SOAH DOCKET NO. 473-19-6677
PUC DOCKET NO. 49831

APPLICATION OF SOUTHWESTERN	**§**	**BEFORE THE STATE OFFICE**
PUBLIC SERVICE COMPANY FOR	**§**	**OF**
AUTHORITY TO CHANGE RATES	**§**	**ADMINISTRATIVE HEARINGS**

DIRECT TESTIMONY AND EXHIBITS

OF

DAVID J. GARRETT

ON BEHALF OF

THE ALLIANCE OF XCEL MUNICIPALITIES

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EXHIBITS

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I. INTRODUCTION

Q. STATE YOUR NAME AND OCCUPATION.

A. My name is David J. Garrett. I am a consultant specializing in public utility regulation. I am the managing member of Resolve Utility Consulting, PLLC. I focus my practice on the primary capital recovery mechanisms for public utility companies: cost of capital and depreciation.

Q. SUMMARIZE YOUR EDUCATIONAL BACKGROUND AND PROFESSIONAL EXPERIENCE.

A. I received a B.B.A. with a major in Finance, an M.B.A. and a Juris Doctor from the University of Oklahoma. I worked in private legal practice for several years before accepting a position as assistant general counsel at the Oklahoma Corporation Commission in 2011. At the Oklahoma Corporation Commission, I worked in the Office of General Counsel in regulatory proceedings. In 2012, I began working for the Public Utility Division as a regulatory analyst providing testimony in regulatory proceedings. After leaving the Oklahoma Corporation Commission, I formed Resolve Utility Consulting, PLLC, where I have represented various consumer groups, state agencies, and municipalities in utility regulatory proceedings, primarily in the areas of cost of capital and depreciation. I am a Certified Depreciation Professional with the Society of Depreciation Professionals. I am also a Certified Rate of Return Analyst with the Society of Utility and Regulatory Financial Analysts. A more complete description of my qualifications and regulatory experience is included in my curriculum vitae.[1]

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[1] Exhibit DJG-1.

Q. WHOSE BEHALF ARE YOU TESTIFYING IN THIS PROCEEDING?

A. I am testifying on behalf of Alliance of Xcel Municipalities ("AXM").

Q. DESCRIBE THE PURPOSE AND SCOPE OF YOUR TESTIMONY IN THIS PROCEEDING.

A. I am addressing the direct testimony and depreciation study of Dane A. Watson filed on behalf of Southwestern Public Service Company ("SPS" or the "Company"). My testimony proposes several adjustments to SPS's proposed depreciation rates.

II. EXECUTIVE SUMMARY

Q. SUMMARIZE THE KEY POINTS OF YOUR TESTIMONY.

A. In the context of utility ratemaking, "depreciation" refers to a cost allocation system designed to measure the rate by which a utility may recover its capital investments in a systematic and rational manner. I employed a well-established depreciation system and used actuarial and simulated plant record analyses to statistically analyze the Company's depreciable assets in order to develop reasonable depreciation rates in this case. Figure 1, below, compares my proposed depreciation accrual by plant function to those proposed by Mr. Watson.[2]

Figure 1:
Summary Depreciation Accrual Comparison

Plant Function	Plant Balance 12/31/2018	SPS Proposed Accrual	AXM Proposed Accrual	**AXM Accrual Adjustment**
Production	$ 2,169,678,356	$ 96,292,499	$ 80,885,050	$ (15,407,450)
Transmission	2,977,906,058	84,164,669	68,250,509	(15,914,160)
Distribution	877,930,177	24,864,758	21,833,167	(3,031,592)
General	388,376,979	31,070,847	30,904,478	(166,369)
Intangible	181,308,163	26,344,745	26,344,745	-
Total Plant Studied	$ 6,595,199,734	$ 262,737,520	$ 228,217,949	**$ (34,519,571)**

[2] Exhibit DJG-2

AXM's total adjustment reduces the Company's proposed annual depreciation accrual by $34.5 million.[3] In this case, SPS is proposing a substantial increase to depreciation expense in the amount of $56.6 million, which is an increase of nearly 30%.[4] The Company's requested increase to depreciation expense is based on several unreasonable depreciation parameters and assumptions. My adjustments to SPS's depreciation accruals would still result in an increase in depreciation expense for SPS, though it would mitigate some of the financial harm otherwise imposed on customers by SPS's proposed increase.

Q. PLEASE SUMMARIZE THE PRIMARY ISSUES DRIVING AXM'S PROPOSED ADJUSTMENTS TO DEPRECIATION RATES?

A. My proposed depreciation adjustments are based on the following factors: (1) removal of contingency costs from SPS's decommissioning cost estimates (thus reducing terminal net salvage rates); (2) retention of the currently approved life of the Tolk generating facility with retirement in 2037; (3) extension of the proposed service lives of several mass property accounts based on actuarial and simulated life analysis; and (4) increases in the net-salvage rates of several mass property accounts based on gradualism. In Figure 2, below, I show the estimated impact of these issues on my adjustments to SPS's depreciation accrual.

Figure 2:
Broad Issue Impacts

Issue	Impact
1. Remove contingency costs from decom. studies	$7.7 million
2. Keep current life of Tolk at 2037	$7.7 million
3. Mass propoperty service life adjustments	$11.7 million
4. Mass property net salvage adjustments	$7.4 million
Total	**$34.5 million**

I discuss these issues in more detail below.

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3 *See* Exhibits DJG-2 and DJG-3.

4 Attachment DAW-RR-2, Appendix B.

Q. PLEASE SUMMARIZE YOUR ADJUSTMENTS TO SERVICE LIFE AND NET SALVAGE TO SPS'S MASS PROPERTY ACCOUNTS.

A. I propose service life and net salvage adjustments to several of SPS's mass property accounts. In Figure 3, below, I summarize my adjustments to these depreciation parameters and show their impacts to the proposed depreciation rates and accruals.[5]

Figure 3:
Mass Property Depreciation Parameter Comparison

		SPS Proposed					AXM Proposed				
Account No.	Description	Iowa Curve Type	Iowa Curve AL	Net Salvage	Depr Rate	Annual Accrual	Iowa Curve Type	Iowa Curve AL	Net Salvage	Depr Rate	Annual Accrual
	Transmission Plant										
352.00	Structures & Improvements	R4	65	-20%	1.91%	1,941,990	R3	70	-20%	1.67%	1,697,068
355.00	Poles & Fixtures	R2.5	51	-75%	3.53%	40,961,092	L1.5	63	-45%	2.27%	26,344,605
356.00	Overhead Conductors & Devices	R2	50	-45%	3.01%	13,429,070	R2	50	-40%	2.85%	12,697,128
	Distribution Plant										
362.00	Station Equipment	R1.5	55	-25%	2.27%	3,872,485	R1	61	-25%	2.00%	3,403,095
364.00	Poles, Towers & Fixtures	R0.5	53	-75%	3.30%	6,622,220	R0.5	56	-60%	2.86%	5,732,862
367.00	Underground Conductor & Devices	R1	53	-30%	2.45%	836,195	R0.5	61	-30%	1.96%	669,060
368.00	Line Transformers	R1	46	-10%	2.39%	3,550,694	L0	55	-10%	1.61%	2,387,492
369.00	Services	R1.5	48	-40%	2.91%	1,752,425	R0.5	60	-40%	2.01%	1,207,423
373.00	Street Lighting & Signal Systems	R2	39	-60%	4.10%	717,713	R2	39	-55%	4.89%	856,982
	General Plant										
390.00	Structures & Improvements	R1	53	-10%	2.13%	1,463,647	L0.5	57	-10%	1.89%	1,297,278

I discuss my proposed adjustments in more detail below.

Q. DESCRIBE WHY IT IS IMPORTANT NOT TO OVERESTIMATE DEPRECIATION RATES.

A. The issue of depreciation is essentially one of timing. Under the rate-base, rate-of-return model, the utility is allowed to recover the original cost of its prudent investments used and useful to provide service. Depreciation systems are designed to allocate those costs in a systematic and rational manner – specifically, over the service life of the utility's assets. If depreciation rates are overestimated (i.e., service lives are underestimated), it encourages economic inefficiency.

[5] *See also* Exhibit DJG-3.

Unlike competitive firms, regulated utility companies are not always incentivized by natural market forces to make the most economically efficient decisions. If a utility is allowed to recover the cost of an asset before the end of its useful life, this could incentivize the utility to unnecessarily replace the asset in order to increase rate base and ultimately increase earnings; this results in economic waste. Thus, from a public policy perspective, it is preferable for regulators to ensure that assets are not depreciated before the end of their true useful lives.

While underestimating the useful lives of depreciable assets could financially harm current ratepayers and encourage economic waste, unintentionally overestimating depreciable lives (i.e., underestimating depreciation rates) does not harm the Company. This is because if an asset's life is overestimated, there are a variety of measures that regulators can use to ensure the utility is not financially harmed and recovers the full cost of its plant investment. One such measure would be the use of a regulatory asset account. In that case, the Company's original cost investment in these assets would remain in the Company's rate base until they are recovered.

Thus, the process of depreciation strives for a perfect match between actual and estimated useful life. When these estimates are not exact, however, it is better from a public policy perspective that useful lives are not underestimated.

III. REGULATORY STANDARDS

Q. DISCUSS THE STANDARD BY WHICH REGULATED UTILITIES ARE ALLOWED TO RECOVER DEPRECIATION EXPENSE.

A. In *Lindheimer v. Illinois Bell Telephone Co.*, the U.S. Supreme Court stated that "depreciation is the loss, not restored by current maintenance, which is due to all the factors causing the ultimate retirement of the property. These factors embrace wear and tear, decay, inadequacy, and obsolescence."[6] The *Lindheimer* Court also recognized that the

[6] *Lindheimer v. Ill. Bell Tel. Co.*, 292 U.S. 151, 167 (1934).

original cost of plant assets, rather than present value or some other measure, is the proper basis for calculating depreciation expense.[7] Moreover, the *Lindheimer* Court found:

> [T]he company has the burden of making a convincing showing that the amounts it has charged to operating expenses for depreciation have not been excessive. That burden is not sustained by proof that its general accounting system has been correct. The calculations are mathematical, but the predictions underlying them are essentially matters of opinion.[8]

Thus, SPS bears the burden of making a convincing showing that its proposed depreciation rates are not excessive.

Q. IN THIS CASE, HAS SPS MADE A CONVINCING SHOWING THAT ITS PROPOSED DEPRECIATION RATES ARE NOT EXCESSIVE?

A. For some accounts, SPS has demonstrated that its proposed rates are reasonable; however, for several accounts the Company has not made a convincing showing that all of its proposed rates are reasonable.

Q. SHOULD DEPRECIATION REPRESENT AN ALLOCATED COST OF CAPITAL TO OPERATIONS, RATHER THAN A MECHANISM TO DETERMINE LOSS OF VALUE?

A. Yes. While the *Lindheimer* case and other early literature recognized depreciation as a necessary expense, the language suggest that depreciation was primarily a mechanism to determine loss of value.[9] Adoption of this "value concept" would require annual appraisals of extensive utility plant assets and is thus not practical in this context. Rather, the "cost allocation concept" recognizes that depreciation is a cost of providing service, and that in addition to receiving a "return on" invested capital through the allowed rate of return, a

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[7] *Id*. (Referring to the straight-line method, the *Lindheimer* Court stated that "[a]ccording to the principle of this accounting practice, the loss is computed upon the actual cost of the property as entered upon the books, less the expected salvage, and the amount charged each year is one year's pro rata share of the total amount."). The original cost standard was reaffirmed by the Court in *Federal Power Commission v. Hope Natural Gas Co.*, 320 U.S. 591, 606 (1944). The *Hope* Court stated: "Moreover, this Court recognized in [*Lindheimer*], supra, the propriety of basing annual depreciation on cost. By such a procedure the utility is made whole and the integrity of its investment maintained. No more is required."

[8] *Id*. at 169.

[9] *See* Frank K. Wolf & W. Chester Fitch, *Depreciation Systems* 71 (Iowa State University Press 1994).

utility should also receive a "return of" its invested capital in the form of recovered depreciation expense.

The cost allocation concept also satisfies several fundamental accounting principles, including verifiability, neutrality, and the matching principle.[10] The definition of "depreciation accounting" published by the American Institute of Certified Public Accountants ("AICPA") properly reflects the cost allocation concept:

> Depreciation accounting is a system of accounting that aims to distribute cost or other basic value of tangible capital assets, less salvage (if any), over the estimated useful life of the unit (which may be a group of assets) in a systematic and rational manner. It is a process of allocation, not of valuation.[11]

Thus, the concept of depreciation as "the allocation of cost has proven to be the most useful and most widely used concept."[12]

IV. ANALYTIC METHODS

Q. DISCUSS THE DEFINITION AND PURPOSE OF A DEPRECIATION SYSTEM, AS WELL AS THE DEPRECIATION SYSTEM YOU EMPLOYED FOR THIS PROJECT.

A. The regulatory standards set forth above do not mandate a specific procedure for conducting depreciation analyses. These standards, however, direct that analysts use a system for estimating depreciation rates that will result in the "systematic and rational" allocation of capital recovery for the utility. Over the years, analysts have developed "depreciation systems" designed to analyze grouped property in accordance with this standard.

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10 National Association of Regulatory Utility Commissioners, *Public Utility Depreciation Practices* 12 (NARUC 1996).

11 American Institute of Accountants, *Accounting Terminology Bulletins Number 1: Review and Résumé* 25 (American Institute of Accountants 1953).

12 Wolf *supra* n. 9, at 73.

A depreciation system may be defined by several primary parameters: 1) a method of allocation; 2) a procedure for applying the method of allocation; 3) a technique of applying the depreciation rate; and 4) a model for analyzing the characteristics of vintage property groups.[13]

In this case, I used the straight-line method, the average life procedure, the remaining life technique, and the broad group model. This system would be denoted as an "SL-AL-RL-BG" system. This depreciation system conforms to the regulatory standards set forth above and is commonly used by depreciation analysts in regulatory proceedings. I provide a more detailed discussion of depreciation system parameters, theories, and equations in Appendix A.

Q. DID MR. WATSON USE A SIMILAR DEPRECIATION SYSTEM IN HIS ANALYSIS?

A. Yes. Essentially, Mr. Watson and I used the same depreciation system to develop our proposed depreciation rates. Thus, the discrepancy in our recommendations is not driven by the use of different depreciation systems, but rather from our differing opinions regarding service life and net salvage. I would also note that Mr. Watson and I both used the Average Life Grouping ("ALG") procedure instead of the Equal Life Grouping ("ELG") procedure. According to Mr. Watson, "[t]he ALG methodology is the same method used in prior studies and has been approved by this Commission in prior dockets both for SPS and other companies within Texas."[14] I agree with the Commission's consistent adoption of the ALG procedure.

Q. DESCRIBE THE PROCESS YOU USED TO ANALYZE THE COMPANY'S DEPRECIABLE PROPERTY.

A. The study of retirement patterns of industrial property is derived from the actuarial process used to study human mortality. Just as actuarial analysts study historical human mortality data to estimate how long people will survive, depreciation analysts study historical plant retirement data to estimate how long property will survive. The most common actuarial

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13 *See* Wolf *supra* n. 9, at 70, 140.

14 Direct Testimony of Dane A. Watson, p. 18, line 21 through p. 19, lines 1-2.

method used by depreciation analysts is called the "retirement rate method." In the retirement rate method, original property data, including additions, retirements, transfers, and other transactions, are organized by vintage and transaction year.[15]

The retirement rate method is ultimately used to develop an "observed life table," ("OLT") which shows the percentage of property surviving at each age interval. This pattern of property retirement is described as a "survivor curve."

The survivor curve derived from the observed life table, however, must be fitted and smoothed with a complete curve in order to determine the ultimate average life of the group.[16] The most widely used survivor curves for this curve-fitting process were developed at Iowa State University in the early 1900s and are commonly known as the "Iowa curves."[17] A more detailed explanation of how the Iowa curves are used in the actuarial analysis of depreciable property is set forth in Appendix C.

Actuarial analysis, however, requires "aged" data. Aged data refers to a collection of property data for which the dates of placements, retirements, transfers, and other actions are known. In keeping aged data, when a utility retires an asset, it would not only record the year it was retired, but it would also track the year the asset was placed into service, or the "vintage" year. The Company, however, did not provide aged data for all of its accounts.

When aged data is not available, and the year-end balances of each account are known, analysts must "simulate" an actuarial analysis by estimating the proportion that each vintage group contributed to year-end balances. For this reason, simulated data is not as

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[15] The "vintage" year refers to the year that a group of property was placed in service (aka "placement" year). The "transaction" year refers to the accounting year in which a property transaction occurred, such as an addition, retirement, or transfer (aka "experience" year).

[16] *See* Appendix C for a more detailed discussion of the actuarial analysis used to determine the average lives of grouped industrial property.

[17] *See* Appendix B for a more detailed discussion of the Iowa curves.

reliable as aged data. In order to analyze accounts that do not contain aged data, analysts use the "simulated plant record" ("SPR") method.[18]

Thus, Mr. Watson and I both used the SPR method to analyze SPS's accounts for which aged data was unavailable. Under the straight-line method of calculating depreciation rates, essentially two estimates are required – service life and net salvage. I will discuss these components separately below.

V. SERVICE LIFE ANALYSIS

A. TOLK PLANT

Q. PLEASE DESCRIBE THE COMPANY'S PROPOSALS REGARDING ITS TOLK GENERATING UNITS.

A. As discussed in Mr. Watson's testimony, the assets at Tolk currently have a retirement date of 2037 pursuant to the Stipulation in Docket No. 47527.[19] SPS proposes that the retirement date for these assets be reduced by five years to 2032.[20]

Q. IS AXM PROPOSING ADJUSTMENTS TO THE REMAINING LIVES OF THESE TOLK UNITS?

A. Yes. I am proposing that the currently approved retirement date of 2037 for the Tolk assets at issue be maintained solely to calculate the depreciation expense for those assets. My testimony and schedules support those calculations. AXM's position on the Tolk-retirement issue is discussed in greater detail in the direct testimony of AXM witness Mark E. Garrett and Scott Norwood. The exhibits to my testimony reflect a 2037 retirement date for the Tolk assets at issue.[21]

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18 The SPR Method is further discussed in Appendix D.

19 *See* Direct Testimony of Dane A. Watson, p. 19, lines 21-22.

20 *Id*. at p. 20, lines 3-11.

21 *See* Exhibit DJG-5.

Q. DESCRIBE THE PROCESS YOU USED TO ESTIMATE SERVICE LIVES FOR THE COMPANY'S MASS PROPERTY ACCOUNTS.

A. To develop service life estimates for SPS's accounts, I obtained and analyzed the Company's actuarial and simulated plant data. Specifically, I used simulated plant analysis to analyze the Company's transmission and distribution assets; I undertook an actuarial analysis to assess the Company's general plant assets. I will discuss each process separately below.

B. ACTUARIAL ANALYSIS

Q. PLEASE DESCRIBE THE ACTUARIAL ANALYSIS PROCESS.

A. I used the Company's historical property data and created an observed life table ("OLT") for each account. The data points on the OLT can be plotted to form a curve (the "OLT curve"). The OLT curve is not a theoretical curve, rather, it is actual observed data from the Company's records that indicate the rate of retirement for each property group. An OLT curve by itself, however, is rarely a smooth curve, and is often not a "complete" curve (i.e., it does not end at zero percent surviving).

To calculate average life (the area under a curve), a complete survivor curve is required. The Iowa curves are empirically-derived curves based on the extensive studies of the actual mortality patterns of many different types of industrial property. The curve-fitting process involves selecting the best Iowa curve to fit the OLT curve. This can be accomplished through a combination of visual and mathematical curve-fitting techniques, as well as professional judgment.

The first step of my approach to curve-fitting involves visually inspecting the OLT curve for any irregularities. For example, if the "tail" end of the curve is erratic and shows a sharp decline over a short period of time, it may indicate that this portion of the data is less reliable, as further discussed below.

After visually inspecting the OLT curve, I use a mathematical curve-fitting technique which essentially involves measuring the distance between the OLT curve and the selected Iowa curve in order to get an objective assessment of how well the curve fits.

After selecting an Iowa curve, I observe the OLT curve along with the Iowa curve on the same graph to determine how well the curve fits. I may repeat this process several times for any given account to ensure that the most reasonable Iowa curve is selected.[22]

Q. DO YOU ALWAYS SELECT THE MATHEMATICALLY BEST-FITTING CURVE?

A. Not necessarily. Mathematical fitting is an important part of the curve-fitting process because it promotes objective, unbiased results. While mathematical curve fitting is important, it may not always yield the optimum result. For example, if a particular account has insufficient retirement history, mathematical curve-fitting techniques may not be as useful in analyzing the account. In fact, for some of the accounts in this case I selected Iowa curves that were not the mathematical best fit, and this generally resulted in selecting shorter curves (i.e., higher depreciation rate), as I illustrate below. In other words, when I chose to deviate from the mathematically best-fitting Iowa curve, I generally selected Iowa curves and service lives that were closer to the Company's position rather than further from it, in the interest of reasonableness.

Q. SHOULD EVERY PORTION OF THE OLT CURVE BE GIVEN EQUAL WEIGHT?

A. Not necessarily. Many analysts have observed that the points comprising the "tail end" of the OLT curve may often have less analytical value than other portions of the curve. "Points at the end of the curve are often based on fewer exposures and may be given less weight than points based on larger samples. The weight placed on those points will depend on the size of the exposures."[23] In accordance with this standard, an analyst may decide to truncate the tail end of the OLT curve at a certain percentage of initial exposures, such as one percent. Using this approach puts a greater emphasis on the most valuable portions of the curve.

For my analysis in this case, I not only considered the entirety of the OLT curve, but also conducted further analyses that involved fitting Iowa curves to the most significant part of

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[22] *See* Exhibit DJG-12 for Iowa curve fitting charts and observed life tables.

[23] Wolf *supra* n. 9, at 46.

the OLT curve for certain accounts. In other words, to verify the accuracy of my curve selection, I narrowed the focus of my additional calculation to consider the top 99% of the "exposures" (i.e., dollars exposed to retirement) and to eliminate the tail end of the curve representing the bottom 1% of exposures.

Q. SUMMARIZE THE DIFFERENCES BETWEEN YOUR SERVICE LIFE ESTIMATES AND THE COMPANY'S SERVICE LIFE ESTIMATES FOR THESE ACCOUNTS.

A. The Iowa curves I selected to describe the service lives for the accounts I identify below provide better mathematical and visual fits to SPS's observed data, when compared to the Company's selected Iowa curves. The following charts and discussion illustrate how my recommendations are based on objective and unbiased factors. For each depreciable account discussed in this section, the curves I selected provide a better mathematical fit to the observed data than the curves the Company selected, especially when applied to the most statistically-relevant portions of the OLT curve.

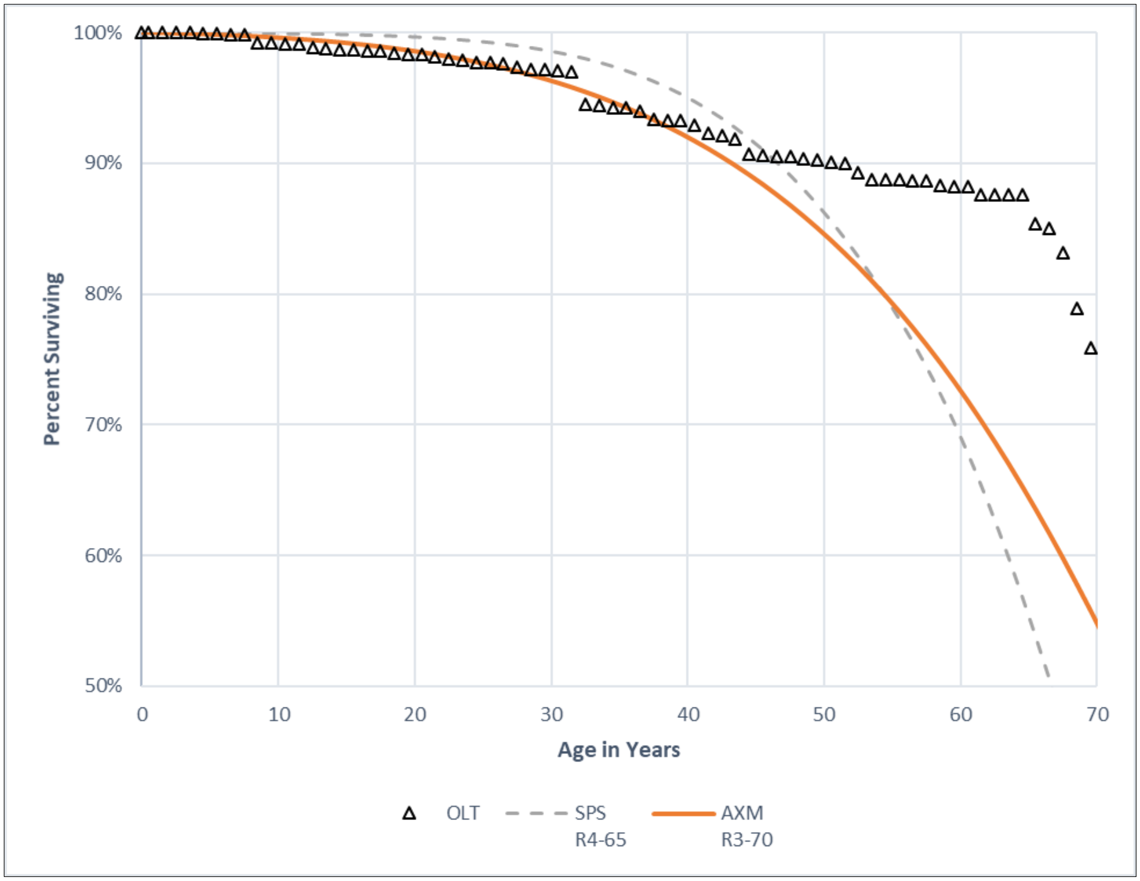
Specifically, in each of the following accounts, the Company selected a curve that underestimates the service life of the account, and thus overstates the depreciation rate and expense. Mathematical curve fitting is especially useful for analyzing the following accounts, because these accounts have sufficient retirement history and display retirement patterns that are relatively conducive to mathematical curve-fitting techniques. The analysis of each adjusted account is discussed below.

1. Account 352 – Structures and Improvements

Q. DESCRIBE YOUR SERVICE LIFE ESTIMATE FOR THIS ACCOUNT AND COMPARE IT WITH THE COMPANY'S ESTIMATE.

A. The observed survivor curve is derived from the OLT calculated from the Company's aged plant data. Thus, as set forth above, the OLT curve is not an estimate; rather, it represents actual data and retirement experience. The OLT curve is represented by the black triangles in each of the following graphs. Mr. Watson selected the R4-65 Iowa curve for this account, and I selected the R3-70 Iowa curve. Both Iowa curves are displayed in the following graph, along with the OLT curve.

Figure 4:
Account 352 – Structures and Improvements



As shown in the graph, both Iowa curves do not provide good fits to the tail end of the OLT curve. This is appropriate because the tail end of this particular OLT curve is not statistically relevant (particularly where the triangles begin to drop off after age 60). However, the 65-year average life selected by Mr. Watson appears to be too short given the fact that more than 80% of the assets in this account are still in service, on average, at age 65. Given the data presented for this account, it is more reasonable to select a slightly longer Iowa curve and service life that provides a better fit to the observed data. We can use mathematical curve fitting techniques to confirm the results.

Q. DOES THE IOWA CURVE YOU SELECTED PROVIDE A BETTER MATHEMATICAL FIT TO THE OBSERVED DATA?

A. Yes. While it is sometimes clear from a visual perspective which Iowa curve provides a closer fit to the observed data, the results can also be verified mathematically.

Mathematical curve fitting essentially involves measuring the distance between the OLT curve and the selected Iowa curve. The best mathematically-fitted curve is the one that minimizes the distance between the OLT curve and the Iowa curve, thus providing the closest fit. The "distance" between the curves is calculated using the "sum-of-squared differences" ("SSD") technique. Specifically, the SSD for the Company's curve is 8.4377, while the SSD for the R3-70 curve I selected is only 4.0811, which means it has a better mathematical fit to the OLT curve.[24] In my opinion, this objective analysis shows that the Iowa curve I selected results in a more reasonable depreciation rate and expense for Account 352.[25]

2. Account 355 – Poles and Fixtures

Q. DESCRIBE YOUR SERVICE LIFE ESTIMATE FOR THIS ACCOUNT AND COMPARE IT WITH THE COMPANY'S ESTIMATE.

A. The OLT curve for account 355 provides a good example of why every data point on the OLT curve should not necessarily be given equal statistical value. Mr. Watson selected the R2.5-51 curve for this account, and I selected the L1.5-63 curve. Both Iowa curves are displayed in the following graph, along with the OLT curve.

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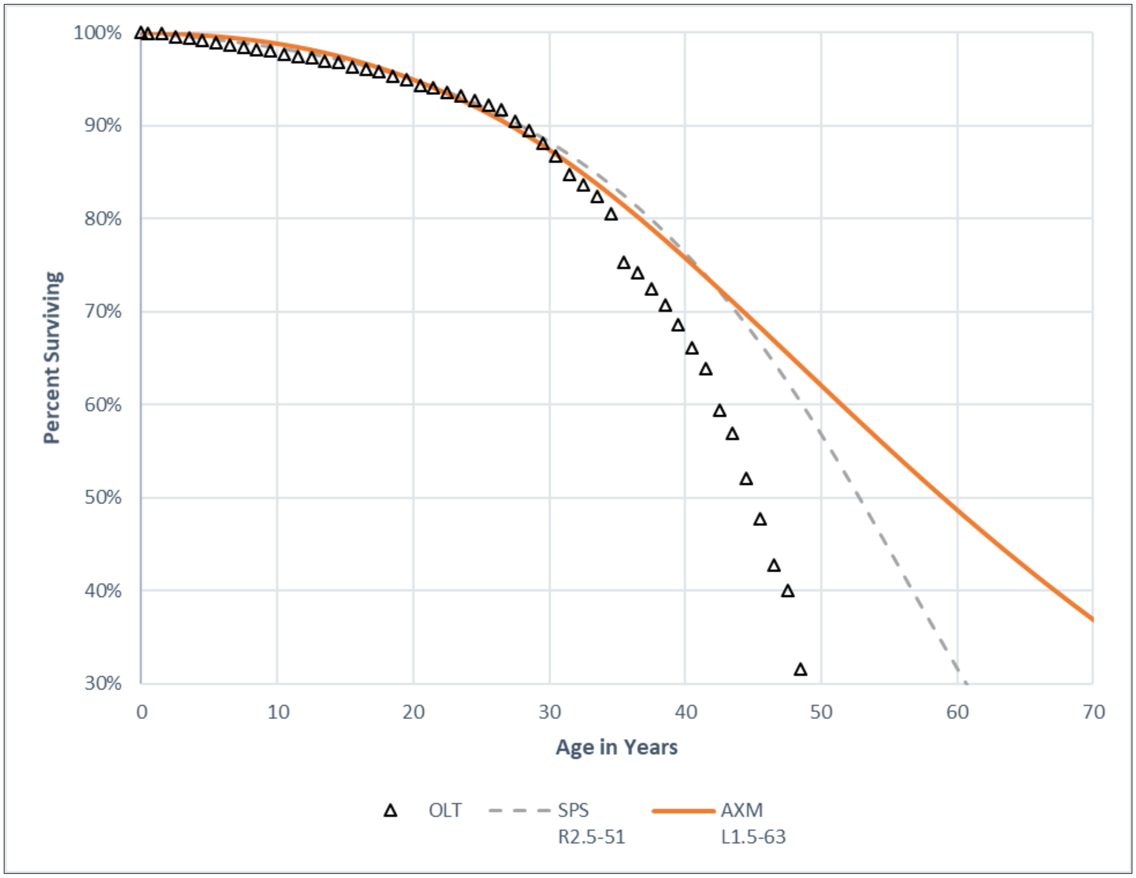
[24] Exhibit DJG-7.

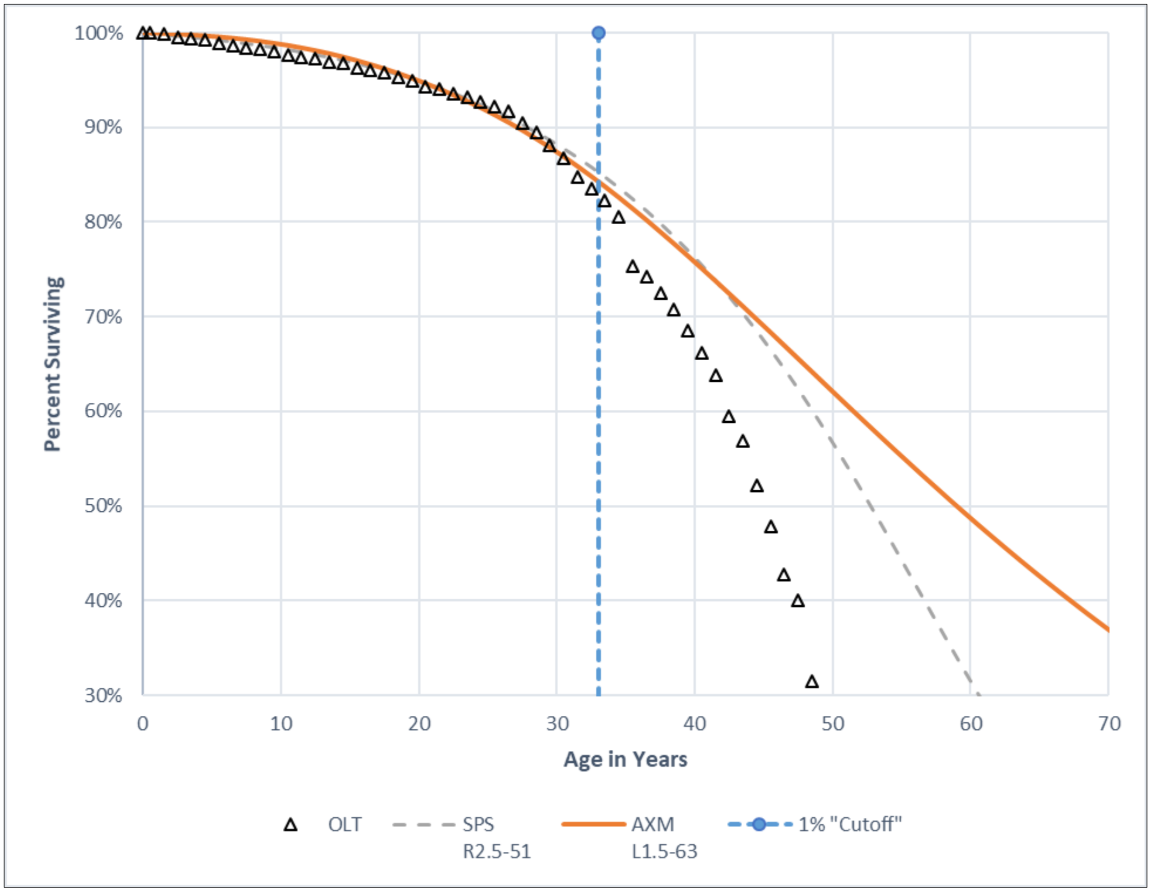
[25] *See* Exhibit DJG-13 for remaining life calculations.

Figure 5:
Account 355 – Poles and Fixtures



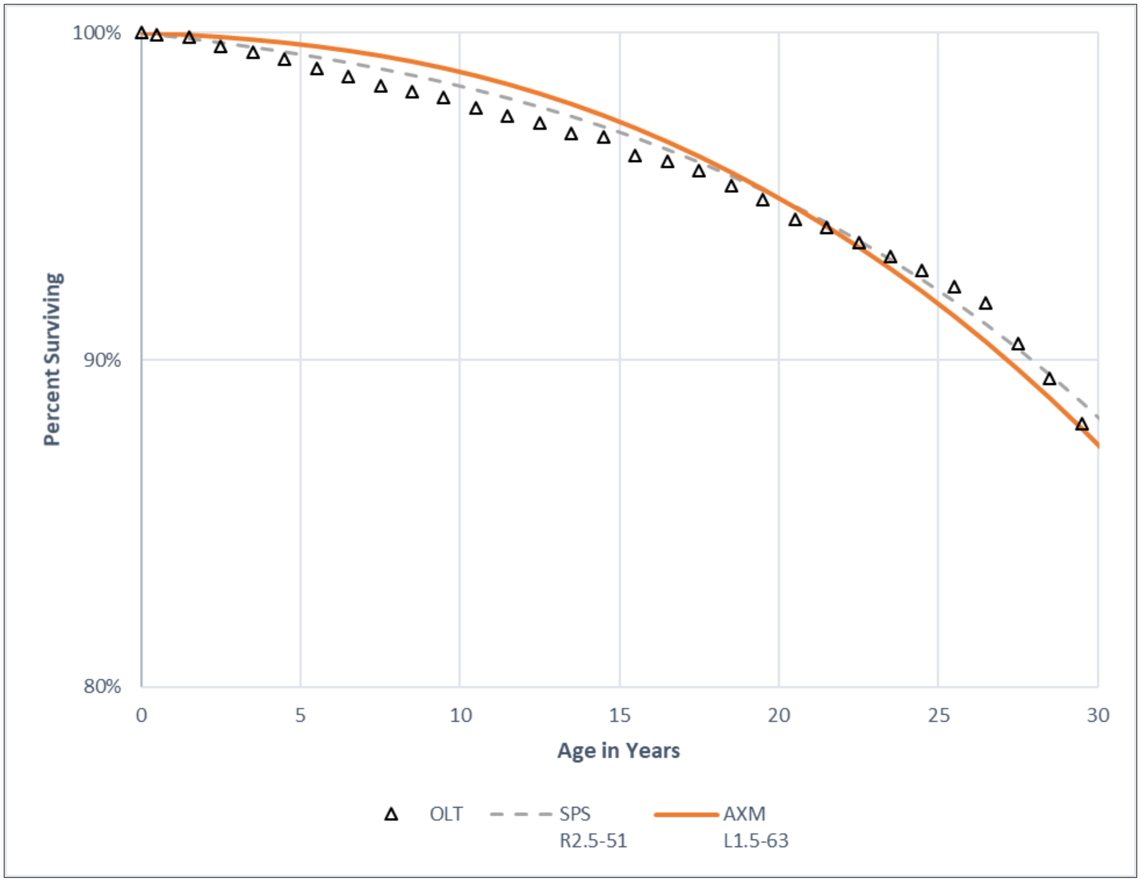
As shown in the graph, both Iowa curves provide relatively close fits to the OLT curve up to age 35. After that age, both Iowa curves appear longer relative to the OLT curve. In this regard, both Iowa curves correctly reflect the idea that the data points beyond about age 35 are not necessarily as valuable from a statistical standpoint. We can use the 1% cutoff benchmark discussed above to "truncate" less relevant portions of the OLT curve, and then proceed with visual and mathematical curve fitting techniques. The graph below shows the same information presented in the graph above, but with an additional truncation line.

Figure 6:
Account 355 – Poles and Fixtures - Truncated



Data points on the OLT occurring to the right of the vertical dotted line are associated with dollars exposed to retirement that are less than 1% of the beginning dollars exposed to retirement in the account, making them less statistically relevant. The graph below in Figure 7 shows the completely truncated OLT curve along with the same two Iowa curves.

Figure 7:
Account 355 – Poles and Fixtures - Truncated



Now that the OLT curve is properly truncated, we see that both Iowa curves provide relatively close fits to relevant portions of the OLT curve.

Q. ARE YOU SUGGESTING THAT MR. WATSON'S SELECTED IOWA CURVE IS OUTSIDE THE RANGE OF REASONABLENESS FOR THIS ACCOUNT?

A. No. I believe both selected Iowa curves fall within the range of reasonableness for this account. In fact, both Iowa curves have the same mathematical curve fitting results.[26] However, it is still incumbent on the Commission to select the most fair and reasonable service life under the circumstances. In my opinion, the L1.5-63 curve for this account presents a reasonable opportunity for the Commission to take a more conservative approach and to partially mitigate an otherwise substantial burden imposed on ratepayers

[26] Exhibit DJG-8.

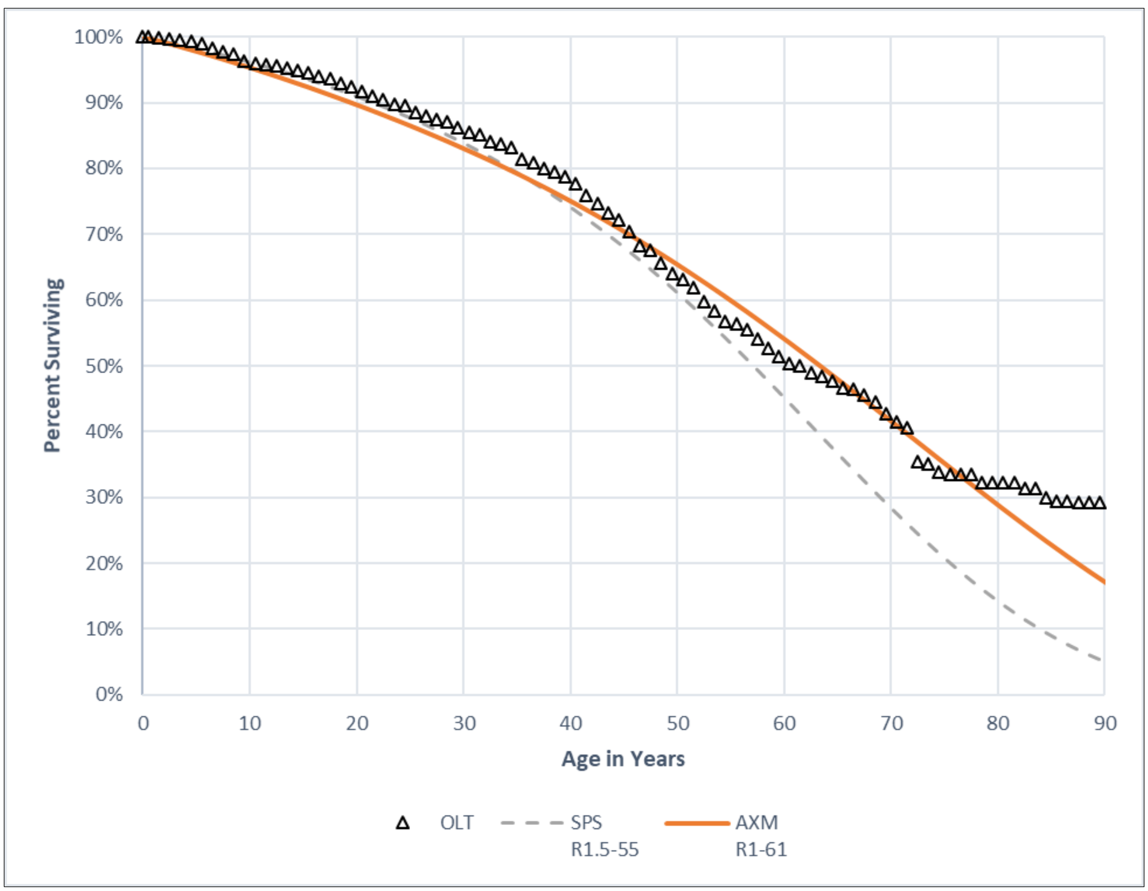
by the Company's requested increase to depreciation expense. If, in SPS's next depreciation study, the updated retirement data indicates a service life closer to 51 years rather than 63 years, the depreciation rate for this account can be appropriately adjusted at that time.

3. Account 362 – Station Equipment

Q. DESCRIBE YOUR SERVICE LIFE ESTIMATE FOR THIS ACCOUNT AND COMPARE IT WITH THE COMPANY'S ESTIMATE.

A. For Account 362, Mr. Watson selected the R1.5-55 curve and I selected the R1-61 curve. Both curves are shown in the graph below along with the OLT curve.

Figure 8:
Account 362 – Station Equipment



Both of the selected Iowa curves are the same shape (R1), but the 55-year average life selected by Mr. Watson appears to give too little consideration for relevant data points occurring after age 50. According to Mr. Watson, "SPS personnel" provided their own estimates for various types of components in this account, and Mr. Watson based his selected Iowa curve for this account in part on the "input from SPS personnel." As I explain later in my testimony, too much reliance on the opinions of other SPS personnel can be problematic because of their inherent bias in the Company's favor, whether consciously expressed or not, but also because no party nor the Commission can test their opinions, facts, or conclusions because they are not witnesses it in this case. Thus the Commission should keep these issues in mind when assessing the opinions of SPS personnel regarding service life estimates, especially when those service life estimates are shorter than what is otherwise indicated by SPS's own historical retirement data, as is the case for this account.

Q. DOES THE IOWA CURVE YOU SELECTED PROVIDE A BETTER MATHEMATICAL FIT TO THE OBSERVED DATA?

A. Yes. Specifically, the SSD for the Company's curve is 0.9918 and the SSD for the R1-61 curve I selected is only 0.1553, which means it results in the better mathematical fit.[27]

4. Account 390 – Structures and Improvements

Q. DESCRIBE YOUR SERVICE LIFE ESTIMATE FOR THIS ACCOUNT AND COMPARE IT WITH THE COMPANY'S ESTIMATE.

A. For Account 390, Mr. Watson selected the R1-53 curve and I selected the L0.5-57 curve. Both curves are shown in the graph below along with the OLT curve.

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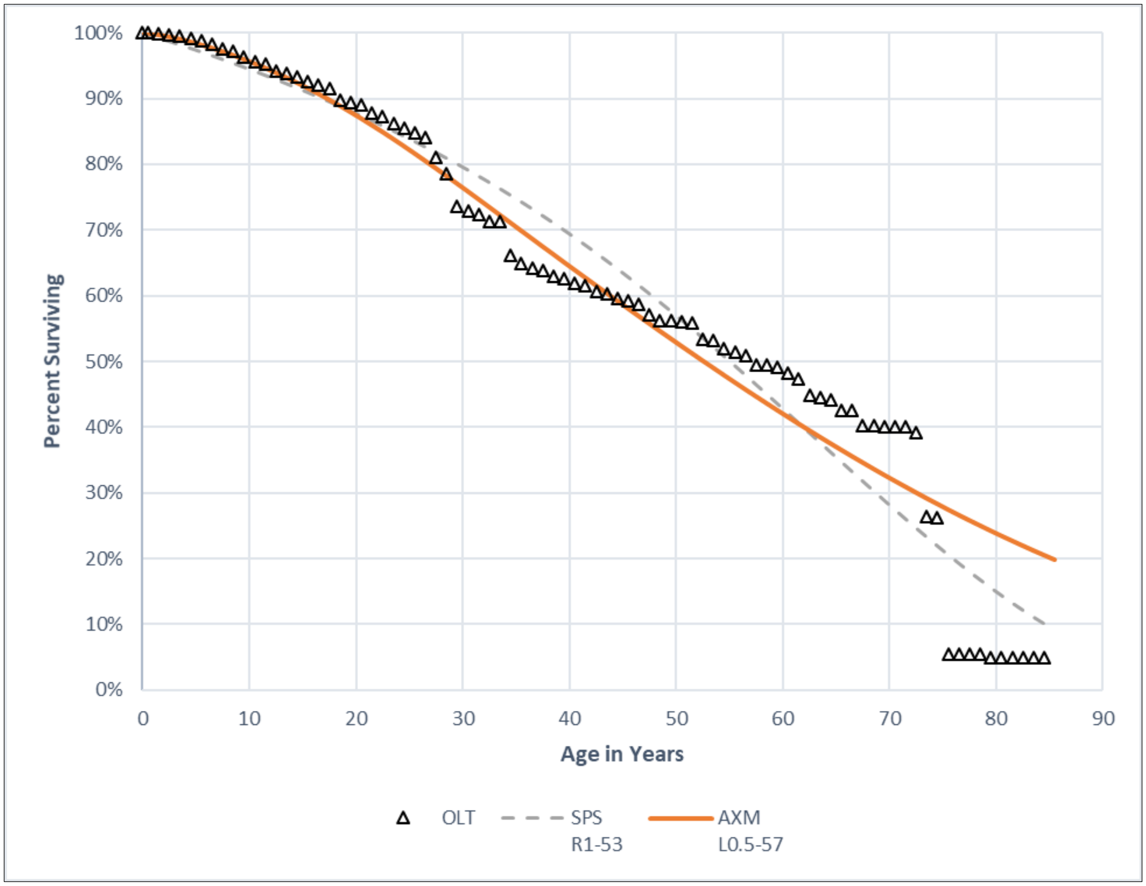
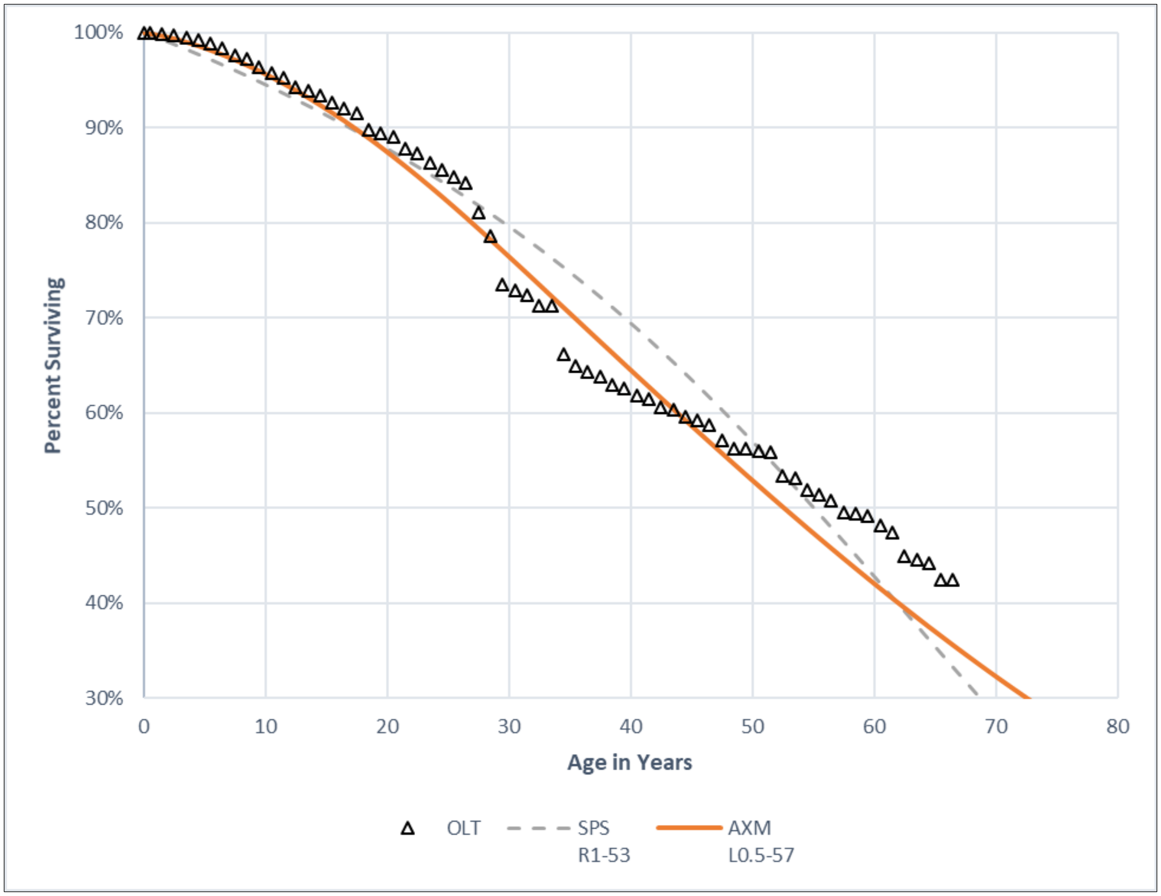
[27] Exhibit DJG-9.

Figure 9:
Account 390 – Structures and Improvements



As shown in this graph, both Iowa curves provide relatively close fits to the OLT curve until age 30. After that point, the L0.5-57 curve appears to be a closer fit from age intervals 30-50 and again from age interval 50-65. After age 65, the data becomes less statistically relevant based on the dollars exposed to retirement. We can also visibly see the disjointed nature of the OLT curve, with sudden, significant declines occurring at age 73 and again at age 75. Yet, the R1-53 curve selected by Mr. Watson appears to give some weight to these irrelevant data points. As with Account 355 discussed above, we can truncate the irrelevant portion of the OLT curve to provide a better basis upon which to conduct the curve fitting analysis. The graph below shows the truncated, relevant OLT curve.

Figure 10:
Account 390 – Structures and Improvements – Truncated



From a visual inspection, it is fairly clear that the L0.5-57 curve provides the better fit, but we can also confirm this result mathematically.

Q. DOES THE IOWA CURVE YOU SELECTED PROVIDE A BETTER MATHEMATICAL FIT TO THE TRUNCATED OLT CURVE?

A. Yes. Specifically, the SSD for the Company's curve is 0.1342 and the SSD for the L0.5-57 curve I selected is only 0.4662, which means it results in the better mathematical fit.[28]

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[28] Exhibit DJG-10.

C. SIMULATED PLANT RECORD ANALYSIS

Q. DESCRIBE THE SIMULATED PLANT RECORD METHOD OF ANALYSIS.

A. As discussed above, when aged data is not available, we must "simulate" the actuarial data required for remaining life analysis. For some of SPS's distribution accounts, both Mr. Watson and I conducted an analysis using the simulated plant record ("SPR") model. The Company did not provide aged data for these accounts. The SPR method involves analyzing the Company's unaged data by choosing an Iowa curve that best simulates that actual year-end account balances in the account.[29] It is important to understand that actuarial analysis based on sufficient historical data will produce more reliable results than simulated plant analysis. The Commission should consider this fact when assessing whether SPS has met its burden to make a convincing showing that its proposed depreciation rates are not excessive for each account.

Q. DESCRIBE THE METRICS USED TO ASSESS THE FIT OF A SELECTED IOWA CURVE IN THE SPR MODEL.

A. There are two primary metrics used to measure the fit of the Iowa curve selected to describe an SPR account. The first is the "conformance index" ("CI"). The CI is the average observed plant balance for the tested years, divided by the square root of the average sum of squared differences between the simulated and actual balances plant balances.[30] A higher CI indicates a better fit. Alex Bauhan, who developed the CI, also proposed a scale for measuring the value of the CI, as follows.

Figure 11:
Conformance Index Scale

CI	Value
> 75	Excellent
50 – 75	Good
25 – 50	Fair
< 25	Poor

[29] A detailed discussion of the SPR method is included in Appendix D.

[30] Bauhan, A. E., "Life Analysis of Utility Plant for Depreciation Accounting Purposes by the Simulated Plant Record Method," 1947, Appendix of the EEl, 1952.

The second metric used to assess the accuracy of an Iowa curve chosen for SPR analysis is called the "retirement experience index" ("REI") which was also proposed by Bauhan. The REI measures the length of retirement experience in an account. A greater retirement experience indicates more reliability in the analytical results for an account. Bauhan proposed a similar scale for the REI, as follows.

Figure 12:
Retirement Experience Index Scale

REI	**Value**
> 75%	Excellent
50% – 75%	Good
33% – 50%	Fair
17% – 33%	Poor
0% – 17%	Valueless

According to Bauhan, "[i]n order for a life determination to be considered entirely satisfactory, it should be required that both the retirements experience index and the conformance index be "Good" or better."[31] However, for some of SPS's accounts there is no Iowa curve available that produces a result of at least "Good" under both scales. This further highlights the relative unreliability of SPS's unaged historical data for these accounts, and why it can be helpful to also consider the service life estimates approved for other utilities that were based on actuarial analyses of superior, aged data.

