097	11.24	98	23.5
2005	9,456.23	6,291	2,149	0.2272	9,199	11.32	813	14.5
2014	5,002.96	1,934	661	0.1320	5,343	11.38	470	5.5
TOTAL	51,274.64	43,200	14,755		46,775		4,293	

COMPOSITE ANNUAL ACCRUAL RATE	8.37%
THEORETICAL ACCUMULATED DEPRECIATION FACTOR	0.29
COMPOSITE AVERAGE AGE (YEARS)	38.66
DIRECTED WEIGHTED ALG COMPOSITE REMAINING LIFE (YEARS)	10.89

ALG - Remaining Life

Survivor Curve: R2

ASL: 75

Net Salvage: -20%

Truncation Year: 2073

Missouri American Water

Account #: 304.2008 - Structures and Improvements - Power and Pumping - Joplin

CALCULATED ANNUAL ACCRUAL AND ACCRUED DEPRECIATION

BASED ON ORIGINAL COST AS OF DECEMBER 31, 2019

Year	Original Cost	Calculated Accumulated Depreciation	Allocated Actual Booked Amount	Accumulated Depreciation Factor	Net Book Value	ALG Remaining Life	Annual Accrual	Average Age
1892	4,444.10	5,111	5,333	1.2000	0	3.12	0	127.5
1898	3,752.58	4,215	4,503	1.2000	0	4.79	0	121.5
1900	6,035.52	6,725	7,243	1.2000	0	5.36	0	119.5
1910	2,434.38	2,599	2,921	1.2000	0	8.26	0	109.5
1911	120.93	129	145	1.2000	0	8.55	0	108.5
1926	50.27	50	60	1.2000	0	13.24	0	93.5
1927	34.54	34	41	1.2000	0	13.59	0	92.5
1941	44.94	40	54	1.2000	0	19.13	0	78.5
1945	1,038.64	898	1,246	1.2000	0	20.95	0	74.5
1946	24.02	21	29	1.2000	0	21.42	0	73.5
1948	167.42	141	201	1.2000	0	22.37	0	71.5
1950	1,232.00	1,018	1,478	1.2000	0	23.34	0	69.5
1951	225.31	184	270	1.2000	0	23.84	0	68.5
1954	3,349.27	2,662	4,019	1.2000	0	25.33	0	65.5
1955	3,322.01	2,613	3,986	1.2000	0	25.83	0	64.5
1956	2,756.27	2,146	3,308	1.2000	0	26.34	0	63.5
1958	174.22	133	209	1.2000	0	27.35	0	61.5
1961	807.33	595	969	1.2000	0	28.88	0	58.5
1963	4,882.19	3,514	5,859	1.2000	0	29.90	0	56.5
1970	4,399.03	2,889	5,279	1.2000	0	33.41	0	49.5
1973	40,084.24	25,213	48,101	1.2000	0	34.86	0	46.5
1976	3,077.61	1,848	3,670	1.1926	23	36.27	1	43.5
1980	50,880.82	28,582	56,755	1.1155	4,302	38.06	113	39.5
1982	43,320.68	23,472	46,608	1.0759	5,377	38.92	138	37.5
1984	50,375.62	26,270	52,165	1.0355	8,286	39.74	208	35.5
1985	12.96	7	13	1.0150	2	40.14	0	34.5

ALG - Remaining Life

Survivor Curve: R2

ASL: 75

Net Salvage: -20%

Truncation Year: 2073

Missouri American Water

Account #: 304.2008 - Structures and Improvements - Power and Pumping - Joplin

CALCULATED ANNUAL ACCRUAL AND ACCRUED DEPRECIATION

BASED ON ORIGINAL COST AS OF DECEMBER 31, 2019

Year	Original Cost	Calculated Accumulated Depreciation	Allocated Actual Booked Amount	Accumulated Depreciation Factor	Net Book Value	ALG Remaining Life	Annual Accrual	Average Age
1986	22,204.47	11,118	22,077	0.9943	4,568	40.54	113	33.5
1989	1,402.86	657	1,305	0.9305	378	41.67	9	30.5
1990	2,863.93	1,311	2,603	0.9087	834	42.03	20	29.5
1991	730.53	326	648	0.8866	229	42.39	5	28.5
1992	2,095.50	912	1,811	0.8641	704	42.73	16	27.5
1997	17,757.52	6,673	13,250	0.7461	8,059	44.34	182	22.5
1998	295.21	107	213	0.7212	141	44.64	3	21.5
2000	29,109.34	9,821	19,500	0.6699	15,431	45.21	341	19.5
2001	16,365.13	5,303	10,530	0.6434	9,109	45.49	200	18.5
2002	69,539.03	21,585	42,861	0.6164	40,586	45.76	887	17.5
2005	10,495.42	2,808	5,577	0.5313	7,018	46.52	151	14.5
2007	32,778.91	7,777	15,442	0.4711	23,892	46.99	508	12.5
2009	11,584.11	2,378	4,722	0.4077	9,178	47.44	193	10.5
2012	178,049.12	27,406	54,419	0.3056	159,240	48.06	3,314	7.5
2013	18,165.82	2,466	4,897	0.2696	16,902	48.25	350	6.5
2014	62,883.36	7,361	14,616	0.2324	60,844	48.44	1,256	5.5
2015	9,750.97	953	1,893	0.1941	9,808	48.62	202	4.5
2016	1,105,614.81	86,039	170,845	0.1545	1,155,893	48.80	23,685	3.5
2017	679,487.62	38,885	77,213	0.1136	738,172	48.97	15,073	2.5

ALG - Remaining Life
Survivor Curve: R2
ASL: 75
Net Salvage: -20%
Truncation Year: 2073

Missouri American Water

Account #: 304.2008 - Structures and Improvements - Power and Pumping - Joplin

CALCULATED ANNUAL ACCRUAL AND ACCRUED DEPRECIATION BASED ON ORIGINAL COST AS OF DECEMBER 31, 2019

Year	Original Cost	Calculated Accumulated Depreciation	Allocated Actual Booked Amount	Accumulated Depreciation Factor	Net Book Value	ALG Remaining Life	Annual Accrual	Average Age
TOTAL	2,498,220.56	374,997	718,889		2,278,976		46,970	
COMPOSITE ANNUAL ACCRUAL RATE				1.88%				
THEORETICAL ACCUMULATED DEPRECIATION FACTOR				0.29				
COMPOSITE AVERAGE AGE (YEARS)				8.94				
DIRECTED WEIGHTED ALG COMPOSITE REMAINING LIFE (YEARS)				47.17				

ALG - Remaining Life
Survivor Curve: R2
ASL: 75
Net Salvage: -20%
Truncation Year: 2054

Missouri American Water

Account #: 304.2009 - Structures and Improvements - Power and Pumping - Jefferson

CALCULATED ANNUAL ACCRUAL AND ACCRUED DEPRECIATION
BASED ON ORIGINAL COST AS OF DECEMBER 31, 2019

Year	Original Cost	Calculated Accumulated Depreciation	Allocated Actual Booked Amount	Accumulated Depreciation Factor	Net Book Value	ALG Remaining Life	Annual Accrual	Average Age
1947	18,852.00	16,505	15,137	0.8030	7,485	20.11	372	72.5
1964	1,809.00	1,392	1,276	0.7055	894	25.35	35	55.5
1966	618.00	467	428	0.6932	313	25.89	12	53.5
1990	72,224.00	40,295	36,957	0.5117	49,712	30.62	1,624	29.5
1993	1,135.00	596	546	0.4814	816	31.01	26	26.5
1994	10,102.00	5,185	4,756	0.4708	7,367	31.13	237	25.5
1997	3,921.00	1,867	1,712	0.4367	2,993	31.48	95	22.5
1999	9,282.55	4,170	3,825	0.4120	7,314	31.69	231	20.5
2002	457,065.45	185,244	169,897	0.3717	378,582	31.99	11,835	17.5
2007	7,077.85	2,266	2,078	0.2936	6,416	32.42	198	12.5
2011	955,569.96	227,500	208,653	0.2184	938,031	32.72	28,671	8.5
2018	11,590.96	596	546	0.0471	13,363	33.15	403	1.5
TOTAL	1,549,247.77	486,082	445,812		1,413,285		43,739	

COMPOSITE ANNUAL ACCRUAL RATE	2.82%
THEORETICAL ACCUMULATED DEPRECIATION FACTOR	0.29
COMPOSITE AVERAGE AGE (YEARS)	13.18
DIRECTED WEIGHTED ALG COMPOSITE REMAINING LIFE (YEARS)	32.22

ALG - Remaining Life
Survivor Curve: R2
ASL: 75
Net Salvage: -20%
Truncation Year: 2030

Missouri American Water

Account #: 304.2010 - Structures and Improvements - Power and Pumping - Rankin Acres

CALCULATED ANNUAL ACCRUAL AND ACCRUED DEPRECIATION
BASED ON ORIGINAL COST AS OF DECEMBER 31, 2019

Year	Original Cost	Calculated Accumulated Depreciation	Allocated Actual Booked Amount	Accumulated Depreciation Factor	Net Book Value	ALG Remaining Life	Annual Accrual	Average Age
2000	4,750.47	3,682	1,378	0.2902	4,322	10.32	419	19.5
2005	280.33	194	73	0.2591	264	10.35	26	14.5
2007	76.79	50	19	0.2428	74	10.36	7	12.5
TOTAL	5,107.59	3,926	1,470		4,659		452	

COMPOSITE ANNUAL ACCRUAL RATE	8.84%
THEORETICAL ACCUMULATED DEPRECIATION FACTOR	0.29
COMPOSITE AVERAGE AGE (YEARS)	19.12
DIRECTED WEIGHTED ALG COMPOSITE REMAINING LIFE (YEARS)	10.32

ALG - Remaining Life
Survivor Curve: R2
ASL: 75
Net Salvage: -20%
Truncation Year: 2035

Missouri American Water

Account #: 304.2011 - Structures and Improvements - Power and Pumping - Spring Valley

CALCULATED ANNUAL ACCRUAL AND ACCRUED DEPRECIATION
BASED ON ORIGINAL COST AS OF DECEMBER 31, 2019

Year	Original Cost	Calculated Accumulated Depreciation	Allocated Actual Booked Amount	Accumulated Depreciation Factor	Net Book Value	ALG Remaining Life	Annual Accrual	Average Age
2007	5,096.00	2,713	1,837	0.3606	4,278	15.18	282	12.5
2019	1,417.07	54	37	0.0259	1,664	15.31	109	0.5
TOTAL	6,513.07	2,767	1,874		5,941		391	

COMPOSITE ANNUAL ACCRUAL RATE	6.00%
THEORETICAL ACCUMULATED DEPRECIATION FACTOR	0.29
COMPOSITE AVERAGE AGE (YEARS)	9.89
DIRECTED WEIGHTED ALG COMPOSITE REMAINING LIFE (YEARS)	15.21

ALG - Remaining Life
Survivor Curve: R2
ASL: 75
Net Salvage: -20%
Truncation Year: 2030

Missouri American Water

Account #: 304.2012 - Structures and Improvements - Power and Pumping - Whitebranch

CALCULATED ANNUAL ACCRUAL AND ACCRUED DEPRECIATION
BASED ON ORIGINAL COST AS OF DECEMBER 31, 2019

Year	Original Cost	Calculated Accumulated Depreciation	Allocated Actual Booked Amount	Accumulated Depreciation Factor	Net Book Value	ALG Remaining Life	Annual Accrual	Average Age
2000	1,713.00	1,328	493	0.2879	1,562	10.32	151	19.5
2007	5.79	4	1	0.2409	6	10.36	1	12.5
TOTAL	1,718.79	1,332	495		1,568		152	

COMPOSITE ANNUAL ACCRUAL RATE 8.84%

THEORETICAL ACCUMULATED DEPRECIATION FACTOR 0.29

COMPOSITE AVERAGE AGE (YEARS) 19.48

DIRECTED WEIGHTED ALG COMPOSITE REMAINING LIFE (YEARS) 10.32

ALG - Remaining Life
Survivor Curve: R2
ASL: 75
Net Salvage: -20%
Truncation Year: 2035

Missouri American Water

Account #: 304.2013 - Structures and Improvements - Power and Pumping - Ozark Mountain

CALCULATED ANNUAL ACCRUAL AND ACCRUED DEPRECIATION
BASED ON ORIGINAL COST AS OF DECEMBER 31, 2019

Year	Original Cost	Calculated Accumulated Depreciation	Allocated Actual Booked Amount	Accumulated Depreciation Factor	Net Book Value	ALG Remaining Life	Annual Accrual	Average Age
2006	6,639.00	3,685	2,331	0.3511	5,636	15.16	372	13.5
2007	28,990.29	15,432	9,763	0.3368	25,025	15.18	1,649	12.5
2018	6,652.61	706	447	0.0671	7,537	15.30	493	1.5
2019	1,417.07	54	34	0.0242	1,666	15.31	109	0.5
TOTAL	43,698.97	19,876	12,575		39,864		2,622	

COMPOSITE ANNUAL ACCRUAL RATE	6.00%
THEORETICAL ACCUMULATED DEPRECIATION FACTOR	0.29
COMPOSITE AVERAGE AGE (YEARS)	10.59
DIRECTED WEIGHTED ALG COMPOSITE REMAINING LIFE (YEARS)	15.20

ALG - Remaining Life
Survivor Curve: R2
ASL: 75
Net Salvage: -20%
Truncation Year: 2030

Missouri American Water

Account #: 304.2014 - Structures and Improvements - Power and Pumping - Maple/River/Stone

CALCULATED ANNUAL ACCRUAL AND ACCRUED DEPRECIATION
BASED ON ORIGINAL COST AS OF DECEMBER 31, 2019

Year	Original Cost	Calculated Accumulated Depreciation	Allocated Actual Booked Amount	Accumulated Depreciation Factor	Net Book Value	ALG Remaining Life	Annual Accrual	Average Age
2000	9,481.15	7,350	3,246	0.3423	8,132	10.32	788	19.5
2005	143.43	99	44	0.3056	128	10.35	12	14.5
2007	62,859.13	40,774	18,006	0.2864	57,425	10.36	5,542	12.5
2009	1,262.08	753	333	0.2636	1,182	10.37	114	10.5
2016	1,125.82	337	149	0.1321	1,202	10.41	116	3.5
2017	1,243.12	286	126	0.1017	1,365	10.41	131	2.5
TOTAL	76,114.73	49,599	21,903		69,435		6,703	

COMPOSITE ANNUAL ACCRUAL RATE	8.81%
THEORETICAL ACCUMULATED DEPRECIATION FACTOR	0.29
COMPOSITE AVERAGE AGE (YEARS)	13.05
DIRECTED WEIGHTED ALG COMPOSITE REMAINING LIFE (YEARS)	10.36

ALG - Remaining Life
Survivor Curve: R2
ASL: 75
Net Salvage: -20%
Truncation Year: 2033

Missouri American Water

Account #: 304.2015 - Structures and Improvements - Power and Pumping - Saddlebrooke

CALCULATED ANNUAL ACCRUAL AND ACCRUED DEPRECIATION
BASED ON ORIGINAL COST AS OF DECEMBER 31, 2019

Year	Original Cost	Calculated Accumulated Depreciation	Allocated Actual Booked Amount	Accumulated Depreciation Factor	Net Book Value	ALG Remaining Life	Annual Accrual	Average Age
2003	10,305.14	6,756	2,965	0.2878	9,401	13.22	711	16.5
TOTAL	10,305.14	6,756	2,965		9,401		711	

COMPOSITE ANNUAL ACCRUAL RATE	6.90%
THEORETICAL ACCUMULATED DEPRECIATION FACTOR	0.29
COMPOSITE AVERAGE AGE (YEARS)	16.50
DIRECTED WEIGHTED ALG COMPOSITE REMAINING LIFE (YEARS)	13.22

ALG - Remaining Life
Survivor Curve: R2
ASL: 75
Net Salvage: -20%
Truncation Year: 2027

Missouri American Water

Account #: 304.2016 - Structures and Improvements - Power and Pumping- Tri-States

CALCULATED ANNUAL ACCRUAL AND ACCRUED DEPRECIATION
BASED ON ORIGINAL COST AS OF DECEMBER 31, 2019

Year	Original Cost	Calculated Accumulated Depreciation	Allocated Actual Booked Amount	Accumulated Depreciation Factor	Net Book Value	ALG Remaining Life	Annual Accrual	Average Age
1987	8,599.60	8,334	2,891	0.3361	7,429	7.35	1,011	32.5
2008	1,793.00	1,297	450	0.2509	1,702	7.44	229	11.5
2017	1,902.81	570	198	0.1038	2,086	7.46	280	2.5
TOTAL	12,295.41	10,200	3,538		11,216		1,519	

COMPOSITE ANNUAL ACCRUAL RATE	12.36%
THEORETICAL ACCUMULATED DEPRECIATION FACTOR	0.29
COMPOSITE AVERAGE AGE (YEARS)	24.79
DIRECTED WEIGHTED ALG COMPOSITE REMAINING LIFE (YEARS)	7.38

ALG - Remaining Life
Survivor Curve: R2
ASL: 75
Net Salvage: -20%
Truncation Year: 2067

Missouri American Water

Account #: 304.2022 - Structures and Improvements - Power and Pumping - Parkville

CALCULATED ANNUAL ACCRUAL AND ACCRUED DEPRECIATION
BASED ON ORIGINAL COST AS OF DECEMBER 31, 2019

Year	Original Cost	Calculated Accumulated Depreciation	Allocated Actual Booked Amount	Accumulated Depreciation Factor	Net Book Value	ALG Remaining Life	Annual Accrual	Average Age
1969	8,456.17	5,750	10,147	1.2000	0	31.57	0	50.5
1989	1,120.05	551	1,344	1.2000	0	38.72	0	30.5
1990	3,544.28	1,705	4,253	1.2000	0	39.00	0	29.5
2006	2,511.58	685	2,468	0.9826	546	42.60	13	13.5
2017	222,857.46	13,993	50,415	0.2262	217,014	44.25	4,905	2.5
TOTAL	238,489.54	22,684	68,628		217,560		4,918	

COMPOSITE ANNUAL ACCRUAL RATE	2.06%
THEORETICAL ACCUMULATED DEPRECIATION FACTOR	0.29
COMPOSITE AVERAGE AGE (YEARS)	4.85
DIRECTED WEIGHTED ALG COMPOSITE REMAINING LIFE (YEARS)	43.67

ALG - Remaining Life
Survivor Curve: R2.5
ASL: 80
Net Salvage: -20%
Truncation Year: 2038

Missouri American Water

Account #: 304.3001 - Structures and Improvements - Water Treatment - Corporate

CALCULATED ANNUAL ACCRUAL AND ACCRUED DEPRECIATION
BASED ON ORIGINAL COST AS OF DECEMBER 31, 2019

Year	Original Cost	Calculated Accumulated Depreciation	Allocated Actual Booked Amount	Accumulated Depreciation Factor	Net Book Value	ALG Remaining Life	Annual Accrual	Average Age
2006	3,157.11	1,594	3,074	0.9736	715	18.18	39	13.5
2007	4,949.48	2,389	4,606	0.9306	1,333	18.20	73	12.5
2008	23,519.86	10,792	20,809	0.8847	7,415	18.21	407	11.5
2012	4,462.25	1,541	2,972	0.6661	2,383	18.26	130	7.5
2016	26,809.90	5,115	9,863	0.3679	22,308	18.31	1,219	3.5
2017	97,659.47	13,959	26,917	0.2756	90,275	18.32	4,929	2.5
2018	257,720.20	23,269	44,868	0.1741	264,396	18.33	14,428	1.5
TOTAL	418,278.27	58,660	113,109		388,825		21,225	

COMPOSITE ANNUAL ACCRUAL RATE	5.07%
THEORETICAL ACCUMULATED DEPRECIATION FACTOR	0.27
COMPOSITE AVERAGE AGE (YEARS)	2.71
DIRECTED WEIGHTED ALG COMPOSITE REMAINING LIFE (YEARS)	18.31

ALG - Remaining Life
Survivor Curve: R2.5
ASL: 80
Net Salvage: -20%
Truncation Year: 2067

Missouri American Water

Account #: 304.3002 - Structures and Improvements - Water Treatment - St. Louis

CALCULATED ANNUAL ACCRUAL AND ACCRUED DEPRECIATION BASED ON ORIGINAL COST AS OF DECEMBER 31, 2019

Year	Original Cost	Calculated Accumulated Depreciation	Allocated Actual Booked Amount	Accumulated Depreciation Factor	Net Book Value	ALG Remaining Life	Annual Accrual	Average Age
1903	43,217.62	46,718	44,370	1.0267	7,492	7.93	944	116.5
1913	3,653.32	3,821	3,629	0.9933	755	10.27	73	106.5
1921	4,109.16	4,168	3,959	0.9634	972	12.38	79	98.5
1932	2,073.31	1,992	1,892	0.9126	596	15.94	37	87.5
1933	1,568.43	1,498	1,423	0.9073	459	16.31	28	86.5
1934	7,385.42	7,013	6,661	0.9019	2,202	16.69	132	85.5
1935	6,271.94	5,919	5,622	0.8963	1,905	17.08	112	84.5
1936	60,987.39	57,193	54,318	0.8906	18,867	17.48	1,079	83.5
1937	1,837.00	1,712	1,625	0.8849	579	17.89	32	82.5
1938	55,692.99	51,542	48,950	0.8789	17,881	18.30	977	81.5
1939	119,764.85	110,076	104,542	0.8729	39,176	18.73	2,092	80.5
1949	283.34	241	229	0.8070	111	23.35	5	70.5
1953	5,662.41	4,637	4,404	0.7777	2,391	25.34	94	66.5
1954	4,431.82	3,594	3,413	0.7701	1,905	25.84	74	65.5
1955	1,537,969.60	1,234,688	1,172,618	0.7624	672,945	26.35	25,543	64.5
1956	239,818.45	190,578	180,997	0.7547	106,785	26.85	3,977	63.5
1957	116,569.89	91,681	87,072	0.7469	52,812	27.35	1,931	62.5
1958	792.73	617	586	0.7391	365	27.86	13	61.5
1960	134,246.99	102,233	97,094	0.7232	64,003	28.86	2,218	59.5
1962	2,059.67	1,534	1,457	0.7072	1,015	29.85	34	57.5
1964	889,378.63	647,053	614,525	0.6910	452,730	30.83	14,686	55.5
1965	6,026.81	4,333	4,115	0.6828	3,117	31.31	100	54.5
1967	1,001.46	703	667	0.6663	534	32.26	17	52.5
1968	2,663,691.31	1,845,411	1,752,640	0.6580	1,443,790	32.72	44,126	51.5
1970	195,615.92	132,074	125,435	0.6412	109,304	33.63	3,251	49.5
1971	3,630,850.89	2,419,156	2,297,542	0.6328	2,059,479	34.07	60,451	48.5

ALG - Remaining Life
Survivor Curve: R2.5
ASL: 80
Net Salvage: -20%
Truncation Year: 2067

Missouri American Water

Account #: 304.3002 - Structures and Improvements - Water Treatment - St. Louis

CALCULATED ANNUAL ACCRUAL AND ACCRUED DEPRECIATION
BASED ON ORIGINAL COST AS OF DECEMBER 31, 2019

Year	Original Cost	Calculated Accumulated Depreciation	Allocated Actual Booked Amount	Accumulated Depreciation Factor	Net Book Value	ALG Remaining Life	Annual Accrual	Average Age
1973	257,650.93	167,048	158,651	0.6158	150,530	34.93	4,310	46.5
1974	24,831.49	15,875	15,077	0.6072	14,721	35.35	416	45.5
1975	4,795.80	3,022	2,870	0.5985	2,885	35.75	81	44.5
1978	26,159.93	15,760	14,968	0.5722	16,424	36.92	445	41.5
1979	10,999.20	6,523	6,195	0.5632	7,004	37.29	188	40.5
1980	53,165.68	31,025	29,465	0.5542	34,333	37.66	912	39.5
1982	8,169.83	4,610	4,378	0.5359	5,425	38.35	141	37.5
1983	2,532.84	1,404	1,334	0.5266	1,706	38.68	44	36.5
1984	25,263.12	13,757	13,066	0.5172	17,250	39.01	442	35.5
1985	2,106,677.82	1,126,060	1,069,451	0.5076	1,458,562	39.32	37,095	34.5
1986	713,319.26	374,018	355,216	0.4980	500,768	39.62	12,638	33.5
1987	246,854.23	126,883	120,504	0.4882	175,721	39.92	4,402	32.5
1988	819,830.26	412,792	392,040	0.4782	591,756	40.21	14,718	31.5
1989	1,910,798.36	941,747	894,404	0.4681	1,398,554	40.48	34,548	30.5
1990	101,948.24	49,141	46,670	0.4578	75,667	40.75	1,857	29.5
1991	357,576.66	168,414	159,947	0.4473	269,145	41.01	6,563	28.5
1992	235,256.79	108,160	102,723	0.4366	179,585	41.26	4,352	27.5
1993	7,264,934.20	3,256,940	3,093,209	0.4258	5,624,712	41.50	135,525	26.5
1994	1,257,522.32	549,076	521,473	0.4147	987,554	41.74	23,661	25.5
1995	1,968,672.40	836,114	794,082	0.4034	1,568,325	41.96	37,372	24.5
1996	860,722.09	355,076	337,226	0.3918	695,641	42.18	16,491	23.5
1998	592,311.02	229,431	217,897	0.3679	492,876	42.60	11,570	21.5
1999	118,521.23	44,363	42,133	0.3555	100,093	42.80	2,339	20.5
2000	1,164,941.22	420,476	399,338	0.3428	998,592	42.99	23,230	19.5
2001	1,141,014.91	396,208	376,290	0.3298	992,928	43.17	22,999	18.5
2002	5,129,012.59	1,708,888	1,622,979	0.3164	4,531,836	43.35	104,543	17.5

ALG - Remaining Life
Survivor Curve: R2.5
ASL: 80
Net Salvage: -20%
Truncation Year: 2067

Missouri American Water

Account #: 304.3002 - Structures and Improvements - Water Treatment - St. Louis

CALCULATED ANNUAL ACCRUAL AND ACCRUED DEPRECIATION BASED ON ORIGINAL COST AS OF DECEMBER 31, 2019

Year	Original Cost	Calculated Depreciation	Accumulated Depreciation	Allocated Actual Booked Amount	Actual Depreciation Factor	Net Book Value	ALG Remaining Life	Annual Accrual	Average Age
2003	367,071.34	117,000		111,118	0.3027	329,368	43.52	7,568	16.5
2004	509,936.97	154,969		147,178	0.2886	464,746	43.69	10,638	15.5
2005	259,825.06	74,996		71,226	0.2741	240,565	43.84	5,487	14.5
2006	597,525.59	163,084		154,885	0.2592	562,145	44.00	12,777	13.5
2007	5,237,366.88	1,344,702		1,277,102	0.2438	5,007,739	44.15	113,437	12.5
2008	5,167,466.13	1,240,586		1,178,220	0.2280	5,022,740	44.29	113,411	11.5
2009	25,528.74	5,690		5,404	0.2117	25,231	44.42	568	10.5
2010	386,085.85	79,195		75,213	0.1948	388,090	44.56	8,710	9.5
2011	1,642,735.84	306,823		291,399	0.1774	1,679,884	44.68	37,595	8.5
2012	865,964.76	145,317		138,012	0.1594	901,146	44.81	20,112	7.5
2013	257,165.61	38,109		36,193	0.1407	272,406	44.92	6,064	6.5
2014	2,280,309.91	291,568		276,911	0.1214	2,459,461	45.04	54,610	5.5
2015	1,937,154.63	206,883		196,483	0.1014	2,128,103	45.15	47,138	4.5
2016	21,691,817.40	1,842,660		1,750,026	0.0807	24,280,155	45.25	536,570	3.5
2017	5,357,159.67	333,554		316,786	0.0591	6,111,805	45.35	134,766	2.5
2018	2,153,098.93	83,301		79,114	0.0367	2,504,605	45.45	55,110	1.5
2019	2,199,395.10	31,158		29,592	0.0135	2,609,682	45.54	57,305	0.5
TOTAL	87,074,052.18	24,792,591		23,546,228		80,942,634		1,884,849	

COMPOSITE ANNUAL ACCRUAL RATE 2.16%

THEORETICAL ACCUMULATED DEPRECIATION FACTOR 0.27

COMPOSITE AVERAGE AGE (YEARS) 17.11

DIRECTED WEIGHTED ALG COMPOSITE REMAINING LIFE (YEARS) 42.43

ALG - Remaining Life
Survivor Curve: R2.5
ASL: 80
Net Salvage: -20%
Truncation Year: 2078

Missouri American Water

Account #: 304.3003 - Structures and Improvements - Water Treatment - St. Joseph

CALCULATED ANNUAL ACCRUAL AND ACCRUED DEPRECIATION
BASED ON ORIGINAL COST AS OF DECEMBER 31, 2019

Year	Original Cost	Calculated Accumulated Depreciation	Allocated Actual Booked Amount	Accumulated Depreciation Factor	Net Book Value	ALG Remaining Life	Annual Accrual	Average Age
1992	2,359.51	990	795	0.3371	2,036	47.39	43	27.5
1998	17,262,598.12	5,991,347	4,814,620	0.2789	15,900,497	49.63	320,362	21.5
2000	94,970.78	30,525	24,530	0.2583	89,435	50.30	1,778	19.5
2002	293,538.26	86,548	69,549	0.2369	282,697	50.92	5,552	17.5
2007	198,424.58	44,369	35,654	0.1797	202,455	52.30	3,871	12.5
2008	232,790.95	48,515	38,986	0.1675	240,363	52.55	4,574	11.5
2009	255,089.91	49,194	39,532	0.1550	266,576	52.80	5,049	10.5
2010	101,146.15	17,894	14,379	0.1422	106,996	53.03	2,018	9.5
2011	3,791.90	609	489	0.1290	4,061	53.25	76	8.5
2013	208,279.38	26,370	21,191	0.1017	228,745	53.68	4,261	6.5
2016	70,990.21	5,116	4,112	0.0579	81,077	54.26	1,494	3.5
2017	2,512.47	133	107	0.0425	2,908	54.44	53	2.5
TOTAL	18,726,492.22	6,301,609	5,063,946		17,407,845		349,132	

COMPOSITE ANNUAL ACCRUAL RATE	1.86%
THEORETICAL ACCUMULATED DEPRECIATION FACTOR	0.27
COMPOSITE AVERAGE AGE (YEARS)	20.75
DIRECTED WEIGHTED ALG COMPOSITE REMAINING LIFE (YEARS)	49.85

ALG - Remaining Life
Survivor Curve: R2.5
ASL: 80
Net Salvage: -20%
Truncation Year: 2055

Missouri American Water

Account #: 304.3004 - Structures and Improvements - Water Treatment - Warrensburg

CALCULATED ANNUAL ACCRUAL AND ACCRUED DEPRECIATION
BASED ON ORIGINAL COST AS OF DECEMBER 31, 2019

Year	Original Cost	Calculated Accumulated Depreciation	Allocated Actual Booked Amount	Accumulated Depreciation Factor	Net Book Value	ALG Remaining Life	Annual Accrual	Average Age
1983	420.25	261	185	0.4403	319	31.31	10	36.5
1991	4,209.77	2,283	1,617	0.3842	3,434	32.48	106	28.5
1996	1,100.00	532	377	0.3426	943	33.05	29	23.5
2000	772,237.06	331,797	235,044	0.3044	691,641	33.44	20,683	19.5
2001	1,276.04	530	375	0.2940	1,156	33.53	34	18.5
2004	5,166.91	1,900	1,346	0.2605	4,854	33.77	144	15.5
2006	70,800.74	23,591	16,712	0.2360	68,249	33.92	2,012	13.5
2008	3,191.19	944	669	0.2095	3,161	34.06	93	11.5
2009	1,110.88	307	217	0.1955	1,116	34.12	33	10.5
2012	50,963.30	10,747	7,613	0.1494	53,543	34.30	1,561	7.5
2013	34,356.47	6,430	4,555	0.1326	36,672	34.36	1,067	6.5
2017	45,155.94	3,617	2,562	0.0567	51,625	34.56	1,494	2.5
2018	5,005.30	249	176	0.0352	5,830	34.60	168	1.5
2019	9,254.42	164	116	0.0126	10,989	34.64	317	0.5
TOTAL	1,004,248.27	383,352	271,565		933,533		27,751	

COMPOSITE ANNUAL ACCRUAL RATE	2.76%
THEORETICAL ACCUMULATED DEPRECIATION FACTOR	0.27
COMPOSITE AVERAGE AGE (YEARS)	16.99
DIRECTED WEIGHTED ALG COMPOSITE REMAINING LIFE (YEARS)	33.62

ALG - Remaining Life
Survivor Curve: R2.5
ASL: 80
Net Salvage: -20%
Truncation Year: 2040

Missouri American Water

Account #: 304.3005 - Structures and Improvements - Water Treatment - Brunswick

CALCULATED ANNUAL ACCRUAL AND ACCRUED DEPRECIATION
BASED ON ORIGINAL COST AS OF DECEMBER 31, 2019

Year	Original Cost	Calculated Accumulated Depreciation	Allocated Actual Booked Amount	Accumulated Depreciation Factor	Net Book Value	ALG Remaining Life	Annual Accrual	Average Age
1985	76,088.08	57,192	30,061	0.3951	61,245	19.46	3,147	34.5
1989	1,352.34	969	509	0.3765	1,114	19.63	57	30.5
1990	1,068.83	755	397	0.3714	886	19.66	45	29.5
1992	657.33	451	237	0.3606	552	19.73	28	27.5
1993	1,563.09	1,055	555	0.3549	1,321	19.77	67	26.5
2001	6,394.60	3,632	1,909	0.2985	5,765	19.99	288	18.5
2003	42,763.67	22,833	12,001	0.2806	39,315	20.04	1,962	16.5
2006	1,191.79	567	298	0.2499	1,132	20.10	56	13.5
2008	518.77	223	117	0.2262	505	20.13	25	11.5
2010	7,229.74	2,742	1,441	0.1993	7,234	20.17	359	9.5
2011	408.57	143	75	0.1845	415	20.18	21	8.5
2013	38,842.99	11,205	5,890	0.1516	40,722	20.21	2,015	6.5
2014	3,362.60	853	448	0.1333	3,587	20.23	177	5.5
2018	21,448.70	1,763	927	0.0432	24,812	20.28	1,224	1.5
TOTAL	202,891.10	104,383	54,865		188,604		9,470	

COMPOSITE ANNUAL ACCRUAL RATE	4.67%
THEORETICAL ACCUMULATED DEPRECIATION FACTOR	0.27
COMPOSITE AVERAGE AGE (YEARS)	19.61
DIRECTED WEIGHTED ALG COMPOSITE REMAINING LIFE (YEARS)	19.88

ALG - Remaining Life
Survivor Curve: R2.5
ASL: 80
Net Salvage: -20%
Truncation Year: 2043

Missouri American Water

Account #: 304.3006 - Structures and Improvements - Water Treatment - St. Charles

CALCULATED ANNUAL ACCRUAL AND ACCRUED DEPRECIATION
BASED ON ORIGINAL COST AS OF DECEMBER 31, 2019

Year	Original Cost	Calculated Accumulated Depreciation	Allocated Actual Booked Amount	Accumulated Depreciation Factor	Net Book Value	ALG Remaining Life	Annual Accrual	Average Age
2006	4,166.49	1,822	1,179	0.2829	3,821	22.94	167	13.5
2009	1,682.50	623	403	0.2395	1,616	23.02	70	10.5
TOTAL	5,848.99	2,445	1,582		5,437		237	

COMPOSITE ANNUAL ACCRUAL RATE	4.05%
THEORETICAL ACCUMULATED DEPRECIATION FACTOR	0.27
COMPOSITE AVERAGE AGE (YEARS)	12.64
DIRECTED WEIGHTED ALG COMPOSITE REMAINING LIFE (YEARS)	22.96

ALG - Remaining Life
Survivor Curve: R2.5
ASL: 80
Net Salvage: -20%
Truncation Year: 2065

Missouri American Water

Account #: 304.3007 - Structures and Improvements - Water Treatment - Mexico

CALCULATED ANNUAL ACCRUAL AND ACCRUED DEPRECIATION
BASED ON ORIGINAL COST AS OF DECEMBER 31, 2019

Year	Original Cost	Calculated Accumulated Depreciation	Allocated Actual Booked Amount	Accumulated Depreciation Factor	Net Book Value	ALG Remaining Life	Annual Accrual	Average Age
1984	252.33	140	114	0.4531	188	37.91	5	35.5
1989	25,517.44	12,819	10,492	0.4112	20,129	39.25	513	30.5
1992	9,721.28	4,563	3,735	0.3842	7,931	39.95	199	27.5
1994	9,738.55	4,346	3,557	0.3653	8,129	40.38	201	25.5
1999	9,166.74	3,517	2,879	0.3141	8,121	41.33	197	20.5
2000	2,062,054.94	763,437	624,871	0.3030	1,849,595	41.50	44,573	19.5
2001	385,446.42	137,371	112,438	0.2917	350,098	41.66	8,404	18.5
2003	2,747.00	900	736	0.2681	2,560	41.97	61	16.5
2004	4,935.56	1,542	1,262	0.2558	4,660	42.12	111	15.5
2005	426,700.31	126,727	103,726	0.2431	408,314	42.26	9,661	14.5
2016	312.99	28	23	0.0721	353	43.52	8	3.5
2017	99,783.77	6,441	5,272	0.0528	114,468	43.61	2,625	2.5
2018	38,356.98	1,538	1,259	0.0328	44,770	43.69	1,025	1.5
2019	150,530.29	2,198	1,799	0.0119	178,838	43.77	4,085	0.5
TOTAL	3,225,264.60	1,065,567	872,164		2,998,154		71,667	

COMPOSITE ANNUAL ACCRUAL RATE	2.22%
THEORETICAL ACCUMULATED DEPRECIATION FACTOR	0.27
COMPOSITE AVERAGE AGE (YEARS)	17.22
DIRECTED WEIGHTED ALG COMPOSITE REMAINING LIFE (YEARS)	41.79

ALG - Remaining Life
Survivor Curve: R2.5
ASL: 80
Net Salvage: -20%
Truncation Year: 2073

Missouri American Water

Account #: 304.3008 - Structures and Improvements - Water Treatment - Joplin

CALCULATED ANNUAL ACCRUAL AND ACCRUED DEPRECIATION
BASED ON ORIGINAL COST AS OF DECEMBER 31, 2019

Year	Original Cost	Calculated Accumulated Depreciation	Allocated Actual Booked Amount	Accumulated Depreciation Factor	Net Book Value	ALG Remaining Life	Annual Accrual	Average Age
1902	609.83	661	732	1.2000	0	7.71	0	117.5
1945	97.73	86	102	1.0403	16	21.67	1	74.5
1959	91,678.34	69,804	82,990	0.9052	27,024	29.16	927	60.5
1968	497.77	338	402	0.8076	195	34.14	6	51.5
1970	347.83	230	273	0.7852	144	35.21	4	49.5
1973	228.91	145	172	0.7512	103	36.77	3	46.5
1974	21,346.22	13,281	15,790	0.7397	9,826	37.28	264	45.5
1984	1,495.81	781	929	0.6209	866	41.88	21	35.5
1985	2,073.50	1,061	1,262	0.6085	1,226	42.28	29	34.5
1986	311.52	156	186	0.5960	188	42.68	4	33.5
1989	27,004.34	12,664	15,056	0.5575	17,350	43.81	396	30.5
1995	30,620.00	12,252	14,566	0.4757	22,178	45.79	484	24.5
1997	43,733.59	16,429	19,533	0.4466	32,948	46.37	711	22.5
2002	303,791.03	94,220	112,019	0.3687	252,531	47.67	5,298	17.5
2003	5,093.34	1,509	1,794	0.3521	4,319	47.90	90	16.5
2004	109,727.99	30,931	36,774	0.3351	94,900	48.13	1,972	15.5
2006	32,303.13	8,148	9,688	0.2999	29,076	48.56	599	13.5
2007	75,566.06	17,898	21,280	0.2816	69,400	48.76	1,423	12.5
2008	4,871,113.92	1,076,843	1,280,261	0.2628	4,565,075	48.96	93,249	11.5
2009	567,621.11	116,277	138,242	0.2435	542,903	49.14	11,047	10.5
2011	11,052.16	1,890	2,247	0.2033	11,015	49.50	223	8.5
2012	33,904.33	5,200	6,183	0.1824	34,503	49.67	695	7.5
2015	7,601.23	738	878	0.1155	8,244	50.14	164	4.5
2017	67,398.28	3,811	4,531	0.0672	76,347	50.43	1,514	2.5
2018	252,049.25	8,877	10,554	0.0419	291,905	50.56	5,773	1.5
2019	12,753.16	168	199	0.0156	15,104	50.69	298	0.5

ALG - Remaining Life
Survivor Curve: R2.5
ASL: 80
Net Salvage: -20%
Truncation Year: 2073

Missouri American Water

Account #: 304.3008 - Structures and Improvements - Water Treatment - Joplin

CALCULATED ANNUAL ACCRUAL AND ACCRUED DEPRECIATION BASED ON ORIGINAL COST AS OF DECEMBER 31, 2019

Year	Original Cost	Calculated Accumulated Depreciation	Allocated Actual Booked Amount	Accumulated Depreciation Factor	Net Book Value	ALG Remaining Life	Annual Accrual	Average Age
TOTAL	6,570,020.38	1,494,398	1,776,639		6,107,385		125,193	
COMPOSITE ANNUAL ACCRUAL RATE				1.91%				
THEORETICAL ACCUMULATED DEPRECIATION FACTOR				0.27				
COMPOSITE AVERAGE AGE (YEARS)				12.29				
DIRECTED WEIGHTED ALG COMPOSITE REMAINING LIFE (YEARS)				48.60				

ALG - Remaining Life
Survivor Curve: R2.5
ASL: 80
Net Salvage: -20%
Truncation Year: 2054

Missouri American Water

Account #: 304.3009 - Structures and Improvements - Water Treatment - Jefferson

CALCULATED ANNUAL ACCRUAL AND ACCRUED DEPRECIATION
BASED ON ORIGINAL COST AS OF DECEMBER 31, 2019

Year	Original Cost	Calculated Accumulated Depreciation	Allocated Actual Booked Amount	Accumulated Depreciation Factor	Net Book Value	ALG Remaining Life	Annual Accrual	Average Age
1927	46,200.06	45,803	40,563	0.8780	14,877	13.91	1,070	92.5
1942	186.00	170	151	0.8113	72	18.83	4	77.5
1950	107.00	93	82	0.7684	46	21.74	2	69.5
1951	523.00	450	399	0.7627	229	22.10	10	68.5
1959	2,145.15	1,735	1,537	0.7164	1,037	24.86	42	60.5
1964	2,065.00	1,600	1,417	0.6863	1,061	26.41	40	55.5
1965	51,008.00	39,174	34,692	0.6801	26,518	26.69	993	54.5
1966	729.00	555	491	0.6739	383	26.97	14	53.5
1970	1,807.95	1,324	1,173	0.6487	997	28.02	36	49.5
1976	817.00	561	497	0.6086	483	29.35	16	43.5
1977	3,968.00	2,696	2,387	0.6016	2,374	29.55	80	42.5
1985	20,286.00	12,384	10,967	0.5406	13,376	30.90	433	34.5
1987	10,638.00	6,290	5,571	0.5237	7,195	31.19	231	32.5
1988	1,060.00	616	546	0.5149	726	31.32	23	31.5
1992	8,791.00	4,737	4,195	0.4772	6,354	31.80	200	27.5
1999	1,563,162.97	705,420	624,712	0.3996	1,251,084	32.50	38,493	20.5
2001	82,880.69	35,000	30,996	0.3740	68,461	32.67	2,096	18.5
2002	171,286.20	69,716	61,739	0.3604	143,804	32.75	4,391	17.5
2003	25,850.17	10,111	8,954	0.3464	22,066	32.82	672	16.5
2005	1,431.33	512	453	0.3167	1,264	32.97	38	14.5
2006	22,632.63	7,690	6,810	0.3009	20,349	33.04	616	13.5
2007	18,920.29	6,078	5,383	0.2845	17,322	33.10	523	12.5
2010	8,891.09	2,318	2,053	0.2309	8,616	33.28	259	9.5
2011	76,367.52	18,230	16,144	0.2114	75,497	33.34	2,265	8.5
2012	4,370.02	943	835	0.1910	4,409	33.39	132	7.5
2013	5,234.12	1,003	888	0.1696	5,393	33.44	161	6.5

ALG - Remaining Life
Survivor Curve: R2.5
ASL: 80
Net Salvage: -20%
Truncation Year: 2054

Missouri American Water

Account #: 304.3009 - Structures and Improvements - Water Treatment - Jefferson

CALCULATED ANNUAL ACCRUAL AND ACCRUED DEPRECIATION
BASED ON ORIGINAL COST AS OF DECEMBER 31, 2019

Year	Original Cost	Calculated Accumulated Depreciation	Allocated Actual Booked Amount	Accumulated Depreciation Factor	Net Book Value	ALG Remaining Life	Annual Accrual	Average Age
2015	14,497.83	2,024	1,792	0.1236	15,605	33.54	465	4.5
2016	44.80	5	4	0.0989	49	33.58	1	3.5
2017	607,372.30	49,893	44,185	0.0727	684,662	33.63	20,361	2.5
2018	360,457.20	18,399	16,294	0.0452	416,255	33.67	12,364	1.5
2019	329,937.07	5,998	5,312	0.0161	390,612	33.71	11,589	0.5
TOTAL	3,443,667.39	1,051,530	931,223		3,201,178		97,622	

COMPOSITE ANNUAL ACCRUAL RATE	2.83%
THEORETICAL ACCUMULATED DEPRECIATION FACTOR	0.27
COMPOSITE AVERAGE AGE (YEARS)	14.42
DIRECTED WEIGHTED ALG COMPOSITE REMAINING LIFE (YEARS)	32.62

ALG - Remaining Life
Survivor Curve: R2.5
ASL: 80
Net Salvage: -20%
Truncation Year: 2030

Missouri American Water

Account #: 304.3014 - Structures and Improvements - Water Treatment - Maple/River/Stone

CALCULATED ANNUAL ACCRUAL AND ACCRUED DEPRECIATION
BASED ON ORIGINAL COST AS OF DECEMBER 31, 2019

Year	Original Cost	Calculated Accumulated Depreciation	Allocated Actual Booked Amount	Accumulated Depreciation Factor	Net Book Value	ALG Remaining Life	Annual Accrual	Average Age
2003	1,826.00	1,335	1,002	0.5488	1,189	10.40	114	16.5
2007	5.63	4	3	0.4882	4	10.42	0	12.5
2013	16,177.18	7,406	5,559	0.3437	13,853	10.44	1,327	6.5
2015	2,022,865.60	726,882	545,641	0.2697	1,881,798	10.44	180,187	4.5
2016	0.04	0	0	0.2248	0	10.45	0	3.5
2018	2,027.15	304	228	0.1126	2,204	10.45	211	1.5
TOTAL	2,042,901.60	735,931	552,434		1,899,048		181,840	

COMPOSITE ANNUAL ACCRUAL RATE	8.90%
THEORETICAL ACCUMULATED DEPRECIATION FACTOR	0.27
COMPOSITE AVERAGE AGE (YEARS)	4.52
DIRECTED WEIGHTED ALG COMPOSITE REMAINING LIFE (YEARS)	10.44

ALG - Remaining Life
Survivor Curve: R2.5
ASL: 80
Net Salvage: -20%
Truncation Year: 2033

Missouri American Water

Account #: 304.3015 - Structures and Improvements - Water Treatment - Saddlebrooke

CALCULATED ANNUAL ACCRUAL AND ACCRUED DEPRECIATION
BASED ON ORIGINAL COST AS OF DECEMBER 31, 2019

Year	Original Cost	Calculated Accumulated Depreciation	Allocated Actual Booked Amount	Accumulated Depreciation Factor	Net Book Value	ALG Remaining Life	Annual Accrual	Average Age
2019	17,865.96	773	4,831	0.2704	16,608	13.42	1,238	0.5
TOTAL	17,865.96	773	4,831		16,608		1,238	

COMPOSITE ANNUAL ACCRUAL RATE	6.93%
THEORETICAL ACCUMULATED DEPRECIATION FACTOR	0.27
COMPOSITE AVERAGE AGE (YEARS)	0.50
DIRECTED WEIGHTED ALG COMPOSITE REMAINING LIFE (YEARS)	13.42

ALG - Remaining Life
Survivor Curve: R2.5
ASL: 80
Net Salvage: -20%
Truncation Year: 2027

Missouri American Water

Account #: 304.3016 - Structures and Improvements - Water Treatment - Tri-States

CALCULATED ANNUAL ACCRUAL AND ACCRUED DEPRECIATION
BASED ON ORIGINAL COST AS OF DECEMBER 31, 2019

Year	Original Cost	Calculated Accumulated Depreciation	Allocated Actual Booked Amount	Accumulated Depreciation Factor	Net Book Value	ALG Remaining Life	Annual Accrual	Average Age
2004	28,701.00	23,154	14,622	0.5095	19,819	7.45	2,659	15.5
2018	47,595.80	9,517	6,010	0.1263	51,105	7.48	6,835	1.5
TOTAL	76,296.80	32,670	20,632		70,924		9,495	

COMPOSITE ANNUAL ACCRUAL RATE	12.44%
THEORETICAL ACCUMULATED DEPRECIATION FACTOR	0.27
COMPOSITE AVERAGE AGE (YEARS)	6.77
DIRECTED WEIGHTED ALG COMPOSITE REMAINING LIFE (YEARS)	7.47

ALG - Remaining Life
Survivor Curve: R2.5
ASL: 80
Net Salvage: -20%
Truncation Year: 2067

Missouri American Water

Account #: 304.3022 - Structures and Improvements - Water Treatment - Parkville

CALCULATED ANNUAL ACCRUAL AND ACCRUED DEPRECIATION
BASED ON ORIGINAL COST AS OF DECEMBER 31, 2019

Year	Original Cost	Calculated Accumulated Depreciation	Allocated Actual Booked Amount	Accumulated Depreciation Factor	Net Book Value	ALG Remaining Life	Annual Accrual	Average Age
1960	89,990.85	68,531	107,989	1.2000	0	28.86	0	59.5
1977	468.82	287	563	1.2000	0	36.54	0	42.5
1978	1,872.67	1,128	2,247	1.2000	0	36.92	0	41.5
1979	11,351.60	6,732	13,622	1.2000	0	37.29	0	40.5
1980	816.99	477	980	1.2000	0	37.66	0	39.5
1983	614.66	341	738	1.2000	0	38.68	0	36.5
1984	4,178.10	2,275	5,014	1.2000	0	39.01	0	35.5
1985	2,210.21	1,181	2,652	1.2000	0	39.32	0	34.5
1990	285.13	137	342	1.2000	0	40.75	0	29.5
1991	2,999.85	1,413	3,600	1.2000	0	41.01	0	28.5
1993	4,135.48	1,854	4,963	1.2000	0	41.50	0	26.5
1994	1,784.00	779	2,141	1.2000	0	41.74	0	25.5
1997	887.38	355	1,065	1.2000	0	42.40	0	22.5
1998	306,883.66	118,871	368,260	1.2000	0	42.60	0	21.5
2001	10,832.52	3,762	12,999	1.2000	0	43.17	0	18.5
2002	3,236.71	1,078	3,884	1.2000	0	43.35	0	17.5
2006	7,526.12	2,054	7,999	1.0629	1,032	44.00	23	13.5
2008	18,149.27	4,357	16,968	0.9349	4,811	44.29	109	11.5
2010	382,320.70	78,422	305,396	0.7988	153,389	44.56	3,443	9.5
2014	18,579.70	2,376	9,251	0.4979	13,044	45.04	290	5.5
2017	22,735,218.46	1,415,570	5,512,579	0.2425	21,769,684	45.35	480,025	2.5
2018	2,141.26	83	323	0.1507	2,247	45.45	49	1.5

ALG - Remaining Life
Survivor Curve: R2.5
ASL: 80
Net Salvage: -20%
Truncation Year: 2067

Missouri American Water

Account #: 304.3022 - Structures and Improvements - Water Treatment - Parkville

CALCULATED ANNUAL ACCRUAL AND ACCRUED DEPRECIATION BASED ON ORIGINAL COST AS OF DECEMBER 31, 2019

Year	Original Cost	Calculated Accumulated Depreciation	Allocated Actual Booked Amount	Accumulated Depreciation Factor	Net Book Value	ALG Remaining Life	Annual Accrual	Average Age
TOTAL	23,606,484.14	1,712,063	6,383,574		21,944,207		483,939	
COMPOSITE ANNUAL ACCRUAL RATE				2.05%				
THEORETICAL ACCUMULATED DEPRECIATION FACTOR				0.27				
COMPOSITE AVERAGE AGE (YEARS)				3.14				
DIRECTED WEIGHTED ALG COMPOSITE REMAINING LIFE (YEARS)				45.23				

ALG - Remaining Life
Survivor Curve: R2.5
ASL: 55
Net Salvage: -20%
Truncation Year:

Missouri American Water

Account #: 304.4000 - Structures and Improvements - Transmission and Distribution

CALCULATED ANNUAL ACCRUAL AND ACCRUED DEPRECIATION
BASED ON ORIGINAL COST AS OF DECEMBER 31, 2019

Year	Original Cost	Calculated Accumulated Depreciation	Allocated Actual Booked Amount	Accumulated Depreciation Factor	Net Book Value	ALG Remaining Life	Annual Accrual	Average Age
1941	17,019.39	18,262	20,423	1.2000	0	5.82	0	78.5
1966	91.40	82	99	1.0821	11	13.85	1	53.5
1978	2,566,971.42	1,920,832	2,315,045	0.9019	765,321	20.70	36,966	41.5
1979	16,138.76	11,845	14,276	0.8846	5,090	21.36	238	40.5
1980	105.52	76	91	0.8670	35	22.03	2	39.5
1981	1,223.36	862	1,039	0.8492	429	22.71	19	38.5
1982	2,354.49	1,623	1,957	0.8310	869	23.40	37	37.5
1983	1,080.51	729	878	0.8126	419	24.10	17	36.5
1986	34,684.39	21,750	26,214	0.7558	15,408	26.26	587	33.5
1988	33,578.14	19,966	24,063	0.7166	16,230	27.75	585	31.5
1989	13,601.38	7,863	9,476	0.6967	6,845	28.50	240	30.5
1990	27,194.66	15,266	18,399	0.6766	14,235	29.27	486	29.5
1991	53,853.55	29,320	35,338	0.6562	29,287	30.05	975	28.5
1993	336,538.95	171,659	206,888	0.6148	196,959	31.62	6,229	26.5
1994	191,784.72	94,476	113,865	0.5937	116,277	32.42	3,586	25.5
1995	857,803.42	407,444	491,064	0.5725	538,300	33.23	16,199	24.5
1996	32,103.30	14,677	17,690	0.5510	20,834	34.05	612	23.5
1997	13,674.46	6,006	7,239	0.5294	9,170	34.87	263	22.5
1998	34,002.81	14,319	17,257	0.5075	23,546	35.70	660	21.5
1999	56,750.05	22,860	27,551	0.4855	40,549	36.54	1,110	20.5
2000	45,887.67	17,638	21,258	0.4633	33,807	37.38	904	19.5
2001	15,554.13	5,690	6,857	0.4409	11,808	38.23	309	18.5
2002	1,833,815.35	636,438	767,055	0.4183	1,433,524	39.09	36,669	17.5
2003	848,798.14	278,562	335,731	0.3955	682,827	39.96	17,089	16.5
2005	17,274.40	5,010	6,038	0.3495	14,691	41.71	352	14.5
2007	506,843.35	127,385	153,529	0.3029	454,684	43.48	10,457	12.5

ALG - Remaining Life
Survivor Curve: R2.5
ASL: 55
Net Salvage: -20%
Truncation Year:

Missouri American Water

Account #: 304.4000 - Structures and Improvements - Transmission and Distribution

CALCULATED ANNUAL ACCRUAL AND ACCRUED DEPRECIATION

BASED ON ORIGINAL COST AS OF DECEMBER 31, 2019

Year	Original Cost	Calculated Accumulated Depreciation	Allocated Actual Booked Amount	Accumulated Depreciation Factor	Net Book Value	ALG Remaining Life	Annual Accrual	Average Age
2008	244,750.33	56,735	68,379	0.2794	225,321	44.38	5,078	11.5
2009	368,816.42	78,251	94,311	0.2557	348,269	45.28	7,692	10.5
2010	2,800.15	539	649	0.2319	2,711	46.18	59	9.5
2011	9,215.87	1,590	1,917	0.2080	9,142	47.09	194	8.5
2012	4,017.49	613	739	0.1839	4,082	48.01	85	7.5
2013	12,316.53	1,632	1,967	0.1597	12,813	48.93	262	6.5
2014	31,707.26	3,563	4,294	0.1354	33,754	49.85	677	5.5
2015	689,452.56	63,519	76,554	0.1110	750,789	50.78	14,786	4.5
2016	163,293.68	11,724	14,130	0.0865	181,823	51.71	3,516	3.5
2017	1,351,340.04	69,432	83,681	0.0619	1,537,927	52.65	29,213	2.5
2018	3,830,456.18	118,314	142,595	0.0372	4,453,952	53.58	83,120	1.5
2019	499,362.92	5,154	6,212	0.0124	593,024	54.53	10,876	0.5
TOTAL	14,766,257.15	4,261,705	5,134,749		12,584,760		290,150	

COMPOSITE ANNUAL ACCRUAL RATE	1.96%
THEORETICAL ACCUMULATED DEPRECIATION FACTOR	0.35
COMPOSITE AVERAGE AGE (YEARS)	15.27
DIRECTED WEIGHTED ALG COMPOSITE REMAINING LIFE (YEARS)	41.77

ALG - Remaining Life
Survivor Curve: R4
ASL: 25
Net Salvage: -20%
Truncation Year:

Missouri American Water

Account #: 304.5300 - Structures and Improvements - Leasehold Improvements

CALCULATED ANNUAL ACCRUAL AND ACCRUED DEPRECIATION
BASED ON ORIGINAL COST AS OF DECEMBER 31, 2019

Year	Original Cost	Calculated Accumulated Depreciation	Allocated Actual Booked Amount	Accumulated Depreciation Factor	Net Book Value	ALG Remaining Life	Annual Accrual	Average Age
2003	121.01	91	81	0.6718	64	9.35	7	16.5
2007	6,585.39	3,856	3,448	0.5236	4,454	12.80	348	12.5
2010	3,673.02	1,655	1,480	0.4029	2,928	15.61	188	9.5
2014	138,952.44	36,537	32,671	0.2351	134,072	19.52	6,868	5.5
2015	46,856.00	10,091	9,023	0.1926	47,204	20.51	2,301	4.5
2016	523,821.71	87,807	78,515	0.1499	550,071	21.51	25,575	3.5
2017	6,328,699.48	758,182	677,955	0.1071	6,916,485	22.50	307,343	2.5
2018	2,918,898.38	209,893	187,683	0.0643	3,314,995	23.50	141,052	1.5
2019	3,789,084.00	90,835	81,223	0.0214	4,465,678	24.50	182,268	0.5
TOTAL	13,756,691.43	1,198,945	1,072,078		15,435,951		665,950	

COMPOSITE ANNUAL ACCRUAL RATE	4.84%
THEORETICAL ACCUMULATED DEPRECIATION FACTOR	0.08
COMPOSITE AVERAGE AGE (YEARS)	1.82
DIRECTED WEIGHTED ALG COMPOSITE REMAINING LIFE (YEARS)	23.18

ALG - Remaining Life

Survivor Curve: S0

ASL: 45

Net Salvage: -20%

Truncation Year:

Missouri American Water

Account #: 304.6100 - Structures and Improvements - Office Buildings

CALCULATED ANNUAL ACCRUAL AND ACCRUED DEPRECIATION

BASED ON ORIGINAL COST AS OF DECEMBER 31, 2019

Year	Original Cost	Calculated Accumulated Depreciation	Allocated Actual Booked Amount	Accumulated Depreciation Factor	Net Book Value	ALG Remaining Life	Annual Accrual	Average Age
1888	945.00	1,134	769	0.8133	365	0.00	365	132.5
1897	231.00	277	188	0.8133	89	0.00	89	123.5
1909	454.00	545	369	0.8133	176	0.00	176	111.5
1922	10.00	12	8	0.8133	4	0.00	4	98.5
1923	222.00	266	181	0.8133	86	0.00	86	97.5
1927	867.00	1,040	705	0.8133	335	0.00	335	93.5
1928	608.00	730	494	0.8133	235	0.00	235	92.5
1935	84.00	96	65	0.7763	36	2.05	18	84.5
1954	564.00	537	364	0.6454	313	9.29	34	65.5
1957	49.00	45	31	0.6237	28	10.49	3	62.5
1958	296.00	269	182	0.6164	173	10.89	16	61.5
1960	24,257.92	21,536	14,596	0.6017	14,514	11.71	1,240	59.5
1962	556.00	481	326	0.5868	341	12.53	27	57.5
1963	50,579.94	43,237	29,303	0.5793	31,393	12.94	2,425	56.5
1964	160.10	135	92	0.5718	101	13.36	8	55.5
1965	9,988.10	8,315	5,636	0.5642	6,350	13.78	461	54.5
1966	91.00	75	51	0.5566	59	14.20	4	53.5
1969	297.00	234	158	0.5335	198	15.48	13	50.5
1971	79,220.29	60,528	41,022	0.5178	54,042	16.35	3,306	48.5
1973	1,535.00	1,137	770	0.5019	1,072	17.23	62	46.5
1975	427.24	306	208	0.4858	305	18.12	17	44.5
1979	5,542.13	3,703	2,510	0.4529	4,141	19.94	208	40.5
1981	924.00	594	403	0.4360	706	20.87	34	38.5
1982	33,837.46	21,342	14,465	0.4275	26,140	21.35	1,224	37.5
1983	1,719.01	1,062	720	0.4189	1,343	21.82	62	36.5
1984	2,146.00	1,299	880	0.4101	1,695	22.31	76	35.5