Q. PLEASE SUMMARIZE THE GENERAL DIFFERENCES BETWEEN YOUR SERVICE LIFE ESTIMATES AND THE COMPANY'S SERVICE LIFE ESTIMATES FOR THESE ACCOUNTS.

A. In this case I am proposing service life adjustments to four of SPS's distribution accounts. For each of these accounts, the Iowa curve I chose results in a higher ranking CI score than Mr. Watson's curve under the overall analysis band, while in some accounts Mr. Watson's curve selection did not even appear on the SPR list. In fact, the Iowa curve I selected for each of these accounts is the highest ranking curve under the CI scale.

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[31] *Id*. (emphasis added).

In each of these instances, Mr. Watson's decision to select a lower ranking curve results in higher depreciation expense and cash flow for SPS. This problem is further exacerbated by the fact that Mr. Watson's decision to deviate from the top-ranked Iowa curves for each account were based upon input from SPS personnel, which cannot be verified or tested. Given the substantial increase in depreciation expense proposed by SPS, the Commission should adopt my proposed adjustments for the accounts discussed below, especially when my adjustments utilize the highest ranking Iowa curve according to Mr. Watson's own analysis of SPS's own retirement data.[32]

Q. DO YOU HAVE ANY OTHER GENERAL CRITICISMS OF MR. WATSON'S SERVICE LIFE ESTIMATES?

A. Yes. In discussing his service life estimates for many of SPS's accounts, Mr. Watson has apparently relied heavily upon the expectations of Company personnel with regard to how long the assets will be in service. SPS is the applicant in this case, and it has hired an independent expert in Mr. Watson to develop service life estimates based on specialized, statistical analysis of the Company's historical retirement data for an issue that heavily affects the Company's cash flow. To the extent SPS employees have simply told the Company's independent depreciation expert how long they think the Company's assets will survive, I think that is problematic and calls into question the objectivity and accuracy of SPS's proposed depreciation rates. The problem is compounded by virtue of the fact that intervening parties, such as AXM, nor the Commission, enjoy the same type of access to SPS's employees, and are not readily available to investigate the accuracy of those employees' opinions.

Q. PLEASE SUMMARIZE YOUR SERVICE LIFE ADJUSTMENTS BASED ON SPR ANALYSIS.

A. My proposed service life adjustments to four of SPS's distribution accounts are summarized in the table below.

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32 *See* Attachment DAW-RR-2, pp. 41-46.

Figure 13:
SPR Service Life Adjustments

Account No.	Description	SPS Iowa Curve	AXM Iowa Curve
	Distribution Plant		
364.00	Poles, Towers & Fixtures	R0.5 - 53	R0.5 - 56
367.00	Underground Conductor & Devices	R1 - 53	R0.5 - 61
368.00	Line Transformers	R1 - 46	L0 - 55
369.00	Services	R1.5 - 48	R0.5 - 60

Again, my adjustments are based on selecting the top-ranking Iowa curve according to Mr. Watson's own analyses for each of these accounts.[33]

VI. NET SALVAGE ANALYSIS

Q. DESCRIBE THE CONCEPT OF NET SALVAGE.

A. If an asset has any value left when it is retired from service, a utility might decide to sell the asset. The proceeds from this transaction are called "gross salvage." The corresponding expense associated with the removal of the asset from service is called the "cost of removal." The term "net salvage" equates to gross salvage less the cost of removal. Often, the net salvage for utility assets is a negative number (or percentage) because the cost of removing the assets from service exceeds any proceeds received from selling the assets. When a negative net salvage rate is applied to an account to calculate the depreciation rate, it results in increasing the total depreciable base to be recovered over a particular period of time and increases the depreciation rate. Therefore, a greater negative net salvage rate equates to a higher depreciation rate and expense, all else held constant.

Q. DESCRIBE HOW YOU ANALYZED THE COMPANY'S NET SALVAGE RATES.

A. The approach to analyzing net salvage is different for lifespan property and mass property. "Life span" property accounts usually consist of property within a production plant. The assets within a production plant will be retired concurrently at the time the plant is retired,

[33] I also present SPR fit summaries and graphs in Exhibit DJG-11. The fit summaries show the ranking of potential Iowa curve selections based on the CI scale.

regardless of their individual ages or remaining economic lives. "Mass" property accounts, on the other hand, usually contain a large number of small units that will not be retired concurrently. In this case, the Company's transmission, distribution, and general plant accounts contain mass property. Since the approach to estimating net salvage is different for life span and mass accounts, I will discuss each type of property separately below.

A. LIFE SPAN PROPERTY

Q. DESCRIBE LIFE SPAN PROPERTY.

A. "Life span" property accounts usually consist of property within a production plant. The assets within a production plant will be retired concurrently at the time the plant is retired, regardless of their individual ages or remaining economic lives. For example, a production plant will contain property from several accounts, such as structures, fuel holders, and generators. When the plant is ultimately retired, all of the property associated with the plant will be retired together, regardless of the age of each individual unit.

Analysts often use the analogy of a car to explain the treatment of life span property. Throughout the life of a car, the owner will retire and replace various components, such as tires, belts, and brakes. When the car reaches the end of its useful life and is finally retired, all of the car's individual components are retired together. Some of the components may still have some useful life remaining, but they are nonetheless retired along with the car. Thus, the various accounts of life span property are scheduled to retire as of the unit's probable retirement date.

Q. DESCRIBE THE COMPANY'S APPROACH TO ESTIMATING TERMINAL NET SALVAGE RATES FOR THE PRODUCTION ACCOUNTS.

A. The Company's terminal net salvage rates are based on decommissioning cost estimates provided by Mr. Kopp. Mr. Kopp's estimates for each of the Company's production units include estimates for scrap value (or "gross salvage") and for the labor and materials required to decommission or dismantle the units (i.e., "removal cost"). Mr. Kopp's estimates also include a 20% contingency on material and labor costs.[34]

Q. DID THE COMPANY ALSO APPLY AN ESCALATION FACTOR TO THE ESTIMATED DECOMMISSIONING COSTS?

A. No. In this context, an escalation factor refers to inflating the present value of decommissioning costs to a future date that corresponds with a production unit's estimated retirement date. Depreciation studies often apply these types of escalation rates applied to present value decommissioning costs; however, SPS's depreciation study in this case did not. I agree with the Company's decision to not escalate its decommissioning cost estimates.

Q. SUMMARIZE THE COMPANY'S REQUEST REGARDING THE RECOVERY OF DECOMMISSIONING COSTS.

A. While the Company and I disagree on certain components of decommissioning cost recovery, the Commission should understand what the Company is asking for in clear terms. That is, the Company is asking the Commission to approve over $280 million of future costs, some of which may not even be incurred, up to 40 years in advance for some plants.[35] Even if I were to take no issue with the Company's cost estimates as proposed, the request itself is problematic because these costs, by definition, are not known and measurable. So, at the very least, the Commission should consider SPS's proposed decommissioning costs with caution and should also consider the adjustments I propose to such costs, as further discussed below.

Q. DESCRIBE HOW THE COMPANY'S DECOMMISSIONING STUDIES ARE BASED ON QUESTIONABLE, COSTLY ASSUMPTIONS AND DO NOT INCLUDE LESS COSTLY ALTERNATIVES.

A. The assumptions relied upon in the Company's decommissioning studies generally include a major demolition of the plants and returning the sites to an "industrial condition,"[36] which would be suitable for development of an industrial facility. In other words, the

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[34] Direct Testimony of Jeffry T. Kopp, pp. 18-22.

[35] Attachment DAW-RR-2, Appendix G.

[36] Direct Testimony of Jeffrey T. Kopp, p. 8, line 8.

decommissioning studies do not consider the less costly alternatives of repowering or selling the plants.

In addition, the studies assume that none of the equipment will have a salvage value in excess of the scrap value, and resale of equipment is not considered as a cost mitigation.[37] All of these assumptions, along with the absence of less costly alternatives, contribute to decommissioning cost estimates that are likely overestimated.

Q. DESPITE YOUR CONCERNS WITH THE COMPANY'S DECOMMISSIONING STUDIES, ARE YOU RECOMMENDING SPECIFIC ADJUSTMENTS TO SPS'S PROPOSED COSTS FOR MATERIAL, LABOR, OR INDIRECT COSTS?

A. No. While as discussed above, SPS's decommissioning costs are likely overestimated because they do not consider less costly alternatives and make other liberal assumptions, I am not recommending specific adjustments to the Company's proposed costs for material, labor, or other indirect costs. However, I think the Commission should take these factors into account when considering my overall recommendation regarding terminal net salvage rates, as further discussed below.

Q. DO THE COMPANY'S DECOMMISSIONING STUDIES INCLUDE ARBITRARY CONTINGENCY FACTORS THAT FURTHER INFLATE COST ESTIMATES?

A. Yes. As discussed above, Mr. Kopp added a contingency factor that increases the base decommissioning costs by 20%. According to Mr. Kopp, these "unspecified"[38] costs were included due to account for the "uncertainty"[39] associated with the decommissioning cost estimates.

Q. DO YOU THINK CONTINGENCY COST RECOVERY IS APPROPRIATE IN RATEMAKING?

A. No. It is undisputed that contingency costs are unknown, unspecified, and related to uncertainties. These aspects of contingency costs actually provide a better argument why they should be excluded for ratemaking purposes. Under basic ratemaking principles,

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37 *Id*. at p. 15.

38 *Id*. at p. 19, line 5.

39 *Id*. at p. 19, line 1.

current customers should not be charged for future costs occurring up to decades into the future that are "unknown" by definition. In other words, even if the plant demolitions were to occur tomorrow, the contingency costs would still be unknown by definition. The fact that contingency costs are to occur up to several decades from now exacerbates this problem, especially from a ratemaking perspective.

Furthermore, contingency costs are clearly arbitrary. Sometimes utilities request a flat 10%, 15%, 20%, or 25% contingency cost, and they are usually simply applied at the same level for every generating facility in a demolition study, regardless of the differences in the facilities that are to be demolished, as Mr. Kopp is proposing in this case. The arbitrary nature of contingency cost estimates is not surprising given the fact that they are unknown by definition.

Q. DOES RECOVERY OF CONTINGENCY COSTS SHIFT RISKS FROM SHAREHOLDERS TO RATEPAYERS?

A. Yes. It is understandable that SPS's shareholders would push for the recovery of an uncertain future costs. In financial modeling, we assume that investors seek the maximum return on investment for a given level of risk. In the competitive market, competition establishes a risk-return equilibrium. Under the regulatory model, however, investors can achieve arbitrage, inflated returns given the level of risk when they can convince regulators to approve mechanisms or costs that reduce risk, while still being awarded returns on equity that are above a market-based cost of equity. Thus, it is not surprising that SPS's shareholders want approval of an uncertain and unknown future cost – it would increase cash flow and reduce risk.

Q. CAN YOU THINK OF A COST IN ANY OTHER AREA OF A RATE CASE IN WHICH THE UTILITY CAN INCREASE SUCH COST BY 20% FOR NO OTHER REASON THAN THE COST IS UNKNOWN?

A. No. By definition, all projected, future costs are uncertain, but I cannot think of any other cost in a rate case in which regulators would allow the utility to arbitrarily increase such a cost by 20% and expect recovery of it.

Q. COULD THE SAME ARGUMENT IN SUPPORT OF INCREASED CONTINGENCY COSTS BE USED TO SUPPORT DECREASED CONTINGENCY COSTS?

A. Yes. If one were to approach this issue objectively, the same arguments used in support of increased contingency costs could be used to support decreased contingency costs. In other words, if a future cost is unknown (which demolition costs are), then it would be just as fair to ratepayers to decrease such cost estimates to account for "unknown" factors as it would be to shareholders to increase such costs. However, I think the most fair and reasonable approach is to disallow contingency factors in either direction.

Q. DO YOUR PROPOSED NET SALVAGE RATES EXCLUDE THE COMPANY'S PROPOSED CONTINGENCY FACTORS?

A. Yes, for the reasons discussed above, my proposed terminal net salvage rates exclude the 20% contingency factors proposed by SPS.[40]

B. MASS PROPERTY

Q. PLEASE SUMMARIZE YOUR NET SALVAGE ADJUSTMENTS TO THE COMPANY'S MASS PROPERTY ACCOUNTS.

A. For several of SPS's mass property accounts, Mr. Watson is proposing significant increases (i.e., more negative) from the currently approved net salvage rates. The table below shows the current net salvage rate for the accounts at issue, as well as Mr. Watson's and my proposals.

40 *See* Exhibit DJG-6 for specific calculations.

Figure 14:
Net Salvage Rate Adjustments

Account No.	Description	Current Salvage	SPS Salvage	AXM Salvage
	Transmission Plant			
355.00	Poles & Fixtures	-35%	-75%	-45%
356.00	Overhead Conductors & Devices	-30%	-45%	-40%
	Distribution Plant			
364.00	Poles, Towers & Fixtures	-50%	-75%	-60%
373.00	Street Lighting & Signal Systems	-45%	-60%	-55%

As shown in Figure 14, above, Mr. Watson's proposed increases to the negative net salvage rates for these accounts are significant. For example, in Account 355, Mr. Watson is proposing a 40% increase (or 4,000 basis points) in the negative net salvage rate, but this also translates to a percentage change increase of more than 100% (i.e., more than double). In general, net savage rate estimates should not change this dramatically between rate cases, or over the course of several years. These substantial increases in proposed net salvage rates are partially contributing to the substantial increases in SPS's proposed depreciation rates.

Q. WOULD YOU AGREE THAT THE NEGATIVE NET SALVAGE RATES SHOULD BE INCREASED FOR THE FOUR ACCOUNTS AT ISSUE?

A. Yes. The historical net salvage data presented for these accounts indicates that the negative net salvage rates should be increased. However, as shown in Table 14, I think the increases should be limited by a maximum increase of 10% (or 1,000 basis points). Approval of this relatively gradual increase in negative net salvage rates will help partially mitigate the financial impact otherwise imposed by SPS's proposed increase to depreciation expense.

VII. RESERVE REALLOCATION

Q. DID BOTH YOU AND MR. WATSON UTILIZE THE REMAINING LIFE TECHNIQUE AS PART OF YOUR DEPRECIATION SYSTEM?

A. Yes. By using the remaining life technique instead of the whole life technique, Mr. Watson and I both chose to allocate the depreciable base for each account over the remaining life of the group instead of the average life.

Q. WHAT IS THE MAIN PURPOSE OF USING THE REMAINING LIFE TECHNIQUE INSTEAD OF THE WHOLE LIFE TECHNIQUE?

A. One of the main reasons that analysts employ the remaining life technique is that there is no need to make a separate adjustment to rebalance or reallocate the theoretical reserve to bring it closer to the book reserve. The authoritative texts are clear that when using the remaining life technique, no separate reallocation of the theoretical reserve (or "Calculated Accumulated Depreciation" or "CAD") is required or even necessary. According to Wolf:

> Users of remaining life depreciation often do not explicitly calculate the CAD. As previously discussed, calculation of the CAD is implicit in the use of the remaining life method of adjustment, because the variation between the CAD and the accumulated provision for depreciation is automatically amortized over the remaining life.[41]

The NARUC manual also agrees that no separate reallocation of the theoretical reserve is required when using the remaining life technique:

> The desirability of using the remaining life technique is that any necessary adjustments of depreciation reserves, because of changes to the estimates of life on net salvage, are accrued automatically over the remaining life of the property.[42]

Thus, the primary purpose of the remaining life technique is the fact that a separate adjustment to the theoretical reserve is not required.

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[41] Wolf *supra* n. 9, at 178 (emphasis added).

[42] NARUC *supra* n. 10, at 65.

Q. DID MR. WATSON MAKE A SEPARATE ADJUSTMENT TO REALLOCATE THE RESERVE DESPITE USING THE REMAINING LIFE TECHNIQUE?

A. Yes. Despite the fact that it is neither required nor necessary when using the remaining life technique, Mr. Watson reallocated the theoretical reserve for each account based on his proposed depreciation parameters (Iowa curve, net salvage, etc.).[43]

Q. IN DEVELOPING YOUR PROPOSED DEPRECIATION RATES, DID YOU UTILIZE THE BOOK RESERVE?

A. Yes. In conformance with the authoritative depreciation texts cited above, I used the book reserve, rather than a rebalanced reserve, when calculating my proposed depreciation rates under the remaining life technique. This approach more closely adheres to authoritative depreciation texts.

Q. IN ADDITION TO THE REASONS DISCUSSED ABOVE, ARE THERE OTHER PRACTICAL BENEFITS OBTAINED BY USING THE BOOK RESERVE INSTEAD OF A REBALANCED RESERVE AS PROPOSED BY MR. WATSON?

A. Yes. Mr. Watson's rebalanced reserve is mathematically influenced by each one of his service life and net salvage estimates. Thus, if the Commission were to adopt even one adjustment proposed by any party to either service life or net salvage, Mr. Watson's rebalanced reserve estimates would no longer be accurate.

On the other hand, if the book reserve is used to calculate depreciation rates, in conformance with the authoritative depreciation texts cited above, then the Commission could freely adjust service life and net salvage without having to also consider a further rebalancing of the depreciation reserve to maintain technical accuracy. Thus, using the book reserve instead of rebalanced reserve is not only in conformance with depreciation texts and standard practice in the industry, but it is also more practical and efficient in the context of a regulatory proceeding.

Finally, Mr. Watson's calculated reserve is based on his opinion, while the book reserve I used to calculate my proposed rates is based on fact. In a process that involves numerous estimates and opinions regarding depreciation parameters such as service life and net

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43 *See* Exhibit DAD-2, p. 12 (Section IV).

salvage, it is preferable to rely on a common set of facts where we can, and the reserve is one such input that should be based on facts, not opinions.

VIII. CONCLUSION AND RECOMMENDATION

Q. SUMMARIZE THE KEY POINTS OF YOUR TESTIMONY.

A. AXM's proposed depreciation adjustment comprises several key issues: (1) removing contingency costs from SPS's decommissioning cost estimates (thus reducing terminal net salvage rates); (2) proposing the current approved life of 2037 for the Tolk generating facility; (3) extending the proposed service lives of several mass property accounts based on actuarial and simulated life analysis; and (4) increasing the net salvage rates of several mass property accounts based on gradualism. Adopting these adjustments would decrease SPS's proposed depreciation accrual by $34.5 million but would still result in an increase from SPS's current depreciation accrual as of December 31, 2018.

Q. WHAT IS AXM'S RECOMMENDATION TO THE COMMISSION REGARDING SPS'S DEPRECIATION RATES?

A. AXM recommends that the Commission adopt the proposed depreciation rates presented in Exhibit DJG-4.[44]

Q. DOES THIS CONCLUDE YOUR TESTIMONY?

A. Yes. I reserve the right to supplement this testimony as needed with any additional information that has been requested from the Company but not yet provided. To the extent I did not address an opinion expressed by the Company, it does not constitute an agreement with such opinion.

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44 *See* Exhibit DJG-4.

SOAH DOCKET NO. 473-19-6677
PUC DOCKET NO. 49831

APPLICATION OF SOUTHWESTERN PUBLIC SERVICE COMPANY FOR AUTHORITY TO CHANGE RATES	**§ § §**	**BEFORE THE STATE OFFICE OF ADMINISTRATIVE HEARINGS**

DIRECT TESTIMONY AND EXHIBITS OF

DAVID J. GARRETT

APPENDIX A:

THE DEPRECIATION SYSTEM

THE DEPRECIATION SYSTEM

A depreciation accounting system may be thought of as a dynamic system in which estimates of life and salvage are inputs to the system, and the accumulated depreciation account is a measure of the state of the system at any given time.[45] The primary objective of the depreciation system is the timely recovery of capital. The process for calculating the annual accruals is determined by the factors required to define the system. A depreciation system should be defined by four primary factors: 1) a method of allocation; 2) a procedure for applying the method of allocation to a group of property; 3) a technique for applying the depreciation rate; and 4) a model for analyzing the characteristics of vintage groups comprising a continuous property group.[46] The figure below illustrates the basic concept of a depreciation system and includes some of the available parameters.[47]

There are hundreds of potential combinations of methods, procedures, techniques, and models, but in practice, analysts use only a few combinations. Ultimately, the system selected must result in the systematic and rational allocation of capital recovery for the utility. Each of the four primary factors defining the parameters of a depreciation system is discussed further below.

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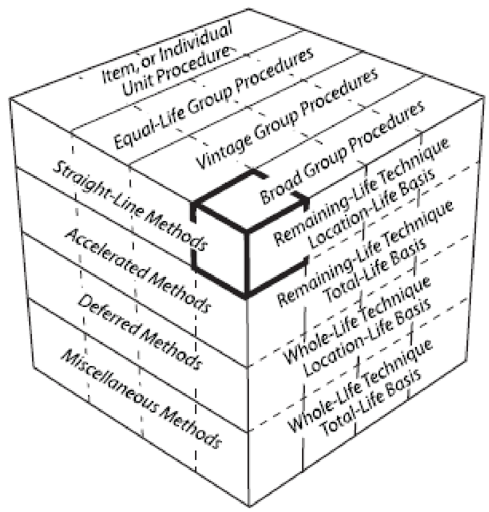
45 Wolf *supra* n. 9, at 69-70.

46 *Id.* at 70, 139-40.

47 Edison Electric Institute, *Introduction to Depreciation* (inside cover) (EEI April 2013). Some definitions of the terms shown in this diagram are not consistent among depreciation practitioners and literature due to the fact that depreciation analysis is a relatively small and fragmented field. This diagram simply illustrates the some of the available parameters of a depreciation system.

Figure 15:
The Depreciation System Cube



1. <u>Allocation Methods</u>

The "method" refers to the pattern of depreciation in relation to the accounting periods. The method most commonly used in the regulatory context is the "straight-line method" – a type of age-life method in which the depreciable cost of plant is charged in equal amounts to each accounting period over the service life of plant.[48] Because group depreciation rates and plant balances often change, the amount of the annual accrual rarely remains the same, even when the straight-line method is employed.[49] The basic formula for the straight-line method is as follows:[50]

48 NARUC *supra* n. 10, at 56.

49 *Id*.

50 *Id*.

Equation 1:
Straight-Line Accrual

$$Annual\ Accrual = \frac{Gross\ Plant - Net\ Salvage}{Service\ Life}$$

Gross plant is a known amount from the utility's records, while both net salvage and service life must be estimated in order to calculate the annual accrual. The straight-line method differs from accelerated methods of recovery, such as the "sum-of-the-years-digits" method and the "declining balance" method. Accelerated methods are primarily used for tax purposes and are rarely used in the regulatory context for determining annual accruals.[51] In practice, the annual accrual is expressed as a rate which is applied to the original cost of plant in order to determine the annual accrual in dollars. The formula for determining the straight-line rate is as follows:[52]

Equation 2:
Straight-Line Rate

$$Depreciation\ Rate\ \% = \frac{100 - Net\ Salvage\ \%}{Service\ Life}$$

2. Grouping Procedures

The "procedure" refers to the way the allocation method is applied through subdividing the total property into groups.[53] While single units may be analyzed for depreciation, a group plan of depreciation is particularly adaptable to utility property. Employing a grouping procedure allows for a composite application of depreciation rates to groups of similar property, rather than excessively conducting calculations for each unit. Whereas an individual unit of property has a

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51 *Id*. at 57.

52 *Id*. at 56.

53 Wolf *supra* n. 9, at 74-75.

single life, a group of property displays a dispersion of lives and the life characteristics of the group must be described statistically.[54] When analyzing mass property categories, it is important that each group contains homogenous units of plant that are used in the same general manner throughout the plant and operated under the same general conditions.[55]

The "average life" and "equal life" grouping procedures are the two most common. In the average life procedure, a constant annual accrual rate based on the average life of all property in the group is applied to the surviving property. While property having shorter lives than the group average will not be fully depreciated, and likewise, property having longer lives than the group average will be over-depreciated, the ultimate result is that the group will be fully depreciated by the time of the final retirement.[56] Thus, the average life procedure treats each unit as though its life is equal to the average life of the group. In contrast, the equal life procedure treats each unit in the group as though its life was known.[57] Under the equal life procedure the property is divided into subgroups that each has a common life.[58]

3. <u>Application Techniques</u>

The third factor of a depreciation system is the "technique" for applying the depreciation rate. There are two commonly used techniques: "whole life" and "remaining life." The whole life technique applies the depreciation rate on the estimated average service life of a group, while the remaining life technique seeks to recover undepreciated costs over the remaining life of the plant.[59]

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54 *Id*. at 74.

55 NARUC *supra* n. 10, at 61-62.

56 *See* Wolf *supr*a n. 9, at 74-75.

57 *Id*. at 75.

58 *Id*.

59 NARUC *supra* n. 10, at 63-64.

In choosing the application technique, consideration should be given to the proper level of the accumulated depreciation account. Depreciation accrual rates are calculated using estimates of service life and salvage. Periodically these estimates must be revised due to changing conditions, which cause the accumulated depreciation account to be higher or lower than necessary. Unless some corrective action is taken, the annual accruals will not equal the original cost of the plant at the time of final retirement.[60] Analysts can calculate the level of imbalance in the accumulated depreciation account by determining the "calculated accumulated depreciation," (a.k.a. "theoretical reserve" and referred to in these appendices as "CAD"). The CAD is the calculated balance that would be in the accumulated depreciation account at a point in time using current depreciation parameters.[61] An imbalance exists when the actual accumulated depreciation account does not equal the CAD. The choice of application technique will affect how the imbalance is dealt with.

Use of the whole life technique requires that an adjustment be made to accumulated depreciation after calculation of the CAD. The adjustment can be made in a lump sum or over a period of time. With use of the remaining life technique, however, adjustments to accumulated depreciation are amortized over the remaining life of the property and are automatically included in the annual accrual.[62] This is one reason that the remaining life technique is popular among practitioners and regulators. The basic formula for the remaining life technique is as follows:[63]

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60 Wolf *supra* n. 9, at 83.

61 NARUC *supra* n. 10, at 325.

62 NARUC *supra* n. 10, at 65 ("The desirability of using the remaining life technique is that any necessary adjustments of [accumulated depreciation] . . . are accrued automatically over the remaining life of the property. Once commenced, adjustments to the depreciation reserve, outside of those inherent in the remaining life rate would require regulatory approval.").

63 *Id*. at 64.

Equation 3:
Remaining Life Accrual

$$Annual\ Accrual = \frac{Gross\ Plant - Accumulated\ Depreciation - Net\ Salvage}{Average\ Remaining\ Life}$$

The remaining life accrual formula is similar to the basic straight-line accrual formula above with two notable exceptions. First, the numerator has an additional factor in the remaining life formula: the accumulated depreciation. Second, the denominator is "average remaining life" instead of "average life." Essentially, the future accrual of plant (gross plant less accumulated depreciation) is allocated over the remaining life of plant. Thus, the adjustment to accumulated depreciation is "automatic" in the sense that it is built into the remaining life calculation.[64]

4. Analysis Model

The fourth parameter of a depreciation system, the "model," relates to the way of viewing the life and salvage characteristics of the vintage groups that have been combined to form a continuous property group for depreciation purposes.[65] A continuous property group is created when vintage groups are combined to form a common group. Over time, the characteristics of the property may change, but the continuous property group will continue. The two analysis models used among practitioners, the "broad group" and the "vintage group," are two ways of viewing the life and salvage characteristics of the vintage groups that have been combined to form a continuous property group.

The broad group model views the continuous property group as a collection of vintage groups that each has the same life and salvage characteristics. Thus, a single survivor curve and a

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[64] Wolf *supra* n. 9, at 178.

[65] *See* Wolf *supra* n. 9, at 139 (I added the term "model" to distinguish this fourth depreciation system parameter from the other three parameters).

single salvage schedule are chosen to describe all the vintages in the continuous property group. In contrast, the vintage group model views the continuous property group as a collection of vintage groups that may have different life and salvage characteristics. Typically, there is not a significant difference between vintage group and broad group results unless vintages within the applicable property group experienced dramatically different retirement levels than anticipated in the overall estimated life for the group. For this reason, many analysts utilize the broad group procedure because it is more efficient.

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PUC DOCKET NO. 49831

APPLICATION OF SOUTHWESTERN PUBLIC SERVICE COMPANY FOR AUTHORITY TO CHANGE RATES	**§ § §**	**BEFORE THE STATE OFFICE OF ADMINISTRATIVE HEARINGS**

DIRECT TESTIMONY AND EXHIBITS OF

DAVID J. GARRETT

APPENDIX B:

IOWA CURVES

IOWA CURVES

Early work in the analysis of the service life of industrial property was based on models that described the life characteristics of human populations.[66] This explains why the word "mortality" is often used in the context of depreciation analysis. In fact, a group of property installed during the same accounting period is analogous to a group of humans born during the same calendar year. Each period the group will incur a certain fraction of deaths / retirements until there are no survivors. Describing this pattern of mortality is part of actuarial analysis and is regularly used by insurance companies to determine life insurance premiums. The pattern of mortality may be described by several mathematical functions, particularly the survivor curve and frequency curve. Each curve may be derived from the other so that if one curve is known, the other may be obtained. A survivor curve is a graph of the percent of units remaining in service expressed as a function of age.[67] A frequency curve is a graph of the frequency of retirements as a function of age. Several types of survivor and frequency curves are illustrated in the figures below.

1. Development

The survivor curves used by analysts today were developed over several decades from extensive analysis of utility and industrial property. In 1931 Edwin Kurtz and Robley Winfrey used extensive data from a range of 65 industrial property groups to create survivor curves representing the life characteristics of each group of property.[68] They generalized the 65 curves into 13 survivor curve types and published their results in *Bulletin 103: Life Characteristics of*

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66 Wolf *supra* n. 9, at 276.

67 *Id*. at 23.

68 *Id*. at 34.

Physical Property. The 13 type curves were designed to be used as valuable aids in forecasting probable future service lives of industrial property. Over the next few years, Winfrey continued gathering additional data, particularly from public utility property, and expanded the examined property groups from 65 to 176.[69] This resulted in 5 additional survivor curve types for a total of 18 curves. In 1935, Winfrey published *Bulletin 125: Statistical Analysis of Industrial Property Retirements*. According to Winfrey, "[t]he 18 type curves are expected to represent quite well all survivor curves commonly encountered in utility and industrial practices."[70] These curves are known as the "Iowa curves" and are used extensively in depreciation analysis in order to obtain the average service lives of property groups. (Use of Iowa curves in actuarial analysis is further discussed in Appendix C.)

In 1942, Winfrey published *Bulletin 155: Depreciation of Group Properties*. In Bulletin 155, Winfrey made some slight revisions to a few of the 18 curve types, and published the equations, tables of the percent surviving, and probable life of each curve at five-percent intervals.[71] Rather than using the original formulas, analysts typically rely on the published tables containing the percentages surviving. This is because absent knowledge of the integration technique applied to each age interval, it is not possible to recreate the exact original published table values. In the 1970s, John Russo collected data from over 2,000 property accounts reflecting observations during the period 1965 – 1975 as part of his Ph.D. dissertation at Iowa State. Russo essentially repeated Winfrey's data collection, testing, and analysis methods used to develop the

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69 *Id*.

70 Robley Winfrey, *Bulletin 125: Statistical Analyses of Industrial Property Retirements* 85, Vol. XXXIV, No. 23 (Iowa State College of Agriculture and Mechanic Arts 1935).

71 Robley Winfrey, Bulletin 155: *Depreciation of Group Properties* 121-28, Vol XLI, No. 1 (The Iowa State College Bulletin 1942); *see also* Wolf supra n. 9, at 305-38 (publishing the percent surviving for each Iowa curve, including "O" type curve, at one percent intervals).

original Iowa curves, except that Russo studied industrial property in service several decades after Winfrey published the original Iowa curves. Russo drew three major conclusions from his research:[72]

1. No evidence was found to conclude that the Iowa curve set, as it stands, is not a valid system of standard curves;

2. No evidence was found to conclude that new curve shapes could be produced at this time that would add to the validity of the Iowa curve set; and

3. No evidence was found to suggest that the number of curves within the Iowa curve set should be reduced.

Prior to Russo's study, some had criticized the Iowa curves as being potentially obsolete because their development was rooted in the study of industrial property in existence during the early 1900s. Russo's research, however, negated this criticism by confirming that the Iowa curves represent a sufficiently wide range of life patterns, and that though technology will change over time, the underlying patterns of retirements remain constant and can be adequately described by the Iowa curves.[73]

Over the years, several more curve types have been added to Winfrey's 18 Iowa curves. In 1967, Harold Cowles added four origin-modal curves. In addition, a square curve is sometimes used to depict retirements which are all planned to occur at a given age. Finally, analysts commonly rely on several "half curves" derived from the original Iowa curves. Thus, the term "Iowa curves" could be said to describe up to 31 standardized survivor curves.

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[72] *See* Wolf *supra* n. 9, at 37.

[73] *Id*.

2. Classification

The Iowa curves are classified by three variables: modal location, average life, and variation of life. First, the mode is the percent life that results in the highest point of the frequency curve and the "inflection point" on the survivor curve. The modal age is the age at which the greatest rate of retirement occurs. As illustrated in the figure below, the modes appear at the steepest point of each survivor curve in the top graph, as well as the highest point of each corresponding frequency curve in the bottom graph.

The classification of the survivor curves was made according to whether the mode of the retirement frequency curves was to the left, to the right, or coincident with average service life. There are three modal "families" of curves: six left modal curves (L0, L1, L2, L3, L4, L5); five right modal curves (R1, R2, R3, R4, R5); and seven symmetrical curves (S0, S1, S2, S3, S4, S5, S6).[74] In the figure below, one curve from each family is shown: L0, S3 and R1, with average life at 100 on the x-axis. It is clear from the graphs that the modes for the L0 and R1 curves appear to the left and right of average life respectively, while the S3 mode is coincident with average life.

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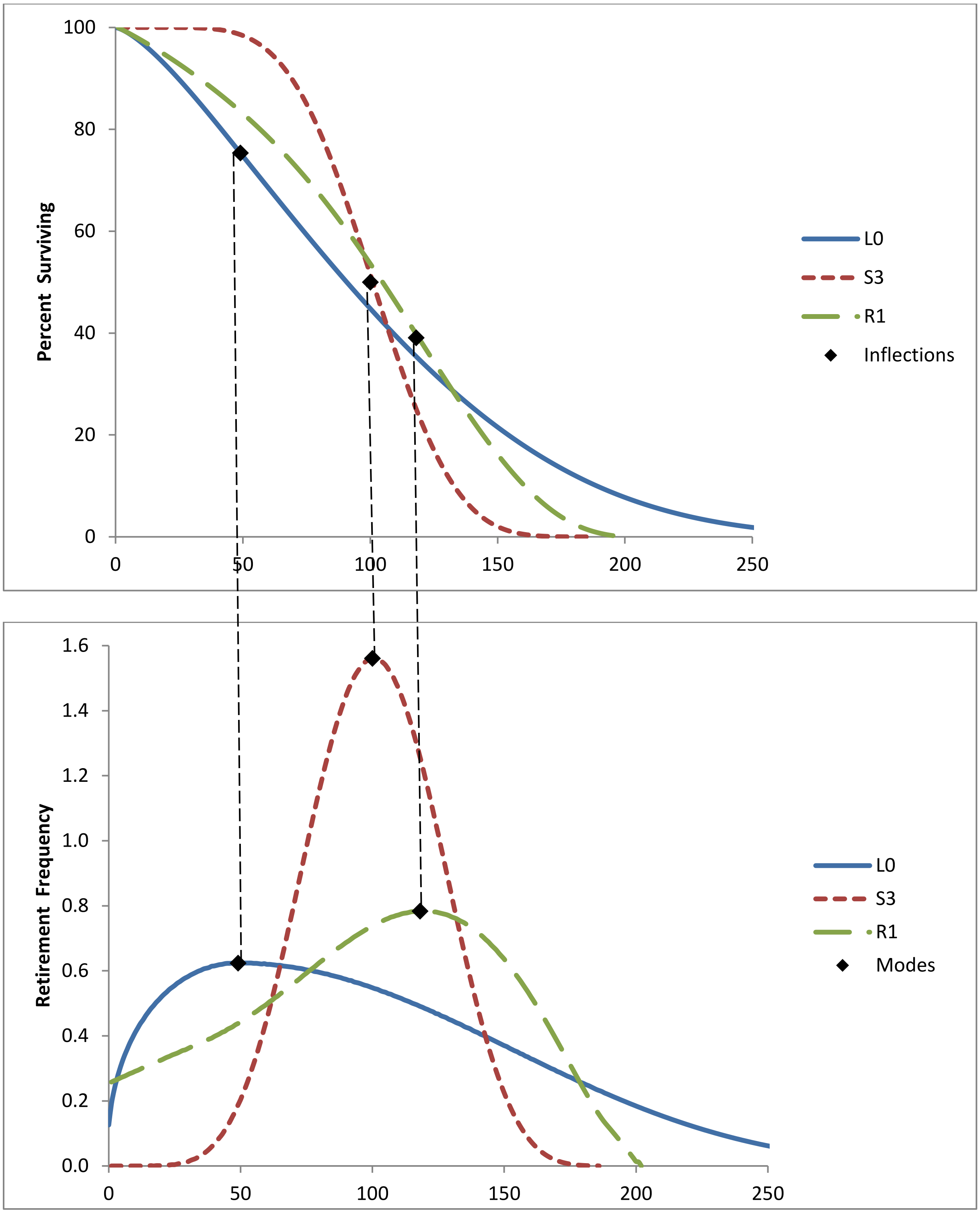
[74] In 1967, Harold A. Cowles added four origin-modal curves known as "O type" curves. There are also several "half" curves and a square curve, so the total amount of survivor curves commonly called "Iowa" curves is about 31 (see NARUC *supra* n. 10, at 68).

Figure 16:
Modal Age Illustration



The second Iowa curve classification variable is average life. The Iowa curves were designed using a single parameter of age expressed as a percent of average life instead of actual age. This was necessary in order for the curves to be of practical value. As Winfrey notes:

> Since the location of a particular survivor on a graph is affected by both its span in years and the shape of the curve, it is difficult to classify a group of curves unless one of these variables can be controlled. This is easily done by expressing the age in percent of average life."[75]

Because age is expressed in terms of percent of average life, any particular Iowa curve type can be modified to forecast property groups with various average lives.

The third variable, variation of life, is represented by the numbers next to each letter. A lower number (e.g., L1) indicates a relatively low mode, large variation, and large maximum life; a higher number (e.g., L5) indicates a relatively high mode, small variation, and small maximum life. All three classification variables – modal location, average life, and variation of life – are used to describe each Iowa curve. For example, a 13-L1 Iowa curve describes a group of property with a 13-year average life, with the greatest number of retirements occurring before (or to the left of) the average life, and a relatively low mode. The graphs below show these 18 survivor curves, organized by modal family.

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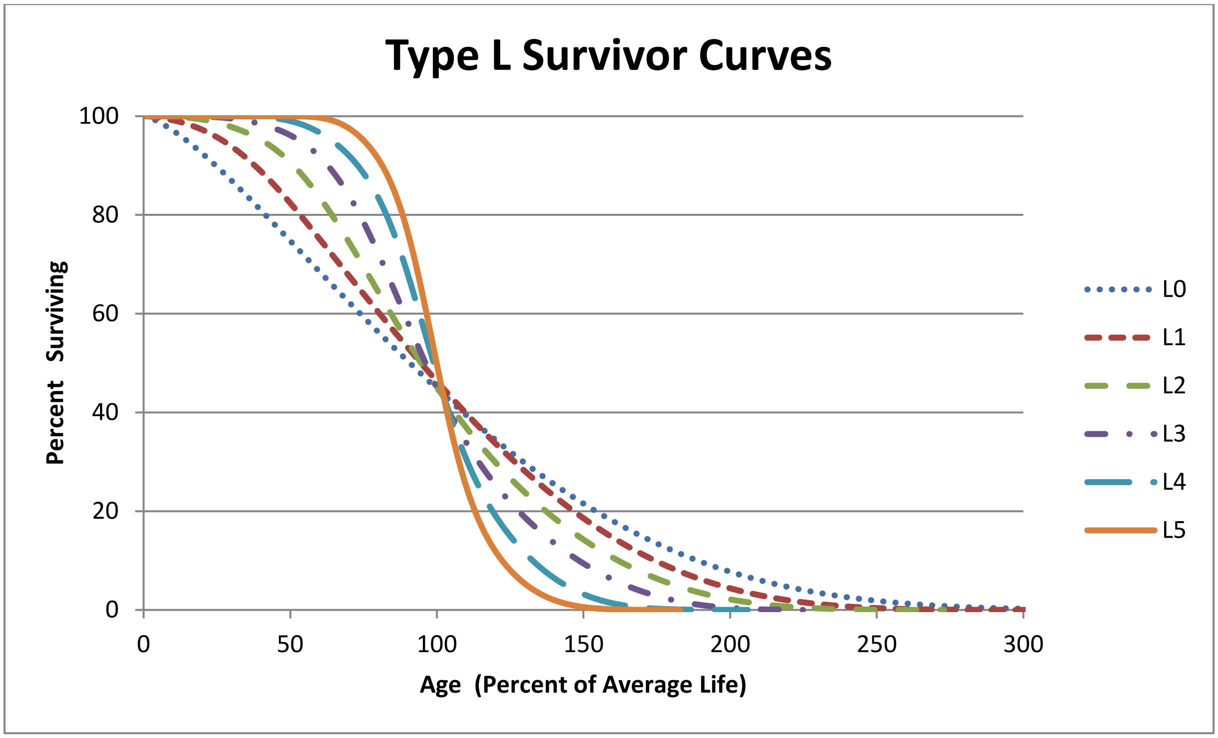
[75] Winfrey, *Bulletin 125: Statistical Analyses of Industrial Property Retirements* 60, Vol. XXXIV, No. 23 (Iowa State College of Agriculture and Mechanic Arts 1935).

Figure 17:
Type L Survivor and Frequency Curves



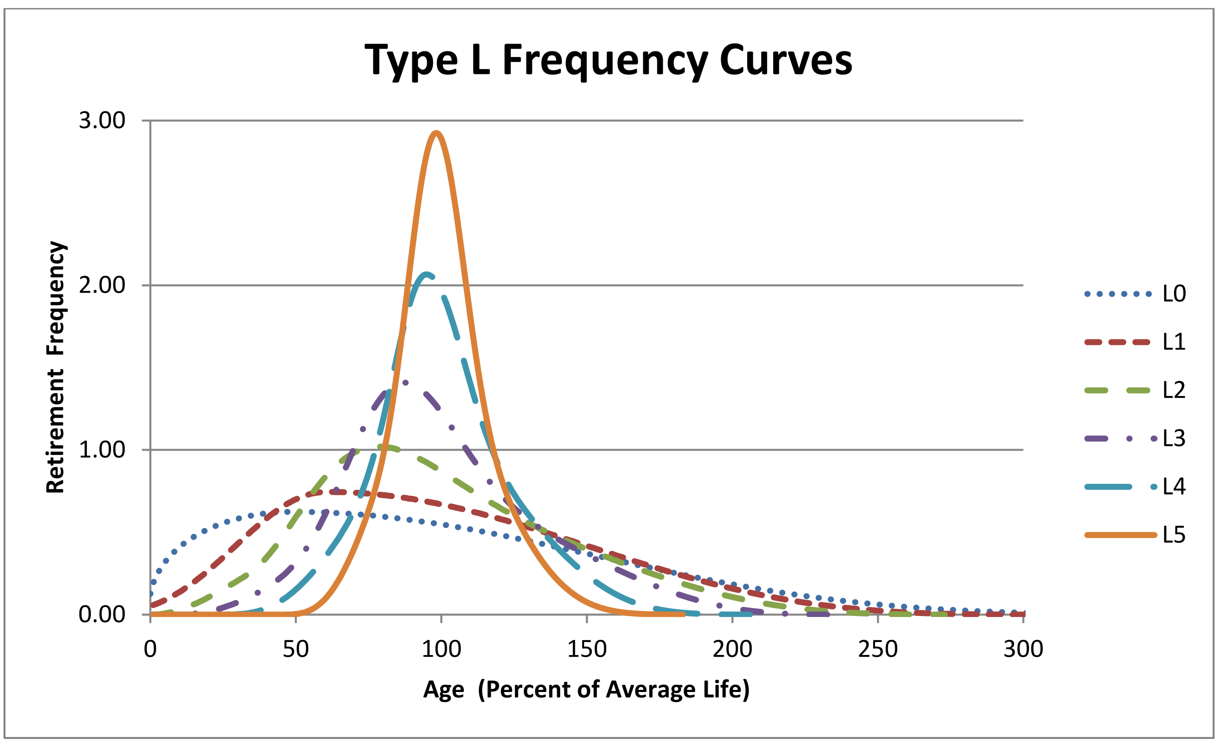
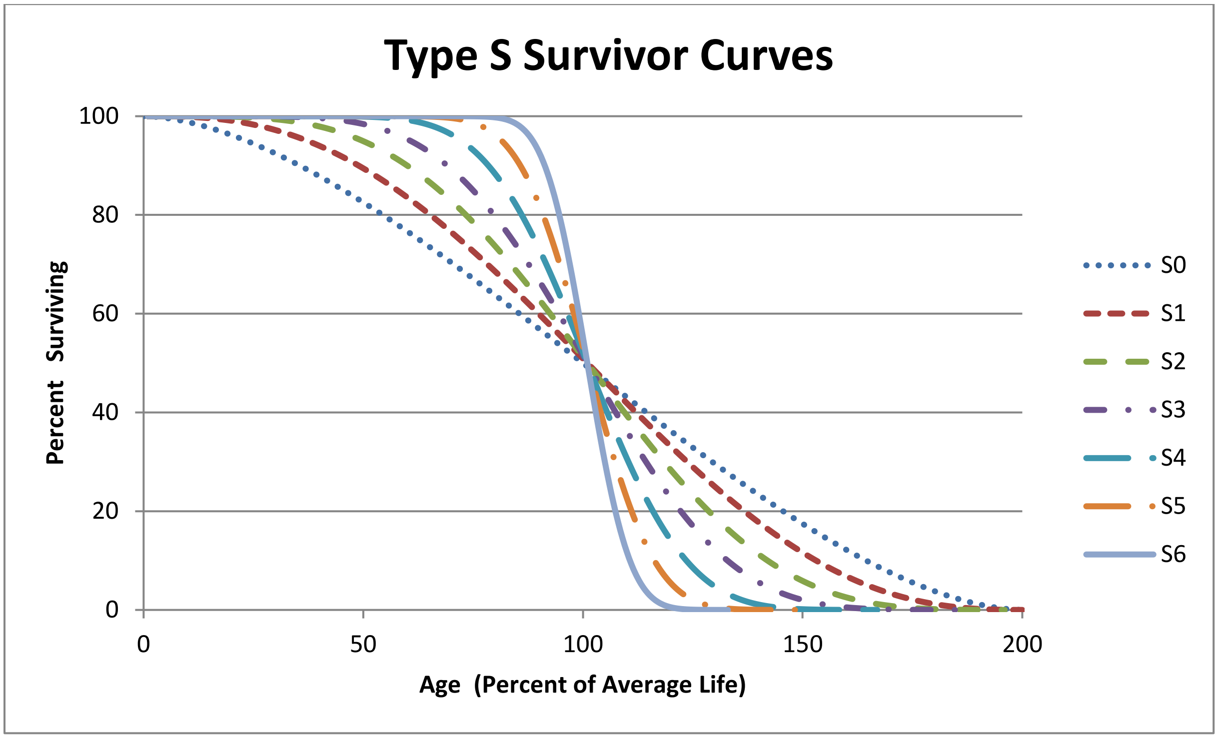


Figure 18:
Type S Survivor and Frequency Curves



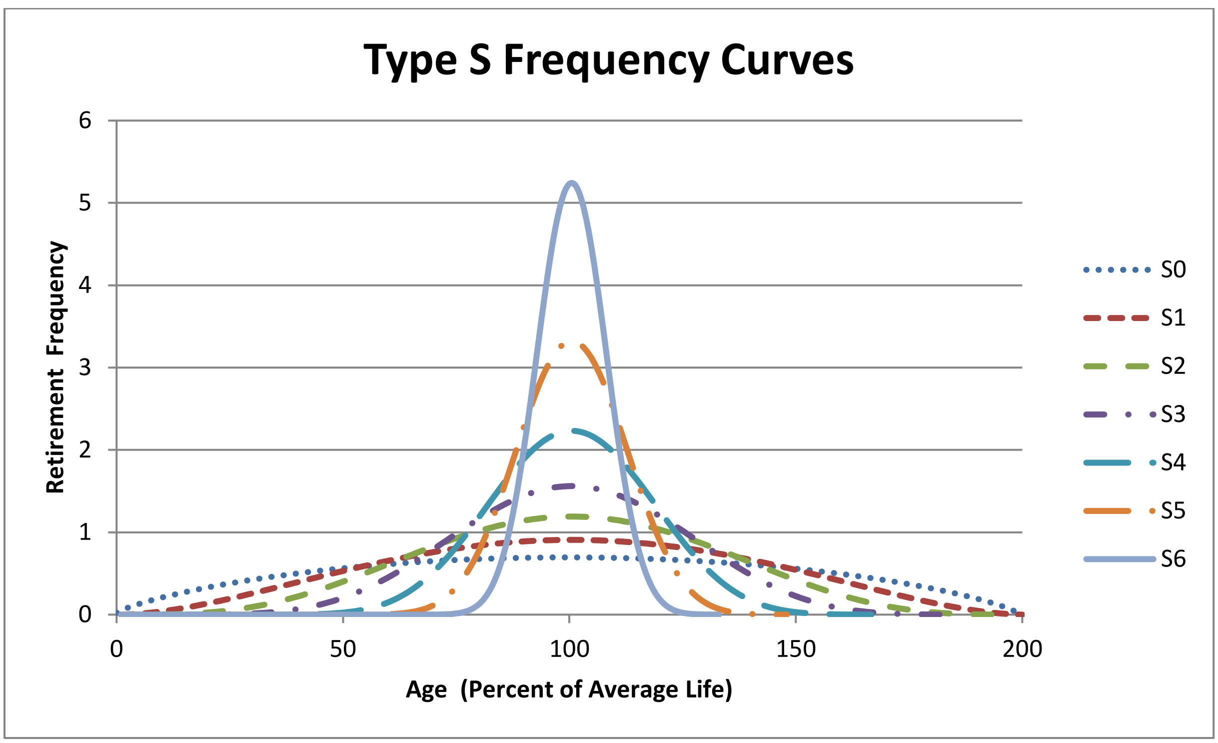
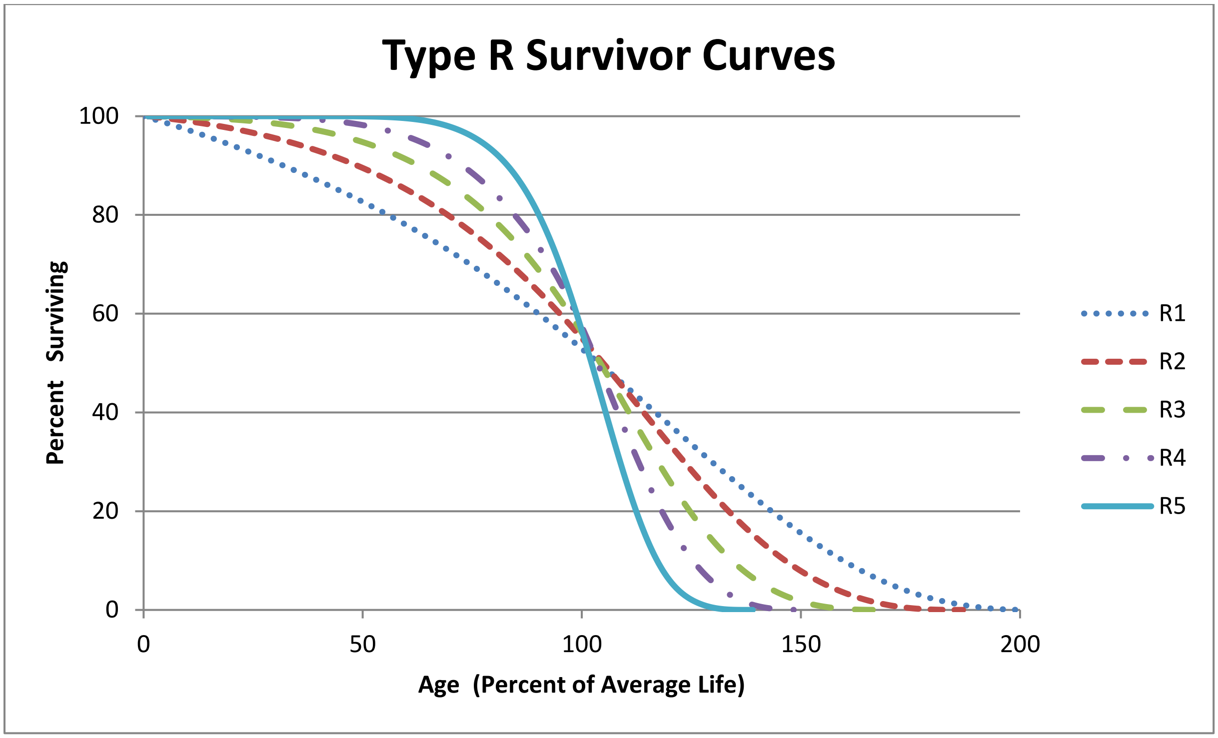
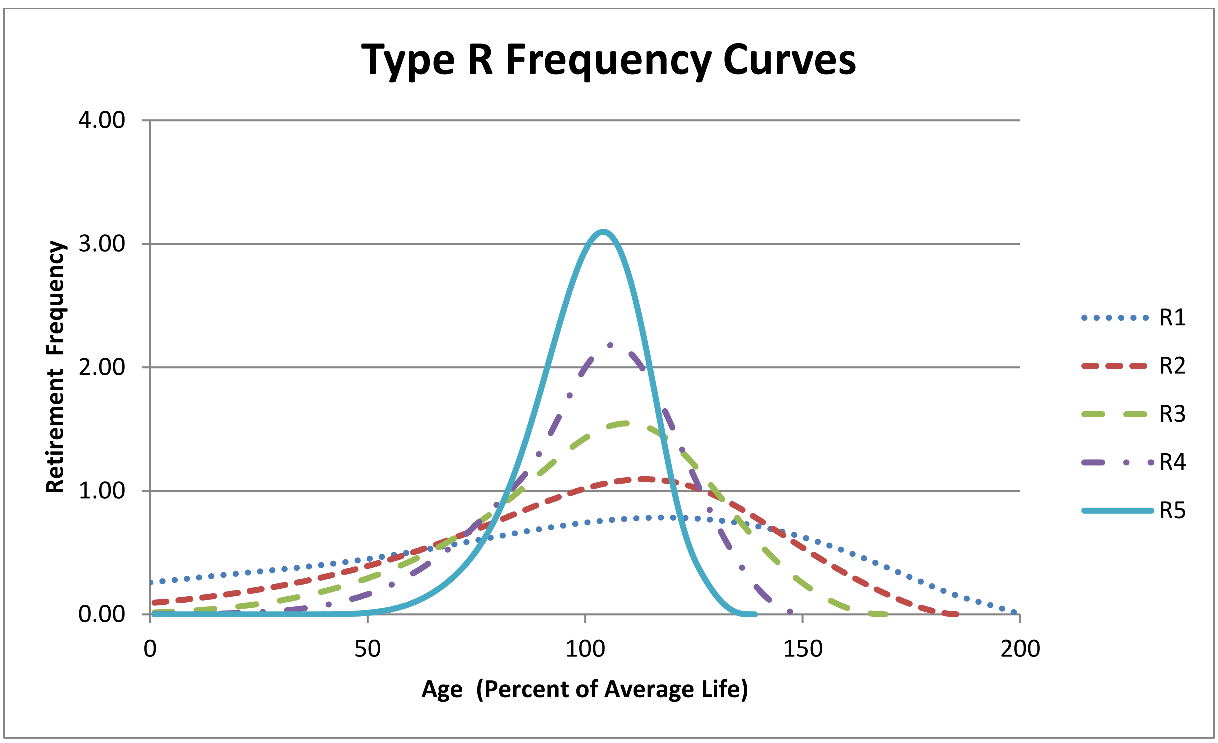


Figure 19:
Type R Survivor and Frequency Curves





As shown in the graphs above, the modes for the L family frequency curves occur to the left of average life (100% on the x-axis), while the S family modes occur at the average, and the R family modes occur after the average.

3. Types of Lives

Several other important statistical analyses and types of lives may be derived from an Iowa curve. These include: 1) average life; 2) realized life; 3) remaining life; and 4) probable life. The figure below illustrates these concepts. It shows the frequency curve, survivor curve, and probable life curve. Age M_x on the x-axis represents the modal age, while age AL_x represents the average age. Thus, this figure illustrates an "L type" Iowa curve since the mode occurs before the average.[76]

First, average life is the area under the survivor curve from age zero to maximum life. Because the survivor curve is measured in percent, the area under the curve must be divided by 100% to convert it from percent-years to years. The formula for average life is as follows:[77]

Equation 4:
Average Life

$$Average\ Life\ = \frac{Area\ Under\ Survivor\ Curve\ from\ Age\ 0\ to\ Max\ Life}{100\%}$$

Thus, average life may not be determined without a complete survivor curve. Many property groups being analyzed will not have experienced full retirement. This results in a "stub" survivor curve. Iowa curves are used to extend stub curves to maximum life in order for the average life calculation to be made (see Appendix C).

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76 From age zero to age M_x on the survivor curve, it could be said that the percent surviving from this property group is decreasing at an increasing rate. Conversely, from point M_x to maximum on the survivor curve, the percent surviving is decreasing at a decreasing rate.

77 *See* NARUC *supra* n. 10, at 71.

Realized life is similar to average life, except that realized life is the average years of service experienced to date from the vintage's original installations.[78] As shown in the figure below, realized life is the area under the survivor curve from zero to age RL_X. Likewise, unrealized life is the area under the survivor curve from age RL_X to maximum life. Thus, it could be said that average life equals realized life plus unrealized life.

Average remaining life represents the future years of service expected from the surviving property.[79] Remaining life is sometimes referred to as "average remaining life" and "life expectancy." To calculate average remaining life at age x, the area under the estimated future portion of the survivor curve is divided by the percent surviving at age x (denoted S_X). Thus, the average remaining life formula is:

Equation 5:
Average Remaining Life

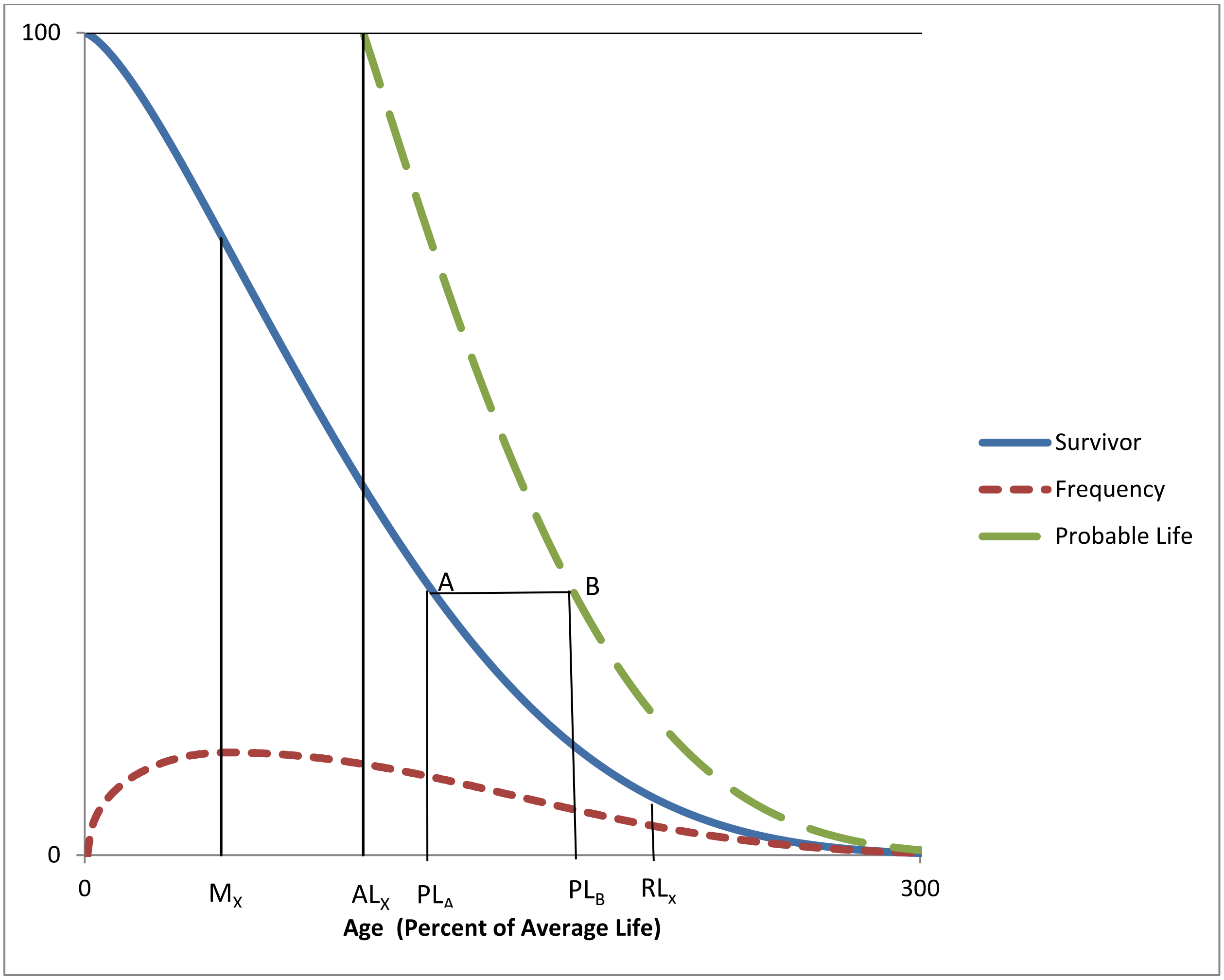
$$Average\ Remaining\ Life\ = \frac{Area\ Under\ Survivor\ Curve\ from\ Age\ x\ to\ Max\ Life}{S_X}$$

It is necessary to determine average remaining life in order to calculate the annual accrual under the remaining life technique.

78 *Id*. at 73.

79 *Id*. at 74.

Figure 20:
Iowa Curve Derivations



Finally, the probable life may also be determined from the Iowa curve. The probable life of a property group is the total life expectancy of the property surviving at any age and is equal to the remaining life plus the current age.[80] The probable life is also illustrated in this figure. The probable life at age PL_A is the age at point PL_B. Thus, to read the probable life at age PL_A, see the corresponding point on the survivor curve above at point "A," then horizontally to point "B" on the probable life curve, and back down to the age corresponding to point "B." It is no coincidence

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[80] Wolf *supra* n. 9, at 28.

that the vertical line from AL_X connects at the top of the probable life curve. This is because at age zero, probable life equals average life.

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DIRECT TESTIMONY AND EXHIBITS OF

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APPENDIX C:

ACTUARIAL ANALYSIS

ACTUARIAL ANALYSIS

Actuarial science is a discipline that applies various statistical methods to assess risk probabilities and other related functions. Actuaries often study human mortality. The results from historical mortality data are used to predict how long similar groups of people who are alive will live today. Insurance companies rely on actuarial analysis in determining premiums for life insurance policies.

The study of human mortality is analogous to estimating service lives of industrial property groups. While some humans die solely from chance, most deaths are related to age; that is, death rates generally increase as age increases. Similarly, physical plant is also subject to forces of retirement. These forces include physical, functional, and contingent factors, as shown in the table below.[81]

Figure 21:
Forces of Retirement

Physical Factors	Functional Factors	Contingent Factors
Wear and tear Decay or deterioration Action of the elements	Inadequacy Obsolescence Changes in technology Regulations Managerial discretion	Casualties or disasters Extraordinary obsolescence

While actuaries study historical mortality data in order to predict how long a group of people will live, depreciation analysts must look at a utility's historical data in order to estimate the average lives of property groups. A utility's historical data is often contained in the Continuing Property Records ("CPR"). Generally, a CPR should contain 1) an inventory of property record

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[81] NARUC *supra* n. 10, at 14-15.

units; 2) the association of costs with such units; and 3) the dates of installation and removal of plant. Since actuarial analysis includes the examination of historical data to forecast future retirements, the historical data used in the analysis should not contain events that are anomalous or unlikely to recur.[82] Historical data is used in the retirement rate actuarial method, which is discussed further below.

<u>The Retirement Rate Method</u>

There are several systematic actuarial methods that use historical data in order to calculate observed survivor curves for property groups. Of these methods, the retirement rate method is superior, and is widely employed by depreciation analysts.[83] The retirement rate method is ultimately used to develop an observed survivor curve, which can be fitted with an Iowa curve discussed in Appendix B in order to forecast average life. The observed survivor curve is calculated by using an observed life table ("OLT"). The figures below illustrate how the OLT is developed. First, historical property data are organized in a matrix format, with placement years on the left forming rows, and experience years on the top forming columns. The placement year (a.k.a. "vintage year" or "installation year") is the year of placement of a group of property. The experience year (a.k.a. "activity year") refers to the accounting data for a particular calendar year. The two matrices below use aged data – that is, data for which the dates of placements, retirements, transfers, and other transactions are known. Without aged data, the retirement rate actuarial method may not be employed. The first matrix is the exposure matrix, which shows the exposures

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82 *Id*. at 112-13.

83 Anson Marston, Robley Winfrey & Jean C. Hempstead, *Engineering Valuation and Depreciation* 154 (2nd ed., McGraw-Hill Book Company, Inc. 1953).

at the beginning of each year.[84] An exposure is simply the depreciable property subject to retirement during a period. The second matrix is the retirement matrix, which shows the annual retirements during each year. Each matrix covers placement years 2003–2015, and experience years 2008-2015. In the exposure matrix, the number in the 2009 experience column and the 2003 placement row is $192,000. This means at the beginning of 2012, there was $192,000 still exposed to retirement from the vintage group placed in 2003. Likewise, in the retirement matrix, $19,000 of the dollars invested in 2003 was retired during 2012.

Figure 22:
Exposure Matrix

	Experience Years Exposures at January 1 of Each Year (Dollars in 000's)									
Placement Years	2008	2009	2010	2011	2012	2013	2014	2015	Total at Start of Age Interval	Age Interval
2003	261	245	228	211	**192**	173	152	131	131	11.5 - 12.5
2004	267	252	236	220	202	**184**	165	145	297	10.5 - 11.5
2005	304	291	277	263	248	232	**216**	198	536	9.5 - 10.5
2006	345	334	322	310	298	284	270	**255**	**847**	8.5 - 9.5
2007	367	357	347	335	324	312	299	286	1,201	7.5 - 8.5
2008	375	366	357	347	336	325	314	302	1,581	6.5 - 7.5
2009		377	366	356	346	336	327	319	1,986	5.5 - 6.5
2010			381	369	358	347	336	327	2,404	4.5 - 5.5
2011				386	372	359	346	334	2,559	3.5 - 4.5
2012					395	380	366	352	2,722	2.5 - 3.5
2013						401	385	370	2,866	1.5 - 2.5
2014							410	393	2,998	0.5 - 1.5
2015								416	3,141	0.0 - 0.5
Total	1919	2222	2514	2796	3070	3333	3586	3827	23,268	

[84] Technically, the last numbers in each column are "gross additions" rather than exposures. Gross additions do not include adjustments and transfers applicable to plant placed in a previous year. Once retirements, adjustments, and transfers are factored in, the balance at the beginning of the next account period is called an "exposure" rather than an addition.

Figure 23:
Retirement Matrix

	Experience Years Retirments During the Year (Dollars in 000's)									
Placement Years	2008	2009	2010	2011	2012	2013	2014	2015	Total During Age Interval	Age Interval
2003	16	17	18	19	**19**	20	21	23	23	11.5 - 12.5
2004	15	16	17	17	18	**19**	20	21	43	10.5 - 11.5
2005	13	14	14	15	16	17	**17**	18	59	9.5 - 10.5
2006	11	12	12	13	13	14	15	**15**	**71**	8.5 - 9.5
2007	10	11	11	12	12	13	13	14	82	7.5 - 8.5
2008	9	9	10	10	11	11	12	13	91	6.5 - 7.5
2009		11	10	10	9	9	9	8	95	5.5 - 6.5
2010			12	11	11	10	10	9	100	4.5 - 5.5
2011				14	13	13	12	11	93	3.5 - 4.5
2012					15	14	14	13	91	2.5 - 3.5
2013						16	15	14	93	1.5 - 2.5
2014							17	16	100	0.5 - 1.5
2015								18	112	0.0 - 0.5
Total	74	89	104	121	139	157	175	194	1,052	

These matrices help visualize how exposure and retirement data are calculated for each age interval. An age interval is typically one year. A common convention is to assume that any unit installed during the year is installed in the middle of the calendar year (i.e., July 1st). This convention is called the "half-year convention" and effectively assumes that all units are installed uniformly during the year.[85] Adoption of the half-year convention leads to age intervals of 0-0.5 years, 0.5-1.5 years, etc., as shown in the matrices.

The purpose of the matrices is to calculate the totals for each age interval, which are shown in the second column from the right in each matrix. This column is calculated by adding each number from the corresponding age interval in the matrix. For example, in the exposure matrix, the total amount of exposures at the beginning of the 8.5-9.5 age interval is $847,000. This number was calculated by adding the numbers shown on the "stairs" to the left (192+184+216+255=847). The same calculation is applied to each number in the column. The amounts retired during the year

85 Wolf *supra* n. 9, at 22.

in the retirements matrix affect the exposures at the beginning of each year in the exposures matrix. For example, the amount exposed to retirement in 2008 from the 2003 vintage is \$261,000. The amount retired during 2008 from the 2003 vintage is \$16,000. Thus, the amount exposed to retirement in 2009 from the 2003 vintage is \$245,000 (\$261,000 - \$16,000). The company's property records may contain other transactions which affect the property, including sales, transfers, and adjusting entries. Although these transactions are not shown in the matrices above, they would nonetheless affect the amount exposed to retirement at the beginning of each year.

The totaled amounts for each age interval in both matrices are used to form the exposure and retirement columns in the OLT, as shown in the chart below. This chart also shows the retirement ratio and the survivor ratio for each age interval. The retirement ratio for an age interval is the ratio of retirements during the interval to the property exposed to retirement at the beginning of the interval. The retirement ratio represents the probability that the property surviving at the beginning of an age interval will be retired during the interval. The survivor ratio is simply the complement to the retirement ratio (1 – retirement ratio). The survivor ratio represents the probability that the property surviving at the beginning of an age interval will survive to the next age interval.

Figure 24:
Observed Life Table

Age at Start of Interval	Exposures at Start of Age Interval	Retirements During Age Interval	Retirement Ratio	Survivor Ratio	Percent Surviving at Start of Age Interval
A	B	C	D = C / B	E = 1 - D	F
0.0	3,141	112	0.036	0.964	**100.00**
0.5	2,998	100	0.033	0.967	**96.43**
1.5	2,866	93	0.032	0.968	**93.21**
2.5	2,722	91	0.033	0.967	**90.19**
3.5	2,559	93	0.037	0.963	**87.19**
4.5	2,404	100	0.042	0.958	**84.01**
5.5	1,986	95	0.048	0.952	**80.50**
6.5	1,581	91	0.058	0.942	**76.67**
7.5	1,201	82	0.068	0.932	**72.26**
8.5	847	71	0.084	0.916	**67.31**
9.5	536	59	0.110	0.890	**61.63**
10.5	297	43	0.143	0.857	**54.87**
11.5	131	23	0.172	0.828	**47.01**
					38.91
Total	23,268	1,052			

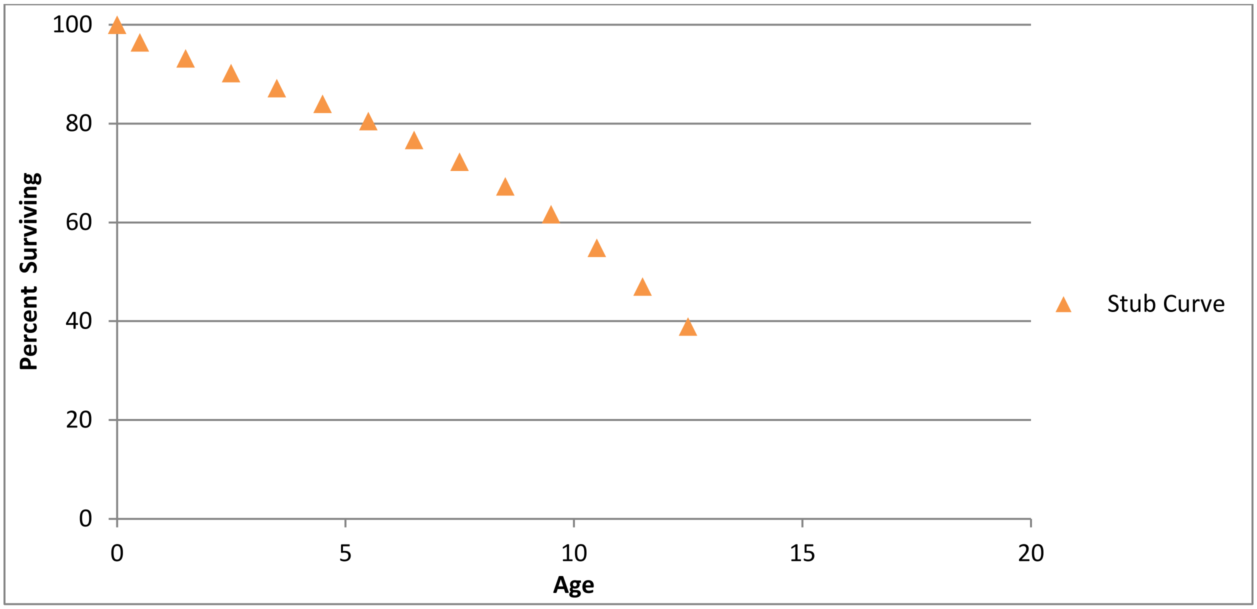
Column F on the right shows the percentages surviving at the beginning of each age interval. This column starts at 100% surviving. Each consecutive number below is calculated by multiplying the percent surviving from the previous age interval by the corresponding survivor ratio for that age interval. For example, the percent surviving at the start of age interval 1.5 is 93.21%, which was calculated by multiplying the percent surviving for age interval 0.5 (96.43%) by the survivor ratio for age interval 0.5 (0.967)[86].

The percentages surviving in Column F are the numbers that are used to form the original survivor curve. This particular curve starts at 100% surviving and ends at 38.91% surviving. An

86 Multiplying 96.43 by 0.967 does not equal 93.21 exactly due to rounding.

observed survivor curve such as this that does not reach zero percent surviving is called a "stub" curve. The figure below illustrates the stub survivor curve derived from the OLT table above.

Figure 25:
Original "Stub" Survivor Curve



The matrices used to develop the basic OLT and stub survivor curve provide a basic illustration of the retirement rate method in that only a few placement and experience years were used. In reality, analysts may have several decades of aged property data to analyze. In that case, it may be useful to use a technique called "banding" in order to identify trends in the data.

Banding

The forces of retirement and characteristics of industrial property are constantly changing. A depreciation analyst may examine the magnitude of these changes. Analysts often use a technique called "banding" to assist with this process. Banding refers to the merging of several years of data into a single data set for further analysis, and it is a common technique associated with the retirement rate method.[87] There are three primary benefits of using bands in depreciation analysis:

1. Increasing the sample size. In statistical analyses, the larger the sample size in relation to the body of total data, the greater the reliability of the result;

2. Smooth the observed data. Generally, the data obtained from a single activity or vintage year will not produce an observed life table that can be easily fit; and

3. Identify trends. By looking at successive bands, the analyst may identify broad trends in the data that may be useful in projecting the future life characteristics of the property.[88]

Two common types of banding methods are the "placement band" method and the "experience band" method." A placement band, as the name implies, isolates selected placement years for analysis. The figure below illustrates the same exposure matrix shown above, except that only the placement years 2005-2008 are considered in calculating the total exposures at the beginning of each age interval.

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87 NARUC *supra* n. 10, at 113.

88 *Id*.

Figure 26:
Placement Bands

	Experience Years Exposures at January 1 of Each Year (Dollars in 000's)									
Placement Years	2008	2009	2010	2011	2012	2013	2014	2015	Total at Start of Age Interval	Age Interval
2003	261	245	228	211	192	173	152	131		11.5 - 12.5
2004	267	252	236	220	202	184	165	145		10.5 - 11.5
2005	304	291	277	263	248	232	216	198	198	9.5 - 10.5
2006	345	334	322	310	298	284	270	255	471	8.5 - 9.5
2007	367	357	347	335	324	312	299	286	788	7.5 - 8.5
2008	375	366	357	347	336	325	314	302	1,133	6.5 - 7.5
2009		377	366	356	346	336	327	319	1,186	5.5 - 6.5
2010			381	369	358	347	336	327	1,237	4.5 - 5.5
2011				386	372	359	346	334	1,285	3.5 - 4.5
2012					395	380	366	352	1,331	2.5 - 3.5
2013						401	385	370	1,059	1.5 - 2.5
2014							410	393	733	0.5 - 1.5
2015								416	375	0.0 - 0.5
Total	1919	2222	2514	2796	3070	3333	3586	3827	9,796	

The shaded cells within the placement band equal the total exposures at the beginning of age interval 4.5–5.5 ($1,237). The same placement band would be used for the retirement matrix covering the same placement years of 2005 – 2008. This of course would result in a different OLT and original stub survivor curve than those that were calculated above without the restriction of a placement band.

Analysts often use placement bands for comparing the survivor characteristics of properties with different physical characteristics.[89] Placement bands allow analysts to isolate the effects of changes in technology and materials that occur in successive generations of plant. For example, if in 2005 an electric utility began placing transmission poles with a special chemical treatment that extended the service lives of the poles, an analyst could use placement bands to isolate and analyze the effect of that change in the property group's physical characteristics. While placement bands are very useful in depreciation analysis, they also possess an intrinsic dilemma. A

[89] Wolf *supra* n. 9, at 182.

fundamental characteristic of placement bands is that they yield fairly complete survivor curves for older vintages. However, with newer vintages, which are arguably more valuable for forecasting, placement bands yield shorter survivor curves. Longer "stub" curves are considered more valuable for forecasting average life. Thus, an analyst must select a band width broad enough to provide confidence in the reliability of the resulting curve fit yet narrow enough so that an emerging trend may be observed.[90]

Analysts also use "experience bands." Experience bands show the composite retirement history for all vintages during a select set of activity years. The figure below shows the same data presented in the previous exposure matrices, except that the experience band from 2011 – 2013 is isolated, resulting in different interval totals.

Figure 27:
Experience Bands

	Experience Years Exposures at January 1 of Each Year (Dollars in 000's)									
Placement Years	2008	2009	2010	2011	2012	2013	2014	2015	Total at Start of Age Interval	Age Interval
2003	261	245	228	211	192	173	152	131		11.5 - 12.5
2004	267	252	236	220	202	184	165	145		10.5 - 11.5
2005	304	291	277	263	248	232	216	198	173	9.5 - 10.5
2006	345	334	322	310	298	284	270	255	376	8.5 - 9.5
2007	367	357	347	335	324	312	299	286	645	7.5 - 8.5
2008	375	366	357	347	336	325	314	302	752	6.5 - 7.5
2009		377	366	356	346	336	327	319	872	5.5 - 6.5
2010			381	369	358	347	336	327	959	4.5 - 5.5
2011				386	372	359	346	334	1,008	3.5 - 4.5
2012					395	380	366	352	1,039	2.5 - 3.5
2013						401	385	370	1,072	1.5 - 2.5
2014							410	393	1,121	0.5 - 1.5
2015								416	1,182	0.0 - 0.5
Total	1919	2222	2514	2796	3070	3333	3586	3827	9,199	

The shaded cells within the experience band equal the total exposures at the beginning of age interval 4.5–5.5 ($1,237). The same experience band would be used for the retirement matrix

[90] NARUC *supra* n. 10, at 114.

covering the same experience years of 2011 – 2013. This of course would result in a different OLT and original stub survivor than if the band had not been used. Analysts often use experience bands to isolate and analyze the effects of an operating environment over time.[91] Likewise, the use of experience bands allows analysis of the effects of an unusual environmental event. For example, if an unusually severe ice storm occurred in 2013, destruction from that storm would affect an electric utility's line transformers of all ages. That is, each of the line transformers from each placement year would be affected, including those recently installed in 2012, as well as those installed in 2003. Using experience bands, an analyst could isolate or even eliminate the 2013 experience year from the analysis. In contrast, a placement band would not effectively isolate the ice storm's effect on life characteristics. Rather, the placement band would show an unusually large rate of retirement during 2013, making it more difficult to accurately fit the data with a smooth Iowa curve. Experience bands tend to yield the most complete stub curves for recent bands because they have the greatest number of vintages included. Longer stub curves are better for forecasting. The experience bands, however, may also result in more erratic retirement dispersion making the curve fitting process more difficult.

Depreciation analysts must use professional judgment in determining the types of bands to use and the band widths. In practice, analysts may use various combinations of placement and experience bands in order to increase the data sample size, identify trends and changes in life characteristics, and isolate unusual events. Regardless of which bands are used, observed survivor curves in depreciation analysis rarely reach zero percent. This is because, as seen in the OLT above, relatively newer vintage groups have not yet been fully retired at the time the property is

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91 *Id*.

studied. An analyst could confine the analysis to older, fully retired vintage groups in order to get complete survivor curves, but such analysis would ignore some of the property currently in service and would arguably not provide an accurate description of life characteristics for current plant in service. Because a complete curve is necessary to calculate the average life of the property group, however, curve fitting techniques using Iowa curves or other standardized curves may be employed in order to complete the stub curve.

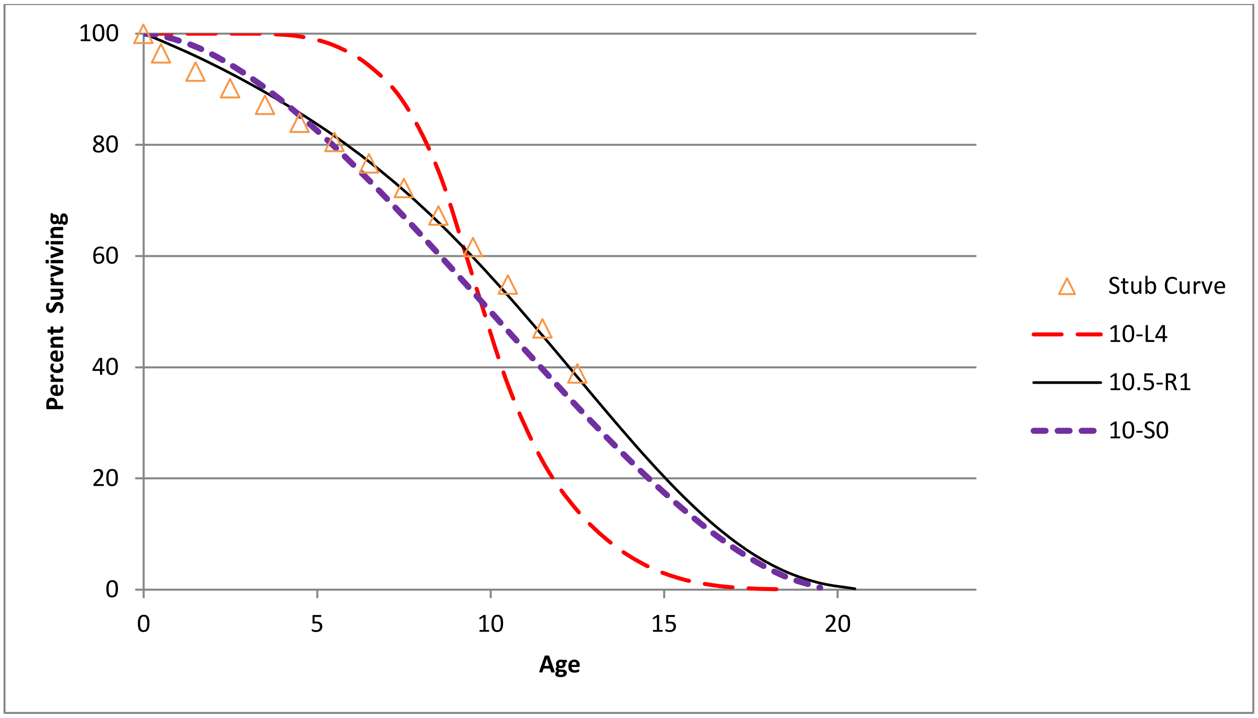
Curve Fitting

Depreciation analysts typically use the survivor curve rather than the frequency curve to fit the observed stub curves. The most commonly used generalized survivor curves used in the curve fitting process are the Iowa curves discussed above. As Wolf notes, if "the Iowa curves are adopted as a model, an underlying assumption is that the process describing the retirement pattern is one of the 22 [or more] processes described by the Iowa curves."[92]

Curve fitting may be done through visual matching or mathematical matching. In visual curve fitting, the analyst visually examines the plotted data to make an initial judgment about the Iowa curves that may be a good fit. The figure below illustrates the stub survivor curve shown above. It also shows three different Iowa curves: the 10-L4, the 10.5-R1, and the 10-S0. Visually, it is clear that the 10.5-R1 curve is a better fit than the other two curves.

[92] Wolf *supra* n. 9, at 46 (22 curves includes Winfrey's 18 original curves plus Cowles's four "O" type curves).

Figure 28:
Visual Curve Fitting



In mathematical fitting, the least squares method is used to calculate the best fit. This mathematical method would be excessively time consuming if done by hand. With the use of modern computer software however, mathematical fitting is an efficient and useful process. The typical logic for a computer program, as well as the software employed for the analysis in this testimony is as follows:

> First (an Iowa curve) curve is arbitrarily selected. . . . If the observed curve is a stub curve, . . . calculate the area under the curve and up to the age at final data point. Call this area the realized life. Then systematically vary the average life of the theoretical survivor curve and calculate its realized life at the age corresponding to the study date. This trial and error procedure ends when you find an average life such that the realized life of the theoretical curve equals the realized life of the observed curve. Call this the average life.
>
> Once the average life is found, calculate the difference between each percent surviving point on the observed survivor curve and the corresponding point on the Iowa curve. Square each difference and sum them. The sum of squares is used as a measure of goodness of fit for that particular Iowa type curve. This procedure is

> repeated for the remaining 21 Iowa type curves. The "best fit" is declared to be the type of curve that minimizes the sum of differences squared.[93]

Mathematical fitting requires less judgment from the analyst and is thus less subjective. Blind reliance on mathematical fitting, however, may lead to poor estimates. Thus, analysts should employ both mathematical and visual curve fitting in reaching their final estimates. This way, analysts may utilize the objective nature of mathematical fitting while still employing professional judgment. As Wolf notes: "The results of mathematical curve fitting serve as a guide for the analyst and speed the visual fitting process. But the results of the mathematical fitting should be checked visually and the final determination of the best fit be made by the analyst."[94]

In the graph above, visual fitting was sufficient to determine that the 10.5-R1 Iowa curve was a better fit than the 10-L4 and the 10-S0 curves. Using the sum of least squares method, mathematical fitting confirms the same result. In the chart below, the percentages surviving from the OLT that formed the original stub curve are shown in the left column, while the corresponding percentages surviving for each age interval are shown for the three Iowa curves. The right portion of the chart shows the differences between the points on each Iowa curve and the stub curve. These differences are summed at the bottom. Curve 10.5-R1 is the best fit because the sum of the squared differences for this curve is less than the same sum of the other two curves. Curve 10-L4 is the worst fit, which was also confirmed visually.

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93 Wolf *supra* n. 9, at 47.

94 *Id*. at 48.

Figure 29:
Mathematical Fitting

Age	Stub	Iowa Curves			Squared Differences		
Interval	**Curve**	**10-L4**	**10-S0**	**10.5-R1**	**10-L4**	**10-S0**	**10.5-R1**
0.0	100.0	100.0	100.0	100.0	0.0	0.0	0.0
0.5	96.4	100.0	99.7	98.7	12.7	10.3	5.3
1.5	93.2	100.0	97.7	96.0	46.1	19.8	7.6
2.5	90.2	100.0	94.4	92.9	96.2	18.0	7.2
3.5	87.2	100.0	90.2	89.5	162.9	9.3	5.2
4.5	84.0	99.5	85.3	85.7	239.9	1.6	2.9
5.5	80.5	97.9	79.7	81.6	301.1	0.7	1.2
6.5	76.7	94.2	73.6	77.0	308.5	9.5	0.1
7.5	72.3	87.6	67.1	71.8	235.2	26.5	0.2
8.5	67.3	75.2	60.4	66.1	62.7	48.2	1.6
9.5	61.6	56.0	53.5	59.7	31.4	66.6	3.6
10.5	54.9	36.8	46.5	52.9	325.4	69.6	3.9
11.5	47.0	23.1	39.6	45.7	572.6	54.4	1.8
12.5	38.9	14.2	32.9	38.2	609.6	36.2	0.4
SUM					**3004.2**	**371.0**	**41.0**

SOAH DOCKET NO. 473-19-6677
PUC DOCKET NO. 49831

APPLICATION OF SOUTHWESTERN	**§**	**BEFORE THE STATE OFFICE**
PUBLIC SERVICE COMPANY FOR	**§**	**OF**
AUTHORITY TO CHANGE RATES	**§**	**ADMINISTRATIVE HEARINGS**

DIRECT TESTIMONY AND EXHIBITS OF

DAVID J. GARRETT

APPENDIX D:

SIMULATED LIFE ANALYSIS

SIMULATED LIFE ANALYSIS

Aged data is required to perform actuarial analysis. That is, the collection of property data must contain the dates of placements, retirements, transfers, and other actions. When a utility's property records do not contain aged data, however, analysts may use another analytical method to simulate the missing data. The contrast between aged and unaged data is illustrated in the matrices below.[95] The first matrix is similar to the matrices in Appendix C used to demonstrate actuarial analysis.

Figure 30:
Aged Data Matrix

End of Year Balances ($)										
Vintage	Installations	1997	1999	2001	2003	2005	2007	2009	2011	2013
1997	220	220	220	220	213	194	152	95	19	0
			250	250	248	235	198	143	31	4
1999	270		270	270	270	262	238	186	57	9
				285	285	282	268	225	91	26
2001	300			300	300	300	291	264	145	42
					320	320	317	301	241	103
2003	350				350	350	350	340	284	157
						375	375	371	325	219
2005	390					390	390	390	362	286
							405	405	392	344
2007	450						450	450	441	416
								480	480	478
2009	500							500	500	500
									580	580
2011	670								670	670
										790
2013	750									750
Balance		220	740	1325	1986	2708	3434	4150	4618	5374

The aged data matrix contains installation or "vintage" years in the first column and experience years in the top row. (Only every other year is shown in order to save space). This matrix contains aged data, meaning that the utility kept track of the age of plant when it was retired. In 2007, for

95 See SDP Fundamentals 2014 pdf. 152.

example, $291 were remaining in service from the 2001 installation of $300. Likewise, in 2011, it was known that $57 were remaining in service from the 1999 vintage installation of $270. The amounts in each experience year column are added to arrive the year-end balances. Now assume that the amount of installations and retirements are the same for each year, but that the utility did not keep track of the age of plant when it was retired. The data matrix below contains the same data, except it is not aged. Thus, while the year-end balances are the same, the amount retired from each vintage in a given year is unknown.

Figure 31:
Unaged Data Matrix

		End of Year Balances ($)								
Vintage	Installations	1997	1999	2001	2003	2005	2007	2009	2011	2013
1997	220									
1999	270									
2001	300									
2003	350									
2005	390									
2007	450									
2009	500									
2011	670									
2013	750									
Balance		220	740	1325	1986	2708	3434	4150	4618	5374

Thus, in 2007 the company still had a year-end balance $3,434, but it is unknown how much of this amount surviving is attributable to each vintage group of property.

The method that depreciation analysts use to examine unaged data is called the "simulated plant record" method ("SPR").[96] The SPR method is used to simulate the retirement pattern for each vintage and to indicate the Iowa curve that best represent the life characteristics of the property being analyzed.[97] In other words, the SPR model may be used to "fill in" the unaged data matrix with simulated vintage balances for each experience year. The SPR model assumes that all vintages' additions retire in accordance with the same retirement pattern.[98]

Unlike with actuarial analysis, which indicates the best fitting Iowa curve type based on the input data, the SPR model requires the analyst or computer program to first choose an Iowa curve and test the results. This process is repeated until the analyst finds the curve that best matches the observed data is found.[99] Although the SPR method may be conducted manually, analysts typically rely on computer programs to make the process more efficient.

In the example presented below, the best fitting curve is the one that most closely simulates the actual balance of $4,150 for 2009. The chart below compares the actual and simulated vintage balances for the 2009 experience year using an Iowa 10-S3 curve. The 2009 simulated balances using the 10-S3 curve produce a year-end balance of $3,775. The actual balance, however, is $4,150. Thus, the 10-S3 curve produces a simulated balance that is $375 short of the actual balance.

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96 Wolf *supra* n. 9, at 220. Cyrus Hill is generally credited with developing the principles used in the SPR method. In 1947, Alex Bauhan expanded the SPR method and developed several criteria used to measure the accuracy of simulated data, which he called the SPR method (See Bauhan, A. E., "Life Analysis of Utility Plant for Depreciation Accounting Purposes by the Simulated Plant Record Method," 1947, Appendix of the EEl, 1952.)

97 NARUC *supra* n. 10, at 106.

98 *Id*. at 107.

99 Wolf *supra* n. 9, at 222.

Figure 32:
SPR Calculation Using Iowa Curve 10-S3

Age Interval	Vintage Year	Installations	10-S3 % Surviving	Sim. Bal. 2009
12.5	1997	220	16	35
11.5	1998	250	28	69
10.5	1999	270	42	114
9.5	2000	285	58	165
8.5	2001	300	72	217
7.5	2002	320	84	269
6.5	2003	350	92	323
5.5	2004	375	97	363
4.5	2005	390	99	386
3.5	2006	405	100	404
2.5	2007	450	100	450
1.5	2008	480	100	480
0.5	2009	500	100	500
		Total Simulated Balance		3,775
		Total Actual Balance		4,150
		Difference		(375)

The process is repeated with another curve until the best fitting curve is found. Specifically, a curve with a longer average life should be chosen in order to increase the simulated balance. For this example, the 12-S3 curve produces a perfect fit for 2009, as shown in the figure below.

Figure 33:
SPR Calculation Using Iowa Curve 12-S3

Age Interval	Vintage Year	Installations	12-S3 % Surviving	Sim. Bal. 2009
12.5	1997	220	43	95
11.5	1998	250	57	143
10.5	1999	270	69	186
9.5	2000	285	79	225
8.5	2001	300	88	264
7.5	2002	320	94	301
6.5	2003	350	97	340
5.5	2004	375	99	371
4.5	2005	390	100	390
3.5	2006	405	100	405
2.5	2007	450	100	450
1.5	2008	480	100	480
0.5	2009	500	100	500
		Total Simulated Balance		4,150
		Total Actual Balance		4,150
		Difference		0

It is not a coincidence that there was an Iowa curve that produced a perfect fit. This is because when only one year is tested under the SPR model, there is always an Iowa curve that will produce a perfect simulation. Thus, it is important that more than one year is tested. The figures below will demonstrate that even though a particular curve may have fit perfectly for one test year, it may not necessarily be the best choice when multiple years are tested. The chart below shows the results of the Iowa 12-S3 curve when 2009, 2011, and 2013 are tested.

Figure 34:
SPR: Curve 12-S3: 2009, 2011, 2013

Vintage	Insts.	% Surv.	2009	% Surv.	2011	% Surv.	2013
1997	220	43	95	21	46	6	13
1998	250	57	143	31	78	12	30
1999	270	69	186	43	116	21	57
2000	285	79	225	57	162	31	88
2001	300	88	264	69	207	43	129
2002	320	94	301	79	253	57	182
2003	350	97	340	88	308	69	242
2004	375	99	371	94	353	79	296
2005	390	100	390	97	378	88	343
2006	405	100	405	99	401	94	381
2007	450	100	450	100	450	97	437
2008	480	100	480	100	480	99	475
2009	500	100	500	100	500	100	500
2010	580			100	580	100	580
2011	670			100	670	100	670
2012	790					100	790
2013	750					100	750
Simulated Balances			$ 4,150		$ 4,982		$ 5,963
Actual Balances			4,150		4,618		5,374
Difference			0		364		589
Difference Squared			0		132,496		346,921
SSD =	**479,417**		**MSD =**	**159,806**		**√MSD =**	**400**
CI =	Average Actual Bal / √MSD =	4,714 / 400 =	**12**		**IV =**	1000 / CI =	**85**

While the 12-S3 curve provided a perfect simulation for 2009, it did not for years 2011 and 2013 because the life characteristics were different in these years. Since the 12-S3 curve produced simulated balances that were greater than the actual balances, a curve with a shorter average life should be analyzed. The figure below shows the SPR results from the same test years using an Iowa 10-S3 curve.

Figure 35:
SPR: Curve 10-S3: 2009, 2011, 2013

Vintage	Insts.	% Surv.	2009	% Surv.	2011	% Surv.	2013
1997	220	16	35	3	7	0	0
1998	250	28	70	8	20	1	3
1999	270	42	113	16	43	3	8
2000	285	58	165	28	80	8	23
2001	300	72	216	42	126	16	48
2002	320	84	269	58	186	28	90
2003	350	92	322	72	252	42	147
2004	375	97	364	84	315	58	218
2005	390	99	386	92	359	72	281
2006	405	100	405	97	393	84	340
2007	450	100	450	99	446	92	414
2008	480	100	480	100	480	97	466
2009	500	100	500	100	500	99	495
2010	580			100	580	100	580
2011	670			100	670	100	670
2012	790					100	790
2013	750					100	750
Simulated Balances			$ 3,775		$ 4,457		$ 5,323
Actual Balances			4,150		4,618		5,374
Difference			(375)		(161)		(51)
Difference Squared			140,625		25,921		2,601

SSD = 169,147 **MSD = 56,382** **√MSD = 237**

CI = Average Actual Bal / √MSD = 4,714 / 237 = **20** **IV =** 1000 / CI = **50**

The 10-S3 curve resulted in a better fit than the 12-S3 curve, despite the fact that the 12-S3 provided a perfect fit for one year. Several useful tools to measure the accuracy of SPR results in discussed below.

There are several indices used to measure the fit of the chosen curve. Alex Bauhan developed the conformance index ("CI") to rank the optimal curves.[100] The CI is the average

[100] Bauhan, A. E., "Life Analysis of Utility Plant for Depreciation Accounting Purposes by the Simulated Plant Record Method," 1947, Appendix of the EEl, 1952.

observed plant balance for the tested years, divided by the square root of the average sum of squared differences between the simulated and actual balances. The formula for the CI is shown below.

Equation 6:
Conformance Index

$$Conformance\ Index = \frac{Average\ of\ Actual\ Balances}{\sqrt{Average\ of\ Sum\ of\ Squared\ Differences}}$$

The previous figure above demonstrates the CI calculation. The difference between the actual and simulated balances was \$375 in 2009, \$161 in 2011, and \$51 in 2013. The sum of these differences squared ("SSD") is 169,147 and the average of the SSD is 56,382 ("MSD"). The square root of the MSD is 237. The CI is the average of the three actual balances (\$4,714) divided by 237, which equals 20. Bauhan proposed a scaled for measuring the value of the CI, which is shown below.

Figure 36:
Conformance Index Scale

CI	Value
> 75	Excellent
50 – 75	Good
25 – 50	Fair
< 25	Poor

Thus, the CI of 20 calculated above indicates that the 12-S3 curve is a poor fit. According to Bauhan, any CI value less than 50 would be considered unsatisfactory.[101]

[101] SDP pdf. 210.

A related measure to the CI is the "index of variation" ("IV").[102] The IV is equal to 1,000 divided by the CI, as shown in the Figures above. Although the IV does not use a definite scale like the CI, it follows that the highest ranking curves are those with the lowest IVs. When divided by ten, the IV approximates the average difference between simulated and actual balances expressed as a percent of the average actual balance.[103] The IV resulting from the 12-S3 curve is 85, while the IV from the 10-S3 is 50, as shown above.

Another important statistical measure is the "retirements experience index" ("REI"), which measures the maturity of the account.[104] According to Bauhan, the CI alone cannot truly measure the validity of the chosen curve because the CI provides no indication of the sufficiency of the retirement experience.[105] A small REI implies that the history of the account may be too short to determine a best fitting Iowa curve. In other words, there may be many potential Iowa curves that could be fitted to a stub curve that is too short. This concept is illustrated in the graph below. This graph shows a stub survivor curve (the diamond-shaped points on the graph). The first seven data points of the stub survivor curve represent a small REI score. If an analyst was looking at only the first seven data points, it appears that several Iowa curves would provide a good fit, including the 10-S1, 8-L3, and 8-R3 (and several others not shown on the graph). These curves, however, have significantly different life characteristics and average lives. Once the longer stub curve is taken into account, it is obvious that the 10-S1 curve provides the best fit.

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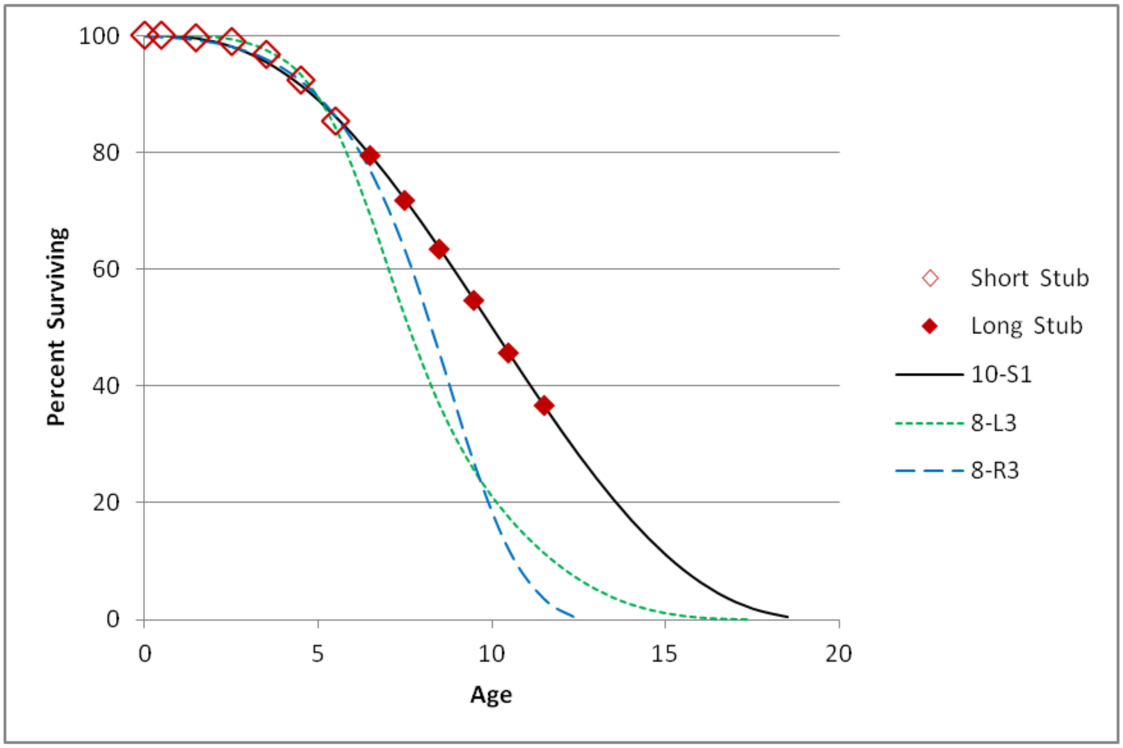
[102] White, R.E. and H. A. Cowles, "A Test Procedure for the Simulated Plant Record Method of Life Analysis," Journal of the American Statistical Association, vol. 70 (1970): 1204-1212.

[103] NARUC *supra* n. 10, at 111.

[104] *See* SDP 210.

[105] SDP 210.

Figure 37:
REI Illustration



Although the REI only applies to simulated analysis, the concept that a longer stub curve provides for better-fitting Iowa curves also applies to actuarial analysis.

The REI is mathematically calculated by dividing the balance from the oldest vintage in the test year at the end of the year by the initial installation amount. Referring to the top row of the SPR figure above, there were $220 of installations in 1997, and only $13 remaining in 2013. The REI for this account using the 12-S3 curve would be 94% (1 – (13/220)). An REI of 100% indicates that a complete curve was used in the simulation.

As with the CI, Bauhan also proposed a scale for the REI, as shown in the figure below. Thus, the REI of 94% from the account above using the 12-S3 curve would be considered excellent. This makes sense because the oldest vintage from that account had been nearly fully retired in the final test year.

Figure 38:
REI Scale

REI	Value
> 75%	Excellent
50% – 75%	Good
33% – 50%	Fair
17% – 33%	Poor
0% – 17%	Valueless

Both the REI and CI, however, must be considered when assessing the value of an Iowa curve under the SPR method. So while the REI of 94% is excellent, the same curve (12-S3) produced a CI of only 12, which is poor. According to Bauhan, in order for a curve to be considered entirely satisfactory, both the REI and CI should be “Good” or better (i.e., both above 50).

SOAH DOCKET NO. 473-19-6677
PUC DOCKET NO. 49831

APPLICATION OF SOUTHWESTERN PUBLIC SERVICE COMPANY FOR AUTHORITY TO CHANGE RATES	**§ § §**	**BEFORE THE STATE OFFICE OF ADMINISTRATIVE HEARINGS**

DIRECT TESTIMONY AND EXHIBITS OF DAVID J. GARRETT

EXHIBIT DJG-1

CURRICULUM VITAE

101 Park Avenue, Suite 1125
Oklahoma City, OK 73102

DAVID J. GARRETT

405.249.1050
dgarrett@resolveuc.com

EDUCATION

University of Oklahoma — Norman, OK
Master of Business Administration — 2014
Areas of Concentration: Finance, Energy

University of Oklahoma College of Law — Norman, OK
Juris Doctor — 2007
Member, American Indian Law Review

University of Oklahoma — Norman, OK
Bachelor of Business Administration — 2003
Major: Finance

PROFESSIONAL DESIGNATIONS

Society of Depreciation Professionals
Certified Depreciation Professional (CDP)

Society of Utility and Regulatory Financial Analysts
Certified Rate of Return Analyst (CRRA)

The Mediation Institute
Certified Civil / Commercial & Employment Mediator

WORK EXPERIENCE

Resolve Utility Consulting PLLC — Oklahoma City, OK
Managing Member — 2016 – Present
Provide expert analysis and testimony specializing in depreciation and cost of capital issues for clients in utility regulatory proceedings.

Oklahoma Corporation Commission — Oklahoma City, OK
Public Utility Regulatory Analyst — 2012 – 2016
Assistant General Counsel — 2011 – 2012
Represented commission staff in utility regulatory proceedings and provided legal opinions to commissioners. Provided expert analysis and testimony in depreciation, cost of capital, incentive compensation, payroll and other issues.

Perebus Counsel, PLLC — Oklahoma City, OK
<u>Managing Member</u> — 2009 – 2011
Represented clients in the areas of family law, estate planning, debt negotiations, business organization, and utility regulation.

Moricoli & Schovanec, P.C. — Oklahoma City, OK
<u>Associate Attorney</u> — 2007 – 2009
Represented clients in the areas of contracts, oil and gas, business structures and estate administration.

TEACHING EXPERIENCE

University of Oklahoma — Norman, OK
Adjunct Instructor – "Conflict Resolution" — 2014 – Present
Adjunct Instructor – "Ethics in Leadership"

Rose State College — Midwest City, OK
Adjunct Instructor – "Legal Research" — 2013 – 2015
Adjunct Instructor – "Oil & Gas Law"

PUBLICATIONS

American Indian Law Review — Norman, OK
"Vine of the Dead: Reviving Equal Protection Rites for Religious Drug Use" — 2006
(31 Am. Indian L. Rev. 143)

VOLUNTEER EXPERIENCE

Calm Waters — Oklahoma City, OK
<u>Board Member</u> — 2015 – 2018
Participate in management of operations, attend meetings, review performance, compensation, and financial records. Assist in fundraising events.

<u>Group Facilitator & Fundraiser</u> — 2014 – 2018
Facilitate group meetings designed to help children and families cope with divorce and tragic events. Assist in fundraising events.

St. Jude Children's Research Hospital — Oklahoma City, OK
<u>Oklahoma Fundraising Committee</u> — 2008 – 2010
Raised money for charity by organizing local fundraising events.

PROFESSIONAL ASSOCIATIONS

Oklahoma Bar Association 2007 – Present

Society of Depreciation Professionals 2014 – Present
Board Member – President 2017
Participate in management of operations, attend meetings, review performance, organize presentation agenda.

Society of Utility Regulatory Financial Analysts 2014 – Present

SELECTED CONTINUING PROFESSIONAL EDUCATION

Society of Depreciation Professionals — Austin, TX
"Life and Net Salvage Analysis" — 2015
Extensive instruction on utility depreciation, including actuarial and simulation life analysis modes, gross salvage, cost of removal, life cycle analysis, and technology forecasting.

Society of Depreciation Professionals — New Orleans, LA
"Introduction to Depreciation" and "Extended Training" — 2014
Extensive instruction on utility depreciation, including average lives and net salvage.

Society of Utility and Regulatory Financial Analysts — Indianapolis, IN
46th Financial Forum. "The Regulatory Compact: Is it Still Relevant?" — 2014
Forum discussions on current issues.

New Mexico State University, Center for Public Utilities — Santa Fe, NM
Current Issues 2012, "The Santa Fe Conference" — 2012
Forum discussions on various current issues in utility regulation.

Michigan State University, Institute of Public Utilities — Clearwater, FL
"39th Eastern NARUC Utility Rate School" — 2011
One-week, hands-on training emphasizing the fundamentals of the utility ratemaking process.

New Mexico State University, Center for Public Utilities — Albuquerque, NM
"The Basics: Practical Regulatory Training for the Changing Electric Industries" — 2010
One-week, hands-on training designed to provide a solid foundation in core areas of utility ratemaking.

The Mediation Institute — Oklahoma City, OK
"Civil / Commercial & Employment Mediation Training" — 2009
Extensive instruction and mock mediations designed to build foundations in conducting mediations in civil matters.