ALG - Remaining Life

Survivor Curve: S0

ASL: 45

Net Salvage: -20%

Truncation Year:

Missouri American Water

Account #: 304.6100 - Structures and Improvements - Office Buildings

CALCULATED ANNUAL ACCRUAL AND ACCRUED DEPRECIATION

BASED ON ORIGINAL COST AS OF DECEMBER 31, 2019

Year	Original Cost	Calculated Accumulated Depreciation	Allocated Actual Booked Amount	Accumulated Depreciation Factor	Net Book Value	ALG Remaining Life	Annual Accrual	Average Age
1985	2,425.24	1,436	973	0.4014	1,937	22.79	85	34.5
1986	25,381.69	14,699	9,962	0.3925	20,496	23.28	880	33.5
1988	13,658.02	7,547	5,115	0.3745	11,275	24.28	464	31.5
1990	130,849.49	68,750	46,594	0.3561	110,425	25.30	4,365	29.5
1991	11,913.73	6,095	4,131	0.3467	10,165	25.81	394	28.5
1992	8,652.37	4,306	2,918	0.3373	7,465	26.34	283	27.5
1993	26,617.95	12,871	8,723	0.3277	23,219	26.87	864	26.5
1994	15,256.10	7,159	4,852	0.3180	13,456	27.40	491	25.5
1995	4,537.00	2,063	1,398	0.3082	4,046	27.95	145	24.5
1996	35,668.83	15,697	10,639	0.2983	32,164	28.50	1,129	23.5
1997	2,693.36	1,145	776	0.2882	2,456	29.05	85	22.5
1998	0.22	0	0	0.2780	0	29.62	0	21.5
1999	37,916.24	14,970	10,146	0.2676	35,354	30.19	1,171	20.5
2000	8,597.74	3,261	2,210	0.2571	8,107	30.78	263	19.5
2001	8,255.15	3,001	2,034	0.2464	7,872	31.37	251	18.5
2003	17,248.35	5,712	3,871	0.2245	16,827	32.58	516	16.5
2004	4,870.64	1,532	1,038	0.2132	4,806	33.20	145	15.5
2005	12,070.86	3,593	2,435	0.2018	12,050	33.84	356	14.5
2006	44,730.06	12,546	8,503	0.1901	45,173	34.48	1,310	13.5
2007	390,453.10	102,657	69,575	0.1782	398,969	35.14	11,354	12.5
2008	1,468,520.18	359,775	243,834	0.1660	1,518,391	35.81	42,398	11.5
2009	172,608.80	39,127	26,518	0.1536	180,613	36.50	4,948	10.5
2010	253,605.84	52,739	35,743	0.1409	268,584	37.20	7,220	9.5
2011	345,667.86	65,254	44,225	0.1279	370,577	37.92	9,772	8.5
2012	431,579.52	72,981	49,462	0.1146	468,433	38.66	12,117	7.5
2013	482,463.28	71,843	48,691	0.1009	530,265	39.42	13,453	6.5

ALG - Remaining Life
Survivor Curve: S0
ASL: 45
Net Salvage: -20%
Truncation Year:

Missouri American Water

Account #: 304.6100 - Structures and Improvements - Office Buildings

CALCULATED ANNUAL ACCRUAL AND ACCRUED DEPRECIATION
BASED ON ORIGINAL COST AS OF DECEMBER 31, 2019

Year	Original Cost	Calculated Accumulated Depreciation	Allocated Actual Booked Amount	Accumulated Depreciation Factor	Net Book Value	ALG Remaining Life	Annual Accrual	Average Age
2014	672,726.62	86,209	58,427	0.0869	748,845	40.19	18,631	5.5
2015	14,651.88	1,564	1,060	0.0724	16,522	41.00	403	4.5
2016	1,986,397.83	168,145	113,958	0.0574	2,269,719	41.83	54,266	3.5
2017	265,283.38	16,380	11,102	0.0418	307,238	42.68	7,198	2.5
2018	515,347.20	19,550	13,250	0.0257	605,167	43.58	13,887	1.5
2019	957,629.38	12,464	8,448	0.0088	1,140,708	44.51	25,627	0.5
TOTAL	8,583,889.10	1,424,011	965,108		9,335,559		244,997	

COMPOSITE ANNUAL ACCRUAL RATE	2.85%
THEORETICAL ACCUMULATED DEPRECIATION FACTOR	0.11
COMPOSITE AVERAGE AGE (YEARS)	8.04
DIRECTED WEIGHTED ALG COMPOSITE REMAINING LIFE (YEARS)	38.78

ALG - Remaining Life
Survivor Curve: R2.5
ASL: 55
Net Salvage: -20%
Truncation Year:

Missouri American Water

Account #: 304.7000 - Structures and Improvements - Shop and Garage

CALCULATED ANNUAL ACCRUAL AND ACCRUED DEPRECIATION
BASED ON ORIGINAL COST AS OF DECEMBER 31, 2019

Year	Original Cost	Calculated Accumulated Depreciation	Allocated Actual Booked Amount	Accumulated Depreciation Factor	Net Book Value	ALG Remaining Life	Annual Accrual	Average Age
1897	1,140.12	1,368	1,368	1.2000	0	0.00	0	123.5
1926	1,258.46	1,457	1,510	1.2000	0	1.94	0	93.5
1943	677.88	721	813	1.2000	0	6.28	0	76.5
1952	16.85	17	20	1.2000	0	8.57	0	67.5
1958	75.46	73	91	1.2000	0	10.49	0	61.5
1962	884.88	829	1,062	1.2000	0	12.05	0	57.5
1963	709.15	658	851	1.2000	0	12.47	0	56.5
1964	1,251.19	1,149	1,501	1.2000	0	12.92	0	55.5
1974	2,433.53	1,954	2,920	1.2000	0	18.20	0	45.5
1978	11,936.96	8,932	14,324	1.2000	0	20.70	0	41.5
1979	1,768.33	1,298	2,122	1.2000	0	21.36	0	40.5
1981	13,885.56	9,783	16,663	1.2000	0	22.71	0	38.5
1982	1,533.00	1,057	1,840	1.2000	0	23.40	0	37.5
1983	363.54	245	436	1.2000	0	24.10	0	36.5
1985	1,163.90	748	1,397	1.2000	0	25.53	0	34.5
1991	1,379.89	751	1,656	1.2000	0	30.05	0	28.5
1992	503.06	265	596	1.1846	8	30.83	0	27.5
1995	7,360.73	3,496	7,854	1.0670	979	33.23	29	24.5
1996	8,010.85	3,662	8,227	1.0270	1,386	34.05	41	23.5
1997	2,352.29	1,033	2,321	0.9866	502	34.87	14	22.5
1998	66.38	28	63	0.9459	17	35.70	0	21.5
1999	5,761.07	2,321	5,213	0.9048	1,700	36.54	47	20.5
2000	121.90	47	105	0.8634	41	37.38	1	19.5
2003	6,590.59	2,163	4,859	0.7372	3,050	39.96	76	16.5
2004	37,216.14	11,506	25,845	0.6945	18,814	40.83	461	15.5
2006	12,134.67	3,285	7,380	0.6081	7,182	42.59	169	13.5

ALG - Remaining Life
Survivor Curve: R2.5
ASL: 55
Net Salvage: -20%
Truncation Year:

Missouri American Water

Account #: 304.7000 - Structures and Improvements - Shop and Garage

CALCULATED ANNUAL ACCRUAL AND ACCRUED DEPRECIATION
BASED ON ORIGINAL COST AS OF DECEMBER 31, 2019

Year	Original Cost	Calculated Accumulated Depreciation	Allocated Actual Booked Amount	Accumulated Depreciation Factor	Net Book Value	ALG Remaining Life	Annual Accrual	Average Age
2007	32,354.60	8,132	18,266	0.5646	20,559	43.48	473	12.5
2008	546,472.16	126,677	284,553	0.5207	371,213	44.38	8,365	11.5
2009	18,096.31	3,839	8,625	0.4766	13,091	45.28	289	10.5
2010	207,417.01	39,910	89,649	0.4322	159,251	46.18	3,448	9.5
2012	871,673.24	133,009	298,777	0.3428	747,231	48.01	15,565	7.5
2013	2,879.93	382	857	0.2977	2,599	48.93	53	6.5
2014	148.86	17	38	0.2524	141	49.85	3	5.5
2015	396,219.40	36,503	81,997	0.2069	393,466	50.78	7,749	4.5
2016	1,309,729.80	94,032	211,223	0.1613	1,360,453	51.71	26,310	3.5
2017	907,052.09	46,604	104,687	0.1154	983,776	52.65	18,687	2.5
2018	206,010.24	6,363	14,293	0.0694	232,919	53.58	4,347	1.5
2019	298,909.60	3,085	6,930	0.0232	351,761	54.53	6,451	0.5
TOTAL	4,917,559.62	557,402	1,230,931		4,670,140		92,579	

COMPOSITE ANNUAL ACCRUAL RATE	1.88%
THEORETICAL ACCUMULATED DEPRECIATION FACTOR	0.25
COMPOSITE AVERAGE AGE (YEARS)	5.64
DIRECTED WEIGHTED ALG COMPOSITE REMAINING LIFE (YEARS)	49.80

ALG - Remaining Life
Survivor Curve: R2.5
ASL: 50
Net Salvage: -20%
Truncation Year:

Missouri American Water

Account #: 304.8000 - Structures and Improvements - Miscellaneous

CALCULATED ANNUAL ACCRUAL AND ACCRUED DEPRECIATION
BASED ON ORIGINAL COST AS OF DECEMBER 31, 2019

Year	Original Cost	Calculated Accumulated Depreciation	Allocated Actual Booked Amount	Accumulated Depreciation Factor	Net Book Value	ALG Remaining Life	Annual Accrual	Average Age
1902	160.15	192	167	1.0426	25	0.00	25	117.5
1907	1,290.47	1,549	1,345	1.0426	203	0.00	203	112.5
1910	21.71	26	23	1.0426	3	0.00	3	109.5
1912	363.07	436	379	1.0426	57	0.00	57	107.5
1913	97.42	117	102	1.0426	15	0.00	15	106.5
1926	448.32	538	467	1.0426	71	0.00	71	93.5
1927	1,564.53	1,877	1,631	1.0426	246	0.00	246	92.5
1928	104.95	126	109	1.0426	17	0.00	17	91.5
1929	352.00	422	367	1.0426	55	0.00	55	90.5
1931	93.64	112	98	1.0426	15	0.00	15	88.5
1936	537.02	613	533	0.9923	112	2.41	46	83.5
1938	1,056.04	1,192	1,036	0.9806	232	2.97	78	81.5
1943	15,254.69	16,786	14,584	0.9560	3,722	4.15	897	76.5
1946	726.10	787	684	0.9423	187	4.81	39	73.5
1952	79.29	83	72	0.9134	23	6.20	4	67.5
1959	2,602.75	2,621	2,277	0.8748	846	8.05	105	60.5
1960	5,010.96	5,009	4,352	0.8685	1,661	8.35	199	59.5
1966	25.85	25	21	0.8247	10	10.45	1	53.5
1981	26.52	20	18	0.6606	14	18.32	1	38.5
1982	19,730.22	14,694	12,767	0.6471	10,910	18.97	575	37.5
1985	1,000.00	696	605	0.6050	595	20.99	28	34.5
1994	1,149,870.42	617,228	536,266	0.4664	843,579	27.63	30,527	25.5
1995	4,074.00	2,110	1,833	0.4499	3,056	28.42	108	24.5
1997	873.30	419	364	0.4165	684	30.02	23	22.5
2000	1,739,945.34	731,124	635,222	0.3651	1,452,713	32.49	44,710	19.5
2001	321,858.09	128,766	111,875	0.3476	274,354	33.33	8,231	18.5

ALG - Remaining Life
Survivor Curve: R2.5
ASL: 50
Net Salvage: -20%
Truncation Year:

Missouri American Water

Account #: 304.8000 - Structures and Improvements - Miscellaneous

CALCULATED ANNUAL ACCRUAL AND ACCRUED DEPRECIATION
BASED ON ORIGINAL COST AS OF DECEMBER 31, 2019

Year	Original Cost	Calculated Accumulated Depreciation	Allocated Actual Booked Amount	Accumulated Depreciation Factor	Net Book Value	ALG Remaining Life	Annual Accrual	Average Age
2002	13,461.37	5,112	4,441	0.3299	11,712	34.18	343	17.5
2003	49,047.69	17,621	15,309	0.3121	43,548	35.03	1,243	16.5
2005	40,228.10	12,782	11,106	0.2761	37,168	36.76	1,011	14.5
2006	134,092.95	39,790	34,571	0.2578	126,341	37.64	3,357	13.5
2007	67,706.23	18,658	16,211	0.2394	65,037	38.52	1,688	12.5
2019	149,211.30	1,694	1,472	0.0099	177,582	49.53	3,586	0.5
TOTAL	3,720,914.49	1,623,226	1,410,306		3,054,792		97,507	

COMPOSITE ANNUAL ACCRUAL RATE	2.62%
THEORETICAL ACCUMULATED DEPRECIATION FACTOR	0.38
COMPOSITE AVERAGE AGE (YEARS)	20.62
DIRECTED WEIGHTED ALG COMPOSITE REMAINING LIFE (YEARS)	31.82

ALG - Remaining Life

Survivor Curve: R4

ASL: 90

Net Salvage: 0%

Truncation Year:

Missouri American Water

Account #: 305.0000 - Collecting and Impounding Reservoirs

CALCULATED ANNUAL ACCRUAL AND ACCRUED DEPRECIATION
BASED ON ORIGINAL COST AS OF DECEMBER 31, 2019

Year	Original Cost	Calculated Accumulated Depreciation	Allocated Actual Booked Amount	Accumulated Depreciation Factor	Net Book Value	ALG Remaining Life	Annual Accrual	Average Age
1956	16,589.73	10,987	16,590	1.0000	0	30.39	0	63.5
1957	577.43	377	577	1.0000	0	31.17	0	62.5
1961	59,395.27	36,709	57,100	0.9614	2,295	34.38	67	58.5
1973	27,479.34	13,825	21,504	0.7825	5,976	44.72	134	46.5
1976	2,433.52	1,150	1,789	0.7353	644	47.46	14	43.5
1995	665.87	180	280	0.4210	386	65.64	6	24.5
2007	1,616.04	224	348	0.2156	1,268	77.53	16	12.5
2012	10,932.19	910	1,415	0.1294	9,517	82.51	115	7.5
TOTAL	119,689.39	64,362	99,604		20,086		352	

COMPOSITE ANNUAL ACCRUAL RATE 0.29%

THEORETICAL ACCUMULATED DEPRECIATION FACTOR 0.83

COMPOSITE AVERAGE AGE (YEARS) 50.68

DIRECTED WEIGHTED ALG COMPOSITE REMAINING LIFE (YEARS) 41.60

ALG - Remaining Life

Survivor Curve: L1

ASL: 60

Net Salvage: -20%

Truncation Year: 2053

Missouri American Water

Account #: 306.0002 - Lake, River, and Other Intakes - St. Louis

CALCULATED ANNUAL ACCRUAL AND ACCRUED DEPRECIATION
BASED ON ORIGINAL COST AS OF DECEMBER 31, 2019

Year	Original Cost	Calculated Accumulated Depreciation	Allocated Actual Booked Amount	Accumulated Depreciation Factor	Net Book Value	ALG Remaining Life	Annual Accrual	Average Age
2014	1,842.34	338	481	0.2613	1,729	29.78	58	5.5
2016	672,617.06	83,580	119,012	0.1769	688,129	30.21	22,777	3.5
TOTAL	674,459.40	83,919	119,493		689,858		22,835	

COMPOSITE ANNUAL ACCRUAL RATE 3.39%

THEORETICAL ACCUMULATED DEPRECIATION FACTOR 0.18

COMPOSITE AVERAGE AGE (YEARS) 3.51

DIRECTED WEIGHTED ALG COMPOSITE REMAINING LIFE (YEARS) 30.21

ALG - Remaining Life
Survivor Curve: L1
ASL: 60
Net Salvage: -20%
Truncation Year: 2063

Missouri American Water

Account #: 306.0003 - Lake, River, and Other Intakes - St. Joseph

CALCULATED ANNUAL ACCRUAL AND ACCRUED DEPRECIATION
BASED ON ORIGINAL COST AS OF DECEMBER 31, 2019

Year	Original Cost	Calculated Accumulated Depreciation	Allocated Actual Booked Amount	Accumulated Depreciation Factor	Net Book Value	ALG Remaining Life	Annual Accrual	Average Age
1995	5,102.84	2,414	904	0.1772	5,219	30.77	170	24.5
TOTAL	5,102.84	2,414	904		5,219		170	

COMPOSITE ANNUAL ACCRUAL RATE	3.32%
THEORETICAL ACCUMULATED DEPRECIATION FACTOR	0.18
COMPOSITE AVERAGE AGE (YEARS)	24.50
DIRECTED WEIGHTED ALG COMPOSITE REMAINING LIFE (YEARS)	30.77

ALG - Remaining Life

Survivor Curve: L1

ASL: 60

Net Salvage: -20%

Truncation Year: 2065

Missouri American Water

Account #: 306.0007 - Lake, River, and Other Intakes - Mexico

CALCULATED ANNUAL ACCRUAL AND ACCRUED DEPRECIATION
BASED ON ORIGINAL COST AS OF DECEMBER 31, 2019

Year	Original Cost	Calculated Accumulated Depreciation	Allocated Actual Booked Amount	Accumulated Depreciation Factor	Net Book Value	ALG Remaining Life	Annual Accrual	Average Age
2007	10,775.14	3,189	1,909	0.1772	11,021	35.03	315	12.5
TOTAL	10,775.14	3,189	1,909		11,021		315	

COMPOSITE ANNUAL ACCRUAL RATE	2.92%
THEORETICAL ACCUMULATED DEPRECIATION FACTOR	0.18
COMPOSITE AVERAGE AGE (YEARS)	12.50
DIRECTED WEIGHTED ALG COMPOSITE REMAINING LIFE (YEARS)	35.03

ALG - Remaining Life

Survivor Curve: L1

ASL: 60

Net Salvage: -20%

Truncation Year: 2073

Missouri American Water

Account #: 306.0008 - Lake, River, and Other Intakes - Joplin

CALCULATED ANNUAL ACCRUAL AND ACCRUED DEPRECIATION
BASED ON ORIGINAL COST AS OF DECEMBER 31, 2019

Year	Original Cost	Calculated Accumulated Depreciation	Allocated Actual Booked Amount	Accumulated Depreciation Factor	Net Book Value	ALG Remaining Life	Annual Accrual	Average Age
1892	10.79	10	7	0.6628	6	11.38	1	127.5
1902	3,090.14	2,880	1,963	0.6352	1,745	13.41	130	117.5
1916	200.87	175	119	0.5945	122	16.39	7	103.5
1957	26,992.58	18,507	12,615	0.4674	19,776	25.61	772	62.5
2007	416,936.03	113,976	77,691	0.1863	422,632	38.63	10,942	12.5
2016	115,518.51	10,715	7,304	0.0632	131,318	42.45	3,093	3.5
TOTAL	562,748.92	146,264	99,700		575,599		14,945	

COMPOSITE ANNUAL ACCRUAL RATE	2.66%
THEORETICAL ACCUMULATED DEPRECIATION FACTOR	0.18
COMPOSITE AVERAGE AGE (YEARS)	13.66
DIRECTED WEIGHTED ALG COMPOSITE REMAINING LIFE (YEARS)	38.64

ALG - Remaining Life

Survivor Curve: L1

ASL: 60

Net Salvage: -20%

Truncation Year: 2054

Missouri American Water

Account #: 306.0009 - Lake, River, and Other Intakes - Jefferson

CALCULATED ANNUAL ACCRUAL AND ACCRUED DEPRECIATION
BASED ON ORIGINAL COST AS OF DECEMBER 31, 2019

Year	Original Cost	Calculated Accumulated Depreciation	Allocated Actual Booked Amount	Accumulated Depreciation Factor	Net Book Value	ALG Remaining Life	Annual Accrual	Average Age
1957	3,288.00	2,477	1,662	0.5055	2,283	21.58	106	62.5
2004	302,958.60	120,962	81,171	0.2679	282,380	28.19	10,016	15.5
2011	6,180,773.25	1,589,237	1,066,446	0.1725	6,350,482	29.78	213,221	8.5
TOTAL	6,487,019.85	1,712,676	1,149,279		6,635,145		223,343	

COMPOSITE ANNUAL ACCRUAL RATE	3.44%
THEORETICAL ACCUMULATED DEPRECIATION FACTOR	0.18
COMPOSITE AVERAGE AGE (YEARS)	8.85
DIRECTED WEIGHTED ALG COMPOSITE REMAINING LIFE (YEARS)	29.71

ALG - Remaining Life

Survivor Curve: R1

ASL: 60

Net Salvage: -10%

Truncation Year:

Missouri American Water

Account #: 307.0000 - Wells and Other Springs

CALCULATED ANNUAL ACCRUAL AND ACCRUED DEPRECIATION BASED ON ORIGINAL COST AS OF DECEMBER 31, 2019

Year	Original Cost	Calculated Accumulated Depreciation	Allocated Actual Booked Amount	Accumulated Depreciation Factor	Net Book Value	ALG Remaining Life	Annual Accrual	Average Age
1920	149,041.84	145,694	163,946	1.1000	0	6.68	0	99.5
1926	100,154.18	94,414	110,170	1.1000	0	8.58	0	93.5
1929	28,653.40	26,485	31,519	1.1000	0	9.58	0	90.5
1933	2,492.80	2,241	2,711	1.0873	32	10.97	3	86.5
1951	12,590.18	9,670	11,698	0.9291	2,151	18.11	119	68.5
1952	6,751.68	5,131	6,207	0.9193	1,220	18.55	66	67.5
1956	40,483.22	29,413	35,581	0.8789	8,951	20.37	439	63.5
1959	44,364.04	31,074	37,590	0.8473	11,211	21.80	514	60.5
1960	3,979.30	2,752	3,329	0.8365	1,048	22.28	47	59.5
1962	104,779.58	70,556	85,352	0.8146	29,905	23.27	1,285	57.5
1966	40.34	26	31	0.7692	13	25.32	1	53.5
1968	25,213.00	15,542	18,802	0.7457	8,933	26.38	339	51.5
1974	2,050.00	1,139	1,378	0.6722	877	29.69	30	45.5
1976	26,174.69	13,992	16,926	0.6467	11,866	30.84	385	43.5
1980	49,217.60	24,173	29,242	0.5941	24,897	33.21	750	39.5
1981	6,098.25	2,927	3,541	0.5807	3,167	33.82	94	38.5
1982	73,430.32	34,427	41,647	0.5672	39,127	34.43	1,137	37.5
1983	3,065.62	1,403	1,697	0.5535	1,675	35.04	48	36.5
1984	233,001.41	103,957	125,758	0.5397	130,544	35.66	3,660	35.5
1985	364.95	159	192	0.5258	210	36.29	6	34.5
1987	64,808.44	26,668	32,260	0.4978	39,029	37.56	1,039	32.5
1988	550.64	220	266	0.4836	339	38.19	9	31.5
1989	337,006.76	130,745	158,162	0.4693	212,545	38.84	5,473	30.5
1990	201,682.20	75,848	91,754	0.4549	130,096	39.49	3,295	29.5
1991	9,561.37	3,482	4,212	0.4405	6,306	40.14	157	28.5
1992	2,703.94	952	1,152	0.4259	1,823	40.79	45	27.5

ALG - Remaining Life
Survivor Curve: R1
ASL: 60
Net Salvage: -10%
Truncation Year:

Missouri American Water

Account #: 307.0000 - Wells and Other Springs

CALCULATED ANNUAL ACCRUAL AND ACCRUED DEPRECIATION BASED ON ORIGINAL COST AS OF DECEMBER 31, 2019

Year	Original Cost	Calculated Accumulated Depreciation	Allocated Actual Booked Amount	Accumulated Depreciation Factor	Net Book Value	ALG Remaining Life	Annual Accrual	Average Age
1993	69,964.01	23,789	28,777	0.4113	48,183	41.45	1,162	26.5
1995	94,847.09	29,939	36,217	0.3818	68,115	42.78	1,592	24.5
1996	100,974.82	30,634	37,058	0.3670	74,014	43.45	1,703	23.5
1997	209,684.05	61,029	73,828	0.3521	156,825	44.12	3,554	22.5
1998	74,522.28	20,768	25,123	0.3371	56,852	44.80	1,269	21.5
1999	330,476.86	87,991	106,443	0.3221	257,082	45.48	5,653	20.5
2000	930,017.55	236,018	285,512	0.3070	737,507	46.16	15,978	19.5
2002	848,239.44	193,988	234,668	0.2767	698,395	47.53	14,695	17.5
2004	412,178.75	83,848	101,432	0.2461	351,965	48.90	7,197	15.5
2005	88,675.86	16,912	20,459	0.2307	77,084	49.60	1,554	14.5
2006	994,697.27	177,020	214,141	0.2153	880,026	50.29	17,498	13.5
2007	610,459.23	100,822	121,964	0.1998	549,541	50.99	10,777	12.5
2008	106,334.04	16,194	19,590	0.1842	97,377	51.69	1,884	11.5
2009	29,120.17	4,059	4,910	0.1686	27,122	52.40	518	10.5
2010	204,081.53	25,796	31,206	0.1529	193,284	53.11	3,640	9.5
2011	38,224.82	4,333	5,242	0.1371	36,805	53.82	684	8.5
2012	143,272.28	14,366	17,379	0.1213	140,221	54.53	2,571	7.5
2013	138,151.63	12,035	14,559	0.1054	137,408	55.25	2,487	6.5
2014	17,508.93	1,294	1,565	0.0894	17,695	55.97	316	5.5
2015	148,651.05	9,009	10,898	0.0733	152,618	56.69	2,692	4.5
2016	140,795.16	6,653	8,048	0.0572	146,826	57.42	2,557	3.5
2017	1,330,897.52	45,029	54,471	0.0409	1,409,516	58.15	24,237	2.5
2018	390,592.52	7,944	9,610	0.0246	420,041	58.89	7,133	1.5
2019	756,042.05	5,125	6,200	0.0082	825,446	59.63	13,843	0.5

ALG - Remaining Life
Survivor Curve: R1
ASL: 60
Net Salvage: -10%
Truncation Year:

Missouri American Water

Account #: 307.0000 - Wells and Other Springs

CALCULATED ANNUAL ACCRUAL AND ACCRUED DEPRECIATION BASED ON ORIGINAL COST AS OF DECEMBER 31, 2019

Year	Original Cost	Calculated Accumulated Depreciation	Allocated Actual Booked Amount	Accumulated Depreciation Factor	Net Book Value	ALG Remaining Life	Annual Accrual	Average Age
TOTAL	9,736,668.66	2,067,686	2,484,423		8,225,913		164,133	
COMPOSITE ANNUAL ACCRUAL RATE				1.69%				
THEORETICAL ACCUMULATED DEPRECIATION FACTOR				0.26				
COMPOSITE AVERAGE AGE (YEARS)				17.16				
DIRECTED WEIGHTED ALG COMPOSITE REMAINING LIFE (YEARS)				48.42				

ALG - Remaining Life
Survivor Curve: R3.5
ASL: 60
Net Salvage: 0%
Truncation Year:

Missouri American Water

Account #: 308.0000 - Infiltration Galleries and Tunnels

CALCULATED ANNUAL ACCRUAL AND ACCRUED DEPRECIATION BASED ON ORIGINAL COST AS OF DECEMBER 31, 2019

Year	Original Cost	Calculated Accumulated Depreciation	Allocated Actual Booked Amount	Accumulated Depreciation Factor	Net Book Value	ALG Remaining Life	Annual Accrual	Average Age
2003	1,803.84	485	408	0.2260	1,396	43.88	32	16.5
TOTAL	1,803.84	485	408		1,396		32	

COMPOSITE ANNUAL ACCRUAL RATE	1.76%
THEORETICAL ACCUMULATED DEPRECIATION FACTOR	0.23
COMPOSITE AVERAGE AGE (YEARS)	16.50
DIRECTED WEIGHTED ALG COMPOSITE REMAINING LIFE (YEARS)	43.88

ALG - Remaining Life
Survivor Curve: R3.5
ASL: 82
Net Salvage: -30%
Truncation Year:

Missouri American Water

Account #: 309.0000 - Supply Mains

CALCULATED ANNUAL ACCRUAL AND ACCRUED DEPRECIATION BASED ON ORIGINAL COST AS OF DECEMBER 31, 2019

Year	Original Cost	Calculated Accumulated Depreciation	Allocated Actual Booked Amount	Accumulated Depreciation Factor	Net Book Value	ALG Remaining Life	Annual Accrual	Average Age
1880	5,076.88	6,600	6,600	1.3000	0	0.00	0	140.5
1891	6,868.42	8,778	8,929	1.3000	0	1.39	0	128.5
1901	26,086.40	31,935	33,390	1.2800	522	4.78	109	118.5
1903	29,449.62	35,865	37,499	1.2733	786	5.18	152	116.5
1912	15,391.31	18,356	19,192	1.2470	816	6.77	120	107.5
1930	558.05	625	654	1.1716	72	11.32	6	89.5
1947	1,053.59	1,047	1,094	1.0386	275	19.34	14	72.5
1952	4,276.98	4,033	4,217	0.9859	1,343	22.52	60	67.5
1954	6,391.26	5,891	6,159	0.9637	2,150	23.86	90	65.5
1955	163,708.59	149,112	155,906	0.9523	56,915	24.55	2,319	64.5
1956	200,978.22	180,851	189,092	0.9409	72,180	25.24	2,860	63.5
1957	4,036.65	3,588	3,751	0.9292	1,497	25.94	58	62.5
1958	2,991.69	2,625	2,745	0.9175	1,144	26.65	43	61.5
1959	63,759.65	55,220	57,736	0.9055	25,151	27.37	919	60.5
1960	62,093.84	53,060	55,478	0.8934	25,244	28.10	898	59.5
1961	239,610.34	201,950	211,152	0.8812	100,342	28.84	3,480	58.5
1963	16,210.10	13,277	13,882	0.8564	7,191	30.34	237	56.5
1964	104,020.93	83,939	87,764	0.8437	47,464	31.10	1,526	55.5
1965	60.42	48	50	0.8309	28	31.87	1	54.5
1966	1.36	1	1	0.8180	1	32.65	0	53.5
1967	19,012.38	14,637	15,304	0.8050	9,412	33.44	281	52.5
1968	449,306.70	340,241	355,744	0.7918	228,354	34.23	6,670	51.5
1969	778.55	580	606	0.7784	406	35.04	12	50.5
1970	1,842.66	1,348	1,410	0.7650	986	35.85	28	49.5
1971	462,698.51	332,536	347,688	0.7514	253,820	36.67	6,922	48.5
1972	41,952.37	29,602	30,950	0.7377	23,588	37.49	629	47.5

ALG - Remaining Life
Survivor Curve: R3.5
ASL: 82
Net Salvage: -30%
Truncation Year:

Missouri American Water

Account #: 309.0000 - Supply Mains

CALCULATED ANNUAL ACCRUAL AND ACCRUED DEPRECIATION BASED ON ORIGINAL COST AS OF DECEMBER 31, 2019

Year	Original Cost	Calculated Accumulated Depreciation	Allocated Actual Booked Amount	Accumulated Depreciation Factor	Net Book Value	ALG Remaining Life	Annual Accrual	Average Age
1973	205,559.47	142,326	148,811	0.7239	118,416	38.33	3,090	46.5
1974	6,817.97	4,630	4,841	0.7100	4,023	39.17	103	45.5
1975	999.62	665	696	0.6960	604	40.01	15	44.5
1976	6,299.57	4,108	4,295	0.6818	3,894	40.87	95	43.5
1977	85,814.70	54,791	57,288	0.6676	54,271	41.73	1,301	42.5
1978	382.84	239	250	0.6532	248	42.59	6	41.5
1979	7,032.84	4,296	4,492	0.6388	4,650	43.47	107	40.5
1980	68,413.20	40,843	42,704	0.6242	46,234	44.34	1,043	39.5
1982	4,304.66	2,449	2,560	0.5948	3,036	46.12	66	37.5
1983	1,883.18	1,045	1,092	0.5800	1,356	47.01	29	36.5
1984	332,493.02	179,686	187,873	0.5650	244,368	47.91	5,100	35.5
1985	802,000.27	421,911	441,135	0.5500	601,465	48.82	12,321	34.5
1986	31,016.38	15,869	16,592	0.5350	23,729	49.73	477	33.5
1987	129,047.83	64,154	67,078	0.5198	100,685	50.64	1,988	32.5
1988	41,904.20	20,221	21,143	0.5046	33,333	51.56	646	31.5
1989	143,093.39	66,957	70,007	0.4892	116,014	52.48	2,210	30.5
1990	49,678.64	22,515	23,541	0.4739	41,041	53.41	768	29.5
1991	270,515.06	118,604	124,009	0.4584	227,661	54.34	4,189	28.5
1992	32,601.57	13,810	14,439	0.4429	27,943	55.28	505	27.5
1993	2,506,355.26	1,024,377	1,071,052	0.4273	2,187,210	56.22	38,905	26.5
1995	44,938.93	17,021	17,797	0.3960	40,624	58.11	699	24.5
1997	31,055.26	10,826	11,319	0.3645	29,053	60.01	484	22.5
1998	63,014.03	21,012	21,970	0.3486	59,949	60.97	983	21.5
1999	3,404.33	1,083	1,133	0.3328	3,293	61.92	53	20.5
2000	9,885,173.35	2,995,439	3,131,925	0.3168	9,718,800	62.89	154,546	19.5
2002	118,740.31	32,348	33,822	0.2848	120,540	64.82	1,860	17.5

ALG - Remaining Life
Survivor Curve: R3.5
ASL: 82
Net Salvage: -30%
Truncation Year:

Missouri American Water

Account #: 309.0000 - Supply Mains

CALCULATED ANNUAL ACCRUAL AND ACCRUED DEPRECIATION BASED ON ORIGINAL COST AS OF DECEMBER 31, 2019

Year	Original Cost	Calculated Accumulated Depreciation	Allocated Actual Booked Amount	Accumulated Depreciation Factor	Net Book Value	ALG Remaining Life	Annual Accrual	Average Age
2003	25,710.68	6,610	6,911	0.2688	26,513	65.78	403	16.5
2004	704.18	170	178	0.2527	737	66.75	11	15.5
2005	24,874.00	5,628	5,885	0.2366	26,451	67.73	391	14.5
2006	3,133.37	661	691	0.2204	3,383	68.70	49	13.5
2007	3,861,281.95	754,286	788,654	0.2042	4,231,012	69.68	60,722	12.5
2008	127,382.86	22,909	23,953	0.1880	141,645	70.66	2,005	11.5
2009	229,510.78	37,710	39,429	0.1718	258,935	71.64	3,615	10.5
2010	31,277.94	4,653	4,865	0.1555	35,797	72.62	493	9.5
2011	1,006,933.99	134,094	140,204	0.1392	1,168,810	73.60	15,881	8.5
2013	13,375.45	1,364	1,426	0.1066	15,962	75.57	211	6.5
2014	118,692.73	10,244	10,711	0.0902	143,590	76.56	1,876	5.5
2019	46,269.60	364	380	0.0082	59,770	81.50	733	0.5
TOTAL	22,289,902.88	7,835,663	8,192,144		20,784,730		345,413	

COMPOSITE ANNUAL ACCRUAL RATE	1.55%
THEORETICAL ACCUMULATED DEPRECIATION FACTOR	0.37
COMPOSITE AVERAGE AGE (YEARS)	23.15
DIRECTED WEIGHTED ALG COMPOSITE REMAINING LIFE (YEARS)	59.83

ALG - Remaining Life
Survivor Curve: R3
ASL: 37
Net Salvage: -10%
Truncation Year:

Missouri American Water

Account #: 310.1000 - Power Generation Equipment

CALCULATED ANNUAL ACCRUAL AND ACCRUED DEPRECIATION
BASED ON ORIGINAL COST AS OF DECEMBER 31, 2019

Year	Original Cost	Calculated Accumulated Depreciation	Allocated Actual Booked Amount	Accumulated Depreciation Factor	Net Book Value	ALG Remaining Life	Annual Accrual	Average Age
1959	98.90	107	78	0.7861	31	0.62	31	60.5
1984	7,820.00	6,695	4,866	0.6222	3,736	8.20	455	35.5
1985	900.00	757	550	0.6110	440	8.72	50	34.5
1997	164,384.84	99,228	72,119	0.4387	108,704	16.70	6,511	22.5
2000	5,884.20	3,135	2,278	0.3872	4,194	19.08	220	19.5
2004	5,325.54	2,303	1,674	0.3144	4,184	22.45	186	15.5
2006	338.89	129	94	0.2764	279	24.21	12	13.5
2007	412,838.91	145,973	106,094	0.2570	348,029	25.11	13,862	12.5
2008	1,778,314.75	580,841	422,157	0.2374	1,533,990	26.01	58,969	11.5
2009	7,722.99	2,312	1,680	0.2176	6,815	26.93	253	10.5
2010	45,607.18	12,397	9,010	0.1976	41,158	27.86	1,477	9.5
2011	45,237.63	11,040	8,024	0.1774	41,738	28.79	1,450	8.5
2012	5,593.51	1,208	878	0.1570	5,275	29.73	177	7.5
2013	48,493.06	9,104	6,617	0.1365	46,725	30.69	1,523	6.5
2014	164,022.24	26,127	18,989	0.1158	161,435	31.64	5,102	5.5
2015	4,456.61	582	423	0.0950	4,479	32.61	137	4.5
2016	1,017,679.48	103,646	75,330	0.0740	1,044,117	33.57	31,099	3.5
2017	6,644,985.21	484,405	352,067	0.0530	6,957,417	34.55	201,384	2.5
2018	1,529,511.20	67,026	48,714	0.0318	1,633,748	35.53	45,987	1.5
2019	876,395.97	12,822	9,319	0.0106	954,717	36.51	26,151	0.5

ALG - Remaining Life
Survivor Curve: R3
ASL: 37
Net Salvage: -10%
Truncation Year:

Missouri American Water

Account #: 310.1000 - Power Generation Equipment

CALCULATED ANNUAL ACCRUAL AND ACCRUED DEPRECIATION BASED ON ORIGINAL COST AS OF DECEMBER 31, 2019

Year	Original Cost	Calculated Accumulated Depreciation	Allocated Actual Booked Amount	Accumulated Depreciation Factor	Net Book Value	ALG Remaining Life	Annual Accrual	Average Age
TOTAL	12,765,611.11	1,569,837	1,140,962		12,901,211		395,037	
COMPOSITE ANNUAL ACCRUAL RATE				3.09%				
THEORETICAL ACCUMULATED DEPRECIATION FACTOR				0.09				
COMPOSITE AVERAGE AGE (YEARS)				4.30				
DIRECTED WEIGHTED ALG COMPOSITE REMAINING LIFE (YEARS)				32.86				

ALG - Remaining Life
Survivor Curve: R0.5
ASL: 55
Net Salvage: -15%
Truncation Year:

Missouri American Water

Account #: 311.0000 - Electric Pumping Equipment

CALCULATED ANNUAL ACCRUAL AND ACCRUED DEPRECIATION
BASED ON ORIGINAL COST AS OF DECEMBER 31, 2019

Year	Original Cost	Calculated Accumulated Depreciation	Allocated Actual Booked Amount	Accumulated Depreciation Factor	Net Book Value	ALG Remaining Life	Annual Accrual	Average Age
1888	71.00	82	82	1.1500	0	0.00	0	131.5
1903	204.53	235	235	1.1500	0	0.00	0	116.5
1909	113.99	130	131	1.1500	0	0.50	0	110.5
1910	408.63	466	470	1.1500	0	0.50	0	109.5
1926	9,512.83	9,444	10,940	1.1500	0	7.52	0	93.5
1927	9,646.79	9,495	11,094	1.1500	0	7.93	0	92.5
1931	39,309.96	37,372	45,206	1.1500	0	9.53	0	88.5
1932	667.10	629	767	1.1500	0	9.93	0	87.5
1933	9,278.77	8,668	10,671	1.1500	0	10.32	0	86.5
1934	978.56	906	1,125	1.1500	0	10.72	0	85.5
1935	125.00	115	144	1.1500	0	11.12	0	84.5
1936	637.03	579	733	1.1500	0	11.51	0	83.5
1937	197.80	178	227	1.1500	0	11.91	0	82.5
1938	72,994.79	65,164	83,944	1.1500	0	12.30	0	81.5
1939	41,740.04	36,915	48,001	1.1500	0	12.70	0	80.5
1940	214.02	187	246	1.1500	0	13.10	0	79.5
1941	295.65	257	340	1.1500	0	13.50	0	78.5
1942	436.13	375	502	1.1500	0	13.91	0	77.5
1943	198.39	169	228	1.1500	0	14.31	0	76.5
1944	469.23	395	540	1.1500	0	14.72	0	75.5
1946	49,127.43	40,536	56,497	1.1500	0	15.54	0	73.5
1947	22,599.89	18,452	25,990	1.1500	0	15.95	0	72.5
1948	54,319.45	43,876	62,467	1.1500	0	16.37	0	71.5
1949	39,562.69	31,609	45,497	1.1500	0	16.79	0	70.5
1950	15,699.81	12,405	18,055	1.1500	0	17.21	0	69.5
1951	207,461.14	162,070	238,580	1.1500	0	17.64	0	68.5

ALG - Remaining Life
Survivor Curve: R0.5
ASL: 55
Net Salvage: -15%
Truncation Year:

Missouri American Water

Account #: 311.0000 - Electric Pumping Equipment

CALCULATED ANNUAL ACCRUAL AND ACCRUED DEPRECIATION
BASED ON ORIGINAL COST AS OF DECEMBER 31, 2019

Year	Original Cost	Calculated Accumulated Depreciation	Allocated Actual Booked Amount	Accumulated Depreciation Factor	Net Book Value	ALG Remaining Life	Annual Accrual	Average Age
1952	345.19	267	397	1.1500	0	18.07	0	67.5
1953	267,178.63	203,904	307,255	1.1500	0	18.50	0	66.5
1954	212,710.87	160,395	244,618	1.1500	0	18.94	0	65.5
1955	715,501.39	532,943	822,827	1.1500	0	19.38	0	64.5
1956	284,539.85	209,301	327,221	1.1500	0	19.82	0	63.5
1957	28,784.20	20,904	33,102	1.1500	0	20.27	0	62.5
1958	9,930.73	7,118	11,420	1.1500	0	20.72	0	61.5
1959	6,026.66	4,262	6,931	1.1500	0	21.17	0	60.5
1960	195,302.58	136,257	224,598	1.1500	0	21.63	0	59.5
1961	187,850.51	129,239	216,028	1.1500	0	22.10	0	58.5
1962	83,357.48	56,535	95,861	1.1500	0	22.56	0	57.5
1964	277,453.35	182,684	319,071	1.1500	0	23.51	0	55.5
1965	77,811.12	50,453	89,483	1.1500	0	23.99	0	54.5
1966	44,090.82	28,143	49,980	1.1336	725	24.47	30	53.5
1967	240,081.46	150,792	267,798	1.1154	8,296	24.96	332	52.5
1968	979,144.43	604,910	1,074,289	1.0972	51,727	25.45	2,032	51.5
1969	71,086.70	43,179	76,684	1.0787	5,066	25.95	195	50.5
1970	245,694.21	146,667	260,473	1.0602	22,075	26.45	835	49.5
1971	668,293.13	391,882	695,962	1.0414	72,575	26.96	2,692	48.5
1972	177,791.39	102,363	181,791	1.0225	22,669	27.46	825	47.5
1973	413,017.98	233,361	414,438	1.0034	60,533	27.98	2,164	46.5
1974	24,624.99	13,647	24,237	0.9842	4,082	28.49	143	45.5
1975	59,073.58	32,094	56,998	0.9649	10,937	29.02	377	44.5
1976	217,507.94	115,780	205,620	0.9453	44,514	29.54	1,507	43.5
1977	425,634.00	221,852	393,998	0.9257	95,481	30.07	3,175	42.5
1978	140,643.20	71,738	127,403	0.9059	34,337	30.61	1,122	41.5

ALG - Remaining Life
Survivor Curve: R0.5
ASL: 55
Net Salvage: -15%
Truncation Year:

Missouri American Water

Account #: 311.0000 - Electric Pumping Equipment

CALCULATED ANNUAL ACCRUAL AND ACCRUED DEPRECIATION
BASED ON ORIGINAL COST AS OF DECEMBER 31, 2019

Year	Original Cost	Calculated Accumulated Depreciation	Allocated Actual Booked Amount	Accumulated Depreciation Factor	Net Book Value	ALG Remaining Life	Annual Accrual	Average Age
1979	218,585.93	109,037	193,645	0.8859	57,729	31.14	1,854	40.5
1980	108,491.37	52,891	93,932	0.8658	30,834	31.68	973	39.5
1981	157,169.50	74,831	132,896	0.8456	47,849	32.23	1,485	38.5
1982	486,518.53	226,056	401,463	0.8252	158,033	32.78	4,821	37.5
1983	168,730.24	76,450	135,771	0.8047	58,269	33.33	1,748	36.5
1984	654,363.19	288,878	513,033	0.7840	239,484	33.89	7,067	35.5
1985	912,024.47	391,963	696,106	0.7633	352,723	34.45	10,240	34.5
1986	1,349,621.84	564,158	1,001,916	0.7424	550,149	35.01	15,715	33.5
1987	393,257.77	159,735	283,681	0.7214	168,565	35.57	4,738	32.5
1988	576,944.18	227,484	404,000	0.7002	259,486	36.14	7,180	31.5
1989	2,011,908.19	769,231	1,366,115	0.6790	947,580	36.71	25,810	30.5
1990	458,913.40	169,949	301,821	0.6577	225,929	37.29	6,059	29.5
1991	2,756,292.40	987,487	1,753,726	0.6363	1,416,010	37.87	37,396	28.5
1992	547,670.49	189,577	336,679	0.6147	293,142	38.44	7,625	27.5
1993	2,614,459.46	873,188	1,550,738	0.5931	1,455,891	39.03	37,305	26.5
1994	1,035,061.02	333,053	591,485	0.5714	598,835	39.61	15,118	25.5
1995	749,253.59	231,906	411,854	0.5497	449,788	40.20	11,190	24.5
1996	805,194.78	239,322	425,023	0.5279	500,951	40.79	12,283	23.5
1997	2,364,913.54	673,743	1,196,533	0.5060	1,523,117	41.37	36,813	22.5
1998	1,225,147.87	333,882	592,958	0.4840	815,962	41.97	19,443	21.5
1999	1,602,943.65	416,964	740,507	0.4620	1,102,878	42.56	25,914	20.5
2000	2,862,788.47	709,099	1,259,324	0.4399	2,032,883	43.15	47,108	19.5
2001	2,329,978.61	548,103	973,403	0.4178	1,706,072	43.75	38,996	18.5
2002	766,260.26	170,691	303,139	0.3956	578,060	44.35	13,035	17.5
2003	256,088.07	53,844	95,623	0.3734	198,878	44.94	4,425	16.5
2004	438,638.79	86,729	154,027	0.3511	350,408	45.54	7,694	15.5

ALG - Remaining Life
Survivor Curve: R0.5
ASL: 55
Net Salvage: -15%
Truncation Year:

Missouri American Water

Account #: 311.0000 - Electric Pumping Equipment

CALCULATED ANNUAL ACCRUAL AND ACCRUED DEPRECIATION
BASED ON ORIGINAL COST AS OF DECEMBER 31, 2019

Year	Original Cost	Calculated Accumulated Depreciation	Allocated Actual Booked Amount	Accumulated Depreciation Factor	Net Book Value	ALG Remaining Life	Annual Accrual	Average Age
2005	115,243.14	21,339	37,898	0.3289	94,632	46.14	2,051	14.5
2006	1,510,955.20	260,778	463,128	0.3065	1,274,470	46.75	27,264	13.5
2007	2,038,369.60	326,116	579,165	0.2841	1,764,960	47.35	37,276	12.5
2008	1,864,821.93	274,800	488,031	0.2617	1,656,514	47.95	34,545	11.5
2009	1,386,277.21	186,736	331,633	0.2392	1,262,586	48.56	26,002	10.5
2010	1,483,575.05	181,021	321,484	0.2167	1,384,627	49.16	28,163	9.5
2011	2,410,516.95	263,475	467,917	0.1941	2,304,177	49.77	46,294	8.5
2012	161,104.12	15,556	27,627	0.1715	157,643	50.38	3,129	7.5
2013	857,444.86	71,841	127,586	0.1488	858,475	50.99	16,835	6.5
2014	2,231,767.01	158,414	281,335	0.1261	2,285,197	51.61	44,282	5.5
2015	8,374,081.61	486,895	864,701	0.1033	8,765,493	52.22	167,859	4.5
2016	7,216,000.90	326,692	580,188	0.0804	7,718,213	52.83	146,082	3.5
2017	9,169,224.18	296,821	527,138	0.0575	10,017,469	53.45	187,411	2.5
2018	4,790,372.86	93,111	165,360	0.0345	5,343,569	54.07	98,826	1.5
2019	6,002,062.22	38,832	68,963	0.0115	6,833,408	54.69	124,947	0.5
TOTAL	84,092,783.49	16,292,054	28,432,748		68,273,953		1,408,430	

COMPOSITE ANNUAL ACCRUAL RATE	1.67%
THEORETICAL ACCUMULATED DEPRECIATION FACTOR	0.34
COMPOSITE AVERAGE AGE (YEARS)	15.60
DIRECTED WEIGHTED ALG COMPOSITE REMAINING LIFE (YEARS)	45.73

ALG - Remaining Life

Survivor Curve: R1

ASL: 50

Net Salvage: -30%

Truncation Year:

Missouri American Water

Account #: 320.0000 - Water Treatment Equipment

CALCULATED ANNUAL ACCRUAL AND ACCRUED DEPRECIATION
BASED ON ORIGINAL COST AS OF DECEMBER 31, 2019

Year	Original Cost	Calculated Accumulated Depreciation	Allocated Actual Booked Amount	Accumulated Depreciation Factor	Net Book Value	ALG Remaining Life	Annual Accrual	Average Age
1881	575.10	748	748	1.3000	0	0.00	0	138.5
1901	12,135.60	15,776	15,776	1.3000	0	0.00	0	118.5
1903	1,850.92	2,406	2,406	1.3000	0	0.00	0	116.5
1905	153.58	200	200	1.3000	0	0.00	0	114.5
1908	186.02	242	242	1.3000	0	0.00	0	111.5
1916	15,506.97	20,159	20,159	1.3000	0	0.00	0	103.5
1924	52.00	65	68	1.3000	0	1.69	0	95.5
1927	40,531.00	49,864	52,690	1.3000	0	2.68	0	92.5
1932	260.13	310	338	1.3000	0	4.19	0	87.5
1933	104.36	123	136	1.3000	0	4.49	0	86.5
1934	111.76	131	145	1.3000	0	4.79	0	85.5
1935	134.40	157	175	1.3000	0	5.09	0	84.5
1936	24,309.43	28,196	31,602	1.3000	0	5.39	0	83.5
1937	7,457.10	8,590	9,694	1.3000	0	5.70	0	82.5
1938	6,635.65	7,590	8,626	1.3000	0	6.01	0	81.5
1940	14,488.38	16,334	18,835	1.3000	0	6.64	0	79.5
1945	36,794.46	39,894	47,833	1.3000	0	8.30	0	74.5
1949	280.60	294	358	1.2774	6	9.71	1	70.5
1950	50,217.23	52,122	63,567	1.2658	1,716	10.08	170	69.5
1951	178,126.91	183,161	223,380	1.2540	8,185	10.45	783	68.5
1952	27,040.09	27,539	33,586	1.2421	1,566	10.83	145	67.5
1953	637,836.49	643,275	784,526	1.2300	44,661	11.21	3,984	66.5
1954	408,839.80	408,205	497,840	1.2177	33,652	11.60	2,901	65.5
1955	161,008.32	159,113	194,051	1.2052	15,260	11.99	1,273	64.5
1956	455,894.38	445,800	543,690	1.1926	48,973	12.39	3,953	63.5
1957	45,476.91	43,992	53,652	1.1798	5,468	12.79	427	62.5

ALG - Remaining Life

Survivor Curve: R1

ASL: 50

Net Salvage: -30%

Truncation Year:

Missouri American Water

Account #: 320.0000 - Water Treatment Equipment

CALCULATED ANNUAL ACCRUAL AND ACCRUED DEPRECIATION
BASED ON ORIGINAL COST AS OF DECEMBER 31, 2019

Year	Original Cost	Calculated Accumulated Depreciation	Allocated Actual Booked Amount	Accumulated Depreciation Factor	Net Book Value	ALG Remaining Life	Annual Accrual	Average Age
1958	87,919.14	84,110	102,579	1.1667	11,715	13.20	887	61.5
1959	553,522.31	523,554	638,518	1.1536	81,061	13.62	5,951	60.5
1960	201,849.89	188,707	230,144	1.1402	32,261	14.04	2,297	59.5
1961	12,769.56	11,796	14,386	1.1266	2,214	14.47	153	58.5
1962	21,579.88	19,691	24,015	1.1128	4,039	14.91	271	57.5
1963	6,545.68	5,898	7,193	1.0989	1,317	15.35	86	56.5
1964	518,730.72	461,363	562,670	1.0847	111,680	15.79	7,072	55.5
1965	539,031.76	473,070	576,947	1.0703	123,794	16.25	7,620	54.5
1966	25,143.87	21,767	26,546	1.0558	6,141	16.70	368	53.5
1968	438,925.34	369,258	450,341	1.0260	120,262	17.64	6,816	51.5
1970	113,900.33	92,963	113,376	0.9954	34,694	18.61	1,864	49.5
1971	1,744,705.63	1,401,641	1,709,416	0.9798	558,701	19.10	29,249	48.5
1972	218,749.55	172,895	210,859	0.9639	73,515	19.60	3,751	47.5
1973	557,131.61	433,007	528,087	0.9479	196,184	20.11	9,757	46.5
1974	25,515.09	19,490	23,770	0.9316	9,400	20.62	456	45.5
1975	18,508.60	13,887	16,937	0.9151	7,124	21.14	337	44.5
1976	12,439.53	9,163	11,175	0.8984	4,996	21.67	231	43.5
1977	1,255,712.51	907,525	1,106,802	0.8814	525,624	22.20	23,673	42.5
1978	31,107.72	22,044	26,885	0.8642	13,555	22.74	596	41.5
1979	205,684.88	142,824	174,185	0.8469	93,205	23.29	4,001	40.5
1980	39,877.98	27,115	33,069	0.8292	18,773	23.85	787	39.5
1981	142,011.77	94,483	115,230	0.8114	69,385	24.41	2,842	38.5
1982	36,543.46	23,772	28,992	0.7934	18,514	24.98	741	37.5
1984	245,816.55	152,502	185,989	0.7566	133,572	26.14	5,110	35.5
1985	1,030,170.83	623,320	760,191	0.7379	579,031	26.73	21,664	34.5
1987	177,371.29	101,794	124,146	0.6999	106,437	27.93	3,811	32.5

ALG - Remaining Life
Survivor Curve: R1
ASL: 50
Net Salvage: -30%
Truncation Year:

Missouri American Water

Account #: 320.0000 - Water Treatment Equipment

CALCULATED ANNUAL ACCRUAL AND ACCRUED DEPRECIATION BASED ON ORIGINAL COST AS OF DECEMBER 31, 2019

Year	Original Cost	Calculated Accumulated Depreciation	Allocated Actual Booked Amount	Accumulated Depreciation Factor	Net Book Value	ALG Remaining Life	Annual Accrual	Average Age
1988	551,539.06	307,800	375,387	0.6806	341,614	28.54	11,971	31.5
1989	1,328,028.94	719,904	877,983	0.6611	848,455	29.15	29,106	30.5
1990	452,792.31	238,141	290,433	0.6414	298,197	29.77	10,016	29.5
1991	1,780,297.63	907,317	1,106,548	0.6216	1,207,839	30.40	39,734	28.5
1992	581,928.90	287,008	350,030	0.6015	406,478	31.03	13,099	27.5
1993	9,871,759.31	4,705,048	5,738,194	0.5813	7,095,093	31.67	224,042	26.5
1994	1,639,236.48	753,882	919,421	0.5609	1,211,586	32.31	37,497	25.5
1995	1,299,413.55	575,706	702,120	0.5403	987,117	32.96	29,949	24.5
1996	1,843,486.27	785,471	957,947	0.5196	1,438,585	33.61	42,799	23.5
1997	2,277,635.88	931,533	1,136,082	0.4988	1,824,845	34.27	53,250	22.5
1998	7,953,756.21	3,116,226	3,800,494	0.4778	6,539,389	34.93	187,209	21.5
1999	3,028,435.22	1,134,120	1,383,152	0.4567	2,553,813	35.60	71,743	20.5
2000	4,714,883.20	1,683,635	2,053,331	0.4355	4,076,017	36.27	112,393	19.5
2001	457,743.72	155,448	189,582	0.4142	405,485	36.94	10,977	18.5
2002	563,859.16	181,571	221,441	0.3927	511,576	37.61	13,600	17.5
2003	378,907.45	115,321	140,644	0.3712	351,936	38.29	9,190	16.5
2004	352,926.81	101,152	123,363	0.3495	335,441	38.98	8,606	15.5
2005	798,966.82	214,754	261,910	0.3278	776,747	39.66	19,584	14.5
2006	832,207.11	208,795	254,642	0.3060	827,227	40.35	20,501	13.5
2007	4,128,111.36	961,499	1,172,628	0.2841	4,193,917	41.04	102,187	12.5
2008	11,538,002.11	2,478,983	3,023,324	0.2620	11,976,078	41.74	286,946	11.5
2009	1,279,437.22	251,671	306,934	0.2399	1,356,335	42.43	31,963	10.5
2010	1,233,752.38	220,180	268,528	0.2177	1,335,350	43.14	30,957	9.5
2012	3,470,685.55	491,775	599,760	0.1728	3,912,131	44.55	87,814	7.5
2013	1,058,341.12	130,343	158,964	0.1502	1,216,880	45.26	26,885	6.5
2014	2,532,765.91	264,715	322,842	0.1275	2,969,754	45.98	64,588	5.5

ALG - Remaining Life
Survivor Curve: R1
ASL: 50
Net Salvage: -30%
Truncation Year:

Missouri American Water

Account #: 320.0000 - Water Treatment Equipment

CALCULATED ANNUAL ACCRUAL AND ACCRUED DEPRECIATION
BASED ON ORIGINAL COST AS OF DECEMBER 31, 2019

Year	Original Cost	Calculated Accumulated Depreciation	Allocated Actual Booked Amount	Accumulated Depreciation Factor	Net Book Value	ALG Remaining Life	Annual Accrual	Average Age
2015	4,484,368.38	384,607	469,061	0.1046	5,360,618	46.70	114,785	4.5
2016	24,735,720.17	1,654,937	2,018,332	0.0816	30,138,104	47.43	635,466	3.5
2017	36,691,368.45	1,758,566	2,144,716	0.0585	45,554,063	48.16	945,957	2.5
2018	8,331,695.74	240,245	292,999	0.0352	10,538,206	48.89	215,545	1.5
2019	9,294,235.82	89,421	109,057	0.0117	11,973,450	49.63	241,255	0.5
TOTAL	159,873,561.31	34,601,701	42,176,622		165,659,008		3,883,644	

COMPOSITE ANNUAL ACCRUAL RATE	2.43%
THEORETICAL ACCUMULATED DEPRECIATION FACTOR	0.26
COMPOSITE AVERAGE AGE (YEARS)	12.18
DIRECTED WEIGHTED ALG COMPOSITE REMAINING LIFE (YEARS)	41.68

ALG - Remaining Life
Survivor Curve: R2.5
ASL: 70
Net Salvage: -30%
Truncation Year:

Missouri American Water

Account #: 330.0000 - Distribution Reservoirs and Standpipes

CALCULATED ANNUAL ACCRUAL AND ACCRUED DEPRECIATION
BASED ON ORIGINAL COST AS OF DECEMBER 31, 2019

Year	Original Cost	Calculated Accumulated Depreciation	Allocated Actual Booked Amount	Accumulated Depreciation Factor	Net Book Value	ALG Remaining Life	Annual Accrual	Average Age
1900	162,544.28	204,584	211,308	1.3000	0	2.23	0	119.5
1907	12,102.71	14,707	15,328	1.2665	405	4.57	89	112.5
1931	2,977.91	3,308	3,447	1.1576	424	10.19	42	88.5
1936	11,700.74	12,686	13,221	1.1299	1,990	11.62	171	83.5
1939	14,246.08	15,191	15,833	1.1114	2,687	12.58	214	80.5
1940	151.23	160	167	1.1048	30	12.92	2	79.5
1941	37.62	40	41	1.0980	8	13.27	1	78.5
1942	139.66	146	152	1.0910	29	13.63	2	77.5
1945	3,794.92	3,891	4,055	1.0686	878	14.79	59	74.5
1953	49.86	48	50	0.9986	15	18.41	1	66.5
1954	272,377.56	258,391	269,299	0.9887	84,792	18.92	4,482	65.5
1955	47,717.98	44,807	46,698	0.9786	15,335	19.44	789	64.5
1956	92,093.52	85,564	89,176	0.9683	30,546	19.97	1,529	63.5
1957	138,248.46	127,048	132,412	0.9578	47,311	20.52	2,306	62.5
1958	1,016.87	924	963	0.9470	359	21.07	17	61.5
1960	89,245.46	79,196	82,540	0.9249	33,479	22.22	1,507	59.5
1961	472,365.00	414,000	431,478	0.9134	182,597	22.81	8,006	58.5
1962	410,603.44	355,299	370,298	0.9018	163,486	23.41	6,985	57.5
1963	143,289.05	122,365	127,530	0.8900	58,745	24.02	2,446	56.5
1965	681,345.52	566,028	589,923	0.8658	295,826	25.27	11,708	54.5
1966	482,128.02	394,795	411,461	0.8534	215,305	25.91	8,311	53.5
1967	308,452.87	248,864	259,370	0.8409	141,618	26.56	5,333	52.5
1968	576,213.25	457,843	477,171	0.8281	271,907	27.22	9,991	51.5
1969	136,782.04	106,989	111,505	0.8152	66,311	27.88	2,378	50.5
1970	395,456.36	304,352	317,200	0.8021	196,893	28.56	6,894	49.5
1971	376,656.63	285,094	297,129	0.7889	192,525	29.24	6,584	48.5

ALG - Remaining Life
Survivor Curve: R2.5
ASL: 70
Net Salvage: -30%
Truncation Year:

Missouri American Water

Account #: 330.0000 - Distribution Reservoirs and Standpipes

CALCULATED ANNUAL ACCRUAL AND ACCRUED DEPRECIATION
BASED ON ORIGINAL COST AS OF DECEMBER 31, 2019

Year	Original Cost	Calculated Accumulated Depreciation	Allocated Actual Booked Amount	Accumulated Depreciation Factor	Net Book Value	ALG Remaining Life	Annual Accrual	Average Age
1972	27,163.87	20,211	21,064	0.7755	14,249	29.94	476	47.5
1973	27,386.21	20,020	20,865	0.7619	14,737	30.64	481	46.5
1975	369,421.44	260,267	271,255	0.7343	208,993	32.06	6,518	44.5
1976	10,083.36	6,968	7,263	0.7203	5,846	32.79	178	43.5
1977	43,217.36	29,279	30,515	0.7061	25,668	33.52	766	42.5
1978	474,237.77	314,772	328,060	0.6918	288,449	34.26	8,419	41.5
1979	521,810.75	339,113	353,429	0.6773	324,925	35.01	9,282	40.5
1980	290,507.96	184,726	192,524	0.6627	185,136	35.76	5,177	39.5
1981	508,118.39	315,924	329,261	0.6480	331,293	36.52	9,071	38.5
1983	31,646.09	18,769	19,562	0.6181	21,578	38.06	567	36.5
1985	32,589.50	18,379	19,155	0.5878	23,211	39.63	586	34.5
1986	94,440.81	51,869	54,058	0.5724	68,715	40.43	1,700	33.5
1987	734,373.31	392,409	408,975	0.5569	545,710	41.23	13,237	32.5
1988	296,284.68	153,882	160,378	0.5413	224,792	42.03	5,348	31.5
1989	1,088,606.45	548,946	572,120	0.5256	843,069	42.85	19,676	30.5
1990	1,102,292.07	539,087	561,844	0.5097	871,135	43.67	19,950	29.5
1991	871,055.19	412,651	430,071	0.4937	702,301	44.49	15,785	28.5
1992	236,223.93	108,263	112,834	0.4777	194,257	45.32	4,286	27.5
1993	102,438.64	45,357	47,272	0.4615	85,898	46.16	1,861	26.5
1995	1,008,733.46	414,993	432,512	0.4288	878,841	47.85	18,367	24.5
1996	965,916.96	382,070	398,199	0.4122	857,493	48.70	17,607	23.5
1997	2,060,441.43	782,177	815,197	0.3956	1,863,377	49.56	37,599	22.5
1998	879,433.33	319,744	333,242	0.3789	810,021	50.42	16,065	21.5
1999	313,653.95	108,980	113,580	0.3621	294,170	51.29	5,735	20.5
2000	479,240.02	158,741	165,442	0.3452	457,570	52.16	8,772	19.5
2001	356,574.49	112,294	117,034	0.3282	346,513	53.04	6,533	18.5

ALG - Remaining Life
Survivor Curve: R2.5
ASL: 70
Net Salvage: -30%
Truncation Year:

Missouri American Water

Account #: 330.0000 - Distribution Reservoirs and Standpipes

CALCULATED ANNUAL ACCRUAL AND ACCRUED DEPRECIATION
BASED ON ORIGINAL COST AS OF DECEMBER 31, 2019

Year	Original Cost	Calculated Accumulated Depreciation	Allocated Actual Booked Amount	Accumulated Depreciation Factor	Net Book Value	ALG Remaining Life	Annual Accrual	Average Age
2002	3,470,789.92	1,036,155	1,079,897	0.3111	3,432,130	53.92	63,646	17.5
2003	1,721,188.30	485,462	505,955	0.2940	1,731,589	54.81	31,591	16.5
2004	77,373.83	20,542	21,409	0.2767	79,177	55.70	1,421	15.5
2005	1,836,233.96	456,947	476,237	0.2594	1,910,867	56.60	33,761	14.5
2006	353,544.33	82,069	85,534	0.2419	374,074	57.50	6,506	13.5
2007	2,913,181.88	627,328	653,811	0.2244	3,133,326	58.40	53,649	12.5
2008	188,651.08	37,442	39,023	0.2069	206,224	59.31	3,477	11.5
2009	255,128.97	46,317	48,272	0.1892	283,396	60.22	4,706	10.5
2010	230,617.95	37,944	39,546	0.1715	260,257	61.14	4,257	9.5
2011	33,533.04	4,945	5,154	0.1537	38,439	62.06	619	8.5
2012	206,485.63	26,911	28,047	0.1358	240,384	62.98	3,817	7.5
2013	8,318.87	941	981	0.1179	9,834	63.91	154	6.5
2014	189,096.79	18,131	18,896	0.0999	226,930	64.84	3,500	5.5
2015	5,657,440.13	444,481	463,245	0.0819	6,891,428	65.77	104,781	4.5
2016	306,051.21	18,731	19,522	0.0638	378,345	66.70	5,672	3.5
2017	421,574.36	18,456	19,235	0.0456	528,812	67.64	7,818	2.5
2018	295,099.62	7,764	8,091	0.0274	375,538	68.58	5,476	1.5
2019	2,217,331.30	19,484	20,306	0.0092	2,862,224	69.53	41,167	0.5
TOTAL	38,139,269.63	13,556,259	14,126,627		35,454,424		689,904	

COMPOSITE ANNUAL ACCRUAL RATE 1.81%

THEORETICAL ACCUMULATED DEPRECIATION FACTOR 0.37

COMPOSITE AVERAGE AGE (YEARS) 22.05

DIRECTED WEIGHTED ALG COMPOSITE REMAINING LIFE (YEARS) 50.86

ALG - Remaining Life

Survivor Curve: R2

ASL: 83

Net Salvage: -35%

Truncation Year:

Missouri American Water

Account #: 331.0100 - Mains - Transmission and Distribution

CALCULATED ANNUAL ACCRUAL AND ACCRUED DEPRECIATION

BASED ON ORIGINAL COST AS OF DECEMBER 31, 2019

Year	Original Cost	Calculated Accumulated Depreciation	Allocated Actual Booked Amount	Accumulated Depreciation Factor	Net Book Value	ALG Remaining Life	Annual Accrual	Average Age
1854	29.81	40	29	0.9877	11	0.00	11	166.5
1872	58.32	77	56	0.9669	22	1.74	13	147.5
1880	89,360.36	114,992	84,128	0.9414	36,509	3.88	9,401	139.5
1881	70,592.21	90,524	66,227	0.9382	29,073	4.16	6,990	138.5
1882	3,540.15	4,524	3,310	0.9349	1,470	4.44	331	137.5
1884	2,430.43	3,083	2,256	0.9281	1,025	5.00	205	135.5
1885	398.74	504	369	0.9247	170	5.29	32	134.5
1886	839.15	1,057	773	0.9213	360	5.57	65	133.5
1887	4,100.97	5,146	3,764	0.9179	1,772	5.86	302	132.5
1888	15,645.48	19,557	14,308	0.9145	6,813	6.15	1,109	131.5
1889	23,134.35	28,810	21,077	0.9111	10,154	6.44	1,578	130.5
1890	24,780.83	30,743	22,492	0.9076	10,963	6.73	1,630	129.5
1891	20,040.79	24,769	18,121	0.9042	8,934	7.01	1,274	128.5
1892	6,113.03	7,527	5,506	0.9008	2,746	7.30	376	127.5
1893	26,485.72	32,485	23,766	0.8973	11,990	7.59	1,579	126.5
1894	33,189.87	40,551	29,667	0.8939	15,139	7.88	1,920	125.5
1895	18,686.87	22,742	16,638	0.8904	8,589	8.18	1,051	124.5
1896	1,323.49	1,605	1,174	0.8869	613	8.46	72	123.5
1897	8,011.37	9,675	7,078	0.8835	3,737	8.75	427	122.5
1898	31,417.31	37,790	27,647	0.8800	14,766	9.05	1,632	121.5
1899	42,394.06	50,791	37,159	0.8765	20,073	9.34	2,149	120.5
1900	217,016.20	258,962	189,457	0.8730	103,515	9.64	10,744	119.5
1901	37,455.14	44,516	32,568	0.8695	17,996	9.93	1,813	118.5
1902	16,644.31	19,702	14,414	0.8660	8,056	10.22	788	117.5
1903	111,099.66	130,973	95,820	0.8625	54,165	10.52	5,148	116.5
1904	22,581.39	26,511	19,395	0.8589	11,090	10.82	1,025	115.5

ALG - Remaining Life

Survivor Curve: R2

ASL: 83

Net Salvage: -35%

Truncation Year:

Missouri American Water

Account #: 331.0100 - Mains - Transmission and Distribution

CALCULATED ANNUAL ACCRUAL AND ACCRUED DEPRECIATION

BASED ON ORIGINAL COST AS OF DECEMBER 31, 2019

Year	Original Cost	Calculated Accumulated Depreciation	Allocated Actual Booked Amount	Accumulated Depreciation Factor	Net Book Value	ALG Remaining Life	Annual Accrual	Average Age
1905	43,146.25	50,442	36,903	0.8553	21,344	11.12	1,919	114.5
1906	48,609.92	56,590	41,402	0.8517	24,222	11.42	2,120	113.5
1907	26,162.00	30,327	22,187	0.8481	13,131	11.73	1,119	112.5
1908	85,823.05	99,055	72,469	0.8444	43,392	12.04	3,604	111.5
1909	16,523.63	18,987	13,891	0.8407	8,416	12.35	681	110.5
1910	184,706.47	211,298	154,585	0.8369	94,768	12.67	7,481	109.5
1911	92,102.92	104,886	76,734	0.8331	47,605	12.99	3,666	108.5
1912	118,745.62	134,604	98,476	0.8293	61,831	13.31	4,646	107.5
1913	151,637.46	171,082	125,163	0.8254	79,547	13.63	5,834	106.5
1914	8,508.68	9,554	6,990	0.8215	4,497	13.97	322	105.5
1915	108,814.95	121,587	88,953	0.8175	57,948	14.30	4,052	104.5
1916	38,717.81	43,048	31,494	0.8134	20,775	14.64	1,419	103.5
1917	22,117.58	24,467	17,900	0.8093	11,959	14.99	798	102.5
1918	2,458.53	2,706	1,979	0.8051	1,340	15.34	87	101.5
1919	5,719.70	6,261	4,581	0.8009	3,141	15.70	200	100.5
1920	24,885.13	27,095	19,823	0.7966	13,772	16.06	858	99.5
1921	284,620.77	308,196	225,476	0.7922	158,762	16.43	9,665	98.5
1922	246,449.97	265,365	194,141	0.7877	138,567	16.80	8,248	97.5
1923	231,645.89	247,992	181,431	0.7832	131,291	17.18	7,642	96.5
1924	221,848.47	236,110	172,738	0.7786	126,758	17.57	7,216	95.5
1925	274,528.00	290,422	212,473	0.7740	158,140	17.96	8,806	94.5
1926	672,699.38	707,280	517,445	0.7692	390,699	18.36	21,282	93.5
1927	324,503.07	339,043	248,043	0.7644	190,036	18.76	10,128	92.5
1929	77,180.90	79,595	58,232	0.7545	45,962	19.60	2,346	90.5
1930	893,248.05	914,997	669,411	0.7494	536,474	20.02	26,795	89.5
1931	374,022.86	380,495	278,370	0.7443	226,561	20.45	11,076	88.5

ALG - Remaining Life

Survivor Curve: R2

ASL: 83

Net Salvage: -35%

Truncation Year:

Missouri American Water

Account #: 331.0100 - Mains - Transmission and Distribution

CALCULATED ANNUAL ACCRUAL AND ACCRUED DEPRECIATION

BASED ON ORIGINAL COST AS OF DECEMBER 31, 2019

Year	Original Cost	Calculated Accumulated Depreciation	Allocated Actual Booked Amount	Accumulated Depreciation Factor	Net Book Value	ALG Remaining Life	Annual Accrual	Average Age
1932	31,613.13	31,934	23,363	0.7390	19,315	20.89	924	87.5
1933	78,109.36	78,334	57,309	0.7337	48,139	21.34	2,256	86.5
1934	36,194.18	36,031	26,360	0.7283	22,502	21.80	1,032	85.5
1935	155,823.80	153,952	112,631	0.7228	97,731	22.26	4,391	84.5
1936	319,993.20	313,710	229,510	0.7172	202,481	22.73	8,910	83.5
1937	69,990.86	68,075	49,804	0.7116	44,684	23.20	1,926	82.5
1938	69,359.44	66,917	48,956	0.7058	44,679	23.68	1,886	81.5
1939	171,257.51	163,862	119,881	0.7000	111,316	24.17	4,605	80.5
1940	256,887.41	243,715	178,302	0.6941	168,496	24.67	6,830	79.5
1941	157,248.32	147,895	108,200	0.6881	104,086	25.18	4,134	78.5
1942	28,288.17	26,370	19,292	0.6820	18,897	25.69	736	77.5
1943	26,020.11	24,036	17,585	0.6758	17,542	26.21	669	76.5
1944	38,000.93	34,779	25,444	0.6696	25,857	26.73	967	75.5
1945	194,325.36	176,164	128,881	0.6632	133,458	27.26	4,895	74.5
1946	232,757.54	208,959	152,874	0.6568	161,349	27.80	5,803	73.5
1947	501,843.83	446,066	326,341	0.6503	351,148	28.35	12,385	72.5
1948	563,786.50	496,045	362,906	0.6437	398,205	28.91	13,776	71.5
1949	720,094.37	627,003	458,714	0.6370	513,413	29.47	17,424	70.5
1950	451,245.61	388,737	284,400	0.6303	324,782	30.04	10,813	69.5
1951	491,612.01	418,914	306,477	0.6234	357,199	30.61	11,669	68.5
1952	567,087.42	477,863	349,604	0.6165	415,964	31.19	13,336	67.5
1953	1,645,062.33	1,370,492	1,002,651	0.6095	1,218,183	31.78	38,332	66.5
1954	2,009,806.14	1,654,902	1,210,724	0.6024	1,502,514	32.38	46,409	65.5
1955	2,873,051.17	2,337,561	1,710,157	0.5952	2,168,462	32.98	65,755	64.5
1956	2,207,686.74	1,774,353	1,298,115	0.5880	1,682,262	33.59	50,088	63.5
1957	1,714,089.95	1,360,496	995,337	0.5807	1,318,684	34.20	38,557	62.5

ALG - Remaining Life

Survivor Curve: R2

ASL: 83

Net Salvage: -35%

Truncation Year:

Missouri American Water

Account #: 331.0100 - Mains - Transmission and Distribution

CALCULATED ANNUAL ACCRUAL AND ACCRUED DEPRECIATION

BASED ON ORIGINAL COST AS OF DECEMBER 31, 2019

Year	Original Cost	Calculated Accumulated Depreciation	Allocated Actual Booked Amount	Accumulated Depreciation Factor	Net Book Value	ALG Remaining Life	Annual Accrual	Average Age
1958	2,195,187.98	1,720,170	1,258,474	0.5733	1,705,029	34.82	48,963	61.5
1959	2,834,604.16	2,192,267	1,603,860	0.5658	2,222,856	35.45	62,703	60.5
1960	2,967,564.41	2,264,460	1,656,676	0.5583	2,349,536	36.09	65,111	59.5
1961	2,157,808.76	1,624,071	1,188,168	0.5506	1,724,874	36.73	46,966	58.5
1962	2,131,272.44	1,581,679	1,157,155	0.5429	1,720,063	37.37	46,024	57.5
1963	2,682,008.74	1,961,926	1,435,343	0.5352	2,185,369	38.03	57,471	56.5
1964	4,261,176.80	3,071,415	2,247,043	0.5273	3,505,545	38.68	90,618	55.5
1965	4,095,148.03	2,907,415	2,127,062	0.5194	3,401,388	39.35	86,439	54.5
1966	4,456,905.23	3,115,594	2,279,365	0.5114	3,737,457	40.02	93,386	53.5
1967	3,494,188.05	2,404,141	1,758,867	0.5034	2,958,287	40.70	72,688	52.5
1968	3,863,523.19	2,615,374	1,913,405	0.4952	3,302,352	41.38	79,804	51.5
1969	4,167,215.61	2,774,264	2,029,648	0.4871	3,596,093	42.07	85,480	50.5
1970	3,090,906.76	2,022,807	1,479,883	0.4788	2,692,841	42.76	62,970	49.5
1971	4,400,881.47	2,830,000	2,070,425	0.4705	3,870,765	43.46	89,057	48.5
1972	3,723,389.94	2,351,624	1,720,445	0.4621	3,306,131	44.17	74,851	47.5
1973	3,863,128.75	2,395,232	1,752,349	0.4536	3,462,875	44.88	77,159	46.5
1974	5,561,612.96	3,383,492	2,475,359	0.4451	5,032,818	45.60	110,377	45.5
1975	4,157,471.37	2,480,435	1,814,684	0.4365	3,797,903	46.32	81,995	44.5
1976	4,419,163.35	2,584,302	1,890,672	0.4278	4,075,198	47.05	86,622	43.5
1977	5,682,191.50	3,255,247	2,381,535	0.4191	5,289,424	47.78	110,708	42.5
1978	8,666,903.24	4,861,235	3,556,474	0.4104	8,143,845	48.52	167,862	41.5
1979	7,917,017.69	4,344,934	3,178,749	0.4015	7,509,225	49.26	152,446	40.5
1980	5,265,063.58	2,825,464	2,067,106	0.3926	5,040,730	50.01	100,802	39.5
1981	4,749,160.65	2,490,462	1,822,019	0.3837	4,589,348	50.76	90,414	38.5
1982	3,975,140.84	2,035,589	1,489,234	0.3746	3,877,206	51.52	75,261	37.5
1983	5,291,710.62	2,644,165	1,934,468	0.3656	5,209,341	52.28	99,645	36.5

ALG - Remaining Life

Survivor Curve: R2

ASL: 83

Net Salvage: -35%

Truncation Year:

Missouri American Water

Account #: 331.0100 - Mains - Transmission and Distribution

CALCULATED ANNUAL ACCRUAL AND ACCRUED DEPRECIATION

BASED ON ORIGINAL COST AS OF DECEMBER 31, 2019

Year	Original Cost	Calculated Accumulated Depreciation	Allocated Actual Booked Amount	Accumulated Depreciation Factor	Net Book Value	ALG Remaining Life	Annual Accrual	Average Age
1984	6,814,700.30	3,320,065	2,428,956	0.3564	6,770,890	53.05	127,640	35.5
1985	13,206,025.00	6,267,953	4,585,627	0.3472	13,242,506	53.82	246,056	34.5
1986	12,633,346.42	5,836,498	4,269,975	0.3380	12,785,043	54.60	234,175	33.5
1987	13,770,055.50	6,186,633	4,526,134	0.3287	14,063,441	55.38	253,956	32.5
1988	16,280,997.25	7,106,592	5,199,175	0.3193	16,780,172	56.16	298,773	31.5
1989	16,300,797.48	6,905,470	5,052,034	0.3099	16,954,043	56.95	297,676	30.5
1990	11,694,785.61	4,802,921	3,513,811	0.3005	12,274,149	57.75	212,539	29.5
1991	16,923,724.85	6,730,243	4,923,838	0.2909	17,923,190	58.55	306,118	28.5
1992	9,116,921.54	3,506,405	2,565,282	0.2814	9,742,562	59.35	164,143	27.5
1993	13,334,014.26	4,952,975	3,623,590	0.2718	14,377,329	60.16	238,975	26.5
1994	14,791,787.40	5,298,828	3,876,617	0.2621	16,092,296	60.98	263,914	25.5
1995	13,718,566.89	4,732,016	3,461,938	0.2524	15,058,128	61.79	243,687	24.5
1996	17,556,777.60	5,821,426	4,258,949	0.2426	19,442,701	62.61	310,516	23.5
1997	24,334,935.11	7,742,261	5,664,229	0.2328	27,187,933	63.44	428,565	22.5
1998	19,165,608.80	5,839,012	4,271,814	0.2229	21,601,758	64.27	336,115	21.5
1999	16,085,336.23	4,682,402	3,425,640	0.2130	18,289,564	65.10	280,933	20.5
2000	32,093,088.31	8,904,930	6,514,836	0.2030	36,810,833	65.94	558,242	19.5
2001	74,224,936.72	19,579,393	14,324,261	0.1930	85,879,404	66.78	1,285,964	18.5
2002	49,516,294.41	12,380,878	9,057,836	0.1829	57,789,161	67.63	854,523	17.5
2003	25,123,385.71	5,934,668	4,341,796	0.1728	29,574,775	68.48	431,895	16.5
2004	15,764,939.28	3,505,194	2,564,396	0.1627	18,718,272	69.33	269,988	15.5
2005	8,074,629.41	1,682,777	1,231,118	0.1525	9,669,632	70.19	137,769	14.5
2006	56,415,832.33	10,967,645	8,023,916	0.1422	68,137,457	71.05	959,040	13.5
2007	54,593,211.87	9,846,133	7,203,420	0.1319	66,497,416	71.91	924,711	12.5
2008	65,229,162.92	10,843,545	7,933,125	0.1216	80,126,245	72.78	1,100,946	11.5
2009	51,678,721.57	7,858,390	5,749,189	0.1112	64,017,085	73.65	869,195	10.5

ALG - Remaining Life
Survivor Curve: R2
ASL: 83
Net Salvage: -35%
Truncation Year:

Missouri American Water

Account #: 331.0100 - Mains - Transmission and Distribution

CALCULATED ANNUAL ACCRUAL AND ACCRUED DEPRECIATION
BASED ON ORIGINAL COST AS OF DECEMBER 31, 2019

Year	Original Cost	Calculated Accumulated Depreciation	Allocated Actual Booked Amount	Accumulated Depreciation Factor	Net Book Value	ALG Remaining Life	Annual Accrual	Average Age
2010	63,752,755.10	8,787,215	6,428,716	0.1008	79,637,503	74.53	1,068,589	9.5
2011	46,705,945.98	5,770,490	4,221,684	0.0904	58,831,343	75.40	780,215	8.5
2012	77,237,393.98	8,435,342	6,171,287	0.0799	98,099,195	76.29	1,285,950	7.5
2013	58,442,364.73	5,541,293	4,054,004	0.0694	74,843,189	77.17	969,841	6.5
2014	104,897,634.41	8,430,278	6,167,582	0.0588	135,444,225	78.06	1,735,153	5.5
2015	54,351,506.60	3,579,957	2,619,093	0.0482	70,755,441	78.95	896,201	4.5
2016	42,351,440.53	2,173,363	1,590,030	0.0375	55,584,415	79.84	696,155	3.5
2017	132,777,647.64	4,875,469	3,566,888	0.0269	175,682,937	80.74	2,175,843	2.5
2018	73,209,770.88	1,615,307	1,181,757	0.0161	97,651,434	81.64	1,196,072	1.5
2019	122,938,991.64	905,039	662,125	0.0054	165,305,513	82.55	2,002,553	0.5
TOTAL	1,576,196,412.84	319,103,076	233,455,439		1,894,409,718		27,230,630	

COMPOSITE ANNUAL ACCRUAL RATE	1.73%
THEORETICAL ACCUMULATED DEPRECIATION FACTOR	0.15
COMPOSITE AVERAGE AGE (YEARS)	14.60
DIRECTED WEIGHTED ALG COMPOSITE REMAINING LIFE (YEARS)	70.55

ALG - Remaining Life
Survivor Curve: S1.5
ASL: 85
Net Salvage: -35%
Truncation Year:

Missouri American Water

Account #: 332.0000 - Mains - Fire

CALCULATED ANNUAL ACCRUAL AND ACCRUED DEPRECIATION BASED ON ORIGINAL COST AS OF DECEMBER 31, 2019

Year	Original Cost	Calculated Accumulated Depreciation	Allocated Actual Booked Amount	Accumulated Depreciation Factor	Net Book Value	ALG Remaining Life	Annual Accrual	Average Age
1935	1,546.00	1,483	1,185	0.7668	902	24.62	37	84.5
1970	643.95	434	347	0.5390	522	42.55	12	49.5
1971	23.30	15	12	0.5307	19	43.21	0	48.5
1972	656.23	429	343	0.5223	543	43.87	12	47.5
1978	707.89	416	332	0.4694	623	48.03	13	41.5
1979	1,018.06	586	469	0.4602	906	48.76	19	40.5
1980	17,621.13	9,936	7,944	0.4508	15,844	49.50	320	39.5
1981	769.12	425	339	0.4414	699	50.24	14	38.5
1982	2,039.39	1,101	881	0.4318	1,873	51.00	37	37.5
1984	18,506.33	9,543	7,630	0.4123	17,354	52.53	330	35.5
1985	11,002.10	5,536	4,427	0.4023	10,426	53.32	196	34.5
1986	12,743.34	6,252	4,999	0.3923	12,204	54.11	226	33.5
1987	15,383.48	7,352	5,878	0.3821	14,889	54.91	271	32.5
1988	10,540.41	4,902	3,919	0.3718	10,310	55.72	185	31.5
1989	8,202.47	3,708	2,965	0.3614	8,109	56.54	143	30.5
1990	10,153.92	4,456	3,563	0.3509	10,145	57.37	177	29.5
1991	28,047.23	11,936	9,544	0.3403	28,320	58.20	487	28.5
1992	9,750.19	4,018	3,213	0.3295	9,950	59.05	169	27.5
1993	20,496.58	8,169	6,532	0.3187	21,139	59.90	353	26.5
1994	21,549.23	8,294	6,631	0.3077	22,460	60.77	370	25.5
1995	28,593.97	10,609	8,482	0.2966	30,120	61.64	489	24.5
1996	8,291.00	2,960	2,367	0.2855	8,826	62.52	141	23.5
1997	26,531.58	9,099	7,275	0.2742	28,543	63.41	450	22.5
1998	16,909.37	5,558	4,444	0.2628	18,384	64.30	286	21.5
1999	18,774.64	5,902	4,719	0.2514	20,627	65.21	316	20.5
2000	35,918.19	10,772	8,613	0.2398	39,877	66.12	603	19.5

ALG - Remaining Life
Survivor Curve: S1.5
ASL: 85
Net Salvage: -35%
Truncation Year:

Missouri American Water

Account #: 332.0000 - Mains - Fire

CALCULATED ANNUAL ACCRUAL AND ACCRUED DEPRECIATION BASED ON ORIGINAL COST AS OF DECEMBER 31, 2019

Year	Original Cost	Calculated Accumulated Depreciation	Allocated Actual Booked Amount	Accumulated Depreciation Factor	Net Book Value	ALG Remaining Life	Annual Accrual	Average Age
2001	35,760.75	10,203	8,158	0.2281	40,119	67.04	598	18.5
2002	20,567.53	5,566	4,450	0.2164	23,316	67.96	343	17.5
2003	17,412.44	4,454	3,561	0.2045	19,945	68.89	290	16.5
2004	16,308.31	3,929	3,141	0.1926	18,875	69.83	270	15.5
2005	21,930.14	4,954	3,961	0.1806	25,645	70.78	362	14.5
2006	44,251.61	9,328	7,458	0.1685	52,282	71.73	729	13.5
2007	25,027.10	4,895	3,914	0.1564	29,873	72.69	411	12.5
2008	39,977.66	7,208	5,763	0.1442	48,207	73.65	655	11.5
2009	35,225.90	5,810	4,645	0.1319	42,910	74.62	575	10.5
2010	12,090.14	1,807	1,445	0.1195	14,877	75.59	197	9.5
2014	506.24	44	35	0.0696	648	79.52	8	5.5
TOTAL	595,476.92	192,089	153,585		650,309		10,093	

COMPOSITE ANNUAL ACCRUAL RATE	1.69%
THEORETICAL ACCUMULATED DEPRECIATION FACTOR	0.26
COMPOSITE AVERAGE AGE (YEARS)	21.41
DIRECTED WEIGHTED ALG COMPOSITE REMAINING LIFE (YEARS)	64.69

ALG - Remaining Life
Survivor Curve: R1.5
ASL: 65
Net Salvage: -110%
Truncation Year:

Missouri American Water

Account #: 333.0000 - Services

CALCULATED ANNUAL ACCRUAL AND ACCRUED DEPRECIATION BASED ON ORIGINAL COST AS OF DECEMBER 31, 2019

Year	Original Cost	Calculated Accumulated Depreciation	Allocated Actual Booked Amount	Accumulated Depreciation Factor	Net Book Value	ALG Remaining Life	Annual Accrual	Average Age
1923	55.69	100	52	0.9382	65	9.47	7	96.5
1924	119.75	214	112	0.9333	140	9.76	14	95.5
1926	113.74	201	105	0.9234	134	10.35	13	93.5
1927	59.07	104	54	0.9183	70	10.64	7	92.5
1928	200.30	350	183	0.9133	238	10.95	22	91.5
1929	50.22	87	46	0.9081	60	11.25	5	90.5
1930	25.31	44	23	0.9029	30	11.56	3	89.5
1932	1.83	3	2	0.8923	2	12.19	0	87.5
1933	188.37	319	167	0.8869	229	12.51	18	86.5
1934	1,506.56	2,539	1,328	0.8814	1,836	12.83	143	85.5
1935	11,919.79	19,963	10,439	0.8758	14,592	13.16	1,109	84.5
1936	9,085.79	15,118	7,906	0.8701	11,174	13.50	828	83.5
1937	5,969.13	9,867	5,160	0.8644	7,376	13.84	533	82.5
1938	6,556.14	10,764	5,629	0.8586	8,139	14.18	574	81.5
1939	5,495.66	8,960	4,686	0.8526	6,855	14.53	472	80.5
1940	8,561.83	13,860	7,248	0.8466	10,732	14.89	721	79.5
1941	6,166.69	9,910	5,183	0.8404	7,768	15.26	509	78.5
1942	3,271.92	5,219	2,729	0.8341	4,142	15.63	265	77.5
1943	689.30	1,091	571	0.8278	877	16.01	55	76.5
1944	299.94	471	246	0.8213	384	16.39	23	75.5
1945	6,619.87	10,312	5,393	0.8146	8,509	16.78	507	74.5
1946	19,700.81	30,436	15,916	0.8079	25,456	17.18	1,482	73.5
1947	17,058.69	26,130	13,664	0.8010	22,159	17.59	1,260	72.5
1948	15,873.11	24,102	12,604	0.7940	20,730	18.00	1,152	71.5
1949	15,340.89	23,084	12,072	0.7869	20,144	18.42	1,093	70.5
1950	19,022.62	28,360	14,831	0.7796	25,117	18.85	1,332	69.5

ALG - Remaining Life
Survivor Curve: R1.5
ASL: 65
Net Salvage: -110%
Truncation Year:

Missouri American Water

Account #: 333.0000 - Services

CALCULATED ANNUAL ACCRUAL AND ACCRUED DEPRECIATION BASED ON ORIGINAL COST AS OF DECEMBER 31, 2019

Year	Original Cost	Calculated Accumulated Depreciation	Allocated Actual Booked Amount	Accumulated Depreciation Factor	Net Book Value	ALG Remaining Life	Annual Accrual	Average Age
1951	20,475.93	30,237	15,812	0.7722	27,187	19.29	1,409	68.5
1952	24,848.84	36,337	19,002	0.7647	33,181	19.74	1,681	67.5
1953	28,824.55	41,728	21,821	0.7570	38,710	20.19	1,917	66.5
1954	35,548.55	50,932	26,634	0.7492	48,018	20.65	2,325	65.5
1955	49,025.51	69,497	36,343	0.7413	66,611	21.12	3,154	64.5
1956	42,536.10	59,641	31,189	0.7332	58,137	21.60	2,691	63.5
1957	42,640.31	59,118	30,915	0.7250	58,630	22.09	2,655	62.5
1958	44,953.31	61,607	32,217	0.7167	62,185	22.58	2,754	61.5
1959	58,375.81	79,056	41,341	0.7082	81,248	23.08	3,520	60.5
1960	33,422.54	44,712	23,381	0.6996	46,806	23.59	1,984	59.5
1961	37,294.07	49,267	25,764	0.6908	52,554	24.11	2,180	58.5
1962	44,824.66	58,453	30,567	0.6819	63,564	24.64	2,580	57.5
1963	62,600.04	80,554	42,125	0.6729	89,335	25.17	3,549	56.5
1964	85,770.83	108,868	56,931	0.6638	123,187	25.71	4,791	55.5
1965	58,448.04	73,151	38,253	0.6545	84,488	26.26	3,217	54.5
1966	63,497.22	78,327	40,960	0.6451	92,384	26.82	3,445	53.5
1967	58,277.08	70,824	37,037	0.6355	85,345	27.38	3,117	52.5
1968	35,492.74	42,478	22,213	0.6259	52,321	27.96	1,872	51.5
1969	52,359.90	61,685	32,257	0.6161	77,699	28.54	2,723	50.5
1970	119,818.38	138,885	72,628	0.6062	178,991	29.12	6,146	49.5
1971	92,570.87	105,524	55,182	0.5961	139,217	29.72	4,685	48.5
1972	104,062.72	116,603	60,976	0.5860	157,556	30.32	5,197	47.5
1973	94,813.65	104,374	54,581	0.5757	144,528	30.93	4,673	46.5
1974	77,904.12	84,212	44,038	0.5653	119,561	31.54	3,791	45.5
1975	60,170.55	63,832	33,380	0.5548	92,978	32.16	2,891	44.5
1976	93,447.52	97,236	50,848	0.5441	145,391	32.79	4,434	43.5

ALG - Remaining Life
Survivor Curve: R1.5
ASL: 65
Net Salvage: -110%
Truncation Year:

Missouri American Water

Account #: 333.0000 - Services

CALCULATED ANNUAL ACCRUAL AND ACCRUED DEPRECIATION BASED ON ORIGINAL COST AS OF DECEMBER 31, 2019

Year	Original Cost	Calculated Accumulated Depreciation	Allocated Actual Booked Amount	Accumulated Depreciation Factor	Net Book Value	ALG Remaining Life	Annual Accrual	Average Age
1977	117,505.87	119,856	62,677	0.5334	184,085	33.43	5,507	42.5
1978	126,101.29	126,009	65,895	0.5226	198,918	34.07	5,838	41.5
1979	157,923.18	154,499	80,793	0.5116	250,846	34.72	7,225	40.5
1980	110,080.26	105,365	55,099	0.5005	176,069	35.37	4,977	39.5
1981	99,105.33	92,745	48,500	0.4894	159,622	36.03	4,430	38.5
1982	105,801.80	96,732	50,585	0.4781	171,599	36.70	4,676	37.5
1983	156,018.87	139,255	72,822	0.4667	254,818	37.37	6,818	36.5
1984	197,409.79	171,871	89,878	0.4553	324,683	38.05	8,533	35.5
1985	297,636.68	252,557	132,071	0.4437	492,966	38.74	12,726	34.5
1986	402,701.80	332,735	173,999	0.4321	671,674	39.43	17,037	33.5
1987	383,331.18	308,130	161,133	0.4203	643,863	40.12	16,049	32.5
1988	364,370.19	284,643	148,850	0.4085	616,327	40.82	15,099	31.5
1989	274,224.00	207,977	108,759	0.3966	467,112	41.53	11,249	30.5
1990	386,520.34	284,274	148,657	0.3846	663,036	42.24	15,699	29.5
1991	472,711.69	336,749	176,098	0.3725	816,596	42.95	19,013	28.5
1992	608,793.06	419,533	219,389	0.3604	1,059,076	43.67	24,252	27.5
1993	726,390.29	483,577	252,880	0.3481	1,272,539	44.39	28,665	26.5
1994	691,079.36	443,800	232,080	0.3358	1,219,187	45.12	27,019	25.5
1995	618,068.54	382,276	199,906	0.3234	1,098,038	45.86	23,945	24.5
1996	981,875.05	583,909	305,348	0.3110	1,756,590	46.59	37,701	23.5
1997	913,750.52	521,508	272,716	0.2985	1,646,161	47.33	34,777	22.5
1998	913,019.41	499,113	261,004	0.2859	1,656,336	48.08	34,450	21.5
1999	2,395,394.79	1,251,471	654,440	0.2732	4,375,889	48.83	89,617	20.5
2000	1,219,457.12	607,449	317,657	0.2605	2,243,202	49.58	45,243	19.5
2001	1,262,943.79	598,219	312,831	0.2477	2,339,351	50.34	46,472	18.5
2002	1,379,245.60	619,431	323,923	0.2349	2,572,493	51.10	50,343	17.5

ALG - Remaining Life
Survivor Curve: R1.5
ASL: 65
Net Salvage: -110%
Truncation Year:

Missouri American Water

Account #: 333.0000 - Services

CALCULATED ANNUAL ACCRUAL AND ACCRUED DEPRECIATION BASED ON ORIGINAL COST AS OF DECEMBER 31, 2019

Year	Original Cost	Calculated Accumulated Depreciation	Allocated Actual Booked Amount	Accumulated Depreciation Factor	Net Book Value	ALG Remaining Life	Annual Accrual	Average Age
2003	83,676.58	35,513	18,571	0.2219	157,150	51.86	3,030	16.5
2004	37,716.60	15,072	7,882	0.2090	71,323	52.63	1,355	15.5
2005	302,811.98	113,457	59,331	0.1959	576,574	53.40	10,797	14.5
2006	1,911,655.16	668,385	349,523	0.1828	3,664,953	54.18	67,647	13.5
2007	2,003,037.83	649,936	339,875	0.1697	3,866,504	54.96	70,355	12.5
2008	1,566,358.78	468,645	245,072	0.1565	3,044,282	55.74	54,617	11.5
2009	2,853,384.74	781,259	408,549	0.1432	5,583,559	56.53	98,780	10.5
2010	2,533,658.52	629,065	328,961	0.1298	4,991,721	57.32	87,093	9.5
2011	1,906,630.22	424,530	222,003	0.1164	3,781,921	58.11	65,084	8.5
2012	2,165,712.42	426,445	223,004	0.1030	4,324,992	58.91	73,423	7.5
2013	2,170,131.76	371,213	194,121	0.0895	4,363,156	59.71	73,078	6.5
2014	2,660,465.80	385,951	201,828	0.0759	5,385,150	60.51	88,996	5.5
2015	2,136,734.79	254,236	132,949	0.0622	4,354,194	61.32	71,011	4.5
2016	765,626.41	71,027	37,143	0.0485	1,570,673	62.13	25,281	3.5
2017	4,899,021.11	325,556	170,245	0.0348	10,117,699	62.94	160,744	2.5
2018	4,926,143.11	197,119	103,081	0.0209	10,241,820	63.76	160,627	1.5
2019	6,424,181.38	86,516	45,243	0.0070	13,445,538	64.58	208,190	0.5
TOTAL	56,384,363.85	17,436,355	9,118,112		109,289,052		2,012,989	

COMPOSITE ANNUAL ACCRUAL RATE	3.57%
THEORETICAL ACCUMULATED DEPRECIATION FACTOR	0.16
COMPOSITE AVERAGE AGE (YEARS)	12.30
DIRECTED WEIGHTED ALG COMPOSITE REMAINING LIFE (YEARS)	55.43

ALG - Remaining Life
Survivor Curve: L4
ASL: 30
Net Salvage: -20%
Truncation Year:

Missouri American Water

Account #: 334.0000 - Meters and Meter Installations

CALCULATED ANNUAL ACCRUAL AND ACCRUED DEPRECIATION
BASED ON ORIGINAL COST AS OF DECEMBER 31, 2019

Year	Original Cost	Calculated Accumulated Depreciation	Allocated Actual Booked Amount	Accumulated Depreciation Factor	Net Book Value	ALG Remaining Life	Annual Accrual	Average Age
1920	31.26	38	20	0.6411	17	0.00	17	99.5
1922	1,432.05	1,718	918	0.6411	800	0.00	800	97.5
1923	2,695.35	3,234	1,728	0.6411	1,506	0.00	1,506	96.5
1924	4,570.38	5,484	2,930	0.6411	2,554	0.00	2,554	95.5
1925	8,232.98	9,880	5,278	0.6411	4,601	0.00	4,601	94.5
1926	6,548.36	7,858	4,198	0.6411	3,660	0.00	3,660	93.5
1927	7,234.93	8,682	4,638	0.6411	4,043	0.00	4,043	92.5
1928	9,249.69	11,100	5,930	0.6411	5,169	0.00	5,169	91.5
1929	6,041.27	7,250	3,873	0.6411	3,376	0.00	3,376	90.5
1930	5,042.06	6,050	3,233	0.6411	2,818	0.00	2,818	89.5
1931	4,384.14	5,261	2,811	0.6411	2,450	0.00	2,450	88.5
1932	2,376.34	2,852	1,524	0.6411	1,328	0.00	1,328	87.5
1933	2,092.57	2,511	1,342	0.6411	1,169	0.00	1,169	86.5
1934	5,251.95	6,302	3,367	0.6411	2,935	0.00	2,935	85.5
1935	4,090.00	4,908	2,622	0.6411	2,286	0.00	2,286	84.5
1936	6,067.85	7,281	3,890	0.6411	3,391	0.00	3,391	83.5
1937	6,639.27	7,967	4,257	0.6411	3,711	0.00	3,711	82.5
1938	792.85	951	508	0.6411	443	0.00	443	81.5
1939	8,657.55	10,389	5,551	0.6411	4,839	0.00	4,839	80.5
1940	10,910.14	13,092	6,995	0.6411	6,097	0.00	6,097	79.5
1941	10,999.68	13,200	7,052	0.6411	6,147	0.00	6,147	78.5
1942	5,592.96	6,712	3,586	0.6411	3,126	0.00	3,126	77.5
1943	2,840.50	3,409	1,821	0.6411	1,587	0.00	1,587	76.5
1944	2,765.46	3,319	1,773	0.6411	1,546	0.00	1,546	75.5
1945	5,938.27	7,126	3,807	0.6411	3,319	0.00	3,319	74.5
1946	14,926.80	17,912	9,570	0.6411	8,342	0.00	8,342	73.5

ALG - Remaining Life

Survivor Curve: L4

ASL: 30

Net Salvage: -20%

Truncation Year:

Missouri American Water

Account #: 334.0000 - Meters and Meter Installations

CALCULATED ANNUAL ACCRUAL AND ACCRUED DEPRECIATION

BASED ON ORIGINAL COST AS OF DECEMBER 31, 2019

Year	Original Cost	Calculated Accumulated Depreciation	Allocated Actual Booked Amount	Accumulated Depreciation Factor	Net Book Value	ALG Remaining Life	Annual Accrual	Average Age
1947	16,810.99	20,173	10,778	0.6411	9,395	0.00	9,395	72.5
1948	30,607.79	36,729	19,623	0.6411	17,106	0.00	17,106	71.5
1949	49,365.01	59,238	31,649	0.6411	27,589	0.00	27,589	70.5
1950	49,402.63	59,283	31,673	0.6411	27,610	0.00	27,610	69.5
1951	62,861.84	75,434	40,302	0.6411	35,132	0.00	35,132	68.5
1952	66,628.89	79,955	42,717	0.6411	37,237	0.00	37,237	67.5
1953	127,421.74	152,906	81,693	0.6411	71,213	0.00	71,213	66.5
1954	85,364.89	102,438	54,729	0.6411	47,708	0.00	47,708	65.5
1955	105,508.54	126,610	67,644	0.6411	58,966	0.00	58,966	64.5
1956	71,402.54	84,255	45,015	0.6304	40,668	0.50	40,668	63.5
1957	70,246.74	82,276	43,958	0.6258	40,338	0.72	40,338	62.5
1958	81,313.03	94,775	50,635	0.6227	46,940	0.86	46,940	61.5
1959	70,043.51	81,340	43,457	0.6204	40,595	0.97	40,595	60.5
1960	60,453.84	69,942	37,368	0.6181	35,177	1.08	32,685	59.5
1961	46,071.63	53,090	28,365	0.6157	26,921	1.19	22,597	58.5
1962	49,750.49	57,113	30,514	0.6133	29,187	1.30	22,451	57.5
1963	61,502.81	70,310	37,565	0.6108	36,239	1.42	25,521	56.5
1964	75,747.87	86,213	46,061	0.6081	44,837	1.55	29,001	55.5
1965	84,553.34	95,821	51,194	0.6055	50,270	1.67	30,131	54.5
1966	77,398.50	87,305	46,645	0.6027	46,234	1.80	25,685	53.5
1967	69,549.23	78,068	41,709	0.5997	41,750	1.94	21,543	52.5
1968	91,001.94	101,651	54,309	0.5968	54,893	2.07	26,462	51.5
1969	103,108.44	114,577	61,215	0.5937	62,515	2.22	28,167	50.5
1970	101,762.85	112,464	60,086	0.5905	62,029	2.37	26,161	49.5
1971	145,269.39	159,661	85,302	0.5872	89,021	2.52	35,281	48.5
1972	208,250.69	227,544	121,570	0.5838	128,331	2.68	47,816	47.5

ALG - Remaining Life
Survivor Curve: L4
ASL: 30
Net Salvage: -20%
Truncation Year:

Missouri American Water

Account #: 334.0000 - Meters and Meter Installations

CALCULATED ANNUAL ACCRUAL AND ACCRUED DEPRECIATION
BASED ON ORIGINAL COST AS OF DECEMBER 31, 2019

Year	Original Cost	Calculated Accumulated Depreciation	Allocated Actual Booked Amount	Accumulated Depreciation Factor	Net Book Value	ALG Remaining Life	Annual Accrual	Average Age
1973	403,602.63	438,283	234,161	0.5802	250,162	2.85	87,719	46.5
1974	310,888.14	335,480	179,236	0.5765	193,829	3.02	64,129	45.5
1975	340,033.91	364,489	194,735	0.5727	213,305	3.20	66,616	44.5
1976	456,853.37	486,279	259,804	0.5687	288,420	3.39	85,085	43.5
1977	272,620.32	288,080	153,912	0.5646	173,232	3.58	48,358	42.5
1978	499,303.16	523,587	279,737	0.5603	319,427	3.78	84,413	41.5
1979	519,790.81	540,700	288,879	0.5558	334,870	3.99	83,836	40.5
1980	481,061.63	496,280	265,147	0.5512	312,127	4.21	74,155	39.5
1981	459,208.72	469,687	250,939	0.5465	300,111	4.43	67,752	38.5
1982	324,006.36	328,523	175,520	0.5417	213,288	4.65	45,854	37.5
1983	544,990.28	547,905	292,729	0.5371	361,259	4.87	74,237	36.5
1984	581,169.86	579,543	309,632	0.5328	387,772	5.07	76,484	35.5
1985	777,776.66	769,811	411,286	0.5288	522,046	5.26	99,323	34.5
1986	780,338.41	767,300	409,945	0.5253	526,461	5.42	97,174	33.5
1987	721,492.16	705,282	376,810	0.5223	488,980	5.56	87,919	32.5
1988	877,198.17	852,723	455,583	0.5194	597,054	5.70	104,791	31.5
1989	712,343.48	688,463	367,824	0.5164	486,988	5.84	83,415	30.5
1990	839,134.96	805,401	430,301	0.5128	576,661	6.01	96,030	29.5
1991	829,369.23	789,062	421,571	0.5083	573,672	6.21	92,304	28.5
1992	939,333.41	883,588	472,074	0.5026	655,126	6.48	101,043	27.5
1993	1,095,007.14	1,014,933	542,248	0.4952	771,761	6.83	113,026	26.5
1994	2,635,416.85	2,397,301	1,280,804	0.4860	1,881,696	7.26	259,229	25.5
1995	1,658,036.56	1,473,756	787,383	0.4749	1,202,261	7.78	154,560	24.5
1996	1,677,613.98	1,450,990	775,219	0.4621	1,237,918	8.38	147,773	23.5
1997	1,780,501.89	1,492,632	797,467	0.4479	1,339,135	9.04	148,102	22.5
1998	1,166,331.83	944,231	504,473	0.4325	895,125	9.76	91,707	21.5

ALG - Remaining Life
Survivor Curve: L4
ASL: 30
Net Salvage: -20%
Truncation Year:

Missouri American Water

Account #: 334.0000 - Meters and Meter Installations

CALCULATED ANNUAL ACCRUAL AND ACCRUED DEPRECIATION
BASED ON ORIGINAL COST AS OF DECEMBER 31, 2019

Year	Original Cost	Calculated Accumulated Depreciation	Allocated Actual Booked Amount	Accumulated Depreciation Factor	Net Book Value	ALG Remaining Life	Annual Accrual	Average Age
1999	5,888,790.65	4,588,771	2,451,639	0.4163	4,614,910	10.52	438,719	20.5
2000	1,751,208.19	1,309,274	699,505	0.3994	1,401,945	11.31	123,967	19.5
2001	3,004,787.23	2,148,157	1,147,694	0.3820	2,458,050	12.13	202,689	18.5
2002	2,314,183.04	1,576,344	842,192	0.3639	1,934,828	12.97	149,168	17.5
2003	602,750.79	389,630	208,168	0.3454	515,133	13.84	37,222	16.5
2004	2,897,204.37	1,769,191	945,224	0.3263	2,531,421	14.73	171,812	15.5
2005	48,568.30	27,876	14,893	0.3066	43,389	15.65	2,772	14.5
2007	3,487,316.31	1,736,790	927,913	0.2661	3,256,866	17.55	185,584	12.5
2008	616,502.24	283,016	151,207	0.2453	588,596	18.52	31,776	11.5
2009	17,280,842.12	7,251,758	3,874,391	0.2242	16,862,619	19.51	864,352	10.5
2010	5,792,722.59	2,200,641	1,175,735	0.2030	5,775,532	20.50	281,698	9.5
2011	4,910,119.25	1,669,361	891,888	0.1816	5,000,255	21.50	232,566	8.5
2012	5,539,322.49	1,661,795	887,846	0.1603	5,759,341	22.50	255,971	7.5
2013	3,704,134.48	963,075	514,541	0.1389	3,930,420	23.50	167,252	6.5
2014	8,148,564.14	1,792,685	957,776	0.1175	8,820,501	24.50	360,020	5.5
2015	7,241,387.14	1,303,450	696,393	0.0962	7,993,271	25.50	313,462	4.5
2016	8,019,804.78	1,122,773	599,863	0.0748	9,023,903	26.50	340,525	3.5
2017	29,932,831.76	2,993,285	1,599,220	0.0534	34,320,178	27.50	1,248,007	2.5
2018	36,839,175.47	2,210,353	1,180,923	0.0321	43,026,087	28.50	1,509,687	1.5
2019	25,067,779.11	501,357	267,860	0.0107	29,813,475	29.50	1,010,626	0.5

ALG - Remaining Life
Survivor Curve: L4
ASL: 30
Net Salvage: -20%
Truncation Year:

Missouri American Water

Account #: 334.0000 - Meters and Meter Installations

CALCULATED ANNUAL ACCRUAL AND ACCRUED DEPRECIATION BASED ON ORIGINAL COST AS OF DECEMBER 31, 2019

Year	Original Cost	Calculated Accumulated Depreciation	Allocated Actual Booked Amount	Accumulated Depreciation Factor	Net Book Value	ALG Remaining Life	Annual Accrual	Average Age
TOTAL	196,978,222.19	60,477,548	32,311,292		204,062,575		11,418,168	
COMPOSITE ANNUAL ACCRUAL RATE				5.80%				
THEORETICAL ACCUMULATED DEPRECIATION FACTOR				0.16				
COMPOSITE AVERAGE AGE (YEARS)				8.80				
DIRECTED WEIGHTED ALG COMPOSITE REMAINING LIFE (YEARS)				22.32				

ALG - Remaining Life

Survivor Curve: R2

ASL: 60

Net Salvage: -40%

Truncation Year:

Missouri American Water

Account #: 335.0000 - Fire Hydrants

CALCULATED ANNUAL ACCRUAL AND ACCRUED DEPRECIATION BASED ON ORIGINAL COST AS OF DECEMBER 31, 2019

Year	Original Cost	Calculated Accumulated Depreciation	Allocated Actual Booked Amount	Accumulated Depreciation Factor	Net Book Value	ALG Remaining Life	Annual Accrual	Average Age
1880	1,816.16	2,543	1,647	0.9068	896	0.00	896	139.5
1881	1,122.54	1,572	1,018	0.9068	554	0.00	554	138.5
1882	97.80	137	89	0.9068	48	0.00	48	137.5
1884	46.05	64	42	0.9068	23	0.00	23	135.5
1885	21.58	30	20	0.9068	11	0.00	11	134.5
1887	67.27	94	61	0.9068	33	0.00	33	132.5
1888	293.17	410	266	0.9068	145	0.00	145	131.5
1889	448.66	628	407	0.9068	221	0.00	221	130.5
1890	289.80	406	263	0.9068	143	0.00	143	129.5
1891	299.48	419	272	0.9068	148	0.00	148	128.5
1892	272.75	382	247	0.9068	135	0.00	135	127.5
1893	376.43	527	341	0.9068	186	0.00	186	126.5
1894	127.91	179	116	0.9068	63	0.00	63	125.5
1895	180.24	252	163	0.9068	89	0.00	89	124.5
1896	39.56	55	36	0.9068	20	0.00	20	123.5
1897	191.19	268	173	0.9068	94	0.00	94	122.5
1898	686.02	960	622	0.9068	338	0.00	338	121.5
1899	23.91	33	22	0.9068	12	0.00	12	120.5
1900	1,090.37	1,527	989	0.9068	538	0.00	538	119.5
1901	1,270.02	1,778	1,152	0.9068	626	0.00	626	118.5
1902	709.89	994	644	0.9068	350	0.00	350	117.5
1903	394.02	552	357	0.9068	194	0.00	194	116.5
1904	765.25	1,071	694	0.9068	377	0.00	377	115.5
1905	742.49	1,039	673	0.9068	366	0.00	366	114.5
1906	1,313.63	1,839	1,191	0.9068	648	0.00	648	113.5
1907	241.75	338	219	0.9068	119	0.00	119	112.5

ALG - Remaining Life

Survivor Curve: R2

ASL: 60

Net Salvage: -40%

Truncation Year:

Missouri American Water

Account #: 335.0000 - Fire Hydrants

CALCULATED ANNUAL ACCRUAL AND ACCRUED DEPRECIATION BASED ON ORIGINAL COST AS OF DECEMBER 31, 2019

Year	Original Cost	Calculated Accumulated Depreciation	Allocated Actual Booked Amount	Accumulated Depreciation Factor	Net Book Value	ALG Remaining Life	Annual Accrual	Average Age
1908	771.75	1,071	694	0.8993	386	0.50	386	111.5
1909	678.56	942	610	0.8991	340	0.51	340	110.5
1910	2,028.02	2,810	1,820	0.8974	1,019	0.62	1,019	109.5
1911	2,583.56	3,566	2,310	0.8941	1,307	0.84	1,307	108.5
1912	825.61	1,135	735	0.8906	421	1.07	392	107.5
1913	2,373.22	3,250	2,105	0.8870	1,218	1.31	926	106.5
1914	506.98	691	448	0.8831	262	1.57	166	105.5
1915	1,225.56	1,663	1,077	0.8791	638	1.83	348	104.5
1916	11,076.19	14,966	9,694	0.8752	5,813	2.09	2,777	103.5
1917	373.49	502	325	0.8711	198	2.36	84	102.5
1919	497.13	662	429	0.8629	267	2.91	92	100.5
1920	3,235.37	4,289	2,778	0.8586	1,752	3.19	549	99.5
1921	3,205.83	4,229	2,739	0.8544	1,749	3.47	504	98.5
1922	2,140.14	2,809	1,819	0.8501	1,177	3.75	314	97.5
1923	435.97	569	369	0.8458	242	4.04	60	96.5
1924	326.42	424	275	0.8415	182	4.32	42	95.5
1925	1,006.92	1,301	843	0.8372	567	4.61	123	94.5
1926	4,770.42	6,133	3,973	0.8328	2,706	4.90	552	93.5
1927	11,877.52	15,190	9,840	0.8284	6,789	5.19	1,308	92.5
1928	9,141.51	11,630	7,533	0.8241	5,265	5.48	961	91.5
1929	15,425.23	19,519	12,643	0.8197	8,952	5.77	1,552	90.5
1930	4,865.79	6,124	3,967	0.8153	2,845	6.06	470	89.5
1931	6,656.25	8,333	5,397	0.8109	3,921	6.35	618	88.5
1932	4,157.86	5,177	3,353	0.8065	2,468	6.64	372	87.5
1933	2,323.12	2,876	1,863	0.8020	1,389	6.93	200	86.5
1934	9,690.77	11,933	7,729	0.7976	5,838	7.23	808	85.5

ALG - Remaining Life
Survivor Curve: R2
ASL: 60
Net Salvage: -40%
Truncation Year:

Missouri American Water

Account #: 335.0000 - Fire Hydrants

CALCULATED ANNUAL ACCRUAL AND ACCRUED DEPRECIATION BASED ON ORIGINAL COST AS OF DECEMBER 31, 2019

Year	Original Cost	Calculated Accumulated Depreciation	Allocated Actual Booked Amount	Accumulated Depreciation Factor	Net Book Value	ALG Remaining Life	Annual Accrual	Average Age
1935	2,545.94	3,117	2,019	0.7931	1,545	7.53	205	84.5
1936	11,206.48	13,643	8,837	0.7886	6,852	7.82	876	83.5
1937	6,412.19	7,761	5,027	0.7840	3,950	8.12	486	82.5
1938	13,308.82	16,014	10,373	0.7794	8,259	8.43	980	81.5
1939	7,447.55	8,908	5,770	0.7748	4,656	8.74	533	80.5
1940	12,151.68	14,446	9,357	0.7700	7,655	9.05	846	79.5
1941	11,360.57	13,421	8,693	0.7652	7,211	9.37	770	78.5
1942	15,360.78	18,031	11,680	0.7604	9,825	9.69	1,014	77.5
1943	594.85	694	449	0.7554	383	10.02	38	76.5
1944	10,856.32	12,576	8,146	0.7503	7,053	10.36	681	75.5
1945	9,298.76	10,697	6,929	0.7452	6,089	10.70	569	74.5
1946	19,784.32	22,599	14,638	0.7399	13,060	11.05	1,182	73.5
1947	26,155.75	29,659	19,211	0.7345	17,407	11.40	1,527	72.5
1948	36,667.90	41,267	26,730	0.7290	24,605	11.77	2,091	71.5
1949	77,337.38	86,366	55,943	0.7234	52,330	12.14	4,311	70.5
1950	114,979.22	127,379	82,509	0.7176	78,462	12.52	6,267	69.5
1951	41,185.11	45,252	29,312	0.7117	28,347	12.91	2,196	68.5
1952	27,825.10	30,314	19,636	0.7057	19,319	13.31	1,452	67.5
1953	20,289.09	21,911	14,193	0.6995	14,212	13.72	1,036	66.5
1954	103,016.61	110,249	71,413	0.6932	72,810	14.13	5,151	65.5
1955	310,825.12	329,553	213,465	0.6868	221,690	14.56	15,225	64.5
1956	111,305.63	116,879	75,708	0.6802	80,120	15.00	5,342	63.5
1957	52,210.89	54,282	35,161	0.6734	37,934	15.44	2,456	62.5
1958	34,618.78	35,624	23,075	0.6665	25,391	15.90	1,597	61.5
1959	68,839.50	70,090	45,401	0.6595	50,975	16.36	3,115	60.5
1960	95,597.64	96,274	62,361	0.6523	71,476	16.84	4,245	59.5

ALG - Remaining Life
Survivor Curve: R2
ASL: 60
Net Salvage: -40%
Truncation Year:

Missouri American Water

Account #: 335.0000 - Fire Hydrants

CALCULATED ANNUAL ACCRUAL AND ACCRUED DEPRECIATION BASED ON ORIGINAL COST AS OF DECEMBER 31, 2019

Year	Original Cost	Calculated Accumulated Depreciation	Allocated Actual Booked Amount	Accumulated Depreciation Factor	Net Book Value	ALG Remaining Life	Annual Accrual	Average Age
1961	59,832.39	59,578	38,591	0.6450	45,174	17.33	2,607	58.5
1962	53,523.45	52,677	34,121	0.6375	40,812	17.82	2,290	57.5
1963	73,088.62	71,071	46,036	0.6299	56,288	18.33	3,071	56.5
1964	67,355.97	64,686	41,900	0.6221	52,398	18.84	2,781	55.5
1965	62,996.49	59,728	38,688	0.6141	49,507	19.37	2,556	54.5
1966	82,179.22	76,889	49,805	0.6060	65,246	19.90	3,278	53.5
1967	38,171.90	35,229	22,820	0.5978	30,621	20.45	1,498	52.5
1968	236,251.96	214,984	139,254	0.5894	191,498	21.00	9,119	51.5
1969	315,619.46	283,052	183,345	0.5809	258,522	21.57	11,988	50.5
1970	221,751.02	195,899	126,892	0.5722	183,559	22.14	8,291	49.5
1971	334,625.91	291,064	188,534	0.5634	279,942	22.72	12,320	48.5
1972	370,060.98	316,769	205,185	0.5545	312,900	23.31	13,421	47.5
1973	501,192.22	421,976	273,332	0.5454	428,337	23.92	17,910	46.5
1974	549,034.49	454,433	294,356	0.5361	474,293	24.53	19,337	45.5
1975	563,600.94	458,337	296,884	0.5268	492,157	25.15	19,571	44.5
1976	623,206.68	497,662	322,357	0.5173	550,132	25.78	21,342	43.5
1977	712,630.25	558,474	361,747	0.5076	635,935	26.41	24,076	42.5
1978	787,042.01	604,921	391,833	0.4979	710,026	27.06	26,239	41.5
1979	847,120.98	638,151	413,358	0.4880	772,612	27.71	27,877	40.5
1980	671,316.66	495,331	320,847	0.4779	618,996	28.38	21,813	39.5
1981	663,979.51	479,515	310,602	0.4678	618,969	29.05	21,308	38.5
1982	582,528.38	411,453	266,516	0.4575	549,024	29.73	18,468	37.5
1983	700,291.90	483,401	313,120	0.4471	667,289	30.42	21,939	36.5
1984	1,034,172.43	697,093	451,537	0.4366	996,304	31.11	32,023	35.5
1985	1,157,462.03	761,201	493,062	0.4260	1,127,385	31.82	35,435	34.5
1986	1,344,033.33	861,615	558,105	0.4152	1,323,542	32.53	40,692	33.5

ALG - Remaining Life
Survivor Curve: R2
ASL: 60
Net Salvage: -40%
Truncation Year:

Missouri American Water
Account #: 335.0000 - Fire Hydrants

**CALCULATED ANNUAL ACCRUAL AND ACCRUED DEPRECIATION
BASED ON ORIGINAL COST AS OF DECEMBER 31, 2019**

Year	Original Cost	Calculated Accumulated Depreciation	Allocated Actual Booked Amount	Accumulated Depreciation Factor	Net Book Value	ALG Remaining Life	Annual Accrual	Average Age
1987	1,567,995.52	978,909	634,081	0.4044	1,561,112	33.24	46,959	32.5
1988	1,538,423.88	934,390	605,244	0.3934	1,548,549	33.97	45,586	31.5
1989	1,299,429.78	767,016	496,829	0.3823	1,322,373	34.70	38,106	30.5
1990	1,403,216.42	804,045	520,815	0.3712	1,443,688	35.44	40,733	29.5
1991	1,105,414.63	614,128	397,797	0.3599	1,149,784	36.19	31,771	28.5
1992	819,721.21	440,988	285,647	0.3485	861,963	36.94	23,332	27.5
1993	1,433,364.52	745,663	482,998	0.3370	1,523,713	37.70	40,412	26.5
1994	1,378,191.99	692,270	448,413	0.3254	1,481,056	38.47	38,496	25.5
1995	1,583,056.29	766,584	496,549	0.3137	1,719,730	39.25	43,818	24.5
1996	1,462,750.51	681,680	441,554	0.3019	1,606,297	40.03	40,130	23.5
1997	1,674,377.92	749,546	485,513	0.2900	1,858,616	40.81	45,538	22.5
1998	1,307,587.27	561,149	363,480	0.2780	1,467,142	41.61	35,261	21.5
1999	558,323.24	229,187	148,454	0.2659	633,198	42.41	14,931	20.5
2000	1,334,275.14	522,620	338,523	0.2537	1,529,462	43.21	35,393	19.5
2001	2,485,600.96	926,517	600,144	0.2414	2,879,697	44.02	65,411	18.5
2002	1,792,068.87	633,814	410,548	0.2291	2,098,348	44.84	46,794	17.5
2003	1,519,297.60	508,147	329,149	0.2166	1,797,868	45.67	39,370	16.5
2004	1,631,683.57	514,178	333,055	0.2041	1,951,302	46.49	41,968	15.5
2005	978,303.94	289,232	187,348	0.1915	1,182,278	47.33	24,980	14.5
2006	2,524,721.81	696,921	451,426	0.1788	3,083,185	48.17	64,007	13.5
2007	1,938,635.26	496,897	321,862	0.1660	2,392,228	49.02	48,806	12.5
2008	3,094,717.31	731,775	474,002	0.1532	3,858,602	49.87	77,379	11.5
2009	3,610,684.81	781,645	506,305	0.1402	4,548,654	50.72	89,678	10.5
2010	3,173,045.63	623,155	403,644	0.1272	4,038,620	51.58	78,293	9.5
2011	1,394,154.72	245,621	159,099	0.1141	1,792,718	52.45	34,180	8.5
2012	2,753,485.89	429,131	277,967	0.1010	3,576,914	53.32	67,083	7.5

ALG - Remaining Life
Survivor Curve: R2
ASL: 60
Net Salvage: -40%
Truncation Year:

Missouri American Water

Account #: 335.0000 - Fire Hydrants

CALCULATED ANNUAL ACCRUAL AND ACCRUED DEPRECIATION BASED ON ORIGINAL COST AS OF DECEMBER 31, 2019

Year	Original Cost	Calculated Accumulated Depreciation	Allocated Actual Booked Amount	Accumulated Depreciation Factor	Net Book Value	ALG Remaining Life	Annual Accrual	Average Age
2013	2,346,029.31	317,688	205,780	0.0877	3,078,661	54.20	56,806	6.5
2014	3,096,182.84	355,650	230,369	0.0744	4,104,287	55.08	74,519	5.5
2015	2,011,703.64	189,520	122,760	0.0610	2,693,625	55.96	48,133	4.5
2016	3,331,263.36	244,684	158,492	0.0476	4,505,277	56.85	79,246	3.5
2017	8,076,407.52	424,715	275,106	0.0341	11,031,865	57.75	191,040	2.5
2018	8,922,387.35	282,130	182,748	0.0205	12,308,594	58.64	209,884	1.5
2019	9,914,561.53	104,708	67,824	0.0068	13,812,563	59.55	231,959	0.5
TOTAL	97,070,442.53	29,316,391	18,989,480		116,909,139		2,598,087	

COMPOSITE ANNUAL ACCRUAL RATE	2.68%
THEORETICAL ACCUMULATED DEPRECIATION FACTOR	0.20
COMPOSITE AVERAGE AGE (YEARS)	15.68
DIRECTED WEIGHTED ALG COMPOSITE REMAINING LIFE (YEARS)	47.06

ALG - Remaining Life
Survivor Curve: SQ
ASL: 25
Net Salvage: 0%
Truncation Year:

Missouri American Water

Account #: 339.1000 - Miscellaneous Intangible Plant - Other

CALCULATED ANNUAL ACCRUAL AND ACCRUED DEPRECIATION
BASED ON ORIGINAL COST AS OF DECEMBER 31, 2019

Year	Original Cost	Calculated Accumulated Depreciation	Allocated Actual Booked Amount	Accumulated Depreciation Factor	Net Book Value	ALG Remaining Life	Annual Accrual	Average Age
2000	2,294.00	1,789	2,294	1.0000	0	5.50	0	19.5
2006	1,122.25	606	1,122	1.0000	0	11.50	0	13.5
2007	4.56	2	5	1.0000	0	12.50	0	12.5
TOTAL	3,420.81	2,398	3,421		0		0	

**** Allocated Booked Amount not equal to summation ****

COMPOSITE ANNUAL ACCRUAL RATE	0.00%
THEORETICAL ACCUMULATED DEPRECIATION FACTOR	89.62
COMPOSITE AVERAGE AGE (YEARS)	17.52
DIRECTED WEIGHTED ALG COMPOSITE REMAINING LIFE (YEARS)	7.48

ALG - Remaining Life
Survivor Curve: SQ
ASL: 25
Net Salvage: 0%
Truncation Year:

Missouri American Water

Account #: 339.2000 - Miscellaneous Source of Supply - Other

CALCULATED ANNUAL ACCRUAL AND ACCRUED DEPRECIATION BASED ON ORIGINAL COST AS OF DECEMBER 31, 2019

Year	Original Cost	Calculated Accumulated Depreciation	Allocated Actual Booked Amount	Accumulated Depreciation Factor	Net Book Value	ALG Remaining Life	Annual Accrual	Average Age
2004	1,729.62	1,072	889	0.5141	840	9.50	88	15.5
TOTAL	1,729.62	1,072	889		840		88	

COMPOSITE ANNUAL ACCRUAL RATE	5.11%
THEORETICAL ACCUMULATED DEPRECIATION FACTOR	0.51
COMPOSITE AVERAGE AGE (YEARS)	15.50
DIRECTED WEIGHTED ALG COMPOSITE REMAINING LIFE (YEARS)	9.50

ALG - Remaining Life
Survivor Curve: SQ
ASL: 30
Net Salvage: 0%
Truncation Year:

Missouri American Water

Account #: 339.4000 - Miscellaneous Water Treatment - Other

CALCULATED ANNUAL ACCRUAL AND ACCRUED DEPRECIATION
BASED ON ORIGINAL COST AS OF DECEMBER 31, 2019

Year	Original Cost	Calculated Accumulated Depreciation	Allocated Actual Booked Amount	Accumulated Depreciation Factor	Net Book Value	ALG Remaining Life	Annual Accrual	Average Age
2001	130,498.65	80,474	55,085	0.4221	75,414	11.50	6,558	18.5
2002	1,342,722.55	783,255	536,140	0.3993	806,583	12.50	64,527	17.5
TOTAL	1,473,221.20	863,729	591,225		881,996		71,084	

COMPOSITE ANNUAL ACCRUAL RATE	4.83%
THEORETICAL ACCUMULATED DEPRECIATION FACTOR	0.40
COMPOSITE AVERAGE AGE (YEARS)	17.59
DIRECTED WEIGHTED ALG COMPOSITE REMAINING LIFE (YEARS)	12.41

ALG - Remaining Life

Survivor Curve: R3

ASL: 55

Net Salvage: 0%

Truncation Year:

Missouri American Water

Account #: 339.5000 - Miscellaneous Transmission and Distribution - Other

CALCULATED ANNUAL ACCRUAL AND ACCRUED DEPRECIATION

BASED ON ORIGINAL COST AS OF DECEMBER 31, 2019

Year	Original Cost	Calculated Accumulated Depreciation	Allocated Actual Booked Amount	Accumulated Depreciation Factor	Net Book Value	ALG Remaining Life	Annual Accrual	Average Age
1956	88.06	76	71	0.8087	17	7.71	2	63.5
1958	905.48	767	722	0.7968	184	8.41	22	61.5
1959	342.52	288	271	0.7905	72	8.78	8	60.5
1960	271.56	226	213	0.7839	59	9.16	6	59.5
1961	900.89	744	700	0.7770	201	9.56	21	58.5
1962	924.06	756	711	0.7699	213	9.98	21	57.5
1963	178.51	145	136	0.7624	42	10.42	4	56.5
1964	1,322.62	1,061	998	0.7547	324	10.87	30	55.5
1966	806.86	633	596	0.7384	211	11.82	18	53.5
1967	1,584.73	1,230	1,156	0.7297	428	12.33	35	52.5
1968	1,506.86	1,155	1,086	0.7208	421	12.85	33	51.5
1969	1,732.79	1,311	1,233	0.7116	500	13.39	37	50.5
1970	2,638.54	1,970	1,853	0.7021	786	13.94	56	49.5
1971	597.85	440	414	0.6923	184	14.52	13	48.5
1977	106.18	71	67	0.6281	39	18.27	2	42.5
1983	690.30	408	384	0.5557	307	22.50	14	36.5
1986	1.18	1	1	0.5169	1	24.78	0	33.5
2006	14,552.89	3,443	3,238	0.2225	11,315	41.99	269	13.5
2007	68.21	15	14	0.2065	54	42.93	1	12.5
2008	66.00	13	13	0.1904	53	43.87	1	11.5
2009	8,342.00	1,545	1,453	0.1742	6,889	44.82	154	10.5
2010	25.00	4	4	0.1579	21	45.77	0	9.5
2015	990.00	79	75	0.0754	915	50.59	18	4.5

ALG - Remaining Life

Survivor Curve: R3

ASL: 55

Net Salvage: 0%

Truncation Year:

Missouri American Water

Account #: 339.5000 - Miscellaneous Transmission and Distribution - Other

CALCULATED ANNUAL ACCRUAL AND ACCRUED DEPRECIATION

BASED ON ORIGINAL COST AS OF DECEMBER 31, 2019

Year	Original Cost	Calculated Accumulated Depreciation	Allocated Actual Booked Amount	Accumulated Depreciation Factor	Net Book Value	ALG Remaining Life	Annual Accrual	Average Age
TOTAL	38,643.09	16,381	15,407		23,236		767	
COMPOSITE ANNUAL ACCRUAL RATE				1.98%				
THEORETICAL ACCUMULATED DEPRECIATION FACTOR				0.40				
COMPOSITE AVERAGE AGE (YEARS)				27.40				
DIRECTED WEIGHTED ALG COMPOSITE REMAINING LIFE (YEARS)				31.69				

ALG - Remaining Life
Survivor Curve: SQ
ASL: 30
Net Salvage: 0%
Truncation Year:

Missouri American Water

Account #: 339.6000 - Miscellaneous Intangible Plant - Software

CALCULATED ANNUAL ACCRUAL AND ACCRUED DEPRECIATION
BASED ON ORIGINAL COST AS OF DECEMBER 31, 2019

Year	Original Cost	Calculated Accumulated Depreciation	Allocated Actual Booked Amount	Accumulated Depreciation Factor	Net Book Value	ALG Remaining Life	Annual Accrual	Average Age
1997	284,734.98	213,551	0	0.0000	284,735	7.50	37,965	22.5
2001	5,685.47	3,506	0	0.0000	5,685	11.50	494	18.5
2006	52,133.77	23,460	0	0.0000	52,134	16.50	3,160	13.5
2007	351,890.70	146,621	0	0.0000	351,891	17.50	20,108	12.5
2008	159,924.43	61,304	0	0.0000	159,924	18.50	8,645	11.5
2009	144,975.18	50,741	0	0.0000	144,975	19.50	7,435	10.5
2013	63,759.25	13,815	0	0.0000	63,759	23.50	2,713	6.5
TOTAL	1,063,103.78	512,999	0		1,063,104		80,519	

COMPOSITE ANNUAL ACCRUAL RATE	7.57%
THEORETICAL ACCUMULATED DEPRECIATION FACTOR	0.00
COMPOSITE AVERAGE AGE (YEARS)	14.48
DIRECTED WEIGHTED ALG COMPOSITE REMAINING LIFE (YEARS)	15.52

ALG - Remaining Life
Survivor Curve: SQ
ASL: 20
Net Salvage: 0%
Truncation Year:

Missouri American Water

Account #: 340.1000 - Office Furniture

CALCULATED ANNUAL ACCRUAL AND ACCRUED DEPRECIATION BASED ON ORIGINAL COST AS OF DECEMBER 31, 2019

Year	Original Cost	Calculated Accumulated Depreciation	Allocated Actual Booked Amount	Accumulated Depreciation Factor	Net Book Value	ALG Remaining Life	Annual Accrual	Average Age
2001	7,790.91	7,207	7,791	1.0000	0	1.50	0	18.5
2002	40,240.72	35,211	40,241	1.0000	0	2.50	0	17.5
2003	69,336.99	57,203	69,337	1.0000	0	3.50	0	16.5
2004	21,813.14	16,905	21,813	1.0000	0	4.50	0	15.5
2005	2,346.99	1,702	2,347	1.0000	0	5.50	0	14.5
2006	67,148.85	45,325	67,149	1.0000	0	6.50	0	13.5
2007	311,616.01	194,760	311,616	1.0000	0	7.50	0	12.5
2008	45,642.90	26,245	45,643	1.0000	0	8.50	0	11.5
2010	61,114.39	29,029	61,114	1.0000	0	10.50	0	9.5
2011	7,483.76	3,181	7,484	1.0000	0	11.50	0	8.5
2012	48,514.57	18,193	48,515	1.0000	0	12.50	0	7.5
2013	9,216.10	2,995	9,216	1.0000	0	13.50	0	6.5
2014	48,358.30	13,299	48,358	1.0000	0	14.50	0	5.5
2015	73,696.08	16,582	65,631	0.8906	8,065	15.50	520	4.5
2016	136,326.68	23,857	94,428	0.6927	41,898	16.50	2,539	3.5
2017	371,519.35	46,440	183,812	0.4948	187,707	17.50	10,726	2.5
2018	352,390.74	26,429	104,609	0.2969	247,782	18.50	13,394	1.5
2019	351,247.52	8,781	34,757	0.0990	316,491	19.50	16,230	0.5
TOTAL	2,025,804.00	573,343	1,223,861		801,943		43,410	

COMPOSITE ANNUAL ACCRUAL RATE 2.14%

THEORETICAL ACCUMULATED DEPRECIATION FACTOR 0.60

COMPOSITE AVERAGE AGE (YEARS) 5.66

DIRECTED WEIGHTED ALG COMPOSITE REMAINING LIFE (YEARS) 14.34

ALG - Remaining Life
Survivor Curve: SQ
ASL: 5
Net Salvage: 0%
Truncation Year:

Missouri American Water

Account #: 340.2000 - Computer Hardware

CALCULATED ANNUAL ACCRUAL AND ACCRUED DEPRECIATION BASED ON ORIGINAL COST AS OF DECEMBER 31, 2019

Year	Original Cost	Calculated Accumulated Depreciation	Allocated Actual Booked Amount	Accumulated Depreciation Factor	Net Book Value	ALG Remaining Life	Annual Accrual	Average Age
2015	950,164.99	855,148	908,243	0.9559	41,922	0.50	41,922	4.5
2016	2,417,485.88	1,692,240	1,797,309	0.7435	620,177	1.50	413,451	3.5
2017	1,539,865.76	769,933	817,737	0.5310	722,129	2.50	288,852	2.5
2018	1,542,560.56	462,768	491,501	0.3186	1,051,060	3.50	300,303	1.5
2019	519,363.17	51,936	55,161	0.1062	464,202	4.50	103,156	0.5
TOTAL	6,969,440.36	3,832,026	4,069,951		2,899,489		1,147,684	

COMPOSITE ANNUAL ACCRUAL RATE	16.47%
THEORETICAL ACCUMULATED DEPRECIATION FACTOR	0.58
COMPOSITE AVERAGE AGE (YEARS)	2.75
DIRECTED WEIGHTED ALG COMPOSITE REMAINING LIFE (YEARS)	2.25

ALG - Remaining Life
Survivor Curve: SQ
ASL: 10
Net Salvage: 0%
Truncation Year:

Missouri American Water

Account #: 340.3000 - Computer Software

CALCULATED ANNUAL ACCRUAL AND ACCRUED DEPRECIATION BASED ON ORIGINAL COST AS OF DECEMBER 31, 2019

Year	Original Cost	Calculated Accumulated Depreciation	Allocated Actual Booked Amount	Accumulated Depreciation Factor	Net Book Value	ALG Remaining Life	Annual Accrual	Average Age
2010	4,874.04	4,630	4,874	1.0000	0	0.50	0	9.5
2011	33,779.64	28,713	33,780	1.0000	0	1.50	0	8.5
2012	2,411,808.48	1,808,856	2,349,755	0.9743	62,053	2.50	24,821	7.5
2013	3,003,617.20	1,952,351	2,536,159	0.8444	467,458	3.50	133,559	6.5
2014	3,653,030.31	2,009,167	2,609,964	0.7145	1,043,066	4.50	231,792	5.5
2015	494,216.49	222,397	288,900	0.5846	205,316	5.50	37,330	4.5
2016	4,368,390.89	1,528,937	1,986,132	0.4547	2,382,259	6.50	366,501	3.5
2017	6,091,235.25	1,522,809	1,978,171	0.3248	4,113,064	7.50	548,409	2.5
2018	5,341,129.83	801,169	1,040,742	0.1949	4,300,388	8.50	505,928	1.5
2019	9,188,263.77	459,413	596,791	0.0650	8,591,473	9.50	904,366	0.5
TOTAL	34,590,345.90	10,338,443	13,425,268		21,165,078		2,752,707	

COMPOSITE ANNUAL ACCRUAL RATE	7.96%
THEORETICAL ACCUMULATED DEPRECIATION FACTOR	0.39
COMPOSITE AVERAGE AGE (YEARS)	2.99
DIRECTED WEIGHTED ALG COMPOSITE REMAINING LIFE (YEARS)	7.01

ALG - Remaining Life

Survivor Curve: SQ

ASL: 7

Net Salvage: 0%

Truncation Year:

Missouri American Water

Account #: 340.3100 - Computer Software - BT Initial Investment

CALCULATED ANNUAL ACCRUAL AND ACCRUED DEPRECIATION
BASED ON ORIGINAL COST AS OF DECEMBER 31, 2019

Year	Original Cost	Calculated Accumulated Depreciation	Allocated Actual Booked Amount	Accumulated Depreciation Factor	Net Book Value	ALG Remaining Life	Annual Accrual	Average Age
2012	19,007,958.00	19,007,958	6,782,882	0.3568	12,225,076	0.00	12,225,076	8.5
2013	24,809,051.00	23,036,976	8,220,614	0.3314	16,588,437	0.50	16,588,437	6.5
2014	2,543,748.00	1,998,659	713,210	0.2804	1,830,538	1.50	1,220,359	5.5
TOTAL	46,360,757.00	44,043,593	15,716,706		30,644,051		30,033,872	

COMPOSITE ANNUAL ACCRUAL RATE 64.78%

THEORETICAL ACCUMULATED DEPRECIATION FACTOR 0.34

COMPOSITE AVERAGE AGE (YEARS) 7.27

DIRECTED WEIGHTED ALG COMPOSITE REMAINING LIFE (YEARS) 0.35

ALG - Remaining Life
Survivor Curve: SQ
ASL: 20
Net Salvage: 0%
Truncation Year:

Missouri American Water

Account #: 340.5000 - Other Equipment

CALCULATED ANNUAL ACCRUAL AND ACCRUED DEPRECIATION BASED ON ORIGINAL COST AS OF DECEMBER 31, 2019

Year	Original Cost	Calculated Accumulated Depreciation	Allocated Actual Booked Amount	Accumulated Depreciation Factor	Net Book Value	ALG Remaining Life	Annual Accrual	Average Age
2007	583.20	365	-1,173	-2.0106	1,756	7.50	234	12.5
2012	15,082.97	5,656	-18,195	-1.2063	33,278	12.50	2,662	7.5
TOTAL	15,666.17	6,021	-19,368		35,034		2,896	

COMPOSITE ANNUAL ACCRUAL RATE	18.49%
THEORETICAL ACCUMULATED DEPRECIATION FACTOR	-1.24
COMPOSITE AVERAGE AGE (YEARS)	7.69
DIRECTED WEIGHTED ALG COMPOSITE REMAINING LIFE (YEARS)	12.31

ALG - Remaining Life
Survivor Curve: L1.5
ASL: 11
Net Salvage: 20%
Truncation Year:

Missouri American Water

Account #: 341.1000 - Transportation Equipment - Light Trucks

CALCULATED ANNUAL ACCRUAL AND ACCRUED DEPRECIATION
BASED ON ORIGINAL COST AS OF DECEMBER 31, 2019

Year	Original Cost	Calculated Depreciation	Accumulated Depreciation	Allocated Actual Booked Amount	Actual Depreciation Factor	Net Book Value	ALG Remaining Life	Annual Accrual	Average Age
1965	693.12	554	554	554	0.8000	0	0.00	0	54.5
1981	84.50	68	68	68	0.8000	0	0.00	0	38.5
1988	9,659.33	7,223	7,223	7,727	0.8000	0	0.72	0	31.5
1991	476.00	339	366	366	0.7693	15	1.21	12	28.5
1993	6,870.41	4,766	5,147	5,147	0.7492	349	1.46	239	26.5
1995	3,447.31	2,317	2,503	2,503	0.7260	255	1.76	145	24.5
1996	1,050.86	694	750	750	0.7132	91	1.92	47	23.5
2000	99.89	61	65	65	0.6546	15	2.67	6	19.5
2002	711.01	409	441	441	0.6206	128	3.10	41	17.5
2003	215.66	120	130	130	0.6023	43	3.33	13	16.5
2006	9,939.24	5,002	5,403	5,403	0.5436	2,549	4.08	625	13.5
2008	194,987.93	90,720	97,982	97,982	0.5025	58,009	4.60	12,603	11.5
2010	360,689.24	153,448	165,731	165,731	0.4595	122,820	5.15	23,847	9.5
2011	130,173.88	52,503	56,706	56,706	0.4356	47,433	5.45	8,697	8.5
2012	459,019.71	173,630	187,529	187,529	0.4085	179,687	5.80	30,986	7.5
2014	67,170.02	21,057	22,743	22,743	0.3386	30,993	6.69	4,633	5.5
2015	439,022.10	118,842	128,355	128,355	0.2924	222,863	7.28	30,622	4.5
2016	921,702.15	203,309	219,584	219,584	0.2382	517,778	7.97	64,990	3.5
2017	8,018,533.43	1,318,094	1,423,607	1,423,607	0.1775	4,991,220	8.74	571,093	2.5
2018	490,385.87	50,161	54,177	54,177	0.1105	338,132	9.59	35,246	1.5
2019	3,798,627.69	132,964	143,607	143,607	0.0378	2,895,295	10.52	275,252	0.5

ALG - Remaining Life
Survivor Curve: L1.5
ASL: 11
Net Salvage: 20%
Truncation Year:

Missouri American Water

Account #: 341.1000 - Transportation Equipment - Light Trucks

CALCULATED ANNUAL ACCRUAL AND ACCRUED DEPRECIATION BASED ON ORIGINAL COST AS OF DECEMBER 31, 2019

Year	Original Cost	Calculated Accumulated Depreciation	Allocated Actual Booked Amount	Accumulated Depreciation Factor	Net Book Value	ALG Remaining Life	Annual Accrual	Average Age
TOTAL	14,913,559.35	2,336,280	2,523,175		9,407,673		1,059,098	
COMPOSITE ANNUAL ACCRUAL RATE				7.10%				
THEORETICAL ACCUMULATED DEPRECIATION FACTOR				0.17				
COMPOSITE AVERAGE AGE (YEARS)				2.63				
DIRECTED WEIGHTED ALG COMPOSITE REMAINING LIFE (YEARS)				8.85				

ALG - Remaining Life
Survivor Curve: L1.5
ASL: 10
Net Salvage: 20%
Truncation Year:

Missouri American Water

Account #: 341.2000 - Transportation Equipment - Heavy Trucks

CALCULATED ANNUAL ACCRUAL AND ACCRUED DEPRECIATION
BASED ON ORIGINAL COST AS OF DECEMBER 31, 2019

Year	Original Cost	Calculated Accumulated Depreciation	Allocated Actual Booked Amount	Accumulated Depreciation Factor	Net Book Value	ALG Remaining Life	Annual Accrual	Average Age
1984	19,381.90	15,506	15,506	0.8000	0	0.00	0	35.5
1985	3,104.42	2,484	2,484	0.8000	0	0.00	0	34.5
1986	46,242.97	36,994	36,994	0.8000	0	0.00	0	33.5
1987	9,854.52	7,884	7,884	0.8000	0	0.00	0	32.5
1988	7,447.25	5,958	5,958	0.8000	0	0.00	0	31.5
1989	930.63	745	745	0.8000	0	0.00	0	30.5
1997	3,871.12	2,611	3,097	0.8000	0	1.57	0	22.5
2000	14,403.76	9,125	11,523	0.8000	0	2.08	0	19.5
2001	78,412.95	48,472	62,730	0.8000	0	2.27	0	18.5
2006	29,123.93	15,380	23,299	0.8000	0	3.40	0	13.5
2008	703,719.50	342,710	562,976	0.8000	0	3.91	0	11.5
2009	12,730.70	5,933	10,185	0.8000	0	4.17	0	10.5
2010	953,272.99	423,826	762,618	0.8000	0	4.44	0	9.5
2011	315,016.69	132,964	252,013	0.8000	0	4.72	0	8.5
2012	827,972.11	328,915	662,378	0.8000	0	5.03	0	7.5
2014	1,227,156.77	409,451	894,589	0.7290	87,136	5.83	14,948	5.5
2015	548,769.48	159,612	348,727	0.6355	90,288	6.36	14,187	4.5
2016	571,937.86	136,593	298,436	0.5218	159,115	7.01	22,683	3.5
2017	966,888.12	173,044	378,074	0.3910	395,436	7.76	50,939	2.5
2018	1,054,391.10	118,050	257,922	0.2446	585,591	8.60	68,088	1.5
2019	5,309,441.81	204,254	446,265	0.0841	3,801,289	9.52	399,332	0.5

ALG - Remaining Life
Survivor Curve: L1.5
ASL: 10
Net Salvage: 20%
Truncation Year:

Missouri American Water

Account #: 341.2000 - Transportation Equipment - Heavy Trucks

CALCULATED ANNUAL ACCRUAL AND ACCRUED DEPRECIATION
BASED ON ORIGINAL COST AS OF DECEMBER 31, 2019

Year	Original Cost	Calculated Accumulated Depreciation	Allocated Actual Booked Amount	Accumulated Depreciation Factor	Net Book Value	ALG Remaining Life	Annual Accrual	Average Age
TOTAL	12,704,070.58	2,580,509	5,044,401		5,118,856		570,177	
COMPOSITE ANNUAL ACCRUAL RATE				4.49%				
THEORETICAL ACCUMULATED DEPRECIATION FACTOR				0.40				
COMPOSITE AVERAGE AGE (YEARS)				3.87				
DIRECTED WEIGHTED ALG COMPOSITE REMAINING LIFE (YEARS)				7.46				

ALG - Remaining Life
Survivor Curve: L1.5
ASL: 6
Net Salvage: 20%
Truncation Year:

Missouri American Water

Account #: 341.3000 - Transportation Equipment - Autos

CALCULATED ANNUAL ACCRUAL AND ACCRUED DEPRECIATION
BASED ON ORIGINAL COST AS OF DECEMBER 31, 2019

Year	Original Cost	Calculated Accumulated Depreciation	Allocated Actual Booked Amount	Accumulated Depreciation Factor	Net Book Value	ALG Remaining Life	Annual Accrual	Average Age
1997	529.60	424	424	0.8000	0	0.00	0	22.5
1998	11,019.03	8,815	8,815	0.8000	0	0.00	0	21.5
1999	985.25	788	788	0.8000	0	0.00	0	20.5
2000	29.70	24	24	0.8000	0	0.00	0	19.5
2006	15,196.59	10,149	12,157	0.8000	0	0.99	0	13.5
2007	31,515.28	20,397	25,212	0.8000	0	1.15	0	12.5
2008	675,980.22	421,787	540,784	0.8000	0	1.32	0	11.5
2009	18,092.44	10,822	14,474	0.8000	0	1.51	0	10.5
2010	88,679.40	50,517	70,944	0.8000	0	1.73	0	9.5
2011	89,453.86	48,175	71,563	0.8000	0	1.96	0	8.5
2012	77,319.46	39,069	61,856	0.8000	0	2.21	0	7.5
2013	2,198.35	1,035	1,759	0.8000	0	2.47	0	6.5
2014	50,274.37	21,888	40,219	0.8000	0	2.73	0	5.5
TOTAL	1,061,273.55	633,890	849,019		0		0	

**** Allocated Booked Amount not equal to summation ****

COMPOSITE ANNUAL ACCRUAL RATE	0.00%
THEORETICAL ACCUMULATED DEPRECIATION FACTOR	2.33
COMPOSITE AVERAGE AGE (YEARS)	10.65
DIRECTED WEIGHTED ALG COMPOSITE REMAINING LIFE (YEARS)	1.52

ALG - Remaining Life
Survivor Curve: R3
ASL: 17
Net Salvage: 5%
Truncation Year:

Missouri American Water

Account #: 341.4000 - Transportation Equipment - Other

CALCULATED ANNUAL ACCRUAL AND ACCRUED DEPRECIATION
BASED ON ORIGINAL COST AS OF DECEMBER 31, 2019

Year	Original Cost	Calculated Accumulated Depreciation	Allocated Actual Booked Amount	Accumulated Depreciation Factor	Net Book Value	ALG Remaining Life	Annual Accrual	Average Age
1958	714.06	678	578	0.8092	101	0.00	101	61.5
2003	37,319.78	27,773	23,657	0.6339	11,797	3.68	3,203	16.5
2007	53,604.16	32,698	27,852	0.5196	23,072	6.08	3,792	12.5
2008	242,556.23	138,282	117,788	0.4856	112,641	6.80	16,569	11.5
2010	309,479.46	149,913	127,695	0.4126	166,310	8.33	19,961	9.5
2011	113,421.80	49,779	42,402	0.3738	65,349	9.15	7,145	8.5
2012	631,125.24	247,238	210,596	0.3337	388,973	9.99	38,937	7.5
2013	2,473,302.01	848,552	722,791	0.2922	1,626,846	10.86	149,794	6.5
2014	1,444,354.63	423,256	360,526	0.2496	1,011,610	11.76	86,050	5.5
2015	631,078.11	152,567	129,955	0.2059	469,569	12.67	37,050	4.5
2016	198,053.35	37,509	31,950	0.1613	156,201	13.61	11,476	3.5
2017	7,982,826.90	1,086,500	925,474	0.1159	6,658,212	14.56	457,155	2.5
2018	99,456.28	8,163	6,953	0.0699	87,530	15.53	5,636	1.5
2019	2,085,267.31	57,285	48,795	0.0234	1,932,209	16.51	117,044	0.5
TOTAL	16,302,559.32	3,260,193	2,777,010		12,710,421		953,913	

COMPOSITE ANNUAL ACCRUAL RATE 5.85%

THEORETICAL ACCUMULATED DEPRECIATION FACTOR 0.17

COMPOSITE AVERAGE AGE (YEARS) 3.77

DIRECTED WEIGHTED ALG COMPOSITE REMAINING LIFE (YEARS) 13.42

ALG - Remaining Life

Survivor Curve: SQ

ASL: 25

Net Salvage: 0%

Truncation Year:

Missouri American Water

Account #: 342.0000 - Stores Equipment

CALCULATED ANNUAL ACCRUAL AND ACCRUED DEPRECIATION BASED ON ORIGINAL COST AS OF DECEMBER 31, 2019

Year	Original Cost	Calculated Accumulated Depreciation	Allocated Actual Booked Amount	Accumulated Depreciation Factor	Net Book Value	ALG Remaining Life	Annual Accrual	Average Age
1931	1.51	2	0	-0.2431	2	0.00	2	89.5
1942	0.50	1	0	-0.2431	1	0.00	1	78.5
1947	1.30	1	0	-0.2431	2	0.00	2	73.5
1953	0.53	1	0	-0.2431	1	0.00	1	67.5
1955	0.09	0	0	-0.2431	0	0.00	0	65.5
1956	6.13	6	-1	-0.2431	8	0.00	8	64.5
1960	1.70	2	0	-0.2431	2	0.00	2	60.5
1961	1.64	2	0	-0.2431	2	0.00	2	59.5
1963	18.88	19	-5	-0.2431	23	0.00	23	57.5
1964	0.30	0	0	-0.2431	0	0.00	0	56.5
1992	886.41	886	-216	-0.2431	1,102	0.00	1,102	28.5
1995	7,150.47	7,007	-1,704	-0.2383	8,854	0.50	8,854	24.5
1996	1,866.00	1,754	-426	-0.2286	2,292	1.50	1,528	23.5
1997	2,099.51	1,890	-459	-0.2188	2,559	2.50	1,024	22.5
1998	244.00	210	-51	-0.2091	295	3.50	84	21.5
1999	5,441.78	4,462	-1,085	-0.1994	6,527	4.50	1,450	20.5
2000	193,597.00	151,006	-36,716	-0.1897	230,313	5.50	41,875	19.5
2001	5,456.98	4,038	-982	-0.1799	6,439	6.50	991	18.5
2002	506.22	354	-86	-0.1702	592	7.50	79	17.5
2003	5,463.85	3,606	-877	-0.1605	6,341	8.50	746	16.5
2004	1,225.18	760	-185	-0.1507	1,410	9.50	148	15.5
2006	6,312.29	3,409	-829	-0.1313	7,141	11.50	621	13.5
2007	14,117.99	7,059	-1,716	-0.1216	15,834	12.50	1,267	12.5
2008	115,575.79	53,165	-12,927	-0.1118	128,502	13.50	9,519	11.5
2009	5,168.97	2,171	-528	-0.1021	5,697	14.50	393	10.5
2010	7,093.00	2,695	-655	-0.0924	7,748	15.50	500	9.5

ALG - Remaining Life
Survivor Curve: SQ
ASL: 25
Net Salvage: 0%
Truncation Year:

Missouri American Water

Account #: 342.0000 - Stores Equipment

CALCULATED ANNUAL ACCRUAL AND ACCRUED DEPRECIATION BASED ON ORIGINAL COST AS OF DECEMBER 31, 2019

Year	Original Cost	Calculated Accumulated Depreciation	Allocated Actual Booked Amount	Accumulated Depreciation Factor	Net Book Value	ALG Remaining Life	Annual Accrual	Average Age
2013	7,276.94	1,892	-460	-0.0632	7,737	18.50	418	6.5
2014	189,054.62	41,592	-10,113	-0.0535	199,167	19.50	10,214	5.5
2015	54,920.51	9,886	-2,404	-0.0438	57,324	20.50	2,796	4.5
2016	17,947.57	2,513	-611	-0.0340	18,559	21.50	863	3.5
2017	67,057.59	6,706	-1,630	-0.0243	68,688	22.50	3,053	2.5
2018	119,389.68	7,163	-1,742	-0.0146	121,131	23.50	5,155	1.5
2019	2,166.35	43	-11	-0.0049	2,177	24.50	89	0.5
TOTAL	830,051.28	314,300	-76,419		906,471		92,809	

COMPOSITE ANNUAL ACCRUAL RATE	11.18%
THEORETICAL ACCUMULATED DEPRECIATION FACTOR	-0.09
COMPOSITE AVERAGE AGE (YEARS)	9.47
DIRECTED WEIGHTED ALG COMPOSITE REMAINING LIFE (YEARS)	15.53

ALG - Remaining Life

Survivor Curve: SQ

ASL: 20

Net Salvage: 0%

Truncation Year:

Missouri American Water

Account #: 343.0000 - Tools, Shop, and Garage Equipment

CALCULATED ANNUAL ACCRUAL AND ACCRUED DEPRECIATION
BASED ON ORIGINAL COST AS OF DECEMBER 31, 2019

Year	Original Cost	Calculated Accumulated Depreciation	Allocated Actual Booked Amount	Accumulated Depreciation Factor	Net Book Value	ALG Remaining Life	Annual Accrual	Average Age
2000	258,216.81	251,761	258,217	1.0000	0	0.50	0	19.5
2001	348,738.48	322,583	348,738	1.0000	0	1.50	0	18.5
2002	145,445.37	127,265	145,445	1.0000	0	2.50	0	17.5
2004	122,689.20	95,084	122,689	1.0000	0	4.50	0	15.5
2005	108,986.05	79,015	106,398	0.9762	2,588	5.50	471	14.5
2006	446,526.64	301,405	405,858	0.9089	40,669	6.50	6,257	13.5
2007	597,341.46	373,338	502,719	0.8416	94,622	7.50	12,616	12.5
2008	383,158.04	220,316	296,667	0.7743	86,491	8.50	10,175	11.5
2009	8,195.05	4,302	5,793	0.7069	2,402	9.50	253	10.5
2010	504,247.90	239,518	322,523	0.6396	181,725	10.50	17,307	9.5
2011	174,799.14	74,290	100,035	0.5723	74,764	11.50	6,501	8.5
2012	163,726.56	61,397	82,675	0.5050	81,052	12.50	6,484	7.5
2013	440,859.90	143,279	192,933	0.4376	247,927	13.50	18,365	6.5
2014	437,086.57	120,199	161,854	0.3703	275,233	14.50	18,982	5.5
2015	284,940.09	64,112	86,329	0.3030	198,611	15.50	12,814	4.5
2016	736,041.24	128,807	173,446	0.2356	562,596	16.50	34,097	3.5
2017	1,555,941.10	194,493	261,894	0.1683	1,294,047	17.50	73,946	2.5
2018	1,546,133.94	115,960	156,146	0.1010	1,389,988	18.50	75,134	1.5
2019	378,436.88	9,461	12,740	0.0337	365,697	19.50	18,754	0.5

ALG - Remaining Life
Survivor Curve: SQ
ASL: 20
Net Salvage: 0%
Truncation Year:

Missouri American Water

Account #: 343.0000 - Tools, Shop, and Garage Equipment

CALCULATED ANNUAL ACCRUAL AND ACCRUED DEPRECIATION BASED ON ORIGINAL COST AS OF DECEMBER 31, 2019

Year	Original Cost	Calculated Accumulated Depreciation	Allocated Actual Booked Amount	Accumulated Depreciation Factor	Net Book Value	ALG Remaining Life	Annual Accrual	Average Age
TOTAL	8,641,510.42	2,926,586	3,743,100		4,898,411		312,155	
COMPOSITE ANNUAL ACCRUAL RATE				3.61%				
THEORETICAL ACCUMULATED DEPRECIATION FACTOR				0.43				
COMPOSITE AVERAGE AGE (YEARS)				6.77				
DIRECTED WEIGHTED ALG COMPOSITE REMAINING LIFE (YEARS)				13.23				

ALG - Remaining Life

Survivor Curve: SQ

ASL: 15

Net Salvage: 0%

Truncation Year:

Missouri American Water

Account #: 344.0000 - Laboratory Equipment

CALCULATED ANNUAL ACCRUAL AND ACCRUED DEPRECIATION
BASED ON ORIGINAL COST AS OF DECEMBER 31, 2019

Year	Original Cost	Calculated Accumulated Depreciation	Allocated Actual Booked Amount	Accumulated Depreciation Factor	Net Book Value	ALG Remaining Life	Annual Accrual	Average Age
1999	81,357.51	81,358	81,358	1.0000	0	0.00	0	21.5
2000	155,163.86	155,164	155,164	1.0000	0	0.00	0	20.5
2001	16,867.48	16,867	16,867	1.0000	0	0.00	0	19.5
2002	17,909.70	17,910	17,910	1.0000	0	0.00	0	18.5
2003	9,370.93	9,371	9,371	1.0000	0	0.00	0	17.5
2004	29,424.41	29,424	29,424	1.0000	0	0.00	0	16.5
2006	67,228.09	60,505	63,011	0.9373	4,217	1.50	2,811	13.5
2007	51,707.79	43,090	44,874	0.8678	6,833	2.50	2,733	12.5
2008	113,965.10	87,373	90,992	0.7984	22,973	3.50	6,564	11.5
2010	32,318.40	20,468	21,316	0.6596	11,002	5.50	2,000	9.5
2011	74,825.95	42,401	44,157	0.5901	30,668	6.50	4,718	8.5
2012	40,809.92	20,405	21,250	0.5207	19,560	7.50	2,608	7.5
2013	39,113.23	16,949	17,651	0.4513	21,462	8.50	2,525	6.5
2014	8,738.32	3,204	3,337	0.3819	5,402	9.50	569	5.5
2015	58,337.92	17,501	18,226	0.3124	40,112	10.50	3,820	4.5
2016	24,047.69	5,611	5,844	0.2430	18,204	11.50	1,583	3.5
2017	550,515.04	91,753	95,553	0.1736	454,962	12.50	36,397	2.5
2018	419,713.21	41,971	43,710	0.1041	376,004	13.50	27,852	1.5
2019	142,281.39	4,743	4,939	0.0347	137,342	14.50	9,472	0.5

ALG - Remaining Life
Survivor Curve: SQ
ASL: 15
Net Salvage: 0%
Truncation Year:

Missouri American Water

Account #: 344.0000 - Laboratory Equipment

CALCULATED ANNUAL ACCRUAL AND ACCRUED DEPRECIATION BASED ON ORIGINAL COST AS OF DECEMBER 31, 2019

Year	Original Cost	Calculated Accumulated Depreciation	Allocated Actual Booked Amount	Accumulated Depreciation Factor	Net Book Value	ALG Remaining Life	Annual Accrual	Average Age
TOTAL	1,933,695.94	766,069	784,954		1,148,742		103,652	
COMPOSITE ANNUAL ACCRUAL RATE				5.36%				
THEORETICAL ACCUMULATED DEPRECIATION FACTOR				0.41				
COMPOSITE AVERAGE AGE (YEARS)				6.76				
DIRECTED WEIGHTED ALG COMPOSITE REMAINING LIFE (YEARS)				9.06				

ALG - Remaining Life
Survivor Curve: L1.5
ASL: 10
Net Salvage: 25%
Truncation Year:

Missouri American Water

Account #: 345.0000 - Power Operated Equipment

CALCULATED ANNUAL ACCRUAL AND ACCRUED DEPRECIATION BASED ON ORIGINAL COST AS OF DECEMBER 31, 2019

Year	Original Cost	Calculated Accumulated Depreciation	Allocated Actual Booked Amount	Accumulated Depreciation Factor	Net Book Value	ALG Remaining Life	Annual Accrual	Average Age
1967	4,425.13	3,319	3,319	0.7500	0	0.00	0	52.5
1968	1,122.70	842	842	0.7500	0	0.00	0	51.5
1970	4,741.00	3,556	3,556	0.7500	0	0.00	0	49.5
1972	446.82	335	335	0.7500	0	0.00	0	47.5
1978	477.09	358	358	0.7500	0	0.00	0	41.5
1980	2,145.00	1,609	1,609	0.7500	0	0.00	0	39.5
1981	4,845.03	3,634	3,634	0.7500	0	0.00	0	38.5
1986	4,175.95	3,132	3,132	0.7500	0	0.00	0	33.5
1987	16,633.23	12,475	12,475	0.7500	0	0.00	0	32.5
1992	58,558.44	39,532	43,919	0.7500	0	1.00	0	27.5
1993	166,029.19	111,436	124,522	0.7500	0	1.05	0	26.5
1994	13,943.28	9,246	10,457	0.7500	0	1.16	0	25.5
1995	5,358.56	3,503	4,019	0.7500	0	1.28	0	24.5
1996	33,995.30	21,871	25,496	0.7500	0	1.42	0	23.5
1998	9,408.51	5,836	7,056	0.7500	0	1.73	0	21.5
1999	976.23	593	732	0.7500	0	1.90	0	20.5
2000	42,175.37	25,048	31,632	0.7500	0	2.08	0	19.5
2001	15,149.42	8,780	11,362	0.7500	0	2.27	0	18.5
2002	6,000.17	3,386	4,500	0.7500	0	2.48	0	17.5
2004	37,695.52	20,030	28,272	0.7500	0	2.92	0	15.5
2005	18,145.87	9,320	13,609	0.7500	0	3.15	0	14.5
2006	38,540.02	19,080	28,905	0.7500	0	3.40	0	13.5
2007	172,754.40	82,230	129,566	0.7500	0	3.65	0	12.5
2008	100,332.48	45,808	75,249	0.7500	0	3.91	0	11.5
2010	198,037.42	82,545	148,528	0.7500	0	4.44	0	9.5
2012	13,754.88	5,123	10,316	0.7500	0	5.03	0	7.5

ALG - Remaining Life
Survivor Curve: L1.5
ASL: 10
Net Salvage: 25%
Truncation Year:

Missouri American Water

Account #: 345.0000 - Power Operated Equipment

CALCULATED ANNUAL ACCRUAL AND ACCRUED DEPRECIATION
BASED ON ORIGINAL COST AS OF DECEMBER 31, 2019

Year	Original Cost	Calculated Accumulated Depreciation	Allocated Actual Booked Amount	Accumulated Depreciation Factor	Net Book Value	ALG Remaining Life	Annual Accrual	Average Age
2013	312,710.27	108,004	234,533	0.7500	0	5.39	0	6.5
2015	8,241.99	2,247	6,181	0.7500	0	6.36	0	4.5
2016	4,744.62	1,062	3,558	0.7500	0	7.01	0	3.5
2017	26,118.28	4,382	19,589	0.7500	0	7.76	0	2.5
2018	270,243.77	28,366	202,683	0.7500	0	8.60	0	1.5
2019	154,193.01	5,561	115,645	0.7500	0	9.52	0	0.5
TOTAL	1,746,118.95	672,248	1,309,589		0		0	

**** Allocated Booked Amount not equal to summation ****

COMPOSITE ANNUAL ACCRUAL RATE	0.00%
THEORETICAL ACCUMULATED DEPRECIATION FACTOR	1.18
COMPOSITE AVERAGE AGE (YEARS)	11.19
DIRECTED WEIGHTED ALG COMPOSITE REMAINING LIFE (YEARS)	4.87

ALG - Remaining Life
Survivor Curve: SQ
ASL: 15
Net Salvage: 0%
Truncation Year:

Missouri American Water

Account #: 346.1000 - Communication Equipment - Non-Telephone

CALCULATED ANNUAL ACCRUAL AND ACCRUED DEPRECIATION
BASED ON ORIGINAL COST AS OF DECEMBER 31, 2019

Year	Original Cost	Calculated Accumulated Depreciation	Allocated Actual Booked Amount	Accumulated Depreciation Factor	Net Book Value	ALG Remaining Life	Annual Accrual	Average Age
2005	539.03	521	508	0.9432	31	0.50	31	14.5
2007	276,756.76	230,631	225,040	0.8131	51,717	2.50	20,687	12.5
2008	964,429.79	739,396	721,473	0.7481	242,956	3.50	69,416	11.5
2009	29,343.13	20,540	20,042	0.6830	9,301	4.50	2,067	10.5
2010	336,462.73	213,093	207,928	0.6180	128,535	5.50	23,370	9.5
2011	263,241.63	149,170	145,554	0.5529	117,687	6.50	18,106	8.5
2012	13,624.44	6,812	6,647	0.4879	6,977	7.50	930	7.5
2013	563,852.01	244,336	238,413	0.4228	325,439	8.50	38,287	6.5
2014	402,574.60	147,611	144,033	0.3578	258,542	9.50	27,215	5.5
2015	126,065.36	37,820	36,903	0.2927	89,162	10.50	8,492	4.5
2016	358,071.18	83,550	81,525	0.2277	276,546	11.50	24,047	3.5
2017	1,402,107.67	233,685	228,020	0.1626	1,174,088	12.50	93,927	2.5
2018	1,194,929.29	119,493	116,596	0.0976	1,078,333	13.50	79,877	1.5
2019	3,225,639.32	107,521	104,915	0.0325	3,120,724	14.50	215,222	0.5
TOTAL	9,157,636.94	2,334,179	2,277,598		6,880,039		621,674	

COMPOSITE ANNUAL ACCRUAL RATE	6.79%
THEORETICAL ACCUMULATED DEPRECIATION FACTOR	0.25
COMPOSITE AVERAGE AGE (YEARS)	3.82
DIRECTED WEIGHTED ALG COMPOSITE REMAINING LIFE (YEARS)	11.18

ALG - Remaining Life
Survivor Curve: SQ
ASL: 10
Net Salvage: 0%
Truncation Year:

Missouri American Water

Account #: 346.2000 - Communication Equipment - Telephone

CALCULATED ANNUAL ACCRUAL AND ACCRUED DEPRECIATION
BASED ON ORIGINAL COST AS OF DECEMBER 31, 2019

Year	Original Cost	Calculated Accumulated Depreciation	Allocated Actual Booked Amount	Accumulated Depreciation Factor	Net Book Value	ALG Remaining Life	Annual Accrual	Average Age
2012	36,360.92	27,271	36,361	1.0000	0	2.50	0	7.5
2014	3,311.20	1,821	3,311	1.0000	0	4.50	0	5.5
2018	2,292.65	344	2,293	1.0000	0	8.50	0	1.5
TOTAL	41,964.77	29,436	41,965		0		0	

**** Allocated Booked Amount not equal to summation ****

COMPOSITE ANNUAL ACCRUAL RATE	0.00%
THEORETICAL ACCUMULATED DEPRECIATION FACTOR	2.32
COMPOSITE AVERAGE AGE (YEARS)	7.01
DIRECTED WEIGHTED ALG COMPOSITE REMAINING LIFE (YEARS)	2.99

ALG - Remaining Life
Survivor Curve: SQ
ASL: 15
Net Salvage: 0%
Truncation Year:

Missouri American Water

Account #: 347.0000 - Miscellaneous Equipment

CALCULATED ANNUAL ACCRUAL AND ACCRUED DEPRECIATION BASED ON ORIGINAL COST AS OF DECEMBER 31, 2019

Year	Original Cost	Calculated Accumulated Depreciation	Allocated Actual Booked Amount	Accumulated Depreciation Factor	Net Book Value	ALG Remaining Life	Annual Accrual	Average Age
2005	263,588.07	254,802	188,336	0.7145	75,252	0.50	75,252	14.5
2006	291,760.25	262,584	194,089	0.6652	97,672	1.50	65,115	13.5
2007	48,774.14	40,645	30,043	0.6160	18,731	2.50	7,492	12.5
2008	103,671.34	79,481	58,749	0.5667	44,923	3.50	12,835	11.5
2009	37,950.39	26,565	19,636	0.5174	18,315	4.50	4,070	10.5
2010	85,458.32	54,124	40,005	0.4681	45,453	5.50	8,264	9.5
2011	20,053.65	11,364	8,399	0.4189	11,654	6.50	1,793	8.5
2012	61,690.07	30,845	22,799	0.3696	38,891	7.50	5,185	7.5
2013	800,444.28	346,859	256,380	0.3203	544,064	8.50	64,008	6.5
2015	989,944.71	296,983	219,515	0.2217	770,430	10.50	73,374	4.5
2016	716,801.90	167,254	123,625	0.1725	593,177	11.50	51,581	3.5
2017	758,968.33	126,495	93,498	0.1232	665,470	12.50	53,238	2.5
2018	467,988.61	46,799	34,591	0.0739	433,397	13.50	32,103	1.5
2019	967,075.67	32,236	23,827	0.0246	943,249	14.50	65,052	0.5
TOTAL	5,614,169.73	1,777,036	1,313,493		4,300,677		519,362	

COMPOSITE ANNUAL ACCRUAL RATE	9.25%
THEORETICAL ACCUMULATED DEPRECIATION FACTOR	0.23
COMPOSITE AVERAGE AGE (YEARS)	4.75
DIRECTED WEIGHTED ALG COMPOSITE REMAINING LIFE (YEARS)	10.25

ALG - Remaining Life
Survivor Curve: SQ
ASL: 20
Net Salvage: 0%
Truncation Year:

Missouri American Water

Account #: 348.0000 - Other Tangible Equipment

CALCULATED ANNUAL ACCRUAL AND ACCRUED DEPRECIATION BASED ON ORIGINAL COST AS OF DECEMBER 31, 2019

Year	Original Cost	Calculated Accumulated Depreciation	Allocated Actual Booked Amount	Accumulated Depreciation Factor	Net Book Value	ALG Remaining Life	Annual Accrual	Average Age
1991	15,959.45	15,959	-204,847	-12.8355	220,806	0.00	220,806	29.5
2002	6,430.98	5,627	-72,227	-11.2310	78,657	2.50	31,463	17.5
2004	895.98	694	-8,913	-9.9475	9,809	4.50	2,180	15.5
2017	5,766.16	721	-9,251	-1.6044	15,018	17.50	858	2.5
2018	1,035.83	78	-997	-0.9627	2,033	18.50	110	1.5
2019	1,851.41	46	-594	-0.3209	2,446	19.50	125	0.5
TOTAL	31,939.81	23,126	-296,829		328,769		255,542	

COMPOSITE ANNUAL ACCRUAL RATE	800.07%
THEORETICAL ACCUMULATED DEPRECIATION FACTOR	-9.29
COMPOSITE AVERAGE AGE (YEARS)	19.23
DIRECTED WEIGHTED ALG COMPOSITE REMAINING LIFE (YEARS)	5.52



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”². 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”³. 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.”⁴ 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 curve⁵. 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.

² Wolf, Frank K. and W. Chester Fitch, *Depreciation Systems* (Iowa State University Press, 1994), 21.

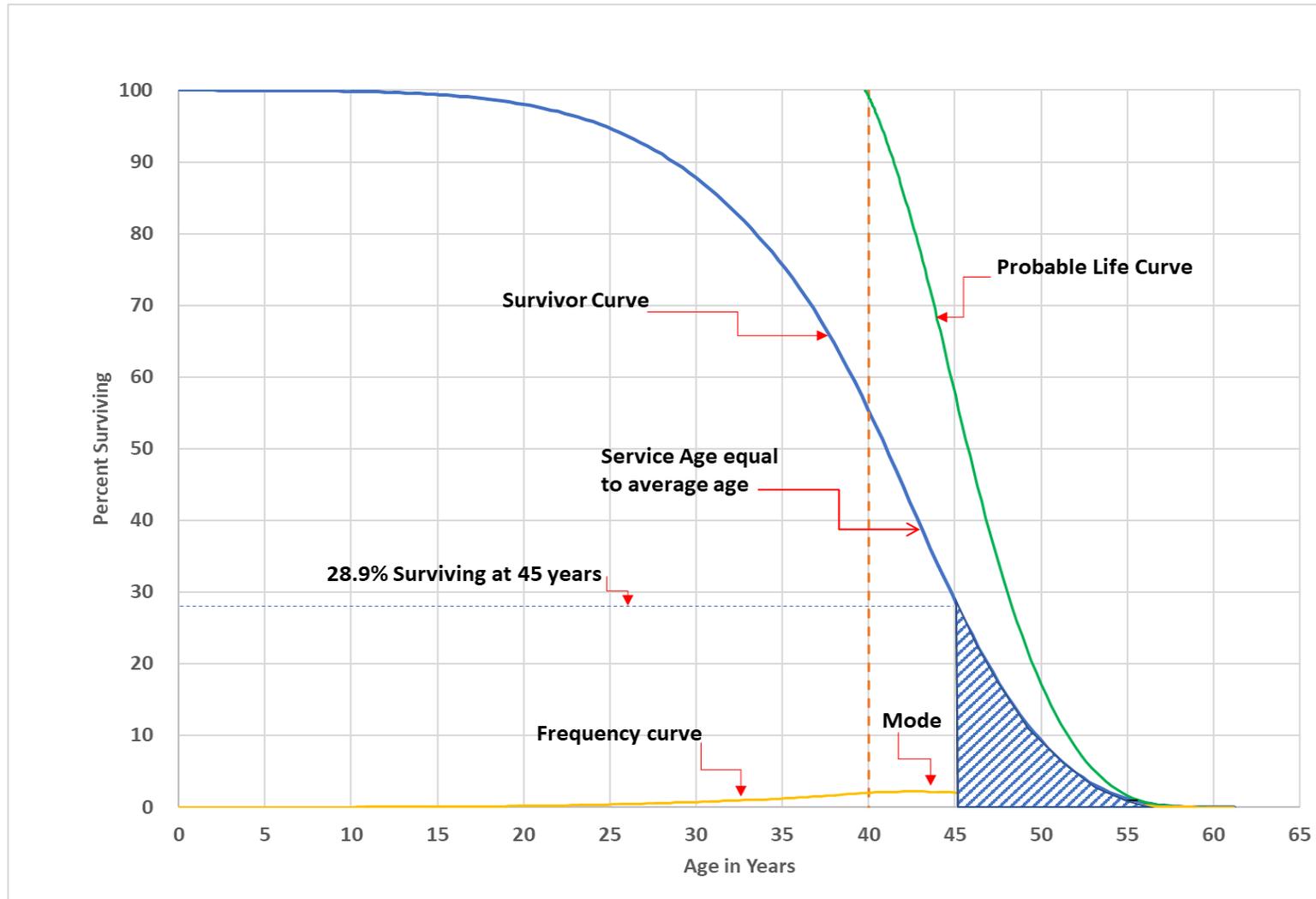
³ *Ibid*, 23.

⁴ *Ibid*, 29.

⁵ *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”⁶. 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*⁷. In 1957, Frank V. B. Couch, Jr., an Iowa State College graduate student, submitted a thesis⁸ presenting his development of the fourth family consisting of the four O-type survivor curves.