Utility Regulatory Proceedings

Regulatory Agency	Utility Applicant	Docket Number	Issues Addressed	Parties Represented
Public Utilities Commission of the State of California	Pacific Gas & Electric Company	18-12-009	Depreciation rates, service lives, net salvage	The Utility Reform Network
Oklahoma Corporation Commission	The Empire District Electric Company	PUD 201800133	Cost of capital, authorized ROE, depreciation rates	Oklahoma Industrial Energy Consumers and Oklahoma Energy Results
Arkansas Public Service Commission	Southwestern Electric Power Company	19-008-U	Cost of capital, depreciation rates, net salvage	Western Arkansas Large Energy Consumers
Public Utility Commission of Texas	CenterPoint Energy Houston Electric	PUC 49421	Depreciation rates, service lives, net salvage	Texas Coast Utilities Coalition
Massachusetts Department of Public Utilities	Massachusetts Electric Company and Nantucket Electric Company	D.P.U. 18-150	Depreciation rates, service lives, net salvage	Massachusetts Office of the Attorney General, Office of Ratepayer Advocacy
Oklahoma Corporation Commission	Oklahoma Gas & Electric Company	PUD 201800140	Cost of capital, authorized ROE, depreciation rates	Oklahoma Industrial Energy Consumers and Oklahoma Energy Results
Public Service Commission of the State of Montana	Montana-Dakota Utilities Company	D2018.9.60	Depreciation rates, service lives, net salvage	Montana Consumer Counsel and Denbury Onshore
Indiana Utility Regulatory Commission	Northern Indiana Public Service Company	45159	Depreciation rates, grouping procedure, demolition costs	Indiana Office of Utility Consumer Counselor
Public Service Commission of the State of Montana	NorthWestern Energy	D2018.2.12	Depreciation rates, service lives, net salvage	Montana Consumer Counsel
Oklahoma Corporation Commission	Public Service Company of Oklahoma	PUD 201800097	Depreciation rates, service lives, net salvage	Oklahoma Industrial Energy Consumers and Wal-Mart
Nevada Public Utilities Commission	Southwest Gas Corporation	18-05031	Depreciation rates, service lives, net salvage	Nevada Bureau of Consumer Protection
Public Utility Commission of Texas	Texas-New Mexico Power Company	PUC 48401	Depreciation rates, service lives, net salvage	Alliance of Texas-New Mexico Power Municipalities
Oklahoma Corporation Commission	Oklahoma Gas & Electric Company	PUD 201700496	Depreciation rates, service lives, net salvage	Oklahoma Industrial Energy Consumers and Oklahoma Energy Results
Maryland Public Service Commission	Washington Gas Light Company	9481	Depreciation rates, service lives, net salvage	Maryland Office of People's Counsel
Indiana Utility Regulatory Commission	Citizens Energy Group	45039	Depreciation rates, service lives, net salvage	Indiana Office of Utility Consumer Counselor
Public Utility Commission of Texas	Entergy Texas, Inc.	PUC 48371	Depreciation rates, decommissioning costs	Texas Municipal Group
Washington Utilities & Transportation Commission	Avista Corporation	UE-180167	Depreciation rates, service lives, net salvage	Washington Office of Attorney General

Utility Regulatory Proceedings

Regulatory Agency	Utility Applicant	Docket Number	Issues Addressed	Parties Represented
New Mexico Public Regulation Commission	Southwestern Public Service Company	17-00255-UT	Cost of capital and authorized rate of return	HollyFrontier Navajo Refining; Occidental Permian
Public Utility Commission of Texas	Southwestern Public Service Company	PUC 47527	Depreciation rates, plant service lives	Alliance of Xcel Municipalities
Public Service Commission of the State of Montana	Montana-Dakota Utilities Company	D2017.9.79	Depreciation rates, service lives, net salvage	Montana Consumer Counsel
Florida Public Service Commission	Florida City Gas	20170179-GU	Cost of capital, depreciation rates	Florida Office of Public Counsel
Washington Utilities & Transportation Commission	Avista Corporation	UE-170485	Cost of capital and authorized rate of return	Washington Office of Attorney General
Wyoming Public Service Commission	Powder River Energy Corporation	10014-182-CA-17	Credit analysis, cost of capital	Private customer
Oklahoma Corporation Commission	Public Service Co. of Oklahoma	PUD 201700151	Depreciation, terminal salvage, risk analysis	Oklahoma Industrial Energy Consumers
Public Utility Commission of Texas	Oncor Electric Delivery Company	PUC 46957	Depreciation rates, simulated analysis	Alliance of Oncor Cities
Nevada Public Utilities Commission	Nevada Power Company	17-06004	Depreciation rates, service lives, net salvage	Nevada Bureau of Consumer Protection
Public Utility Commission of Texas	El Paso Electric Company	PUC 46831	Depreciation rates, interim retirements	City of El Paso
Idaho Public Utilities Commission	Idaho Power Company	IPC-E-16-24	Accelerated depreciation of North Valmy plant	Micron Technology, Inc.
Idaho Public Utilities Commission	Idaho Power Company	IPC-E-16-23	Depreciation rates, service lives, net salvage	Micron Technology, Inc.
Public Utility Commission of Texas	Southwestern Electric Power Company	PUC 46449	Depreciation rates, decommissioning costs	Cities Advocating Reasonable Deregulation
Massachusetts Department of Public Utilities	Eversource Energy	D.P.U. 17-05	Cost of capital, capital structure, and rate of return	Sunrun Inc.; Energy Freedom Coalition of America
Railroad Commission of Texas	Atmos Pipeline - Texas	GUD 10580	Depreciation rates, grouping procedure	City of Dallas
Public Utility Commission of Texas	Sharyland Utility Company	PUC 45414	Depreciation rates, simulated analysis	City of Mission
Oklahoma Corporation Commission	Empire District Electric Company	PUD 201600468	Cost of capital, depreciation rates	Oklahoma Industrial Energy Consumers

Utility Regulatory Proceedings

Regulatory Agency	Utility Applicant	Docket Number	Issues Addressed	Parties Represented
Railroad Commission of Texas	CenterPoint Energy Texas Gas	GUD 10567	Depreciation rates, simulated plant analysis	Texas Coast Utilities Coalition
Arkansas Public Service Commission	Oklahoma Gas & Electric Company	160-159-GU	Cost of capital, depreciation rates, terminal salvage	Arkansas River Valley Energy Consumers; Wal-Mart
Florida Public Service Commission	Peoples Gas	160-159-GU	Depreciation rates, service lives, net salvage	Florida Office of Public Counsel
Arizona Corporation Commission	Arizona Public Service Company	E-01345A-16-0036	Cost of capital, depreciation rates, terminal salvage	Energy Freedom Coalition of America
Nevada Public Utilities Commission	Sierra Pacific Power Company	16-06008	Depreciation rates, net salvage, theoretical reserve	Northern Nevada Utility Customers
Oklahoma Corporation Commission	Oklahoma Gas & Electric Co.	PUD 201500273	Cost of capital, depreciation rates, terminal salvage	Public Utility Division
Oklahoma Corporation Commission	Public Service Co. of Oklahoma	PUD 201500208	Cost of capital, depreciation rates, terminal salvage	Public Utility Division
Oklahoma Corporation Commission	Oklahoma Natural Gas Company	PUD 201500213	Cost of capital, depreciation rates, net salvage	Public Utility Division

SOAH DOCKET NO. 473-19-6677
PUC DOCKET NO. 49831

APPLICATION OF SOUTHWESTERN	§	BEFORE THE STATE OFFICE
PUBLIC SERVICE COMPANY FOR	§	OF
AUTHORITY TO CHANGE RATES	§	ADMINISTRATIVE HEARINGS

DIRECT TESTIMONY AND EXHIBITS
OF
DAVID J. GARRETT

EXHIBIT DJG-2

SUMMARY DEPRECIATION ACCRUAL ADJUSTMENT

Summary Accrual Adjustment

	[1]	[2]	[3]	[4]
Plant Function	Plant Balance 12/31/2018	SPS Proposed Accrual	AXM Proposed Accrual	**AXM Accrual Adjustment**
Production	$ 2,169,678,356	$ 96,292,499	$ 80,885,050	$ (15,407,450)
Transmission	2,977,906,058	84,164,669	68,250,509	(15,914,160)
Distribution	877,930,177	24,864,758	21,833,167	(3,031,592)
General	388,376,979	31,070,847	30,904,478	(166,369)
Intangible	181,308,163	26,344,745	26,344,745	-
Total Plant Studied	$ 6,595,199,734	$ 262,737,520	$ 228,217,949	**$ (34,519,571)**

[1], [2] From depreciation study

[3] From Exhibit DJG-4

[4] = [3] - [2]

SOAH DOCKET NO. 473-19-6677
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APPLICATION OF SOUTHWESTERN	§	BEFORE THE STATE OFFICE
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DIRECT TESTIMONY AND EXHIBITS
OF
DAVID J. GARRETT

EXHIBIT DJG-3

DEPRECIATION PARAMETER COMPARISON

Depreciation Parameter Comparison

SPS Proposed					AXM Proposed				
Iowa Curve		Net	Depr	Annual	Iowa Curve		Net	Depr	Annual
Type	AL	Salvage	Rate	Accrual	Type	AL	Salvage	Rate	Accrual
R4	65	-20%	1.91%	1,941,990	R3	70	-20%	1.67%	1,697,068
R2.5	51	-75%	3.53%	40,961,092	L1.5	63	-45%	2.27%	26,344,605
R2	50	-45%	3.01%	13,429,070	R2	50	-40%	2.85%	12,697,128
R1.5	55	-25%	2.27%	3,872,485	R1	61	-25%	2.00%	3,403,095
R0.5	53	-75%	3.30%	6,622,220	R0.5	56	-60%	2.86%	5,732,862
R1	53	-30%	2.45%	836,195	R0.5	61	-30%	1.96%	669,060
R1	46	-10%	2.39%	3,550,694	L0	55	-10%	1.61%	2,387,492
R1.5	48	-40%	2.91%	1,752,425	R0.5	60	-40%	2.01%	1,207,423
R2	39	-60%	4.10%	717,713	R2	39	-55%	4.89%	856,982
R1	53	-10%	2.13%	1,463,647	L0.5	57	-10%	1.89%	1,297,278

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APPLICATION OF SOUTHWESTERN	**§**	**BEFORE THE STATE OFFICE**
PUBLIC SERVICE COMPANY FOR	**§**	**OF**
AUTHORITY TO CHANGE RATES	**§**	**ADMINISTRATIVE HEARINGS**

DIRECT TESTIMONY AND EXHIBITS
OF
DAVID J. GARRETT

EXHIBIT DJG-4

DETAILED RATE COMPARISON

Detailed Rate Comparison

		[1]	[2]		[3]		[4]	
			SPS Proposed		AXM Proposed		Difference	
Account No.	Description	Plant 12/31/2018	Rate	Annual Accrual	Rate	Annual Accrual	Rate	Annual Accrual
	STEAM PRODUCTION PLANT							
	Cunningham Common							
310.00	Land Rights	53,100	1.89%	1,002	0.26%	140	-1.62%	-862
311.00	Structures and Improvements	7,671,299	4.39%	336,917	3.24%	248,442	-1.15%	-88,474
312.00	Boiler Plant Equipment	6,640,582	4.06%	269,402	3.43%	227,542	-0.63%	-41,860
314.00	Turbogenerators	398,981	4.94%	19,700	4.75%	18,934	-0.19%	-766
315.00	Accessory Electric Equipment	783,399	3.32%	26,034	4.13%	32,366	0.81%	6,333
316.00	Miscellaneous Power Plant Equipment	1,518,322	3.21%	48,717	1.49%	22,571	-1.72%	-26,146
	Total	17,065,682	4.11%	701,772	3.22%	549,995	-0.89%	-151,776
	Cunningham Unit 1							
311.00	Structures and Improvements	2,390,443	21.34%	510,232	17.04%	407,354	-4.30%	-102,879
312.00	Boiler Plant Equipment	8,208,183	26.44%	2,170,621	28.83%	2,366,698	2.39%	196,077
314.00	Turbogenerators	6,137,045	23.25%	1,427,007	16.00%	981,694	-7.26%	-445,313
315.00	Accessory Electric Equipment	935,547	26.68%	249,576	31.28%	292,633	4.60%	43,056
316.00	Miscellaneous Power Plant Equipment	308,513	33.37%	102,955	64.17%	197,960	30.79%	95,005
	Total	17,979,731	24.81%	4,460,392	23.62%	4,246,338	-1.19%	-214,054
	Cunningham Unit 2							
311.00	Structures and Improvements	2,377,337	7.01%	166,539	8.46%	201,133	1.46%	34,594
312.00	Boiler Plant Equipment	17,652,086	7.65%	1,350,736	5.64%	995,543	-2.01%	-355,193
314.00	Turbogenerators	11,616,984	6.39%	742,034	4.55%	529,074	-1.83%	-212,960
315.00	Accessory Electric Equipment	5,352,506	7.83%	419,184	9.69%	518,611	1.86%	99,426
316.00	Miscellaneous Power Plant Equipment	134,895	10.87%	14,667	17.87%	24,110	7.00%	9,443
	Total	37,133,808	7.25%	2,693,161	6.11%	2,268,471	-1.14%	-424,690
	Harrington Common							
310.00	Land Rights	13,705	2.44%	334	1.79%	245	-0.65%	-90
311.00	Structures and Improvements	26,337,880	4.58%	1,206,091	4.99%	1,313,287	0.41%	107,196
312.00	Boiler Plant Equipment	15,958,561	4.81%	768,209	5.19%	828,776	0.38%	60,567
314.00	Turbogenerators	3,146,873	4.38%	137,978	4.68%	147,426	0.30%	9,448
315.00	Accessory Electric Equipment	1,199,779	5.85%	70,172	5.98%	71,691	0.13%	1,519
316.00	Miscellaneous Power Plant Equipment	2,629,324	3.85%	101,315	4.01%	105,558	0.16%	4,243
	Total	49,286,121	4.63%	2,284,099	5.01%	2,466,983	0.37%	182,883

Detailed Rate Comparison

		[1]	[2]		[3]		[4]	
			SPS Proposed		AXM Proposed		Difference	
Account No.	Description	Plant 12/31/2018	Rate	Annual Accrual	Rate	Annual Accrual	Rate	Annual Accrual
	Harrington Unit 1							
311.00	Structures and Improvements	6,969,988	2.49%	173,699	1.09%	76,174	-1.40%	-97,526
312.00	Boiler Plant Equipment	106,514,384	3.35%	3,566,510	2.88%	3,062,943	-0.47%	-503,566
314.00	Turbogenerators	42,456,474	3.63%	1,540,142	3.48%	1,477,092	-0.15%	-63,051
315.00	Accessory Electric Equipment	7,832,270	3.19%	249,831	2.49%	195,335	-0.70%	-54,496
316.00	Miscellaneous Power Plant Equipment	966,618	2.78%	26,871	2.23%	21,535	-0.55%	-5,336
	Total	164,739,735	3.37%	5,557,053	2.93%	4,833,078	-0.44%	-723,975
	Harrington Unit 2							
311.00	Structures and Improvements	6,123,513	2.75%	168,618	1.81%	111,087	-0.94%	-57,532
312.00	Boiler Plant Equipment	112,965,832	3.07%	3,468,354	2.76%	3,113,613	-0.31%	-354,741
314.00	Turbogenerators	48,509,437	3.42%	1,661,445	3.28%	1,590,808	-0.15%	-70,637
315.00	Accessory Electric Equipment	5,908,413	3.08%	181,858	2.67%	158,037	-0.40%	-23,821
316.00	Miscellaneous Power Plant Equipment	1,546,811	2.40%	37,165	1.24%	19,170	-1.16%	-17,995
	Total	175,054,007	3.15%	5,517,441	2.85%	4,992,715	-0.30%	-524,726
	Harrington Unit 3							
311.00	Structures and Improvements	9,357,196	2.38%	222,249	1.49%	139,185	-0.89%	-83,064
312.00	Boiler Plant Equipment	120,540,206	2.74%	3,302,529	2.29%	2,766,087	-0.45%	-536,442
314.00	Turbogenerators	54,024,505	2.85%	1,540,394	2.54%	1,372,199	-0.31%	-168,195
315.00	Accessory Electric Equipment	6,045,955	2.80%	169,440	2.25%	135,771	-0.56%	-33,668
316.00	Miscellaneous Power Plant Equipment	1,878,140	2.37%	44,530	1.68%	31,604	-0.69%	-12,926
	Total	191,846,002	2.75%	5,279,142	2.32%	4,444,847	-0.43%	-834,295
	Jones Common							
311.00	Structures and Improvements	9,045,042	2.35%	212,713	2.58%	233,440	0.23%	20,727
312.00	Boiler Plant Equipment	12,167,839	2.32%	282,748	2.51%	305,624	0.19%	22,876
314.00	Turbogenerators	7,885,491	2.12%	167,050	2.38%	187,406	0.26%	20,356
315.00	Accessory Electric Equipment	2,560,333	2.49%	63,741	2.58%	66,159	0.09%	2,417
316.00	Miscellaneous Power Plant Equipment	3,666,003	2.24%	82,009	1.88%	69,017	-0.35%	-12,992
	Total	35,324,709	2.29%	808,262	2.44%	861,646	0.15%	53,385
	Jones Unit 1							
310.00	Land Rights	108,562	3.66%	3,974	2.52%	2,739	-1.14%	-1,235
311.00	Structures and Improvements	5,094,828	4.07%	207,231	2.60%	132,266	-1.47%	-74,966
312.00	Boiler Plant Equipment	23,143,052	5.30%	1,227,129	5.07%	1,172,437	-0.24%	-54,692

Detailed Rate Comparison

		[1]	[2]		[3]		[4]	
			SPS Proposed		AXM Proposed		Difference	
Account No.	Description	Plant 12/31/2018	Rate	Annual Accrual	Rate	Annual Accrual	Rate	Annual Accrual
314.00	Turbogenerators	22,662,978	5.44%	1,232,414	4.78%	1,082,189	-0.66%	-150,225
315.00	Accessory Electric Equipment	2,767,418	5.77%	159,651	5.16%	142,822	-0.61%	-16,829
316.00	Miscellaneous Power Plant Equipment	756,086	3.04%	23,019	4.21%	31,869	1.17%	8,850
	Total	54,532,923	5.23%	2,853,418	4.70%	2,564,322	-0.53%	-289,096
	Jones Unit 2							
311.00	Structures and Improvements	2,179,724	3.79%	82,505	2.05%	44,782	-1.73%	-37,723
312.00	Boiler Plant Equipment	16,282,969	3.82%	621,953	2.72%	443,636	-1.10%	-178,317
314.00	Turbogenerators	20,915,587	4.49%	938,702	3.98%	832,158	-0.51%	-106,544
315.00	Accessory Electric Equipment	2,913,009	5.17%	150,597	5.25%	153,069	0.08%	2,472
316.00	Miscellaneous Power Plant Equipment	598,526	3.02%	18,101	2.10%	12,594	-0.92%	-5,508
	Total	42,889,815	4.22%	1,811,858	3.47%	1,486,240	-0.76%	-325,619
	Maddox							
310.00	Land Rights	19,971	3.35%	669	1.76%	352	-1.59%	-317
311.00	Structures and Improvements	4,909,575	6.22%	305,350	5.85%	287,221	-0.37%	-18,129
312.00	Boiler Plant Equipment	20,350,280	6.76%	1,374,704	6.69%	1,361,754	-0.06%	-12,950
314.00	Turbogenerators	12,709,583	6.02%	765,253	5.24%	665,586	-0.78%	-99,666
315.00	Accessory Electric Equipment	6,652,978	6.45%	428,898	7.76%	516,292	1.31%	87,394
316.00	Miscellaneous Power Plant Equipment	963,849	5.96%	57,456	6.29%	60,614	0.33%	3,158
	Total	45,606,237	6.43%	2,932,330	6.34%	2,891,818	-0.09%	-40,511
	Moore County							
310.00	Land Rights	463	0.00%	0	0.00%	0	0.00%	0
310.00	Water Rights	17,164	0.00%	0	0.00%	0	0.00%	0
	Total	17,627	0.00%	0	0.00%	0	0.00%	0
	Nichols Common							
310.00	Land Rights	676,746	4.71%	31,872	3.88%	26,266	-0.83%	-5,606
311.00	Structures and Improvements	52,035,520	5.55%	2,888,450	5.95%	3,093,738	0.39%	205,289
312.00	Boiler Plant Equipment	10,680,419	6.82%	728,611	7.35%	784,867	0.53%	56,256
314.00	Turbogenerators	3,396,729	5.11%	173,446	5.71%	194,022	0.61%	20,575
315.00	Accessory Electric Equipment	2,298,724	5.24%	120,406	5.16%	118,666	-0.08%	-1,740
316.00	Miscellaneous Power Plant Equipment	2,341,972	4.41%	103,366	3.61%	84,498	-0.81%	-18,868
	Total	71,430,109	5.66%	4,046,151	6.02%	4,302,057	0.36%	255,906

Detailed Rate Comparison

		[1]	[2]		[3]		[4]	
			SPS Proposed		AXM Proposed		Difference	
Account No.	Description	Plant 12/31/2018	Rate	Annual Accrual	Rate	Annual Accrual	Rate	Annual Accrual
	Nichols Unit 1							
311.00	Structures and Improvements	2,079,572	8.65%	179,834	19.76%	410,999	11.12%	231,165
312.00	Boiler Plant Equipment	10,859,989	9.18%	997,370	9.92%	1,077,816	0.74%	80,447
314.00	Turbogenerators	9,683,276	7.96%	770,307	6.41%	620,645	-1.55%	-149,662
315.00	Accessory Electric Equipment	2,251,603	9.22%	207,508	7.12%	160,348	-2.09%	-47,160
316.00	Miscellaneous Power Plant Equipment	234,700	8.74%	20,506	18.41%	43,198	9.67%	22,692
	Total	25,109,140	8.66%	2,175,525	9.21%	2,313,007	0.55%	137,482
	Nichols Unit 2							
311.00	Structures and Improvements	1,108,535	5.77%	63,972	10.43%	115,607	4.66%	51,635
312.00	Boiler Plant Equipment	11,971,470	8.35%	999,569	6.77%	810,773	-1.58%	-188,796
314.00	Turbogenerators	12,230,817	8.78%	1,073,385	6.72%	822,316	-2.05%	-251,069
315.00	Accessory Electric Equipment	1,038,609	7.05%	73,247	4.85%	50,350	-2.20%	-22,896
316.00	Miscellaneous Power Plant Equipment	79,414	5.01%	3,981	0.66%	526	-4.35%	-3,455
	Total	26,428,846	8.38%	2,214,154	6.81%	1,799,572	-1.57%	-414,582
	Nichols Unit 3							
311.00	Structures and Improvements	1,592,946	3.47%	55,347	5.42%	86,337	1.95%	30,991
312.00	Boiler Plant Equipment	19,913,278	4.36%	867,956	2.75%	547,963	-1.61%	-319,994
314.00	Turbogenerators	20,314,607	4.57%	927,601	3.63%	738,254	-0.93%	-189,347
315.00	Accessory Electric Equipment	2,256,197	4.76%	107,402	6.80%	153,512	2.04%	46,110
316.00	Miscellaneous Power Plant Equipment	319,173	5.56%	17,745	5.59%	17,839	0.03%	94
	Total	44,396,201	4.45%	1,976,051	3.48%	1,543,905	-0.97%	-432,146
	Plant X Common							
310.00	Water Rights	1,314,134	2.96%	38,861	0.32%	4,262	-2.63%	-34,599
311.00	Structures and Improvements	8,116,832	8.63%	700,631	9.06%	735,006	0.42%	34,375
312.00	Boiler Plant Equipment	4,498,544	10.87%	489,131	13.16%	592,025	2.29%	102,895
314.00	Turbogenerators	3,424,396	13.53%	463,203	13.15%	450,476	-0.37%	-12,727
315.00	Accessory Electric Equipment	124,534	8.87%	11,050	5.47%	6,810	-3.40%	-4,240
316.00	Miscellaneous Power Plant Equipment	1,503,059	7.72%	116,064	7.82%	117,549	0.10%	1,485
	Total	18,981,499	9.58%	1,818,940	10.04%	1,906,128	0.46%	87,188
	Plant X Unit 1							
311.00	Structures and Improvements	1,286,334	20.11%	258,622	25.84%	332,403	5.74%	73,782

Detailed Rate Comparison

		[1]	[2]		[3]		[4]	
			SPS Proposed		AXM Proposed		Difference	
Account No.	Description	Plant 12/31/2018	Rate	Annual Accrual	Rate	Annual Accrual	Rate	Annual Accrual
312.00	Boiler Plant Equipment	6,252,484	21.32%	1,332,719	18.83%	1,177,316	-2.49%	-155,403
314.00	Turbogenerators	4,549,359	19.93%	906,707	21.56%	981,019	1.63%	74,312
315.00	Accessory Electric Equipment	871,549	28.31%	246,762	60.17%	524,440	31.86%	277,678
316.00	Miscellaneous Power Plant Equipment	0	21.18%	0	21.18%	226,525	0.00%	226,525
	Total	12,959,727	21.18%	2,744,809	25.01%	3,241,703	3.83%	496,894
	Plant X Unit 2							
311.00	Structures and Improvements	1,021,771	19.71%	201,435	6.18%	63,170	-13.53%	-138,266
312.00	Boiler Plant Equipment	16,241,946	22.22%	3,608,979	5.51%	894,804	-16.71%	-2,714,175
314.00	Turbogenerators	6,735,026	20.12%	1,355,229	1.98%	133,095	-18.15%	-1,222,134
315.00	Accessory Electric Equipment	613,416	19.07%	117,003	8.18%	50,207	-10.89%	-66,796
316.00	Miscellaneous Power Plant Equipment	52,890	21.28%	11,254	21.99%	11,632	0.71%	378
	Total	24,665,049	21.46%	5,293,902	4.67%	1,152,908	-16.79%	-4,140,993
	Plant X Unit 3							
311.00	Structures and Improvements	1,034,626	5.86%	60,662	7.97%	82,505	2.11%	21,843
312.00	Boiler Plant Equipment	8,456,316	6.46%	546,569	3.48%	294,676	-2.98%	-251,893
314.00	Turbogenerators	7,508,924	6.17%	463,161	7.01%	526,330	0.84%	63,169
315.00	Accessory Electric Equipment	976,256	6.93%	67,630	8.95%	87,369	2.02%	19,740
316.00	Miscellaneous Power Plant Equipment	977,798	6.54%	63,987	6.06%	59,246	-0.48%	-4,742
	Total	18,953,919	6.34%	1,202,009	5.54%	1,050,126	-0.80%	-151,884
	Plant X Unit 4							
311.00	Structures and Improvements	1,836,578	6.08%	111,727	7.79%	143,055	1.71%	31,328
312.00	Boiler Plant Equipment	18,044,134	5.05%	912,129	3.65%	657,851	-1.41%	-254,278
314.00	Turbogenerators	13,769,136	5.71%	785,813	3.97%	546,145	-1.74%	-239,668
315.00	Accessory Electric Equipment	1,813,628	4.91%	88,984	2.48%	44,905	-2.43%	-44,078
316.00	Miscellaneous Power Plant Equipment	164,046	7.11%	11,658	10.65%	17,463	3.54%	5,806
	Total	35,627,522	5.36%	1,910,310	3.96%	1,409,420	-1.41%	-500,891
	Riverview							
310.00	Land Rights	1,245	0.00%	0	0.00%	0	0.00%	0
	Total	1,245	0.00%	0	0.00%	0	0.00%	0
	Tolk Common							

Detailed Rate Comparison

		[1]	[2]		[3]		[4]	
			SPS Proposed		AXM Proposed		Difference	
Account No.	Description	Plant 12/31/2018	Rate	Annual Accrual	Rate	Annual Accrual	Rate	Annual Accrual
310.00	Water Rights	10,220,448	5.14%	525,423	4.16%	424,951	-0.98%	-100,472
311.00	Structures and Improvements	31,860,962	11.71%	3,731,710	9.09%	2,895,521	-2.62%	-836,189
312.00	Boiler Plant Equipment	16,865,777	9.96%	1,680,331	8.38%	1,413,333	-1.58%	-266,998
314.00	Turbogenerators	11,467,141	10.19%	1,168,288	8.63%	989,393	-1.56%	-178,895
315.00	Accessory Electric Equipment	0	9.93%	0	0.00%	0	-9.93%	0
316.00	Miscellaneous Power Plant Equipment	3,406,289	6.63%	225,823	6.89%	234,538	0.26%	8,715
	Total	73,820,616	9.93%	7,331,575	8.07%	5,957,736	-1.86%	-1,373,839
	Tolk Unit 1							
310.00	Land Rights	19,917	2.74%	546	1.67%	332	-1.08%	-214
311.00	Structures and Improvements	19,801,317	3.11%	615,835	2.01%	397,833	-1.10%	-218,003
312.00	Boiler Plant Equipment	191,862,522	3.71%	7,114,909	2.66%	5,111,656	-1.04%	-2,003,253
314.00	Turbogenerators	61,261,005	3.16%	1,937,674	1.99%	1,218,973	-1.17%	-718,701
315.00	Accessory Electric Equipment	3,587,978	3.18%	114,233	2.01%	72,174	-1.17%	-42,060
316.00	Miscellaneous Power Plant Equipment	521,526	3.36%	17,521	2.29%	11,943	-1.07%	-5,579
	Total	277,054,265	3.54%	9,800,719	2.46%	6,812,910	-1.08%	-2,987,809
	Tolk Unit 2							
310.00	Land Rights	277,377	2.74%	7,608	1.82%	5,043	-0.92%	-2,565
311.00	Structures and Improvements	9,713,838	3.25%	315,748	2.26%	219,197	-0.99%	-96,551
312.00	Boiler Plant Equipment	210,860,524	3.74%	7,886,580	3.01%	6,339,036	-0.73%	-1,547,544
314.00	Turbogenerators	79,132,275	3.29%	2,599,613	2.46%	1,947,486	-0.82%	-652,127
315.00	Accessory Electric Equipment	3,292,957	4.34%	142,998	3.16%	103,923	-1.19%	-39,075
316.00	Miscellaneous Power Plant Equipment	2,241,379	2.99%	67,122	2.04%	45,683	-0.96%	-21,439
	Total	305,518,350	3.61%	11,019,669	2.83%	8,660,369	-0.77%	-2,359,299
	Tolk Common Retiring 2055							
310.00	Water Rights TX		0.00%	0	0.00%	0	0.00%	0
311.00	Structures and Improvements	5,740,159	2.91%	167,105	2.89%	165,972	-0.02%	-1,133
312.00	Boiler Plant Equipment	481,278	3.00%	14,454	2.81%	13,541	-0.19%	-913
314.00	Turbogenerators	1,937,671	3.05%	59,030	2.91%	56,374	-0.14%	-2,655
315.00	Accessory Electric Equipment	22,551	3.31%	746	3.57%	805	0.26%	59
316.00	Miscellaneous Power Plant Equipment	3,736,234	2.42%	90,353	2.08%	77,851	-0.33%	-12,502
	Total	11,917,894	2.78%	331,687	2.64%	314,543	-0.14%	-17,144
	Tolk Unit 1 Retiring 2055							

Detailed Rate Comparison

		[1]	[2]		[3]		[4]	
			SPS Proposed		AXM Proposed		Difference	
Account No.	Description	Plant 12/31/2018	Rate	Annual Accrual	Rate	Annual Accrual	Rate	Annual Accrual
310.00	Land Rights TX		0.00%	0	0.00%	0	0.00%	0
311.00	Structures and Improvements	12,374,235	1.74%	215,120	1.05%	130,283	-0.69%	-84,837
312.00	Boiler Plant Equipment	7,127,683	1.70%	121,435	1.11%	79,288	-0.59%	-42,147
314.00	Turbogenerators	15,404,390	1.75%	269,522	1.05%	161,864	-0.70%	-107,658
315.00	Accessory Electric Equipment	12,860,737	1.80%	230,892	1.13%	145,373	-0.66%	-85,519
316.00	Miscellaneous Power Plant Equipment	199,904	1.64%	3,272	0.96%	1,911	-0.68%	-1,362
	Total	47,966,949	1.75%	840,241	1.08%	518,718	-0.67%	-321,523
	Tolk Unit 2 Retiring 2055							
310.00	Land Rights TX		0.00%	0	0.00%	0	0.00%	0
311.00	Structures and Improvements	8,645,191	1.69%	146,126	1.05%	91,122	-0.64%	-55,004
312.00	Boiler Plant Equipment	8,030,975	1.71%	137,393	1.30%	104,257	-0.41%	-33,136
314.00	Turbogenerators	27,246,395	2.08%	565,576	1.65%	448,642	-0.43%	-116,934
315.00	Accessory Electric Equipment	8,914,265	1.93%	171,600	1.43%	127,569	-0.49%	-44,030
316.00	Miscellaneous Power Plant Equipment	1,318,439	1.72%	22,733	1.10%	14,541	-0.62%	-8,192
	Total	54,155,264	1.93%	1,043,428	1.45%	786,130	-0.48%	-257,297
	Total Steam Production Plant	1,880,462,991	4.71%	88,648,098	3.90%	73,375,686	-0.81%	-15,272,411
	OTHER PRODUCTION PLANT							
	Blackhawk							
342.00	Fuel Holders and Accessory Equipment	4,054,689	2.71%	110,018	2.71%	110,018	0.00%	0
	Total	4,054,689	2.71%	110,018	2.71%	110,018	0.00%	0
	Cunningham							
341.00	Structures and Improvements	588,074	2.83%	16,630	2.67%	15,707	-0.16%	-923
342.00	Fuel Holders and Accessory Equipment	1,502,692	3.17%	47,684	3.05%	45,803	-0.13%	-1,880
343.00	Prime Movers	50,206,735	2.70%	1,354,481	3.01%	1,513,614	0.32%	159,133
344.00	Generators	13,132,851	3.96%	519,505	4.10%	538,997	0.15%	19,491
345.00	Accessory Electric Equipment	5,919,580	2.58%	152,582	2.43%	143,817	-0.15%	-8,765
346.00	Miscellaneous Power Plant Equipment	1,140,410	3.12%	35,608	3.33%	37,952	0.21%	2,344
	Total	72,490,341	2.93%	2,126,490	3.17%	2,295,889	0.23%	169,400

Detailed Rate Comparison

		[1]	[2]		[3]		[4]	
			SPS Proposed		AXM Proposed		Difference	
Account No.	Description	Plant 12/31/2018	Rate	Annual Accrual	Rate	Annual Accrual	Rate	Annual Accrual
	Jones Unit 3							
341.00	Structures and Improvements	4,748,588	2.20%	104,700	2.16%	102,380	-0.05%	-2,320
342.00	Fuel Holders and Accessory Equipment	0	2.21%	0	2.21%	0	0.00%	0
343.00	Prime Movers	10,724	1.93%	207	2.62%	281	0.69%	74
344.00	Generators	66,479,720	2.21%	1,466,683	2.16%	1,434,635	-0.05%	-32,047
345.00	Accessory Electric Equipment	10,399,410	2.20%	229,293	2.15%	224,013	-0.05%	-5,280
346.00	Miscellaneous Power Plant Equipment	1,591,994	2.20%	35,101	2.17%	34,578	-0.03%	-523
	Total	83,230,435	2.21%	1,835,984	2.16%	1,795,888	-0.05%	-40,096
	Jones Unit 4							
341.00	Structures and Improvements	6,505,115	2.21%	143,542	2.19%	142,223	-0.02%	-1,320
342.00	Fuel Holders and Accessory Equipment	0	2.21%	0	2.21%	0	0.00%	0
343.00	Prime Movers	0	2.21%	0	2.21%	0	0.00%	0
344.00	Generators	65,249,124	2.21%	1,440,768	2.19%	1,427,553	-0.02%	-13,215
345.00	Accessory Electric Equipment	10,703,795	2.21%	236,190	2.19%	233,958	-0.02%	-2,231
346.00	Miscellaneous Power Plant Equipment	1,196,889	2.21%	26,411	2.19%	26,155	-0.02%	-256
	Total	83,654,923	2.21%	1,846,910	2.19%	1,829,889	-0.02%	-17,022
	Maddox							
341.00	Structures and Improvements	1,643,938	4.14%	68,133	3.58%	58,860	-0.56%	-9,272
342.00	Fuel Holders and Accessory Equipment	512,886	2.47%	12,683	-4.85%	-24,855	-7.32%	-37,538
343.00	Prime Movers	0	3.37%	0	3.37%	0	0.00%	0
344.00	Generators	15,428,875	3.16%	487,244	2.76%	425,812	-0.40%	-61,433
345.00	Accessory Electric Equipment	1,627,920	4.67%	76,027	3.07%	49,987	-1.60%	-26,041
346.00	Miscellaneous Power Plant Equipment	169,443	5.41%	9,166	3.73%	6,317	-1.68%	-2,848
	Total	19,383,062	3.37%	653,253	2.66%	516,121	-0.71%	-137,131
	Quay County							
341.00	Structures and Improvements	916,182	4.72%	43,246	4.04%	37,012	-0.68%	-6,234
342.00	Fuel Holders and Accessory Equipment	1,575	3.19%	50	-306.23%	-4,824	-309.42%	-4,874
343.00	Prime Movers	4,620,155	2.02%	93,505	0.49%	22,796	-1.53%	-70,709
344.00	Generators	17,151,429	4.51%	773,325	4.48%	768,358	-0.03%	-4,968
345.00	Accessory Electric Equipment	3,065,104	4.35%	133,449	3.68%	112,783	-0.67%	-20,667
346.00	Miscellaneous Power Plant Equipment	646,793	4.36%	28,171	3.93%	25,434	-0.42%	-2,737
	Total	26,401,239	4.06%	1,071,746	3.64%	961,557	-0.42%	-110,189

Detailed Rate Comparison

Account No.	Description	[1] Plant 12/31/2018	[2] SPS Proposed Rate	SPS Proposed Annual Accrual	[3] AXM Proposed Rate	AXM Proposed Annual Accrual	[4] Difference Rate	Difference Annual Accrual
	Riverview							
340.00	Land and Water Rights	676	0.00%	0	0.00%	0	0.00%	0
	Total	676	0.00%	0	0.00%	0	0.00%	0
	Total Other Production Plant	289,215,365	2.64%	7,644,402	2.60%	7,509,363	-0.05%	-135,038
	Total Production Plant	**2,169,678,356**	**4.44%**	**96,292,499**	**3.73%**	**80,885,050**	**-0.71%**	**-15,407,450**
	TRANSMISSION PLANT							
350.20	Land Rights	151,888,969	1.27%	1,936,404	1.24%	1,888,262	-0.03%	-48,143
352.00	Structures & Improvements	101,632,641	1.91%	1,941,990	1.67%	1,697,068	-0.24%	-244,923
353.00	Station Equipment	1,108,171,071	2.32%	25,745,127	2.30%	25,488,927	-0.02%	-256,200
354.00	Towers & Fixtures	8,177,682	1.53%	125,082	1.45%	118,966	-0.07%	-6,117
355.00	Poles & Fixtures	1,160,752,855	3.53%	40,961,092	2.27%	26,344,605	-1.26%	-14,616,486
356.00	Overhead Conductors & Devices	446,002,528	3.01%	13,429,070	2.85%	12,697,128	-0.16%	-731,942
357.00	Underground Conduit	272,859	1.62%	4,422	0.80%	2,178	-0.82%	-2,243
358.00	Underground Conductor & Devices	489,717	2.74%	13,439	1.06%	5,211	-1.68%	-8,228
359.00	Roads and Trails	517,736	1.55%	8,044	1.58%	8,165	0.02%	121
	Total Transmission Plant	**2,977,906,058**	**2.83%**	**84,164,669**	**2.29%**	**68,250,509**	**-0.53%**	**-15,914,160**
	DISTRIBUTION PLANT - TEXAS							
360.20	Land Rights	2,745,173	1.43%	39,202	1.42%	38,846	-0.01%	-356
361.00	Structures & Improvements	14,411,029	1.57%	226,410	1.54%	221,673	-0.03%	-4,737
362.00	Station Equipment	170,237,439	2.27%	3,872,485	2.00%	3,403,095	-0.28%	-469,390
364.00	Poles, Towers & Fixtures	200,626,063	3.30%	6,622,220	2.86%	5,732,862	-0.44%	-889,358
365.00	Overhead Conductors & Devices	169,511,992	3.19%	5,408,058	3.17%	5,379,954	-0.02%	-28,103
366.00	Underground Conduit	19,054,496	1.76%	336,030	1.67%	318,134	-0.09%	-17,895
367.00	Underground Conductor & Devices	34,104,914	2.45%	836,195	1.96%	669,060	-0.49%	-167,136
368.00	Line Transformers	148,560,954	2.39%	3,550,694	1.61%	2,387,492	-0.78%	-1,163,203
369.00	Services	60,121,851	2.91%	1,752,425	2.01%	1,207,423	-0.91%	-545,003
370.00	Meters	41,048,433	3.66%	1,503,327	3.94%	1,617,647	0.28%	114,320

Detailed Rate Comparison

		[1]	[2]		[3]		[4]	
			SPS Proposed		AXM Proposed		Difference	
Account No.	Description	Plant 12/31/2018	Rate	Annual Accrual	Rate	Annual Accrual	Rate	Annual Accrual
371.00	Installations on Customers' Premises	0	4.42%	0	4.42%	0	0.00%	0
373.00	Street Lighting & Signal Systems	17,507,832	4.10%	717,713	4.89%	856,982	0.80%	139,269
	Total Distribution Plant	**877,930,177**	**2.83%**	**24,864,758**	**2.49%**	**21,833,167**	**-0.35%**	**-3,031,592**
	GENERAL PLANT							
	Depreciated							
389.20	Land Rights	45,967	1.76%	809	1.76%	809	0.00%	0
390.00	Structures & Improvements	68,728,412	2.13%	1,463,647	1.89%	1,297,278	-0.24%	-166,369
390.70	Structures & Improvements - Leasehold	4,232,845			0.00%	0	0.00%	0
	Total	73,007,224	2.13%	1,464,456	1.78%	1,298,088	-0.35%	-166,369
	Amortized							
391.00	Office Furniture & Equipment	15,816,085	5.00%	790,804	5.00%	790,804	0.00%	0
391.00	Computer Equipment	62,858,242	20.00%	12,571,648	20.00%	12,571,648	0.00%	0
392.01	Transportation Equipment - Autos	3,199,963	9.00%	287,997	9.00%	287,997	0.00%	0
392.02	Transportation Equipment - Light Trucks	34,619,349	8.80%	3,046,503	8.80%	3,046,503	0.00%	0
392.03	Transportation Equipment - Trailers	7,549,445	5.93%	447,934	5.93%	447,934	0.00%	0
392.04	Transportation Equipment - Heavy Trucks	42,554,006	7.42%	3,156,089	7.42%	3,156,089	0.00%	0
393.00	Stores Equipment	363,950	2.86%	10,399	2.86%	10,399	0.00%	0
394.00	Tools, Shop & Garage Equipment	43,989,343	2.86%	1,256,838	2.86%	1,256,838	0.00%	0
395.00	Laboratory Equipment	6,962,017	4.00%	278,481	4.00%	278,481	0.00%	0
396.00	Power Operated Equipment	12,874,069	5.00%	643,703	5.00%	643,703	0.00%	0
397.00	Communication Equipment	82,297,656	6.67%	5,486,510	6.67%	5,486,510	0.00%	0
398.00	Miscellaneous Equipment	2,285,630	4.17%	95,235	4.17%	95,235	0.00%	0
	Total	315,369,755	8.90%	28,072,141	8.90%	28,072,141	0.00%	0
	Reserve Deficiency over 10 years for AR 15 Assets			1,534,250		1,534,250		
	Total General Plant	**388,376,979**	**8.00%**	**31,070,847**	**7.96%**	**30,904,478**	**-0.04%**	**-166,369**
	INTANGIBLE PLANT							

Detailed Rate Comparison

		[1]	[2]		[3]		[4]	
			SPS Proposed		AXM Proposed		Difference	
Account No.	Description	Plant 12/31/2018	Rate	Annual Accrual	Rate	Annual Accrual	Rate	Annual Accrual
303.00	Software - 3 Year	2,014,163	33.33%	671,388	33.33%	671,388	0.00%	0
303.00	Software - 5 Year	100,980,651	20.00%	20,196,130	20.00%	20,196,130	0.00%	0
303.00	Software - 7 Year	0	14.29%	0	14.29%	0	0.00%	0
303.00	Software - 10 Year	7,689,422	10.00%	768,942	10.00%	768,942	0.00%	0
303.00	Software - 15 Year	70,623,927	6.67%	4,708,285	6.67%	4,708,285	0.00%	0
	Total Intangible Plant	**181,308,163**	**14.53%**	**26,344,745**	**14.53%**	**26,344,745**	**0.00%**	**0**
	TOTAL ELECTRIC PLANT	**$ 6,595,199,734**	**3.98%**	**$ 262,737,520**	**3.46%**	**$ 228,217,949**	**-0.52%**	**$ (34,519,571)**

[1], [2] From depreciation study
[3] From Exhibit DJG-5
[4] = [3] - [2]

SOAH DOCKET NO. 473-19-6677
PUC DOCKET NO. 49831

APPLICATION OF SOUTHWESTERN	**§**	**BEFORE THE STATE OFFICE**
PUBLIC SERVICE COMPANY FOR	**§**	**OF**
AUTHORITY TO CHANGE RATES	**§**	**ADMINISTRATIVE HEARINGS**

DIRECT TESTIMONY AND EXHIBITS
OF
DAVID J. GARRETT

EXHIBIT DJG-5

DEPRECIATION RATE DEVELOPMENT

Depreciation Rate Development

		[1]	[2]		[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]	[12]	[13]
			Iowa Curve							Service Life		Net Salvage		Total	
Account No.	Description	Plant 12/31/2018	Type	AL	Net Salvage	Depreciable Base	Book Reserve	Future Accruals	Remaining Life	Accrual	Rate	Accrual	Rate	Accrual	Rate
	STEAM PRODUCTION PLANT														
	Cunningham Common														
310.00	Land Rights	53,100			0.0%	53,100	50,019	3,080	22.00	140	0.26%	0	0.00%	140	**0.26%**
311.00	Structures and Improvements	7,671,299			-26.3%	9,691,388	4,225,660	5,465,728	22.00	156,620	2.04%	91,822	1.20%	248,442	**3.24%**
312.00	Boiler Plant Equipment	6,640,582			-26.3%	8,389,252	3,383,324	5,005,929	22.00	148,057	2.23%	79,485	1.20%	227,542	**3.43%**
314.00	Turbogenerators	398,981			-26.3%	504,045	87,493	416,552	22.00	14,159	3.55%	4,776	1.20%	18,934	**4.75%**
315.00	Accessory Electric Equipment	783,399			-26.3%	989,692	277,634	712,058	22.00	22,989	2.93%	9,377	1.20%	32,366	**4.13%**
316.00	Miscellaneous Power Plant Equipment	1,518,322			-26.3%	1,918,143	1,421,590	496,553	22.00	4,397	0.29%	18,174	1.20%	22,571	**1.49%**
	Total	17,065,682			-26.3%	21,545,619	9,445,720	12,099,900	22.00	346,362	2.03%	203,634	1.19%	549,995	**3.22%**
	Cunningham Unit 1														
311.00	Structures and Improvements	2,390,443			-19.7%	2,861,008	2,453,655	407,354	1.00	-63,212	-2.64%	470,565	19.69%	407,354	**17.04%**
312.00	Boiler Plant Equipment	8,208,183			-19.7%	9,823,986	7,457,289	2,366,698	1.00	750,894	9.15%	1,615,804	19.69%	2,366,698	**28.83%**
314.00	Turbogenerators	6,137,045			-19.7%	7,345,139	6,363,445	981,694	1.00	-226,400	-3.69%	1,208,094	19.69%	981,694	**16.00%**
315.00	Accessory Electric Equipment	935,547			-19.7%	1,119,713	827,080	292,633	1.00	108,467	11.59%	184,165	19.69%	292,633	**31.28%**
316.00	Miscellaneous Power Plant Equipment	308,513			-19.7%	369,245	171,284	197,960	1.00	137,228	44.48%	60,732	19.69%	197,960	**64.17%**
	Total	17,979,731			-19.7%	21,519,091	17,272,752	4,246,338	1.00	706,978	3.93%	3,539,360	19.69%	4,246,338	**23.62%**
	Cunningham Unit 2														
311.00	Structures and Improvements	2,377,337			-13.5%	2,697,594	1,289,666	1,407,928	7.00	155,382	6.54%	45,751	1.92%	201,133	**8.46%**
312.00	Boiler Plant Equipment	17,652,086			-13.5%	20,030,048	13,061,245	6,968,803	7.00	655,834	3.72%	339,709	1.92%	995,543	**5.64%**
314.00	Turbogenerators	11,616,984			-13.5%	13,181,941	9,478,421	3,703,520	7.00	305,509	2.63%	223,565	1.92%	529,074	**4.55%**
315.00	Accessory Electric Equipment	5,352,506			-13.5%	6,073,558	2,443,284	3,630,274	7.00	415,603	7.76%	103,007	1.92%	518,611	**9.69%**
316.00	Miscellaneous Power Plant Equipment	134,895			-13.5%	153,067	-15,704	168,771	7.00	21,514	15.95%	2,596	1.92%	24,110	**17.87%**
	Total	37,133,808			-13.5%	42,136,208	26,256,912	15,879,296	7.00	1,553,842	4.18%	714,629	1.92%	2,268,471	**6.11%**
	Harrington Common														
310.00	Land Rights	13,705			0.0%	13,705	8,320	5,384	22.00	245	1.79%	0	0.00%	245	**1.79%**
311.00	Structures and Improvements	26,337,880			-47.1%	38,755,931	9,863,621	28,892,309	22.00	748,830	2.84%	564,457	2.14%	1,313,287	**4.99%**
312.00	Boiler Plant Equipment	15,958,561			-47.1%	23,482,865	5,249,793	18,233,072	22.00	486,762	3.05%	342,014	2.14%	828,776	**5.19%**
314.00	Turbogenerators	3,146,873			-47.1%	4,630,593	1,387,217	3,243,376	22.00	79,984	2.54%	67,442	2.14%	147,426	**4.68%**
315.00	Accessory Electric Equipment	1,199,779			-47.1%	1,765,463	188,263	1,577,199	22.00	45,978	3.83%	25,713	2.14%	71,691	**5.98%**
316.00	Miscellaneous Power Plant Equipment	2,629,324			-47.1%	3,869,024	1,546,747	2,322,277	22.00	49,208	1.87%	56,350	2.14%	105,558	**4.01%**
	Total	49,286,121			-47.1%	72,517,580	18,243,961	54,273,619	22.00	1,411,007	2.86%	1,055,975	2.14%	2,466,983	**5.01%**
	Harrington Unit 1														
311.00	Structures and Improvements	6,969,988			-4.3%	7,268,172	5,897,049	1,371,123	18.00	59,608	0.86%	16,566	0.24%	76,174	**1.09%**
312.00	Boiler Plant Equipment	106,514,384			-4.3%	111,071,195	55,938,212	55,132,983	18.00	2,809,787	2.64%	253,156	0.24%	3,062,943	**2.88%**
314.00	Turbogenerators	42,456,474			-4.3%	44,272,812	17,685,158	26,587,655	18.00	1,376,184	3.24%	100,908	0.24%	1,477,092	**3.48%**
315.00	Accessory Electric Equipment	7,832,270			-4.3%	8,167,344	4,651,320	3,516,024	18.00	176,719	2.26%	18,615	0.24%	195,335	**2.49%**
316.00	Miscellaneous Power Plant Equipment	966,618			-4.3%	1,007,971	620,349	387,622	18.00	19,237	1.99%	2,297	0.24%	21,535	**2.23%**
	Total	164,739,735			-4.3%	171,787,495	84,792,089	86,995,407	18.00	4,441,536	2.70%	391,542	0.24%	4,833,078	**2.93%**
	Harrington Unit 2														
311.00	Structures and Improvements	6,123,513			-3.9%	6,364,597	4,142,860	2,221,737	20.00	99,033	1.62%	12,054	0.20%	111,087	**1.81%**
312.00	Boiler Plant Equipment	112,965,832			-3.9%	117,413,325	55,141,072	62,272,254	20.00	2,891,238	2.56%	222,375	0.20%	3,113,613	**2.76%**
314.00	Turbogenerators	48,509,437			-3.9%	50,419,266	18,603,104	31,816,162	20.00	1,495,317	3.08%	95,491	0.20%	1,590,808	**3.28%**
315.00	Accessory Electric Equipment	5,908,413			-3.9%	6,141,029	2,980,285	3,160,744	20.00	146,406	2.48%	11,631	0.20%	158,037	**2.67%**
316.00	Miscellaneous Power Plant Equipment	1,546,811			-3.9%	1,607,709	1,224,302	383,407	20.00	16,125	1.04%	3,045	0.20%	19,170	**1.24%**
	Total	175,054,007			-3.9%	181,945,927	82,091,623	99,854,303	20.00	4,648,119	2.66%	344,596	0.20%	4,992,715	**2.85%**
	Harrington Unit 3														
311.00	Structures and Improvements	9,357,196			-3.3%	9,668,104	6,606,032	3,062,071	22.00	125,053	1.34%	14,132	0.15%	139,185	**1.49%**
312.00	Boiler Plant Equipment	120,540,206			-3.3%	124,545,353	63,691,449	60,853,905	22.00	2,584,034	2.14%	182,052	0.15%	2,766,087	**2.29%**
314.00	Turbogenerators	54,024,505			-3.3%	55,819,559	25,631,179	30,188,380	22.00	1,290,606	2.39%	81,593	0.15%	1,372,199	**2.54%**
315.00	Accessory Electric Equipment	6,045,955			-3.3%	6,246,841	3,259,871	2,986,971	22.00	126,640	2.09%	9,131	0.15%	135,771	**2.25%**
316.00	Miscellaneous Power Plant Equipment	1,878,140			-3.3%	1,940,545	1,245,247	695,298	22.00	28,768	1.53%	2,837	0.15%	31,604	**1.68%**
	Total	191,846,002			-3.3%	198,220,402	100,433,777	97,786,625	22.00	4,155,101	2.17%	289,745	0.15%	4,444,847	**2.32%**
	Jones Common														

Depreciation Rate Development

		[1]	[2]		[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]	[12]	[13]
			Iowa Curve							Service Life		Net Salvage		Total	
Account No.	Description	Plant 12/31/2018	Type	AL	Net Salvage	Depreciable Base	Book Reserve	Future Accruals	Remaining Life	Accrual	Rate	Accrual	Rate	Accrual	Rate
311.00	Structures and Improvements	9,045,042			-17.9%	10,663,961	1,326,353	9,337,608	40.00	192,967	2.13%	40,473	0.45%	233,440	2.58%
312.00	Boiler Plant Equipment	12,167,839			-17.9%	14,345,688	2,120,715	12,224,973	40.00	251,178	2.06%	54,446	0.45%	305,624	2.51%
314.00	Turbogenerators	7,885,491			-17.9%	9,296,868	1,800,609	7,496,260	40.00	152,122	1.93%	35,284	0.45%	187,406	2.38%
315.00	Accessory Electric Equipment	2,560,333			-17.9%	3,018,592	372,251	2,646,341	40.00	54,702	2.14%	11,456	0.45%	66,159	2.58%
316.00	Miscellaneous Power Plant Equipment	3,666,003			-17.9%	4,322,159	1,561,492	2,760,668	40.00	52,613	1.44%	16,404	0.45%	69,017	1.88%
	Total	35,324,709			-17.9%	41,647,269	7,181,419	34,465,849	40.00	703,582	1.99%	158,064	0.45%	861,646	2.44%
	Jones Unit 1														
310.00	Land Rights	108,562			0.0%	108,562	72,950	35,611	13.00	2,739	2.52%	0	0.00%	2,739	2.52%
311.00	Structures and Improvements	5,094,828			-14.0%	5,809,265	4,089,812	1,719,453	13.00	77,309	1.52%	54,957	1.08%	132,266	2.60%
312.00	Boiler Plant Equipment	23,143,052			-14.0%	26,388,355	11,146,671	15,241,684	13.00	922,799	3.99%	249,639	1.08%	1,172,437	5.07%
314.00	Turbogenerators	22,662,978			-14.0%	25,840,961	11,772,510	14,068,451	13.00	837,728	3.70%	244,460	1.08%	1,082,189	4.78%
315.00	Accessory Electric Equipment	2,767,418			-14.0%	3,155,487	1,298,796	1,856,691	13.00	112,971	4.08%	29,851	1.08%	142,822	5.16%
316.00	Miscellaneous Power Plant Equipment	756,086			-14.0%	862,110	447,815	414,296	13.00	23,713	3.14%	8,156	1.08%	31,869	4.21%
	Total	54,532,923			-14.0%	62,164,740	28,828,554	33,336,186	13.00	1,977,259	3.63%	587,063	1.08%	2,564,322	4.70%
	Jones Unit 2														
311.00	Structures and Improvements	2,179,724			-18.4%	2,580,125	1,863,611	716,514	16.00	19,757	0.91%	25,025	1.15%	44,782	2.05%
312.00	Boiler Plant Equipment	16,282,969			-18.4%	19,274,037	12,175,857	7,098,180	16.00	256,695	1.58%	186,942	1.15%	443,636	2.72%
314.00	Turbogenerators	20,915,587			-18.4%	24,757,634	11,443,103	13,314,531	16.00	592,030	2.83%	240,128	1.15%	832,158	3.98%
315.00	Accessory Electric Equipment	2,913,009			-18.4%	3,448,108	998,998	2,449,110	16.00	119,626	4.11%	33,444	1.15%	153,069	5.25%
316.00	Miscellaneous Power Plant Equipment	598,526			-18.4%	708,471	506,974	201,497	16.00	5,722	0.96%	6,872	1.15%	12,594	2.10%
	Total	42,889,815			-18.4%	50,768,375	26,988,543	23,779,832	16.00	993,830	2.32%	492,410	1.15%	1,486,240	3.47%
	Maddox														
310.00	Land Rights	19,971			0.0%	19,971	16,455	3,516	10.00	352	1.76%	0	0.00%	352	1.76%
311.00	Structures and Improvements	4,909,575			-14.9%	5,641,794	2,769,580	2,872,214	10.00	214,000	4.36%	73,222	1.49%	287,221	5.85%
312.00	Boiler Plant Equipment	20,350,280			-14.9%	23,385,342	9,767,804	13,617,538	10.00	1,058,248	5.20%	303,506	1.49%	1,361,754	6.69%
314.00	Turbogenerators	12,709,583			-14.9%	14,605,103	7,949,242	6,655,861	10.00	476,034	3.75%	189,552	1.49%	665,586	5.24%
315.00	Accessory Electric Equipment	6,652,978			-14.9%	7,645,210	2,482,292	5,162,918	10.00	417,069	6.27%	99,223	1.49%	516,292	7.76%
316.00	Miscellaneous Power Plant Equipment	963,849			-14.9%	1,107,598	501,462	606,136	10.00	46,239	4.80%	14,375	1.49%	60,614	6.29%
	Total	45,606,237			-14.9%	52,405,018	23,486,835	28,918,184	10.00	2,211,940	4.85%	679,878	1.49%	2,891,818	6.34%
	Moore County														
310.00	Land Rights	463			0.0%	463	444	20						0	0.00%
310.00	Water Rights	17,164			0.0%	17,164	18,040	-876						0	0.00%
	Total	17,627			0.0%	17,627	18,483	-856		0	0.00%	0	0.00%	0	0.00%
	Nichols Common														
310.00	Land Rights	676,746			0.0%	676,746	361,555	315,190	12.00	26,266	3.88%	0	0.00%	26,266	3.88%
311.00	Structures and Improvements	52,035,520			-16.1%	60,406,881	23,282,020	37,124,861	12.00	2,396,125	4.60%	697,613	1.34%	3,093,738	5.95%
312.00	Boiler Plant Equipment	10,680,419			-16.1%	12,398,662	2,980,255	9,418,407	12.00	641,680	6.01%	143,187	1.34%	784,867	7.35%
314.00	Turbogenerators	3,396,729			-16.1%	3,943,187	1,614,927	2,328,260	12.00	148,483	4.37%	45,538	1.34%	194,022	5.71%
315.00	Accessory Electric Equipment	2,298,724			-16.1%	2,668,537	1,244,546	1,423,991	12.00	87,848	3.82%	30,818	1.34%	118,666	5.16%
316.00	Miscellaneous Power Plant Equipment	2,341,972			-16.1%	2,718,743	1,704,767	1,013,976	12.00	53,100	2.27%	31,398	1.34%	84,498	3.61%
	Total	71,430,109			-15.9%	82,812,756	31,188,070	51,624,686	12.00	3,353,503	4.69%	948,554	1.33%	4,302,057	6.02%
	Nichols Unit 1														
311.00	Structures and Improvements	2,079,572			-13.1%	2,352,478	708,481	1,643,997	4.00	342,773	16.48%	68,227	3.28%	410,999	19.76%
312.00	Boiler Plant Equipment	10,859,989			-13.1%	12,285,166	7,973,900	4,311,266	4.00	721,522	6.64%	356,294	3.28%	1,077,816	9.92%
314.00	Turbogenerators	9,683,276			-13.1%	10,954,031	8,471,450	2,482,581	4.00	302,957	3.13%	317,689	3.28%	620,645	6.41%
315.00	Accessory Electric Equipment	2,251,603			-13.1%	2,547,085	1,905,694	641,392	4.00	86,477	3.84%	73,871	3.28%	160,348	7.12%
316.00	Miscellaneous Power Plant Equipment	234,700			-13.1%	265,500	92,708	172,792	4.00	35,498	15.12%	7,700	3.28%	43,198	18.41%
	Total	25,109,140			-13.1%	28,404,260	19,152,232	9,252,028	4.00	1,489,227	5.93%	823,780	3.28%	2,313,007	9.21%
	Nichols Unit 2														
311.00	Structures and Improvements	1,108,535			-12.4%	1,246,159	668,126	578,033	5.00	88,082	7.95%	27,525	2.48%	115,607	10.43%
312.00	Boiler Plant Equipment	11,971,470			-12.4%	13,457,718	9,403,852	4,053,866	5.00	513,523	4.29%	297,250	2.48%	810,773	6.77%
314.00	Turbogenerators	12,230,817			-12.4%	13,749,264	9,637,684	4,111,580	5.00	518,627	4.24%	303,689	2.48%	822,316	6.72%
315.00	Accessory Electric Equipment	1,038,609			-12.4%	1,167,552	915,801	251,751	5.00	24,562	2.36%	25,789	2.48%	50,350	4.85%
316.00	Miscellaneous Power Plant Equipment	79,414			-12.4%	89,273	86,643	2,630	5.00	-1,446	-1.82%	1,972	2.48%	526	0.66%

Depreciation Rate Development

		[1]	[2]		[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]	[12]	[13]
			Iowa Curve							Service Life		Net Salvage		Total	
Account No.	Description	Plant 12/31/2018	Type	AL	Net Salvage	Depreciable Base	Book Reserve	Future Accruals	Remaining Life	Accrual	Rate	Accrual	Rate	Accrual	Rate
	Total	26,428,846			-12.4%	29,709,966	20,712,106	8,997,860	5.00	1,143,348	4.33%	656,224	2.48%	1,799,572	**6.81%**
	Nichols Unit 3														
311.00	Structures and Improvements	1,592,946			-11.3%	1,773,110	737,061	1,036,049	12.00	71,324	4.48%	15,014	0.94%	86,337	**5.42%**
312.00	Boiler Plant Equipment	19,913,278			-11.3%	22,165,501	15,589,949	6,575,552	12.00	360,277	1.81%	187,685	0.94%	547,963	**2.75%**
314.00	Turbogenerators	20,314,607			-11.3%	22,612,221	13,753,173	8,859,049	12.00	546,786	2.69%	191,468	0.94%	738,254	**3.63%**
315.00	Accessory Electric Equipment	2,256,197			-11.3%	2,511,377	669,235	1,842,141	12.00	132,247	5.86%	21,265	0.94%	153,512	**6.80%**
316.00	Miscellaneous Power Plant Equipment	319,173			-11.3%	355,272	141,202	214,069	12.00	14,831	4.65%	3,008	0.94%	17,839	**5.59%**
	Total	44,396,201			-11.3%	49,417,481	30,890,621	18,526,860	12.00	1,125,465	2.54%	418,440	0.94%	1,543,905	**3.48%**
	Plant X Common														
310.00	Water Rights	1,314,134			0.0%	1,314,134	1,275,773	38,361	9.00	4,262	0.32%	0	0.00%	4,262	**0.32%**
311.00	Structures and Improvements	8,116,832			-52.6%	12,383,024	5,767,967	6,615,056	9.00	260,985	3.22%	474,021	5.84%	735,006	**9.06%**
312.00	Boiler Plant Equipment	4,498,544			-52.6%	6,862,971	1,534,743	5,328,228	9.00	329,311	7.32%	262,714	5.84%	592,025	**13.16%**
314.00	Turbogenerators	3,424,396			-52.6%	5,224,252	1,169,971	4,054,281	9.00	250,492	7.31%	199,984	5.84%	450,476	**13.15%**
315.00	Accessory Electric Equipment	124,534			-52.6%	189,989	128,702	61,287	9.00	-463	-0.37%	7,273	5.84%	6,810	**5.47%**
316.00	Miscellaneous Power Plant Equipment	1,503,059			-52.6%	2,293,063	1,235,123	1,057,941	9.00	29,771	1.98%	87,778	5.84%	117,549	**7.82%**
	Total	18,981,499			-48.9%	28,267,432	11,112,278	17,155,154	9.00	874,358	4.61%	1,031,770	5.44%	1,906,128	**10.04%**
	Plant X Unit 1														
311.00	Structures and Improvements	1,286,334			-11.7%	1,436,552	1,104,149	332,403	1.00	182,185	14.16%	150,218	11.68%	332,403	**25.84%**
312.00	Boiler Plant Equipment	6,252,484			-11.7%	6,982,651	5,805,335	1,177,316	1.00	447,149	7.15%	730,167	11.68%	1,177,316	**18.83%**
314.00	Turbogenerators	4,549,359			-11.7%	5,080,635	4,099,616	981,019	1.00	449,744	9.89%	531,275	11.68%	981,019	**21.56%**
315.00	Accessory Electric Equipment	871,549			-11.7%	973,329	448,889	524,440	1.00	422,660	48.50%	101,780	11.68%	524,440	**60.17%**
316.00	Miscellaneous Power Plant Equipment	0			-11.7%	0	-226,525	226,525	1.00					226,525	**21.18%**
	Total	12,959,727			-11.7%	14,473,167	11,231,463	3,241,703	1.00	1,501,738	11.59%	1,513,440	13.43%	3,241,703	**25.01%**
	Plant X Unit 2														
311.00	Structures and Improvements	1,021,771			-10.7%	1,131,126	1,067,956	63,170	1.00	-46,185	-4.52%	109,354	10.70%	63,170	**6.18%**
312.00	Boiler Plant Equipment	16,241,946			-10.7%	17,980,229	17,085,425	894,804	1.00	-843,479	-5.19%	1,738,283	10.70%	894,804	**5.51%**
314.00	Turbogenerators	6,735,026			-10.7%	7,455,838	7,322,743	133,095	1.00	-587,717	-8.73%	720,812	10.70%	133,095	**1.98%**
315.00	Accessory Electric Equipment	613,416			-10.7%	679,066	628,859	50,207	1.00	-15,444	-2.52%	65,650	10.70%	50,207	**8.18%**
316.00	Miscellaneous Power Plant Equipment	52,890			-10.7%	58,550	46,918	11,632	1.00	5,972	11.29%	5,661	10.70%	11,632	**21.99%**
	Total	24,665,049			-10.7%	27,304,809	26,151,901	1,152,908	1.00	-1,486,852	-6.03%	2,639,760	10.70%	1,152,908	**4.67%**
	Plant X Unit 3														
311.00	Structures and Improvements	1,034,626			-13.8%	1,177,869	682,840	495,030	6.00	58,631	5.67%	23,874	2.31%	82,505	**7.97%**
312.00	Boiler Plant Equipment	8,456,316			-13.8%	9,627,088	7,859,035	1,768,054	6.00	99,547	1.18%	195,129	2.31%	294,676	**3.48%**
314.00	Turbogenerators	7,508,924			-13.8%	8,548,530	5,390,550	3,157,981	6.00	353,062	4.70%	173,268	2.31%	526,330	**7.01%**
315.00	Accessory Electric Equipment	976,256			-13.8%	1,111,418	587,201	524,217	6.00	64,842	6.64%	22,527	2.31%	87,369	**8.95%**
316.00	Miscellaneous Power Plant Equipment	977,798			-13.8%	1,113,173	757,700	355,473	6.00	36,683	3.75%	22,563	2.31%	59,246	**6.06%**
	Total	18,953,919			-13.8%	21,578,079	15,277,325	6,300,754	6.00	612,766	3.23%	437,360	2.31%	1,050,126	**5.54%**
	Plant X Unit 4														
311.00	Structures and Improvements	1,836,578			-9.3%	2,007,318	719,826	1,287,492	9.00	124,084	6.76%	18,971	1.03%	143,055	**7.79%**
312.00	Boiler Plant Equipment	18,044,134			-9.3%	19,721,631	13,800,976	5,920,655	9.00	471,462	2.61%	186,389	1.03%	657,851	**3.65%**
314.00	Turbogenerators	13,769,136			-9.3%	15,049,202	10,133,892	4,915,309	9.00	403,916	2.93%	142,230	1.03%	546,145	**3.97%**
315.00	Accessory Electric Equipment	1,813,628			-9.3%	1,982,234	1,578,085	404,149	9.00	26,171	1.44%	18,734	1.03%	44,905	**2.48%**
316.00	Miscellaneous Power Plant Equipment	164,046			-9.3%	179,297	22,127	157,170	9.00	15,769	9.61%	1,695	1.03%	17,463	**10.65%**
	Total	35,627,522			-9.3%	38,939,682	26,254,906	12,684,776	9.00	1,041,402	2.92%	368,018	1.03%	1,409,420	**3.96%**
	Riverview														
310.00	Land Rights	1,245			0.0%	1,245	1,245	0						0	**0.00%**
	Total	1,245			0.0%	1,245	1,245	0		0	0.00%	0	0.00%	0	**0.00%**
	Tolk Common														
310.00	Water Rights	10,220,448			0.0%	10,220,448	2,146,380	8,074,068	19.00	424,951	4.16%	0	0.00%	424,951	**4.16%**
311.00	Structures and Improvements	31,860,962			-87.7%	59,792,291	4,777,390	55,014,902	19.00	1,425,451	4.47%	1,470,070	4.61%	2,895,521	**9.09%**
312.00	Boiler Plant Equipment	16,865,777			-87.7%	31,651,381	4,798,052	26,853,329	19.00	635,143	3.77%	778,190	4.61%	1,413,333	**8.38%**
314.00	Turbogenerators	11,467,141			-87.7%	21,519,960	2,721,497	18,798,463	19.00	460,297	4.01%	529,096	4.61%	989,393	**8.63%**

Depreciation Rate Development

Account No.	Description	[1] Plant 12/31/2018	[2] Iowa Curve Type	AL	[3] Net Salvage	[4] Depreciable Base	[5] Book Reserve	[6] Future Accruals	[7] Remaining Life	[8] Service Life Accrual	[9] Rate	[10] Net Salvage Accrual	[11] Rate	[12] Total Accrual	[13] Rate
315.00	Accessory Electric Equipment	0			-87.7%	0	0	0	19.00					0	**0.00%**
316.00	Miscellaneous Power Plant Equipment	3,406,289			-87.7%	6,392,456	1,936,226	4,456,231	19.00	77,372	2.27%	157,167	4.61%	234,538	**6.89%**
	Total	73,820,616			-75.5%	129,576,537	16,379,544	113,196,992	19.00	3,023,214	4.10%	2,934,522	3.98%	5,957,736	**8.07%**
	Tolk Unit 1														
310.00	Land Rights	19,917			0.0%	19,917	13,609	6,309	19.00	332	1.67%	0	0.00%	332	**1.67%**
311.00	Structures and Improvements	19,801,317			-4.0%	20,596,149	13,037,326	7,558,823	19.00	356,000	1.80%	41,833	0.21%	397,833	**2.01%**
312.00	Boiler Plant Equipment	191,862,522			-4.0%	199,563,960	102,442,503	97,121,457	19.00	4,706,317	2.45%	405,339	0.21%	5,111,656	**2.66%**
314.00	Turbogenerators	61,261,005			-4.0%	63,720,046	40,559,550	23,160,496	19.00	1,089,550	1.78%	129,423	0.21%	1,218,973	**1.99%**
315.00	Accessory Electric Equipment	3,587,978			-4.0%	3,732,001	2,360,700	1,371,300	19.00	64,594	1.80%	7,580	0.21%	72,174	**2.01%**
316.00	Miscellaneous Power Plant Equipment	521,526			-4.0%	542,460	315,552	226,908	19.00	10,841	2.08%	1,102	0.21%	11,943	**2.29%**
	Total	277,054,265			-4.0%	288,174,533	158,729,240	129,445,293	19.00	6,227,633	2.25%	585,277	0.21%	6,812,910	**2.46%**
	Tolk Unit 2														
310.00	Land Rights	277,377			0.0%	277,377	181,561	95,816	19.00	5,043	1.82%	0	0.00%	5,043	**1.82%**
311.00	Structures and Improvements	9,713,838			-3.6%	10,066,189	5,901,440	4,164,749	19.00	200,653	2.07%	18,545	0.19%	219,197	**2.26%**
312.00	Boiler Plant Equipment	210,860,524			-3.6%	218,509,090	98,067,408	120,441,682	19.00	5,936,480	2.82%	402,556	0.19%	6,339,036	**3.01%**
314.00	Turbogenerators	79,132,275			-3.6%	82,002,649	45,000,411	37,002,238	19.00	1,796,414	2.27%	151,072	0.19%	1,947,486	**2.46%**
315.00	Accessory Electric Equipment	3,292,957			-3.6%	3,412,403	1,437,858	1,974,545	19.00	97,637	2.97%	6,287	0.19%	103,923	**3.16%**
316.00	Miscellaneous Power Plant Equipment	2,241,379			-3.6%	2,322,681	1,454,695	867,986	19.00	41,404	1.85%	4,279	0.19%	45,683	**2.04%**
	Total	305,518,350			-3.6%	316,590,388	152,043,373	164,547,016	19.00	8,077,630	2.64%	582,739	0.19%	8,660,369	**2.83%**
	Tolk Common Retiring 2055														
310.00	Water Rights TX														
311.00	Structures and Improvements	5,740,159			-25.7%	7,214,191	1,073,240	6,140,951	37.00	126,133	2.20%	39,839	0.69%	165,972	**2.89%**
312.00	Boiler Plant Equipment	481,278			-25.7%	604,867	103,849	501,018	37.00	10,201	2.12%	3,340	0.69%	13,541	**2.81%**
314.00	Turbogenerators	1,937,671			-25.7%	2,435,252	349,407	2,085,844	37.00	42,926	2.22%	13,448	0.69%	56,374	**2.91%**
315.00	Accessory Electric Equipment	22,551			-25.7%	28,342	-1,449	29,791	37.00	649	2.88%	157	0.69%	805	**3.57%**
316.00	Miscellaneous Power Plant Equipment	3,736,234			-25.7%	4,695,673	1,815,202	2,880,471	37.00	51,920	1.39%	25,931	0.69%	77,851	**2.08%**
	Total	11,917,894			-25.7%	14,978,324	3,340,248	11,638,076	37.00	231,828	1.95%	82,714	0.69%	314,543	**2.64%**
	Tolk Unit 1 Retiring 2055														
310.00	Land Rights TX														
311.00	Structures and Improvements	12,374,235			-4.0%	12,870,941	8,050,468	4,820,474	37.00	116,859	0.94%	13,425	0.11%	130,283	**1.05%**
312.00	Boiler Plant Equipment	7,127,683			-4.0%	7,413,791	4,480,124	2,933,668	37.00	71,556	1.00%	7,733	0.11%	79,288	**1.11%**
314.00	Turbogenerators	15,404,390			-4.0%	16,022,729	10,033,774	5,988,954	37.00	145,152	0.94%	16,712	0.11%	161,864	**1.05%**
315.00	Accessory Electric Equipment	12,860,737			-4.0%	13,376,972	7,998,183	5,378,789	37.00	131,420	1.02%	13,952	0.11%	145,373	**1.13%**
316.00	Miscellaneous Power Plant Equipment	199,904			-4.0%	207,929	137,233	70,696	37.00	1,694	0.85%	217	0.11%	1,911	**0.96%**
	Total	47,966,949			-4.0%	49,892,362	30,699,781	19,192,581	37.00	466,680	0.97%	52,038	0.11%	518,718	**1.08%**
	Tolk Unit 2 Retiring 2055														
310.00	Land Rights TX														
311.00	Structures and Improvements	8,645,191			-3.6%	8,958,779	5,587,269	3,371,509	37.00	82,647	0.96%	8,475	0.10%	91,122	**1.05%**
312.00	Boiler Plant Equipment	8,030,975			-3.6%	8,322,284	4,464,781	3,857,503	37.00	96,384	1.20%	7,873	0.10%	104,257	**1.30%**
314.00	Turbogenerators	27,246,395			-3.6%	28,234,707	11,634,961	16,599,746	37.00	421,931	1.55%	26,711	0.10%	448,642	**1.65%**
315.00	Accessory Electric Equipment	8,914,265			-3.6%	9,237,613	4,517,550	4,720,063	37.00	118,830	1.33%	8,739	0.10%	127,569	**1.43%**
316.00	Miscellaneous Power Plant Equipment	1,318,439			-3.6%	1,366,263	828,260	538,003	37.00	13,248	1.00%	1,293	0.10%	14,541	**1.10%**
	Total	54,155,264			-3.6%	56,119,644	27,032,821	29,086,823	37.00	733,039	1.35%	53,091	0.10%	786,130	**1.45%**
	Total Steam Production Plant	1,880,462,991			-11.3%	2,092,916,015	1,005,237,823	1,087,678,192	14.82	51,564,537	2.74%	21,584,624	1.16%	73,375,686	**3.90%**
	OTHER PRODUCTION PLANT														
	Blackhawk														
342.00	Fuel Holders and Accessory Equipment	4,054,689			-15.2%	4,671,395	2,911,103	1,760,292	16.00	71,474	1.76%	38,544	0.95%	110,018	**2.71%**
	Total	4,054,689			-15.2%	4,671,395	2,911,103	1,760,292	16.00	71,474	1.76%	38,544	0.95%	110,018	**2.71%**
	Cunningham														
341.00	Structures and Improvements	588,074			-1.1%	594,828	249,284	345,543	22.00	15,400	2.62%	307	0.05%	15,707	**2.67%**

Depreciation Rate Development

		[1]	[2]		[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]	[12]	[13]
Account		Plant	Iowa Curve		Net	Depreciable	Book	Future	Remaining	Service Life		Net Salvage		Total	
No.	Description	12/31/2018	Type	AL	Salvage	Base	Reserve	Accruals	Life	Accrual	Rate	Accrual	Rate	Accrual	Rate
342.00	Fuel Holders and Accessory Equipment	1,502,692			-1.1%	1,519,950	512,273	1,007,677	22.00	45,019	3.00%	784	0.05%	45,803	**3.05%**
343.00	Prime Movers	50,206,735			-1.1%	50,783,365	17,483,848	33,299,518	22.00	1,487,404	2.96%	26,210	0.05%	1,513,614	**3.01%**
344.00	Generators	13,132,851			-1.1%	13,283,683	1,425,756	11,857,927	22.00	532,141	4.05%	6,856	0.05%	538,997	**4.10%**
345.00	Accessory Electric Equipment	5,919,580			-1.1%	5,987,567	2,823,601	3,163,967	22.00	140,726	2.38%	3,090	0.05%	143,817	**2.43%**
346.00	Miscellaneous Power Plant Equipment	1,140,410			-1.1%	1,153,507	318,571	834,937	22.00	37,356	3.28%	595	0.05%	37,952	**3.33%**
	Total	72,490,341			-1.1%	73,322,901	22,813,333	50,509,568	22.00	2,258,046	3.11%	37,844	0.05%	2,295,889	**3.17%**
	Jones Unit 3														
341.00	Structures and Improvements	4,748,588			-0.5%	4,771,039	880,583	3,890,456	38.00	101,790	2.14%	591	0.01%	102,380	**2.16%**
342.00	Fuel Holders and Accessory Equipment	0			-0.5%	0	0	0	38.00	0	2.63%	0	-0.43%	0	**2.21%**
343.00	Prime Movers	10,724			-0.5%	10,775	89	10,686	38.00	280	2.61%	1	0.01%	281	**2.62%**
344.00	Generators	66,479,720			-0.5%	66,794,041	12,277,896	54,516,145	38.00	1,426,364	2.15%	8,272	0.01%	1,434,635	**2.16%**
345.00	Accessory Electric Equipment	10,399,410			-0.5%	10,448,579	1,936,101	8,512,478	38.00	222,719	2.14%	1,294	0.01%	224,013	**2.15%**
346.00	Miscellaneous Power Plant Equipment	1,591,994			-0.5%	1,599,521	285,540	1,313,981	38.00	34,380	2.16%	198	0.01%	34,578	**2.17%**
	Total	83,230,435			-0.5%	83,623,955	15,380,209	68,243,746	38.00	1,785,532	2.15%	10,356	0.01%	1,795,888	**2.16%**
	Jones Unit 4														
341.00	Structures and Improvements	6,505,115			-0.5%	6,535,715	846,814	5,688,902	40.00	141,458	2.17%	765	0.01%	142,223	**2.19%**
342.00	Fuel Holders and Accessory Equipment	0			-0.5%	0	0	0	40.00	0				0	**2.21%**
343.00	Prime Movers	0			-0.5%	0	0	0	40.00	0				0	**2.21%**
344.00	Generators	65,249,124			-0.5%	65,556,061	8,453,924	57,102,138	40.00	1,419,880	2.18%	7,673	0.01%	1,427,553	**2.19%**
345.00	Accessory Electric Equipment	10,703,795			-0.5%	10,754,147	1,395,820	9,358,327	40.00	232,699	2.17%	1,259	0.01%	233,958	**2.19%**
346.00	Miscellaneous Power Plant Equipment	1,196,889			-0.5%	1,202,520	156,332	1,046,188	40.00	26,014	2.17%	141	0.01%	26,155	**2.19%**
	Total	83,654,923			-0.5%	84,048,443	10,852,889	73,195,554	40.00	1,820,051	2.18%	9,838	0.01%	1,829,889	**2.19%**
	Maddox														
341.00	Structures and Improvements	1,643,938			-4.5%	1,717,176	1,305,155	412,021	7.00	48,398	2.94%	10,463	0.64%	58,860	**3.58%**
342.00	Fuel Holders and Accessory Equipment	512,886			-4.5%	535,736	709,721	-173,985	7.00	-28,119	-5.48%	3,264	0.64%	-24,855	**-4.85%**
343.00	Prime Movers	0			-4.5%	0	0	0	7.00					0	**3.37%**
344.00	Generators	15,428,875			-4.5%	16,116,235	13,135,553	2,980,682	7.00	327,617	2.12%	98,194	0.64%	425,812	**2.76%**
345.00	Accessory Electric Equipment	1,627,920			-4.5%	1,700,444	1,350,535	349,909	7.00	39,626	2.43%	10,361	0.64%	49,987	**3.07%**
346.00	Miscellaneous Power Plant Equipment	169,443			-4.5%	176,992	132,770	44,222	7.00	5,239	3.09%	1,078	0.64%	6,317	**3.73%**
	Total	19,383,062			-4.5%	20,246,582	16,633,733	3,612,849	7.00	392,761	2.03%	123,360	0.64%	516,121	**2.66%**
	Quay County														
341.00	Structures and Improvements	916,182			-1.6%	930,549	338,364	592,185	16.00	36,114	3.94%	898	0.10%	37,012	**4.04%**
342.00	Fuel Holders and Accessory Equipment	1,575			-1.6%	1,600	78,784	-77,184	16.00	-4,826	#########	2	0.10%	-4,824	**#########**
343.00	Prime Movers	4,620,155			-1.6%	4,692,604	4,327,875	364,730	16.00	18,268	0.40%	4,528	0.10%	22,796	**0.49%**
344.00	Generators	17,151,429			-1.6%	17,420,382	5,126,661	12,293,720	16.00	751,548	4.38%	16,810	0.10%	768,358	**4.48%**
345.00	Accessory Electric Equipment	3,065,104			-1.6%	3,113,168	1,308,641	1,804,527	16.00	109,779	3.58%	3,004	0.10%	112,783	**3.68%**
346.00	Miscellaneous Power Plant Equipment	646,793			-1.6%	656,936	249,993	406,943	16.00	24,800	3.83%	634	0.10%	25,434	**3.93%**
	Total	26,401,239			-1.6%	26,815,239	11,430,319	15,384,920	16.00	935,682	3.54%	25,875	0.10%	961,557	**3.64%**
	Riverview														
340.00	Land and Water Rights	676			0.0%	676	625	50						0	**0.00%**
	Total	676			0.0%	676	625	50		0	0.00%	0	0.00%	0	**0.00%**
	Total Other Production Plant	289,215,365			-1.2%	292,729,191	80,022,211	212,706,980	28.33	7,263,547	2.51%	245,817	0.08%	7,509,363	**2.60%**
	Total Production Plant	**2,169,678,356**			**-10.0%**	**2,385,645,206**	**1,085,260,034**	**1,300,385,172**	**16.08**	**58,828,084**	**2.71%**	**21,830,441**	**1.02%**	**80,885,050**	**3.73%**
	TRANSMISSION PLANT														
350.20	Land Rights	151,888,969	R4	80	0.0%	151,888,969	16,344,596	135,544,374	71.78	1,888,262	1.24%	0	0.00%	1,888,262	**1.24%**
352.00	Structures & Improvements	101,632,641	R3	70	-20.0%	121,959,169	20,983,647	100,975,522	59.50	1,355,445	1.33%	341,622	0.34%	1,697,068	**1.67%**
353.00	Station Equipment	1,108,171,071	R1.5	53	-20.0%	1,329,805,286	155,108,665	1,174,696,621	46.09	20,679,840	1.87%	4,809,087	0.43%	25,488,927	**2.30%**
354.00	Towers & Fixtures	8,177,682	R4	75	-5.0%	8,586,566	2,763,359	5,823,206	48.95	110,612	1.35%	8,353	0.10%	118,966	**1.45%**
355.00	Poles & Fixtures	1,160,752,855	L1.5	63	-45.0%	1,683,091,640	208,057,179	1,475,034,461	55.99	17,015,461	1.47%	9,329,144	0.80%	26,344,605	**2.27%**
356.00	Overhead Conductors & Devices	446,002,528	R2	50	-40.0%	624,403,539	104,071,223	520,332,316	40.98	8,343,794	1.87%	4,353,334	0.98%	12,697,128	**2.85%**

Depreciation Rate Development

		[1]	[2]		[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]	[12]	[13]
			Iowa Curve							Service Life		Net Salvage		Total	
Account No.	Description	Plant 12/31/2018	Type	AL	Net Salvage	Depreciable Base	Book Reserve	Future Accruals	Remaining Life	Accrual	Rate	Accrual	Rate	Accrual	Rate
357.00	Underground Conduit	272,859	R3	75	0.0%	272,859	199,871	72,988	33.50	2,178	0.80%	0	0.00%	2,178	**0.80%**
358.00	Underground Conductor & Devices	489,717	R3	45	0.0%	489,717	389,982	99,735	19.14	5,211	1.06%	0	0.00%	5,211	**1.06%**
359.00	Roads and Trails	517,736	R4	65	0.0%	517,736	15,561	502,175	61.50	8,165	1.58%	0	0.00%	8,165	**1.58%**
	Total Transmission Plant	**2,977,906,058**			**-31.7%**	**3,921,015,481**	**507,934,083**	**3,413,081,398**	**50.01**	**49,408,968**	**1.66%**	**18,841,541**	**0.63%**	**68,250,509**	**2.29%**
	DISTRIBUTION PLANT - TEXAS														
360.20	Land Rights	2,745,173	R4	70	0.0%	2,745,173	546,822	2,198,351	56.59	38,846	1.42%	0	0.00%	38,846	**1.42%**
361.00	Structures & Improvements	14,411,029	R1.5	70	-10.0%	15,852,132	2,193,621	13,658,510	61.62	198,284	1.38%	23,389	0.16%	221,673	**1.54%**
362.00	Station Equipment	170,237,439	R1	61	-25.0%	212,796,799	38,762,521	174,034,278	51.14	2,570,882	1.51%	832,213	0.49%	3,403,095	**2.00%**
364.00	Poles, Towers & Fixtures	200,626,063	R0.5	56	-60.0%	321,001,701	53,850,345	267,151,356	46.60	3,149,694	1.57%	2,583,168	1.29%	5,732,862	**2.86%**
365.00	Overhead Conductors & Devices	169,511,992	R0.5	47	-50.0%	254,267,989	47,120,957	207,147,031	38.50	3,178,699	1.88%	2,201,255	1.30%	5,379,954	**3.17%**
366.00	Underground Conduit	19,054,496	R2.5	68	-20.0%	22,865,395	7,660,346	15,205,049	47.79	238,399	1.25%	79,735	0.42%	318,134	**1.67%**
367.00	Underground Conductor & Devices	34,104,914	R0.5	61	-30.0%	44,336,388	9,558,669	34,777,718	51.98	472,225	1.38%	196,835	0.58%	669,060	**1.96%**
368.00	Line Transformers	148,560,954	L0	55	-10.0%	163,417,050	52,900,067	110,516,983	46.29	2,066,556	1.39%	320,935	0.22%	2,387,492	**1.61%**
369.00	Services	60,121,851	R0.5	60	-40.0%	84,170,592	25,139,702	59,030,890	48.89	715,528	1.19%	491,895	0.82%	1,207,423	**2.01%**
370.00	Meters	41,048,433	R2	30	-10.0%	45,153,276	17,330,044	27,823,232	17.20	1,378,991	3.36%	238,656	0.58%	1,617,647	**3.94%**
371.00	Installations on Customers' Premises	0	R0.5	26	-15.0%	0	139,266	-139,266	26.00					0	**4.42%**
373.00	Street Lighting & Signal Systems	17,507,832	R2	39	-55.0%	27,137,140	4,671,781	22,465,359	26.21	489,654	2.80%	367,327	2.10%	856,982	**4.89%**
	Total Distribution Plant	**877,930,177**			**-36.0%**	**1,193,743,634**	**259,874,143**	**933,869,491**	**42.77**	**14,497,758**	**1.65%**	**7,335,408**	**0.84%**	**21,833,167**	**2.49%**
	GENERAL PLANT														
	Depreciated														
389.20	Land Rights	45,967	R4	60	0.0%	45,967	16,964	29,003	35.85	809	1.76%	0	0.00%	809	**1.76%**
390.00	Structures & Improvements	68,728,412	L0.5	57	-10.0%	75,601,253	16,549,137	59,052,117	45.52	1,146,293	1.67%	150,985	0.22%	1,297,278	**1.89%**
390.70	Structures & Improvements - Leasehold	4,232,845				4,232,845	866,064	3,366,781						0	**0.00%**
	Total	73,007,224			-9.4%	79,880,066	17,432,165	62,447,901	48.11	1,147,102	1.57%	150,985	0.21%	1,298,088	**1.78%**
	Amortized														
391.00	Office Furniture & Equipment	15,816,085	SQ	20	0.0%	15,816,085	4,673,711	11,142,374	20.00					790,804	**5.00%**
391.00	Computer Equipment	62,858,242	SQ	5	0.0%	62,858,242	36,630,103	26,228,139	5.00					12,571,648	**20.00%**
392.01	Transportation Equipment - Autos	3,199,963	SQ	10	10.0%	2,879,966	774,015	2,105,952	10.00					287,997	**9.00%**
392.02	Transportation Equipment - Light Trucks	34,619,349	SQ	10	12.0%	30,465,027	23,131,727	7,333,300	10.00					3,046,503	**8.80%**
392.03	Transportation Equipment - Trailers	7,549,445	SQ	15	11.0%	6,719,006	2,643,128	4,075,878	15.00					447,934	**5.93%**
392.04	Transportation Equipment - Heavy Trucks	42,554,006	SQ	12	11.0%	37,873,065	28,357,693	9,515,372	12.00					3,156,089	**7.42%**
393.00	Stores Equipment	363,950	SQ	35	0.0%	363,950	291,965	71,985	35.00					10,399	**2.86%**
394.00	Tools, Shop & Garage Equipment	43,989,343	SQ	35	0.0%	43,989,343	7,899,775	36,089,568	35.00					1,256,838	**2.86%**
395.00	Laboratory Equipment	6,962,017	SQ	25	0.0%	6,962,017	8,389,052	-1,427,034	25.00					278,481	**4.00%**
396.00	Power Operated Equipment	12,874,069	SQ	15	25.0%	9,655,551	5,337,122	4,318,430	15.00					643,703	**5.00%**
397.00	Communication Equipment	82,297,656	SQ	15	0.0%	82,297,656	59,716,518	22,581,138	15.00					5,486,510	**6.67%**
398.00	Miscellaneous Equipment	2,285,630	SQ	24	0.0%	2,285,630	1,749,793	535,837	24.00					95,235	**4.17%**
	Total	315,369,755			4.2%	302,165,540	179,594,602	122,570,938	4.37					28,072,141	**8.90%**
	Reserve Deficiency over 10 years for AR 15 Assets													1,534,250	
	Total General Plant	**388,376,979**			**1.6%**	**382,045,606**	**197,026,767**	**185,018,839**	**5.99**	**1,147,102**	**0.30%**	**150,985**	**7.66%**	**30,904,478**	**7.96%**
	INTANGIBLE PLANT														
303.00	Software - 3 Year	2,014,163	SQ	3	0.0%	2,014,163	852,667	1,161,496						671,388	**33.33%**
303.00	Software - 5 Year	100,980,651	SQ	5	0.0%	100,980,651	79,476,505	21,504,147						20,196,130	**20.00%**
303.00	Software - 7 Year	0	SQ	7	0.0%	0	0	0						0	**14.29%**
303.00	Software - 10 Year	7,689,422	SQ	10	0.0%	7,689,422	16,078,911	-8,389,489						768,942	**10.00%**
303.00	Software - 15 Year	70,623,927	SQ	15	0.0%	70,623,927	8,215,128	62,408,799						4,708,285	**6.67%**
	Total Intangible Plant	**181,308,163**			**0.0%**	**181,308,163**	**104,623,210**	**76,684,953**	**2.91**	**0**	**0.00%**	**0**	**14.53%**	**26,344,745**	**14.53%**
	TOTAL PLANT STUDIED	**$ 6,595,199,734**			**-22.3%**	**$ 8,063,758,090**	**$ 2,154,718,237**	**$ 5,909,039,853**	**25.89**	**$ 123,881,913**	**1.88%**	**$ 48,158,375**	**1.58%**	**$ 228,217,949**	**3.46%**

Depreciation Rate Development

		[1]	[2]		[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]	[12]	[13]
			Iowa Curve							Service Life		Net Salvage		Total	
Account No.	Description	Plant 12/31/2018	Type	AL	Net Salvage	Depreciable Base	Book Reserve	Future Accruals	Remaining Life	Accrual	Rate	Accrual	Rate	Accrual	Rate

[1] From depreciation study
[2] Average life and Iowa curve shape developed through statistical analysis and professional judgment
[3] Mass net salvage rates developed through statistical analysis and professional judgment; terminal net salvage rates for production units are from Exhibit DJG-6
[4] = [1]*(1-[3])
[5] From depreciation study
[6] = [4] - [5]
[7] Composite remaining life based on Iowa cuve in [2]; see remaining life exhibit for detailed calculations
[8] = ([1] - [5]) / [7]
[9] = [8] / [1]
[10] = [12] - [8]
[11] = [13] - [9]
[12] = [6] / [7]
[13] = [12] / [1]

SOAH DOCKET NO. 473-19-6677
PUC DOCKET NO. 49831

APPLICATION OF SOUTHWESTERN	§	BEFORE THE STATE OFFICE
PUBLIC SERVICE COMPANY FOR	§	OF
AUTHORITY TO CHANGE RATES	§	ADMINISTRATIVE HEARINGS

DIRECT TESTIMONY AND EXHIBITS
OF
DAVID J. GARRETT

EXHIBIT DJG-6

TERMINAL NET SALVAGE ADJUSTMENT

Terminal Net Salvage

[1] Production Units	[2] Plant Balance 12/31/2018	[3] Terminal Net Salvage Est.	[4] Contingency Cost	[5] Adjusted Net Salvage	[6] Adjusted Net Salvage Rate
Steam Production Plant					
Cunningham Common	$ 17,065,682	$ 5,617,400	$ 1,123,480	$ 4,493,920	-26.3%
Cunningham Unit 1	17,979,731	4,424,200	884,840	3,539,360	-19.7%
Cunningham Unit 2	37,133,808	6,253,000	1,250,600	5,002,400	-13.5%
Harrington Common	49,286,121	29,047,400	5,809,480	23,237,920	-47.1%
Harrington Unit 1	164,739,735	8,809,700	1,761,940	7,047,760	-4.3%
Harrington Unit 2	175,054,007	8,614,900	1,722,980	6,891,920	-3.9%
Harrington Unit 3	191,846,002	7,968,000	1,593,600	6,374,400	-3.3%
Jones Common	35,324,709	7,903,200	1,580,640	6,322,560	-17.9%
Jones Unit 1	54,532,923	9,558,800	1,911,760	7,647,040	-14.0%
Jones Unit 2	42,889,815	9,848,200	1,969,640	7,878,560	-18.4%
Maddox	45,606,237	8,502,200	1,700,440	6,801,760	-14.9%
Nichols Common	71,430,109	14,364,400	2,872,880	11,491,520	-16.1%
Nichols Unit 1	25,109,140	4,118,900	823,780	3,295,120	-13.1%
Nichols Unit 2	26,428,846	4,101,400	820,280	3,281,120	-12.4%
Nichols Unit 3	44,396,201	6,276,600	1,255,320	5,021,280	-11.3%
Plant X Common	18,981,499	12,470,800	2,494,160	9,976,640	-52.6%
Plant X Unit 1	12,959,727	1,891,800	378,360	1,513,440	-11.7%
Plant X Unit 2	24,665,049	3,299,700	659,940	2,639,760	-10.7%
Plant X Unit 3	18,953,919	3,280,200	656,040	2,624,160	-13.8%
Plant X Unit 4	35,627,522	4,140,200	828,040	3,312,160	-9.3%
Tolk Common	73,820,616	80,894,762	16,178,952	64,715,810	-87.7%
Tolk Unit 1	277,054,265	13,901,335	2,780,267	11,121,068	-4.0%
Tolk Unit 2	305,518,350	13,852,625	2,770,525	11,082,100	-3.6%
Tolk Common Retiring 2055	11,917,894	3,825,538	765,108	3,060,430	-25.7%
Tolk Unit 1 Retiring 2055	47,966,949	2,406,765	481,353	1,925,412	-4.0%
Tolk Unit 2 Retiring 2055	54,155,264	2,455,475	491,095	1,964,380	-3.6%
Other Production Plant					
Cunningham	72,490,341	1,040,700	208,140	832,560	-1.1%
Jones Unit 3	83,230,435	491,900	98,380	393,520	-0.5%
Jones Unit 4	83,654,923	491,900	98,380	393,520	-0.5%
Maddox	19,383,062	1,079,400	215,880	863,520	-4.5%
Quay County	26,401,239	517,500	103,500	414,000	-1.6%

[1], [2], [3] From depreciation study
[4] = [3]*0.2
[5] = [3] - [4]
[6] = [5] / [2] * -1

SOAH DOCKET NO. 473-19-6677
PUC DOCKET NO. 49831

APPLICATION OF SOUTHWESTERN PUBLIC SERVICE COMPANY FOR AUTHORITY TO CHANGE RATES	**§ § §**	**BEFORE THE STATE OFFICE OF ADMINISTRATIVE HEARINGS**

DIRECT TESTIMONY AND EXHIBITS OF DAVID J. GARRETT

EXHIBIT DJG-7

IOWA CURVE FITTING – ACCOUNT 352

Account 352 Curve Fitting

[1] Age (Years)	[2] Exposures (Dollars)	[3] Observed Life Table (OLT)	[4] SPS R4-65	[5] AXM R3-70	[6] SPS SSD	[7] AXM SSD
0.0	77,873,407	100.00%	100.00%	100.00%	0.0000	0.0000
0.5	54,492,421	99.99%	100.00%	99.99%	0.0000	0.0000
1.5	54,419,109	99.98%	100.00%	99.97%	0.0000	0.0000
2.5	40,902,741	99.98%	100.00%	99.94%	0.0000	0.0000
3.5	33,046,196	99.98%	99.99%	99.91%	0.0000	0.0000
4.5	24,043,089	99.93%	99.99%	99.87%	0.0000	0.0000
5.5	19,859,113	99.91%	99.99%	99.84%	0.0000	0.0000
6.5	17,216,736	99.81%	99.98%	99.79%	0.0000	0.0000
7.5	16,849,507	99.81%	99.98%	99.75%	0.0000	0.0000
8.5	16,758,701	99.25%	99.97%	99.70%	0.0001	0.0000
9.5	13,989,361	99.25%	99.96%	99.64%	0.0001	0.0000
10.5	24,134,788	99.11%	99.95%	99.57%	0.0001	0.0000
11.5	24,503,456	99.11%	99.94%	99.50%	0.0001	0.0000
12.5	24,160,622	98.87%	99.93%	99.43%	0.0001	0.0000
13.5	24,773,633	98.80%	99.91%	99.34%	0.0001	0.0000
14.5	24,400,408	98.65%	99.89%	99.25%	0.0002	0.0000
15.5	24,526,457	98.65%	99.87%	99.15%	0.0001	0.0000
16.5	25,115,496	98.64%	99.84%	99.04%	0.0001	0.0000
17.5	23,319,799	98.64%	99.81%	98.92%	0.0001	0.0000
18.5	23,203,142	98.39%	99.77%	98.79%	0.0002	0.0000
19.5	23,047,298	98.37%	99.73%	98.65%	0.0002	0.0000
20.5	21,505,841	98.36%	99.68%	98.49%	0.0002	0.0000
21.5	20,479,766	98.17%	99.62%	98.33%	0.0002	0.0000
22.5	20,149,260	97.94%	99.55%	98.15%	0.0003	0.0000
23.5	20,641,409	97.90%	99.47%	97.96%	0.0002	0.0000
24.5	20,392,517	97.71%	99.38%	97.75%	0.0003	0.0000
25.5	20,166,856	97.70%	99.28%	97.53%	0.0002	0.0000
26.5	7,113,550	97.62%	99.16%	97.29%	0.0002	0.0000
27.5	6,827,431	97.39%	99.03%	97.03%	0.0003	0.0000
28.5	6,289,536	97.22%	98.87%	96.75%	0.0003	0.0000
29.5	5,176,356	97.17%	98.70%	96.46%	0.0002	0.0001
30.5	5,118,738	97.12%	98.51%	96.15%	0.0002	0.0001
31.5	5,014,518	97.02%	98.29%	95.81%	0.0002	0.0001
32.5	4,217,556	94.51%	98.04%	95.46%	0.0012	0.0001
33.5	3,826,414	94.42%	97.76%	95.08%	0.0011	0.0000
34.5	3,573,305	94.28%	97.46%	94.67%	0.0010	0.0000
35.5	3,221,058	94.23%	97.11%	94.25%	0.0008	0.0000
36.5	2,951,281	93.97%	96.73%	93.80%	0.0008	0.0000
37.5	3,112,967	93.38%	96.31%	93.32%	0.0009	0.0000
38.5	3,043,392	93.27%	95.84%	92.81%	0.0007	0.0000
39.5	2,046,195	93.25%	95.33%	92.27%	0.0004	0.0001
40.5	1,943,144	92.90%	94.77%	91.71%	0.0003	0.0001
41.5	1,344,323	92.34%	94.15%	91.11%	0.0003	0.0002
42.5	1,231,257	92.11%	93.47%	90.48%	0.0002	0.0003
43.5	1,169,445	91.90%	92.74%	89.81%	0.0001	0.0004
44.5	1,585,393	90.74%	91.94%	89.11%	0.0001	0.0003
45.5	1,556,388	90.61%	91.07%	88.38%	0.0000	0.0005
46.5	1,406,676	90.57%	90.13%	87.60%	0.0000	0.0009
47.5	1,397,848	90.50%	89.13%	86.79%	0.0002	0.0014
48.5	1,422,005	90.38%	88.04%	85.93%	0.0005	0.0020
49.5	1,361,047	90.30%	86.87%	85.03%	0.0012	0.0028
50.5	1,382,567	90.05%	85.63%	84.09%	0.0020	0.0035
51.5	1,362,780	90.00%	84.30%	83.10%	0.0033	0.0048
52.5	1,291,147	89.28%	82.88%	82.07%	0.0041	0.0052
53.5	1,098,725	88.73%	81.38%	80.97%	0.0054	0.0060
54.5	1,011,388	88.72%	79.80%	79.84%	0.0080	0.0079
55.5	995,774	88.72%	78.12%	78.64%	0.0112	0.0102
56.5	955,171	88.69%	76.34%	77.39%	0.0152	0.0128

Account 352 Curve Fitting

[1] Age (Years)	[2] Exposures (Dollars)	[3] Observed Life Table (OLT)	[4] SPS R4-65	[5] AXM R3-70	[6] SPS SSD	[7] AXM SSD
57.5	875,146	88.65%	74.44%	76.09%	0.0202	0.0158
58.5	861,724	88.35%	72.42%	74.72%	0.0254	0.0186
59.5	854,270	88.21%	70.23%	73.30%	0.0323	0.0222
60.5	370,050	88.21%	67.90%	71.82%	0.0412	0.0269
61.5	336,731	87.64%	65.39%	70.27%	0.0495	0.0302
62.5	322,950	87.62%	62.73%	68.67%	0.0620	0.0359
63.5	272,994	87.62%	59.89%	67.00%	0.0769	0.0425
64.5	210,809	87.58%	56.91%	65.27%	0.0940	0.0498
65.5	190,158	85.38%	53.80%	63.48%	0.0997	0.0480
66.5	159,659	85.00%	50.59%	61.63%	0.1184	0.0546
67.5	99,269	83.12%	47.29%	59.73%	0.1284	0.0547
68.5	35,847	78.90%	43.95%	57.77%	0.1222	0.0446
69.5	34,469	75.86%	40.60%	55.76%	0.1244	0.0404
70.5	34,469	75.86%	37.26%	53.71%	0.1490	0.0491
71.5	13,732	75.83%	33.97%	51.61%	0.1752	0.0587
72.5	7,908	75.83%	30.78%	49.48%	0.2030	0.0694
73.5	7,888	75.83%	27.68%	47.32%	0.2318	0.0813
74.5	7,566	75.83%	24.73%	45.13%	0.2611	0.0942
75.5	5,816	75.83%	21.92%	42.93%	0.2906	0.1082
76.5	5,816	75.83%	19.29%	40.72%	0.3197	0.1233
77.5	5,816	75.83%	16.83%	38.51%	0.3481	0.1392
78.5	5,816	75.83%	14.55%	36.32%	0.3755	0.1561
79.5	5,816	75.83%	12.47%	34.14%	0.4014	0.1738
80.5	5,816	75.83%	10.58%	31.98%	0.4258	0.1923
81.5	5,407	75.83%	8.87%	29.87%	0.4483	0.2113
82.5	5,407	75.83%	7.34%	27.79%	0.4691	0.2308
83.5	5,407	75.83%	6.00%	25.77%	0.4877	0.2506
84.5	5,407	75.83%	4.81%	23.81%	0.5044	0.2706
85.5	4,985	69.92%	3.79%	21.92%	0.4373	0.2304
86.5	4,985	69.92%	2.92%	20.10%	0.4489	0.2482
87.5	150	69.92%	2.19%	18.35%	0.4587	0.2659
88.5	150	69.92%	1.59%	16.70%	0.4668	0.2833
89.5	0	69.92%	1.12%	15.12%	0.4733	0.3003
90.5			0.75%	13.64%		
Sum of Squared Differences				[8]	8.4337	4.0811
Up to 1% of Beginning Exposures				[9]	0.1412	0.1165

[1] Age in years using half-year convention
[2] Dollars exposed to retirement at the beginning of each age interval
[3] Observed life table based on the Company's property records. These numbers form the original survivor curve.
[4] The Company's selected Iowa curve to be fitted to the OLT.
[5] My selected Iowa curve to be fitted to the OLT.
[6] = ([4] - [3])^2. This is the squared difference between each point on the Company's curve and the observed survivor curve.
[7] = ([5] - [3])^2. This is the squared difference between each point on my curve and the observed survivor curve.
[8] = Sum of squared differences. The smallest SSD represents the best mathematical fit.