⁶ *Ibid*, 21

⁷ Marston, Anson, Robley Winfrey and Jean C. Hempstead, *Engineering Valuation and Depreciation* (The Iowa State University Press, 1953)

⁸ 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

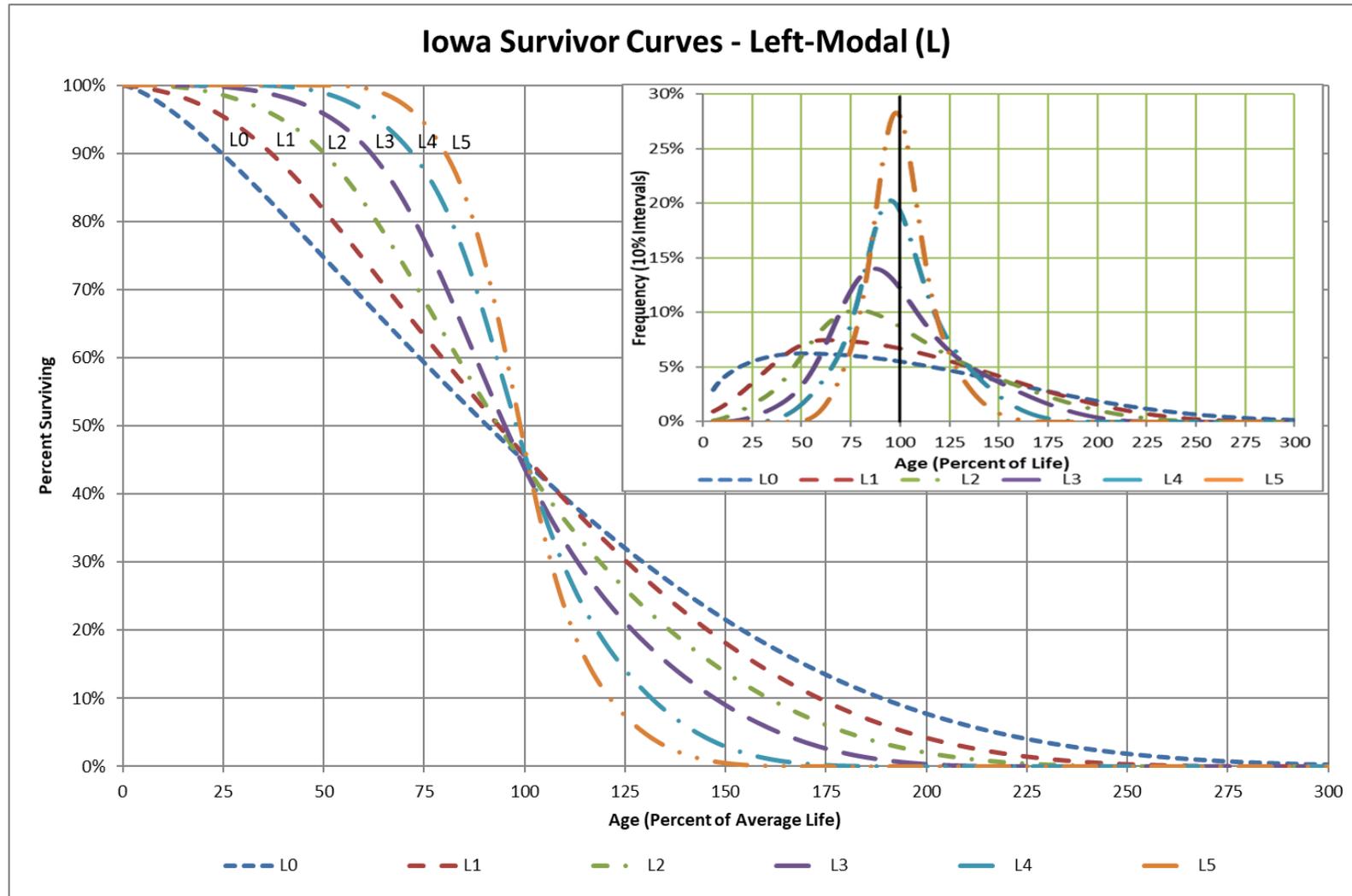




Figure 3: Right Modal or "R" Iowa Type Survivor Curves

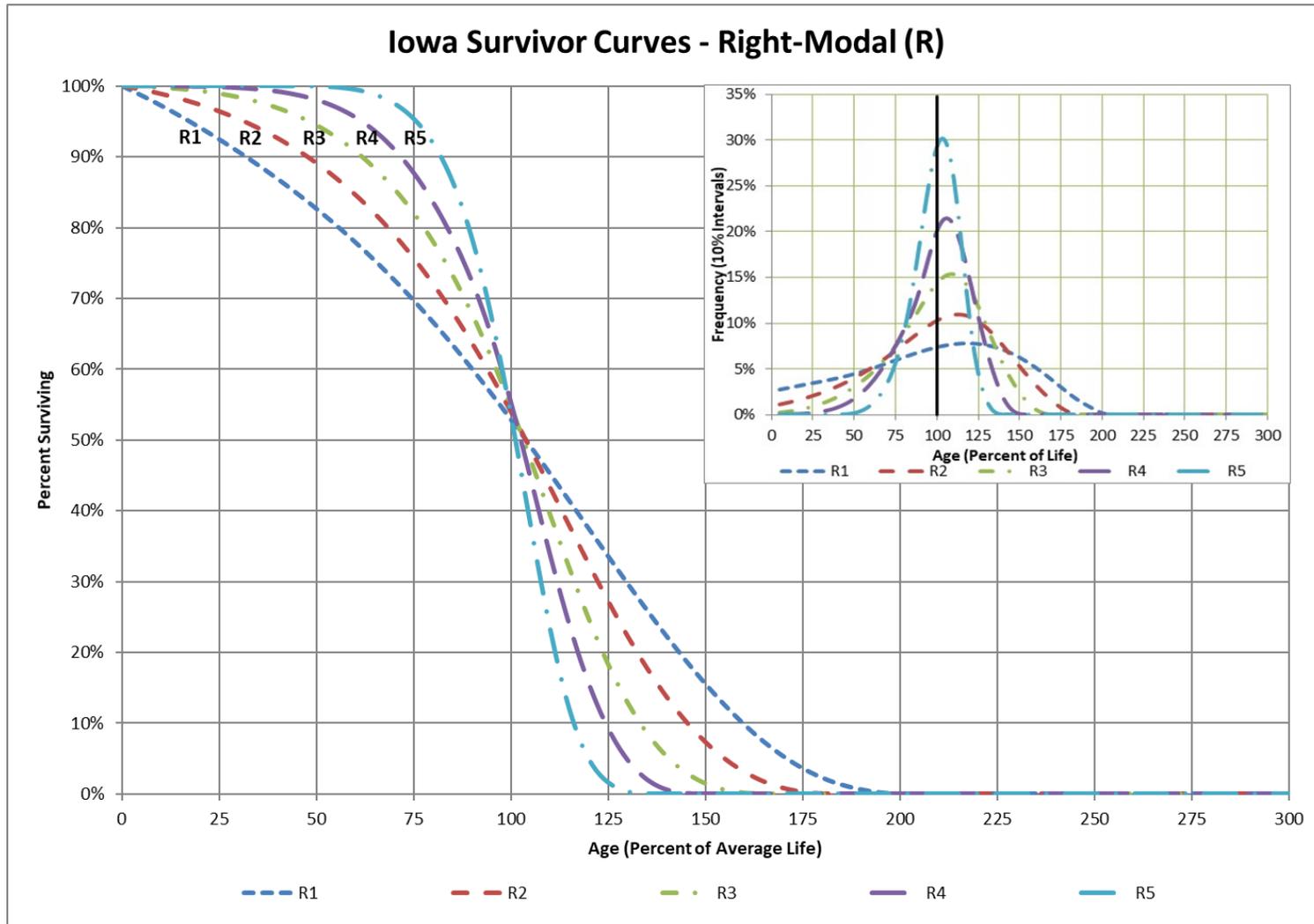




Figure 4: Symmetrical or "S" Iowa Type Survivor Curves

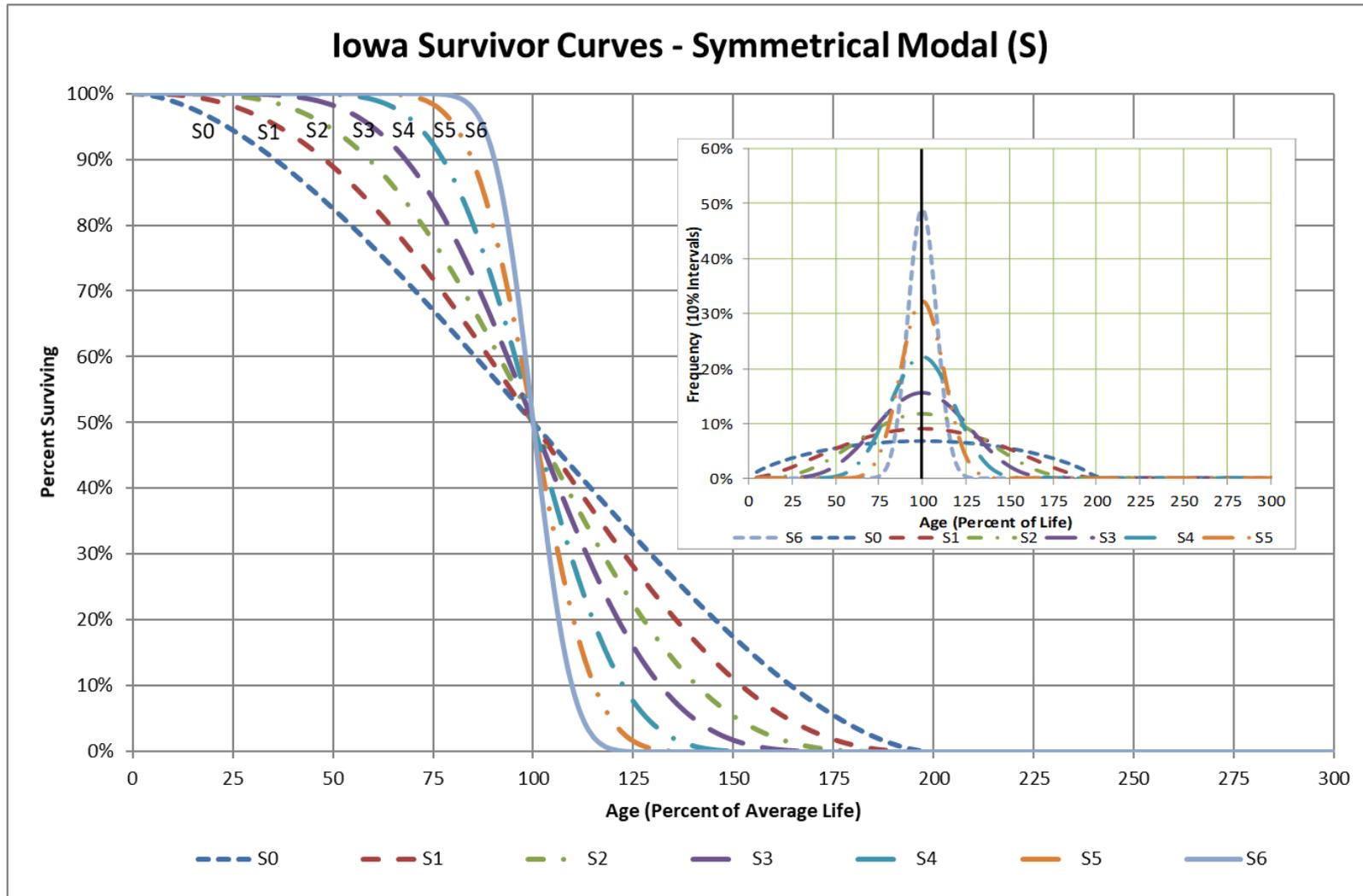
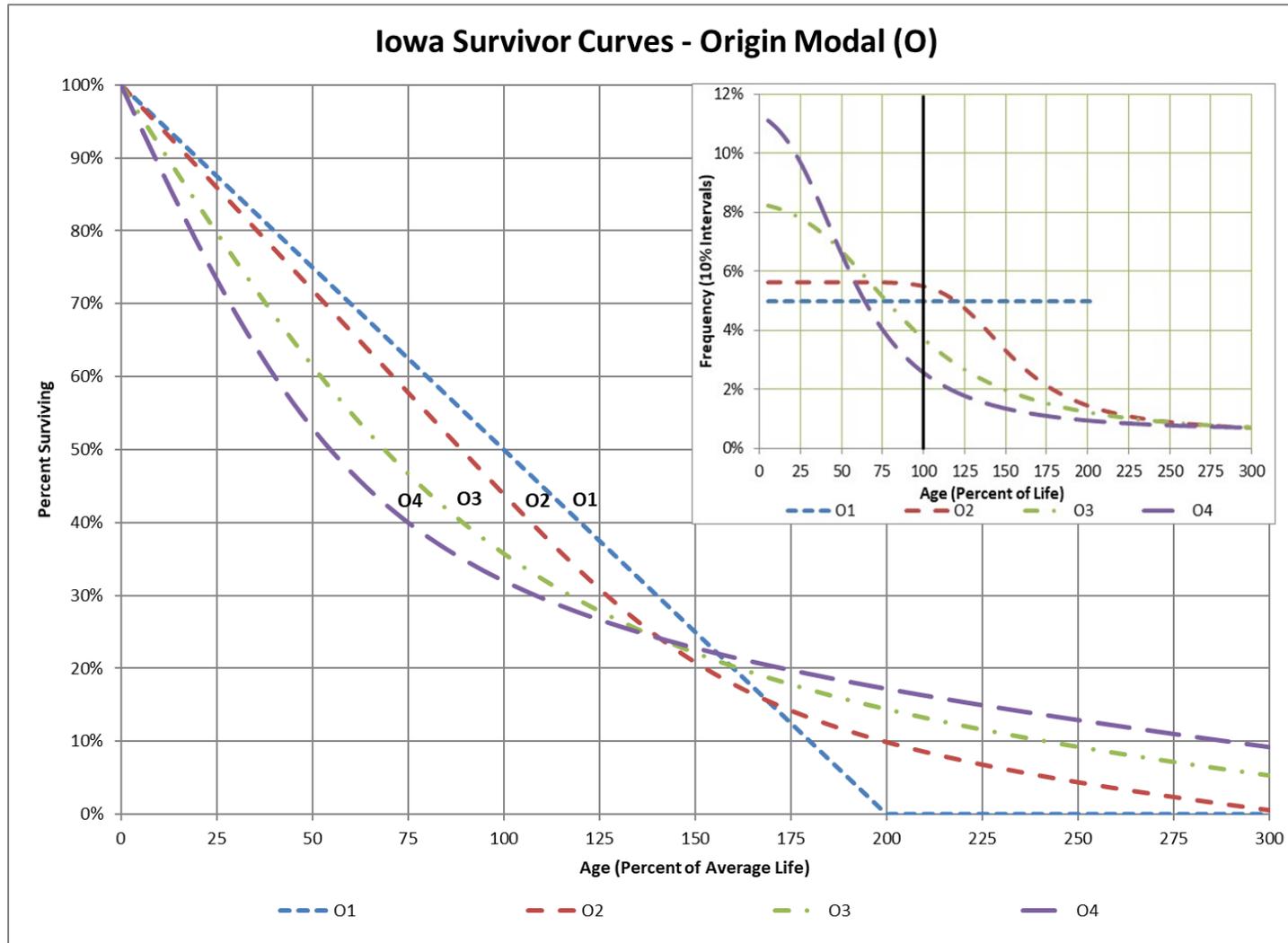




Figure 5: Origin Modal or "O" Iowa Type Survivor Curves





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,⁹ Engineering Valuation and Depreciation¹⁰ and Depreciation Systems.¹¹

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:

$$\underline{\$10 + \$12 + \$13 + \$11 + \$13 + \$13 + \$15 + \$17 + \$19 + \$20 = \$143 \text{ k}}$$

⁹ Anson, Winfrey & Hempstead, supra note 6

¹⁰ Anson, Winfrey & Hempstead, supra note 6

¹¹ 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

**Retirements (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)	Exposures (Thousands of Dollars)										Total at Beginning of Age Interval (12)	Age Interval (13)
	2008 (2)	2009 (3)	2010 (4)	2011 (5)	2012 (6)	2013 (7)	2014 (8)	2015 (9)	2016 (10)	2017 (11)		
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 ^o	416	407	397	386	374	361	347	332	316	1,503	8½-9½
2009		460 ^o	455	444	432	419	405	390	374	356	1,952	7½-8½
2010			510 ^o	504	492	479	464	448	431	412	2,463	6½-7½
2011				580 ^o	574	561	546	530	501	482	3,057	5½-6½
2012					660 ^o	653	639	623	628	609	3,789	4½-5½
2013						750 ^o	742	724	685	663	4,332	3½-4½
2014							850 ^o	841	821	799	4,955	2½-3½
2015								960 ^o	949	923	5,719	1½-2½
2016									1,080 ^o	1,069	6,579	½-1½
2017										1,220 ^o	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	

^o 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	=	$\$143,000 \div \$3,789,000$	= 0.0377
Survivor Ratio	=	$1.000 - 0.0377$	= 0.9623
Percent surviving at age 5½	=	$(88.15) \times (0.9623)$	= 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

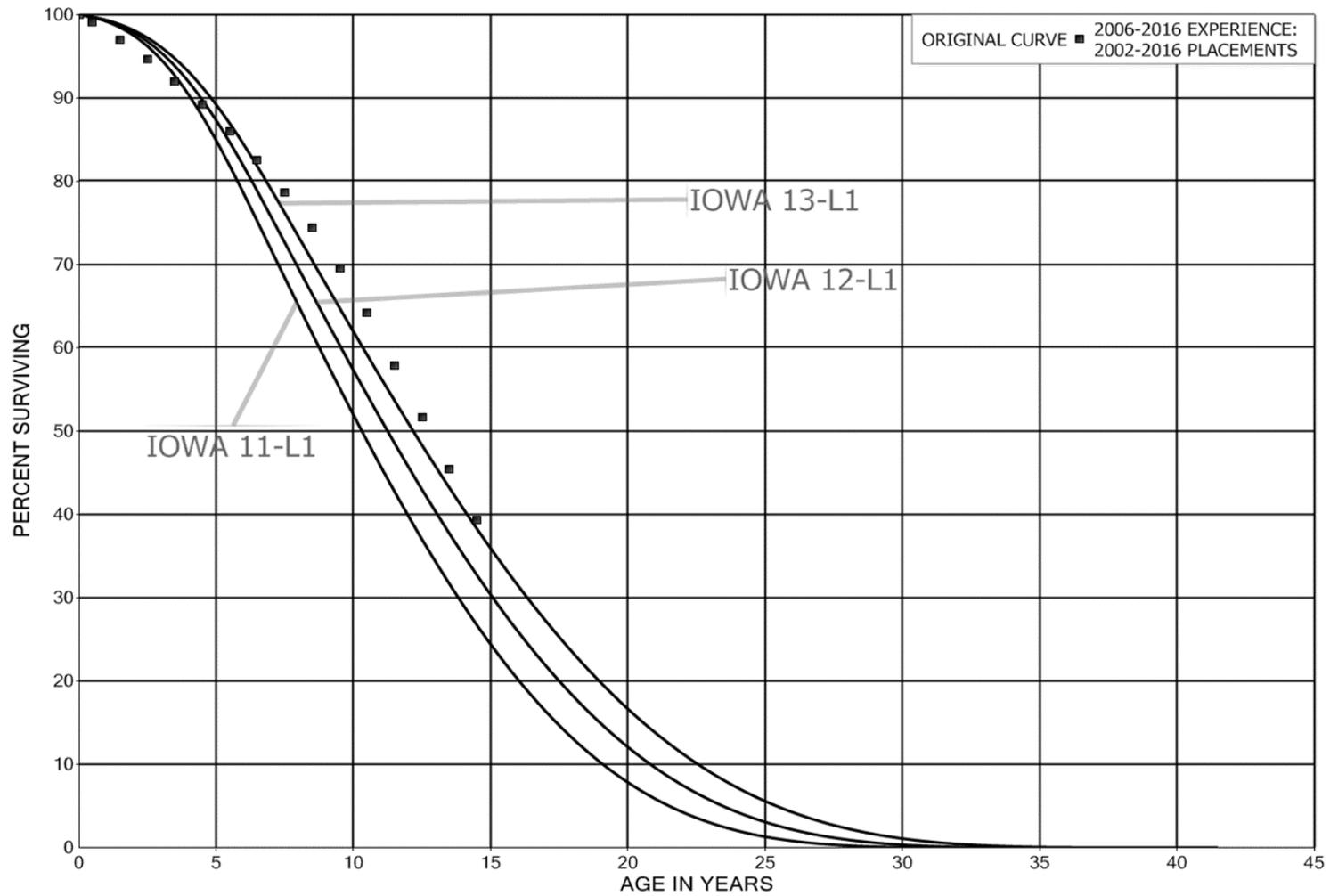




Figure 7: Illustration of the Matching of an Original Survivor Curve with a SO Iowa Type Curve Original and Smooth Survivor Curves

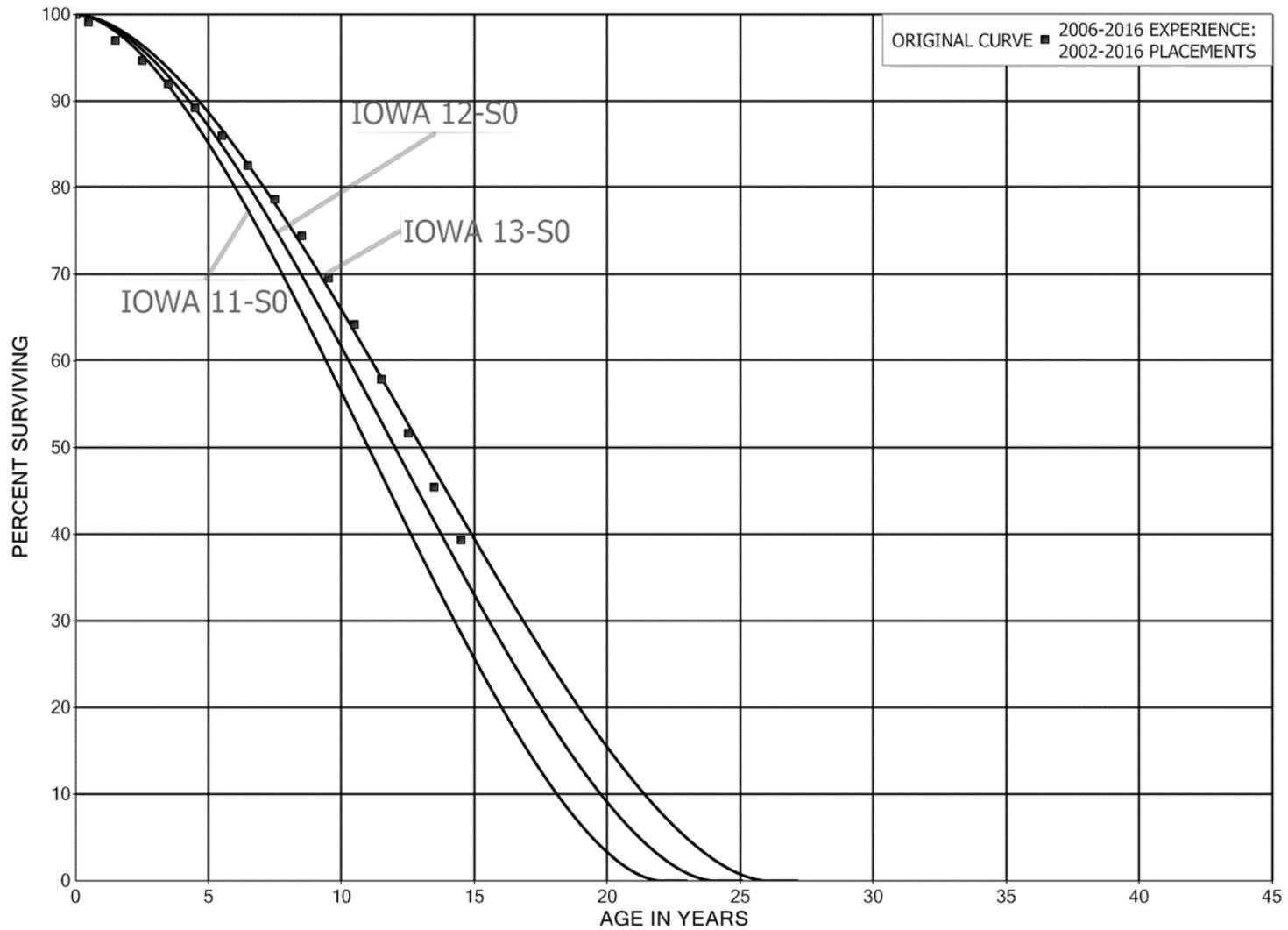




Figure 8: Illustration of the Matching of an Original Survivor Curve with a R1 Iowa Type Curve Original and Smooth Survivor Curves

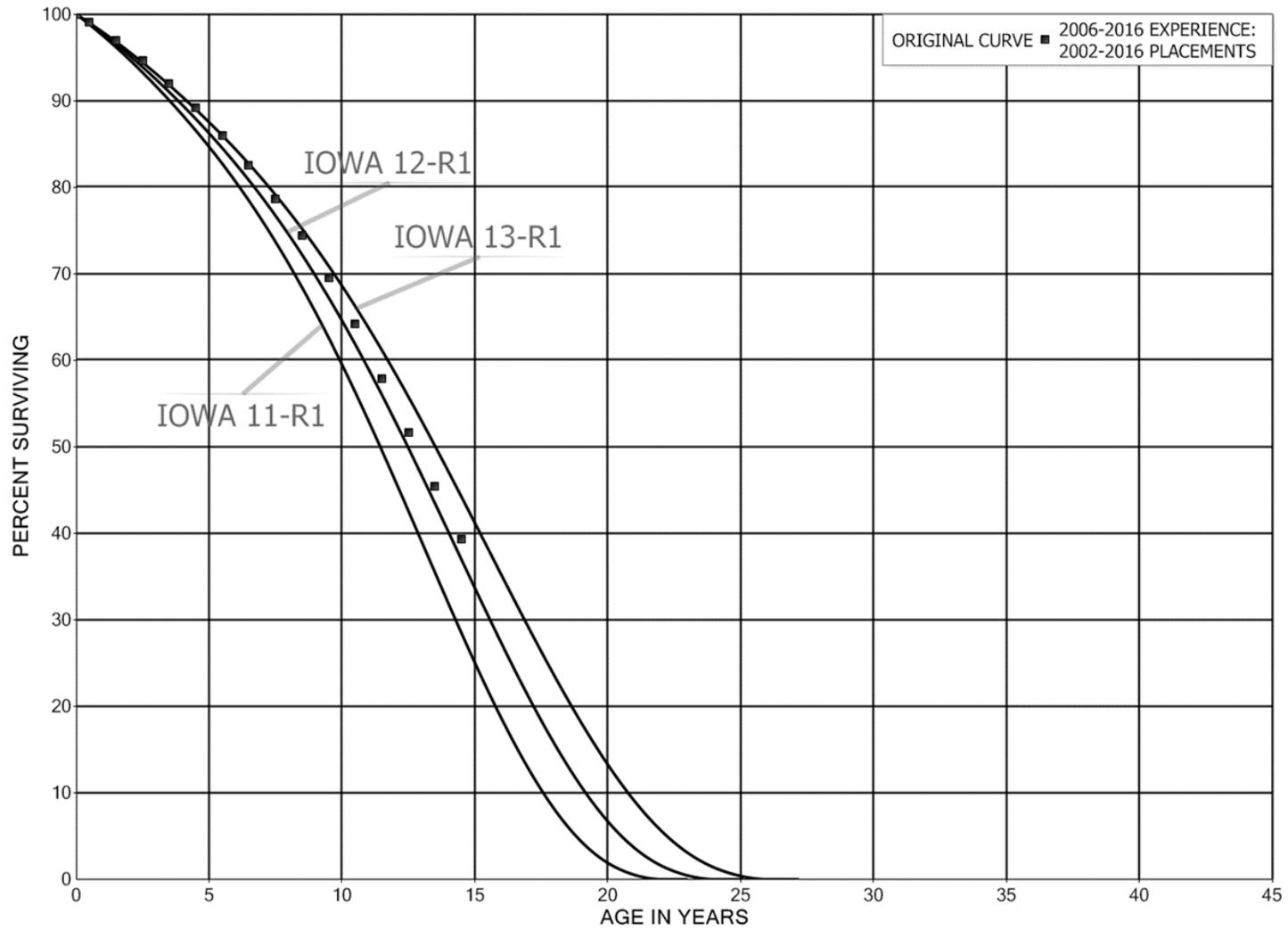
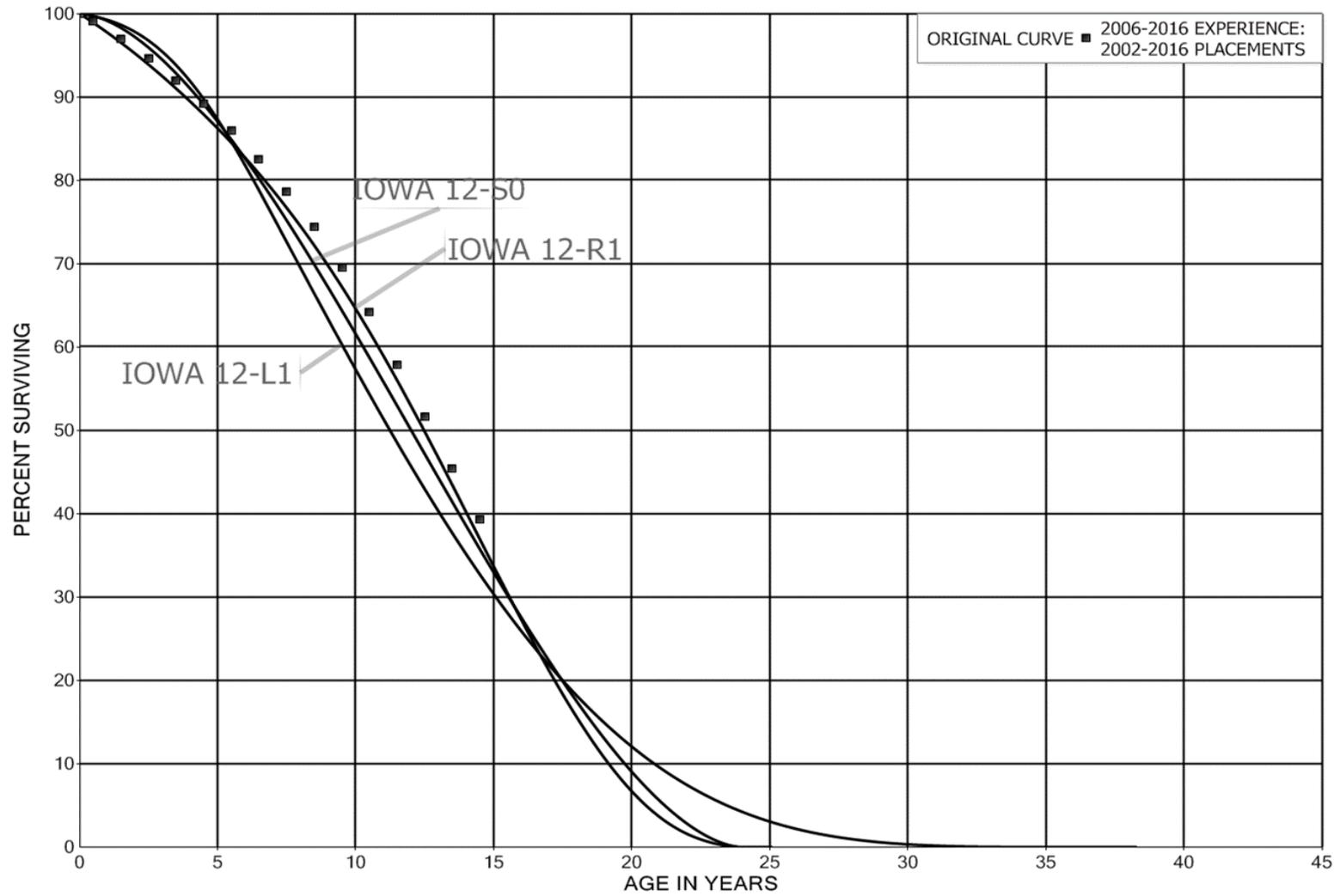




Figure 9: Illustration of the Matching of an Original Survivor Curve with a L1 Iowa Type Curve Original and Smooth Survivor Curves





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.



2019 DEPRECIATION STUDY - WASTEWATER ASSETS

Prepared for Missouri American Water Company
St. Louis, Missouri

Prepared May, 2020

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Missouri American Water Company
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Attention: Mr. Brian LaGrand

Dear Mr. LaGrand

Pursuant to your request, we have conducted a review and assessment of the wastewater assets for Missouri American Water Company. Our study presents a description of the methods used in the estimation of service life and net salvage, as well as our recommendations for average service life and net salvage estimates.

We gratefully acknowledge the assistance of Missouri American Water Company personnel in the completion of our review.

Should you have any questions or concerns, please do not hesitate to contact me directly at 587.997.6489

Yours truly,

Concentric Advisors, ULC

D R A F T

Larry E. Kennedy
Vice President

LEK/ta
Project no: 03776



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SECTION 1

1 STUDY HIGHLIGHTS

Pursuant to request of Missouri American Water (“MAWC” or the “Company”), Concentric Energy Advisors (“Concentric”) completed a depreciation study related to wastewater accounts. The purpose of the study is to determine the annual depreciation accrual rates and amounts applicable to the original cost of wastewater utility plant, as of December 31, 2019.

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. Variances between the calculated

accrued depreciation and the book accumulated depreciation, as of December 31, 2019, are amortized over the composite remaining life of each account within the detailed remaining life calculations.

Concentric recommends the calculated annual depreciation accrual rates set forth herein apply specifically to wastewater plant in service, as of December 31, 2019, 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 \$1.6 million when applied to depreciable plant balances of \$79.7 million, as of December 31, 2019. The report study results are summarized at an aggregate functional group level as follows:

SUMMARY OF ORIGINAL COST, ACCRUAL PERCENTAGES AND AMOUNTS

Plant Group / Accounts	Original Cost	Annual Accrual \$	Annual Accrual
Structures and Improvements	\$8,910,969	\$156,065	1.75%
Collecting, Treatment, and General Plant	\$70,820,789	\$1,399,556	1.98%
TOTAL	\$79,731,758	\$1,555,621	1.95%



SECTION 2

2 BASIS OF THE UPDATE

2.1 Scope

Concentric has been retained by MAWC to develop reasonable and appropriate depreciation rates based on plant in service as of December 31, 2019. This report sets forth the results of the study and describes the process and procedures followed by Concentric in the development of the depreciation rates for the companies Wastewater Treatment, Transmission, Distribution, and General Plant assets. This report also defines the concepts, methods and judgments which underlie the recommended annual depreciation accrual rates, related to the plant in service as of December 31, 2019. The annual depreciation accruals rates and amounts are based on the Straight-Line remaining life method of depreciation.

The Straight-Line method, Average Life Group (“ALG”) procedure is a commonly used depreciation calculation procedure that has been widely accepted in jurisdictions throughout North America. Concentric recommends its continued use. Amortization accounting is used for certain accounts because of the disproportionate plant accounting effort required for these accounts. Many regulated utilities in North America have received approval to adopt amortization accounting for these 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	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

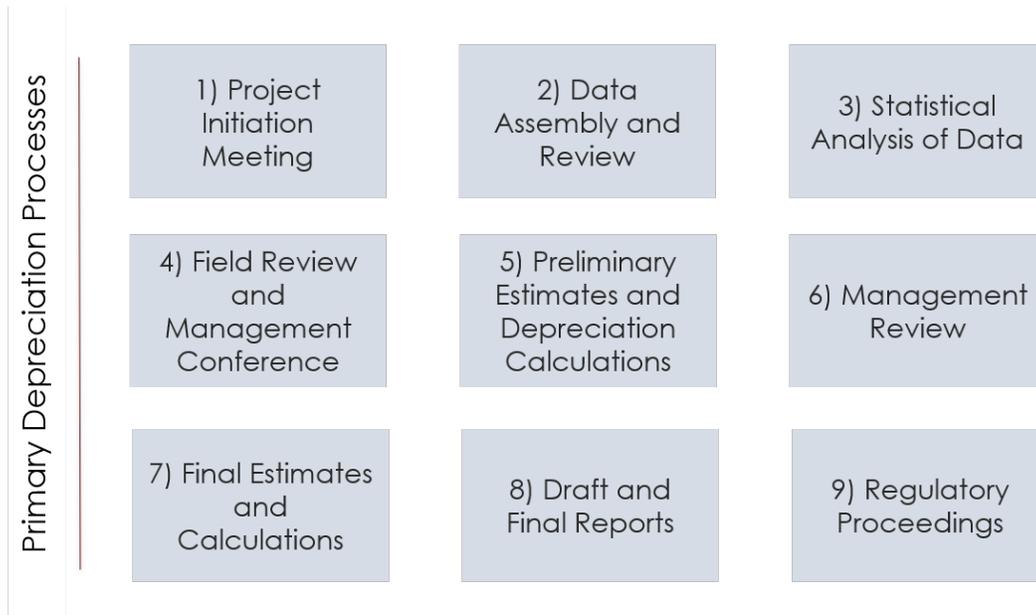


2.3 Depreciation

A full and comprehensive depreciation study includes the following components:

1. fully justified recommendations regarding Average Service Life estimates for each account;
2. fully justified 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.



2.4 Information Provided by MAWC

MAWC has provided Concentric with the required information, as of December 31, 2019, 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;



- 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, 2019 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”) and Net Salvage recommendations (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 MAWC 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 in public utility regulation is the loss in service value, not restored by current maintenance, incurred with the consumption or prospective retirement of utility plant in service from causes which are known to be in current operation and against which the utility is not protected by insurance. Among causes to be given consideration are:

- wear and tear;
- deterioration;
- action of the elements;
- inadequacy;
- obsolescence;
- changes in the art;
- changes in demand; and
- the requirements of public authorities.

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;
- intentional actions of third parties; and
- other natural forces of nature.

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 wastewater 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 Depreciation Methods & Procedures

This study calculates the annual and accrued depreciation using the Straight-Line method and ALG procedure for most accounts. For certain 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.

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.

3.2 Estimation of Survivor Curves

3.2.1 Survivor Curves

The use of an average service life for 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 by 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 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."*¹ 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.

¹ Robley Winfrey, *Statistical Analyses of Industrial Property Retirements*, Bulletin 125 revised (Engineering Research Institute, Iowa State University, 1935) 65



The program that is used by Concentric for statistical smooth curve fitting utilizes an internal “goodness-of-fit” criterion which is 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 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 1% 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 1% 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.

3.2.2 Survivor Curve Judgments

The service life 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 wastewater transmission and distribution industries, and comparisons of the service life estimates from our studies of other wastewater utilities. The use of survivor curves to reflect the expected dispersion of retirement provides a consistent method of estimating depreciation for wastewater 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 and analyzing historical data for the plant accounts using widely accepted techniques and forecasting the survivor characteristics for each depreciable group based on interpretations of the historical data analyses and the probable future. This included discussions of upcoming projects and business cases, and operational staff interviews. The combination of historical experience and the estimated future yielded estimated survivor curves from which the average service lives were derived.

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 354.20 – STRUCTURES AND IMPROVEMENTS – COLLECTION

Investment \$	Investment %	Previously Approved Curves	Concentric Recommends Curves	Previously Approved Salvage	Concentric Recommends Salvage
\$3,526,144	4.42%	50-R3	45-R3	-5%	-10%



The investment in Structures and Improvements – Collection is approximately \$3.5 million representing 4.42 percent of the total depreciable plant studied. The current approved life parameter for this account is an Iowa 50-R3. The retirements, additions and other plant transactions, for the period 1951 through 2019, were analyzed by the retirement rate method. Retirements of \$76,114 were recorded for the period 2004 through 2019, resulting in actual observed data points as depicted on page 6-3 of this report. Of the total retirement activity, \$69,460 (91% of the total) have occurred since the last depreciation study. This increased retirement activity has resulted in indications where the current Iowa 50-R3 has a related Residual Measure of 0.1119, which is not as good of a fit as the Iowa 45-R3 with a Residual Measure of 0.1043. The Iowa 45-R3 is recommended for this account based on the visual fit to historic data and on the professional judgment of Concentric.

The first year of recorded net salvage activity for these accounts is 2008. The currently approved net salvage percentage is negative five percent. For the period 2008 to 2019, the net salvage ranged from zero percent to negative 55 percent with a cumulative value of negative 15 percent. A three-year band analysis from 2010 forward produced a range from zero percent to negative 116 percent. The most recent three-year bands (i.e. 2015-2017, 2016-2018 and 2017-2019) indicate values of negative 15 percent, negative 11 percent and negative 13 percent respectively. The most recent five-year band indicates negative 13 percent. Based on historical indications Concentric views that negative 10 percent better represents the net salvage expectation for the equipment in this account.

ACCOUNT 354.40 – STRUCTURES AND IMPROVEMENTS – TREATMENT

Investment \$	Investment %	Previously Approved Curves	Concentric Recommends Curves	Previously Approved Salvage	Concentric Recommends Salvage
\$4,066,510	5.10%	60-R2.5	55-R1.5	-5%	-5%

The investment in Structures and Improvements – Treatment is approximately \$4.1 million representing 5.10 percent of the total depreciable plant studied. The current approved life parameter for this account is an Iowa 60-R2.5. The retirements, additions and other plant transactions, for the period 2001 through 2019, were analyzed by the retirement rate method. Retirements of \$279,075 were recorded for the period 2007 through 2019, of which virtually all (98%) have occurred since the last depreciation study, resulting in actual observed data points as depicted on page 6-8 of this report. The current Iowa 60-R2.5 has a related Residual Measure of 0.2818 which is not as good of a fit as the Iowa 55-R1.5 with a Residual Measure of 0.1857 Peer comparison of American utilities produced a range from 50 to 55 years, resulting in MAWC with the longest currently approved life. As such, the Iowa 55-R1.5 is recommended for this account based on the fit to historic data, the review of American peer wastewater utilities, and on the professional judgment of Concentric.

The first year of recorded net salvage activity for this account is 2016. The currently approved net salvage percentage is negative five percent. For the period 2016 to 2019, the net salvage ranged from zero percent to negative 58 percent with a cumulative value of negative 12 percent. The most recent three-year bands (i.e. 2015-2017, 2016-2018 and 2017-2019) indicate values of negative two percent, negative three percent and negative 57 percent respectively. The most recent five-year band



indicates negative 13 percent. A peer comparison of American utilities indicated a range from negative 15 percent to negative 25 percent. Based on historical indications and the review of peer wastewater utilities, Concentric views that continued use of the negative five percent remains an appropriate net salvage expectation for the equipment in these accounts.

ACCOUNT 354.50 – STRUCTURES AND IMPROVEMENTS - GENERAL

Investment \$	Investment %	Previously Approved Curves	Concentric Recommends Curves	Previously Approved Salvage	Concentric Recommends Salvage
\$912,325	1.14%	35-R2.5	35-R2	-5%	-5%

The investment in Structures and Improvements - General is approximately \$0.9 million representing 1.14 percent of the total depreciable plant studied. The current approved life parameter for this account is an Iowa 35-R2.5. The retirements, additions and other plant transactions, for the period 2007 through 2019, were analyzed by the retirement rate method. Retirements of \$28,512 were recorded for the period 2008 through 2019, resulting in actual observed data points as depicted on page 6-10 of this report. The current Iowa 35-R2.5 has a related Residual Measure of 0.1033, which does not fit the historical data as well as the Iowa 35-R2 with a Residual Measure of 0.0747. Peer comparison of American utilities produced a range from 50 to 65 years, however given the limited retirement history of this account, Concentric recommends waiting until more retirement data is available before making a dramatic change to the life estimate. As such, the Iowa 35-R2 is recommended for this account based on the fit to historic data and on the professional judgment of Concentric.

The first year of recorded net salvage activity for this account is 2014. The currently approved net salvage is negative five percent. For the period 2014 to 2019, the net salvage ranged from negative five percent to negative 126 percent with a cumulative value of negative 11 percent. Due to the lack of retirement history in this account, Concentric views that the currently approved negative five percent better represents the net salvage expectation for the equipment in this account.

ACCOUNT 360.00 – COLLECTING SEWERS

Investment \$	Investment %	Previously Approved Curves	Concentric Recommends Curves	Previously Approved Salvage	Concentric Recommends Salvage
\$6,529,642	8.19%	60-R2.5	55-R1.5	-10%	-10%

The investment in Collecting Sewers is approximately \$6.5 million representing 8.19 percent of the total depreciable plant studied. The current approved life parameter for this account is an Iowa 60-R2.5. The retirements, additions and other plant transactions, for the period 1975 through 2019, were analyzed by the retirement rate method. Retirements of \$327,949 were recorded for the period 2004 through 2019, resulting in actual observed data points as depicted on page 6-14 of this report. Of the total retirement activity, \$283,778 (86.5% of the total) have occurred since the last depreciation study. The current Iowa 60-R2.5 has a related Residual Measure of 0.1745, which does not fit the historical data as well as the Iowa 55-R1.5 with a Residual Measure of 0.0691. As such, the



Iowa 55-R1.5 is recommended for this account based on the fit to historic data and on the professional judgment of Concentric.

The first year of recorded net salvage activity for this account is 2011. The currently approved net salvage is negative ten percent. For the period 2011 to 2019, the net salvage ranged from positive 15 percent to negative 55 percent with a cumulative value of negative eight percent. A three-year band analysis from 2013 forward produced a range from zero percent to negative 23 percent. The most recent three-year bands (i.e. 2015-2017, 2016-2018 and 2017-2019) indicate values of negative 23 percent, negative 20 percent and negative seven percent respectively. The most recent five-year band indicates negative nine percent. Based on historical indications, Concentric views that the currently approved negative ten percent better represents the net salvage expectation for the equipment in this account.

ACCOUNT 361.00 – COLLECTING MAINS

Investment \$	Investment %	Previously Approved Curves	Concentric Recommends Curves	Previously Approved Salvage	Concentric Recommends Salvage
\$31,812,647	39.90%	70-R3	65-S1	-20%	-30%

The investment in Collecting Mains is approximately \$31.8 million representing 39.90 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 1951 through 2019, were analyzed by the retirement rate method. Retirements of \$509,482 were recorded for the period 1951 through 2019, resulting in actual observed data points as depicted on page 6-17 of this report. The current Iowa 70-R3 has a related Residual Measure of 1.3761, which does not fit the historical data as well as the Iowa 65-S1 with a Residual Measure of 0.9797. Specifically, the retirement activity that has occurred since the completion of the last study, has provided an indication of significantly increased early life interim retirement which results in the current Iowa 70-R3 not properly recognizing the pattern of retirement for this account. Peer comparison of American utilities produced a range from 65 to 75 years. As such, the Iowa 65-S1 is recommended for this account based on the fit to historic data, the review of American peer wastewater utilities, and on the professional judgment of Concentric.

The first year of recorded net salvage activity for this account is 2010. The currently approved net salvage is negative 20 percent. For the period 2010 to 2019, the net salvage ranged from zero percent to less than negative 1,000 percent with a cumulative value of negative 40 percent. A three-year band analysis from 2012 forward produced a range from negative one percent to negative 53 percent. The most recent three-year bands (i.e. 2015-2017, 2016-2018 and 2017-2019) indicate values of negative 35 percent, negative 42 percent and negative 44 percent respectively. The most recent five-year band indicates negative 41 percent. Based on historical indications and the review of American wastewater utilities, Concentric views that negative 30 percent better represents the net salvage expectation for the equipment in this account.



ACCOUNT 363.00 - SERVICES

Investment \$	Investment %	Previously Approved Curves	Concentric Recommends Curves	Previously Approved Salvage	Concentric Recommends Salvage
\$2,121,684	2.66%	55-R2	50-R0.5	-40%	-50%

The investment in Services is approximately \$2.1 million representing 2.66 percent of the total depreciable plant studied. The current approved life parameter for this account is an Iowa 55-R2. The retirements, additions and other plant transactions, for the period 1965 through 2019, were analyzed by the retirement rate method. Retirements of \$171,004 were recorded for the period 1965 through 2019, resulting in actual observed data points as depicted on page 6-20 of this report. The current Iowa 55-R2 has a related Residual Measure of 2.0305, which does not fit the historical data as well as the Iowa 50-R0.5 with a Residual Measure of 1.4378. As such, the Iowa 50-R0.5 is recommended for this account based on the fit to historic data and on the professional judgment of Concentric.

The first year of recorded net salvage activity for this account is 2012. The currently approved net salvage is negative 40 percent. For the period 2012 to 2019, the net salvage ranged from zero percent to less than negative 1,000 percent with a cumulative value of negative 98 percent. The most recent three-year bands (i.e. 2015-2017, 2016-2018 and 2017-2019) indicate values of negative 88 percent, negative 93 percent and negative 41 percent respectively. The most recent five-year band indicates negative 100 percent. Based on historical indications Concentric views that negative 50 percent better represents the net salvage expectation for the equipment in this account.

ACCOUNT 371.00 – PUMPING EQUIPMENT

Investment \$	Investment %	Previously Approved Curves	Concentric Recommends Curves	Previously Approved Salvage	Concentric Recommends Salvage
\$4,740,197	5.95%	15-L1.5	18-S1	-5%	-5%

The investment in Pumping Equipment is approximately \$4.7 million representing 5.95 percent of the total depreciable plant studied. The current approved life parameter for this account is an Iowa 15-L1.5. The retirements, additions and other plant transactions, for the period 1981 through 2019, were analyzed by the retirement rate method. Retirements of \$239,805 were recorded for the period 2004 through 2019, resulting in actual observed data points as depicted on page 6-26 of this report. The current Iowa 15-L1.5 has a related Residual Measure of 0.7347, which does not fit the historical data as well as the Iowa 18-S1 with a Residual Measure of 0.2767. As such, the Iowa 18-S1 is recommended for this account based on the fit to historic data and on the professional judgment of Concentric.

The first year of recorded net salvage activity for this account is 2010. The currently approved net salvage is negative five percent. For the period 2010 to 2019, the net salvage ranged from zero percent to negative 31 percent with a cumulative value of negative seven percent. A three-year band analysis from 2010 forward produced a range from negative one percent to negative 23 percent. The



most recent three-year bands (i.e. 2015-2017, 2016-2018 and 2017-2019) indicate values of negative 20 percent, negative 18 percent and negative five percent respectively. The most recent five-year band indicates negative 12 percent. Based on historical indications Concentric views that negative five percent continues to represent the net salvage expectation for the equipment in this account.

ACCOUNT 380.00 – TREATMENT EQUIPMENT

Investment \$	Investment %	Previously Approved Curves	Concentric Recommends Curves	Previously Approved Salvage	Concentric Recommends Salvage
\$9,793,607	12.28%	30-S0.5	35-S1.5	-20%	-20%

The investment in Treatment Equipment is approximately \$9.8 million representing 12.28 percent of the total depreciable plant studied. The current approved life parameter for this account is an Iowa 30-S0.5. The retirements, additions and other plant transactions, for the period 1984 through 2019, were analyzed by the retirement rate method. Retirements of \$143,851 were recorded for the period 2004 through 2019, resulting in actual observed data points as depicted on page 6-28 of this report. The current Iowa 30-S0.5 has a related Residual Measure of 1.0142, which does not fit the historical data as well as the Iowa 35-S1.5 with a Residual Measure of 0.5024. Peer comparison of American utilities produced a range from 15 to 35 years. As such, the Iowa 35-S1.5 is recommended for this account based on the fit to historic data, the review of American peer wastewater utilities, and on the professional judgment of Concentric.

The first year of recorded net salvage activity for this account is 2010. The currently approved net salvage is negative 20 percent. For the period 2010 to 2019, the net salvage ranged from positive 14 percent to negative 480 percent with a cumulative value of negative 30 percent. A three-year band analysis from 2010 forward produced a range from negative one percent to negative 113 percent. The most recent three-year bands (i.e. 2015-2017, 2016-2018 and 2017-2019) indicate values of negative five percent, negative 13 percent and negative 113 percent respectively. The most recent five-year band indicates negative 43 percent. Based on historical indications Concentric views that the currently approved negative 20 percent continues to represent the net salvage expectation for the equipment in this account.

ACCOUNT 381.00 – PLANT SEWERS

Investment \$	Investment %	Previously Approved Curves	Concentric Recommends Curves	Previously Approved Salvage	Concentric Recommends Salvage
\$11,534,464	14.47%	50-R2.5	45-R1	0%	-10%

The investment in Plant Sewers is approximately \$11.5 million representing 14.47 percent of the total depreciable plant studied. The current approved life parameter for this account is an Iowa 50-R2.5. The retirements, additions and other plant transactions, for the period 2003 through 2019, were analyzed by the retirement rate method. Retirements of \$62,220 were recorded for the period 2007 through 2019, resulting in actual observed data points as depicted on page 6-30 of this report.



Of these retirements, virtually all of occurred since the completion of the last depreciation study. With this retirement activity now being considered, it is apparent that the current Iowa 50-R2.5 has a related Residual Measure of 0.2057, does not fit the historical data as well as the Iowa 45-R1 with a Residual Measure of 0.0771. As such, the Iowa 45-R1 is recommended for this account based on the fit to historic data and on the professional judgment of Concentric.

The first year of recorded net salvage activity for this account is 2015. The currently approved net salvage is zero percent. For the period 2015 to 2019, the net salvage ranged from zero percent to negative six percent with a cumulative value of negative 19 percent. The most recent three-year bands (i.e. 2015-2017, 2016-2018 and 2017-2019) indicate values of negative 14 percent, negative four percent and negative 23 percent respectively. The most recent five-year band indicates negative 19 percent. Based on historical indications Concentric views that negative ten percent better represents the net salvage expectation for the equipment in this account.

ACCOUNT 391.00 – TRANSPORTATION EQUIPMENT

Investment \$	Investment %	Previously Approved Curves	Concentric Recommends Curves	Previously Approved Salvage	Concentric Recommends Salvage
\$823,798	1.03%	10-L2.5	12-L3	5%	0%

The investment in Transportation Equipment is approximately \$0.8 million representing 1.03 percent of the total depreciable plant studied. The current approved life parameter for this account is an Iowa 10-L2.5. The retirements, additions and other plant transactions, for the period 2004 through 2019, were analyzed by the retirement rate method. Retirements of \$16,374 were recorded for the period 2011 through 2019, resulting in actual observed data points as depicted on page 6-34 of this report. The current Iowa 10-L2.5 has a related Residual Measure of 1.6335, which does not fit the historical data as well as the Iowa 12-L3 with a Residual Measure of 1.1918. Peer comparison of American utilities produced a range from eight to ten years. As such, the Iowa 12-L3 is recommended for this account based on the fit to historic data, the review of American peer wastewater utilities, and on the professional judgment of Concentric.

OTHER ACCOUNTS

The above analysis provides the consideration relating to over 94 percent of the depreciable plant. Many of the accounts related to the remaining six percent of the depreciable plant studied as of December 31, 2019, 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 wastewater plant in service.



SECTION 4

4 CALCULATION OF ANNUAL AND ACCRUED DEPRECIATION

4.1 Group Depreciation 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 (Also known as the Average Service Life 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 Life Group procedure has been continued. While the Equal Life Group procedure provides an enhanced matching of depreciation expense to the consumption of service value, the Average Life Group procedure was used in order to conform to past Company practices and prior approvals by the Missouri Public Service Commission.

4.2 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. The accounts and their amortization periods are as follows:



Account	Title	Amortization Period-Years
390.00	Office Furniture and Equipment	20
390.20	Computers and Peripheral	5
392.00	Stores Equipment	25
393.00	Tools, Shop, and Garage Equipment	20
394.00	Laboratory Equipment	15
396.00	Communication Equipment	15
397.00	Miscellaneous Equipment	15
398.00	Other Tangible Equipment	20

For the purpose of calculating annual amortization amounts, as of December 31, 2019, 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.

4.3 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:

$$Composite\ Remaining\ Life = \frac{\sum \left(\frac{Book\ Cost}{Life} \times Remaining\ Life \right)}{\sum \frac{Book\ Cost}{Life}} \quad (1)$$

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:



$$\text{Composite Remaining Life} = \frac{\sum \text{Whole Life Future Accruals}}{\sum \text{Whole Life Annual Accrual}} \quad (2)$$

or

$$\text{Composite Remaining Life} = \frac{\sum \text{BookCost} - \text{Calc, Reserve}}{\sum \text{Whole Life Annual Accrual}} \quad (3)$$



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, 2019, 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.