SOAH DOCKET NO. 473-19-6677
PUC DOCKET NO. 49831

APPLICATION OF SOUTHWESTERN	§	BEFORE THE STATE OFFICE
PUBLIC SERVICE COMPANY FOR	§	OF
AUTHORITY TO CHANGE RATES	§	ADMINISTRATIVE HEARINGS

**DIRECT TESTIMONY AND EXHIBITS
OF
DAVID J. GARRETT**

EXHIBIT DJG-8

IOWA CURVE FITTING – ACCOUNT 355

Account 355 Curve Fitting

[1] Age (Years)	[2] Exposures (Dollars)	[3] Observed Life Table (OLT)	[4] SPS R2.5-51	[5] AXM L1.5-63	[6] SPS SSD	[7] AXM SSD
0.0	1,168,742,554	100.00%	100.00%	100.00%	0.0000	0.0000
0.5	1,034,360,803	99.95%	99.95%	99.98%	0.0000	0.0000
1.5	979,503,615	99.85%	99.83%	99.92%	0.0000	0.0000
2.5	917,856,690	99.57%	99.71%	99.86%	0.0000	0.0000
3.5	778,044,811	99.39%	99.57%	99.78%	0.0000	0.0000
4.5	516,137,560	99.20%	99.43%	99.69%	0.0000	0.0000
5.5	456,544,623	98.92%	99.27%	99.58%	0.0000	0.0000
6.5	381,491,716	98.67%	99.10%	99.44%	0.0000	0.0001
7.5	326,228,905	98.36%	98.91%	99.29%	0.0000	0.0001
8.5	303,703,756	98.21%	98.71%	99.11%	0.0000	0.0001
9.5	264,740,228	98.01%	98.50%	98.91%	0.0000	0.0001
10.5	250,678,377	97.70%	98.26%	98.68%	0.0000	0.0001
11.5	244,942,034	97.45%	98.01%	98.42%	0.0000	0.0001
12.5	231,712,004	97.24%	97.74%	98.13%	0.0000	0.0001
13.5	222,086,079	96.93%	97.45%	97.81%	0.0000	0.0001
14.5	207,698,812	96.82%	97.14%	97.46%	0.0000	0.0000
15.5	202,225,512	96.25%	96.80%	97.07%	0.0000	0.0001
16.5	182,681,203	96.06%	96.44%	96.66%	0.0000	0.0000
17.5	164,905,991	95.77%	96.05%	96.21%	0.0000	0.0000
18.5	159,022,273	95.32%	95.64%	95.72%	0.0000	0.0000
19.5	152,031,769	94.88%	95.19%	95.20%	0.0000	0.0000
20.5	147,122,795	94.31%	94.71%	94.65%	0.0000	0.0000
21.5	137,046,337	94.03%	94.20%	94.06%	0.0000	0.0000
22.5	125,054,418	93.57%	93.66%	93.44%	0.0000	0.0000
23.5	126,672,165	93.17%	93.08%	92.78%	0.0000	0.0000
24.5	102,363,205	92.73%	92.46%	92.07%	0.0000	0.0000
25.5	83,462,304	92.24%	91.80%	91.32%	0.0000	0.0001
26.5	61,562,023	91.75%	91.09%	90.53%	0.0000	0.0001
27.5	44,354,639	90.51%	90.35%	89.70%	0.0000	0.0001
28.5	35,976,991	89.43%	89.55%	88.81%	0.0000	0.0000
29.5	27,006,682	88.06%	88.71%	87.89%	0.0000	0.0000
30.5	22,105,406	86.71%	87.81%	86.91%	0.0001	0.0000
31.5	21,231,490	84.72%	86.87%	85.90%	0.0005	0.0001
32.5	18,312,512	83.58%	85.86%	84.83%	0.0005	0.0002
33.5	11,034,831	82.33%	84.80%	83.73%	0.0006	0.0002
34.5	8,923,717	80.55%	83.68%	82.59%	0.0010	0.0004
35.5	6,905,880	75.33%	82.49%	81.42%	0.0051	0.0037
36.5	5,801,689	74.22%	81.24%	80.21%	0.0049	0.0036
37.5	5,343,833	72.45%	79.92%	78.97%	0.0056	0.0042
38.5	4,401,413	70.72%	78.53%	77.70%	0.0061	0.0049
39.5	3,361,936	68.60%	77.06%	76.41%	0.0072	0.0061
40.5	3,041,354	66.14%	75.52%	75.10%	0.0088	0.0080
41.5	2,629,988	63.86%	73.90%	73.77%	0.0101	0.0098
42.5	2,350,563	59.44%	72.19%	72.43%	0.0163	0.0169
43.5	1,322,621	56.88%	70.40%	71.07%	0.0183	0.0201
44.5	1,185,411	52.13%	68.53%	69.70%	0.0269	0.0309
45.5	1,006,224	47.79%	66.58%	68.32%	0.0353	0.0422
46.5	526,053	42.82%	64.54%	66.94%	0.0472	0.0582

Account 355 Curve Fitting

[1] Age (Years)	[2] Exposures (Dollars)	[3] Observed Life Table (OLT)	[4] SPS R2.5-51	[5] AXM L1.5-63	[6] SPS SSD	[7] AXM SSD
47.5	475,812	40.01%	62.41%	65.55%	0.0502	0.0652
48.5	340,194	31.52%	60.21%	64.16%	0.0823	0.1065
49.5	271,157	29.11%	57.93%	62.77%	0.0831	0.1133
50.5	138,946	16.47%	55.58%	61.39%	0.1530	0.2018
51.5	108,969	14.36%	53.17%	60.01%	0.1506	0.2084
52.5	75,037	10.31%	50.70%	58.63%	0.1631	0.2335
53.5	51,724	8.52%	48.18%	57.27%	0.1573	0.2376
54.5	39,678	7.09%	45.63%	55.91%	0.1485	0.2384
55.5	34,202	6.63%	43.06%	54.57%	0.1327	0.2298
56.5	14,958	3.66%	40.47%	53.24%	0.1355	0.2458
57.5	12,864	3.14%	37.90%	51.92%	0.1208	0.2379
58.5	11,353	2.84%	35.34%	50.62%	0.1056	0.2282
59.5	9,098	2.27%	32.82%	49.33%	0.0933	0.2215
60.5	7,596	1.90%	30.34%	48.06%	0.0809	0.2131
61.5	7,240	1.81%	27.93%	46.81%	0.0682	0.2025
62.5	6,842	1.71%	25.60%	45.57%	0.0571	0.1924
63.5	2,849	1.51%	23.36%	44.36%	0.0477	0.1836
64.5	2,424	1.28%	21.21%	43.16%	0.0397	0.1754
65.5	1,070	1.15%	19.17%	41.98%	0.0325	0.1667
66.5	1,070	1.15%	17.25%	40.82%	0.0259	0.1574
67.5	668	0.86%	15.44%	39.68%	0.0213	0.1507
68.5	477	0.61%	13.76%	38.56%	0.0173	0.1440
69.5	112	0.14%	12.19%	37.46%	0.0145	0.1393
70.5	0	0.00%	10.74%	36.38%	0.0115	0.1324
71.5			9.41%	35.32%		

Sum of Squared Differences	[8]	2.1876	4.6361
Up to 1% of Beginning Exposures	[9]	0.0016	0.0016

[1] Age in years using half-year convention
[2] Dollars exposed to retirement at the beginning of each age interval
[3] Observed life table based on the Company's property records. These numbers form the original survivor curve.
[4] The Company's selected Iowa curve to be fitted to the OLT.
[5] My selected Iowa curve to be fitted to the OLT.
[6] = ([4] - [3])^2. This is the squared difference between each point on the Company's curve and the observed survivor curve.
[7] = ([5] - [3])^2. This is the squared difference between each point on my curve and the observed survivor curve.
[8] = Sum of squared differences. The smallest SSD represents the best mathematical fit.

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APPLICATION OF SOUTHWESTERN	§	BEFORE THE STATE OFFICE
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DIRECT TESTIMONY AND EXHIBITS
OF
DAVID J. GARRETT

EXHIBIT DJG-9

IOWA CURVE FITTING – ACCOUNT 362

Account 362 Curve Fitting

[1] Age (Years)	[2] Exposures (Dollars)	[3] Observed Life Table (OLT)	[4] SPS R1.5-55	[5] AXM R1-61	[6] SPS SSD	[7] AXM SSD
0.0	304,042,882	100.00%	100.00%	100.00%	0.0000	0.0000
0.5	280,477,245	99.99%	99.84%	99.79%	0.0000	0.0000
1.5	254,144,010	99.82%	99.51%	99.36%	0.0000	0.0000
2.5	232,906,248	99.70%	99.17%	98.92%	0.0000	0.0001
3.5	194,258,842	99.55%	98.82%	98.47%	0.0001	0.0001
4.5	179,424,716	99.32%	98.45%	98.01%	0.0001	0.0002
5.5	166,308,690	98.96%	98.07%	97.54%	0.0001	0.0002
6.5	159,086,790	98.32%	97.68%	97.06%	0.0000	0.0002
7.5	141,068,443	97.70%	97.28%	96.57%	0.0000	0.0001
8.5	129,395,264	97.42%	96.86%	96.08%	0.0000	0.0002
9.5	122,865,331	96.28%	96.43%	95.57%	0.0000	0.0001
10.5	117,559,647	96.04%	95.99%	95.05%	0.0000	0.0001
11.5	112,990,546	95.81%	95.53%	94.52%	0.0000	0.0002
12.5	109,368,262	95.56%	95.06%	93.99%	0.0000	0.0002
13.5	102,604,116	95.19%	94.57%	93.44%	0.0000	0.0003
14.5	101,055,694	94.85%	94.06%	92.89%	0.0001	0.0004
15.5	99,385,994	94.47%	93.55%	92.32%	0.0001	0.0005
16.5	98,188,666	94.03%	93.01%	91.75%	0.0001	0.0005
17.5	96,063,725	93.66%	92.46%	91.17%	0.0001	0.0006
18.5	92,845,590	93.00%	91.89%	90.57%	0.0001	0.0006
19.5	87,955,195	92.39%	91.30%	89.97%	0.0001	0.0006
20.5	82,563,260	91.73%	90.70%	89.36%	0.0001	0.0006
21.5	76,331,409	91.06%	90.08%	88.74%	0.0001	0.0005
22.5	75,476,897	90.43%	89.43%	88.11%	0.0001	0.0005
23.5	73,479,785	89.72%	88.77%	87.47%	0.0001	0.0005
24.5	66,959,117	89.50%	88.08%	86.82%	0.0002	0.0007
25.5	62,232,720	88.46%	87.38%	86.16%	0.0001	0.0005
26.5	59,271,326	87.99%	86.65%	85.48%	0.0002	0.0006
27.5	57,893,624	87.45%	85.90%	84.80%	0.0002	0.0007
28.5	55,925,200	87.10%	85.12%	84.10%	0.0004	0.0009
29.5	53,026,786	86.19%	84.31%	83.39%	0.0004	0.0008
30.5	51,037,358	85.46%	83.48%	82.67%	0.0004	0.0008
31.5	49,698,519	85.09%	82.63%	81.93%	0.0006	0.0010
32.5	48,961,424	84.13%	81.74%	81.18%	0.0006	0.0009
33.5	45,885,986	83.68%	80.83%	80.41%	0.0008	0.0011
34.5	42,789,345	83.13%	79.89%	79.63%	0.0011	0.0012
35.5	37,298,756	81.47%	78.92%	78.83%	0.0007	0.0007
36.5	35,856,776	80.92%	77.91%	78.02%	0.0009	0.0008
37.5	35,080,759	80.05%	76.88%	77.19%	0.0010	0.0008
38.5	32,145,603	79.42%	75.81%	76.35%	0.0013	0.0009
39.5	30,846,301	78.70%	74.71%	75.49%	0.0016	0.0010
40.5	28,066,665	77.68%	73.58%	74.61%	0.0017	0.0009
41.5	26,121,890	75.82%	72.42%	73.71%	0.0012	0.0004
42.5	23,246,791	74.64%	71.22%	72.80%	0.0012	0.0003
43.5	21,362,389	73.18%	69.98%	71.87%	0.0010	0.0002
44.5	20,263,535	72.15%	68.72%	70.92%	0.0012	0.0002
45.5	18,575,338	70.32%	67.41%	69.96%	0.0008	0.0000
46.5	17,170,817	68.34%	66.08%	68.98%	0.0005	0.0000
47.5	16,469,259	67.53%	64.71%	67.98%	0.0008	0.0000
48.5	15,530,533	65.65%	63.31%	66.96%	0.0005	0.0002
49.5	14,362,056	64.09%	61.88%	65.93%	0.0005	0.0003
50.5	13,366,276	63.14%	60.41%	64.88%	0.0007	0.0003
51.5	12,470,365	61.86%	58.92%	63.81%	0.0009	0.0004
52.5	11,032,980	59.67%	57.39%	62.72%	0.0005	0.0009
53.5	10,097,745	58.28%	55.84%	61.62%	0.0006	0.0011
54.5	9,277,722	56.71%	54.26%	60.51%	0.0006	0.0014
55.5	8,484,954	56.30%	52.65%	59.38%	0.0013	0.0009
56.5	7,752,040	55.41%	51.03%	58.23%	0.0019	0.0008
57.5	7,120,251	54.03%	49.38%	57.07%	0.0022	0.0009

Account 362 Curve Fitting

[1] Age (Years)	[2] Exposures (Dollars)	[3] Observed Life Table (OLT)	[4] SPS R1.5-55	[5] AXM R1-61	[6] SPS SSD	[7] AXM SSD
58.5	6,485,963	52.58%	47.72%	55.89%	0.0024	0.0011
59.5	5,766,012	51.45%	46.04%	54.70%	0.0029	0.0011
60.5	5,145,256	50.38%	44.35%	53.50%	0.0036	0.0010
61.5	4,861,036	50.02%	42.65%	52.29%	0.0054	0.0005
62.5	4,355,360	48.90%	40.95%	51.06%	0.0063	0.0005
63.5	3,961,480	48.31%	39.25%	49.83%	0.0082	0.0002
64.5	3,366,277	47.69%	37.55%	48.58%	0.0103	0.0001
65.5	3,076,408	46.68%	35.85%	47.33%	0.0117	0.0000
66.5	2,519,482	46.46%	34.16%	46.07%	0.0151	0.0000
67.5	2,028,625	45.64%	32.49%	44.80%	0.0173	0.0001
68.5	1,375,004	44.54%	30.84%	43.53%	0.0188	0.0001
69.5	870,146	42.65%	29.21%	42.25%	0.0181	0.0000
70.5	682,174	41.50%	27.60%	40.97%	0.0193	0.0000
71.5	448,771	40.61%	26.03%	39.69%	0.0213	0.0001
72.5	304,231	35.36%	24.48%	38.40%	0.0118	0.0009
73.5	232,072	35.02%	22.98%	37.12%	0.0145	0.0004
74.5	127,028	33.76%	21.51%	35.83%	0.0150	0.0004
75.5	119,852	33.46%	20.08%	34.55%	0.0179	0.0001
76.5	115,028	33.46%	18.70%	33.28%	0.0218	0.0000
77.5	104,663	33.46%	17.36%	32.00%	0.0259	0.0002
78.5	95,011	32.21%	16.08%	30.74%	0.0260	0.0002
79.5	92,784	32.21%	14.84%	29.48%	0.0302	0.0007
80.5	76,156	32.21%	13.66%	28.24%	0.0344	0.0016
81.5	65,551	32.21%	12.52%	27.00%	0.0388	0.0027
82.5	63,763	31.33%	11.44%	25.78%	0.0396	0.0031
83.5	63,763	31.33%	10.42%	24.56%	0.0437	0.0046
84.5	60,965	29.95%	9.44%	23.37%	0.0420	0.0043
85.5	57,062	29.47%	8.52%	22.19%	0.0439	0.0053
86.5	57,062	29.47%	7.66%	21.03%	0.0476	0.0071
87.5	39,507	29.18%	6.84%	19.89%	0.0499	0.0086
88.5	22,012	29.18%	6.08%	18.77%	0.0533	0.0108
89.5	20,861	29.18%	5.38%	17.68%	0.0566	0.0132
90.5	20,861	29.18%	4.72%	16.60%	0.0598	0.0158
91.5	4,604	29.18%	4.12%	15.56%	0.0628	0.0186
92.5	0	29.18%	3.57%	14.54%	0.0656	0.0214
93.5			3.07%	13.55%		
Sum of Squared Differences				[8]	0.9918	0.1553
Up to 1% of Beginning Exposures				[9]	0.0808	0.0347

[1] Age in years using half-year convention
[2] Dollars exposed to retirement at the beginning of each age interval
[3] Observed life table based on the Company's property records. These numbers form the original survivor curve.
[4] The Company's selected Iowa curve to be fitted to the OLT.
[5] My selected Iowa curve to be fitted to the OLT.
[6] = ([4] - [3])^2. This is the squared difference between each point on the Company's curve and the observed survivor curve.
[7] = ([5] - [3])^2. This is the squared difference between each point on my curve and the observed survivor curve.
[8] = Sum of squared differences. The smallest SSD represents the best mathematical fit.

SOAH DOCKET NO. 473-19-6677
PUC DOCKET NO. 49831

APPLICATION OF SOUTHWESTERN PUBLIC SERVICE COMPANY FOR AUTHORITY TO CHANGE RATES	**§ § §**	**BEFORE THE STATE OFFICE OF ADMINISTRATIVE HEARINGS**

DIRECT TESTIMONY AND EXHIBITS OF DAVID J. GARRETT

EXHIBIT DJG-10

IOWA CURVE FITTING – ACCOUNT 390

Account 390 Curve Fitting

[1] Age (Years)	[2] Exposures (Dollars)	[3] Observed Life Table (OLT)	[4] SPS R1-53	[5] AXM L0.5-57	[6] SPS SSD	[7] AXM SSD
0.0	80,095,658	100.00%	100.00%	100.00%	0.0000	0.0000
0.5	79,418,006	99.99%	99.76%	99.92%	0.0000	0.0000
1.5	78,110,715	99.89%	99.26%	99.68%	0.0000	0.0000
2.5	75,191,136	99.75%	98.75%	99.38%	0.0001	0.0000
3.5	73,567,041	99.49%	98.23%	99.02%	0.0002	0.0000
4.5	67,277,786	99.24%	97.69%	98.62%	0.0002	0.0000
5.5	65,146,711	98.82%	97.14%	98.17%	0.0003	0.0000
6.5	61,836,782	98.35%	96.58%	97.68%	0.0003	0.0000
7.5	58,587,247	97.62%	96.01%	97.15%	0.0003	0.0000
8.5	52,074,400	97.25%	95.42%	96.58%	0.0003	0.0000
9.5	50,146,237	96.32%	94.82%	95.97%	0.0002	0.0000
10.5	48,501,053	95.69%	94.21%	95.33%	0.0002	0.0000
11.5	47,961,357	95.30%	93.59%	94.65%	0.0003	0.0000
12.5	46,521,716	94.24%	92.95%	93.93%	0.0002	0.0000
13.5	45,875,179	93.83%	92.30%	93.18%	0.0002	0.0000
14.5	43,636,236	93.37%	91.64%	92.39%	0.0003	0.0001
15.5	40,906,148	92.64%	90.97%	91.57%	0.0003	0.0001
16.5	41,596,683	92.06%	90.28%	90.71%	0.0003	0.0002
17.5	41,197,814	91.48%	89.58%	89.82%	0.0004	0.0003
18.5	40,438,372	89.74%	88.87%	88.90%	0.0001	0.0001
19.5	40,303,406	89.38%	88.15%	87.95%	0.0002	0.0002
20.5	39,932,093	88.99%	87.41%	86.97%	0.0002	0.0004
21.5	38,356,521	87.75%	86.66%	85.95%	0.0001	0.0003
22.5	36,238,326	87.29%	85.89%	84.92%	0.0002	0.0006
23.5	35,263,973	86.24%	85.11%	83.85%	0.0001	0.0006
24.5	34,750,201	85.51%	84.31%	82.77%	0.0001	0.0008
25.5	34,239,319	84.80%	83.50%	81.66%	0.0002	0.0010
26.5	32,365,222	84.14%	82.67%	80.53%	0.0002	0.0013
27.5	30,648,541	81.06%	81.82%	79.39%	0.0001	0.0003
28.5	26,324,763	78.64%	80.95%	78.23%	0.0005	0.0000
29.5	22,902,516	73.51%	80.06%	77.06%	0.0043	0.0013
30.5	21,172,004	72.89%	79.15%	75.87%	0.0039	0.0009
31.5	17,669,144	72.34%	78.22%	74.69%	0.0035	0.0006
32.5	13,171,426	71.31%	77.27%	73.49%	0.0036	0.0005
33.5	8,718,825	71.21%	76.30%	72.29%	0.0026	0.0001
34.5	7,697,912	66.17%	75.31%	71.10%	0.0083	0.0024
35.5	6,910,018	64.93%	74.29%	69.90%	0.0088	0.0025
36.5	6,599,995	64.26%	73.25%	68.70%	0.0081	0.0020
37.5	6,665,896	63.81%	72.19%	67.51%	0.0070	0.0014
38.5	6,467,551	62.91%	71.10%	66.32%	0.0067	0.0012
39.5	5,106,540	62.62%	70.00%	65.13%	0.0054	0.0006
40.5	3,779,672	61.85%	68.87%	63.94%	0.0049	0.0004
41.5	3,571,875	61.45%	67.71%	62.76%	0.0039	0.0002
42.5	3,496,494	60.62%	66.53%	61.59%	0.0035	0.0001
43.5	3,333,632	60.31%	65.34%	60.41%	0.0025	0.0000
44.5	3,277,522	59.59%	64.11%	59.25%	0.0020	0.0000
45.5	3,264,805	59.16%	62.87%	58.08%	0.0014	0.0001
46.5	3,143,422	58.67%	61.60%	56.93%	0.0009	0.0003
47.5	3,052,161	57.16%	60.32%	55.78%	0.0010	0.0002
48.5	3,004,470	56.27%	59.01%	54.63%	0.0008	0.0003
49.5	2,999,345	56.18%	57.68%	53.50%	0.0002	0.0007
50.5	2,998,742	56.02%	56.34%	52.37%	0.0000	0.0013
51.5	2,994,861	55.89%	54.97%	51.25%	0.0001	0.0022
52.5	2,589,646	53.40%	53.59%	50.13%	0.0000	0.0011
53.5	2,183,659	53.11%	52.20%	49.03%	0.0001	0.0017

Account 390 Curve Fitting

[1] Age (Years)	[2] Exposures (Dollars)	[3] Observed Life Table (OLT)	[4] SPS R1-53	[5] AXM L0.5-57	[6] SPS SSD	[7] AXM SSD
54.5	1,816,104	51.88%	50.78%	47.93%	0.0001	0.0016
55.5	1,790,170	51.40%	49.36%	46.85%	0.0004	0.0021
56.5	1,737,907	50.82%	47.92%	45.77%	0.0008	0.0026
57.5	1,595,497	49.49%	46.47%	44.70%	0.0009	0.0023
58.5	1,578,732	49.39%	45.02%	43.64%	0.0019	0.0033
59.5	1,561,035	49.09%	43.55%	42.60%	0.0031	0.0042
60.5	1,526,847	48.21%	42.08%	41.56%	0.0038	0.0044
61.5	1,476,274	47.37%	40.61%	40.54%	0.0046	0.0047
62.5	1,377,097	44.87%	39.13%	39.52%	0.0033	0.0029
63.5	1,355,895	44.52%	37.65%	38.52%	0.0047	0.0036
64.5	1,328,308	44.12%	36.17%	37.53%	0.0063	0.0043
65.5	1,009,352	42.49%	34.70%	36.55%	0.0061	0.0035
66.5	981,238	42.48%	33.23%	35.59%	0.0086	0.0048
67.5	483,967	40.30%	31.77%	34.63%	0.0073	0.0032
68.5	454,145	40.22%	30.31%	33.69%	0.0098	0.0043
69.5	386,257	39.98%	28.87%	32.77%	0.0123	0.0052
70.5	384,283	39.97%	27.44%	31.85%	0.0157	0.0066
71.5	384,283	39.97%	26.03%	30.95%	0.0194	0.0081
72.5	374,261	39.22%	24.63%	30.07%	0.0213	0.0084
73.5	250,483	26.31%	23.26%	29.19%	0.0009	0.0008
74.5	249,453	26.20%	21.91%	28.34%	0.0018	0.0005
75.5	51,514	5.42%	20.58%	27.49%	0.0230	0.0487
76.5	48,932	5.42%	19.28%	26.66%	0.0192	0.0451
77.5	48,447	5.42%	18.01%	25.84%	0.0158	0.0417
78.5	48,447	5.42%	16.76%	25.04%	0.0129	0.0385
79.5	42,125	4.98%	15.56%	24.26%	0.0112	0.0372
80.5	41,926	4.98%	14.39%	23.48%	0.0088	0.0342
81.5	41,599	4.98%	13.25%	22.73%	0.0068	0.0315
82.5	41,599	4.98%	12.16%	21.98%	0.0052	0.0289
83.5	41,599	4.98%	11.11%	21.26%	0.0038	0.0265
84.5	-258	4.98%	10.10%	20.54%	0.0026	0.0242
85.5			9.13%	19.84%		
Sum of Squared Differences				[8]	0.3321	0.4662
Up to 1% of Beginning Exposures				[9]	0.1342	0.0725

[1] Age in years using half-year convention
[2] Dollars exposed to retirement at the beginning of each age interval
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[6] = ([4] - [3])^2. This is the squared difference between each point on the Company's curve and the observed survivor curve.
[7] = ([5] - [3])^2. This is the squared difference between each point on my curve and the observed survivor curve.
[8] = Sum of squared differences. The smallest SSD represents the best mathematical fit.

SOAH DOCKET NO. 473-19-6677
PUC DOCKET NO. 49831

APPLICATION OF SOUTHWESTERN	§	BEFORE THE STATE OFFICE
PUBLIC SERVICE COMPANY FOR	§	OF
AUTHORITY TO CHANGE RATES	§	ADMINISTRATIVE HEARINGS

DIRECT TESTIMONY AND EXHIBITS
OF
DAVID J. GARRETT

EXHIBIT DJG-11

SIMULATED PLANT RECORD ANALYSIS AND GRAPHICAL BALANCE FIT SUMMARIES

SPS

Electric Division

364.00 Poles, Towers and Fixtures

Simulated Plant Record Analysis Calculated As Of 12/31/2018

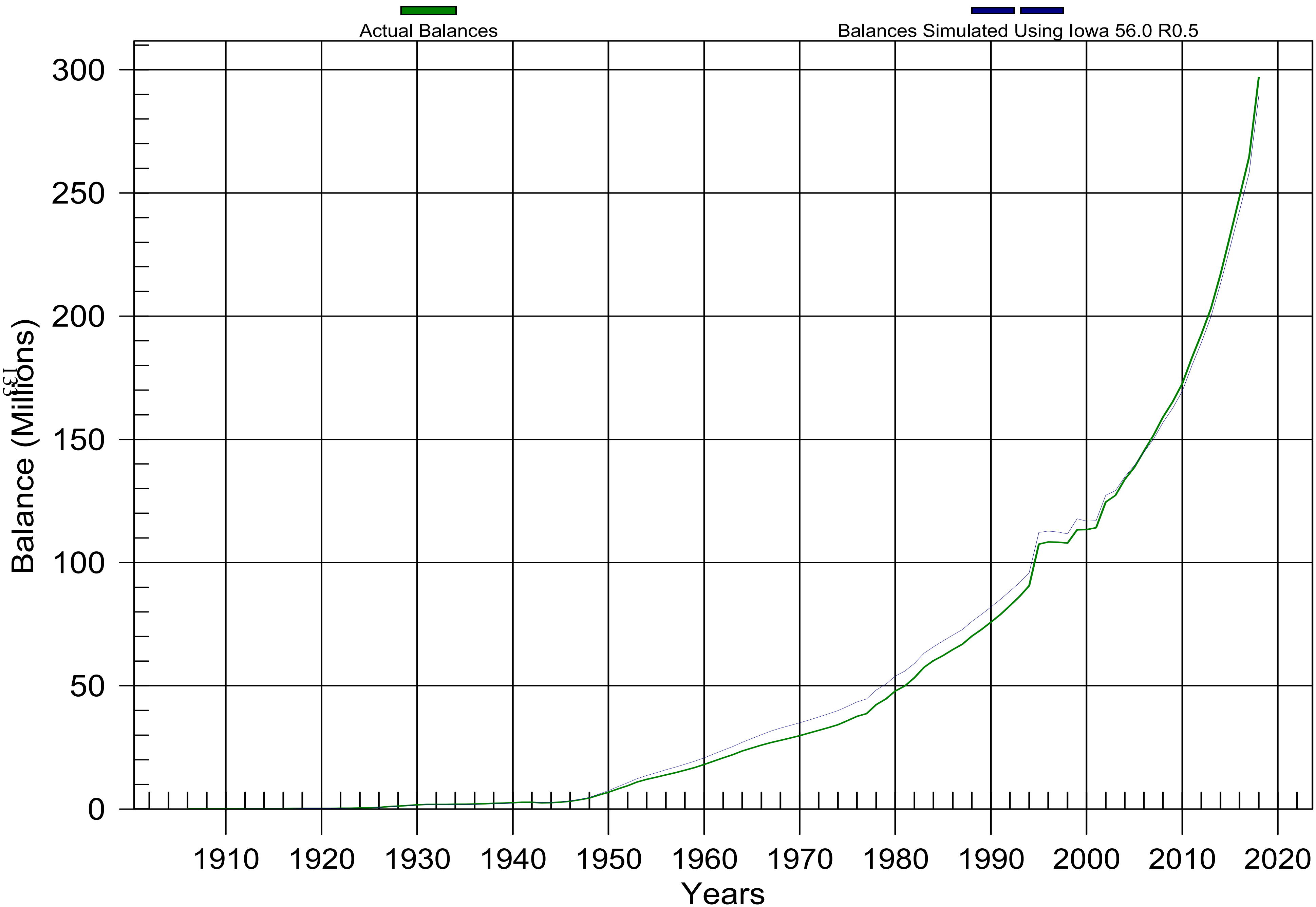
Simulated Balances Method

No. Of Test Points -	113
Interval Between Test Points -	1
First Test Point -	1906
Last Test Point -	2018

Curve Type	Average Service Life	Sum Of Squares Difference	Conformance Index	Index Of Variation	Ret Exp Index
O4	134.28 Yrs.	1.0641E+15	16.52	60.54	64.94
O3	98.31 Yrs.	1.0958E+15	16.28	61.44	69.07
O2	70.50 Yrs.	1.1830E+15	15.67	63.83	82.02
O1	62.78 Yrs.	1.1854E+15	15.65	63.90	89.60
SC	62.78 Yrs.	1.1854E+15	15.65	63.90	89.60
R0.5	55.97 Yrs.	1.3760E+15	14.53	68.84	100.00
L0	61.23 Yrs.	1.4096E+15	14.35	69.68	88.79
S.5	55.41 Yrs.	1.4485E+15	14.16	70.63	100.00
L0.5	55.94 Yrs.	1.6094E+15	13.43	74.45	94.21
R1	50.84 Yrs.	1.6603E+15	13.22	75.62	100.00
S0	50.13 Yrs.	1.7860E+15	12.75	78.43	100.00
L1	51.63 Yrs.	1.8482E+15	12.53	79.79	97.97
R1.5	47.84 Yrs.	1.9754E+15	12.12	82.49	100.00
S0.5	47.59 Yrs.	2.0467E+15	11.91	83.96	100.00
L1.5	48.69 Yrs.	2.0942E+15	11.77	84.93	99.33
R2	45.38 Yrs.	2.3372E+15	11.15	89.72	100.00
S1	45.47 Yrs.	2.3377E+15	11.14	89.73	100.00
L2	46.22 Yrs.	2.3648E+15	11.08	90.25	99.92
S1.5	44.09 Yrs.	2.5818E+15	10.60	94.30	100.00
R2.5	43.78 Yrs.	2.6610E+15	10.45	95.74	100.00
L3	43.03 Yrs.	2.8195E+15	10.15	98.55	100.00
S2	42.84 Yrs.	2.8369E+15	10.12	98.85	100.00
R3	42.34 Yrs.	2.9860E+15	9.86	101.41	100.00
S3	41.31 Yrs.	3.1970E+15	9.53	104.94	100.00
L4	40.97 Yrs.	3.2466E+15	9.46	105.75	100.00
R4	40.72 Yrs.	3.3725E+15	9.28	107.78	100.00
S4	40.13 Yrs.	3.4748E+15	9.14	109.40	100.00
L5	39.94 Yrs.	3.4929E+15	9.12	109.69	100.00
R5	39.63 Yrs.	3.5894E+15	8.99	111.19	100.00
S5	39.47 Yrs.	3.6152E+15	8.96	111.59	100.00
S6	39.09 Yrs.	3.6769E+15	8.89	112.54	100.00
SQ	39.00 Yrs.	3.7190E+15	8.84	113.18	100.00

SPS

Electric Division
364.00 Poles, Towers and Fixtures
Actual And Simulated Balances 1906-2018



SPS
Electric Division
367.00 Underground Conductor and Devices

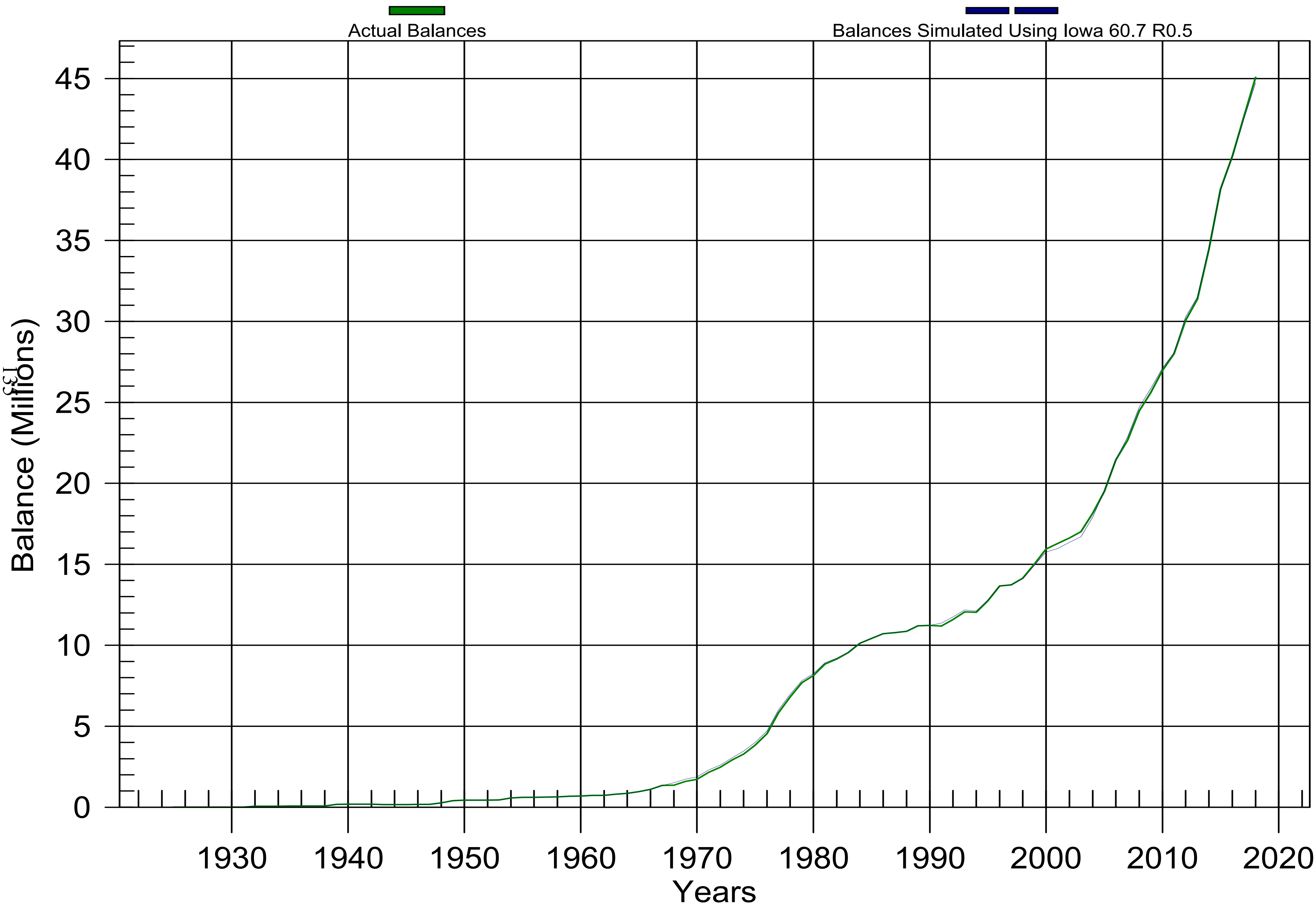
Simulated Plant Record Analysis Calculated As Of 12/31/2018

Simulated Balances Method

No. Of Test Points -	94
Interval Between Test Points -	1
First Test Point -	1925
Last Test Point -	2018

Curve Type	Average Service Life	Sum Of Squares Difference	Conformance Index	Index Of Variation	Ret Exp Index
SC	71.31 Yrs.	1.1262E+12	77.90	12.84	65.56
O1	71.31 Yrs.	1.1262E+12	77.90	12.84	65.56
O2	80.13 Yrs.	1.1263E+12	77.89	12.84	64.97
O3	114.75 Yrs.	1.1462E+12	77.21	12.95	56.44
R0.5	60.72 Yrs.	1.1489E+12	77.12	12.97	81.93
O4	158.41 Yrs.	1.1590E+12	76.79	13.02	53.89
S.5	59.34 Yrs.	1.3005E+12	72.49	13.80	82.70
L0	66.12 Yrs.	1.4380E+12	68.93	14.51	75.13
R1	52.63 Yrs.	1.4538E+12	68.56	14.59	97.15
L0.5	58.72 Yrs.	1.9072E+12	59.86	16.71	83.58
R1.5	47.84 Yrs.	2.2625E+12	54.96	18.20	99.92
S0	51.34 Yrs.	2.2810E+12	54.73	18.27	96.84
L1	52.94 Yrs.	3.0641E+12	47.22	21.18	90.89
S0.5	47.69 Yrs.	3.3932E+12	44.88	22.28	99.88
R2	44.28 Yrs.	3.9949E+12	41.36	24.18	100.00
L1.5	49.00 Yrs.	4.5226E+12	38.87	25.73	95.49
S1	44.78 Yrs.	5.3488E+12	35.74	27.98	100.00
R2.5	42.13 Yrs.	6.3203E+12	32.88	30.41	100.00
L2	45.94 Yrs.	7.2819E+12	30.63	32.64	98.31
S1.5	42.97 Yrs.	7.4047E+12	30.38	32.92	100.00
R3	40.47 Yrs.	1.0037E+13	26.09	38.32	100.00
S2	41.47 Yrs.	1.0489E+13	25.52	39.18	100.00
L3	42.13 Yrs.	1.3732E+13	22.31	44.83	99.99
S3	39.81 Yrs.	1.7256E+13	19.90	50.25	100.00
R4	39.00 Yrs.	1.8797E+13	19.07	52.45	100.00
L4	39.75 Yrs.	2.1966E+13	17.64	56.70	100.00
S4	38.81 Yrs.	2.7660E+13	15.72	63.62	100.00
L5	38.84 Yrs.	3.2199E+13	14.57	68.64	100.00
R5	38.44 Yrs.	3.3029E+13	14.38	69.52	100.00
S5	38.44 Yrs.	3.8364E+13	13.35	74.93	100.00
S6	38.34 Yrs.	4.7237E+13	12.03	83.14	100.00
SQ	38.00 Yrs.	5.8675E+13	10.79	92.66	100.00

SPS
Electric Division
367.00 Underground Conductor and Devices
Actual And Simulated Balances 1925-2018



SPS

Electric Division

368.00 Line Transformers

Simulated Plant Record Analysis Calculated As Of 12/31/2018

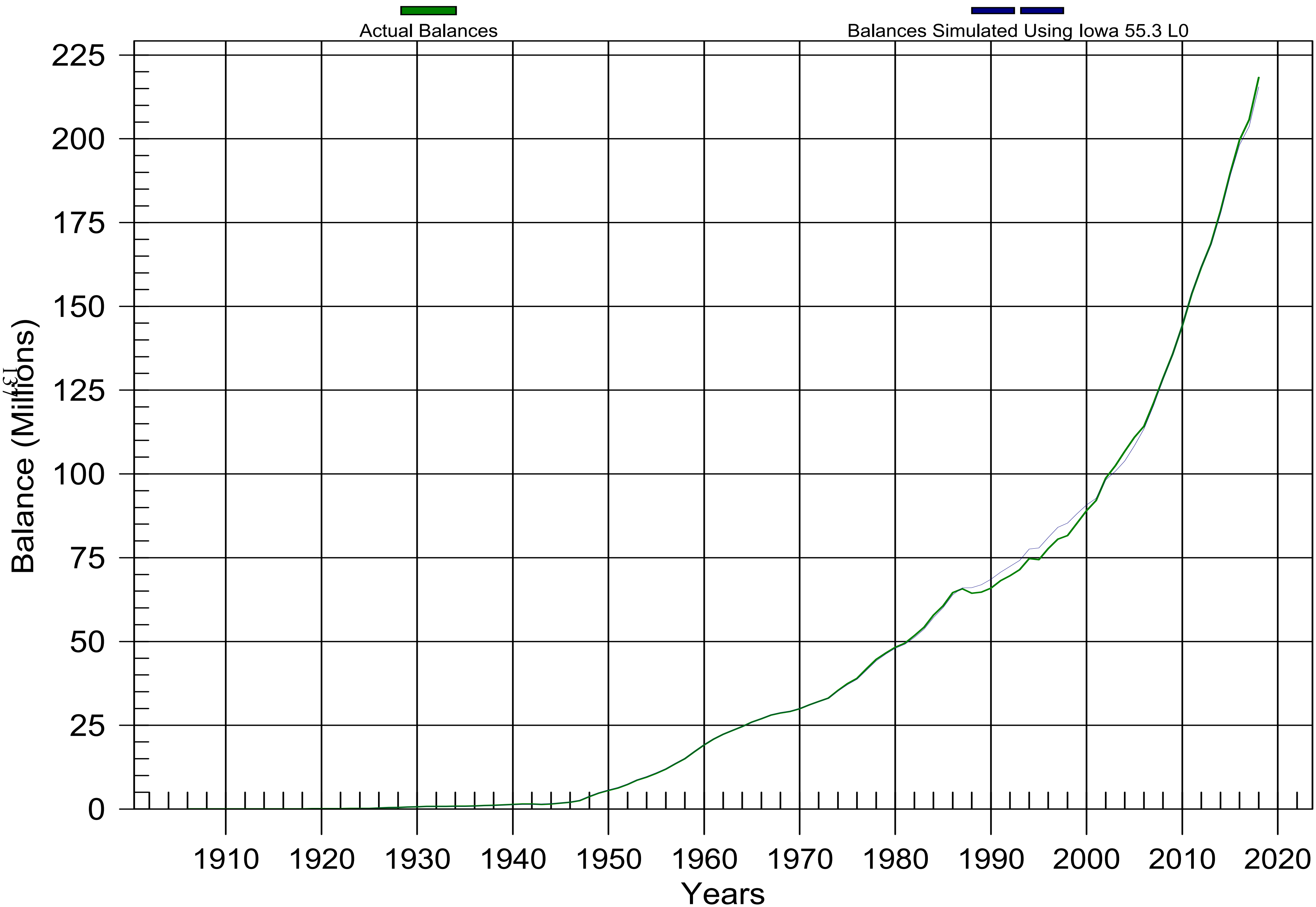
Simulated Balances Method

No. Of Test Points -	113
Interval Between Test Points -	1
First Test Point -	1906
Last Test Point -	2018

Curve Type	Average Service Life	Sum Of Squares Difference	Conformance Index	Index Of Variation	Ret Exp Index
O4	117.72 Yrs.	1.2035E+14	41.25	24.25	68.64
O3	86.47 Yrs.	1.2214E+14	40.94	24.42	73.40
O2	62.50 Yrs.	1.3299E+14	39.24	25.49	86.75
SC	55.66 Yrs.	1.3391E+14	39.10	25.57	100.00
O1	55.66 Yrs.	1.3391E+14	39.10	25.57	100.00
L0	55.30 Yrs.	1.4383E+14	37.73	26.51	92.89
S.5	50.06 Yrs.	1.6586E+14	35.13	28.46	100.00
R0.5	50.31 Yrs.	1.6781E+14	34.93	28.63	100.00
L0.5	51.06 Yrs.	1.7875E+14	33.84	29.55	96.80
L1	47.59 Yrs.	2.3147E+14	29.74	33.62	99.20
S0	46.06 Yrs.	2.3216E+14	29.70	33.67	100.00
R1	46.38 Yrs.	2.3820E+14	29.32	34.11	100.00
L1.5	45.31 Yrs.	3.0714E+14	25.82	38.73	99.79
S0.5	44.13 Yrs.	3.1237E+14	25.60	39.06	100.00
R1.5	44.16 Yrs.	3.3750E+14	24.63	40.60	100.00
L2	43.38 Yrs.	4.0132E+14	22.59	44.27	99.99
S1	42.50 Yrs.	4.1346E+14	22.25	44.94	100.00
R2	42.31 Yrs.	4.6579E+14	20.97	47.70	100.00
S1.5	41.47 Yrs.	5.1765E+14	19.89	50.28	100.00
R2.5	41.13 Yrs.	5.9643E+14	18.53	53.97	100.00
L3	40.81 Yrs.	6.0716E+14	18.36	54.46	100.00
S2	40.53 Yrs.	6.3350E+14	17.98	55.63	100.00
R3	40.06 Yrs.	7.3564E+14	16.68	59.94	100.00
S3	39.38 Yrs.	8.2060E+14	15.80	63.31	100.00
L4	39.16 Yrs.	8.4303E+14	15.58	64.17	100.00
R4	38.84 Yrs.	9.2460E+14	14.88	67.20	100.00
S4	38.47 Yrs.	9.7895E+14	14.46	69.15	100.00
L5	38.31 Yrs.	9.9249E+14	14.36	69.63	100.00
R5	38.06 Yrs.	1.0511E+15	13.96	71.65	100.00
S5	37.94 Yrs.	1.0681E+15	13.84	72.23	100.00
S6	37.63 Yrs.	1.1232E+15	13.50	74.07	100.00
SQ	37.00 Yrs.	1.2031E+15	13.04	76.66	100.00

SPS

Electric Division
368.00 Line Transformers
Actual And Simulated Balances 1906-2018



SPS

Electric Division

369.00 Services

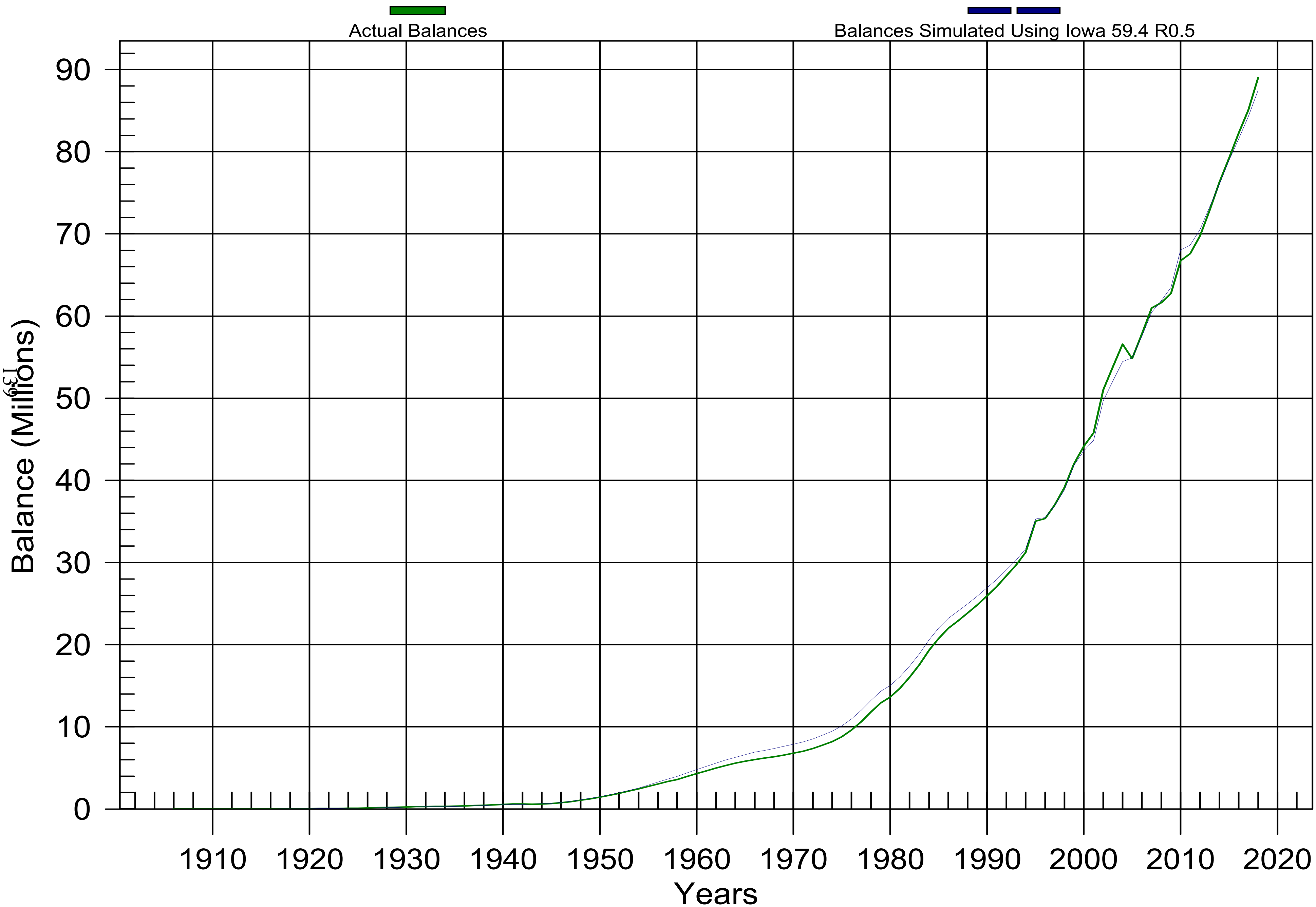
Simulated Plant Record Analysis Calculated As Of 12/31/2018

Simulated Balances Method

No. Of Test Points -	113
Interval Between Test Points -	1
First Test Point -	1906
Last Test Point -	2018

Curve Type	Average Service Life	Sum Of Squares Difference	Conformance Index	Index Of Variation	Ret Exp Index
O4	150.94 Yrs.	5.4716E+13	24.80	40.32	61.43
O3	109.69 Yrs.	5.5255E+13	24.68	40.52	65.15
O2	77.19 Yrs.	5.6681E+13	24.37	41.04	77.67
O1	68.72 Yrs.	5.6684E+13	24.37	41.04	81.86
SC	68.72 Yrs.	5.6684E+13	24.37	41.04	81.86
R0.5	59.41 Yrs.	6.0763E+13	23.54	42.49	97.00
S.5	58.25 Yrs.	6.4341E+13	22.87	43.72	97.98
L0	64.67 Yrs.	6.5274E+13	22.71	44.04	86.25
R1	52.34 Yrs.	6.8444E+13	22.18	45.09	100.00
L0.5	57.78 Yrs.	7.1602E+13	21.68	46.12	93.06
S0	51.03 Yrs.	7.6795E+13	20.94	47.76	100.00
R1.5	48.16 Yrs.	7.8187E+13	20.75	48.20	100.00
L1	52.28 Yrs.	8.0376E+13	20.46	48.87	97.70
S0.5	47.66 Yrs.	8.5591E+13	19.83	50.43	100.00
L1.5	48.59 Yrs.	8.8922E+13	19.46	51.40	99.35
R2	44.81 Yrs.	9.0978E+13	19.23	51.99	100.00
S1	44.84 Yrs.	9.6467E+13	18.68	53.53	100.00
L2	45.50 Yrs.	9.9322E+13	18.41	54.32	99.95
R2.5	42.75 Yrs.	1.0209E+14	18.16	55.07	100.00
S1.5	43.09 Yrs.	1.0461E+14	17.94	55.75	100.00
S2	41.50 Yrs.	1.1357E+14	17.22	58.09	100.00
R3	40.94 Yrs.	1.1421E+14	17.17	58.25	100.00
L3	41.69 Yrs.	1.1613E+14	17.02	58.74	100.00
S3	39.63 Yrs.	1.2583E+14	16.36	61.14	100.00
R4	38.97 Yrs.	1.2910E+14	16.15	61.93	100.00
L4	39.25 Yrs.	1.3086E+14	16.04	62.35	100.00
S4	38.28 Yrs.	1.3778E+14	15.63	63.98	100.00
L5	38.06 Yrs.	1.4217E+14	15.39	64.99	100.00
R5	37.75 Yrs.	1.4364E+14	15.31	65.32	100.00
S5	37.56 Yrs.	1.4865E+14	15.05	66.45	100.00
S6	37.19 Yrs.	1.5762E+14	14.61	68.43	100.00
SQ	37.00 Yrs.	1.6634E+14	14.23	70.30	100.00

SPS
Electric Division
369.00 Services
Actual And Simulated Balances 1906-2018



SOAH DOCKET NO. 473-19-6677
PUC DOCKET NO. 49831

APPLICATION OF SOUTHWESTERN	**§**	**BEFORE THE STATE OFFICE**
PUBLIC SERVICE COMPANY FOR	**§**	**OF**
AUTHORITY TO CHANGE RATES	**§**	**ADMINISTRATIVE HEARINGS**

DIRECT TESTIMONY AND EXHIBITS OF DAVID J. GARRETT

EXHIBIT DJG-12

ACTUARIAL OBSERVED LIFE TABLES AND IOWA CURVE CHARTS

SPS
Electric Division
352.00 Structures and Improvements
Observed Life Table
Retirement Expr. 1986 TO 2018
Placement Years 1928 TO 2018

Age Interval	$ Surviving At Beginning of Age Interval	$ Retired During The Age Interval	Retirement Ratio	% Surviving At Beginning of Age Interval
0.0 - 0.5	$80,799,395.19	$11,757.00	0.00015	100.00
0.5 - 1.5	$63,414,710.36	$1,478.00	0.00002	99.99
1.5 - 2.5	$60,682,921.49	$0.00	0.00000	99.98
2.5 - 3.5	$47,127,257.69	$1,604.19	0.00003	99.98
3.5 - 4.5	$38,866,551.33	$16,675.30	0.00043	99.98
4.5 - 5.5	$29,322,723.11	$5,628.00	0.00019	99.94
5.5 - 6.5	$25,088,148.27	$19,276.12	0.00077	99.92
6.5 - 7.5	$23,620,309.03	$0.00	0.00000	99.84
7.5 - 8.5	$22,171,610.56	$94,590.80	0.00427	99.84
8.5 - 9.5	$34,956,369.67	$0.00	0.00000	99.41
9.5 - 10.5	$32,780,283.32	$20,164.32	0.00062	99.41
10.5 - 11.5	$30,796,976.25	$0.00	0.00000	99.35
11.5 - 12.5	$31,553,282.55	$59,351.33	0.00188	99.35
12.5 - 13.5	$30,994,381.34	$15,830.17	0.00051	99.17
13.5 - 14.5	$25,363,859.16	$36,830.32	0.00145	99.12
14.5 - 15.5	$25,232,068.54	$1,259.40	0.00005	98.97
15.5 - 16.5	$25,309,033.19	$1,031.29	0.00004	98.97
16.5 - 17.5	$25,515,028.40	$1,510.15	0.00006	98.96
17.5 - 18.5	$23,922,239.07	$58,145.78	0.00243	98.96
18.5 - 19.5	$23,893,769.50	$5,107.33	0.00021	98.72
19.5 - 20.5	$23,215,586.85	$2,367.59	0.00010	98.70
20.5 - 21.5	$21,615,536.96	$41,136.21	0.00190	98.69
21.5 - 22.5	$21,650,019.08	$48,662.07	0.00225	98.50
22.5 - 23.5	$21,233,649.96	$8,555.86	0.00040	98.28
23.5 - 24.5	$21,353,024.18	$40,547.78	0.00190	98.24
24.5 - 25.5	$21,195,966.51	$1,300.00	0.00006	98.05
25.5 - 26.5	$20,329,015.80	$16,611.41	0.00082	98.04
26.5 - 27.5	$6,732,454.83	$16,553.72	0.00246	97.96
27.5 - 28.5	$6,883,293.71	$11,875.40	0.00173	97.72
28.5 - 29.5	$6,467,344.77	$3,472.08	0.00054	97.55
29.5 - 30.5	$5,328,608.98	$2,447.60	0.00046	97.50
30.5 - 31.5	$5,128,680.17	$5,543.55	0.00108	97.46
31.5 - 32.5	$5,115,571.36	$129,769.44	0.02537	97.35
32.5 - 33.5	$4,301,235.57	$3,937.00	0.00092	94.88
33.5 - 34.5	$3,855,302.34	$5,575.54	0.00145	94.80
34.5 - 35.5	$3,703,506.51	$2,011.79	0.00054	94.66
35.5 - 36.5	$3,501,855.97	$8,788.15	0.00251	94.61

SPS
Electric Division
352.00 Structures and Improvements
Observed Life Table
Retirement Expr. 1986 TO 2018
Placement Years 1928 TO 2018

Age Interval	$ Surviving At Beginning of Age Interval	$ Retired During The Age Interval	Retirement Ratio	% Surviving At Beginning of Age Interval
36.5 - 37.5	$3,213,095.62	$18,503.28	0.00576	94.37
37.5 - 38.5	$3,212,761.24	$3,932.84	0.00122	93.83
38.5 - 39.5	$3,104,382.60	$633.00	0.00020	93.71
39.5 - 40.5	$2,171,061.86	$7,579.10	0.00349	93.69
40.5 - 41.5	$2,041,895.30	$11,779.65	0.00577	93.37
41.5 - 42.5	$1,344,837.53	$3,256.05	0.00242	92.83
42.5 - 43.5	$1,707,930.72	$2,861.61	0.00168	92.60
43.5 - 44.5	$1,671,305.28	$14,768.99	0.00884	92.45
44.5 - 45.5	$1,615,348.19	$2,279.59	0.00141	91.63
45.5 - 46.5	$1,621,167.43	$584.88	0.00036	91.50
46.5 - 47.5	$1,516,343.82	$1,077.65	0.00071	91.47
47.5 - 48.5	$1,477,950.66	$1,954.87	0.00132	91.40
48.5 - 49.5	$1,481,044.65	$1,257.62	0.00085	91.28
49.5 - 50.5	$1,457,495.55	$3,681.96	0.00253	91.20
50.5 - 51.5	$1,465,180.74	$759.48	0.00052	90.97
51.5 - 52.5	$1,385,359.18	$10,918.62	0.00788	90.93
52.5 - 53.5	$1,289,455.77	$7,986.43	0.00619	90.21
53.5 - 54.5	$1,093,033.51	$69.03	0.00006	89.65
54.5 - 55.5	$1,017,378.41	$0.00	0.00000	89.65
55.5 - 56.5	$1,001,714.36	$350.16	0.00035	89.65
56.5 - 57.5	$956,088.44	$490.15	0.00051	89.61
57.5 - 58.5	$877,980.11	$2,906.47	0.00331	89.57
58.5 - 59.5	$864,429.40	$1,366.01	0.00158	89.27
59.5 - 60.5	$855,534.23	$0.00	0.00000	89.13
60.5 - 61.5	$370,524.81	$2,395.44	0.00646	89.13
61.5 - 62.5	$336,730.63	$85.29	0.00025	88.55
62.5 - 63.5	$322,969.62	$0.00	0.00000	88.53
63.5 - 64.5	$273,465.11	$114.25	0.00042	88.53
64.5 - 65.5	$211,259.26	$5,315.52	0.02516	88.50
65.5 - 66.5	$190,177.80	$825.70	0.00434	86.27
66.5 - 67.5	$159,678.47	$3,544.48	0.02220	85.89
67.5 - 68.5	$99,269.07	$5,039.60	0.05077	83.99
68.5 - 69.5	$35,847.21	$1,378.30	0.03845	79.72
69.5 - 70.5	$39,726.25	$0.00	0.00000	76.66
70.5 - 71.5	$39,726.25	$14.36	0.00036	76.66
71.5 - 72.5	$13,732.39	$0.00	0.00000	76.63
72.5 - 73.5	$7,908.08	$0.00	0.00000	76.63

SPS
Electric Division
352.00 Structures and Improvements
Observed Life Table
Retirement Expr. 1986 TO 2018
Placement Years 1928 TO 2018

Age Interval	$ Surviving At Beginning of Age Interval	$ Retired During The Age Interval	Retirement Ratio	% Surviving At Beginning of Age Interval
73.5 - 74.5	$7,888.15	$0.00	0.00000	76.63
74.5 - 75.5	$7,565.57	$0.00	0.00000	76.63
75.5 - 76.5	$5,816.14	$0.00	0.00000	76.63
76.5 - 77.5	$5,816.14	$0.00	0.00000	76.63
77.5 - 78.5	$5,816.14	$0.00	0.00000	76.63
78.5 - 79.5	$5,816.14	$0.00	0.00000	76.63
79.5 - 80.5	$5,816.14	$0.00	0.00000	76.63
80.5 - 81.5	$5,816.14	$0.00	0.00000	76.63
81.5 - 82.5	$5,407.34	$0.00	0.00000	76.63
82.5 - 83.5	$5,407.34	$0.00	0.00000	76.63
83.5 - 84.5	$5,407.34	$0.00	0.00000	76.63
84.5 - 85.5	$5,407.34	$421.90	0.07802	76.63
85.5 - 86.5	$4,985.44	$0.00	0.00000	70.65
86.5 - 87.5	$4,985.44	$0.00	0.00000	70.65
87.5 - 88.5	$150.00	$0.00	0.00000	70.65
88.5 - 89.5	$150.00	$0.00	0.00000	70.65
89.5 - 90.5	$0.00	$0.00	0.00000	70.65

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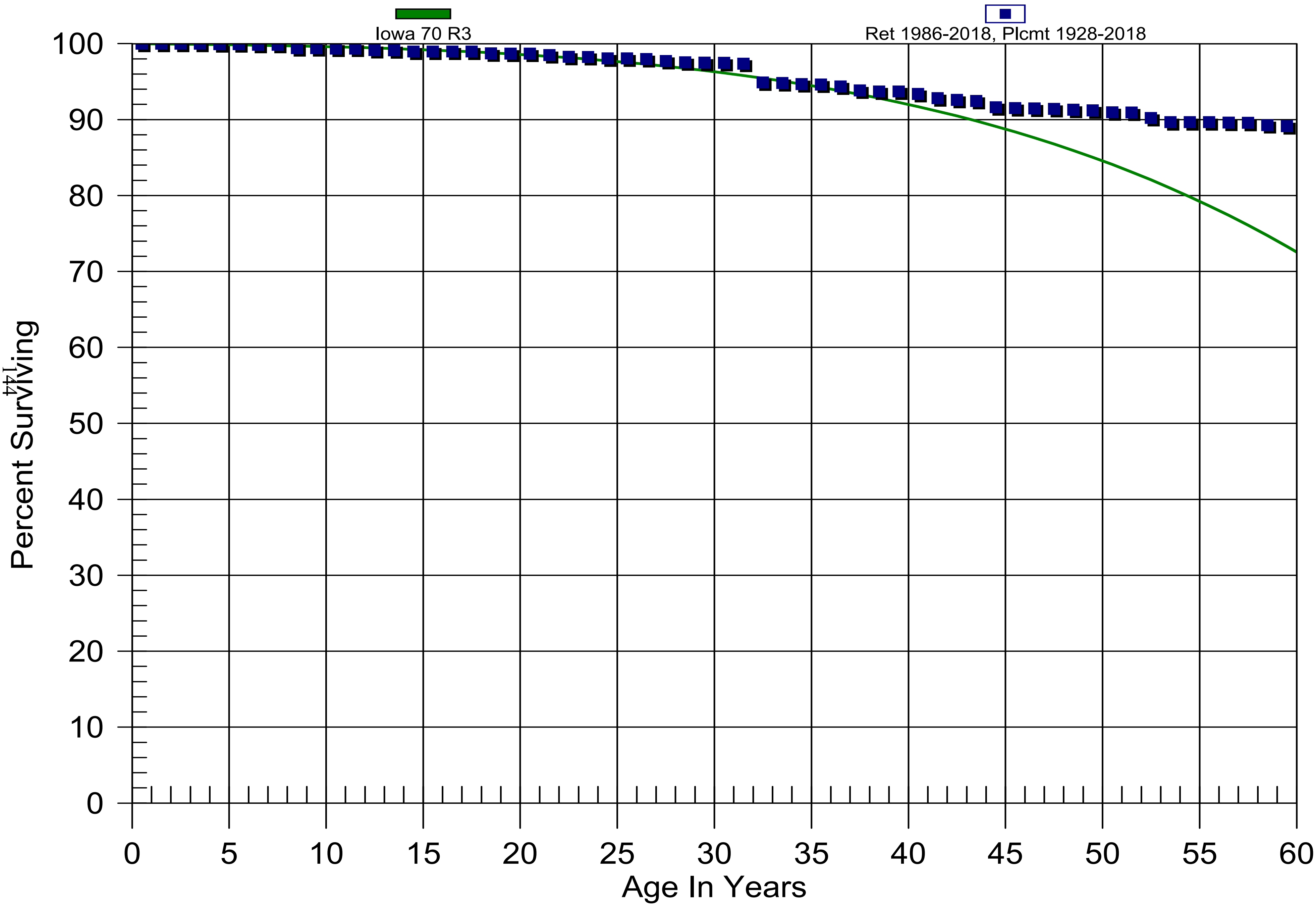
Electric Division
352.00 Structures and Improvements
Original And Smooth Survivor Curves



SPS
Electric Division
355.00 Poles and Fixtures

Observed Life Table
Retirement Expr. 1968 TO 2018
Placement Years 1901 TO 2018

Age Interval	$ Surviving At Beginning of Age Interval	$ Retired During The Age Interval	Retirement Ratio	% Surviving At Beginning of Age Interval
0.0 - 0.5	$1,180,685,251.39	$547,540.28	0.00046	100.00
0.5 - 1.5	$1,047,570,781.39	$1,078,601.25	0.00103	99.95
1.5 - 2.5	$981,639,672.97	$2,749,036.61	0.00280	99.85
2.5 - 3.5	$922,558,829.96	$1,605,481.25	0.00174	99.57
3.5 - 4.5	$782,201,355.53	$1,527,188.36	0.00195	99.40
4.5 - 5.5	$515,821,465.82	$1,465,393.62	0.00284	99.20
5.5 - 6.5	$455,681,910.64	$1,141,630.71	0.00251	98.92
6.5 - 7.5	$380,402,669.73	$1,190,735.67	0.00313	98.67
7.5 - 8.5	$325,293,704.22	$511,478.78	0.00157	98.37
8.5 - 9.5	$303,113,845.33	$626,714.20	0.00207	98.21
9.5 - 10.5	$264,177,423.32	$833,706.75	0.00316	98.01
10.5 - 11.5	$248,486,200.53	$625,550.43	0.00252	97.70
11.5 - 12.5	$242,625,765.14	$537,251.34	0.00221	97.45
12.5 - 13.5	$232,745,701.23	$728,855.85	0.00313	97.24
13.5 - 14.5	$222,741,832.97	$250,383.03	0.00112	96.93
14.5 - 15.5	$207,374,097.19	$1,225,788.58	0.00591	96.82
15.5 - 16.5	$202,133,840.80	$403,941.76	0.00200	96.25
16.5 - 17.5	$182,575,519.29	$550,714.22	0.00302	96.06
17.5 - 18.5	$164,821,349.84	$784,878.54	0.00476	95.77
18.5 - 19.5	$158,992,337.77	$722,646.05	0.00455	95.31
19.5 - 20.5	$151,342,376.89	$912,623.46	0.00603	94.88
20.5 - 21.5	$146,503,214.57	$440,140.00	0.00300	94.31
21.5 - 22.5	$137,457,733.28	$669,321.00	0.00487	94.02
22.5 - 23.5	$125,397,562.75	$543,483.59	0.00433	93.57
23.5 - 24.5	$124,934,495.86	$595,335.27	0.00477	93.16
24.5 - 25.5	$102,362,967.99	$534,538.56	0.00522	92.72
25.5 - 26.5	$83,537,944.32	$443,507.22	0.00531	92.23
26.5 - 27.5	$61,638,087.10	$832,056.96	0.01350	91.74
27.5 - 28.5	$44,353,030.88	$530,840.90	0.01197	90.50
28.5 - 29.5	$35,976,366.90	$552,096.71	0.01535	89.42
29.5 - 30.5	$27,005,674.65	$412,621.43	0.01528	88.05
30.5 - 31.5	$22,104,398.64	$507,237.28	0.02295	86.70
31.5 - 32.5	$21,229,153.40	$285,118.79	0.01343	84.71
32.5 - 33.5	$18,310,175.58	$275,540.18	0.01505	83.58
33.5 - 34.5	$11,034,289.37	$237,417.02	0.02152	82.32
34.5 - 35.5	$8,923,175.10	$578,661.40	0.06485	80.55
35.5 - 36.5	$6,905,338.63	$101,516.27	0.01470	75.32

SPS
Electric Division
355.00 Poles and Fixtures

Observed Life Table
Retirement Expr. 1968 TO 2018
Placement Years 1901 TO 2018

Age Interval	$ Surviving At Beginning of Age Interval	$ Retired During The Age Interval	Retirement Ratio	% Surviving At Beginning of Age Interval
36.5 - 37.5	$5,798,001.61	$138,620.48	0.02391	74.22
37.5 - 38.5	$5,484,703.40	$142,474.48	0.02598	72.44
38.5 - 39.5	$4,532,429.99	$143,610.28	0.03169	70.56
39.5 - 40.5	$3,468,295.64	$127,489.83	0.03676	68.32
40.5 - 41.5	$3,140,983.64	$109,500.16	0.03486	65.81
41.5 - 42.5	$2,738,407.57	$198,499.03	0.07249	63.52
42.5 - 43.5	$2,443,505.53	$106,061.73	0.04341	58.91
43.5 - 44.5	$1,410,725.32	$112,302.74	0.07961	56.36
44.5 - 45.5	$1,271,367.96	$124,634.68	0.09803	51.87
45.5 - 46.5	$1,066,303.41	$124,198.17	0.11648	46.79
46.5 - 47.5	$567,083.43	$37,456.54	0.06605	41.34
47.5 - 48.5	$513,852.97	$101,170.29	0.19689	38.61
48.5 - 49.5	$378,094.13	$26,188.32	0.06926	31.01
49.5 - 50.5	$308,896.20	$117,702.41	0.38104	28.86
50.5 - 51.5	$176,685.71	$17,912.21	0.10138	17.86
51.5 - 52.5	$146,591.50	$30,803.25	0.21013	16.05
52.5 - 53.5	$112,600.32	$13,003.61	0.11548	12.68
53.5 - 54.5	$89,286.89	$8,672.31	0.09713	11.21
54.5 - 55.5	$77,281.82	$2,625.37	0.03397	10.12
55.5 - 56.5	$71,806.03	$15,402.42	0.21450	9.78
56.5 - 57.5	$52,452.52	$2,760.66	0.05263	7.68
57.5 - 58.5	$49,691.86	$1,261.41	0.02538	7.28
58.5 - 59.5	$48,180.38	$13,910.17	0.28871	7.09
59.5 - 60.5	$34,270.21	$19,392.07	0.56586	5.05
60.5 - 61.5	$14,878.14	$7,616.35	0.51192	2.19
61.5 - 62.5	$7,261.79	$398.44	0.05487	1.07
62.5 - 63.5	$6,863.35	$808.79	0.11784	1.01
63.5 - 64.5	$2,870.00	$424.42	0.14788	0.89
64.5 - 65.5	$2,445.58	$253.47	0.10364	0.76
65.5 - 66.5	$1,091.33	$0.00	0.00000	0.68
66.5 - 67.5	$1,178.17	$269.72	0.22893	0.68
67.5 - 68.5	$776.21	$190.63	0.24559	0.52
68.5 - 69.5	$585.58	$365.33	0.62388	0.40
69.5 - 70.5	$220.25	$112.02	0.50860	0.15
70.5 - 71.5	$108.23	$0.00	0.00000	0.07
71.5 - 72.5	$108.23	$21.39	0.19763	0.07
72.5 - 73.5	$86.84	$0.00	0.00000	0.06

SPS
Electric Division
355.00 Poles and Fixtures
Observed Life Table
Retirement Expr. 1968 TO 2018
Placement Years 1901 TO 2018

Age Interval	$ Surviving At Beginning of Age Interval	$ Retired During The Age Interval	Retirement Ratio	% Surviving At Beginning of Age Interval
73.5 - 74.5	$86.84	$0.00	0.00000	0.06
74.5 - 75.5	$86.84	$0.00	0.00000	0.06
75.5 - 76.5	$86.84	$0.00	0.00000	0.06
76.5 - 77.5	$86.84	$0.00	0.00000	0.06
77.5 - 78.5	$86.84	$0.00	0.00000	0.06
78.5 - 79.5	$86.84	$0.00	0.00000	0.06
79.5 - 80.5	$86.84	$0.00	0.00000	0.06
80.5 - 81.5	$86.84	$0.00	0.00000	0.06
81.5 - 82.5	$86.84	$0.00	0.00000	0.06
82.5 - 83.5	$86.84	$0.00	0.00000	0.06
83.5 - 84.5	$86.84	$0.00	0.00000	0.06
84.5 - 85.5	$86.84	$0.00	0.00000	0.06
85.5 - 86.5	$86.84	$0.00	0.00000	0.06
86.5 - 87.5	$86.84	$0.00	0.00000	0.06
87.5 - 88.5	$86.84	$0.00	0.00000	0.06
88.5 - 89.5	$86.84	$0.00	0.00000	0.06
89.5 - 90.5	$86.84	$0.00	0.00000	0.06
90.5 - 91.5	$86.84	$0.00	0.00000	0.06
91.5 - 92.5	$86.84	$0.00	0.00000	0.06
92.5 - 93.5	$86.84	$0.00	0.00000	0.06
93.5 - 94.5	$86.84	$0.00	0.00000	0.06
94.5 - 95.5	$86.84	$0.00	0.00000	0.06
95.5 - 96.5	$86.84	$0.00	0.00000	0.06
96.5 - 97.5	$86.84	$0.00	0.00000	0.06

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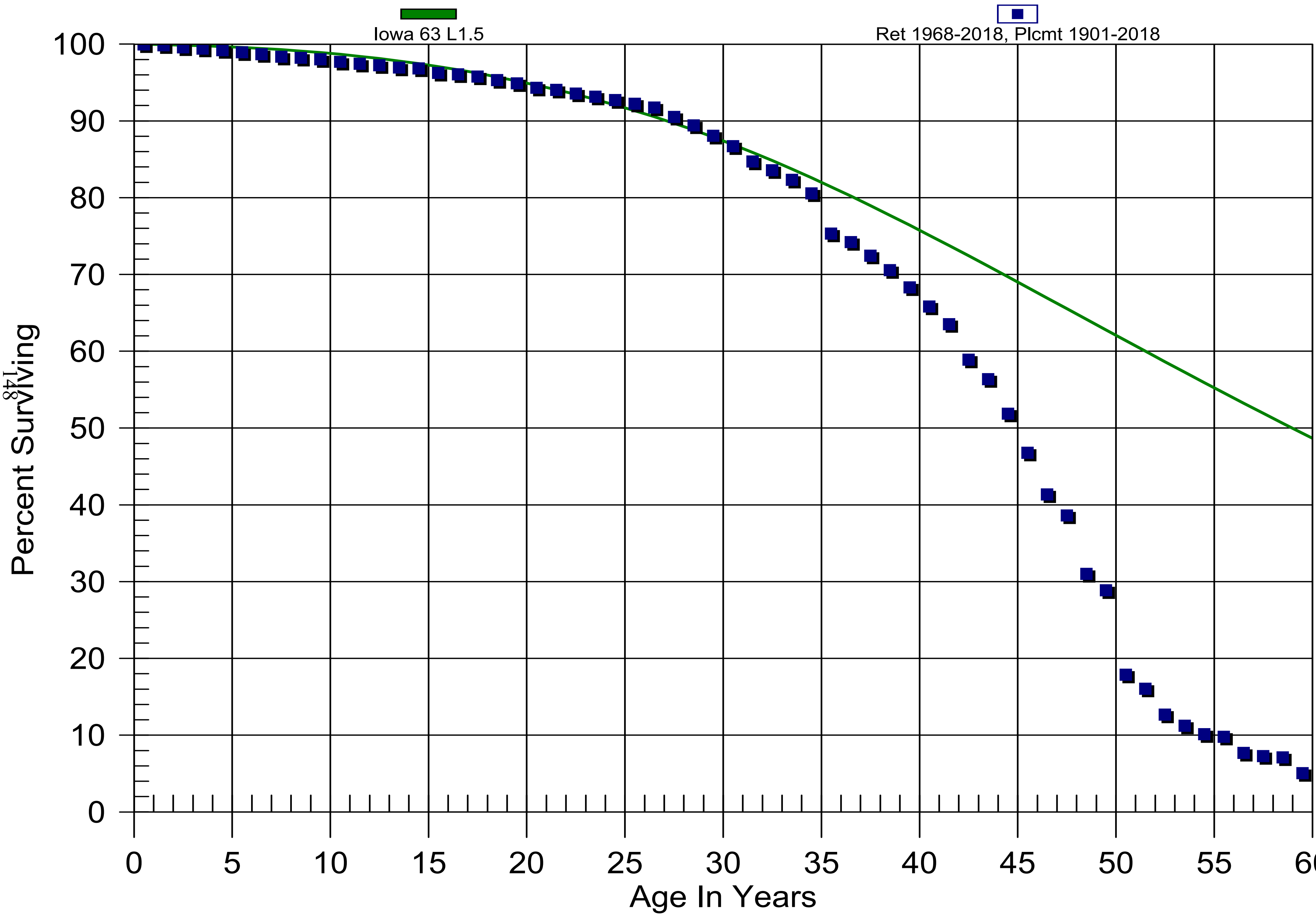
Electric Division
355.00 Poles and Fixtures
Original And Smooth Survivor Curves



SPS
Electric Division
362.00 Station Equipment
Observed Life Table
Retirement Expr. 1973 TO 2018
Placement Years 1900 TO 2018

Age Interval	$ Surviving At Beginning of Age Interval	$ Retired During The Age Interval	Retirement Ratio	% Surviving At Beginning of Age Interval
0.0 - 0.5	$188,320,564.81	$18,373.00	0.00010	100.00
0.5 - 1.5	$175,556,239.26	$499,499.95	0.00285	99.99
1.5 - 2.5	$163,504,884.10	$297,918.61	0.00182	99.71
2.5 - 3.5	$145,892,453.39	$341,833.15	0.00234	99.52
3.5 - 4.5	$130,647,802.69	$462,769.21	0.00354	99.29
4.5 - 5.5	$120,228,881.72	$641,567.87	0.00534	98.94
5.5 - 6.5	$109,600,002.75	$1,077,617.04	0.00983	98.41
6.5 - 7.5	$102,400,762.37	$1,005,214.22	0.00982	97.44
7.5 - 8.5	$97,190,346.26	$394,667.20	0.00406	96.49
8.5 - 9.5	$91,486,945.24	$1,512,372.80	0.01653	96.10
9.5 - 10.5	$84,533,277.61	$309,292.94	0.00366	94.51
10.5 - 11.5	$80,744,322.11	$288,237.39	0.00357	94.16
11.5 - 12.5	$78,189,571.43	$291,763.21	0.00373	93.82
12.5 - 13.5	$74,589,403.98	$426,548.77	0.00572	93.47
13.5 - 14.5	$70,904,673.41	$365,479.85	0.00515	92.94
14.5 - 15.5	$70,835,625.20	$406,419.94	0.00574	92.46
15.5 - 16.5	$69,242,095.53	$458,291.71	0.00662	91.93
16.5 - 17.5	$67,999,479.99	$392,710.88	0.00578	91.32
17.5 - 18.5	$66,548,965.74	$669,499.72	0.01006	90.79
18.5 - 19.5	$64,534,452.05	$611,032.31	0.00947	89.88
19.5 - 20.5	$60,890,043.99	$630,032.81	0.01035	89.03
20.5 - 21.5	$58,623,396.11	$598,596.69	0.01021	88.11
21.5 - 22.5	$55,578,609.65	$527,356.36	0.00949	87.21
22.5 - 23.5	$56,520,390.27	$599,599.27	0.01061	86.38
23.5 - 24.5	$54,409,568.51	$176,456.23	0.00324	85.47
24.5 - 25.5	$51,922,741.75	$782,233.35	0.01507	85.19
25.5 - 26.5	$48,178,115.01	$325,742.53	0.00676	83.90
26.5 - 27.5	$47,975,853.08	$364,570.64	0.00760	83.34
27.5 - 28.5	$46,613,850.83	$236,432.86	0.00507	82.70
28.5 - 29.5	$44,830,151.45	$578,262.20	0.01290	82.28
29.5 - 30.5	$43,056,352.99	$454,281.81	0.01055	81.22
30.5 - 31.5	$41,711,858.92	$221,041.92	0.00530	80.37
31.5 - 32.5	$41,104,336.00	$556,284.25	0.01353	79.94
32.5 - 33.5	$39,013,192.76	$264,787.82	0.00679	78.86
33.5 - 34.5	$36,379,760.13	$298,081.17	0.00819	78.32
34.5 - 35.5	$34,598,922.17	$856,735.40	0.02476	77.68
35.5 - 36.5	$32,046,274.30	$250,012.85	0.00780	75.76

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Electric Division
362.00 Station Equipment

Observed Life Table
Retirement Expr. 1973 TO 2018
Placement Years 1900 TO 2018

Age Interval	$ Surviving At Beginning of Age Interval	$ Retired During The Age Interval	Retirement Ratio	% Surviving At Beginning of Age Interval
36.5 - 37.5	$30,960,089.11	$388,487.36	0.01255	75.17
37.5 - 38.5	$30,059,197.61	$276,506.44	0.00920	74.22
38.5 - 39.5	$27,790,707.99	$290,523.91	0.01045	73.54
39.5 - 40.5	$26,976,001.94	$399,403.57	0.01481	72.77
40.5 - 41.5	$24,413,356.68	$671,877.37	0.02752	71.69
41.5 - 42.5	$22,617,501.17	$406,389.71	0.01797	69.72
42.5 - 43.5	$20,416,070.91	$455,428.01	0.02231	68.47
43.5 - 44.5	$18,611,014.02	$299,185.17	0.01608	66.94
44.5 - 45.5	$17,280,422.89	$516,122.92	0.02987	65.87
45.5 - 46.5	$16,070,737.36	$521,984.27	0.03248	63.90
46.5 - 47.5	$14,936,005.90	$203,900.41	0.01365	61.82
47.5 - 48.5	$14,293,883.71	$457,231.33	0.03199	60.98
48.5 - 49.5	$13,308,242.69	$368,744.19	0.02771	59.03
49.5 - 50.5	$12,037,527.09	$213,434.62	0.01773	57.39
50.5 - 51.5	$11,161,423.98	$270,829.95	0.02426	56.38
51.5 - 52.5	$10,525,122.02	$441,973.62	0.04199	55.01
52.5 - 53.5	$9,414,454.87	$256,489.83	0.02724	52.70
53.5 - 54.5	$8,495,231.95	$273,057.90	0.03214	51.26
54.5 - 55.5	$7,593,012.30	$66,561.27	0.00877	49.61
55.5 - 56.5	$7,156,168.27	$134,047.47	0.01873	49.18
56.5 - 57.5	$6,462,857.28	$193,474.03	0.02994	48.26
57.5 - 58.5	$5,875,138.34	$191,281.64	0.03256	46.81
58.5 - 59.5	$5,379,626.38	$139,480.52	0.02593	45.29
59.5 - 60.5	$4,748,550.06	$119,415.85	0.02515	44.11
60.5 - 61.5	$4,186,604.72	$36,736.67	0.00877	43.01
61.5 - 62.5	$3,922,415.76	$108,913.99	0.02777	42.63
62.5 - 63.5	$3,518,586.36	$52,572.10	0.01494	41.44
63.5 - 64.5	$3,204,320.50	$51,211.90	0.01598	40.83
64.5 - 65.5	$2,680,221.12	$71,211.00	0.02657	40.17
65.5 - 66.5	$2,442,349.76	$14,032.67	0.00575	39.11
66.5 - 67.5	$1,961,785.56	$44,479.61	0.02267	38.88
67.5 - 68.5	$1,577,398.12	$48,873.03	0.03098	38.00
68.5 - 69.5	$1,208,734.74	$58,488.58	0.04839	36.82
69.5 - 70.5	$763,661.12	$23,522.06	0.03080	35.04
70.5 - 71.5	$598,493.28	$14,519.86	0.02426	33.96
71.5 - 72.5	$383,876.44	$58,020.25	0.15114	33.14
72.5 - 73.5	$262,605.05	$3,265.16	0.01243	28.13

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Electric Division
362.00 Station Equipment
Observed Life Table
Retirement Expr. 1973 TO 2018
Placement Years 1900 TO 2018

Age Interval	$ Surviving At Beginning of Age Interval	$ Retired During The Age Interval	Retirement Ratio	% Surviving At Beginning of Age Interval
73.5 - 74.5	$233,794.66	$8,326.64	0.03562	27.78
74.5 - 75.5	$127,852.26	$1,130.42	0.00884	26.79
75.5 - 76.5	$108,927.98	$0.00	0.00000	26.55
76.5 - 77.5	$105,002.92	$0.00	0.00000	26.55
77.5 - 78.5	$93,464.55	$3,997.83	0.04277	26.55
78.5 - 79.5	$83,750.38	$813.67	0.00972	25.42
79.5 - 80.5	$81,858.60	$0.00	0.00000	25.17
80.5 - 81.5	$65,230.80	$0.00	0.00000	25.17
81.5 - 82.5	$59,895.20	$1,787.57	0.02984	25.17
82.5 - 83.5	$58,107.63	$178.22	0.00307	24.42
83.5 - 84.5	$57,929.41	$2,798.13	0.04830	24.34
84.5 - 85.5	$55,131.28	$973.76	0.01766	23.17
85.5 - 86.5	$51,228.15	$0.00	0.00000	22.76
86.5 - 87.5	$51,228.15	$573.69	0.01120	22.76
87.5 - 88.5	$33,673.44	$0.00	0.00000	22.50
88.5 - 89.5	$22,993.99	$0.00	0.00000	22.50
89.5 - 90.5	$21,842.66	$0.00	0.00000	22.50
90.5 - 91.5	$21,842.66	$0.00	0.00000	22.50
91.5 - 92.5	$5,585.24	$0.00	0.00000	22.50
92.5 - 93.5	$981.50	$607.50	0.61895	22.50
93.5 - 94.5	$374.00	$0.00	0.00000	8.58
94.5 - 95.5	$374.00	$0.00	0.00000	8.58

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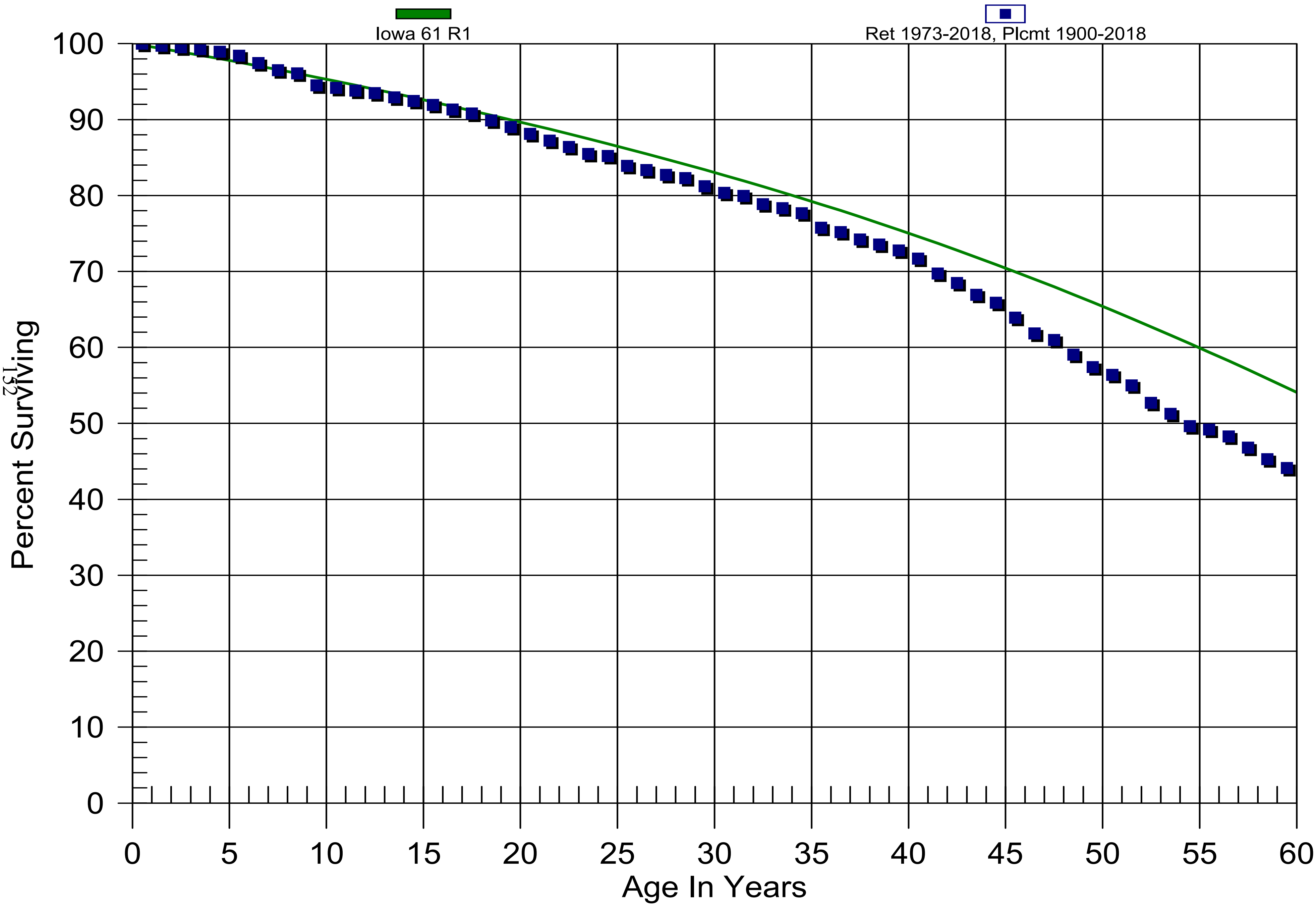
Electric Division
362.00 Station Equipment
Original And Smooth Survivor Curves



SPS
Electric Division
390.00 Structures and Improvements
Observed Life Table
Retirement Expr. 1968 TO 2018
Placement Years 1911 TO 2018

Age Interval	$ Surviving At Beginning of Age Interval	$ Retired During The Age Interval	Retirement Ratio	% Surviving At Beginning of Age Interval
0.0 - 0.5	$78,930,942.88	$9,904.03	0.00013	100.00
0.5 - 1.5	$78,199,173.80	$80,333.25	0.00103	99.99
1.5 - 2.5	$76,901,019.95	$107,925.66	0.00140	99.88
2.5 - 3.5	$74,040,615.79	$196,021.28	0.00265	99.74
3.5 - 4.5	$72,221,767.48	$181,826.18	0.00252	99.48
4.5 - 5.5	$65,936,125.78	$284,037.44	0.00431	99.23
5.5 - 6.5	$63,781,050.01	$310,670.13	0.00487	98.80
6.5 - 7.5	$60,470,577.80	$463,308.76	0.00766	98.32
7.5 - 8.5	$57,225,557.47	$219,138.33	0.00383	97.57
8.5 - 9.5	$50,702,602.95	$501,200.49	0.00989	97.19
9.5 - 10.5	$48,782,717.66	$327,655.96	0.00672	96.23
10.5 - 11.5	$47,145,299.60	$195,729.76	0.00415	95.59
11.5 - 12.5	$46,603,593.26	$534,255.63	0.01146	95.19
12.5 - 13.5	$45,160,830.57	$202,872.80	0.00449	94.10
13.5 - 14.5	$44,509,411.26	$223,082.82	0.00501	93.68
14.5 - 15.5	$42,261,314.84	$339,581.38	0.00804	93.21
15.5 - 16.5	$39,480,024.03	$259,902.39	0.00658	92.46
16.5 - 17.5	$39,782,951.84	$262,081.08	0.00659	91.85
17.5 - 18.5	$39,431,911.43	$783,249.97	0.01986	91.24
18.5 - 19.5	$38,624,511.51	$162,211.71	0.00420	89.43
19.5 - 20.5	$38,489,484.48	$174,489.21	0.00453	89.06
20.5 - 21.5	$38,160,442.87	$557,685.53	0.01461	88.65
21.5 - 22.5	$36,587,900.33	$197,831.81	0.00541	87.36
22.5 - 23.5	$34,472,337.56	$436,469.53	0.01266	86.88
23.5 - 24.5	$33,518,437.36	$301,064.32	0.00898	85.78
24.5 - 25.5	$32,633,554.30	$289,069.49	0.00886	85.01
25.5 - 26.5	$31,933,402.40	$264,982.97	0.00830	84.26
26.5 - 27.5	$31,154,284.82	$1,182,851.11	0.03797	83.56
27.5 - 28.5	$29,198,276.56	$915,993.98	0.03137	80.39
28.5 - 29.5	$24,849,489.22	$1,716,355.31	0.06907	77.87
29.5 - 30.5	$21,898,281.48	$195,003.93	0.00890	72.49
30.5 - 31.5	$20,167,330.91	$157,913.56	0.00783	71.84
31.5 - 32.5	$16,676,208.68	$252,285.83	0.01513	71.28
32.5 - 33.5	$12,479,064.43	$19,094.85	0.00153	70.20
33.5 - 34.5	$8,031,357.06	$617,435.15	0.07688	70.10
34.5 - 35.5	$7,027,931.32	$143,909.20	0.02048	64.71
35.5 - 36.5	$6,457,439.12	$70,652.46	0.01094	63.38

SPS
Electric Division
390.00 Structures and Improvements
Observed Life Table
Retirement Expr. 1968 TO 2018
Placement Years 1911 TO 2018

Age Interval	$ Surviving At Beginning of Age Interval	$ Retired During The Age Interval	Retirement Ratio	% Surviving At Beginning of Age Interval
36.5 - 37.5	$6,148,930.71	$46,464.14	0.00756	62.69
37.5 - 38.5	$6,214,706.97	$94,201.98	0.01516	62.21
38.5 - 39.5	$6,019,862.83	$29,719.69	0.00494	61.27
39.5 - 40.5	$4,658,499.00	$62,852.72	0.01349	60.97
40.5 - 41.5	$3,327,925.80	$24,713.35	0.00743	60.15
41.5 - 42.5	$3,120,610.09	$47,888.55	0.01535	59.70
42.5 - 43.5	$3,046,402.86	$18,139.30	0.00595	58.78
43.5 - 44.5	$2,883,151.66	$39,884.79	0.01383	58.43
44.5 - 45.5	$2,826,969.28	$23,260.87	0.00823	57.62
45.5 - 46.5	$2,824,746.59	$26,952.44	0.00954	57.15
46.5 - 47.5	$2,708,897.57	$81,309.12	0.03002	56.61
47.5 - 48.5	$2,617,686.90	$47,463.92	0.01813	54.91
48.5 - 49.5	$2,569,881.83	$4,649.64	0.00181	53.91
49.5 - 50.5	$2,564,640.59	$8,506.57	0.00332	53.81
50.5 - 51.5	$2,563,320.90	$7,193.87	0.00281	53.63
51.5 - 52.5	$2,558,822.67	$133,017.04	0.05198	53.48
52.5 - 53.5	$2,152,758.14	$14,210.07	0.00660	50.70
53.5 - 54.5	$1,761,955.65	$50,631.99	0.02874	50.37
54.5 - 55.5	$1,397,824.65	$16,642.00	0.01191	48.92
55.5 - 56.5	$1,372,852.54	$20,201.76	0.01472	48.34
56.5 - 57.5	$1,321,517.73	$45,508.23	0.03444	47.63
57.5 - 58.5	$1,179,459.50	$3,403.14	0.00289	45.99
58.5 - 59.5	$1,162,979.89	$9,459.75	0.00813	45.86
59.5 - 60.5	$1,145,273.53	$28,212.52	0.02463	45.48
60.5 - 61.5	$1,108,683.79	$26,416.30	0.02383	44.36
61.5 - 62.5	$1,057,856.10	$77,875.05	0.07362	43.30
62.5 - 63.5	$960,910.04	$10,875.06	0.01132	40.12
63.5 - 64.5	$939,708.66	$11,983.86	0.01275	39.66
64.5 - 65.5	$913,822.10	$49,351.00	0.05401	39.16
65.5 - 66.5	$595,279.24	$238.00	0.00040	37.04
66.5 - 67.5	$575,935.31	$50,313.00	0.08736	37.03
67.5 - 68.5	$474,032.92	$927.63	0.00196	33.79
68.5 - 69.5	$444,680.00	$2,756.00	0.00620	33.73
69.5 - 70.5	$385,200.86	$20.88	0.00005	33.52
70.5 - 71.5	$383,226.98	$0.00	0.00000	33.52
71.5 - 72.5	$383,226.98	$7,278.81	0.01899	33.52
72.5 - 73.5	$373,204.57	$123,219.00	0.33016	32.88

SPS
Electric Division
390.00 Structures and Improvements
Observed Life Table
Retirement Expr. 1968 TO 2018
Placement Years 1911 TO 2018

Age Interval	$ Surviving At Beginning of Age Interval	$ Retired During The Age Interval	Retirement Ratio	% Surviving At Beginning of Age Interval
73.5 - 74.5	$249,426.73	$1,030.00	0.00413	22.02
74.5 - 75.5	$248,042.22	$197,863.78	0.79770	21.93
75.5 - 76.5	$50,178.44	$0.00	0.00000	4.44
76.5 - 77.5	$49,876.26	$0.00	0.00000	4.44
77.5 - 78.5	$49,390.72	$0.00	0.00000	4.44
78.5 - 79.5	$49,390.72	$3,883.00	0.07862	4.44
79.5 - 80.5	$43,069.27	$0.00	0.00000	4.09
80.5 - 81.5	$42,870.02	$0.00	0.00000	4.09
81.5 - 82.5	$42,543.14	$0.00	0.00000	4.09
82.5 - 83.5	$42,543.14	$0.00	0.00000	4.09
83.5 - 84.5	$42,543.14	$0.00	0.00000	4.09
84.5 - 85.5	$685.63	$0.00	0.00000	4.09
85.5 - 86.5	$685.63	$0.00	0.00000	4.09
86.5 - 87.5	$685.63	$0.00	0.00000	4.09
87.5 - 88.5	$685.63	$0.00	0.00000	4.09
88.5 - 89.5	$685.63	$0.00	0.00000	4.09
89.5 - 90.5	$685.63	$0.00	0.00000	4.09
90.5 - 91.5	$175.00	$0.00	0.00000	4.09
91.5 - 92.5	$175.00	$0.00	0.00000	4.09
92.5 - 93.5	$175.00	$0.00	0.00000	4.09
93.5 - 94.5	$175.00	$0.00	0.00000	4.09
94.5 - 95.5	$175.00	$0.00	0.00000	4.09
95.5 - 96.5	$175.00	$0.00	0.00000	4.09
96.5 - 97.5	$175.00	$0.00	0.00000	4.09
97.5 - 98.5	$175.00	$0.00	0.00000	4.09
98.5 - 99.5	$175.00	$0.00	0.00000	4.09
99.5 - 100.5	$175.00	$0.00	0.00000	4.09
100.5 - 101.5	$175.00	$0.00	0.00000	4.09
101.5 - 102.5	$175.00	$0.00	0.00000	4.09
102.5 - 103.5	$0.00	$0.00	0.00000	4.09
103.5 - 104.5	$0.00	$0.00	0.00000	4.09
104.5 - 105.5	$0.00	$0.00	0.00000	4.09
105.5 - 106.5	$0.00	$0.00	0.00000	4.09
106.5 - 107.5	$0.00	$0.00	0.00000	4.09

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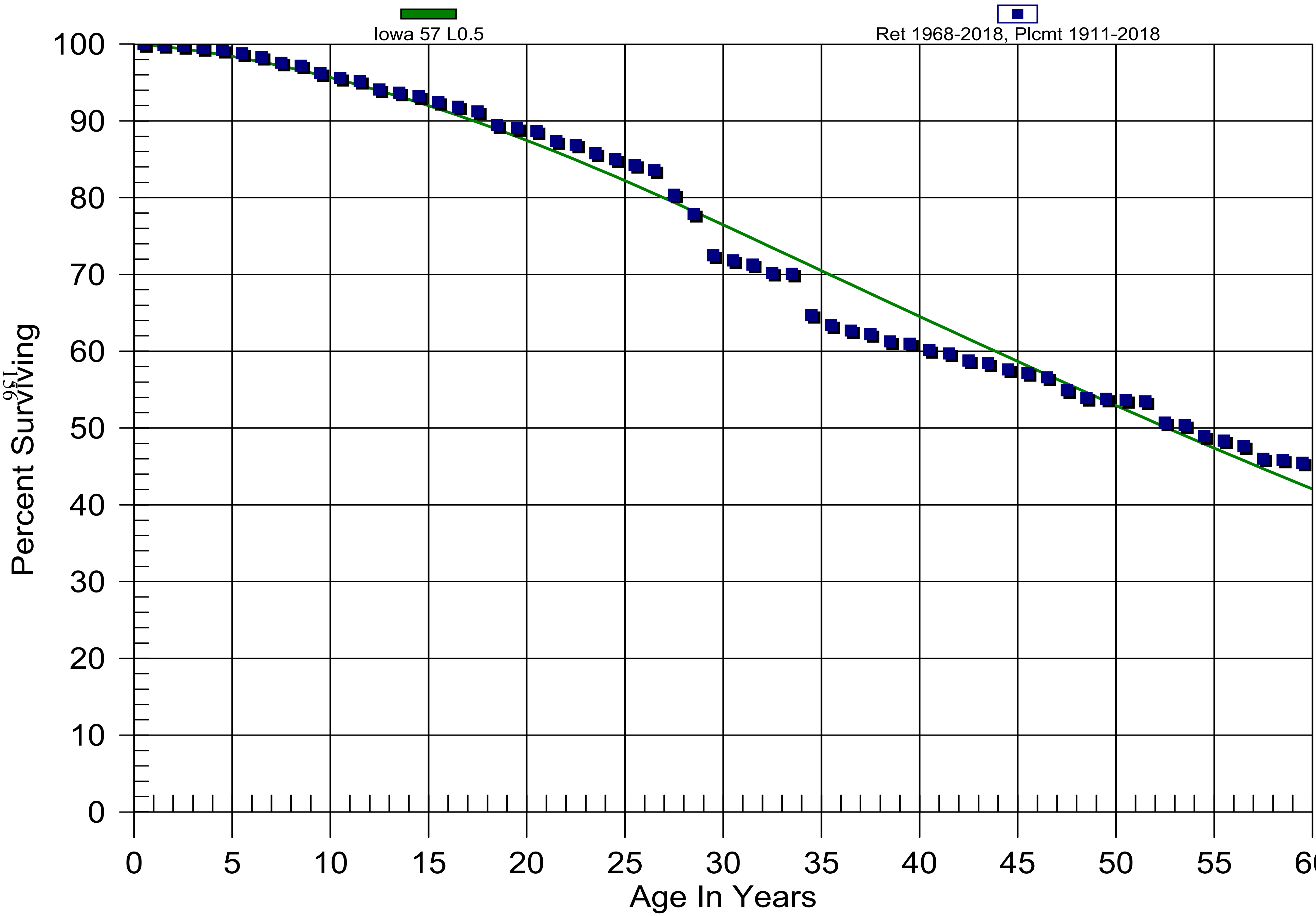
Electric Division
390.00 Structures and Improvements
Original And Smooth Survivor Curves



SOAH DOCKET NO. 473-19-6677
PUC DOCKET NO. 49831

APPLICATION OF SOUTHWESTERN	§	BEFORE THE STATE OFFICE
PUBLIC SERVICE COMPANY FOR	§	OF
AUTHORITY TO CHANGE RATES	§	ADMINISTRATIVE HEARINGS

DIRECT TESTIMONY AND EXHIBITS OF DAVID J. GARRETT

EXHIBIT DJG-13

REMAINING LIFE DEVELOPMENT

SPS
Electric Division
352.00 Structures and Improvements

Original Cost Of Utility Plant In Service
And Development Of Composite Remaining Life as of December 31, 2018
Based Upon Broad Group/Remaining Life Procedure and Technique

Average Service Life: 70 **Survivor Curve:** R3

Year (1)	Original Cost (2)	Avg. Service Life (3)	Avg. Annual Accrual (4)	Avg. Remaining Life (5)	Future Annual Accruals (6)
1929	150.00	70.00	2.14	7.23	15.48
1931	4,835.44	70.00	69.08	7.77	536.92
1937	408.80	70.00	5.84	9.58	55.94
1943	1,749.43	70.00	24.99	11.74	293.49
1944	322.58	70.00	4.61	12.15	55.97
1945	19.93	70.00	0.28	12.56	3.58
1946	5,824.31	70.00	83.20	12.99	1,080.85
1947	25,979.50	70.00	371.14	13.43	4,985.92
1950	58,382.26	70.00	834.03	14.84	12,379.17
1951	56,864.92	70.00	812.36	15.34	12,462.22
1952	29,673.63	70.00	423.91	15.85	6,719.18
1953	15,785.87	70.00	225.51	16.37	3,692.18
1954	62,091.60	70.00	887.02	16.91	15,001.87
1955	49,955.14	70.00	713.64	17.46	12,461.24
1956	13,695.72	70.00	195.65	18.03	3,527.11
1957	31,398.74	70.00	448.55	18.60	8,344.18
1958	485,009.42	70.00	6,928.71	19.19	132,983.87
1959	8,004.33	70.00	114.35	19.79	2,263.35
1960	11,433.38	70.00	163.33	20.40	3,332.79
1961	79,548.87	70.00	1,136.41	21.03	23,902.25
1962	46,343.51	70.00	662.05	21.67	14,345.29
1963	15,831.45	70.00	226.16	22.32	5,047.57
1964	86,783.59	70.00	1,239.77	22.98	28,484.54
1965	183,229.00	70.00	2,617.56	23.65	61,896.85
1966	84,500.10	70.00	1,207.14	24.33	29,364.67
1967	77,935.41	70.00	1,113.36	25.01	27,849.07
1968	12,418.18	70.00	177.40	25.72	4,562.05

SPS
Electric Division
352.00 Structures and Improvements

Original Cost Of Utility Plant In Service
And Development Of Composite Remaining Life as of December 31, 2018
Based Upon Broad Group/Remaining Life Procedure and Technique

Average Service Life: 70 **Survivor Curve: R3**

Year (1)	Original Cost (2)	Avg. Service Life (3)	Avg. Annual Accrual (4)	Avg. Remaining Life (5)	Future Annual Accruals (6)
1969	81,119.75	70.00	1,158.85	26.42	30,620.79
1970	33,022.39	70.00	471.75	27.14	12,805.04
1971	58,303.48	70.00	832.91	27.87	23,213.19
1972	163,353.18	70.00	2,333.62	28.61	66,759.53
1973	42,454.12	70.00	606.49	29.35	17,801.58
1974	55,414.37	70.00	791.63	30.10	23,830.94
1975	49,492.75	70.00	707.04	30.87	21,824.50
1976	121,698.31	70.00	1,738.55	31.64	55,000.30
1977	674,226.58	70.00	9,631.81	32.42	312,216.80
1978	133,173.91	70.00	1,902.48	33.20	63,161.85
1979	1,025,792.52	70.00	14,654.18	33.99	498,154.09
1980	162,471.25	70.00	2,321.02	34.79	80,757.67
1981	20,710.66	70.00	295.87	35.60	10,533.05
1982	356,479.35	70.00	5,092.56	36.42	185,461.51
1983	463,513.77	70.00	6,621.62	37.24	246,586.59
1984	271,072.51	70.00	3,872.46	38.07	147,427.84
1985	482,362.99	70.00	6,890.90	38.91	268,102.06
1986	696,903.46	70.00	9,955.76	39.75	395,754.34
1987	143,627.20	70.00	2,051.82	40.60	83,306.03
1988	214,869.52	70.00	3,069.56	41.46	127,254.24
1989	1,149,200.07	70.00	16,417.14	42.32	694,805.62
1990	579,463.06	70.00	8,278.04	43.19	357,535.80
1991	329,259.77	70.00	4,703.71	44.07	207,284.26
1992	13,155,037.26	70.00	187,929.09	44.95	8,447,378.91
1993	923,987.30	70.00	13,199.82	45.84	605,065.24
1994	303,639.36	70.00	4,337.70	46.73	202,712.16
1995	537,621.40	70.00	7,680.31	47.63	365,823.12

SPS

Electric Division

352.00 Structures and Improvements

Original Cost Of Utility Plant In Service

And Development Of Composite Remaining Life as of December 31, 2018

Based Upon Broad Group/Remaining Life Procedure and Technique

Average Service Life: **70** *Survivor Curve:* **R3**

Year (1)	Original Cost (2)	Avg. Service Life (3)	Avg. Annual Accrual (4)	Avg. Remaining Life (5)	Future Annual Accruals (6)
1996	474,505.73	70.00	6,778.65	48.54	329,022.37
1997	1,000,362.96	70.00	14,290.90	49.45	706,655.55
1998	1,890,795.51	70.00	27,011.36	50.36	1,360,422.93
1999	587,133.70	70.00	8,387.62	51.29	430,161.48
2000	310,420.70	70.00	4,434.58	52.21	231,537.17
2001	1,968,855.81	70.00	28,126.51	53.14	1,494,697.29
2002	105,252.47	70.00	1,503.61	54.08	81,309.34
2003	53,767.66	70.00	768.11	55.02	42,258.78
2004	812,300.60	70.00	11,604.29	55.96	649,371.58
2005	707,277.67	70.00	10,103.97	56.91	574,994.79
2006	840,125.07	70.00	12,001.79	57.86	694,408.62
2007	576,364.65	70.00	8,233.78	58.81	484,262.92
2008	2,515,271.11	70.00	35,932.44	59.77	2,147,765.48
2009	3,188,407.32	70.00	45,548.67	60.73	2,766,326.59
2010	375,239.51	70.00	5,360.56	61.70	330,740.59
2011	1,309,473.69	70.00	18,706.77	62.67	1,172,279.79
2012	2,716,118.16	70.00	38,801.68	63.64	2,469,219.93
2013	4,382,386.82	70.00	62,605.52	64.61	4,044,918.89
2014	9,459,539.08	70.00	135,136.26	65.59	8,862,947.22
2015	8,817,787.91	70.00	125,968.39	66.56	8,384,800.20
2016	14,151,733.55	70.00	202,167.60	67.54	13,654,824.68
2017	3,477,770.43	70.00	49,682.43	68.52	3,404,448.64
2018	18,235,305.02	70.00	260,504.34	69.51	18,106,991.52
Total	101,632,640.53	70.00	1,451,894.74	59.50	86,391,190.96

Composite Average Remaining Life ... 59.50 Years

SPS
Electric Division
355.00 Poles and Fixtures

Original Cost Of Utility Plant In Service
And Development Of Composite Remaining Life as of December 31, 2018
Based Upon Broad Group/Remaining Life Procedure and Technique

Average Service Life: 63 **Survivor Curve:** L1.5

Year (1)	Original Cost (2)	Avg. Service Life (3)	Avg. Annual Accrual (4)	Avg. Remaining Life (5)	Future Annual Accruals (6)
1951	132.24	63.00	2.10	25.85	54.26
1953	1,100.78	63.00	17.47	26.38	460.96
1955	3,184.56	63.00	50.55	26.92	1,360.53
1960	250.07	63.00	3.97	28.27	112.23
1962	3,951.09	63.00	62.71	28.83	1,808.29
1963	2,850.42	63.00	45.24	29.12	1,317.37
1964	3,373.35	63.00	53.54	29.41	1,574.53
1965	10,309.82	63.00	163.64	29.70	4,859.81
1966	3,187.93	63.00	50.60	29.99	1,517.71
1967	12,182.00	63.00	193.36	30.30	5,858.04
1968	14,508.08	63.00	230.28	30.60	7,047.30
1969	43,009.61	63.00	682.67	30.92	21,106.07
1970	34,588.55	63.00	549.01	31.24	17,149.22
1971	15,773.92	63.00	250.37	31.56	7,902.77
1972	375,021.81	63.00	5,952.54	31.90	189,881.31
1973	80,429.87	63.00	1,276.63	32.24	41,162.14
1974	26,641.53	63.00	422.87	32.60	13,783.44
1975	926,718.48	63.00	14,709.36	32.96	484,787.42
1976	97,651.01	63.00	1,549.97	33.33	51,661.17
1977	293,075.91	63.00	4,651.86	33.71	156,829.18
1978	199,843.56	63.00	3,172.02	34.11	108,192.93
1979	907,039.36	63.00	14,397.01	34.51	496,900.10
1980	811,858.93	63.00	12,886.25	34.93	450,171.35
1981	319,235.73	63.00	5,067.08	35.36	179,195.59
1982	1,002,567.42	63.00	15,913.28	35.81	569,885.70
1983	1,439,175.07	63.00	22,843.35	36.27	828,604.38
1984	1,873,697.25	63.00	29,740.31	36.75	1,092,895.03