Missouri American Water

**TABLE 1 - ESTIMATED SURVIVOR CURVE, ORIGINAL COST, BOOK DEPRECIATION RESERVE AND CALCULATED ANNUAL DEPRECIATION ACCRUALS RELATED TO UTILITY PLANT AS OF DECEMBER 31, 2019
DEPRECIATION RELATED TO RECOVERY OF ORIGINAL COST OF INVESTMENT**

Account	Account Description	Survivor Curve	Net Salvage	Original Cost as of Dec. 31, 2019	Book Depreciation Reserve	Future Accruals	Calculated Annual Accrual Amount	Calculated Annual Accrual Rate	Composite Remaining Life
(1)	(2)	(3)	(4)	(5)	(6)	(7)	8.00	9.00	
DEPRECIABLE PLANT STUDIED									
Structures and Improvements									
354.2	Collection	45-R3	-10	3,526,144	1,446,196	2,432,562	58,795	1.67	39.31
354.3	Pumping	50-R4	0	405,991	46,755	359,236	8,034	1.98	44.48
354.4	Treatment	55-R1.5	-5	4,066,510	1,177,665	3,092,170	62,384	1.53	48.54
354.5	General	35-R2	-5	912,325	116,032	841,910	26,851	2.94	31.28
Total Structures and Improvements				8,910,969	2,786,648	6,725,878	156,065	1.75	
Collecting, Treatment, and General Plant									
355	Power Generating Equipment - Collection	20-R1.5	0	29,499	2,669	26,830	1,927	6.53	14.43
360	Collecting Sewers	55-R1.5	-10	6,529,642	2,150,975	5,031,631	105,073	1.61	46.96
361	Collecting Mains	65-S1	-30	31,812,647	12,937,653	28,418,788	465,308	1.46	60.19
363	Services	50-R0.5	-50	2,121,684	645,225	2,537,301	52,086	2.45	46.88
364	Flow Measuring Devices	30-S3	0	517,923	319,672	198,251	12,026	2.32	16.28
370	Receiving Wells	35-L4	0	741,249	367,476	373,773	11,869	1.60	27.74
371	Pumping Equipment	18-S1	-5	4,740,197	2,836,558	2,140,648	130,791	2.76	12.95
380	Treatment Equipment	35-S1.5	-20	9,793,607	4,284,359	7,467,969	259,856	2.65	27.37
381	Plant Sewers	45-R1	-10	11,534,464	1,623,868	11,064,043	266,988	2.31	41.38
382	Outfall Sewer Lines	30-R2	0	243,076	48,720	194,357	9,773	4.02	20.97
390	Office Furniture and Equipment	20-SQ	0	214,551	78,342	136,209	8,248	3.84	15.69
390.2	Computers and Peripheral	5-SQ	0	55,120	120,140	-65,020	0	0.00	1.96
391	Transportation Equipment	12-L3	0	823,798	609,667	214,132	22,093	2.68	7.52
392	Stores Equipment	25-SQ	0	27,005	27,296	-292	0	0.00	12.97
393	Tools, Shop, and Garage Equipment	20-SQ	0	201,002	56,764	144,238	11,050	5.50	13.44
394	Laboratory Equipment	15-SQ	0	118,229	42,001	76,228	7,809	6.61	9.67
395	Power Operated Equipment	15-L1.5	0	581,819	756,558	-174,739	0	0.00	11.07
396	Communication Equipment	15-SQ	0	424,499	68,136	356,363	29,168	6.87	12.42
397	Miscellaneous Equipment	15-SQ	0	199,965	197,814	2,150	148	0.07	7.70
398	Other Tangible Plant	20-SQ	0	110,814	22,660	88,154	5,343	4.82	16.50
Total Collecting, Treatment, and General Plant				70,820,789	27,196,553	58,231,014	1,399,556	1.98	
Total Depreciable Plant				79,731,758	29,983,200	64,956,892	1,555,621	1.95	
Non Depreciable Plant									
351	Organization			5,700					
352	Franchises and Consents			5,562					
353.2	Land and Land Rights - Source of Supply			30,000					
353.3	Land and Land Rights - Pumping			86,505	22				
353.4	Land and Land Rights - Treatment			259,567	18,312				
353.5	Land and Land Rights - Water Treatment			381,782					
389.1	Other Plant and Miscellaneous Equipment				1,787				
Total Non Depreciable Plant				769,116	20,121				
TOTAL PLANT				80,500,874	30,003,321	64,956,892	1,555,621	1.93	



SECTION 6

6 RETIREMENT RATE ANALYSIS

Account 35420 - Collection Plant - Structures and Improvements

RETIREMENT RATE ANALYSIS

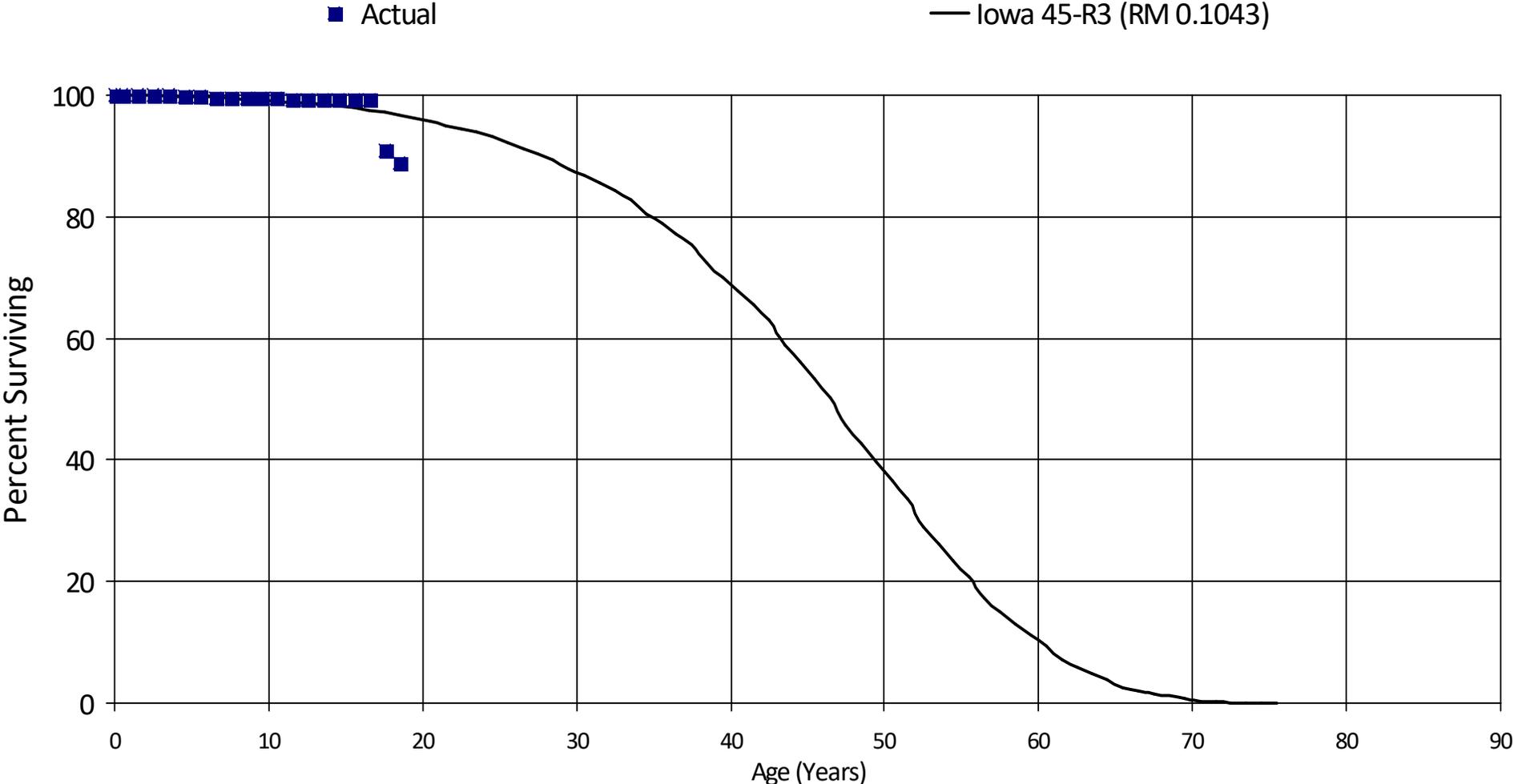
Age at Begin of Interval	Exposures at Beginning of Age Interval	Retirements During Age Interval	Retmt Ratio	Survivor Ratio	% Surviving
0	2,339,938	0	0.00000	1.00000	100.00
0.5	1,803,152	0	0.00000	1.00000	100.00
1.5	1,629,020	0	0.00000	1.00000	100.00
2.5	1,611,658	0	0.00000	1.00000	100.00
3.5	1,611,658	4,811	0.00299	0.99701	100.00
4.5	1,564,060	0	0.00000	1.00000	99.70
5.5	1,549,121	2,429	0.00157	0.99843	99.70
6.5	1,326,098	0	0.00000	1.00000	99.54
7.5	1,326,098	0	0.00000	1.00000	99.54
8.5	1,326,098	170	0.00013	0.99987	99.54
9.5	1,290,512	0	0.00000	1.00000	99.53
10.5	1,230,108	3,656	0.00297	0.99703	99.53
11.5	1,149,007	0	0.00000	1.00000	99.23
12.5	133,577	0	0.00000	1.00000	99.23
13.5	116,916	0	0.00000	1.00000	99.23
14.5	116,916	0	0.00000	1.00000	99.23
15.5	80,047	0	0.00000	1.00000	99.23
16.5	65,634	5,464	0.08325	0.91675	99.23
17.5	60,171	1,491	0.02478	0.97522	90.97
18.5	58,680	58,093	0.98999	0.01001	88.72
Totals:	20,388,470	76,114			

Missouri American Water

Account 35420 - Collection Plant - Structures and Improvements

Placement Band - 1951 - 2019 Experience Band - 2004 - 2019

Actual and Smooth Survivor Curves



Account 35430 - Pumping Plant - Structures and Improvements

RETIREMENT RATE ANALYSIS

Age at Begin of Interval	Exposures at Beginning of Age Interval	Retirements During Age Interval	Retmt Ratio	Survivor Ratio	% Surviving
0	404,782	0	0.00000	1.00000	100.00
0.5	323,403	0	0.00000	1.00000	100.00
1.5	275,329	0	0.00000	1.00000	100.00
2.5	168,331	0	0.00000	1.00000	100.00
3.5	168,331	0	0.00000	1.00000	100.00
4.5	168,331	0	0.00000	1.00000	100.00
5.5	168,331	0	0.00000	1.00000	100.00
6.5	147,680	0	0.00000	1.00000	100.00
7.5	147,680	0	0.00000	1.00000	100.00
8.5	147,680	0	0.00000	1.00000	100.00
9.5	26,707	0	0.00000	1.00000	100.00
10.5	26,707	0	0.00000	1.00000	100.00
11.5	24,605	0	0.00000	1.00000	100.00
12.5	8,309	0	0.00000	1.00000	100.00
13.5	8,309	0	0.00000	1.00000	100.00
14.5	6,224	0	0.00000	1.00000	100.00
15.5	6,224	0	0.00000	1.00000	100.00
16.5	6,224	0	0.00000	1.00000	100.00
17.5	6,224	0	0.00000	1.00000	100.00
18.5	6,224	0	0.00000	1.00000	100.00
19.5	6,224	0	0.00000	1.00000	100.00
20.5	6,224	0	0.00000	1.00000	100.00
21.5	6,224	0	0.00000	1.00000	100.00
22.5	6,224	0	0.00000	1.00000	100.00
23.5	6,224	0	0.00000	1.00000	100.00
24.5	6,224	0	0.00000	1.00000	100.00
25.5	6,224	0	0.00000	1.00000	100.00
26.5	6,224	0	0.00000	1.00000	100.00
27.5	6,224	0	0.00000	1.00000	100.00
28.5	6,224	0	0.00000	1.00000	100.00
29.5	6,224	0	0.00000	1.00000	100.00
30.5	6,224	0	0.00000	1.00000	100.00
31.5	6,224	0	0.00000	1.00000	100.00
32.5	6,224	0	0.00000	1.00000	100.00
33.5	6,224	0	0.00000	1.00000	100.00
34.5	6,224	0	0.00000	1.00000	100.00
35.5	6,224	0	0.00000	1.00000	100.00
36.5	6,224	0	0.00000	1.00000	100.00
37.5	6,224	0	0.00000	1.00000	100.00
38.5	6,224	0	0.00000	1.00000	100.00
39.5	6,224	0	0.00000	1.00000	100.00

Account 35430 - Pumping Plant - Structures and Improvements

RETIREMENT RATE ANALYSIS

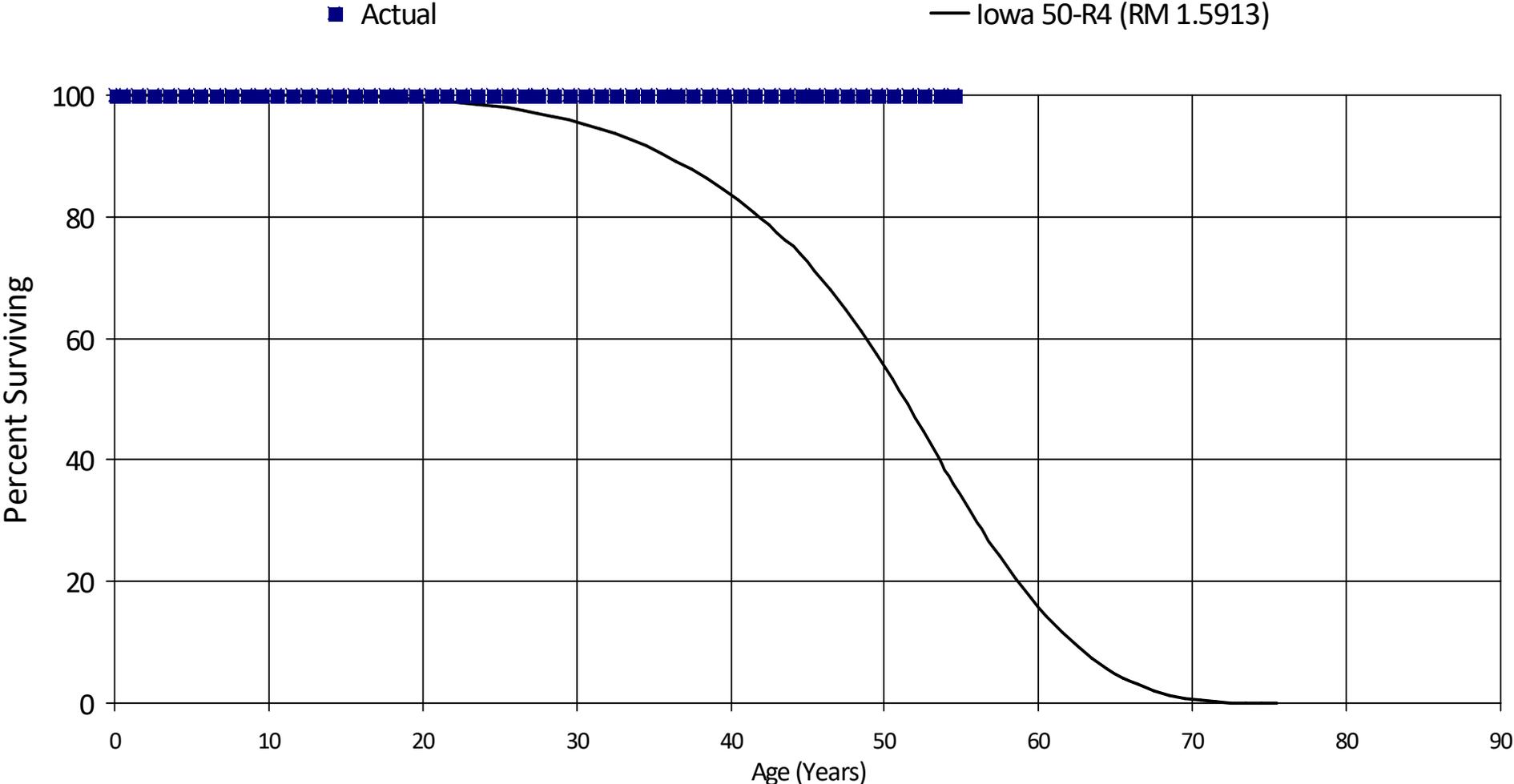
Age at Begin of Interval	Exposures at Beginning of Age Interval	Retirements During Age Interval	Retmt Ratio	Survivor Ratio	% Surviving
40.5	6,224	0	0.00000	1.00000	100.00
41.5	6,224	0	0.00000	1.00000	100.00
42.5	6,224	0	0.00000	1.00000	100.00
43.5	6,224	0	0.00000	1.00000	100.00
44.5	6,224	0	0.00000	1.00000	100.00
45.5	6,224	0	0.00000	1.00000	100.00
46.5	6,224	0	0.00000	1.00000	100.00
47.5	6,224	0	0.00000	1.00000	100.00
48.5	6,224	0	0.00000	1.00000	100.00
49.5	6,224	0	0.00000	1.00000	100.00
50.5	6,224	0	0.00000	1.00000	100.00
51.5	6,224	0	0.00000	1.00000	100.00
52.5	6,224	0	0.00000	1.00000	100.00
53.5	6,224	0	0.00000	1.00000	100.00
54.5	6,224	0	0.00000	1.00000	100.00
Totals:	2,469,694	0			

Missouri American Water

Account 35430 - Pumping Plant - Structures and Improvements

Placement Band - 1964 - 2019 Experience Band - 2019 - 2019

Actual and Smooth Survivor Curves



Account 35440 - Treatment and Disposal Plant - Structures and Improvements

RETIREMENT RATE ANALYSIS

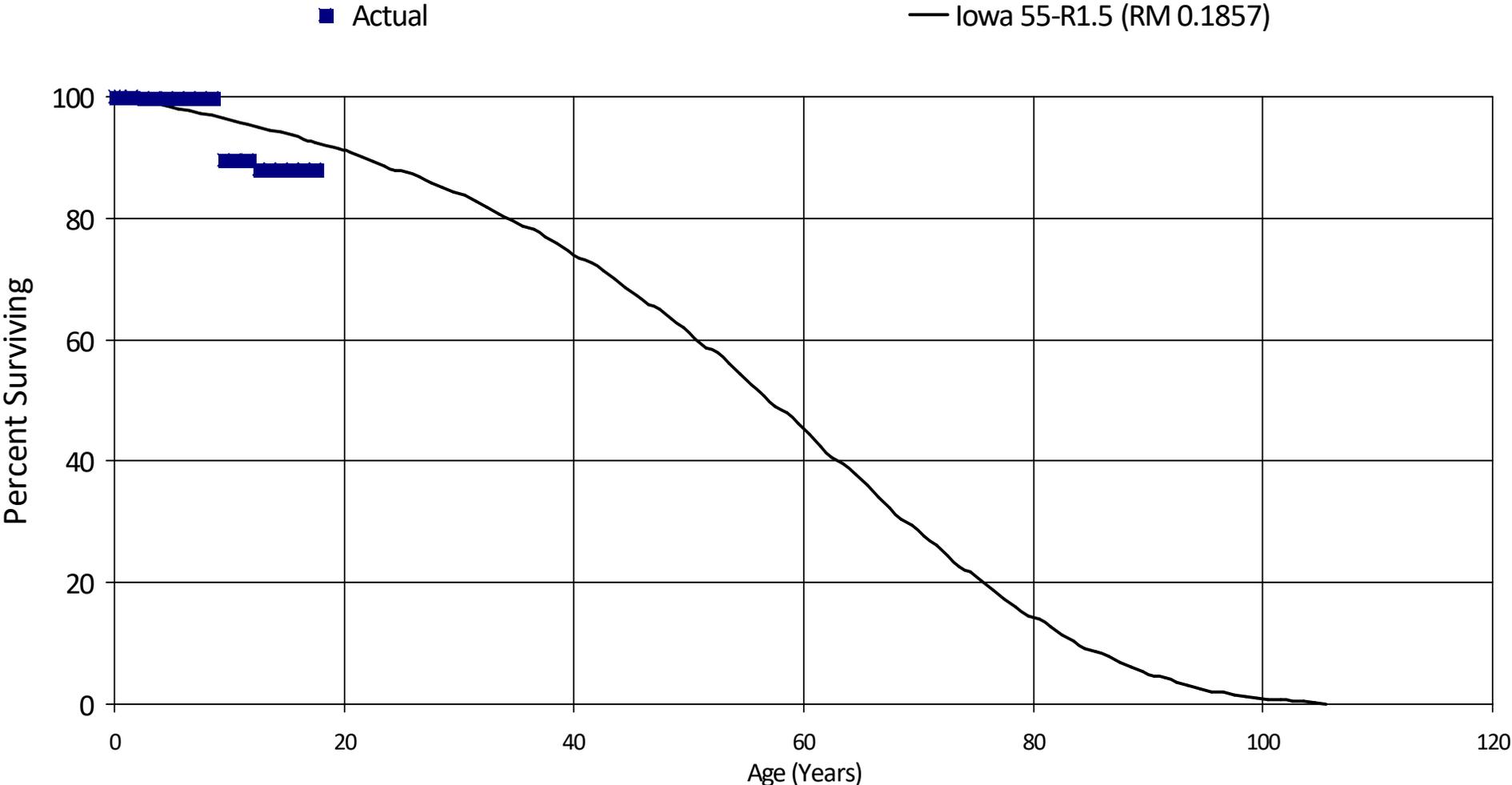
Age at Begin of Interval	Exposures at Beginning of Age Interval	Retirements During Age Interval	Retmt Ratio	Survivor Ratio	% Surviving
0	3,495,736	0	0.00000	1.00000	100.00
0.5	2,921,160	0	0.00000	1.00000	100.00
1.5	2,807,195	5,675	0.00202	0.99798	100.00
2.5	2,568,574	0	0.00000	1.00000	99.80
3.5	2,536,099	0	0.00000	1.00000	99.80
4.5	2,399,049	1,557	0.00065	0.99935	99.80
5.5	2,340,778	0	0.00000	1.00000	99.74
6.5	2,243,578	2,123	0.00095	0.99905	99.74
7.5	2,241,455	0	0.00000	1.00000	99.65
8.5	2,070,103	206,307	0.09966	0.90034	99.65
9.5	1,863,797	0	0.00000	1.00000	89.72
10.5	1,860,588	0	0.00000	1.00000	89.72
11.5	1,796,550	33,788	0.01881	0.98119	89.72
12.5	736,999	0	0.00000	1.00000	88.03
13.5	719,153	0	0.00000	1.00000	88.03
14.5	642,653	0	0.00000	1.00000	88.03
15.5	642,653	0	0.00000	1.00000	88.03
16.5	642,653	0	0.00000	1.00000	88.03
17.5	642,653	29,625	0.04610	0.95390	88.03
Totals:	35,171,426	279,075			

Missouri American Water

Account 35440 - Treatment and Disposal Plant - Structures and Improvements

Placement Band - 2001 - 2019 Experience Band - 2007 - 2019

Actual and Smooth Survivor Curves



Account 35450 - General Plant - Structures and Improvements

RETIREMENT RATE ANALYSIS

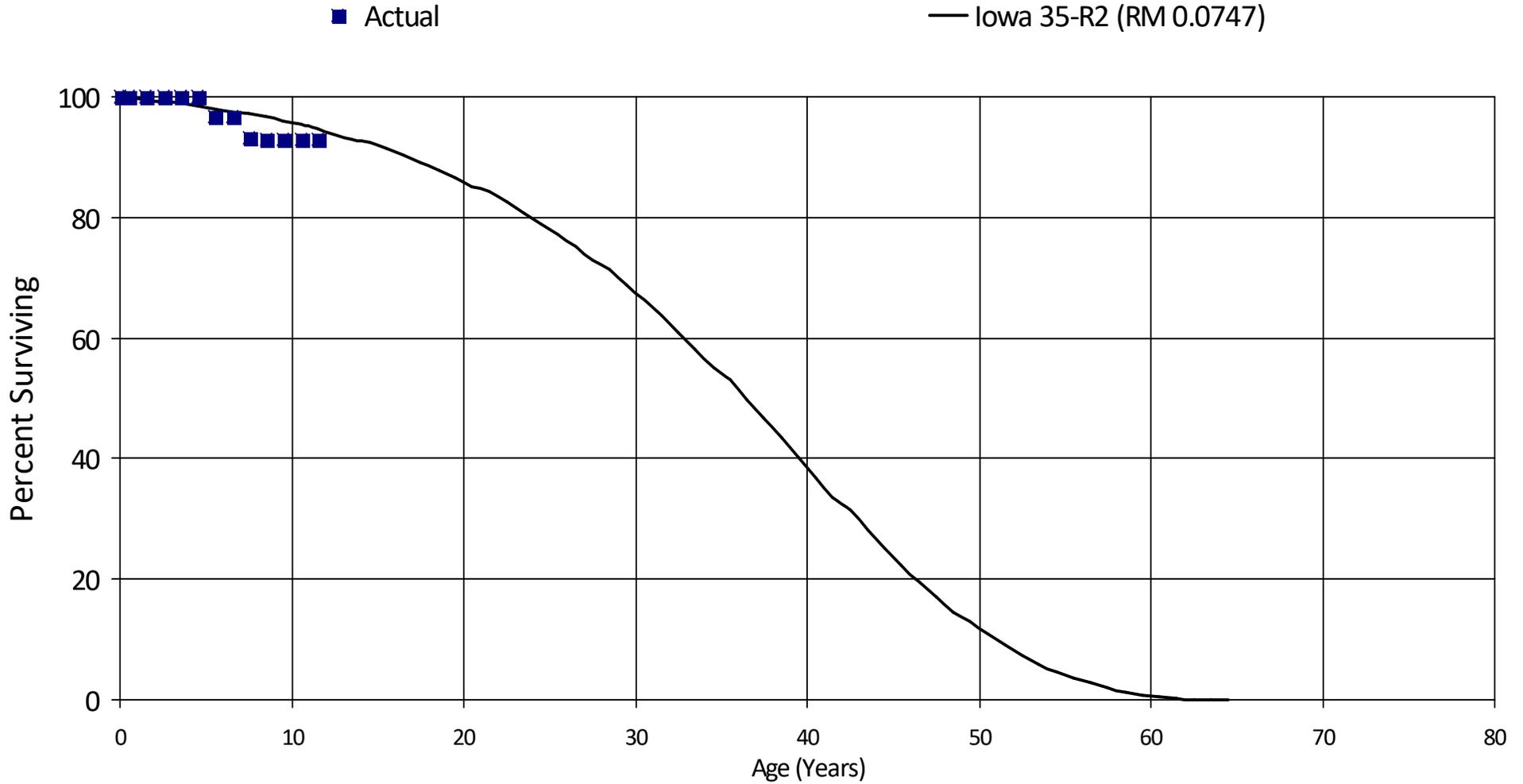
Age at Begin of Interval	Exposures at Beginning of Age Interval	Retirements During Age Interval	Retmt Ratio	Survivor Ratio	% Surviving
0	1,259,271	0	0.00000	1.00000	100.00
0.5	990,944	0	0.00000	1.00000	100.00
1.5	861,810	0	0.00000	1.00000	100.00
2.5	459,785	0	0.00000	1.00000	100.00
3.5	459,785	0	0.00000	1.00000	100.00
4.5	424,740	13,950	0.03284	0.96716	100.00
5.5	369,729	0	0.00000	1.00000	96.72
6.5	369,729	13,986	0.03783	0.96217	96.72
7.5	355,743	576	0.00162	0.99838	93.06
8.5	158,676	0	0.00000	1.00000	92.91
9.5	158,676	0	0.00000	1.00000	92.91
10.5	146,637	0	0.00000	1.00000	92.91
11.5	132,527	0	0.00000	1.00000	92.91
Totals:	6,148,050	28,512			

Missouri American Water

Account 35450 - General Plant - Structures and Improvements

Placement Band - 2007 - 2019 Experience Band - 2008 - 2019

Actual and Smooth Survivor Curves



Missouri American Water

Account 35500 - Collection Plant - Power Generating Equipment

RETIREMENT RATE ANALYSIS

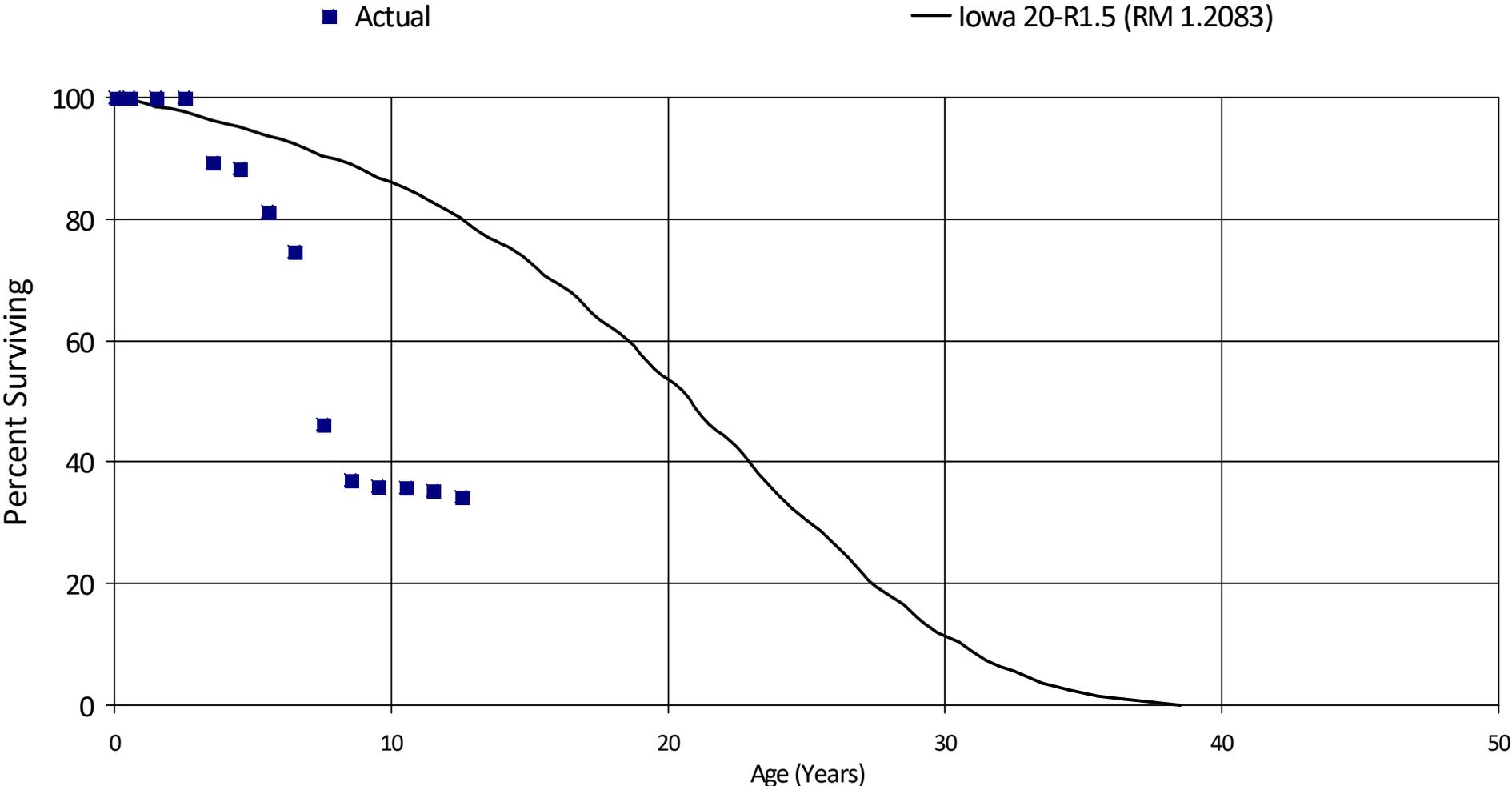
Age at Begin of Interval	Exposures at Beginning of Age Interval	Retirements During Age Interval	Retmt Ratio	Survivor Ratio	% Surviving
0	815,251	0	0.00000	1.00000	100.00
0.5	673,011	0	0.00000	1.00000	100.00
1.5	534,004	0	0.00000	1.00000	100.00
2.5	375,474	40,449	0.10773	0.89227	100.00
3.5	335,025	3,492	0.01042	0.98958	89.23
4.5	317,519	25,429	0.08009	0.91991	88.30
5.5	286,286	23,315	0.08144	0.91856	81.23
6.5	262,971	99,828	0.37962	0.62038	74.61
7.5	163,143	32,616	0.19992	0.80008	46.29
8.5	129,487	3,821	0.02951	0.97049	37.04
9.5	84,353	583	0.00691	0.99309	35.95
10.5	80,379	899	0.01118	0.98882	35.70
11.5	76,459	2,000	0.02616	0.97384	35.30
12.5	13,063	11,871	0.90876	0.09124	34.38
Totals:	4,146,425	244,303			

Missouri American Water

Account 35500 - Collection Plant - Power Generating Equipment

Placement Band - 1967 - 2019 Experience Band - 2007 - 2019

Actual and Smooth Survivor Curves



Missouri American Water

Account 36000 - Collection Plant - Sewers

RETIREMENT RATE ANALYSIS

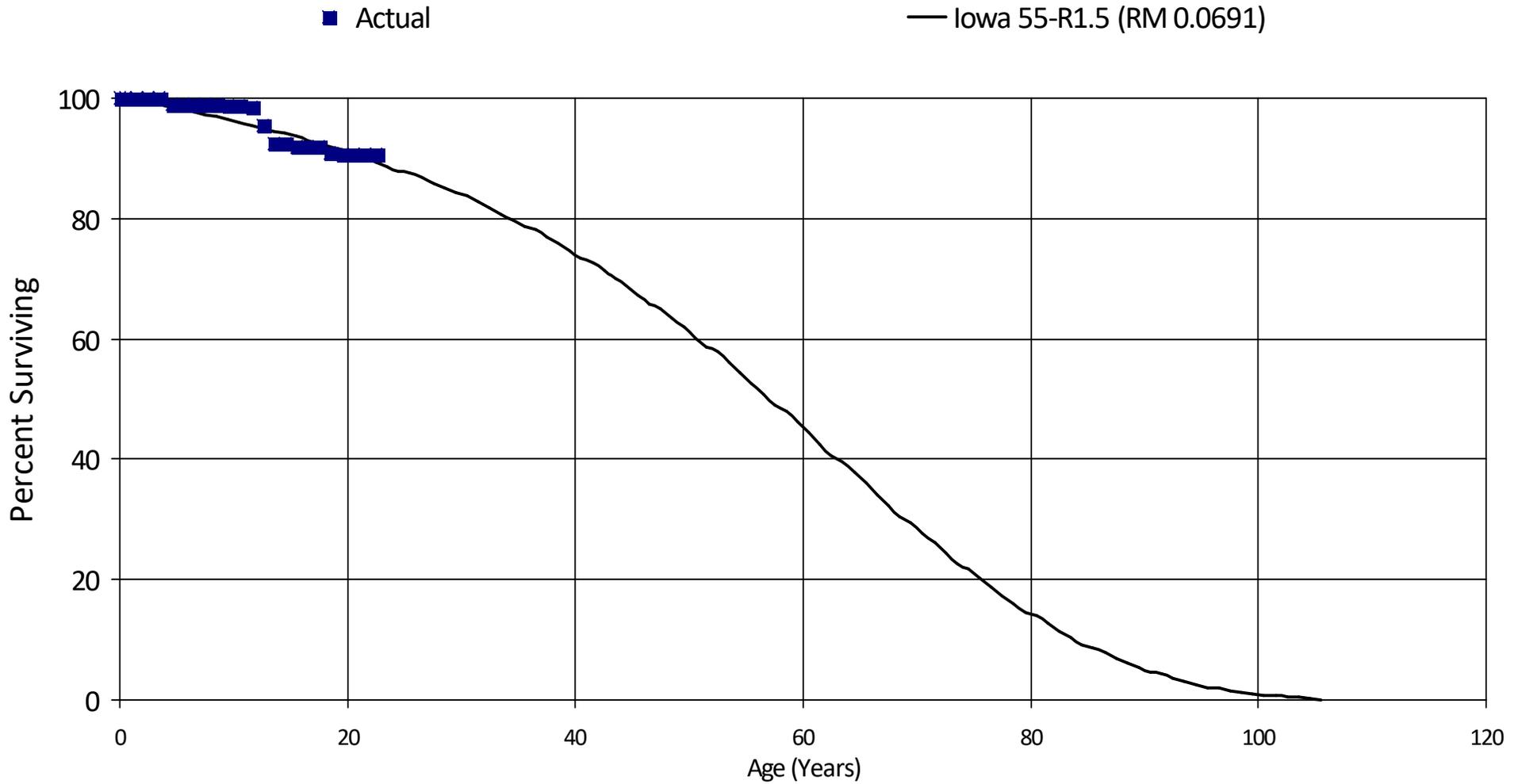
Age at Begin of Interval	Exposures at Beginning of Age Interval	Retirements During Age Interval	Retmt Ratio	Survivor Ratio	% Surviving
0	4,949,621	2,529	0.00051	0.99949	100.00
0.5	4,612,562	0	0.00000	1.00000	99.95
1.5	4,544,968	0	0.00000	1.00000	99.95
2.5	4,459,761	0	0.00000	1.00000	99.95
3.5	4,455,547	38,559	0.00865	0.99135	99.95
4.5	4,407,481	0	0.00000	1.00000	99.09
5.5	4,407,388	7,848	0.00178	0.99822	99.09
6.5	4,097,974	1,008	0.00025	0.99975	98.91
7.5	4,094,715	228	0.00006	0.99994	98.89
8.5	4,093,735	3,956	0.00097	0.99903	98.88
9.5	4,028,392	5,696	0.00141	0.99859	98.78
10.5	4,021,815	10,747	0.00267	0.99733	98.64
11.5	3,992,414	115,565	0.02895	0.97105	98.38
12.5	3,523,636	111,431	0.03162	0.96838	95.53
13.5	2,346,190	5,055	0.00215	0.99785	92.51
14.5	1,546,750	7,762	0.00502	0.99498	92.31
15.5	1,538,988	0	0.00000	1.00000	91.85
16.5	350,225	0	0.00000	1.00000	91.85
17.5	350,225	4,229	0.01208	0.98792	91.85
18.5	345,996	474	0.00137	0.99863	90.74
19.5	345,522	0	0.00000	1.00000	90.62
20.5	345,522	0	0.00000	1.00000	90.62
21.5	345,522	0	0.00000	1.00000	90.62
22.5	345,522	12,862	0.03722	0.96278	90.62
Totals:	67,550,467	327,949			

Missouri American Water

Account 36000 - Collection Plant - Sewers

Placement Band - 1975 - 2019 Experience Band - 2004 - 2019

Actual and Smooth Survivor Curves



Missouri American Water

Account 36100 - Collection Plant - Collecting Mains

RETIREMENT RATE ANALYSIS

Age at Begin of Interval	Exposures at Beginning of Age Interval	Retirements During Age Interval	Retmt Ratio	Survivor Ratio	% Surviving
0	10,652,041	43,124	0.00405	0.99595	100.00
0.5	9,115,970	3,230	0.00035	0.99965	99.60
1.5	6,997,351	1,407	0.00020	0.99980	99.57
2.5	4,269,131	15,301	0.00358	0.99642	99.55
3.5	3,681,060	0	0.00000	1.00000	99.19
4.5	3,330,758	6,827	0.00205	0.99795	99.19
5.5	3,302,452	66,892	0.02026	0.97974	98.99
6.5	2,725,384	0	0.00000	1.00000	96.98
7.5	2,592,274	50,476	0.01947	0.98053	96.98
8.5	2,446,537	407	0.00017	0.99983	95.09
9.5	2,224,779	0	0.00000	1.00000	95.07
10.5	2,216,060	41	0.00002	0.99998	95.07
11.5	2,212,954	3,285	0.00148	0.99852	95.07
12.5	1,836,552	0	0.00000	1.00000	94.93
13.5	1,759,189	0	0.00000	1.00000	94.93
14.5	1,467,042	608	0.00041	0.99959	94.93
15.5	1,136,627	0	0.00000	1.00000	94.89
16.5	905,713	0	0.00000	1.00000	94.89
17.5	905,713	0	0.00000	1.00000	94.89
18.5	825,068	0	0.00000	1.00000	94.89
19.5	825,068	0	0.00000	1.00000	94.89
20.5	676,817	0	0.00000	1.00000	94.89
21.5	636,160	0	0.00000	1.00000	94.89
22.5	636,160	15,640	0.02459	0.97541	94.89
23.5	620,520	0	0.00000	1.00000	92.56
24.5	619,237	0	0.00000	1.00000	92.56
25.5	619,237	0	0.00000	1.00000	92.56
26.5	619,237	0	0.00000	1.00000	92.56
27.5	619,237	0	0.00000	1.00000	92.56
28.5	619,237	1,296	0.00209	0.99791	92.56
29.5	615,411	0	0.00000	1.00000	92.37
30.5	615,411	0	0.00000	1.00000	92.37
31.5	615,411	0	0.00000	1.00000	92.37
32.5	594,875	0	0.00000	1.00000	92.37
33.5	547,209	0	0.00000	1.00000	92.37
34.5	507,601	0	0.00000	1.00000	92.37
35.5	494,594	7	0.00001	0.99999	92.37
36.5	494,587	107,770	0.21790	0.78210	92.37
37.5	384,673	29,152	0.07578	0.92422	72.24
38.5	355,521	24,662	0.06937	0.93063	66.77
39.5	289,483	0	0.00000	1.00000	62.14

Missouri American Water

Account 36100 - Collection Plant - Collecting Mains

RETIREMENT RATE ANALYSIS

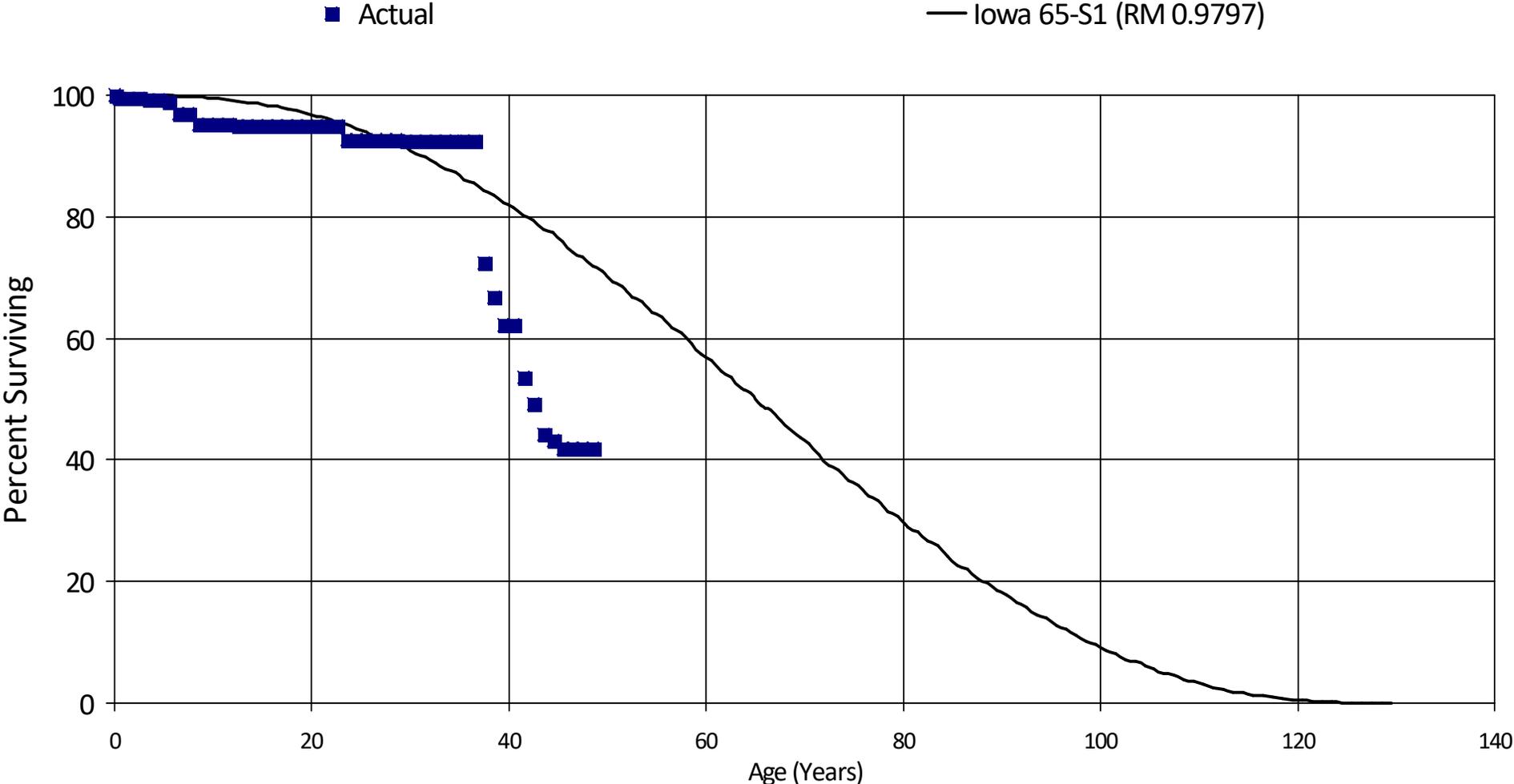
Age at Begin of Interval	Exposures at Beginning of Age Interval	Retirements During Age Interval	Retmt Ratio	Survivor Ratio	% Surviving
40.5	265,539	37,109	0.13975	0.86025	62.14
41.5	228,430	17,940	0.07854	0.92146	53.46
42.5	210,490	21,859	0.10385	0.89615	49.26
43.5	176,675	3,801	0.02151	0.97849	44.14
44.5	170,285	4,832	0.02838	0.97162	43.19
45.5	165,452	16	0.00010	0.99990	41.96
46.5	149,645	708	0.00473	0.99527	41.96
47.5	148,937	0	0.00000	1.00000	41.76
48.5	148,937	53,092	0.35647	0.64353	41.76
Totals:	78,272,729	509,482			

Missouri American Water

Account 36100 - Collection Plant - Collecting Mains

Placement Band - 1951 - 2019 Experience Band - 1951 - 2019

Actual and Smooth Survivor Curves



Missouri American Water

Account 36300 - Collection Plant - Services

RETIREMENT RATE ANALYSIS

Age at Begin of Interval	Exposures at Beginning of Age Interval	Retirements During Age Interval	Retmt Ratio	Survivor Ratio	% Surviving
0	2,136,412	1	0.00000	1.00000	100.00
0.5	1,792,676	3,080	0.00172	0.99828	100.00
1.5	978,786	33,887	0.03462	0.96538	99.83
2.5	634,887	14,867	0.02342	0.97658	96.37
3.5	370,387	2,131	0.00575	0.99425	94.11
4.5	305,678	0	0.00000	1.00000	93.57
5.5	305,678	0	0.00000	1.00000	93.57
6.5	296,767	116,845	0.39373	0.60627	93.57
7.5	179,922	0	0.00000	1.00000	56.73
8.5	179,922	0	0.00000	1.00000	56.73
9.5	179,922	0	0.00000	1.00000	56.73
10.5	177,865	0	0.00000	1.00000	56.73
11.5	174,129	0	0.00000	1.00000	56.73
12.5	171,506	0	0.00000	1.00000	56.73
13.5	171,506	0	0.00000	1.00000	56.73
14.5	171,506	0	0.00000	1.00000	56.73
15.5	171,506	0	0.00000	1.00000	56.73
16.5	171,506	0	0.00000	1.00000	56.73
17.5	171,506	0	0.00000	1.00000	56.73
18.5	171,506	0	0.00000	1.00000	56.73
19.5	171,506	0	0.00000	1.00000	56.73
20.5	49,428	0	0.00000	1.00000	56.73
21.5	49,428	0	0.00000	1.00000	56.73
22.5	49,428	0	0.00000	1.00000	56.73
23.5	49,428	0	0.00000	1.00000	56.73
24.5	49,428	0	0.00000	1.00000	56.73
25.5	49,428	0	0.00000	1.00000	56.73
26.5	43,947	0	0.00000	1.00000	56.73
27.5	43,947	0	0.00000	1.00000	56.73
28.5	43,947	0	0.00000	1.00000	56.73
29.5	43,947	193	0.00439	0.99561	56.73
30.5	43,753	0	0.00000	1.00000	56.48
31.5	43,753	0	0.00000	1.00000	56.48
32.5	43,753	0	0.00000	1.00000	56.48
33.5	43,753	0	0.00000	1.00000	56.48
34.5	43,753	0	0.00000	1.00000	56.48
35.5	43,753	0	0.00000	1.00000	56.48
36.5	32,843	0	0.00000	1.00000	56.48
37.5	32,843	0	0.00000	1.00000	56.48
38.5	32,843	0	0.00000	1.00000	56.48
39.5	32,843	0	0.00000	1.00000	56.48

Missouri American Water

Account 36300 - Collection Plant - Services

RETIREMENT RATE ANALYSIS

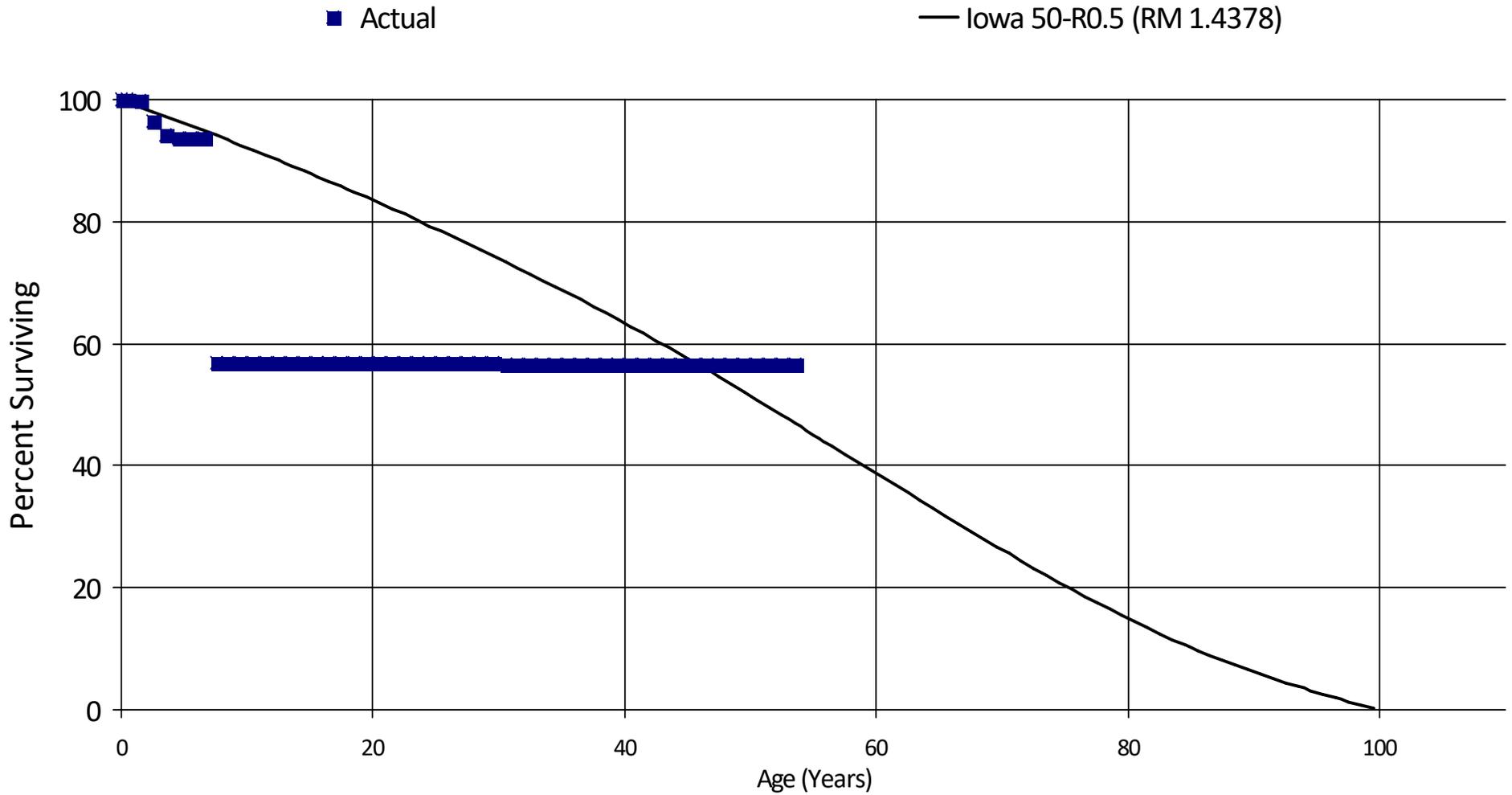
Age at Begin of Interval	Exposures at Beginning of Age Interval	Retirements During Age Interval	Retmt Ratio	Survivor Ratio	% Surviving
40.5	32,843	0	0.00000	1.00000	56.48
41.5	17,623	0	0.00000	1.00000	56.48
42.5	17,623	0	0.00000	1.00000	56.48
43.5	17,623	0	0.00000	1.00000	56.48
44.5	17,623	0	0.00000	1.00000	56.48
45.5	17,623	0	0.00000	1.00000	56.48
46.5	7,951	0	0.00000	1.00000	56.48
47.5	7,951	0	0.00000	1.00000	56.48
48.5	7,951	0	0.00000	1.00000	56.48
49.5	7,951	0	0.00000	1.00000	56.48
50.5	7,951	0	0.00000	1.00000	56.48
51.5	7,951	0	0.00000	1.00000	56.48
52.5	7,951	0	0.00000	1.00000	56.48
53.5	7,951	0	0.00000	1.00000	56.48
Totals:	10,135,896	171,004			

Missouri American Water

Account 36300 - Collection Plant - Services

Placement Band - 1965 - 2019 Experience Band - 1965 - 2019

Actual and Smooth Survivor Curves



Missouri American Water

Account 36400 - Collection Plant - Flow Measuring Devices

RETIREMENT RATE ANALYSIS

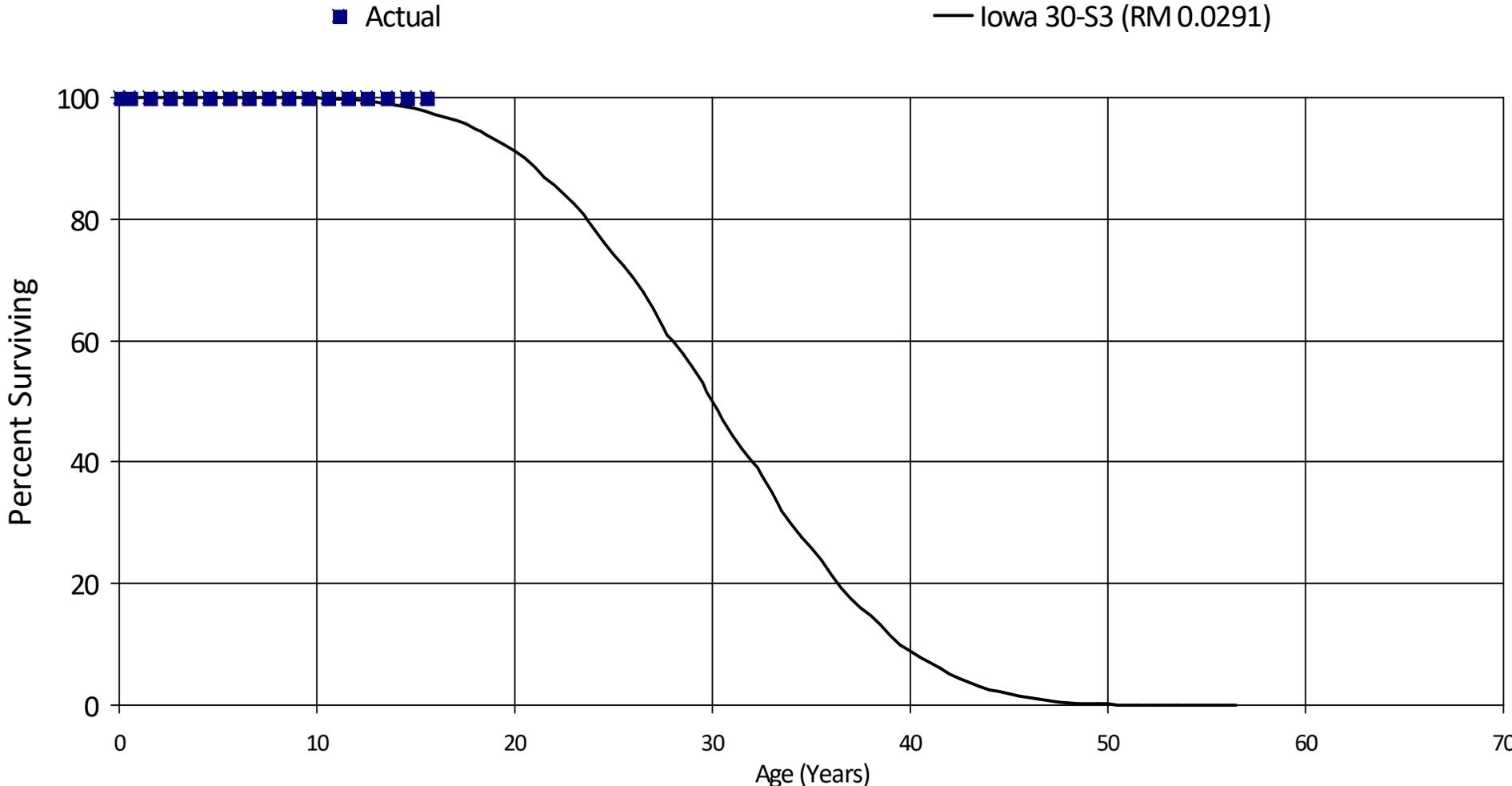
Age at Begin of Interval	Exposures at Beginning of Age Interval	Retirements During Age Interval	Retmt Ratio	Survivor Ratio	% Surviving
0	514,297	0	0.00000	1.00000	100.00
0.5	514,297	0	0.00000	1.00000	100.00
1.5	514,297	0	0.00000	1.00000	100.00
2.5	514,297	0	0.00000	1.00000	100.00
3.5	514,297	0	0.00000	1.00000	100.00
4.5	514,297	0	0.00000	1.00000	100.00
5.5	514,297	0	0.00000	1.00000	100.00
6.5	514,297	0	0.00000	1.00000	100.00
7.5	514,297	0	0.00000	1.00000	100.00
8.5	514,297	0	0.00000	1.00000	100.00
9.5	514,297	0	0.00000	1.00000	100.00
10.5	514,297	0	0.00000	1.00000	100.00
11.5	514,297	0	0.00000	1.00000	100.00
12.5	204,435	0	0.00000	1.00000	100.00
13.5	204,435	0	0.00000	1.00000	100.00
14.5	194,575	0	0.00000	1.00000	100.00
15.5	194,575	0	0.00000	1.00000	100.00
Totals:	7,483,877	0			

Missouri American Water

Account 36400 - Collection Plant - Flow Measuring Devices

Placement Band - 2003 - 2019 Experience Band - 2019 - 2019

Actual and Smooth Survivor Curves



Missouri American Water

Account 37000 - Pumping Plant - Receiving Wells

RETIREMENT RATE ANALYSIS

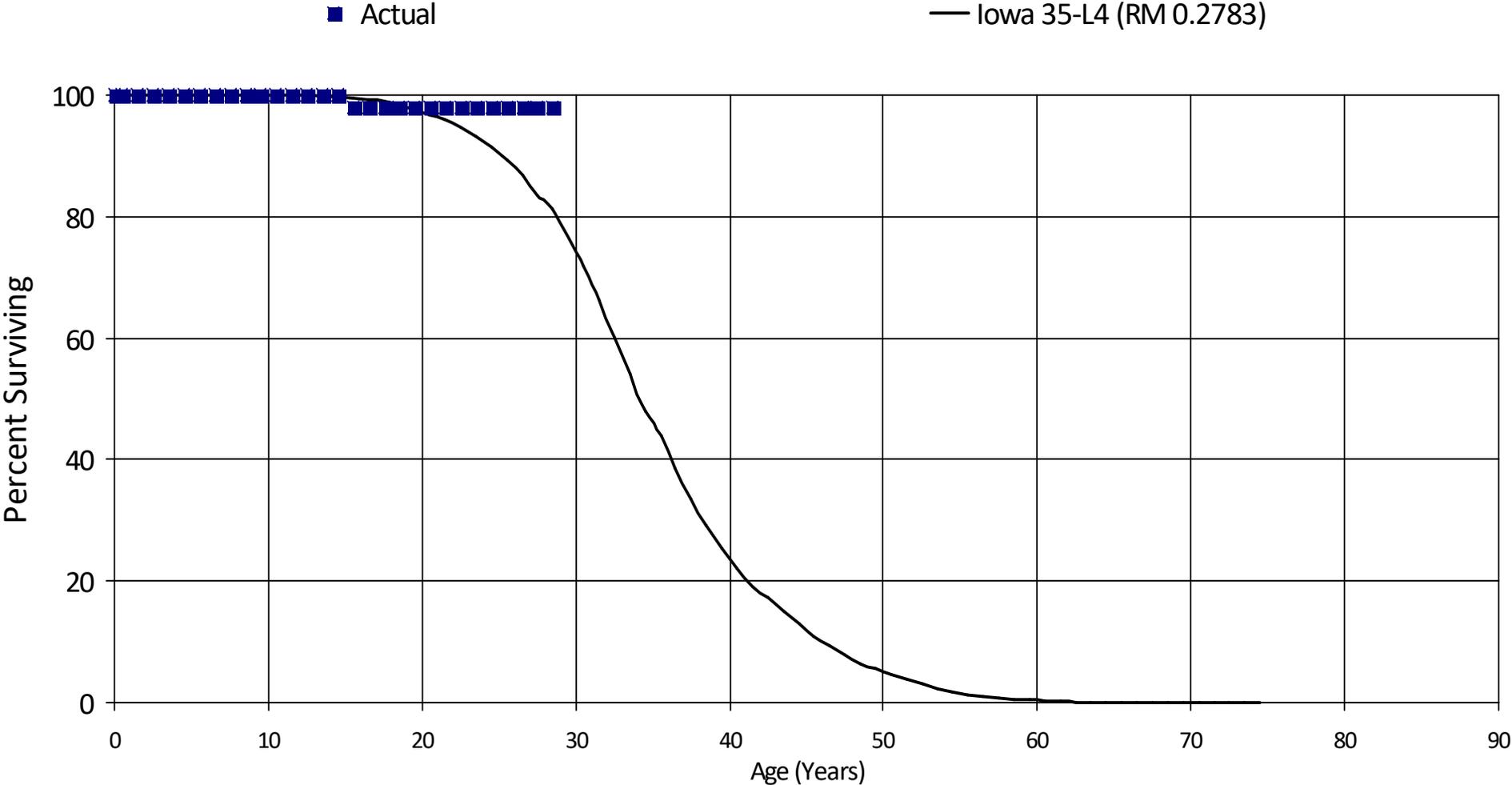
Age at Begin of Interval	Exposures at Beginning of Age Interval	Retirements During Age Interval	Retmt Ratio	Survivor Ratio	% Surviving
0	283,954	0	0.00000	1.00000	100.00
0.5	282,305	0	0.00000	1.00000	100.00
1.5	282,305	0	0.00000	1.00000	100.00
2.5	281,494	0	0.00000	1.00000	100.00
3.5	281,494	0	0.00000	1.00000	100.00
4.5	281,494	0	0.00000	1.00000	100.00
5.5	281,494	0	0.00000	1.00000	100.00
6.5	173,765	0	0.00000	1.00000	100.00
7.5	173,765	0	0.00000	1.00000	100.00
8.5	173,765	0	0.00000	1.00000	100.00
9.5	173,765	0	0.00000	1.00000	100.00
10.5	173,765	0	0.00000	1.00000	100.00
11.5	173,765	0	0.00000	1.00000	100.00
12.5	153,297	0	0.00000	1.00000	100.00
13.5	153,297	0	0.00000	1.00000	100.00
14.5	150,427	3,159	0.02100	0.97900	100.00
15.5	147,268	0	0.00000	1.00000	97.90
16.5	57,226	0	0.00000	1.00000	97.90
17.5	57,226	0	0.00000	1.00000	97.90
18.5	57,226	0	0.00000	1.00000	97.90
19.5	52,480	0	0.00000	1.00000	97.90
20.5	52,480	0	0.00000	1.00000	97.90
21.5	52,480	0	0.00000	1.00000	97.90
22.5	52,480	0	0.00000	1.00000	97.90
23.5	52,480	0	0.00000	1.00000	97.90
24.5	52,480	0	0.00000	1.00000	97.90
25.5	52,480	0	0.00000	1.00000	97.90
26.5	52,480	0	0.00000	1.00000	97.90
27.5	52,480	0	0.00000	1.00000	97.90
28.5	52,480	0	0.00000	1.00000	97.90
Totals:	4,317,900	3,159			

Missouri American Water

Account 37000 - Pumping Plant - Receiving Wells

Placement Band - 1990 - 2019 Experience Band - 2011 - 2019

Actual and Smooth Survivor Curves



Missouri American Water
Account 37100 - Pumping Equipment

RETIREMENT RATE ANALYSIS

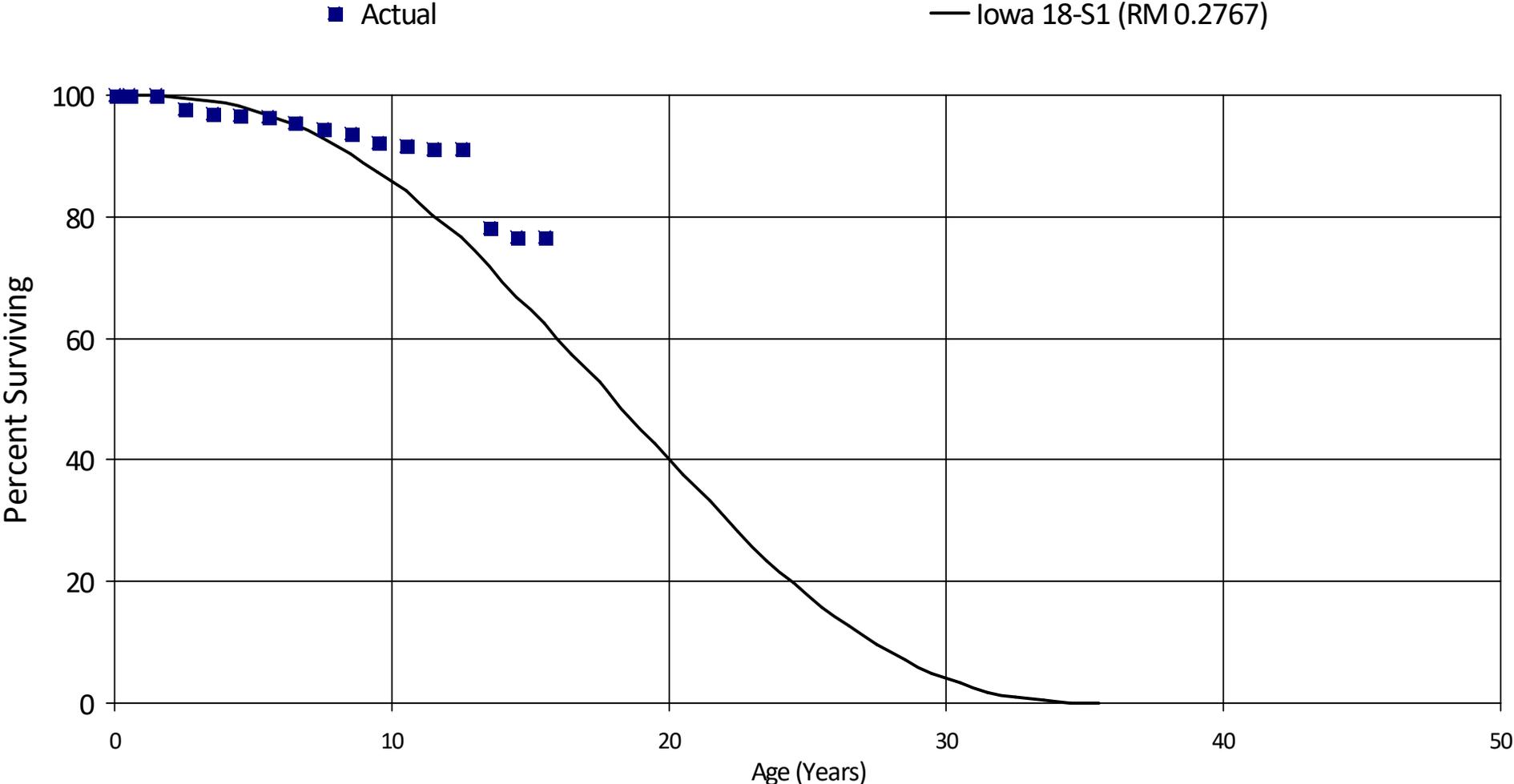
Age at Begin of Interval	Exposures at Beginning of Age Interval	Retirements During Age Interval	Retmt Ratio	Survivor Ratio	% Surviving
0	4,307,231	0	0.00000	1.00000	100.00
0.5	3,296,002	687	0.00021	0.99979	100.00
1.5	2,753,867	59,494	0.02160	0.97840	99.98
2.5	2,453,520	20,624	0.00841	0.99159	97.82
3.5	2,432,896	8,195	0.00337	0.99663	97.00
4.5	2,387,446	8,219	0.00344	0.99656	96.67
5.5	2,351,934	21,148	0.00899	0.99101	96.34
6.5	2,129,698	21,368	0.01003	0.98997	95.47
7.5	2,099,920	18,889	0.00900	0.99100	94.51
8.5	2,070,983	35,834	0.01730	0.98270	93.66
9.5	1,894,908	10,801	0.00570	0.99430	92.04
10.5	1,653,278	7,936	0.00480	0.99520	91.52
11.5	1,167,223	412	0.00035	0.99965	91.08
12.5	153,236	21,830	0.14246	0.85754	91.05
13.5	79,520	1,368	0.01720	0.98280	78.08
14.5	76,153	0	0.00000	1.00000	76.74
15.5	62,803	3,000	0.04777	0.95223	76.74
Totals:	31,370,617	239,805			

Missouri American Water

Account 37100 - Pumping Equipment

Placement Band - 1981 - 2019 Experience Band - 2004 - 2019

Actual and Smooth Survivor Curves



Missouri American Water
Account 38000 - Treatment Equipment

RETIREMENT RATE ANALYSIS

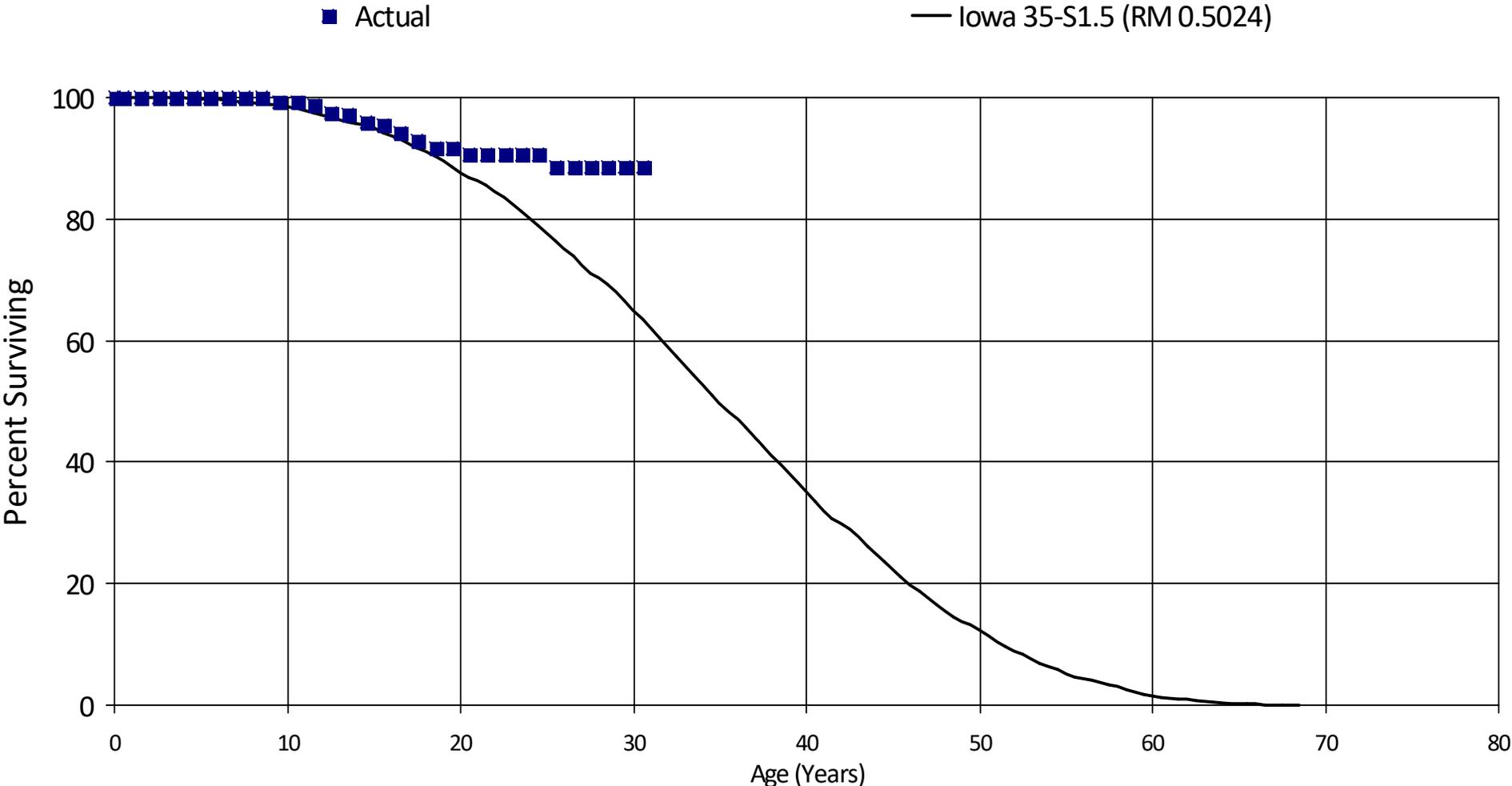
Age at Begin of Interval	Exposures at Beginning of Age Interval	Retirements During Age Interval	Retmt Ratio	Survivor Ratio	% Surviving
0	6,957,840	0	0.00000	1.00000	100.00
0.5	6,383,468	0	0.00000	1.00000	100.00
1.5	6,131,100	0	0.00000	1.00000	100.00
2.5	5,543,235	0	0.00000	1.00000	100.00
3.5	5,536,323	901	0.00016	0.99984	100.00
4.5	5,535,421	0	0.00000	1.00000	99.98
5.5	5,409,863	2,014	0.00037	0.99963	99.98
6.5	4,894,762	1,617	0.00033	0.99967	99.94
7.5	4,872,132	99	0.00002	0.99998	99.91
8.5	3,909,068	21,522	0.00551	0.99449	99.91
9.5	3,885,921	3,882	0.00100	0.99900	99.36
10.5	3,882,039	20,403	0.00526	0.99474	99.26
11.5	3,861,353	50,605	0.01311	0.98689	98.74
12.5	1,422,503	2,434	0.00171	0.99829	97.45
13.5	836,173	11,146	0.01333	0.98667	97.28
14.5	825,026	5,502	0.00667	0.99333	95.98
15.5	381,749	4,944	0.01295	0.98705	95.34
16.5	284,329	3,600	0.01266	0.98734	94.11
17.5	280,728	3,959	0.01410	0.98590	92.92
18.5	276,770	0	0.00000	1.00000	91.61
19.5	251,804	2,500	0.00993	0.99007	91.61
20.5	249,304	0	0.00000	1.00000	90.70
21.5	249,304	0	0.00000	1.00000	90.70
22.5	249,304	0	0.00000	1.00000	90.70
23.5	249,304	0	0.00000	1.00000	90.70
24.5	242,684	5,528	0.02278	0.97722	90.70
25.5	237,155	0	0.00000	1.00000	88.63
26.5	237,155	0	0.00000	1.00000	88.63
27.5	237,155	0	0.00000	1.00000	88.63
28.5	237,155	0	0.00000	1.00000	88.63
29.5	52,519	0	0.00000	1.00000	88.63
30.5	52,178	3,195	0.06123	0.93877	88.63
Totals:	73,654,824	143,851			

Missouri American Water

Account 38000 - Treatment Equipment

Placement Band - 1984 - 2019 Experience Band - 2004 - 2019

Actual and Smooth Survivor Curves



Missouri American Water

Account 38100 - Treatment and Disposal - Plant Sewers

RETIREMENT RATE ANALYSIS

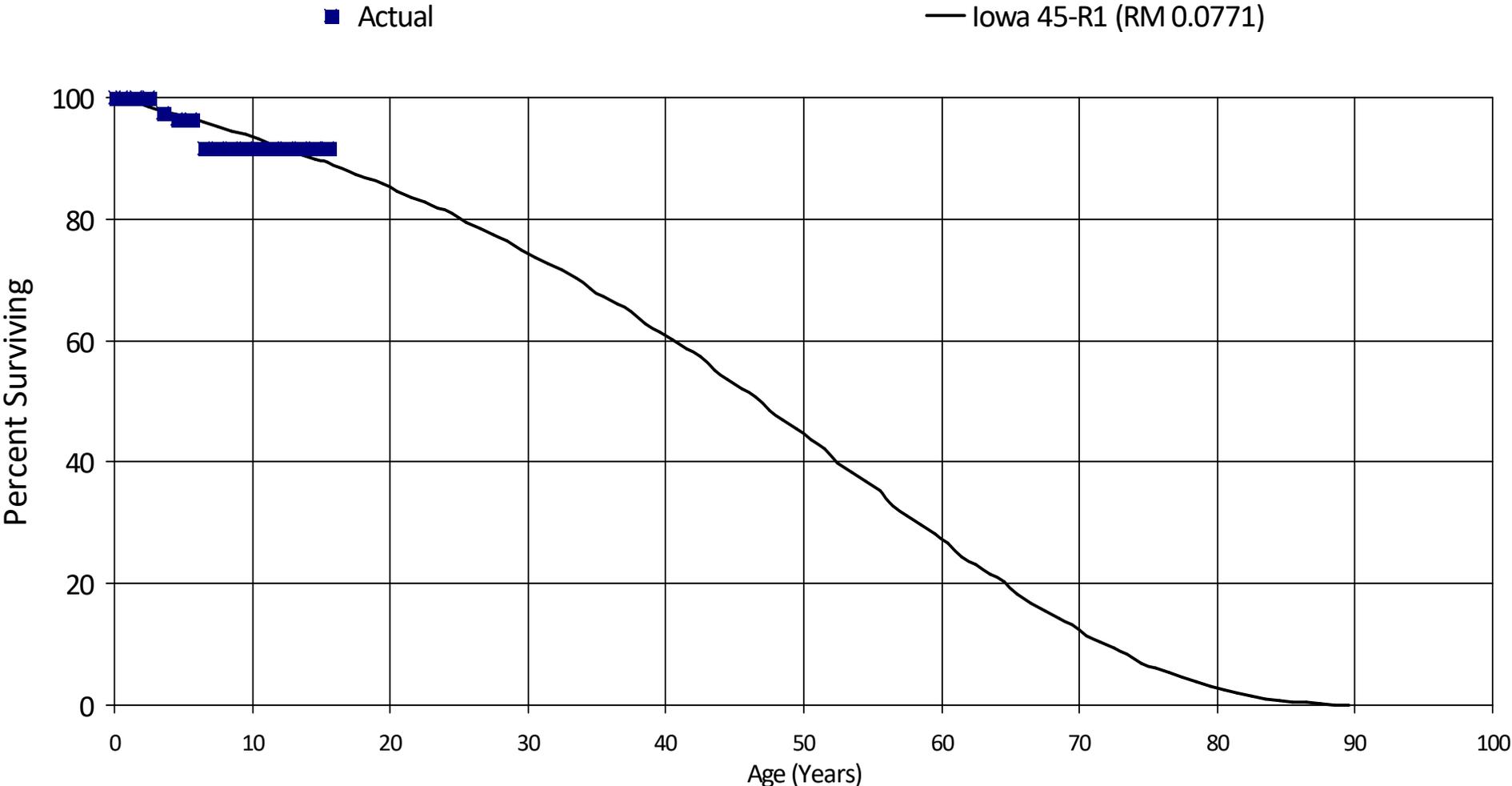
Age at Begin of Interval	Exposures at Beginning of Age Interval	Retirements During Age Interval	Retmt Ratio	Survivor Ratio	% Surviving
0	1,308,395	0	0.00000	1.00000	100.00
0.5	1,037,315	0	0.00000	1.00000	100.00
1.5	1,002,135	0	0.00000	1.00000	100.00
2.5	846,012	21,781	0.02575	0.97425	100.00
3.5	824,101	7,251	0.00880	0.99120	97.42
4.5	664,930	0	0.00000	1.00000	96.56
5.5	658,701	33,182	0.05037	0.94963	96.56
6.5	625,518	6	0.00001	0.99999	91.70
7.5	625,513	0	0.00000	1.00000	91.70
8.5	618,747	0	0.00000	1.00000	91.70
9.5	609,214	0	0.00000	1.00000	91.70
10.5	607,686	0	0.00000	1.00000	91.70
11.5	604,851	0	0.00000	1.00000	91.70
12.5	435,031	0	0.00000	1.00000	91.70
13.5	435,031	0	0.00000	1.00000	91.70
14.5	435,031	0	0.00000	1.00000	91.70
15.5	435,031	0	0.00000	1.00000	91.70
Totals:	11,773,241	62,220			

Missouri American Water

Account 38100 - Treatment and Disposal - Plant Sewers

Placement Band - 2003 - 2019 Experience Band - 2007 - 2019

Actual and Smooth Survivor Curves



Account 38200 - Treatment and Disposal - Outfall Sewer Line

RETIREMENT RATE ANALYSIS

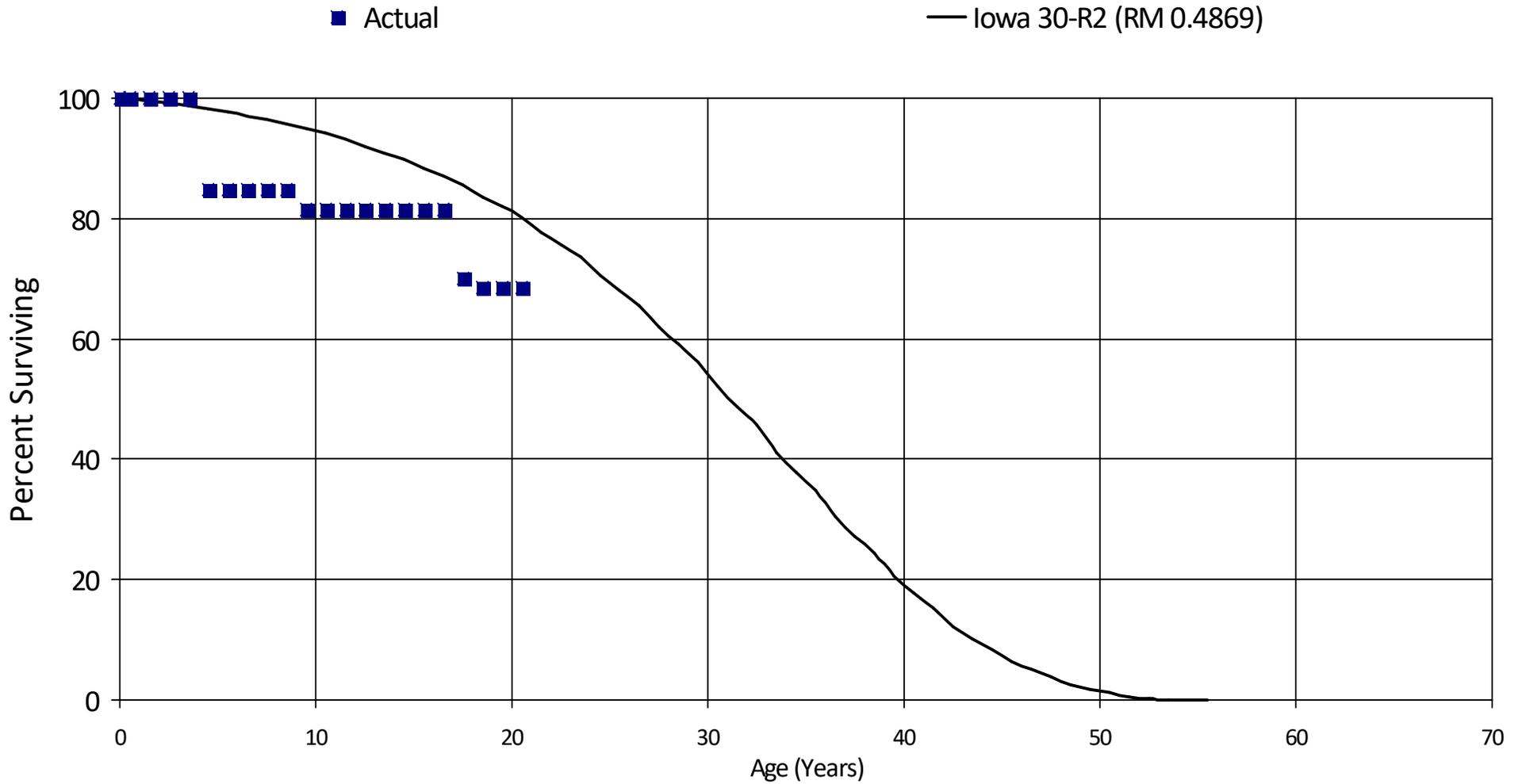
Age at Begin of Interval	Exposures at Beginning of Age Interval	Retirements During Age Interval	Retmt Ratio	Survivor Ratio	% Surviving
0	269,228	0	0.00000	1.00000	100.00
0.5	269,228	0	0.00000	1.00000	100.00
1.5	218,808	0	0.00000	1.00000	100.00
2.5	209,808	0	0.00000	1.00000	100.00
3.5	209,808	32,080	0.15290	0.84710	100.00
4.5	177,727	0	0.00000	1.00000	84.71
5.5	177,727	0	0.00000	1.00000	84.71
6.5	177,727	0	0.00000	1.00000	84.71
7.5	177,727	0	0.00000	1.00000	84.71
8.5	161,699	6,181	0.03823	0.96177	84.71
9.5	155,518	0	0.00000	1.00000	81.47
10.5	154,010	0	0.00000	1.00000	81.47
11.5	154,010	0	0.00000	1.00000	81.47
12.5	89,664	0	0.00000	1.00000	81.47
13.5	89,664	0	0.00000	1.00000	81.47
14.5	89,664	0	0.00000	1.00000	81.47
15.5	89,664	0	0.00000	1.00000	81.47
16.5	40,100	5,561	0.13868	0.86132	81.47
17.5	34,538	771	0.02232	0.97768	70.17
18.5	33,767	0	0.00000	1.00000	68.60
19.5	33,767	0	0.00000	1.00000	68.60
20.5	33,767	0	0.00000	1.00000	68.60
Totals:	3,047,622	44,593			

Missouri American Water

Account 38200 - Treatment and Disposal - Outfall Sewer Line

Placement Band - 1965 - 2019 Experience Band - 1965 - 2019

Actual and Smooth Survivor Curves



Missouri American Water

Account 39100 - General Plant - Transportation Equipment

RETIREMENT RATE ANALYSIS

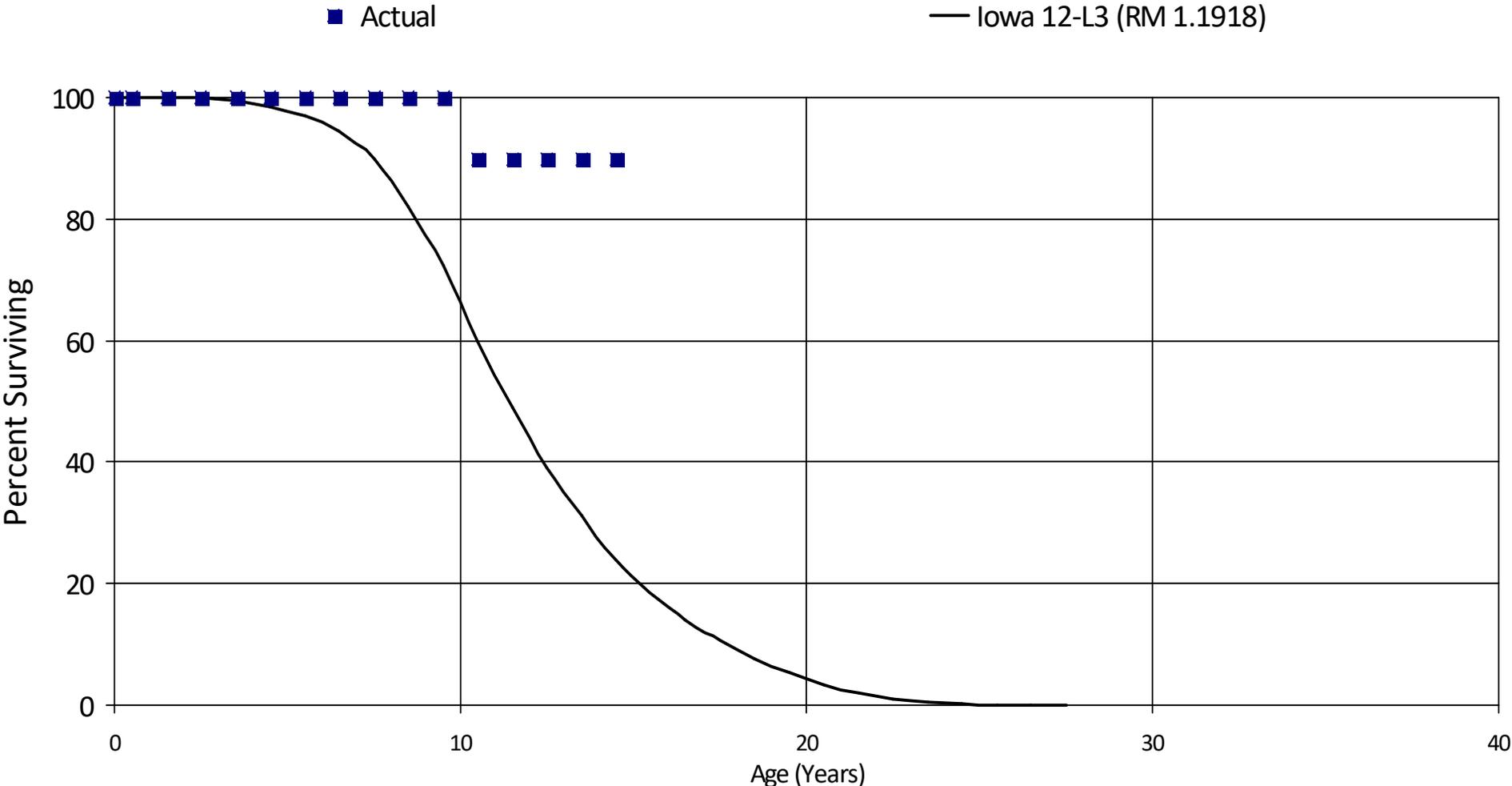
Age at Begin of Interval	Exposures at Beginning of Age Interval	Retirements During Age Interval	Retmt Ratio	Survivor Ratio	% Surviving
0	343,050	0	0.00000	1.00000	100.00
0.5	343,050	0	0.00000	1.00000	100.00
1.5	343,050	0	0.00000	1.00000	100.00
2.5	261,652	129	0.00049	0.99951	100.00
3.5	261,523	0	0.00000	1.00000	99.95
4.5	249,586	0	0.00000	1.00000	99.95
5.5	249,586	0	0.00000	1.00000	99.95
6.5	207,363	0	0.00000	1.00000	99.95
7.5	207,363	0	0.00000	1.00000	99.95
8.5	181,385	0	0.00000	1.00000	99.95
9.5	161,195	16,245	0.10078	0.89922	99.95
10.5	94,597	0	0.00000	1.00000	89.88
11.5	94,597	0	0.00000	1.00000	89.88
12.5	76,015	0	0.00000	1.00000	89.88
13.5	46,070	0	0.00000	1.00000	89.88
14.5	0	0	0.00000	0.00000	89.88
Totals:	3,120,083	16,374			

Missouri American Water

Account 39100 - General Plant - Transportation Equipment

Placement Band - 2004 - 2019 Experience Band - 2011 - 2019

Actual and Smooth Survivor Curves





SECTION 7

7 NET SALVAGE STUDY

MISSOURI AMERICAN WATER
ACCOUNT 35420 COLLECTION PLANT - 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
2008	4,811		0		0		0						0
2009						0							0
2010						0		0	0				0
2011						0		0	0				0
2012	2,429		0		0	0	0	0	0	0	0		0
2013		(2,809)				(2,809)		-936	-116	-562	-116	-1,405	-39
2014						0		-936	-116	-562	-116	-1,405	-39
2015	15,444		0		0	0	0	-936	-18	-562	-16	-1,405	-12
2016	5,633	(3,111)	(55)		0	(3,111)	(55)	-1,037	-15	-1,184	-25	-1,973	-21
2017	1,491	(248)	(17)	45	3	(203)	(14)	-1,105	-15	-1,225	-27	-1,531	-21
2018	62,336	(4,088)	(7)		0	(4,088)	(7)	-2,467	-11	-1,480	-9	-2,042	-11
2019		(3,719)				(3,719)		-2,670	-13	-2,224	-13	-2,322	-15
TOTAL	92,145	(13,975)	(15.17)	45	0.05	-13,930	(15.12)						

Previously Approved -5
Recommended -10

MISSOURI AMERICAN WATER

ACCOUNT 35440 TREATMENT AND DISPOSAL PLANT - 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
2009	5,675		0		0	0	0						0
2010						0							0
2011						0		0	0				0
2012						0		0	0				0
2013						0		0	0	0	0		0
2014						0		0	0	0	0		0
2015	59,289		0		0	0	0	0	0	0	0		0
2016	207,864	(4,905)	(2)		0	(4,905)	(2)	-1,635	-2	-981	-2	-4,905	-2
2017		(4)				(4)		-1,636	-2	-982	-2	-2,455	-2
2018	2,123	(510)	(24)		0	(510)	(24)	-1,806	-3	-1,084	-2	-1,806	-2
2019	63,413	(36,664)	(58)		0	(36,664)	(58)	-12,392	-57	-8,417	-13	-10,521	-12

TOTAL 338,364 (42,083) (12.44) 0 0.00 -42,083 (12.44)

Previously Approved -5

Recommended -5

MISSOURI AMERICAN WATER

ACCOUNT 35450 GENERAL PLANT - 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
2014	27,936	(1,513)	(5)		0	(1,513)	(5)					-1,513	-5
2015	576	(726)	(126)		0	(726)	(126)					-1,120	-8
2016		(120)				(120)		-786	-8			-786	-8
2017						0		-282	-147			-786	-8
2018		(86)				(86)		-69	0	-489	-9	-611	-9
2019		(633)				(633)		-240	0	-313	-272	-616	-11
TOTAL	28,512	(3,078)	(10.80)	0	0.00	-3,078	(10.80)						

Previously Approved -5
Recommended -5

MISSOURI AMERICAN WATER
ACCOUNT 35500 ELECTRIC 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
2012	1,163	(3)	(0)		0	(3)	(0)					-3	0
2013						0						-3	0
2014	1,015		0		0	0	0	-1	0			-3	0
2015	267,940		0		0	0	0	0	0			-3	0
2016	3,431	(85)	(2)		0	(85)	(2)	-28	0	-18	0	-44	0
2017		(889)		11		(878)		-321	0	-193	0	-322	0
2018	973		0		0	0	0	-321	-22	-193	0	-322	0
2019	5,000		0		0	0	0	-293	-15	-193	0	-322	0
TOTAL	279,522	(977)	(0.35)	11	0.00	-966	(0.35)						

Previously Approved 0
Recommended 0

MISSOURI AMERICAN WATER
ACCOUNT 36000 COLLECTION SEWERS
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		(44)				(44)						-44	0
2012	46,406		0		0	0	0					-44	0
2013	228	(125)	(55)		0	(125)	(55)	-56	0			-85	0
2014	1,008	153	15		0	153	15	9	0			-5	0
2015	12,945	(3,024)	(23)		0	(3,024)	(23)	-999	-21	-608	-5	-760	-5
2016	40,343	(5,325)	(13)		0	(5,325)	(13)	-2,732	-15	-1,664	-8	-1,673	-8
2017	13,301	(7,100)	(53)		0	(7,100)	(53)	-5,150	-23	-3,084	-23	-2,578	-14
2018	24,121	(3,239)	(13)		0	(3,239)	(13)	-5,222	-20	-3,707	-20	-2,672	-14
2019	195,612	(6,614)	(3)		0	(6,614)	(3)	-5,651	-7	-5,061	-9	-3,165	-8
TOTAL	333,964	(25,319)	(7.58)	0	0.00	-25,319	(7.58)						

Previously Approved -10
Recommended -10

MISSOURI AMERICAN WATER
ACCOUNT 36100 COLLECTING 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
2010	16	(3,000)	(18,750)		0	(3,000)	(18,750)					-3,000	-18,750
2011	5,746		0		0	0	0					-3,000	-52
2012		(77)				(77)		-1,026	-53			-1,539	-53
2013	1,859		0		0	0	0	-26	-1			-1,539	-40
2014	7,637	(1,745)	(23)		0	(1,745)	(23)	-607	-19	-964	-32	-1,607	-32
2015	49,094	(3,723)	(8)		0	(3,723)	(8)	-1,823	-9	-1,109	-9	-2,136	-13
2016	85,611	(39,543)	(46)		0	(39,543)	(46)	-15,004	-32	-9,018	-31	-9,618	-32
2017	0	(3,358)			0	(3,358)	0	-15,541	-35	-9,674	-34	-8,574	-34
2018	190,274	(74,973)	(39)	1,319	1	(73,654)	(39)	-38,852	-42	-24,405	-37	-17,871	-37
2019	196,145	(91,925)	(47)		0	(91,925)	(47)	-56,312	-44	-42,441	-41	-27,128	-40
TOTAL	536,381	(218,344)	(40.71)	1,319	0.25	-217,025	(40.46)						

Previously Approved -20
Recommended -30

MISSOURI AMERICAN WATER
ACCOUNT 36300 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
2011	2,131		0		0	0	0						0
2012		(511)				(511)						-511	-24
2013						0		-170	-24			-511	-24
2014	5,580	(4,543)	(81)		0	(4,543)	(81)	-1,685	-91			-2,527	-66
2015		(3,773)				(3,773)		-2,772	-149	-1,765	-114	-2,942	-114
2016	1,186	(93,439)	(7,882)		0	(93,439)	(7,882)	-33,918	-1,504	-20,453	-1,512	-25,566	-1,150
2017	135,067	(23,167)	(17)		0	(23,167)	0	-40,126	-88	-24,984	-88	-25,087	-87
2018	0	(10,599)			0	(10,599)		-42,402	-93	-27,104	-96	-22,672	-94
2019	27,041	(32,378)	(120)		0	(32,378)	(120)	-22,048	-41	-32,671	-100	-24,059	-98
TOTAL	171,005	(168,410)	(98.48)	0	0.00	-168,410	(98.48)						

Previously Approved -40
Recommended -50

MISSOURI AMERICAN WATER
ACCOUNT 37100 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
2008	51,000		0		0		0						0
2009	4,407		0		0	0	0						0
2010		(1,976)				(1,976)		-659	-4			-988	-4
2011	4,022		0		0	0	0	-659	-23			-988	-3
2012	33,373	(203)	(1)		0	(203)	(1)	-726	-6	-436	-2	-726	-2
2013						0		-68	-1	-436	-5	-726	-2
2014	26,361	(300)	(1)		0	(300)	(1)	-168	-1	-496	-4	-620	-2
2015	30,308	(2,977)	(10)		0	(2,977)	(10)	-1,092	-6	-696	-4	-1,091	-4
2016	38,442	(9,657)	(25)		0	(9,657)	(25)	-4,311	-14	-2,627	-10	-2,519	-8
2017	11,089	(3,468)	(31)		0	(3,468)	(31)	-5,367	-20	-3,280	-15	-2,654	-9
2018	22,990		0		0	0	0	-4,375	-18	-3,280	-13	-2,654	-8
2019	29,716		0		0	0	0	-1,156	-5	-3,220	-12	-2,654	-7
TOTAL	251,708	(18,580)	(7.38)	0	0.00	-18,580	(7.38)						

Previously Approved -5
Recommended -5

MISSOURI AMERICAN WATER
ACCOUNT 38000 TREATMENT 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
2008	40,449		0		0		0						0
2009	16,350		0		0	0	0						0
2010	10,631	(13,831)	(130)		0	(13,831)	(130)	-4,610	-21			-6,916	-21
2011	93,382	12,933	14		0	12,933	14	-299	-1			-299	-1
2012	1,606		0		0	0	0	-299	-1	-180	-1	-299	-1
2013	28,121	(37,784)	(134)		0	(37,784)	(134)	-8,284	-20	-7,736	-26	-9,671	-20
2014	51,586	(12,504)	(24)		0	(12,504)	(24)	-16,763	-62	-10,237	-28	-10,237	-21
2015	31,527	(691)	(2)		0	(691)	(2)	-16,993	-46	-7,609	-18	-8,646	-19
2016	73,534	(3,901)	(5)		0	(3,901)	(5)	-5,699	-11	-10,976	-29	-7,968	-16
2017	15,177	(1,853)	(12)		0	(1,853)	(12)	-2,148	-5	-11,347	-28	-7,204	-16
2018	30,864	(9,443)	(31)		0	(9,443)	(31)	-5,066	-13	-5,678	-14	-7,453	-17
2019	11,180	(53,614)	(480)		0	(53,614)	(480)	-21,637	-113	-13,900	-43	-12,069	-30
TOTAL	404,408	(120,688)	(29.84)	0	0.00	-120,688	(29.84)						

Previously Approved -20
Recommended -20

MISSOURI AMERICAN WATER
ACCOUNT 38100 PLANT SEWERS
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
2014	6		0		0	0	0						0
2015	0	(2,326)	0			(2,326)	0					-2,326	-38,768
2016	29,033	(1,851)	(6)		0	(1,851)	(6)	-1,393	-14			-2,089	-14
2017	0		0		0	0	0	-1,393	-14			-2,089	-14
2018	33,182	(479)	(1)		0	(479)	(1)	-777	-4	-931	-7	-1,552	-7
2019		(7,148)				(7,148)		-2,542	-23	-2,361	-19	-2,951	-19
TOTAL	62,221	(11,804)	(18.97)	0	0.00	-11,804	(18.97)						

Previously Approved 0
Recommended -10



SECTION 8

8 DETAILED DEPRECIATION CALCULATIONS

ALG - Remaining Life
Survivor Curve: R3
ASL: 45
Net Salvage: -10%
Truncation Year:

Missouri American Water

Account #: 354.2000 - Structures and Improvements - Collection

CALCULATED ANNUAL ACCRUAL AND ACCRUED DEPRECIATION
BASED ON ORIGINAL COST AS OF DECEMBER 31, 2019

Year	Original Cost	Calculated Accumulated Depreciation	Allocated Actual Booked Amount	Accumulated Depreciation Factor	Net Book Value	ALG Remaining Life	Annual Accrual	Average Age
2003	14,412.68	5,506	15,854	1.1000	0	29.37	0	16.5
2004	16,549.13	5,960	17,576	1.0621	628	30.27	21	15.5
2006	16,661.40	5,261	15,515	0.9312	2,812	32.08	88	13.5
2007	1,015,599.24	297,845	878,375	0.8649	238,785	33.00	7,235	12.5
2008	77,444.98	20,956	61,803	0.7980	23,387	33.93	689	11.5
2009	60,404.30	14,965	44,135	0.7307	22,310	34.86	640	10.5
2010	35,416.33	7,960	23,474	0.6628	15,484	35.81	432	9.5
2013	231,494.64	35,846	105,712	0.4567	148,932	38.67	3,852	6.5
2014	29,878.36	3,923	11,568	0.3872	21,298	39.63	537	5.5
2015	264,025.98	28,415	83,799	0.3174	206,630	40.60	5,090	4.5
2016	261,911.60	21,961	64,767	0.2473	223,336	41.57	5,373	3.5
2017	290,010.65	17,398	51,307	0.1769	267,705	42.55	6,292	2.5
2018	413,636.93	14,910	43,972	0.1063	411,029	43.53	9,443	1.5
2019	798,697.42	9,610	28,340	0.0355	850,227	44.51	19,103	0.5
TOTAL	3,526,143.64	490,515	1,446,196		2,432,562		58,795	

COMPOSITE ANNUAL ACCRUAL RATE	1.67%
THEORETICAL ACCUMULATED DEPRECIATION FACTOR	0.41
COMPOSITE AVERAGE AGE (YEARS)	5.90
DIRECTED WEIGHTED ALG COMPOSITE REMAINING LIFE (YEARS)	39.31

ALG - Remaining Life

Survivor Curve: R4

ASL: 50

Net Salvage: 0%

Truncation Year:

Missouri American Water

Account #: 354.3000 - Structures and Improvements - Pumping

CALCULATED ANNUAL ACCRUAL AND ACCRUED DEPRECIATION
BASED ON ORIGINAL COST AS OF DECEMBER 31, 2019

Year	Original Cost	Calculated Accumulated Depreciation	Allocated Actual Booked Amount	Accumulated Depreciation Factor	Net Book Value	ALG Remaining Life	Annual Accrual	Average Age
1964	6,223.91	5,579	5,815	0.9343	409	5.18	79	55.5
2005	2,085.00	601	626	0.3003	1,459	35.60	41	14.5
2007	16,295.63	4,054	4,225	0.2593	12,070	37.56	321	12.5
2008	2,102.03	481	502	0.2387	1,600	38.55	42	11.5
2010	119,809.84	22,691	23,652	0.1974	96,157	40.53	2,372	9.5
2013	20,651.64	2,679	2,793	0.1352	17,859	43.51	410	6.5
2015	2,372.27	213	222	0.0937	2,150	45.51	47	4.5
2017	155,071.90	7,744	8,072	0.0521	147,000	47.50	3,095	2.5
2019	81,378.61	813	847	0.0104	80,531	49.50	1,627	0.5
TOTAL	405,990.83	44,855	46,755		359,236		8,034	

COMPOSITE ANNUAL ACCRUAL RATE 1.98%

THEORETICAL ACCUMULATED DEPRECIATION FACTOR 0.12

COMPOSITE AVERAGE AGE (YEARS) 5.70

DIRECTED WEIGHTED ALG COMPOSITE REMAINING LIFE (YEARS) 44.48

ALG - Remaining Life

Survivor Curve: R1.5

ASL: 55

Net Salvage: -5%

Truncation Year:

Missouri American Water

Account #: 354.4000 - Structures and Improvements - Treatment

CALCULATED ANNUAL ACCRUAL AND ACCRUED DEPRECIATION

BASED ON ORIGINAL COST AS OF DECEMBER 31, 2019

Year	Original Cost	Calculated Accumulated Depreciation	Allocated Actual Booked Amount	Accumulated Depreciation Factor	Net Book Value	ALG Remaining Life	Annual Accrual	Average Age
2001	613,027.61	170,242	399,660	0.6519	244,019	40.45	6,032	18.5
2005	76,499.57	16,835	39,521	0.5166	40,803	43.47	939	14.5
2006	17,846.31	3,666	8,607	0.4823	10,131	44.24	229	13.5
2007	1,032,455.44	196,931	462,314	0.4478	621,764	45.01	13,814	12.5
2008	64,037.93	11,268	26,452	0.4131	40,787	45.78	891	11.5
2009	3,208.92	517	1,214	0.3782	2,156	46.56	46	10.5
2011	170,323.87	22,330	52,422	0.3078	126,418	48.13	2,626	8.5
2013	97,199.83	9,797	23,000	0.2366	79,059	49.72	1,590	6.5
2014	147,718.98	12,633	29,658	0.2008	125,447	50.52	2,483	5.5
2015	193,889.35	13,604	31,937	0.1647	171,647	51.32	3,344	4.5
2016	373,694.44	20,451	48,011	0.1285	344,368	52.13	6,606	3.5
2017	293,617.89	11,513	27,027	0.0920	281,272	52.95	5,312	2.5
2018	258,613.68	6,107	14,337	0.0554	257,207	53.76	4,784	1.5
2019	724,375.89	5,752	13,504	0.0186	747,091	54.58	13,687	0.5
TOTAL	4,066,509.71	501,648	1,177,665		3,092,170		62,384	

COMPOSITE ANNUAL ACCRUAL RATE 1.53%

THEORETICAL ACCUMULATED DEPRECIATION FACTOR 0.29

COMPOSITE AVERAGE AGE (YEARS) 8.10

DIRECTED WEIGHTED ALG COMPOSITE REMAINING LIFE (YEARS) 48.54

ALG - Remaining Life

Survivor Curve: R2

ASL: 35

Net Salvage: -5%

Truncation Year:

Missouri American Water

Account #: 354.5000 - Structures and Improvements - General

CALCULATED ANNUAL ACCRUAL AND ACCRUED DEPRECIATION
BASED ON ORIGINAL COST AS OF DECEMBER 31, 2019

Year	Original Cost	Calculated Accumulated Depreciation	Allocated Actual Booked Amount	Accumulated Depreciation Factor	Net Book Value	ALG Remaining Life	Annual Accrual	Average Age
2007	133,076.67	42,698	48,619	0.3653	91,112	24.31	3,749	12.5
2008	14,128.14	4,193	4,775	0.3379	10,060	25.11	401	11.5
2009	12,038.65	3,280	3,734	0.3102	8,906	25.92	344	10.5
2011	66,160.03	14,738	16,782	0.2537	52,686	27.57	1,911	8.5
2013	23.81	4	5	0.1958	20	29.27	1	6.5
2014	42,487.42	6,212	7,073	0.1665	37,539	30.13	1,246	5.5
2015	28,869.10	3,469	3,950	0.1368	26,363	30.99	851	4.5
2016	143,788.58	13,496	15,368	0.1069	135,610	31.87	4,255	3.5
2017	71,755.02	4,831	5,501	0.0767	69,842	32.76	2,132	2.5
2018	131,671.13	5,340	6,080	0.0462	132,174	33.65	3,928	1.5
2019	268,326.63	3,640	4,144	0.0154	277,599	34.55	8,035	0.5
TOTAL	912,325.18	101,900	116,032		841,910		26,851	

COMPOSITE ANNUAL ACCRUAL RATE	2.94%
THEORETICAL ACCUMULATED DEPRECIATION FACTOR	0.13
COMPOSITE AVERAGE AGE (YEARS)	4.27
DIRECTED WEIGHTED ALG COMPOSITE REMAINING LIFE (YEARS)	31.28

ALG - Remaining Life
Survivor Curve: R1.5
ASL: 20
Net Salvage: 0%
Truncation Year:

Missouri American Water

Account #: 355.0000 - Power Generating Equipment - Collection

CALCULATED ANNUAL ACCRUAL AND ACCRUED DEPRECIATION
BASED ON ORIGINAL COST AS OF DECEMBER 31, 2019

Year	Original Cost	Calculated Accumulated Depreciation	Allocated Actual Booked Amount	Accumulated Depreciation Factor	Net Book Value	ALG Remaining Life	Annual Accrual	Average Age
2001	7.30	5	2	0.2084	6	7.17	1	18.5
2004	1,192.03	667	217	0.1818	975	8.81	111	15.5
2007	1,814.20	847	275	0.1516	1,539	10.66	144	12.5
2008	3,021.16	1,311	426	0.1409	2,595	11.32	229	11.5
2009	3,391.35	1,357	441	0.1299	2,951	12.00	246	10.5
2010	4,868.19	1,778	577	0.1186	4,291	12.70	338	9.5
2011	1,039.87	343	111	0.1070	929	13.41	69	8.5
2012	887.34	260	84	0.0952	803	14.14	57	7.5
2014	5,804.56	1,267	411	0.0709	5,393	15.64	345	5.5
2018	5,659.01	347	113	0.0199	5,546	18.77	295	1.5
2019	1,814.02	37	12	0.0067	1,802	19.59	92	0.5
TOTAL	29,499.03	8,218	2,669		26,830		1,927	

COMPOSITE ANNUAL ACCRUAL RATE	6.53%
THEORETICAL ACCUMULATED DEPRECIATION FACTOR	0.09
COMPOSITE AVERAGE AGE (YEARS)	7.28
DIRECTED WEIGHTED ALG COMPOSITE REMAINING LIFE (YEARS)	14.43

ALG - Remaining Life
Survivor Curve: R1.5
ASL: 55
Net Salvage: -10%
Truncation Year:

Missouri American Water

Account #: 360.0000 - Collection Plant - Sewers

CALCULATED ANNUAL ACCRUAL AND ACCRUED DEPRECIATION BASED ON ORIGINAL COST AS OF DECEMBER 31, 2019

Year	Original Cost	Calculated Accumulated Depreciation	Allocated Actual Booked Amount	Accumulated Depreciation Factor	Net Book Value	ALG Remaining Life	Annual Accrual	Average Age
1975	1,732.29	1,104	1,906	1.1000	0	23.13	0	44.5
1980	2,305.65	1,334	2,536	1.1000	0	26.07	0	39.5
1985	3,032.03	1,563	3,201	1.0557	134	29.23	5	34.5
1995	2,859.96	1,083	2,218	0.7755	928	36.07	26	24.5
1996	322,729.33	117,568	240,789	0.7461	114,213	36.79	3,105	23.5
2003	1,190,684.49	310,674	636,288	0.5344	673,465	41.95	16,052	16.5
2005	794,384.68	183,140	375,087	0.4722	498,736	43.47	11,472	14.5
2006	1,066,015.23	229,434	469,902	0.4408	702,715	44.24	15,885	13.5
2007	352,637.30	70,465	144,319	0.4093	243,582	45.01	5,412	12.5
2008	18,654.06	3,439	7,043	0.3775	13,477	45.78	294	11.5
2009	881.02	149	305	0.3456	665	46.56	14	10.5
2010	61,387.08	9,398	19,248	0.3136	48,278	47.35	1,020	9.5
2011	752.37	103	212	0.2813	616	48.13	13	8.5
2012	1,363.27	166	339	0.2489	1,160	48.92	24	7.5
2013	301,566.04	31,844	65,220	0.2163	266,503	49.72	5,360	6.5
2014	93.18	8	17	0.1835	85	50.52	2	5.5
2015	390,549.79	28,708	58,796	0.1505	370,809	51.32	7,225	4.5
2016	440,317.60	25,245	51,703	0.1174	432,646	52.13	8,299	3.5
2017	478,600.68	19,660	40,264	0.0841	486,196	52.95	9,183	2.5
2018	382,283.40	9,457	19,370	0.0507	401,142	53.76	7,461	1.5
2019	716,812.74	5,963	12,213	0.0170	776,281	54.58	14,222	0.5

ALG - Remaining Life
Survivor Curve: R1.5
ASL: 55
Net Salvage: -10%
Truncation Year:

Missouri American Water

Account #: 360.0000 - Collection Plant - Sewers

CALCULATED ANNUAL ACCRUAL AND ACCRUED DEPRECIATION BASED ON ORIGINAL COST AS OF DECEMBER 31, 2019

Year	Original Cost	Calculated Accumulated Depreciation	Allocated Actual Booked Amount	Accumulated Depreciation Factor	Net Book Value	ALG Remaining Life	Annual Accrual	Average Age
TOTAL	6,529,642.19	1,050,505	2,150,975		5,031,631		105,073	
COMPOSITE ANNUAL ACCRUAL RATE				1.61%				
THEORETICAL ACCUMULATED DEPRECIATION FACTOR				0.33				
COMPOSITE AVERAGE AGE (YEARS)				10.12				
DIRECTED WEIGHTED ALG COMPOSITE REMAINING LIFE (YEARS)				46.96				

ALG - Remaining Life

Survivor Curve: S1

ASL: 65

Net Salvage: -30%

Truncation Year:

Missouri American Water

Account #: 361.0000 - Collecting Mains

CALCULATED ANNUAL ACCRUAL AND ACCRUED DEPRECIATION BASED ON ORIGINAL COST AS OF DECEMBER 31, 2019

Year	Original Cost	Calculated Accumulated Depreciation	Allocated Actual Booked Amount	Accumulated Depreciation Factor	Net Book Value	ALG Remaining Life	Annual Accrual	Average Age
1964	40,511.51	32,362	52,665	1.3000	0	25.06	0	55.5
1965	28,315.13	22,353	36,810	1.3000	0	25.53	0	54.5
1969	2,719.29	2,041	3,535	1.3000	0	27.47	0	50.5
1970	16,044.82	11,883	20,858	1.3000	0	27.97	0	49.5
1973	15,792.07	11,207	20,530	1.3000	0	29.52	0	46.5
1975	2,589.94	1,783	3,367	1.3000	0	30.58	0	44.5
1976	11,955.28	8,099	15,542	1.3000	0	31.13	0	43.5
1979	23,943.49	15,412	31,127	1.3000	0	32.82	0	40.5
1980	41,376.93	26,155	53,790	1.3000	0	33.39	0	39.5
1982	2,143.59	1,304	2,787	1.3000	0	34.58	0	37.5
1984	13,007.55	7,597	16,910	1.3000	0	35.80	0	35.5
1985	39,607.67	22,638	51,490	1.3000	0	36.42	0	34.5
1986	47,665.91	26,638	61,966	1.3000	0	37.06	0	33.5
1987	20,535.78	11,212	26,697	1.3000	0	37.70	0	32.5
1989	143.14	74	186	1.3000	0	39.02	0	30.5
1990	2,529.96	1,280	3,289	1.3000	0	39.70	0	29.5
1995	1,283.57	558	1,669	1.3000	0	43.25	0	24.5
1998	40,656.74	15,836	52,854	1.3000	0	45.53	0	21.5
1999	148,250.65	55,421	192,726	1.3000	0	46.31	0	20.5
2001	80,645.83	27,561	104,840	1.3000	0	47.91	0	18.5
2003	228,992.06	70,681	297,690	1.3000	0	49.57	0	16.5
2004	329,807.20	96,215	425,675	1.2907	3,074	50.41	61	15.5
2005	292,146.72	80,203	354,836	1.2146	24,955	51.27	487	14.5
2006	77,362.69	19,889	87,991	1.1374	12,581	52.15	241	13.5
2007	373,117.16	89,315	395,149	1.0590	89,904	53.03	1,695	12.5
2008	3,065.57	679	3,003	0.9796	982	53.93	18	11.5

ALG - Remaining Life
Survivor Curve: S1
ASL: 65
Net Salvage: -30%
Truncation Year:

Missouri American Water

Account #: 361.0000 - Collecting Mains

CALCULATED ANNUAL ACCRUAL AND ACCRUED DEPRECIATION BASED ON ORIGINAL COST AS OF DECEMBER 31, 2019

Year	Original Cost	Calculated Accumulated Depreciation	Allocated Actual Booked Amount	Accumulated Depreciation Factor	Net Book Value	ALG Remaining Life	Annual Accrual	Average Age
2009	8,718.49	1,772	7,839	0.8991	3,495	54.84	64	10.5
2010	221,351.21	40,899	180,944	0.8175	106,813	55.76	1,916	9.5
2011	95,261.23	15,823	70,004	0.7349	53,836	56.70	950	8.5
2012	133,338.71	19,626	86,831	0.6512	86,509	57.64	1,501	7.5
2013	528,031.46	67,637	299,239	0.5667	387,202	58.60	6,608	6.5
2014	25,783.75	2,805	12,408	0.4812	21,111	59.56	354	5.5
2015	22,526,894.82	2,011,479	8,899,210	0.3950	20,385,753	60.54	336,758	4.5
2016	286,632.20	19,961	88,310	0.3081	284,312	61.52	4,622	3.5
2017	3,383,640.53	168,699	746,358	0.2206	3,652,375	62.51	58,431	2.5
2018	1,225,837.01	36,729	162,498	0.1326	1,431,090	63.50	22,536	1.5
2019	1,492,947.63	14,926	66,035	0.0442	1,874,797	64.50	29,067	0.5
TOTAL	31,812,647.29	3,058,749	12,937,653		28,418,788		465,308	

COMPOSITE ANNUAL ACCRUAL RATE	1.46%
THEORETICAL ACCUMULATED DEPRECIATION FACTOR	0.41
COMPOSITE AVERAGE AGE (YEARS)	4.97
DIRECTED WEIGHTED ALG COMPOSITE REMAINING LIFE (YEARS)	60.19

ALG - Remaining Life
Survivor Curve: R0.5
ASL: 50
Net Salvage: -50%
Truncation Year:

Missouri American Water

Account #: 363.0000 - Collection Plant - Services

CALCULATED ANNUAL ACCRUAL AND ACCRUED DEPRECIATION BASED ON ORIGINAL COST AS OF DECEMBER 31, 2019

Year	Original Cost	Calculated Accumulated Depreciation	Allocated Actual Booked Amount	Accumulated Depreciation Factor	Net Book Value	ALG Remaining Life	Annual Accrual	Average Age
1965	7,950.51	7,280	11,926	1.5000	0	19.48	0	54.5
1973	9,672.06	7,748	14,508	1.5000	0	23.30	0	46.5
1978	15,220.70	11,035	22,831	1.5000	0	25.83	0	41.5
1983	11,103.62	7,167	16,655	1.5000	0	28.48	0	36.5
1993	5,288.16	2,525	7,932	1.5000	0	34.08	0	26.5
1999	299,194.00	111,420	390,503	1.3052	58,288	37.59	1,551	20.5
2007	2,623.03	601	2,107	0.8034	1,827	42.36	43	12.5
2008	3,735.20	789	2,764	0.7400	2,839	42.96	66	11.5
2009	2,057.45	397	1,392	0.6765	1,694	43.57	39	10.5
2013	166.83	20	70	0.4210	180	46.00	4	6.5
2015	27,291.66	2,276	7,975	0.2922	32,962	47.22	698	4.5
2016	30,177.62	1,959	6,868	0.2276	38,399	47.84	803	3.5
2017	348,313.69	16,174	56,686	0.1627	465,784	48.45	9,613	2.5
2018	901,749.14	25,146	88,132	0.0977	1,264,492	49.07	25,769	1.5
2019	457,140.12	4,244	14,875	0.0325	670,836	49.69	13,500	0.5
TOTAL	2,121,683.79	198,782	645,225		2,537,301		52,086	

COMPOSITE ANNUAL ACCRUAL RATE	2.45%
THEORETICAL ACCUMULATED DEPRECIATION FACTOR	0.30
COMPOSITE AVERAGE AGE (YEARS)	5.17
DIRECTED WEIGHTED ALG COMPOSITE REMAINING LIFE (YEARS)	46.88

ALG - Remaining Life

Survivor Curve: S3

ASL: 30

Net Salvage: 0%

Truncation Year:

Missouri American Water

Account #: 364.0000 - Flow Measuring Devices

CALCULATED ANNUAL ACCRUAL AND ACCRUED DEPRECIATION BASED ON ORIGINAL COST AS OF DECEMBER 31, 2019

Year	Original Cost	Calculated Accumulated Depreciation	Allocated Actual Booked Amount	Accumulated Depreciation Factor	Net Book Value	ALG Remaining Life	Annual Accrual	Average Age
2003	194,575.00	103,690	139,938	0.7192	54,637	14.01	3,899	16.5
2005	9,860.23	4,681	6,317	0.6406	3,543	15.76	225	14.5
2007	309,861.46	127,953	172,683	0.5573	137,178	17.61	7,789	12.5
2015	3,626.14	544	734	0.2024	2,892	25.50	113	4.5
TOTAL	517,922.83	236,868	319,672		198,251		12,026	

COMPOSITE ANNUAL ACCRUAL RATE 2.32%

THEORETICAL ACCUMULATED DEPRECIATION FACTOR 0.62

COMPOSITE AVERAGE AGE (YEARS) 13.98

DIRECTED WEIGHTED ALG COMPOSITE REMAINING LIFE (YEARS) 16.28

ALG - Remaining Life

Survivor Curve: L4

ASL: 35

Net Salvage: 0%

Truncation Year:

Missouri American Water

Account #: 370.0000 - Receiving Wells

CALCULATED ANNUAL ACCRUAL AND ACCRUED DEPRECIATION BASED ON ORIGINAL COST AS OF DECEMBER 31, 2019

Year	Original Cost	Calculated Accumulated Depreciation	Allocated Actual Booked Amount	Accumulated Depreciation Factor	Net Book Value	ALG Remaining Life	Annual Accrual	Average Age
1990	52,480.00	39,601	52,480	1.0000	0	8.59	0	29.5
2000	4,746.07	2,586	4,746	1.0000	0	15.93	0	19.5
2003	90,042.27	42,067	90,042	1.0000	0	18.65	0	16.5
2005	2,870.00	1,185	2,870	1.0000	0	20.55	0	14.5
2007	20,468.18	7,302	20,468	1.0000	0	22.51	0	12.5
2013	107,729.00	20,007	64,593	0.5996	43,136	28.50	1,514	6.5
2016	279,977.00	27,998	90,393	0.3229	189,584	31.50	6,019	3.5
2017	181,286.97	12,949	41,807	0.2306	139,480	32.50	4,292	2.5
2019	1,649.51	24	76	0.0461	1,573	34.50	46	0.5
TOTAL	741,249.00	153,719	367,476		373,773		11,869	

COMPOSITE ANNUAL ACCRUAL RATE	1.60%
THEORETICAL ACCUMULATED DEPRECIATION FACTOR	0.50
COMPOSITE AVERAGE AGE (YEARS)	7.50
DIRECTED WEIGHTED ALG COMPOSITE REMAINING LIFE (YEARS)	27.74

ALG - Remaining Life

Survivor Curve: S1

ASL: 18

Net Salvage: -5%

Truncation Year:

Missouri American Water

Account #: 371.0000 - Pumping Equipment

CALCULATED ANNUAL ACCRUAL AND ACCRUED DEPRECIATION BASED ON ORIGINAL COST AS OF DECEMBER 31, 2019

Year	Original Cost	Calculated Accumulated Depreciation	Allocated Actual Booked Amount	Accumulated Depreciation Factor	Net Book Value	ALG Remaining Life	Annual Accrual	Average Age
1983	351.47	369	369	1.0500	0	0.00	0	37.5
1990	2,395.00	2,259	2,515	1.0500	0	1.83	0	29.5
1998	112.00	89	118	1.0500	0	4.42	0	21.5
2003	30,576.44	20,634	32,105	1.0500	0	6.43	0	16.5
2004	13,349.45	8,656	14,017	1.0500	0	6.88	0	15.5
2005	1,999.00	1,241	2,099	1.0500	0	7.36	0	14.5
2006	69,481.50	41,115	72,956	1.0500	0	7.86	0	13.5
2007	1,013,574.93	568,873	1,064,254	1.0500	0	8.38	0	12.5
2008	478,119.98	253,000	502,026	1.0500	0	8.93	0	11.5
2009	230,828.11	114,325	242,370	1.0500	0	9.51	0	10.5
2010	140,240.66	64,438	147,253	1.0500	0	10.12	0	9.5
2011	10,049.04	4,237	9,946	0.9898	605	10.77	56	8.5
2012	10,015.64	3,820	8,969	0.8955	1,548	11.46	135	7.5
2013	201,126.14	68,152	160,000	0.7955	51,182	12.19	4,198	6.5
2014	28,661.54	8,417	19,762	0.6895	10,333	12.97	797	5.5
2015	183,180.74	45,038	105,735	0.5772	86,605	13.79	6,282	4.5
2016	246,544.58	48,151	113,044	0.4585	145,828	14.65	9,953	3.5
2017	412,395.53	58,610	137,600	0.3337	295,415	15.56	18,981	2.5
2018	648,681.98	56,138	131,797	0.2032	549,319	16.52	33,259	1.5
2019	1,018,512.81	29,657	69,625	0.0684	999,813	17.50	57,129	0.5

ALG - Remaining Life

Survivor Curve: S1

ASL: 18

Net Salvage: -5%

Truncation Year:

Missouri American Water

Account #: 371.0000 - Pumping Equipment

CALCULATED ANNUAL ACCRUAL AND ACCRUED DEPRECIATION BASED ON ORIGINAL COST AS OF DECEMBER 31, 2019

Year	Original Cost	Calculated Accumulated Depreciation	Allocated Actual Booked Amount	Accumulated Depreciation Factor	Net Book Value	ALG Remaining Life	Annual Accrual	Average Age
TOTAL	4,740,196.54	1,397,219	2,836,558		2,140,648		130,791	
COMPOSITE ANNUAL ACCRUAL RATE				2.76%				
THEORETICAL ACCUMULATED DEPRECIATION FACTOR				0.60				
COMPOSITE AVERAGE AGE (YEARS)				6.23				
DIRECTED WEIGHTED ALG COMPOSITE REMAINING LIFE (YEARS)				12.95				

ALG - Remaining Life
Survivor Curve: S1.5
ASL: 35
Net Salvage: -20%
Truncation Year:

Missouri American Water

Account #: 380.0000 - Treatment Equipment

CALCULATED ANNUAL ACCRUAL AND ACCRUED DEPRECIATION BASED ON ORIGINAL COST AS OF DECEMBER 31, 2019

Year	Original Cost	Calculated Accumulated Depreciation	Allocated Actual Booked Amount	Accumulated Depreciation Factor	Net Book Value	ALG Remaining Life	Annual Accrual	Average Age
1967	10,151.07	10,610	12,181	1.2000	0	4.51	0	52.5
1973	84.95	84	102	1.2000	0	6.17	0	46.5
1982	14,184.67	12,594	17,022	1.2000	0	9.10	0	37.5
1983	70,734.33	61,898	84,881	1.2000	0	9.48	0	36.5
1985	6,215.57	5,273	7,459	1.2000	0	10.26	0	34.5
1988	31,062.74	24,998	37,275	1.2000	0	11.53	0	31.5
1989	341.27	269	410	1.2000	0	11.98	0	30.5
1990	184,636.39	142,778	221,564	1.2000	0	12.45	0	29.5
1995	6,620.28	4,532	7,675	1.1593	269	15.03	18	24.5
2000	26,183.24	15,167	25,685	0.9810	5,735	18.10	317	19.5
2003	89,621.72	45,452	76,971	0.8588	30,575	20.21	1,513	16.5
2004	437,775.76	210,815	357,005	0.8155	168,326	20.95	8,033	15.5
2006	566,331.30	242,411	410,512	0.7249	269,086	22.52	11,951	13.5
2007	2,440,964.80	976,700	1,653,997	0.6776	1,275,160	23.33	54,658	12.5
2008	282.91	105	178	0.6291	162	24.17	7	11.5
2010	38,069.79	11,878	20,115	0.5284	25,569	25.90	987	9.5
2011	963,992.44	271,127	459,141	0.4763	697,650	26.80	26,035	8.5
2012	21,913.73	5,476	9,273	0.4232	17,024	27.71	614	7.5
2013	517,005.97	112,666	190,795	0.3690	429,612	28.64	14,998	6.5
2014	274,740.45	50,946	86,275	0.3140	243,414	29.59	8,226	5.5
2015	788,300.49	120,191	203,539	0.2582	742,422	30.55	24,299	4.5
2016	819,856.43	97,635	165,340	0.2017	818,487	31.53	25,962	3.5
2017	1,075,380.73	91,784	155,432	0.1445	1,135,025	32.51	34,912	2.5
2018	701,643.46	36,021	61,000	0.0869	780,972	33.50	23,311	1.5
2019	707,512.54	12,125	20,533	0.0290	828,482	34.50	24,014	0.5

ALG - Remaining Life
Survivor Curve: S1.5
ASL: 35
Net Salvage: -20%
Truncation Year:

Missouri American Water

Account #: 380.0000 - Treatment Equipment

CALCULATED ANNUAL ACCRUAL AND ACCRUED DEPRECIATION BASED ON ORIGINAL COST AS OF DECEMBER 31, 2019

Year	Original Cost	Calculated Accumulated Depreciation	Allocated Actual Booked Amount	Accumulated Depreciation Factor	Net Book Value	ALG Remaining Life	Annual Accrual	Average Age
TOTAL	9,793,607.03	2,563,534	4,284,359		7,467,969		259,856	
COMPOSITE ANNUAL ACCRUAL RATE				2.65%				
THEORETICAL ACCUMULATED DEPRECIATION FACTOR				0.44				
COMPOSITE AVERAGE AGE (YEARS)				8.32				
DIRECTED WEIGHTED ALG COMPOSITE REMAINING LIFE (YEARS)				27.37				

ALG - Remaining Life

Survivor Curve: R1

ASL: 45

Net Salvage: -10%

Truncation Year:

Missouri American Water

Account #: 381.0000 - Plant Sewers

CALCULATED ANNUAL ACCRUAL AND ACCRUED DEPRECIATION BASED ON ORIGINAL COST AS OF DECEMBER 31, 2019

Year	Original Cost	Calculated Accumulated Depreciation	Allocated Actual Booked Amount	Accumulated Depreciation Factor	Net Book Value	ALG Remaining Life	Annual Accrual	Average Age
2003	435,001.75	123,917	196,881	0.4526	281,621	33.35	8,445	16.5
2007	204,993.08	44,726	71,061	0.3466	154,432	36.07	4,281	12.5
2008	2,835.59	571	907	0.3198	2,212	36.76	60	11.5
2009	1,527.50	282	447	0.2929	1,233	37.46	33	10.5
2010	9,532.99	1,595	2,534	0.2658	7,952	38.16	208	9.5
2011	6,766.13	1,016	1,614	0.2385	5,829	38.86	150	8.5
2014	25,796.73	2,530	4,020	0.1558	24,357	40.99	594	5.5
2015	10,376,686.33	835,431	1,327,347	0.1279	10,087,007	41.71	241,858	4.5
2016	66,881.86	4,202	6,676	0.0998	66,894	42.43	1,577	3.5
2017	96,473.41	4,343	6,900	0.0715	99,221	43.16	2,299	2.5
2018	36,887.76	999	1,588	0.0430	38,989	43.89	888	1.5
2019	271,080.87	2,451	3,894	0.0144	294,295	44.63	6,594	0.5
TOTAL	11,534,464.00	1,022,061	1,623,868		11,064,043		266,988	

COMPOSITE ANNUAL ACCRUAL RATE 2.31%

THEORETICAL ACCUMULATED DEPRECIATION FACTOR 0.14

COMPOSITE AVERAGE AGE (YEARS) 4.98

DIRECTED WEIGHTED ALG COMPOSITE REMAINING LIFE (YEARS) 41.38

ALG - Remaining Life

Survivor Curve: R2

ASL: 30

Net Salvage: 0%

Truncation Year:

Missouri American Water

Account #: 382.0000 - Outfall Sewer Lines

CALCULATED ANNUAL ACCRUAL AND ACCRUED DEPRECIATION BASED ON ORIGINAL COST AS OF DECEMBER 31, 2019

Year	Original Cost	Calculated Accumulated Depreciation	Allocated Actual Booked Amount	Accumulated Depreciation Factor	Net Book Value	ALG Remaining Life	Annual Accrual	Average Age
1965	805.09	792	527	0.6543	278	0.50	278	54.5
1971	171.86	161	107	0.6218	65	1.97	33	48.5
1976	149.25	132	88	0.5899	61	3.41	18	43.5
1998	17,745.57	10,027	6,673	0.3761	11,072	13.05	849	21.5
2003	64,126.00	28,979	19,286	0.3008	44,840	16.44	2,727	16.5
2007	64,345.35	22,671	15,088	0.2345	49,257	19.43	2,535	12.5
2009	1,507.96	452	301	0.1996	1,207	21.00	57	10.5
2011	16,028.42	3,939	2,622	0.1636	13,407	22.63	593	8.5
2012	10,140.42	2,212	1,472	0.1452	8,668	23.46	370	7.5
2016	8,636.43	898	598	0.0692	8,039	26.88	299	3.5
2017	9,000.00	672	447	0.0497	8,553	27.76	308	2.5
2018	50,420.02	2,270	1,511	0.0300	48,909	28.65	1,707	1.5
TOTAL	243,076.37	73,204	48,720		194,357		9,773	

COMPOSITE ANNUAL ACCRUAL RATE	4.02%
THEORETICAL ACCUMULATED DEPRECIATION FACTOR	0.20
COMPOSITE AVERAGE AGE (YEARS)	10.94
DIRECTED WEIGHTED ALG COMPOSITE REMAINING LIFE (YEARS)	20.97

ALG - Remaining Life

Survivor Curve: SQ

ASL: 20

Net Salvage: 0%

Truncation Year:

Missouri American Water

Account #: 390.0000 - Office Furniture and Equipment

CALCULATED ANNUAL ACCRUAL AND ACCRUED DEPRECIATION
BASED ON ORIGINAL COST AS OF DECEMBER 31, 2019

Year	Original Cost	Calculated Accumulated Depreciation	Allocated Actual Booked Amount	Accumulated Depreciation Factor	Net Book Value	ALG Remaining Life	Annual Accrual	Average Age
2004	7,216.00	5,592	7,216	1.0000	0	4.50	0	15.5
2007	7,458.47	4,662	7,458	1.0000	0	7.50	0	12.5
2008	28.81	17	29	1.0000	0	8.50	0	11.5
2011	131.62	56	99	0.7527	33	11.50	3	8.5
2014	3,404.12	936	1,658	0.4871	1,746	14.50	120	5.5
2015	101,083.84	22,744	40,282	0.3985	60,802	15.50	3,923	4.5
2016	57,307.60	10,029	17,762	0.3099	39,545	16.50	2,397	3.5
2017	6,260.45	783	1,386	0.2214	4,874	17.50	279	2.5
2018	11,846.73	889	1,574	0.1328	10,273	18.50	555	1.5
2019	19,813.00	495	877	0.0443	18,936	19.50	971	0.5
TOTAL	214,550.64	46,202	78,342		136,209		8,248	

COMPOSITE ANNUAL ACCRUAL RATE	3.84%
THEORETICAL ACCUMULATED DEPRECIATION FACTOR	0.37
COMPOSITE AVERAGE AGE (YEARS)	4.31
DIRECTED WEIGHTED ALG COMPOSITE REMAINING LIFE (YEARS)	15.69

ALG - Remaining Life

Survivor Curve: SQ

ASL: 5

Net Salvage: 0%

Truncation Year:

Missouri American Water

Account #: 390.2000 - Computers and Peripheral

CALCULATED ANNUAL ACCRUAL AND ACCRUED DEPRECIATION BASED ON ORIGINAL COST AS OF DECEMBER 31, 2019

Year	Original Cost	Calculated Accumulated Depreciation	Allocated Actual Booked Amount	Accumulated Depreciation Factor	Net Book Value	ALG Remaining Life	Annual Accrual	Average Age
2011	242.17	242	242	1.0000	0	0.00	0	9.5
2015	3,231.87	2,909	3,232	1.0000	0	0.50	0	4.5
2016	22,970.66	16,079	22,971	1.0000	0	1.50	0	3.5
2017	28,675.57	14,338	28,676	1.0000	0	2.50	0	2.5
TOTAL	55,120.27	33,568	55,120		0		0	

**** Allocated Booked Amount not equal to summation ****

COMPOSITE ANNUAL ACCRUAL RATE	0.00%
THEORETICAL ACCUMULATED DEPRECIATION FACTOR	2.18
COMPOSITE AVERAGE AGE (YEARS)	3.06
DIRECTED WEIGHTED ALG COMPOSITE REMAINING LIFE (YEARS)	1.96

ALG - Remaining Life

Survivor Curve: L3

ASL: 12

Net Salvage: 0%

Truncation Year:

Missouri American Water

Account #: 391.0000 - Transportation Equipment

CALCULATED ANNUAL ACCRUAL AND ACCRUED DEPRECIATION
BASED ON ORIGINAL COST AS OF DECEMBER 31, 2019

Year	Original Cost	Calculated Accumulated Depreciation	Allocated Actual Booked Amount	Accumulated Depreciation Factor	Net Book Value	ALG Remaining Life	Annual Accrual	Average Age
2005	46,070.01	33,951	46,070	1.0000	0	3.16	0	14.5
2006	29,944.88	21,551	29,945	1.0000	0	3.36	0	13.5
2007	18,581.83	13,101	18,582	1.0000	0	3.54	0	12.5
2009	50,353.67	33,934	50,354	1.0000	0	3.91	0	10.5
2010	20,189.47	13,111	20,189	1.0000	0	4.21	0	9.5
2011	25,978.49	15,953	25,978	1.0000	0	4.63	0	8.5
2013	42,222.39	21,400	42,222	1.0000	0	5.92	0	6.5
2015	266,937.41	97,485	237,524	0.8898	29,414	7.62	3,861	4.5
2016	60,530.37	17,427	42,461	0.7015	18,069	8.55	2,115	3.5
2017	141,928.93	29,452	71,761	0.5056	70,168	9.51	7,378	2.5
2018	60,530.37	7,565	18,433	0.3045	42,098	10.50	4,009	1.5
2019	60,530.37	2,523	6,147	0.1016	54,383	11.50	4,729	0.5
TOTAL	823,798.19	307,454	609,667		214,132		22,093	

COMPOSITE ANNUAL ACCRUAL RATE 2.68%

THEORETICAL ACCUMULATED DEPRECIATION FACTOR 0.74

COMPOSITE AVERAGE AGE (YEARS) 5.35

DIRECTED WEIGHTED ALG COMPOSITE REMAINING LIFE (YEARS) 7.52

ALG - Remaining Life

Survivor Curve: SQ

ASL: 25

Net Salvage: 0%

Truncation Year:

Missouri American Water

Account #: 392.0000 - Stores Equipment

CALCULATED ANNUAL ACCRUAL AND ACCRUED DEPRECIATION BASED ON ORIGINAL COST AS OF DECEMBER 31, 2019

Year	Original Cost	Calculated Accumulated Depreciation	Allocated Actual Booked Amount	Accumulated Depreciation Factor	Net Book Value	ALG Remaining Life	Annual Accrual	Average Age
2007	25,404.64	12,702	25,405	1.0000	0	12.50	0	12.5
2015	1,600.00	288	1,600	1.0000	0	20.50	0	4.5
TOTAL	27,004.64	12,990	27,005		0		0	

**** Allocated Booked Amount not equal to summation ****

COMPOSITE ANNUAL ACCRUAL RATE	0.00%
THEORETICAL ACCUMULATED DEPRECIATION FACTOR	1.01
COMPOSITE AVERAGE AGE (YEARS)	12.03
DIRECTED WEIGHTED ALG COMPOSITE REMAINING LIFE (YEARS)	12.97

ALG - Remaining Life

Survivor Curve: SQ

ASL: 20

Net Salvage: 0%

Truncation Year:

Missouri American Water

Account #: 393.0000 - Tools, Shop, and Garage Equipment

CALCULATED ANNUAL ACCRUAL AND ACCRUED DEPRECIATION
BASED ON ORIGINAL COST AS OF DECEMBER 31, 2019

Year	Original Cost	Calculated Accumulated Depreciation	Allocated Actual Booked Amount	Accumulated Depreciation Factor	Net Book Value	ALG Remaining Life	Annual Accrual	Average Age
2005	560.31	406	350	0.6244	210	5.50	38	14.5
2006	1,931.94	1,304	1,123	0.5813	809	6.50	124	13.5
2007	51,331.63	32,082	27,630	0.5383	23,702	7.50	3,160	12.5
2008	14,652.49	8,425	7,256	0.4952	7,397	8.50	870	11.5
2010	203.58	97	83	0.4091	120	10.50	11	9.5
2011	6,352.43	2,700	2,325	0.3660	4,027	11.50	350	8.5
2012	14,011.15	5,254	4,525	0.3230	9,486	12.50	759	7.5
2013	6,530.97	2,123	1,828	0.2799	4,703	13.50	348	6.5
2014	16,021.76	4,406	3,794	0.2368	12,227	14.50	843	5.5
2015	10,782.77	2,426	2,089	0.1938	8,693	15.50	561	4.5
2016	3,488.99	611	526	0.1507	2,963	16.50	180	3.5
2017	34,530.40	4,316	3,717	0.1077	30,813	17.50	1,761	2.5
2018	14,931.02	1,120	964	0.0646	13,967	18.50	755	1.5
2019	25,672.53	642	553	0.0215	25,120	19.50	1,288	0.5
TOTAL	201,001.97	65,912	56,764		144,238		11,050	

COMPOSITE ANNUAL ACCRUAL RATE 5.50%

THEORETICAL ACCUMULATED DEPRECIATION FACTOR 0.28

COMPOSITE AVERAGE AGE (YEARS) 6.56

DIRECTED WEIGHTED ALG COMPOSITE REMAINING LIFE (YEARS) 13.44

ALG - Remaining Life

Survivor Curve: SQ

ASL: 15

Net Salvage: 0%

Truncation Year:

Missouri American Water

Account #: 394.0000 - Laboratory Equipment

CALCULATED ANNUAL ACCRUAL AND ACCRUED DEPRECIATION
BASED ON ORIGINAL COST AS OF DECEMBER 31, 2019

Year	Original Cost	Calculated Accumulated Depreciation	Allocated Actual Booked Amount	Accumulated Depreciation Factor	Net Book Value	ALG Remaining Life	Annual Accrual	Average Age
2005	2,205.97	2,132	2,132	0.9667	74	0.50	74	14.5
2006	2,656.55	2,391	2,391	0.9000	266	1.50	177	13.5
2007	12,951.16	10,793	10,793	0.8333	2,159	2.50	864	12.5
2009	5,742.71	4,020	4,020	0.7000	1,723	4.50	383	10.5
2011	10,728.71	6,080	6,080	0.5667	4,649	6.50	715	8.5
2013	8,347.05	3,617	3,617	0.4333	4,730	8.50	556	6.5
2014	14,217.87	5,213	5,213	0.3667	9,005	9.50	948	5.5
2015	5,855.94	1,757	1,757	0.3000	4,099	10.50	390	4.5
2016	4,497.62	1,049	1,049	0.2333	3,448	11.50	300	3.5
2017	20,522.16	3,420	3,420	0.1667	17,102	12.50	1,368	2.5
2018	7,684.80	768	768	0.1000	6,916	13.50	512	1.5
2019	22,818.58	761	761	0.0333	22,058	14.50	1,521	0.5
TOTAL	118,229.12	42,001	42,001		76,228		7,809	

COMPOSITE ANNUAL ACCRUAL RATE	6.61%
THEORETICAL ACCUMULATED DEPRECIATION FACTOR	0.36
COMPOSITE AVERAGE AGE (YEARS)	5.33
DIRECTED WEIGHTED ALG COMPOSITE REMAINING LIFE (YEARS)	9.67

ALG - Remaining Life
Survivor Curve: L1.5
ASL: 15
Net Salvage: 0%
Truncation Year:

Missouri American Water

Account #: 395.0000 - Power Operated Equipment

CALCULATED ANNUAL ACCRUAL AND ACCRUED DEPRECIATION BASED ON ORIGINAL COST AS OF DECEMBER 31, 2019

Year	Original Cost	Calculated Accumulated Depreciation	Allocated Actual Booked Amount	Accumulated Depreciation Factor	Net Book Value	ALG Remaining Life	Annual Accrual	Average Age
2007	531.97	278	532	1.0000	0	7.15	0	12.5
2015	579,884.99	152,152	579,885	1.0000	0	11.06	0	4.5
2019	1,402.04	45	1,402	1.0000	0	14.52	0	0.5
TOTAL	581,819.00	152,475	581,819		0		0	

**** Allocated Booked Amount not equal to summation ****

COMPOSITE ANNUAL ACCRUAL RATE	0.00%
THEORETICAL ACCUMULATED DEPRECIATION FACTOR	1.30
COMPOSITE AVERAGE AGE (YEARS)	4.50
DIRECTED WEIGHTED ALG COMPOSITE REMAINING LIFE (YEARS)	11.07

ALG - Remaining Life

Survivor Curve: SQ

ASL: 15

Net Salvage: 0%

Truncation Year:

Missouri American Water

Account #: 396.0000 - Communication Equipment

CALCULATED ANNUAL ACCRUAL AND ACCRUED DEPRECIATION BASED ON ORIGINAL COST AS OF DECEMBER 31, 2019

Year	Original Cost	Calculated Accumulated Depreciation	Allocated Actual Booked Amount	Accumulated Depreciation Factor	Net Book Value	ALG Remaining Life	Annual Accrual	Average Age
2007	18,240.04	15,200	14,191	0.7780	4,049	2.50	1,620	12.5
2010	32,320.34	20,470	19,110	0.5913	13,210	5.50	2,402	9.5
2011	7,016.88	3,976	3,712	0.5290	3,305	6.50	508	8.5
2014	10,233.37	3,752	3,503	0.3423	6,730	9.50	708	5.5
2015	2,221.88	667	622	0.2801	1,600	10.50	152	4.5
2016	7.63	2	2	0.2178	6	11.50	1	3.5
2017	99,344.66	16,557	15,458	0.1556	83,887	12.50	6,711	2.5
2018	57,815.19	5,782	5,398	0.0934	52,418	13.50	3,883	1.5
2019	197,298.63	6,577	6,140	0.0311	191,159	14.50	13,183	0.5
TOTAL	424,498.62	72,982	68,136		356,363		29,168	

COMPOSITE ANNUAL ACCRUAL RATE 6.87%

THEORETICAL ACCUMULATED DEPRECIATION FACTOR 0.16

COMPOSITE AVERAGE AGE (YEARS) 2.58

DIRECTED WEIGHTED ALG COMPOSITE REMAINING LIFE (YEARS) 12.42

ALG - Remaining Life

Survivor Curve: SQ

ASL: 15

Net Salvage: 0%

Truncation Year:

Missouri American Water

Account #: 397.0000 - Miscellaneous Equipment

CALCULATED ANNUAL ACCRUAL AND ACCRUED DEPRECIATION BASED ON ORIGINAL COST AS OF DECEMBER 31, 2019

Year	Original Cost	Calculated Accumulated Depreciation	Allocated Actual Booked Amount	Accumulated Depreciation Factor	Net Book Value	ALG Remaining Life	Annual Accrual	Average Age
2005	6,159.57	5,954	6,160	1.0000	0	0.50	0	14.5
2006	68,652.55	61,787	68,653	1.0000	0	1.50	0	13.5
2007	13,474.25	11,229	13,474	1.0000	0	2.50	0	12.5
2008	481.00	369	481	1.0000	0	3.50	0	11.5
2009	94.27	66	94	1.0000	0	4.50	0	10.5
2010	1,773.21	1,123	1,773	1.0000	0	5.50	0	9.5
2011	260.30	148	260	1.0000	0	6.50	0	8.5
2013	7,847.37	3,401	7,847	1.0000	0	8.50	0	6.5
2015	12,030.56	3,609	12,031	1.0000	0	10.50	0	4.5
2016	3,173.59	741	3,174	1.0000	0	11.50	0	3.5
2017	41,037.83	6,840	41,038	1.0000	0	12.50	0	2.5
2018	7,655.56	766	7,656	1.0000	0	13.50	0	1.5
2019	37,324.60	1,244	35,174	0.9424	2,150	14.50	148	0.5
TOTAL	199,964.66	97,275	197,814		2,150		148	

COMPOSITE ANNUAL ACCRUAL RATE 0.07%

THEORETICAL ACCUMULATED DEPRECIATION FACTOR 0.99

COMPOSITE AVERAGE AGE (YEARS) 7.30

DIRECTED WEIGHTED ALG COMPOSITE REMAINING LIFE (YEARS) 7.70

ALG - Remaining Life

Survivor Curve: SQ

ASL: 20

Net Salvage: 0%

Truncation Year:

Missouri American Water

Account #: 398.0000 - Other Tangible Plant

CALCULATED ANNUAL ACCRUAL AND ACCRUED DEPRECIATION BASED ON ORIGINAL COST AS OF DECEMBER 31, 2019

Year	Original Cost	Calculated Accumulated Depreciation	Allocated Actual Booked Amount	Accumulated Depreciation Factor	Net Book Value	ALG Remaining Life	Annual Accrual	Average Age
2016	110,813.56	19,392	22,660	0.2045	88,154	16.50	5,343	3.5
TOTAL	110,813.56	19,392	22,660		88,154		5,343	

COMPOSITE ANNUAL ACCRUAL RATE	4.82%
THEORETICAL ACCUMULATED DEPRECIATION FACTOR	0.20
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”². 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”³. 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.”⁴ 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 curve⁵. 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.

² Wolf, Frank K. and W. Chester Fitch, *Depreciation Systems* (Iowa State University Press, 1994), 21.

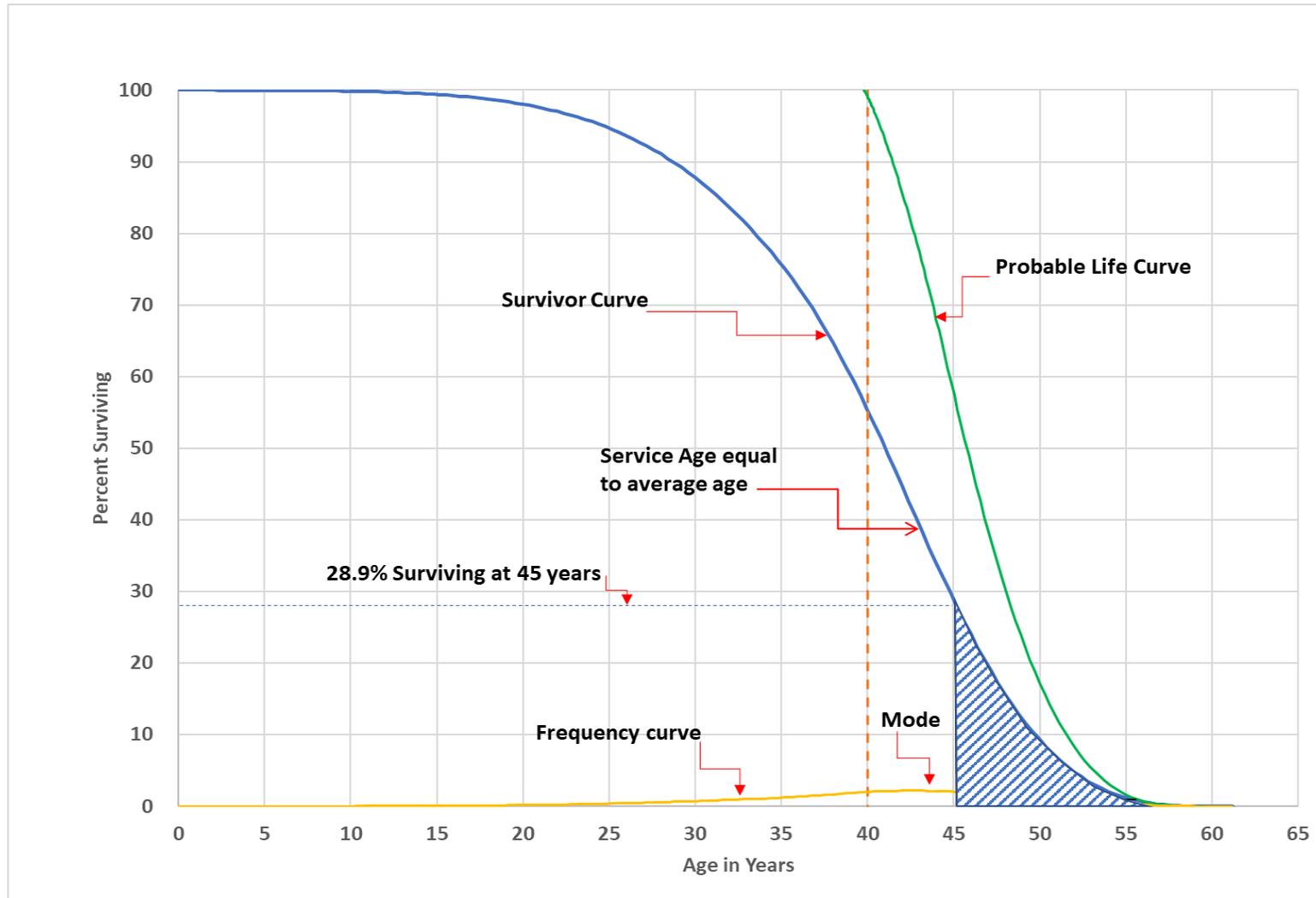
³ *Ibid*, 23.

⁴ *Ibid*, 29.

⁵ *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”⁶. 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*⁷. In 1957, Frank V. B. Couch, Jr., an Iowa State College graduate student, submitted a thesis⁸ presenting his development of the fourth family consisting of the four O-type survivor curves.

⁶ *Ibid*, 21

⁷ Marston, Anson, Robley Winfrey and Jean C. Hempstead, *Engineering Valuation and Depreciation* (The Iowa State University Press, 1953)

⁸ 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

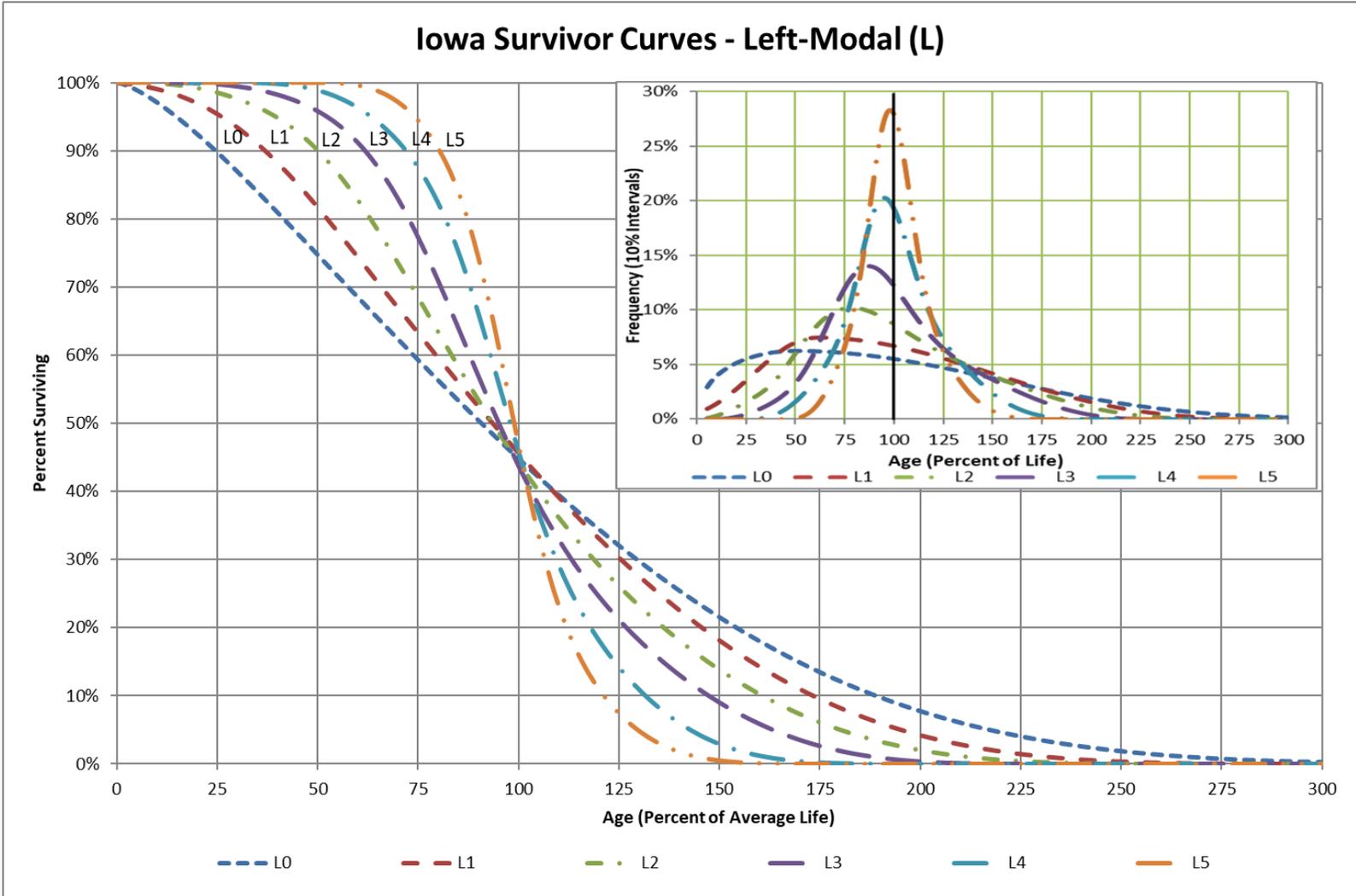




Figure 3: Right Modal or "R" Iowa Type Survivor Curves

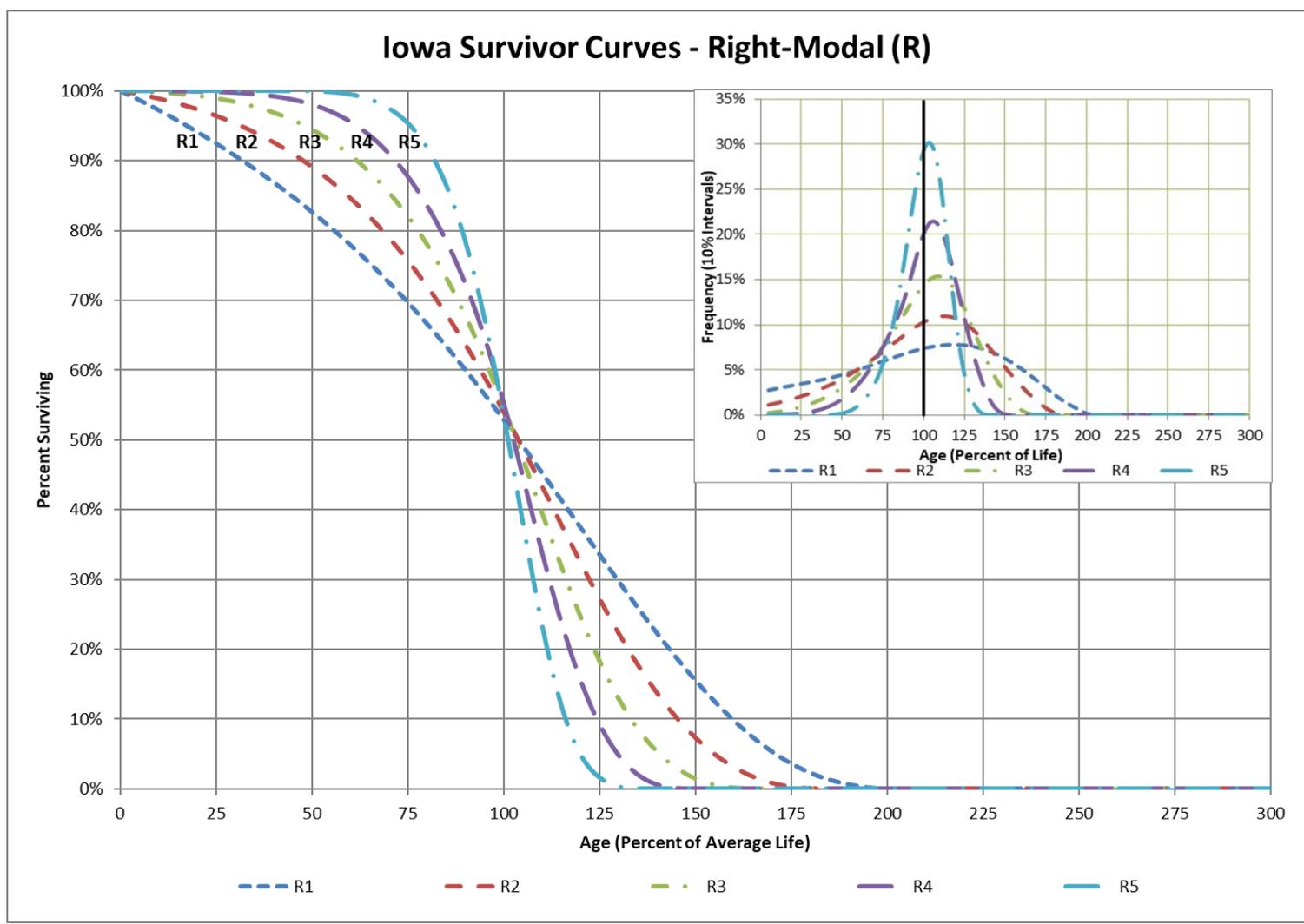




Figure 4: Symmetrical or "S" Iowa Type Survivor Curves

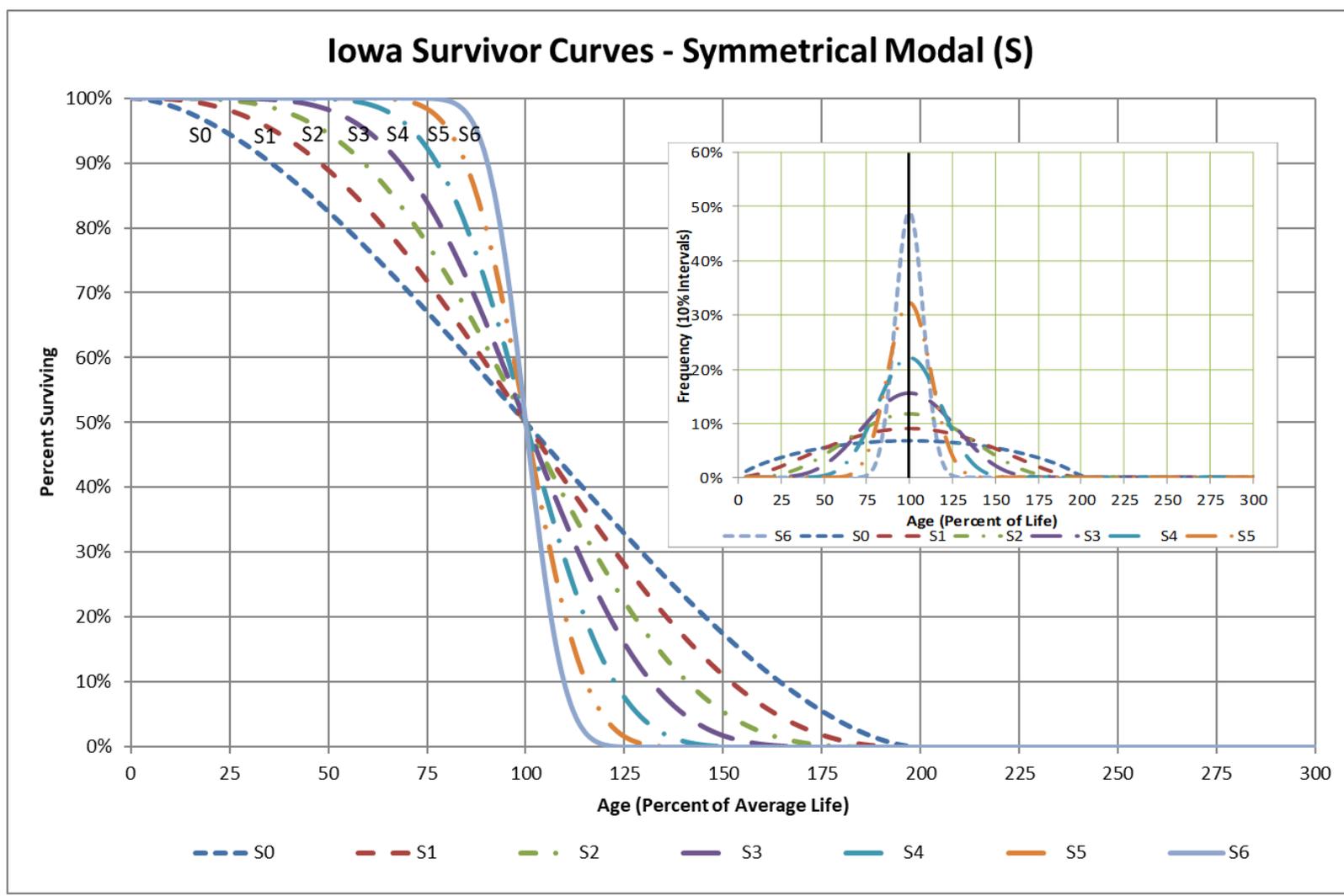
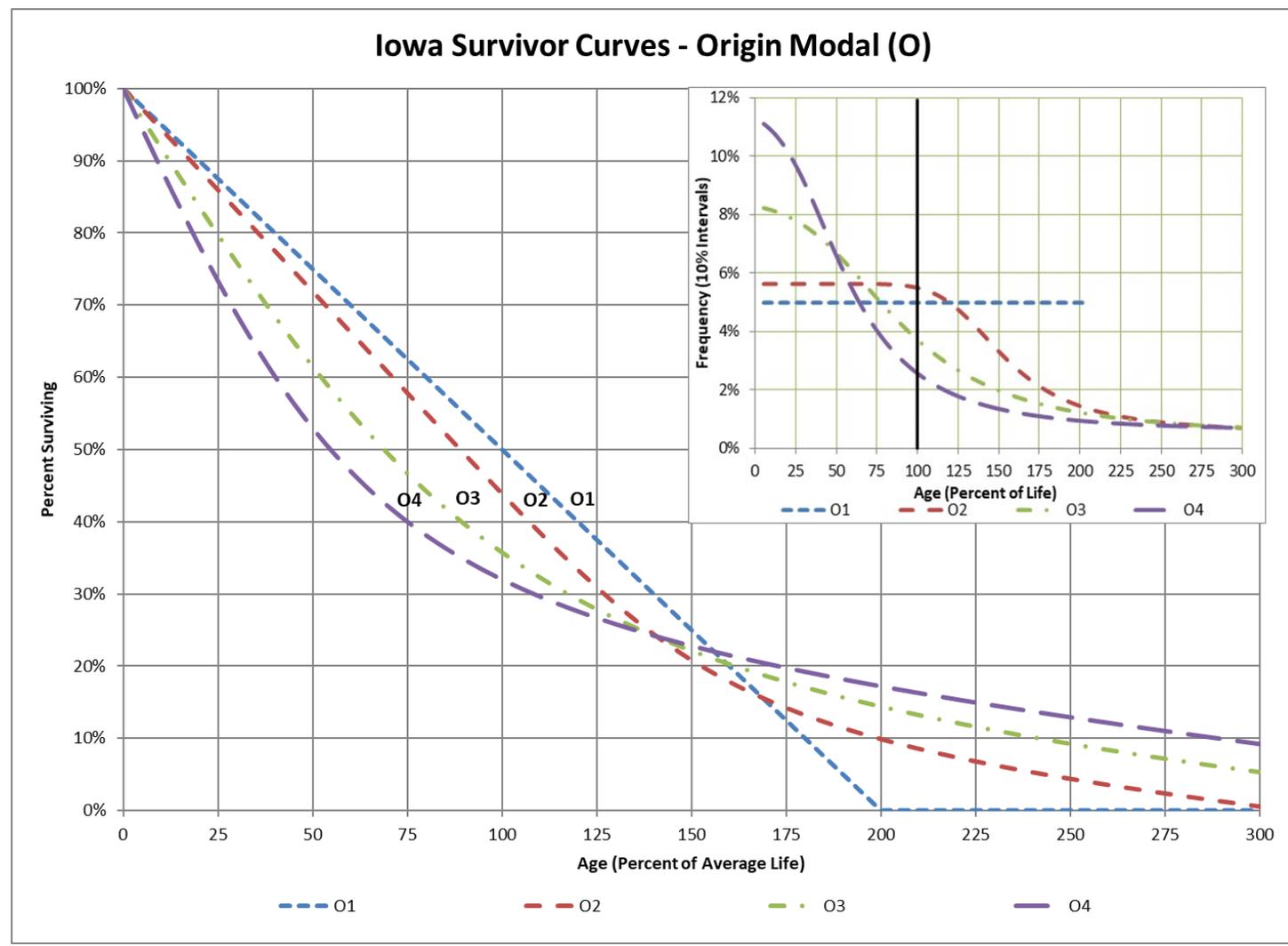




Figure 5: Origin Modal or "O" Iowa Type Survivor Curves





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,⁹ Engineering Valuation and Depreciation¹⁰ and Depreciation Systems.¹¹

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:

$$\underline{\$10 + \$12 + \$13 + \$11 + \$13 + \$13 + \$15 + \$17 + \$19 + \$20 = \$143 \text{ k}}$$

⁹ Anson, Winfrey & Hempstead, supra note 6

¹⁰ Anson, Winfrey & Hempstead, supra note 6

¹¹ 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

**Retirements (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)	Exposures (Thousands of Dollars)										Total at Beginning of Age Interval (12)	Age Interval (13)
	2008 (2)	2009 (3)	2010 (4)	2011 (5)	2012 (6)	2013 (7)	2014 (8)	2015 (9)	2016 (10)	2017 (11)		
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 ^o	416	407	397	386	374	361	347	332	316	1,503	8½-9½
2009		460 ^o	455	444	432	419	405	390	374	356	1,952	7½-8½
2010			510 ^o	504	492	479	464	448	431	412	2,463	6½-7½
2011				580 ^o	574	561	546	530	501	482	3,057	5½-6½
2012					660 ^o	653	639	623	628	609	3,789	4½-5½
2013						750 ^o	742	724	685	663	4,332	3½-4½
2014							850 ^o	841	821	799	4,955	2½-3½
2015								960 ^o	949	923	5,719	1½-2½
2016									1,080 ^o	1,069	6,579	½-1½
2017										1,220 ^o	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	

^o 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	=	$\$143,000 \div \$3,789,000$	= 0.0377
Survivor Ratio	=	$1.000 - 0.0377$	= 0.9623
Percent surviving at age 5½	=	$(88.15) \times (0.9623)$	= 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

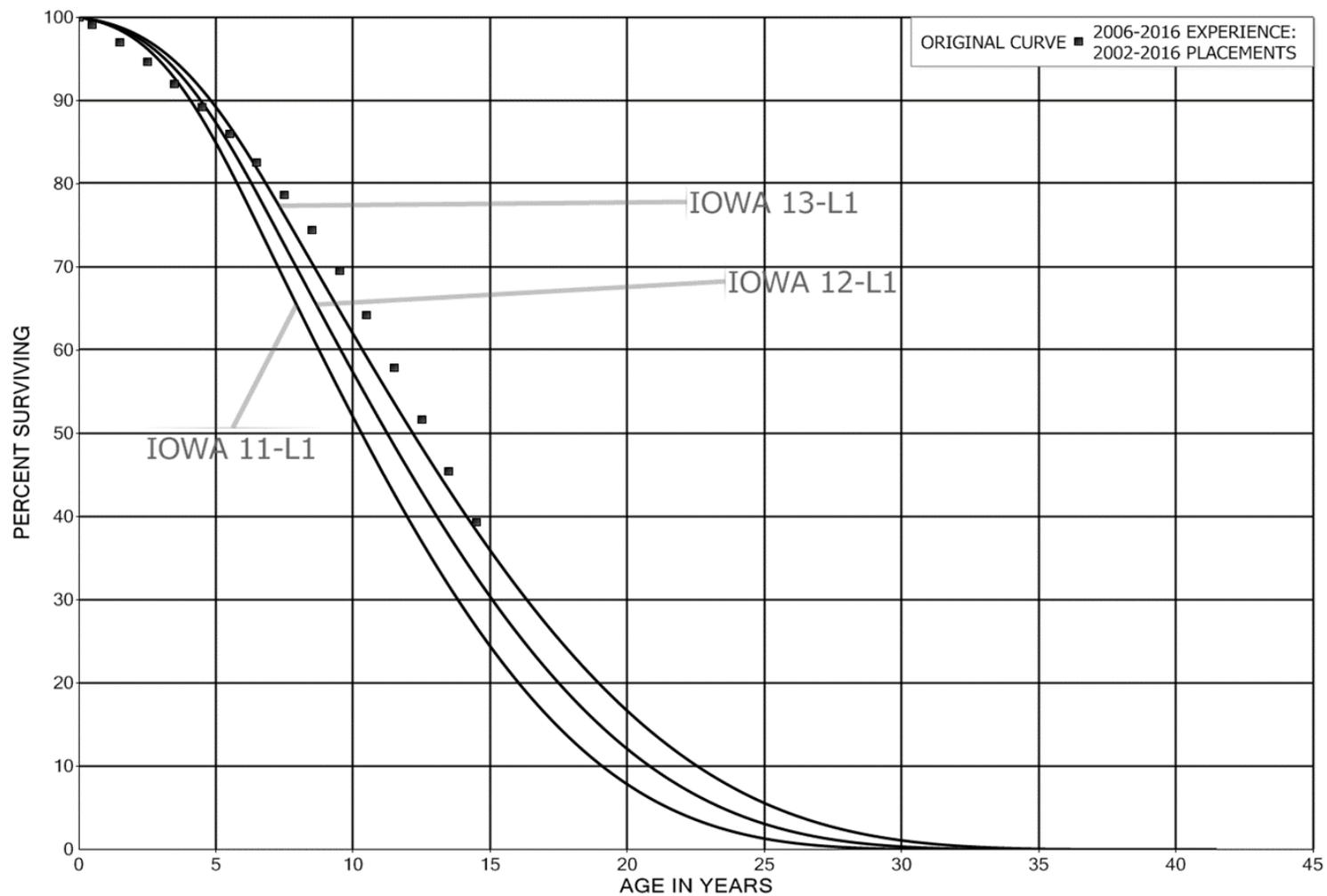




Figure 7: Illustration of the Matching of an Original Survivor Curve with a SO Iowa Type Curve Original and Smooth Survivor Curves

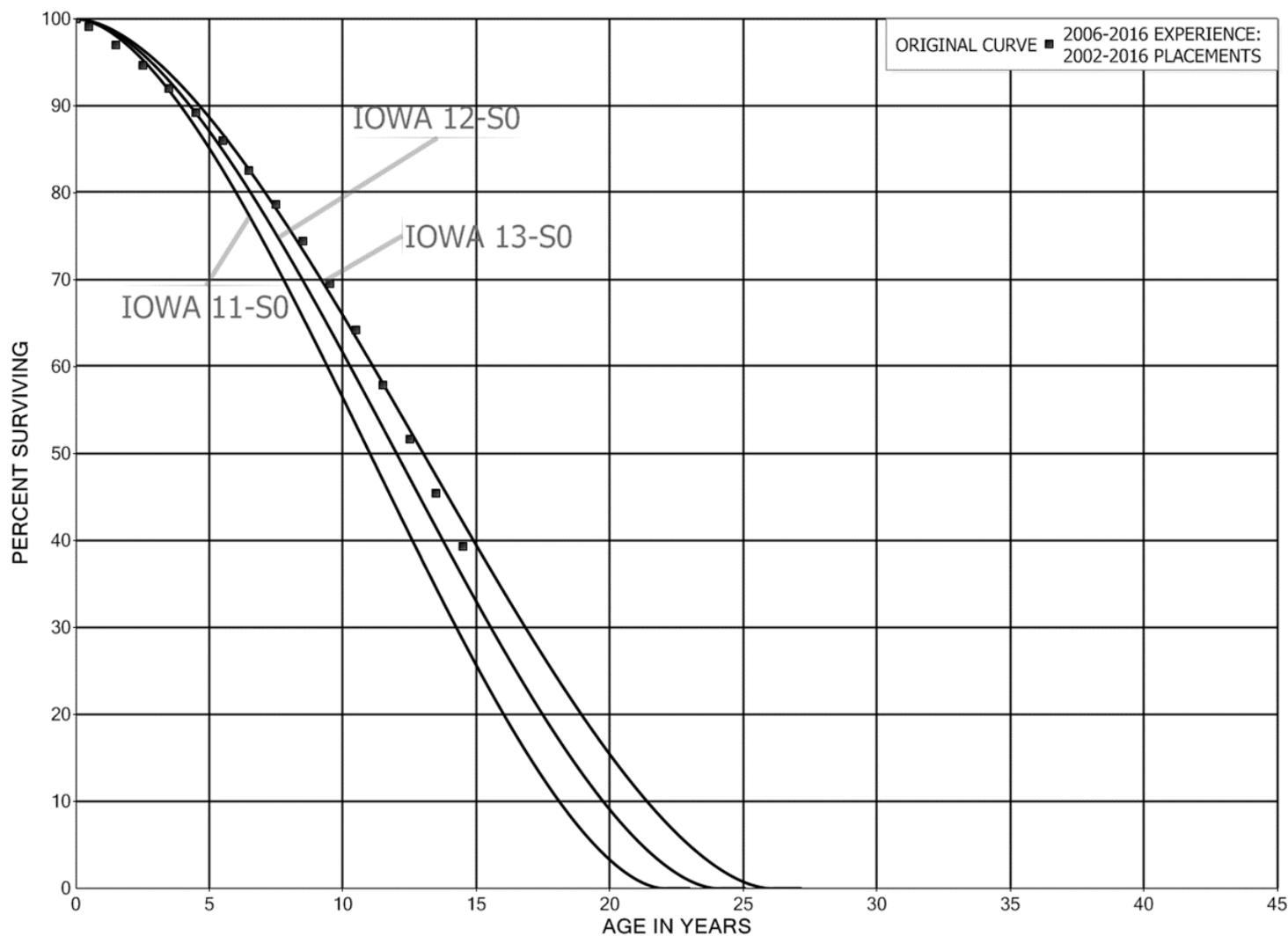




Figure 8: Illustration of the Matching of an Original Survivor Curve with a R1 Iowa Type Curve Original and Smooth Survivor Curves

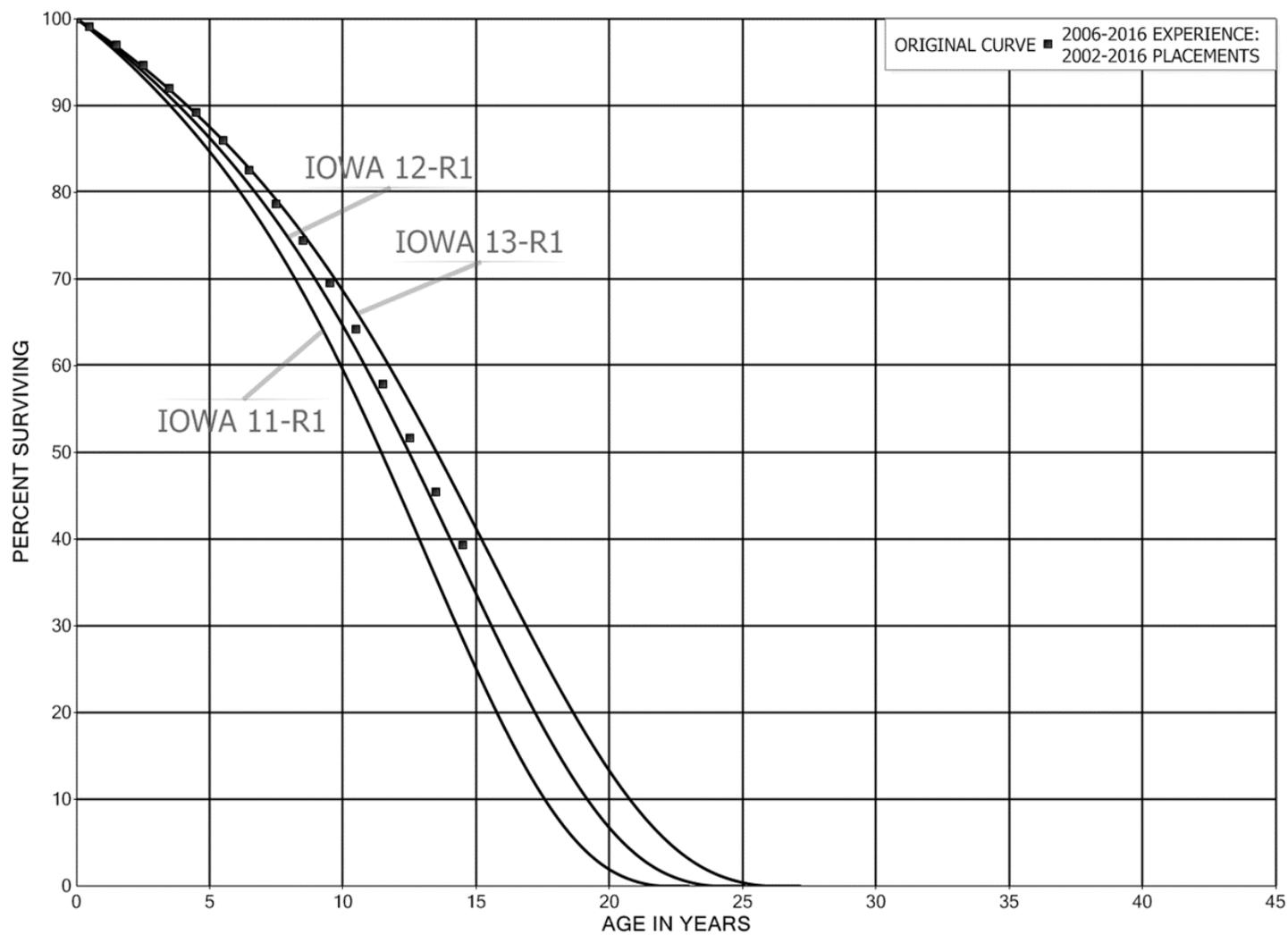
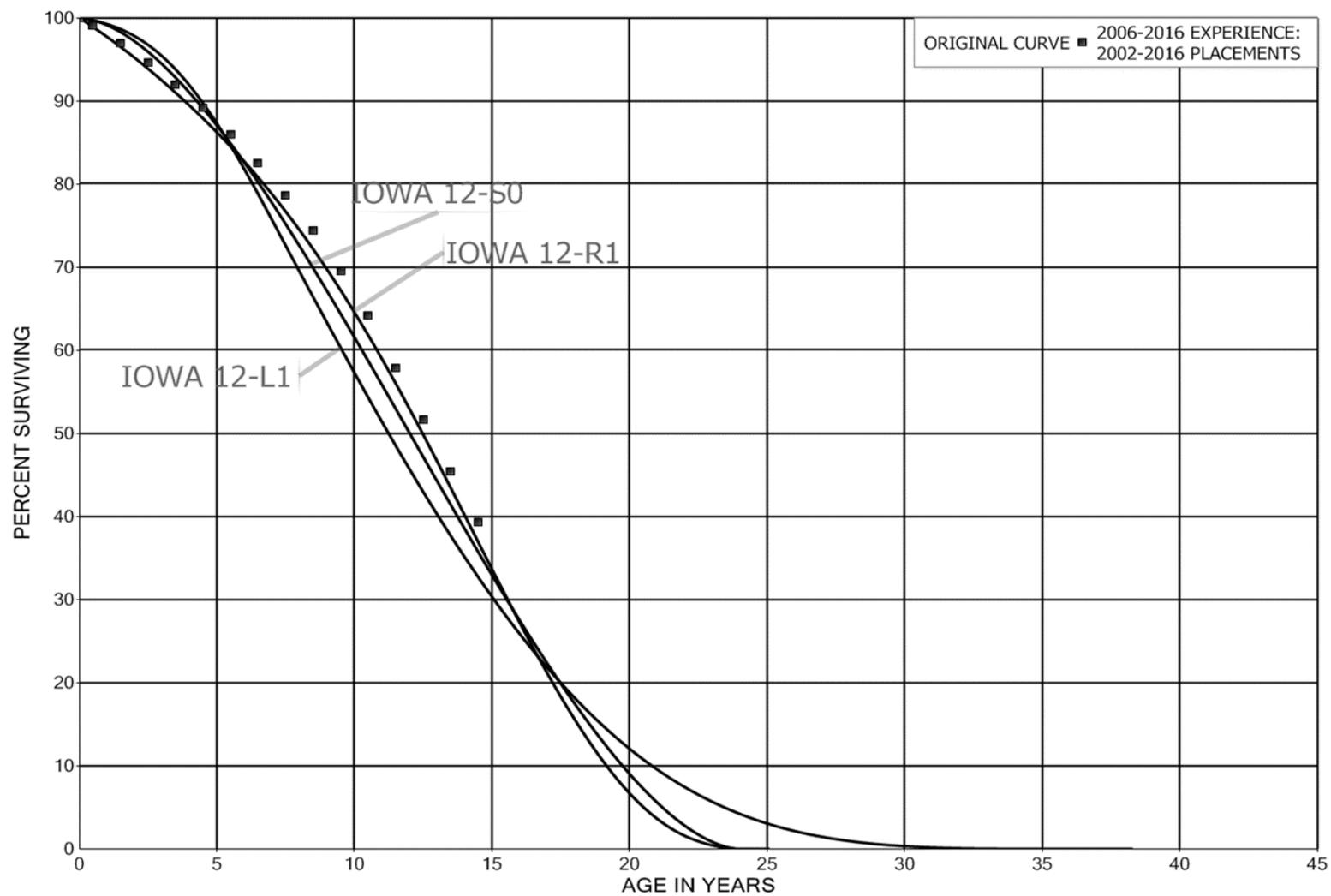




Figure 9: Illustration of the Matching of an Original Survivor Curve with a L1 Iowa Type Curve Original and Smooth Survivor Curves





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.