SPS
Electric Division
355.00 Poles and Fixtures

Original Cost Of Utility Plant In Service
And Development Of Composite Remaining Life as of December 31, 2018
Based Upon Broad Group/Remaining Life Procedure and Technique

Average Service Life: 63 **Survivor Curve: L1.5**

Year (1)	Original Cost (2)	Avg. Service Life (3)	Avg. Annual Accrual (4)	Avg. Remaining Life (5)	Future Annual Accruals (6)
1985	7,000,346.03	63.00	111,113.19	37.24	4,138,075.62
1986	2,633,859.03	63.00	41,806.00	37.75	1,578,146.13
1987	366,213.47	63.00	5,812.73	38.28	222,505.65
1988	4,496,262.58	63.00	71,367.05	38.83	2,770,885.85
1989	8,458,754.31	63.00	134,261.81	39.39	5,288,379.82
1990	7,845,823.08	63.00	124,533.04	39.97	4,978,009.37
1991	16,483,608.26	63.00	261,636.53	40.57	10,615,318.42
1992	21,458,347.53	63.00	340,598.21	41.20	14,031,159.83
1993	18,368,573.05	63.00	291,555.68	41.84	12,197,319.12
1994	21,996,219.36	63.00	349,135.60	42.49	14,834,936.09
1996	11,486,698.60	63.00	182,322.94	43.85	7,995,488.53
1997	9,098,674.35	63.00	144,418.96	44.56	6,435,409.73
1998	4,407,424.90	63.00	69,956.97	45.28	3,167,526.09
1999	6,488,289.22	63.00	102,985.55	46.01	4,738,825.52
2000	5,238,170.23	63.00	83,143.00	46.76	3,888,045.12
2001	17,416,271.93	63.00	276,440.26	47.52	13,137,446.25
2002	19,294,887.02	63.00	306,258.63	48.30	14,792,665.82
2003	4,452,788.79	63.00	70,677.01	49.09	3,469,485.13
2004	15,259,280.97	63.00	242,203.36	49.90	12,084,982.52
2005	8,932,542.30	63.00	141,782.02	50.72	7,190,596.38
2006	11,115,464.91	63.00	176,430.52	51.55	9,094,602.51
2007	5,274,992.34	63.00	83,727.46	52.40	4,387,016.09
2008	13,437,644.50	63.00	213,289.38	53.26	11,358,860.93
2009	38,592,730.77	63.00	612,564.19	54.13	33,159,310.25
2010	21,712,913.04	63.00	344,638.81	55.02	18,962,130.97
2011	53,946,569.84	63.00	856,268.42	55.92	47,882,331.32
2012	74,021,766.70	63.00	1,174,912.54	56.83	66,773,921.02

SPS
Electric Division
355.00 Poles and Fixtures

Original Cost Of Utility Plant In Service
And Development Of Composite Remaining Life as of December 31, 2018
Based Upon Broad Group/Remaining Life Procedure and Technique

Average Service Life: **63** *Survivor Curve:* **L1.5**

Year (1)	Original Cost (2)	Avg. Service Life (3)	Avg. Annual Accrual (4)	Avg. Remaining Life (5)	Future Annual Accruals (6)
2013	58,585,753.36	63.00	929,903.99	57.76	53,707,181.33
2014	265,026,939.31	63.00	4,206,647.42	58.69	246,893,150.71
2015	139,370,713.59	63.00	2,212,165.51	59.63	131,920,031.23
2016	60,219,855.42	63.00	955,841.32	60.59	57,912,649.98
2017	65,907,933.96	63.00	1,046,125.50	61.55	64,388,263.01
2018	133,855,184.33	63.00	2,124,620.11	62.52	132,822,587.79
Total	1,160,752,855.43	63.00	18,424,081.80	55.99	1,031,553,322.96

Composite Average Remaining Life ... ***55.99 Years***

SPS
Electric Division
362.00 Station Equipment

Original Cost Of Utility Plant In Service
And Development Of Composite Remaining Life as of December 31, 2018
Based Upon Broad Group/Remaining Life Procedure and Technique

Average Service Life: 61 **Survivor Curve: R1**

Year (1)	Original Cost (2)	Avg. Service Life (3)	Avg. Annual Accrual (4)	Avg. Remaining Life (5)	Future Annual Accruals (6)
1926	4,603.74	61.00	75.47	9.57	722.39
1927	16,257.42	61.00	266.51	9.91	2,641.08
1929	1,151.33	61.00	18.87	10.60	200.10
1930	10,679.45	61.00	175.07	10.95	1,917.46
1931	16,981.02	61.00	278.37	11.31	3,147.82
1933	2,929.37	61.00	48.02	12.03	577.80
1937	5,335.60	61.00	87.47	13.53	1,183.57
1938	16,627.80	61.00	272.58	13.92	3,793.38
1939	1,053.61	61.00	17.27	14.31	247.10
1940	5,716.34	61.00	93.71	14.70	1,377.66
1941	10,364.63	61.00	169.91	15.10	2,565.69
1942	3,925.06	61.00	64.34	15.50	997.60
1943	17,793.86	61.00	291.70	15.91	4,641.77
1944	96,716.84	61.00	1,585.49	16.33	25,885.08
1945	37,279.11	61.00	611.12	16.74	10,232.87
1946	63,625.14	61.00	1,043.02	17.17	17,905.99
1947	201,487.66	61.00	3,303.01	17.60	58,118.36
1948	134,032.15	61.00	2,197.21	18.03	39,612.31
1949	386,585.04	61.00	6,337.34	18.47	117,029.45
1950	319,790.35	61.00	5,242.37	18.91	99,132.91
1951	339,833.94	61.00	5,570.94	19.36	107,842.76
1952	424,013.65	61.00	6,950.91	19.81	137,710.85
1953	165,111.30	61.00	2,706.69	20.27	54,867.20
1954	472,748.52	61.00	7,749.83	20.73	160,691.34
1955	259,712.49	61.00	4,257.50	21.20	90,279.22
1956	294,794.29	61.00	4,832.60	21.68	104,770.50
1957	208,041.62	61.00	3,410.45	22.16	75,575.97

SPS
Electric Division
362.00 Station Equipment

Original Cost Of Utility Plant In Service
And Development Of Composite Remaining Life as of December 31, 2018
Based Upon Broad Group/Remaining Life Procedure and Technique

Average Service Life: **61** *Survivor Curve:* **R1**

Year (1)	Original Cost (2)	Avg. Service Life (3)	Avg. Annual Accrual (4)	Avg. Remaining Life (5)	Future Annual Accruals (6)
1958	426,019.90	61.00	6,983.80	22.65	158,158.48
1959	490,967.64	61.00	8,048.50	23.14	186,220.74
1960	255,596.11	61.00	4,190.02	23.64	99,031.58
1961	342,182.42	61.00	5,609.44	24.14	135,402.30
1962	444,393.25	61.00	7,285.00	24.65	179,546.19
1963	331,789.96	61.00	5,439.08	25.16	136,851.50
1964	630,955.18	61.00	10,343.33	25.68	265,627.10
1965	556,798.54	61.00	9,127.67	26.21	239,198.76
1966	841,474.26	61.00	13,794.40	26.74	368,832.11
1967	401,874.64	61.00	6,587.98	27.28	179,688.30
1968	514,423.96	61.00	8,433.02	27.82	234,584.13
1969	702,922.06	61.00	11,523.09	28.37	326,868.91
1970	265,298.47	61.00	4,349.07	28.92	125,773.19
1971	461,132.45	61.00	7,559.40	29.48	222,853.83
1972	464,487.56	61.00	7,614.41	30.05	228,785.82
1973	738,807.31	61.00	12,111.36	30.62	370,809.59
1974	585,684.17	61.00	9,601.20	31.19	299,502.60
1975	1,043,656.16	61.00	17,108.79	31.78	543,667.38
1976	1,825,233.47	61.00	29,921.29	32.36	968,373.72
1977	1,008,352.94	61.00	16,530.06	32.96	544,797.84
1978	1,838,873.98	61.00	30,144.90	33.56	1,011,570.45
1979	501,847.99	61.00	8,226.86	34.16	281,029.92
1980	1,570,464.20	61.00	25,744.83	34.77	895,139.19
1981	188,235.74	61.00	3,085.77	35.38	109,186.94
1982	565,812.78	61.00	9,275.44	36.00	333,938.40
1983	1,558,477.78	61.00	25,548.33	36.63	935,753.37
1984	1,539,134.33	61.00	25,231.23	37.25	939,972.33

SPS

Electric Division

362.00 Station Equipment

Original Cost Of Utility Plant In Service

And Development Of Composite Remaining Life as of December 31, 2018

Based Upon Broad Group/Remaining Life Procedure and Technique

Average Service Life: **61** *Survivor Curve:* **R1**

Year (1)	Original Cost (2)	Avg. Service Life (3)	Avg. Annual Accrual (4)	Avg. Remaining Life (5)	Future Annual Accruals (6)
1985	2,115,472.56	61.00	34,679.22	37.89	1,313,934.66
1986	252,264.42	61.00	4,135.40	38.53	159,321.47
1987	103,001.95	61.00	1,688.52	39.17	66,134.83
1988	1,012,521.03	61.00	16,598.39	39.81	660,846.44
1989	964,256.27	61.00	15,807.18	40.46	639,624.14
1990	1,199,293.26	61.00	19,660.17	41.12	808,372.71
1991	1,053,690.49	61.00	17,273.29	41.78	721,596.06
1992	864,548.81	61.00	14,172.66	42.44	601,436.87
1993	3,527,798.44	61.00	57,831.66	43.10	2,492,554.49
1994	2,779,402.52	61.00	45,563.11	43.77	1,994,207.66
1995	2,397,249.98	61.00	39,298.43	44.44	1,746,330.54
1997	3,458,824.33	61.00	56,700.96	45.79	2,596,223.92
1998	2,372,982.74	61.00	38,900.62	46.47	1,807,557.35
1999	3,629,556.18	61.00	59,499.79	47.15	2,805,281.77
2000	2,291,540.89	61.00	37,565.53	47.83	1,796,822.68
2001	1,303,960.83	61.00	21,376.00	48.52	1,037,104.52
2002	1,512,896.34	61.00	24,801.11	49.21	1,220,368.86
2003	1,430,189.54	61.00	23,445.28	49.90	1,169,860.70
2004	1,521,085.84	61.00	24,935.36	50.59	1,261,497.24
2005	3,880,896.11	61.00	63,620.04	51.29	3,262,913.01
2006	3,423,195.29	61.00	56,116.89	51.99	2,917,341.90
2007	1,990,961.97	61.00	32,638.10	52.69	1,719,656.88
2008	4,015,564.24	61.00	65,827.67	53.39	3,514,811.40
2009	3,551,878.47	61.00	58,226.41	54.10	3,150,142.69
2010	6,145,037.51	61.00	100,736.40	54.81	5,521,726.11
2011	7,018,878.30	61.00	115,061.39	55.53	6,389,199.44
2012	4,043,043.31	61.00	66,278.14	56.25	3,727,879.17

SPS
Electric Division
362.00 Station Equipment

Original Cost Of Utility Plant In Service
And Development Of Composite Remaining Life as of December 31, 2018
Based Upon Broad Group/Remaining Life Procedure and Technique

Average Service Life: 61 **Survivor Curve: R1**

Year (1)	Original Cost (2)	Avg. Service Life (3)	Avg. Annual Accrual (4)	Avg. Remaining Life (5)	Future Annual Accruals (6)
2013	7,671,955.90	61.00	125,767.38	56.97	7,164,715.49
2014	10,686,548.02	61.00	175,185.98	57.69	10,107,048.09
2015	16,468,803.64	61.00	269,975.25	58.42	15,772,295.40
2016	18,472,896.80	61.00	302,828.62	59.15	17,913,525.32
2017	12,102,645.41	61.00	198,400.25	59.89	11,882,232.27
2018	13,619,260.97	61.00	223,262.33	60.63	13,536,293.81
Total	170,494,190.94	61.00	2,794,933.60	51.14	142,923,690.80

Composite Average Remaining Life ... 51.14 Years

SPS
Electric Division
364.00 Poles, Towers and Fixtures

Original Cost Of Utility Plant In Service
And Development Of Composite Remaining Life as of December 31, 2018
Based Upon Broad Group/Remaining Life Procedure and Technique

Average Service Life: 56 **Survivor Curve: R0.5**

Year (1)	Original Cost (2)	Avg. Service Life (3)	Avg. Annual Accrual (4)	Avg. Remaining Life (5)	Future Annual Accruals (6)
1906	0.02	0.00	0.00	0.00	0.00
1911	424.65	56.00	7.58	2.22	16.86
1912	1,734.80	56.00	30.98	2.69	83.39
1913	500.32	56.00	8.93	3.16	28.22
1914	120.08	56.00	2.14	3.62	7.77
1915	202.63	56.00	3.62	4.08	14.77
1916	1,082.78	56.00	19.33	4.53	87.64
1917	2,351.12	56.00	41.98	4.98	209.00
1918	375.35	56.00	6.70	5.42	36.31
1919	753.17	56.00	13.45	5.85	78.71
1920	1,102.64	56.00	19.69	6.28	123.61
1921	1,426.97	56.00	25.48	6.70	170.71
1922	3,717.47	56.00	66.38	7.12	472.38
1923	4,967.62	56.00	88.71	7.53	668.08
1924	5,718.30	56.00	102.11	7.94	810.68
1925	8,741.92	56.00	156.10	8.34	1,302.57
1926	31,250.21	56.00	558.03	8.75	4,881.06
1927	40,347.51	56.00	720.48	9.15	6,590.69
1928	28,594.01	56.00	510.60	9.55	4,875.41
1929	32,872.45	56.00	587.00	9.95	5,837.77
1930	42,896.31	56.00	765.99	10.34	7,921.26
1931	31,381.88	56.00	560.38	10.74	6,016.72
1932	7,826.63	56.00	139.76	11.13	1,555.86
1933	2,874.05	56.00	51.32	11.53	591.70
1934	4,127.92	56.00	73.71	11.92	878.99
1935	8,920.65	56.00	159.29	12.32	1,962.67
1936	12,822.76	56.00	228.97	12.72	2,912.18

SPS
Electric Division
364.00 Poles, Towers and Fixtures

Original Cost Of Utility Plant In Service
And Development Of Composite Remaining Life as of December 31, 2018
Based Upon Broad Group/Remaining Life Procedure and Technique

Average Service Life: **56** *Survivor Curve:* **R0.5**

Year (1)	Original Cost (2)	Avg. Service Life (3)	Avg. Annual Accrual (4)	Avg. Remaining Life (5)	Future Annual Accruals (6)
1937	33,203.45	56.00	592.91	13.12	7,777.87
1938	38,936.49	56.00	695.28	13.52	9,398.60
1939	29,512.54	56.00	527.00	13.92	7,335.31
1940	39,279.41	56.00	701.40	14.32	10,045.71
1941	44,534.18	56.00	795.24	14.73	11,712.00
1942	6,261.14	56.00	111.80	15.14	1,692.25
1943	36,050.43	56.00	643.74	15.55	10,007.37
1944	36,030.50	56.00	643.39	15.96	10,267.10
1945	79,434.39	56.00	1,418.44	16.37	23,223.97
1946	152,008.80	56.00	2,714.39	16.79	45,576.60
1947	211,858.03	56.00	3,783.10	17.21	65,114.03
1948	305,295.46	56.00	5,451.59	17.64	96,141.70
1949	520,465.66	56.00	9,293.84	18.06	167,869.66
1950	545,026.49	56.00	9,732.42	18.49	179,978.84
1951	691,172.27	56.00	12,342.11	18.93	233,591.95
1952	667,370.98	56.00	11,917.10	19.36	230,756.02
1953	731,371.08	56.00	13,059.93	19.80	258,639.62
1954	603,109.95	56.00	10,769.60	20.25	218,066.31
1955	544,026.14	56.00	9,714.56	20.70	201,055.20
1956	594,094.92	56.00	10,608.62	21.15	224,349.52
1957	542,252.54	56.00	9,682.88	21.60	209,183.77
1958	637,439.05	56.00	11,382.61	22.06	251,134.08
1959	656,433.81	56.00	11,721.79	22.53	264,049.88
1960	794,606.05	56.00	14,189.11	22.99	326,261.54
1961	859,969.30	56.00	15,356.28	23.46	360,333.93
1962	917,259.74	56.00	16,379.31	23.94	392,129.25
1963	899,253.46	56.00	16,057.77	24.42	392,133.99

SPS

Electric Division

364.00 Poles, Towers and Fixtures

Original Cost Of Utility Plant In Service

And Development Of Composite Remaining Life as of December 31, 2018

Based Upon Broad Group/Remaining Life Procedure and Technique

Average Service Life: 56 **Survivor Curve: R0.5**

Year (1)	Original Cost (2)	Avg. Service Life (3)	Avg. Annual Accrual (4)	Avg. Remaining Life (5)	Future Annual Accruals (6)
1964	1,084,590.85	56.00	19,367.30	24.90	482,322.28
1965	996,176.56	56.00	17,788.51	25.39	451,672.63
1966	1,024,612.54	56.00	18,296.28	25.88	473,570.71
1967	1,002,718.23	56.00	17,905.32	26.38	472,337.60
1968	839,803.46	56.00	14,996.19	26.88	403,099.44
1969	786,549.79	56.00	14,045.25	27.38	384,623.62
1970	899,850.45	56.00	16,068.43	27.89	448,190.78
1971	885,537.38	56.00	15,812.85	28.41	449,172.46
1972	951,860.78	56.00	16,997.17	28.92	491,600.18
1973	1,073,078.81	56.00	19,161.73	29.44	564,186.58
1974	1,066,296.14	56.00	19,040.62	29.97	570,614.42
1975	1,378,162.84	56.00	24,609.55	30.50	750,506.63
1976	1,457,705.70	56.00	26,029.93	31.03	807,696.21
1977	1,133,224.14	56.00	20,235.74	31.57	638,766.60
1978	2,820,539.64	56.00	50,365.76	32.11	1,617,079.35
1979	1,906,164.70	56.00	34,037.97	32.65	1,111,343.31
1980	2,684,142.42	56.00	47,930.14	33.20	1,591,191.24
1981	1,862,508.20	56.00	33,258.40	33.75	1,122,458.55
1982	2,664,342.75	56.00	47,576.58	34.30	1,632,090.19
1983	3,521,505.83	56.00	62,882.76	34.86	2,192,258.40
1984	2,391,444.92	56.00	42,703.51	35.42	1,512,702.57
1985	2,293,002.67	56.00	40,945.65	35.99	1,473,556.63
1986	2,326,072.46	56.00	41,536.17	36.56	1,518,387.56
1987	2,276,471.42	56.00	40,650.45	37.13	1,509,200.65
1988	3,096,453.73	56.00	55,292.70	37.70	2,084,506.87
1989	2,860,231.95	56.00	51,074.54	38.27	1,954,870.52
1990	3,040,333.63	56.00	54,290.57	38.85	2,109,373.15

SPS
Electric Division
364.00 Poles, Towers and Fixtures

Original Cost Of Utility Plant In Service
And Development Of Composite Remaining Life as of December 31, 2018
Based Upon Broad Group/Remaining Life Procedure and Technique

Average Service Life: 56 **Survivor Curve:** R0.5

Year (1)	Original Cost (2)	Avg. Service Life (3)	Avg. Annual Accrual (4)	Avg. Remaining Life (5)	Future Annual Accruals (6)
1991	3,251,388.50	56.00	58,059.33	39.43	2,289,524.77
1992	3,357,318.17	56.00	59,950.89	40.02	2,399,068.82
1993	3,581,561.61	56.00	63,955.16	40.60	2,596,689.66
1994	4,172,063.03	56.00	74,499.62	41.19	3,068,560.60
1995	14,786,109.63	56.00	264,032.32	41.78	11,030,723.75
1996	1,286,781.98	56.00	22,977.78	42.37	973,535.24
1997	621,594.49	56.00	11,099.68	42.96	476,849.64
1998	274,000.34	56.00	4,892.76	43.55	213,098.65
1999	6,424,600.36	56.00	114,722.68	44.15	5,064,880.83
2000	145,296.76	56.00	2,594.53	44.75	116,092.81
2001	1,174,294.43	56.00	20,969.12	45.34	950,793.85
2002	10,498,294.02	56.00	187,465.74	45.94	8,612,375.51
2003	2,825,539.01	56.00	50,455.03	46.54	2,348,194.11
2004	6,403,835.89	56.00	114,351.89	47.14	5,390,680.57
2005	5,663,135.20	56.00	101,125.36	47.74	4,828,038.50
2006	6,328,346.35	56.00	113,003.89	48.35	5,463,310.55
2007	6,590,680.08	56.00	117,688.33	48.95	5,760,857.44
2008	7,828,872.15	56.00	139,798.45	49.56	6,927,837.08
2009	7,104,463.10	56.00	126,862.84	50.16	6,363,813.01
2010	8,331,578.49	56.00	148,775.17	50.77	7,553,513.16
2011	11,821,819.27	56.00	211,099.64	51.38	10,846,525.04
2012	11,038,481.78	56.00	197,111.75	51.99	10,248,196.22
2013	12,277,266.58	56.00	219,232.46	52.60	11,532,628.12
2014	15,575,904.99	56.00	278,135.52	53.22	14,802,026.62
2015	17,066,637.65	56.00	304,755.21	53.83	16,406,321.44
2016	16,985,694.72	56.00	303,309.83	54.45	16,515,699.36
2017	17,976,074.63	56.00	320,994.83	55.07	17,677,163.29

SPS

Electric Division

364.00 Poles, Towers and Fixtures

Original Cost Of Utility Plant In Service

And Development Of Composite Remaining Life as of December 31, 2018

Based Upon Broad Group/Remaining Life Procedure and Technique

Average Service Life: **56** *Survivor Curve:* **R0.5**

Year (1)	Original Cost (2)	Avg. Service Life (3)	Avg. Annual Accrual (4)	Avg. Remaining Life (5)	Future Annual Accruals (6)
2018	33,687,677.29	56.00	601,553.47	55.69	33,500,723.57
Total	296,896,082.97	55.49	5,301,608.30	46.60	247,031,062.42

Composite Average Remaining Life ... **46.60 Years**

SPS
Electric Division
367.00 Underground Conductor and Devices
Original Cost Of Utility Plant In Service
And Development Of Composite Remaining Life as of December 31, 2018
Based Upon Broad Group/Remaining Life Procedure and Technique

Average Service Life: **61** *Survivor Curve:* **R0.5**

Year (1)	Original Cost (2)	Avg. Service Life (3)	Avg. Annual Accrual (4)	Avg. Remaining Life (5)	Future Annual Accruals (6)
1925	192.63	61.00	3.16	12.41	39.19
1926	1,595.37	61.00	26.15	12.81	334.99
1927	48.45	61.00	0.79	13.20	10.49
1928	44.91	61.00	0.74	13.60	10.01
1930	908.18	61.00	14.89	14.40	214.36
1931	594.42	61.00	9.74	14.80	144.20
1932	15,694.63	61.00	257.28	15.20	3,910.93
1935	1,564.35	61.00	25.64	16.42	421.01
1936	129.11	61.00	2.12	16.83	35.61
1937	553.95	61.00	9.08	17.24	156.54
1938	1,586.21	61.00	26.00	17.65	459.01
1939	29,706.72	61.00	486.99	18.07	8,799.24
1940	1,697.30	61.00	27.82	18.49	514.42
1941	305.78	61.00	5.01	18.91	94.79
1943	162.79	61.00	2.67	19.76	52.74
1945	1,143.26	61.00	18.74	20.63	386.59
1946	570.77	61.00	9.36	21.06	197.09
1947	388.34	61.00	6.37	21.50	136.90
1948	39,032.95	61.00	639.87	21.95	14,044.05
1949	57,355.35	61.00	940.23	22.40	21,056.75
1950	17,179.73	61.00	281.63	22.85	6,434.03
1951	5,276.41	61.00	86.50	23.30	2,015.33
1952	3,560.48	61.00	58.37	23.76	1,386.64
1953	2,933.47	61.00	48.09	24.22	1,164.62
1954	65,166.14	61.00	1,068.28	24.68	26,367.94
1955	20,220.23	61.00	331.47	25.15	8,336.95
1956	2,316.91	61.00	37.98	25.62	973.21

SPS
Electric Division
367.00 Underground Conductor and Devices
Original Cost Of Utility Plant In Service
And Development Of Composite Remaining Life as of December 31, 2018
Based Upon Broad Group/Remaining Life Procedure and Technique

Average Service Life: 61 *Survivor Curve:* R0.5

Year (1)	Original Cost (2)	Avg. Service Life (3)	Avg. Annual Accrual (4)	Avg. Remaining Life (5)	Future Annual Accruals (6)
1957	10,979.80	61.00	179.99	26.10	4,697.64
1958	1,181.70	61.00	19.37	26.58	514.88
1959	23,283.71	61.00	381.69	27.06	10,329.23
1960	12,484.54	61.00	204.66	27.55	5,638.22
1961	26,642.55	61.00	436.76	28.04	12,246.71
1962	5,048.69	61.00	82.76	28.53	2,361.63
1963	42,027.49	61.00	688.96	29.03	20,002.97
1964	28,092.70	61.00	460.53	29.54	13,602.15
1965	63,579.78	61.00	1,042.27	30.04	31,311.70
1966	93,965.56	61.00	1,540.39	30.55	47,062.14
1967	145,734.11	61.00	2,389.04	31.07	74,217.87
1968	124,571.02	61.00	2,042.11	31.58	64,496.13
1969	151,192.11	61.00	2,478.51	32.10	79,571.72
1970	86,096.89	61.00	1,411.40	32.63	46,052.26
1971	290,293.10	61.00	4,758.82	33.16	157,792.10
1972	211,453.93	61.00	3,466.40	33.69	116,783.77
1973	311,049.57	61.00	5,099.08	34.23	174,517.82
1974	298,596.11	61.00	4,894.93	34.76	170,172.19
1975	390,766.62	61.00	6,405.90	35.31	226,178.32
1976	514,985.31	61.00	8,442.23	35.85	302,681.89
1977	938,420.98	61.00	15,383.68	36.40	560,012.09
1978	711,405.86	61.00	11,662.18	36.96	430,984.32
1979	652,103.98	61.00	10,690.04	37.51	400,993.37
1980	355,900.42	61.00	5,834.33	38.07	222,112.99
1981	540,423.82	61.00	8,859.25	38.63	342,249.02
1982	257,172.81	61.00	4,215.87	39.20	165,245.58
1983	328,522.27	61.00	5,385.51	39.76	214,147.95

SPS
Electric Division
367.00 Underground Conductor and Devices

Original Cost Of Utility Plant In Service
And Development Of Composite Remaining Life as of December 31, 2018
Based Upon Broad Group/Remaining Life Procedure and Technique

Average Service Life: 61 *Survivor Curve:* R0.5

Year (1)	Original Cost (2)	Avg. Service Life (3)	Avg. Annual Accrual (4)	Avg. Remaining Life (5)	Future Annual Accruals (6)
1984	475,069.02	61.00	7,787.88	40.33	314,109.33
1985	306,824.97	61.00	5,029.83	40.91	205,750.81
1986	283,703.62	61.00	4,650.80	41.48	192,921.51
1987	111,208.18	61.00	1,823.05	42.06	76,674.48
1988	130,916.99	61.00	2,146.14	42.64	91,507.80
1989	352,413.75	61.00	5,777.17	43.22	249,690.40
1990	55,457.19	61.00	909.12	43.80	39,822.59
1991	189,942.85	61.00	3,113.76	44.39	138,218.15
1992	394,855.88	61.00	6,472.93	44.98	291,132.66
1993	435,229.76	61.00	7,134.79	45.57	325,101.58
1994	24,563.39	61.00	402.67	46.16	18,585.91
1995	654,887.52	61.00	10,735.67	46.75	501,872.16
1996	832,233.22	61.00	13,642.92	47.34	645,880.90
1997	160,162.58	61.00	2,625.57	47.94	125,860.93
1998	428,678.74	61.00	7,027.39	48.53	341,053.99
1999	841,102.84	61.00	13,788.32	49.13	677,410.12
2000	821,097.97	61.00	13,460.38	49.73	669,349.10
2001	305,912.71	61.00	5,014.87	50.33	252,378.64
2002	470,555.20	61.00	7,713.88	50.93	392,839.14
2003	439,217.76	61.00	7,200.16	51.53	371,005.66
2004	1,238,007.88	61.00	20,294.85	52.13	1,057,955.48
2005	1,634,017.56	61.00	26,786.69	52.73	1,412,534.81
2006	1,931,053.36	61.00	31,656.05	53.34	1,688,443.85
2007	1,484,791.26	61.00	24,340.41	53.94	1,312,983.32
2008	1,905,464.64	61.00	31,236.57	54.55	1,703,939.18
2009	1,283,484.23	61.00	21,040.35	55.16	1,160,525.72
2010	1,410,189.43	61.00	23,117.45	55.77	1,289,185.23

SPS
Electric Division
367.00 Underground Conductor and Devices
Original Cost Of Utility Plant In Service
And Development Of Composite Remaining Life as of December 31, 2018
Based Upon Broad Group/Remaining Life Procedure and Technique

Average Service Life: **61** *Survivor Curve:* **R0.5**

Year (1)	Original Cost (2)	Avg. Service Life (3)	Avg. Annual Accrual (4)	Avg. Remaining Life (5)	Future Annual Accruals (6)
2011	1,131,097.69	61.00	18,542.25	56.38	1,045,366.68
2012	2,372,034.22	61.00	38,885.11	56.99	2,216,029.60
2013	1,437,058.11	61.00	23,557.91	57.60	1,356,999.72
2014	3,208,961.18	61.00	52,604.98	58.22	3,062,532.20
2015	3,851,428.77	61.00	63,137.05	58.83	3,714,561.77
2016	2,366,226.86	61.00	38,789.91	59.45	2,306,101.18
2017	2,620,550.40	61.00	42,959.07	60.07	2,580,555.42
2018	2,604,908.37	61.00	42,702.65	60.69	2,591,633.88
Total	45,079,212.37	61.00	738,990.27	51.98	38,414,188.20

Composite Average Remaining Life ... 51.98 Years

SPS
Electric Division
368.00 Line Transformers

Original Cost Of Utility Plant In Service
And Development Of Composite Remaining Life as of December 31, 2018
Based Upon Broad Group/Remaining Life Procedure and Technique

Average Service Life: 55 *Survivor Curve:* L0

Year (1)	Original Cost (2)	Avg. Service Life (3)	Avg. Annual Accrual (4)	Avg. Remaining Life (5)	Future Annual Accruals (6)
1906	564.74	55.00	10.27	18.00	184.85
1911	261.40	55.00	4.75	18.96	90.12
1912	1,020.11	55.00	18.55	19.16	355.40
1913	648.35	55.00	11.79	19.36	228.20
1914	101.17	55.00	1.84	19.56	35.97
1915	300.00	55.00	5.45	19.76	107.77
1916	451.47	55.00	8.21	19.96	163.84
1917	2,250.98	55.00	40.93	20.17	825.32
1918	711.76	55.00	12.94	20.37	263.61
1919	878.87	55.00	15.98	20.57	328.78
1920	1,451.93	55.00	26.40	20.78	548.64
1921	1,735.63	55.00	31.56	20.99	662.45
1922	1,910.88	55.00	34.74	21.20	736.67
1923	2,551.63	55.00	46.39	21.42	993.65
1924	3,997.09	55.00	72.68	21.63	1,572.04
1925	5,281.39	55.00	96.03	21.85	2,097.81
1926	16,161.77	55.00	293.86	22.06	6,483.34
1927	20,164.55	55.00	366.64	22.28	8,169.29
1928	15,102.30	55.00	274.60	22.50	6,179.65
1929	15,629.60	55.00	284.18	22.73	6,458.33
1930	17,403.44	55.00	316.44	22.95	7,261.98
1931	14,749.09	55.00	268.17	23.17	6,214.80
1932	5,691.29	55.00	103.48	23.40	2,421.64
1933	2,927.26	55.00	53.22	23.63	1,257.74
1934	2,606.37	55.00	47.39	23.86	1,130.89
1935	3,817.10	55.00	69.40	24.10	1,672.33
1936	10,002.74	55.00	181.87	24.33	4,424.92

SPS
Electric Division
368.00 Line Transformers

Original Cost Of Utility Plant In Service
And Development Of Composite Remaining Life as of December 31, 2018
Based Upon Broad Group/Remaining Life Procedure and Technique

Average Service Life: 55 *Survivor Curve:* L0

Year (1)	Original Cost (2)	Avg. Service Life (3)	Avg. Annual Accrual (4)	Avg. Remaining Life (5)	Future Annual Accruals (6)
1937	27,784.42	55.00	505.19	24.57	12,410.31
1938	25,444.94	55.00	462.65	24.80	11,475.52
1939	26,430.47	55.00	480.57	25.05	12,036.30
1940	32,567.32	55.00	592.15	25.29	14,973.92
1941	26,048.27	55.00	473.62	25.53	12,091.89
1942	1,804.96	55.00	32.82	25.78	845.94
1943	31,124.42	55.00	565.92	26.02	14,727.51
1944	42,591.28	55.00	774.41	26.27	20,346.94
1945	64,026.03	55.00	1,164.15	26.53	30,881.80
1946	77,802.69	55.00	1,414.64	26.78	37,885.38
1947	177,529.45	55.00	3,227.91	27.04	87,272.10
1948	381,927.34	55.00	6,944.35	27.29	189,544.30
1949	339,850.89	55.00	6,179.30	27.56	170,270.81
1950	279,756.20	55.00	5,086.63	27.82	141,505.04
1951	265,227.59	55.00	4,822.47	28.08	135,430.47
1952	368,556.87	55.00	6,701.24	28.35	189,978.86
1953	462,026.90	55.00	8,400.75	28.62	240,419.03
1954	371,682.50	55.00	6,758.07	28.89	195,241.43
1955	452,243.14	55.00	8,222.85	29.16	239,810.19
1956	509,332.05	55.00	9,260.87	29.44	272,648.78
1957	651,271.26	55.00	11,841.66	29.72	351,923.00
1958	633,827.51	55.00	11,524.49	30.00	345,730.84
1959	917,394.78	55.00	16,680.42	30.28	505,129.71
1960	904,081.63	55.00	16,438.35	30.57	502,495.21
1961	812,089.96	55.00	14,765.72	30.86	455,635.87
1962	673,608.52	55.00	12,247.80	31.15	381,495.03
1963	620,007.39	55.00	11,273.21	31.44	354,441.40

SPS

Electric Division

368.00 Line Transformers

Original Cost Of Utility Plant In Service

And Development Of Composite Remaining Life as of December 31, 2018

Based Upon Broad Group/Remaining Life Procedure and Technique

Average Service Life: 55 **Survivor Curve: L0**

Year (1)	Original Cost (2)	Avg. Service Life (3)	Avg. Annual Accrual (4)	Avg. Remaining Life (5)	Future Annual Accruals (6)
1964	587,192.17	55.00	10,676.55	31.74	338,838.59
1965	702,101.64	55.00	12,765.87	32.04	408,955.82
1966	686,413.75	55.00	12,480.63	32.34	403,575.46
1967	648,585.92	55.00	11,792.83	32.64	384,924.44
1968	467,698.25	55.00	8,503.86	32.95	280,174.70
1969	333,391.18	55.00	6,061.84	33.26	201,591.28
1970	589,899.78	55.00	10,725.78	33.57	360,038.97
1971	767,441.76	55.00	13,953.91	33.88	472,791.31
1972	698,423.37	55.00	12,699.00	34.20	434,312.52
1973	711,991.16	55.00	12,945.69	34.52	446,895.31
1974	1,427,895.96	55.00	25,962.54	34.84	904,638.34
1975	1,343,661.29	55.00	24,430.95	35.17	859,241.27
1976	1,162,293.06	55.00	21,133.25	35.50	750,218.08
1977	1,876,943.90	55.00	34,127.30	35.83	1,222,839.19
1978	1,944,599.39	55.00	35,357.43	36.17	1,278,785.54
1979	1,565,130.23	55.00	28,457.78	36.51	1,038,870.34
1980	1,379,641.06	55.00	25,085.15	36.85	924,315.26
1981	1,119,670.04	55.00	20,358.26	37.19	757,159.29
1982	1,702,986.38	55.00	30,964.34	37.54	1,162,389.05
1983	2,001,016.50	55.00	36,383.23	37.89	1,378,596.31
1984	2,728,055.17	55.00	49,602.52	38.25	1,897,060.45
1985	2,474,600.59	55.00	44,994.11	38.60	1,736,901.28
1986	3,158,921.21	55.00	57,436.69	38.96	2,237,954.18
1987	1,966,467.68	55.00	35,755.05	39.33	1,406,182.73
1988	543,283.11	55.00	9,878.18	39.70	392,124.59
1989	1,210,407.13	55.00	22,008.08	40.07	881,806.24
1990	1,801,328.25	55.00	32,752.42	40.44	1,324,577.80

SPS
Electric Division
368.00 Line Transformers

Original Cost Of Utility Plant In Service
And Development Of Composite Remaining Life as of December 31, 2018
Based Upon Broad Group/Remaining Life Procedure and Technique

Average Service Life: 55 *Survivor Curve:* L0

Year (1)	Original Cost (2)	Avg. Service Life (3)	Avg. Annual Accrual (4)	Avg. Remaining Life (5)	Future Annual Accruals (6)
1991	2,165,437.11	55.00	39,372.79	40.82	1,607,213.79
1992	1,966,742.43	55.00	35,760.05	41.20	1,473,397.76
1993	2,063,101.61	55.00	37,512.09	41.59	1,560,061.82
1994	3,397,915.40	55.00	61,782.17	41.98	2,593,517.67
1995	983,704.10	55.00	17,886.08	42.37	757,902.49
1996	3,316,292.48	55.00	60,298.07	42.77	2,579,246.12
1997	3,301,614.63	55.00	60,031.19	43.18	2,592,272.55
1998	1,886,602.29	55.00	34,302.91	43.60	1,495,463.87
1999	3,265,072.53	55.00	59,366.77	44.02	2,613,126.94
2000	3,157,610.24	55.00	57,412.85	44.44	2,551,679.81
2001	2,677,882.52	55.00	48,690.26	44.88	2,185,281.47
2002	5,865,621.59	55.00	106,650.93	45.33	4,834,160.56
2003	3,395,458.78	55.00	61,737.50	45.78	2,826,467.05
2004	3,845,694.77	55.00	69,923.86	46.25	3,233,776.73
2005	5,340,984.66	55.00	97,111.78	46.72	4,537,205.04
2006	5,821,951.53	55.00	105,856.90	47.21	4,997,436.64
2007	7,774,599.28	55.00	141,360.67	47.71	6,744,284.79
2008	8,777,404.01	55.00	159,594.05	48.22	7,696,208.90
2009	8,408,712.27	55.00	152,890.35	48.75	7,453,739.60
2010	9,892,684.59	55.00	179,872.49	49.30	8,867,116.33
2011	10,990,830.72	55.00	199,839.40	49.86	9,963,283.28
2012	9,339,138.95	55.00	169,807.72	50.44	8,564,900.45
2013	8,144,081.26	55.00	148,078.73	51.04	7,558,407.61
2014	11,272,988.46	55.00	204,969.70	51.67	10,591,302.94
2015	13,216,970.88	55.00	240,315.91	52.33	12,575,964.37
2016	11,289,461.04	55.00	205,269.21	53.02	10,883,037.35
2017	7,736,726.54	55.00	140,672.06	53.76	7,562,086.37

SPS

Electric Division

368.00 Line Transformers

Original Cost Of Utility Plant In Service

And Development Of Composite Remaining Life as of December 31, 2018

Based Upon Broad Group/Remaining Life Procedure and Technique

Average Service Life: 55 **Survivor Curve: L0**

Year (1)	Original Cost (2)	Avg. Service Life (3)	Avg. Annual Accrual (4)	Avg. Remaining Life (5)	Future Annual Accruals (6)
2018	14,116,326.53	55.00	256,668.33	54.56	14,003,310.53
Total	218,336,062.82	55.00	3,969,868.04	46.29	183,775,128.78

Composite Average Remaining Life ... 46.29 Years

SPS
Electric Division
369.00 Services

Original Cost Of Utility Plant In Service
And Development Of Composite Remaining Life as of December 31, 2018
Based Upon Broad Group/Remaining Life Procedure and Technique

Average Service Life: 60 *Survivor Curve:* R0.5

Year (1)	Original Cost (2)	Avg. Service Life (3)	Avg. Annual Accrual (4)	Avg. Remaining Life (5)	Future Annual Accruals (6)
1906	144.57	60.00	2.41	3.63	8.75
1911	150.11	60.00	2.50	5.88	14.71
1912	741.96	60.00	12.37	6.31	78.06
1913	291.21	60.00	4.85	6.74	32.72
1914	92.39	60.00	1.54	7.16	11.03
1915	110.79	60.00	1.85	7.58	14.00
1916	186.66	60.00	3.11	7.99	24.87
1917	1,239.85	60.00	20.66	8.40	173.62
1918	379.30	60.00	6.32	8.81	55.68
1919	538.47	60.00	8.97	9.21	82.69
1920	851.13	60.00	14.19	9.61	136.38
1921	854.89	60.00	14.25	10.02	142.71
1922	1,083.63	60.00	18.06	10.41	188.07
1923	1,608.80	60.00	26.81	10.81	289.84
1924	2,229.36	60.00	37.16	11.21	416.36
1925	2,704.54	60.00	45.07	11.60	522.99
1926	2,433.45	60.00	40.56	12.00	486.59
1927	7,758.86	60.00	129.31	12.39	1,602.82
1928	5,336.47	60.00	88.94	12.79	1,137.53
1929	5,750.95	60.00	95.85	13.19	1,263.85
1930	9,546.16	60.00	159.10	13.58	2,161.12
1931	7,234.03	60.00	120.56	13.98	1,685.81
1932	4,984.32	60.00	83.07	14.38	1,194.71
1933	1,677.25	60.00	27.95	14.78	413.27
1934	2,157.81	60.00	35.96	15.19	546.14
1935	6,297.99	60.00	104.96	15.59	1,636.46
1936	8,132.62	60.00	135.54	16.00	2,168.27

SPS
Electric Division
369.00 Services

Original Cost Of Utility Plant In Service
And Development Of Composite Remaining Life as of December 31, 2018
Based Upon Broad Group/Remaining Life Procedure and Technique

Average Service Life: **60** *Survivor Curve:* **R0.5**

Year (1)	Original Cost (2)	Avg. Service Life (3)	Avg. Annual Accrual (4)	Avg. Remaining Life (5)	Future Annual Accruals (6)
1937	15,185.61	60.00	253.09	16.41	4,152.22
1938	10,721.99	60.00	178.70	16.82	3,005.12
1939	13,481.51	60.00	224.69	17.23	3,871.54
1940	17,182.04	60.00	286.36	17.65	5,053.21
1941	14,195.37	60.00	236.59	18.06	4,273.80
1942	157.00	60.00	2.62	18.49	48.37
1943	18,656.87	60.00	310.94	18.91	5,879.89
1944	11,572.76	60.00	192.88	19.34	3,729.61
1945	22,227.66	60.00	370.45	19.77	7,322.79
1946	43,832.87	60.00	730.53	20.20	14,756.88
1947	61,138.15	60.00	1,018.95	20.64	21,027.56
1948	75,930.05	60.00	1,265.48	21.08	26,671.43
1949	79,450.83	60.00	1,324.16	21.52	28,494.77
1950	96,655.05	60.00	1,610.89	21.97	35,384.27
1951	105,655.88	60.00	1,760.90	22.42	39,471.41
1952	115,388.36	60.00	1,923.10	22.87	43,979.64
1953	145,099.92	60.00	2,418.29	23.33	56,409.68
1954	137,428.47	60.00	2,290.43	23.79	54,482.73
1955	181,808.61	60.00	3,030.09	24.25	73,483.82
1956	194,119.06	60.00	3,235.26	24.72	79,974.62
1957	200,745.24	60.00	3,345.69	25.19	84,283.72
1958	190,774.95	60.00	3,179.52	25.67	81,609.61
1959	227,407.10	60.00	3,790.05	26.15	99,098.37
1960	238,022.59	60.00	3,966.97	26.63	105,642.29
1961	237,254.12	60.00	3,954.16	27.12	107,226.92
1962	240,288.90	60.00	4,004.74	27.61	110,566.23
1963	238,612.74	60.00	3,976.81	28.10	111,761.22

SPS
Electric Division
369.00 Services

Original Cost Of Utility Plant In Service
And Development Of Composite Remaining Life as of December 31, 2018
Based Upon Broad Group/Remaining Life Procedure and Technique

Average Service Life: 60 **Survivor Curve: R0.5**

Year (1)	Original Cost (2)	Avg. Service Life (3)	Avg. Annual Accrual (4)	Avg. Remaining Life (5)	Future Annual Accruals (6)
1964	219,173.35	60.00	3,652.82	28.60	104,480.03
1965	219,095.47	60.00	3,651.52	29.11	106,279.62
1966	214,248.42	60.00	3,570.74	29.61	105,737.75
1967	166,889.04	60.00	2,781.43	30.12	83,783.47
1968	170,210.97	60.00	2,836.80	30.64	86,910.94
1969	199,460.90	60.00	3,324.29	31.15	103,566.24
1970	213,164.10	60.00	3,552.67	31.68	112,537.08
1971	225,051.03	60.00	3,750.78	32.20	120,785.17
1972	282,486.51	60.00	4,708.02	32.73	154,103.36
1973	358,727.33	60.00	5,978.68	33.26	198,878.94
1974	364,744.12	60.00	6,078.96	33.80	205,478.23
1975	483,479.72	60.00	8,057.85	34.34	276,714.14
1976	666,491.80	60.00	11,107.99	34.89	387,502.48
1977	798,879.13	60.00	13,314.40	35.43	471,760.07
1978	920,910.03	60.00	15,348.22	35.98	552,270.73
1979	874,063.07	60.00	14,567.45	36.54	532,235.68
1980	595,797.34	60.00	9,929.77	37.09	368,324.86
1981	880,818.19	60.00	14,680.03	37.65	552,734.24
1982	1,070,836.88	60.00	17,846.95	38.22	682,028.24
1983	1,237,727.06	60.00	20,628.40	38.78	799,997.30
1984	1,431,502.72	60.00	23,857.94	39.35	938,807.63
1985	1,222,935.63	60.00	20,381.88	39.92	813,659.61
1986	1,067,918.64	60.00	17,798.31	40.49	720,737.14
1987	840,788.80	60.00	14,012.89	41.07	575,512.20
1988	858,337.78	60.00	14,305.36	41.65	595,805.78
1989	947,746.78	60.00	15,795.49	42.23	667,044.00
1990	989,754.31	60.00	16,495.60	42.81	706,224.43

SPS
Electric Division
369.00 Services

Original Cost Of Utility Plant In Service
And Development Of Composite Remaining Life as of December 31, 2018
Based Upon Broad Group/Remaining Life Procedure and Technique

Average Service Life: 60 **Survivor Curve:** R0.5

Year (1)	Original Cost (2)	Avg. Service Life (3)	Avg. Annual Accrual (4)	Avg. Remaining Life (5)	Future Annual Accruals (6)
1991	1,005,912.89	60.00	16,764.90	43.40	727,552.69
1992	1,164,730.97	60.00	19,411.82	43.98	853,813.31
1993	1,172,328.73	60.00	19,538.45	44.57	870,868.13
1994	1,403,677.44	60.00	23,394.19	45.16	1,056,536.13
1995	3,326,577.85	60.00	55,441.93	45.75	2,536,689.77
1996	398,669.64	60.00	6,644.37	46.35	307,946.21
1997	1,520,745.44	60.00	25,345.29	46.94	1,189,730.31
1998	1,956,172.89	60.00	32,602.28	47.54	1,549,797.16
1999	2,936,308.51	60.00	48,937.57	48.13	2,355,491.91
2000	1,874,594.45	60.00	31,242.66	48.73	1,522,470.86
2001	1,486,900.29	60.00	24,781.21	49.33	1,222,441.30
2002	4,716,426.61	60.00	78,605.65	49.93	3,924,674.90
2003	2,576,160.29	60.00	42,935.21	50.53	2,169,502.66
2004	2,561,341.88	60.00	42,688.24	51.13	2,182,722.17
2005	869,355.20	60.00	14,488.98	51.73	749,576.66
2006	2,955,012.52	60.00	49,249.29	52.34	2,577,642.39
2007	3,140,485.52	60.00	52,340.45	52.94	2,771,122.00
2008	1,851,591.00	60.00	30,859.28	53.55	1,652,538.79
2009	2,033,801.97	60.00	33,896.07	54.16	1,835,757.13
2010	4,937,398.69	60.00	82,288.45	54.77	4,506,750.39
2011	1,142,702.00	60.00	19,044.68	55.38	1,054,650.71
2012	2,448,736.65	60.00	40,811.52	55.99	2,285,029.31
2013	3,333,330.38	60.00	55,554.47	56.60	3,144,559.09
2014	3,341,386.41	60.00	55,688.74	57.22	3,186,386.98
2015	3,598,068.22	60.00	59,966.69	57.83	3,468,086.86
2016	3,283,757.71	60.00	54,728.28	58.45	3,198,932.15
2017	3,483,604.44	60.00	58,059.00	59.07	3,429,521.54

SPS

Electric Division

369.00 Services

Original Cost Of Utility Plant In Service

And Development Of Composite Remaining Life as of December 31, 2018

Based Upon Broad Group/Remaining Life Procedure and Technique

Average Service Life: **60** *Survivor Curve:* **R0.5**

Year (1)	Original Cost (2)	Avg. Service Life (3)	Avg. Annual Accrual (4)	Avg. Remaining Life (5)	Future Annual Accruals (6)
2018	4,001,022.11	60.00	66,682.46	59.69	3,980,294.29
Total	89,049,551.09	60.00	1,484,131.60	48.89	72,563,135.89

Composite Average Remaining Life ... 48.89 Years

SPS
Electric Division
390.00 Structures and Improvements

Original Cost Of Utility Plant In Service
And Development Of Composite Remaining Life as of December 31, 2018
Based Upon Broad Group/Remaining Life Procedure and Technique

Average Service Life: 57 *Survivor Curve:* L0.5

Year (1)	Original Cost (2)	Avg. Service Life (3)	Avg. Annual Accrual (4)	Avg. Remaining Life (5)	Future Annual Accruals (6)
1916	175.00	57.00	3.07	18.72	57.48
1928	510.63	57.00	8.96	21.14	189.34
1934	41,857.51	57.00	734.33	22.46	16,495.98
1937	326.88	57.00	5.73	23.16	132.82
1938	199.25	57.00	3.50	23.40	81.79
1939	2,438.45	57.00	42.78	23.64	1,011.14
1941	485.54	57.00	8.52	24.12	205.48
1942	302.18	57.00	5.30	24.37	129.19
1945	558.84	57.00	9.80	25.12	246.31
1946	2,743.60	57.00	48.13	25.38	1,221.56
1948	1,953.00	57.00	34.26	25.90	887.42
1949	56,723.14	57.00	995.13	26.16	26,036.25
1950	28,425.29	57.00	498.68	26.43	13,180.11
1951	51,589.39	57.00	905.06	26.70	24,164.20
1952	19,105.93	57.00	335.19	26.97	9,040.57
1953	269,191.86	57.00	4,722.60	27.25	128,669.87
1954	13,902.70	57.00	243.90	27.52	6,712.79
1955	10,326.32	57.00	181.16	27.80	5,036.63
1956	19,071.01	57.00	334.57	28.09	9,396.67
1957	24,411.39	57.00	428.26	28.37	12,149.92
1958	6,377.22	57.00	111.88	28.66	3,206.23
1959	8,246.61	57.00	144.68	28.95	4,188.14
1960	13,076.47	57.00	229.41	29.24	6,708.61
1961	96,558.50	57.00	1,693.98	29.54	50,038.81
1962	45,016.05	57.00	789.74	29.84	23,564.56
1963	7,987.10	57.00	140.12	30.14	4,223.35
1964	312,570.89	57.00	5,483.62	30.45	166,956.30

SPS
Electric Division
390.00 Structures and Improvements

Original Cost Of Utility Plant In Service
And Development Of Composite Remaining Life as of December 31, 2018
Based Upon Broad Group/Remaining Life Procedure and Technique

Average Service Life: 57 *Survivor Curve:* L0.5

Year (1)	Original Cost (2)	Avg. Service Life (3)	Avg. Annual Accrual (4)	Avg. Remaining Life (5)	Future Annual Accruals (6)
1965	386,833.71	57.00	6,786.46	30.75	208,711.91
1966	276,835.82	57.00	4,856.70	31.07	150,874.02
1967	9,282.37	57.00	162.85	31.38	5,110.00
1968	7,017.59	57.00	123.11	31.70	3,902.36
1969	475.69	57.00	8.35	32.02	267.19
1971	26,334.55	57.00	462.00	32.67	15,092.33
1972	88,669.60	57.00	1,555.58	33.00	51,330.45
1973	30,855.76	57.00	541.32	33.33	18,042.46
1974	17,386.34	57.00	305.02	33.67	10,268.97
1975	144,623.79	57.00	2,537.22	34.01	86,281.44
1976	54,944.73	57.00	963.93	34.35	33,110.60
1977	249,898.50	57.00	4,384.12	34.70	152,110.79
1978	1,513,257.16	57.00	26,547.99	35.05	930,388.85
1979	1,351,129.54	57.00	23,703.69	35.40	839,081.19
1980	163,370.16	57.00	2,866.10	35.76	102,479.65
1981	22,435.78	57.00	393.60	36.12	14,215.39
1982	249,640.27	57.00	4,379.59	36.48	159,766.14
1983	426,526.06	57.00	7,482.81	36.85	275,719.92
1984	385,795.21	57.00	6,768.24	37.22	251,902.65
1985	4,470,394.84	57.00	78,426.85	37.59	2,948,308.81
1986	3,938,565.36	57.00	69,096.64	37.97	2,623,765.06
1987	3,333,299.93	57.00	58,478.11	38.36	2,243,056.05
1988	1,535,442.04	57.00	26,937.19	38.75	1,043,756.32
1989	1,235,743.46	57.00	21,679.40	39.15	848,668.80
1990	3,433,368.46	57.00	60,233.67	39.55	2,382,421.51
1991	303,448.27	57.00	5,323.58	39.97	212,775.15
1992	538,198.52	57.00	9,441.94	40.39	381,392.87

SPS
Electric Division
390.00 Structures and Improvements
Original Cost Of Utility Plant In Service
And Development Of Composite Remaining Life as of December 31, 2018
Based Upon Broad Group/Remaining Life Procedure and Technique

Average Service Life: 57 *Survivor Curve:* L0.5

Year (1)	Original Cost (2)	Avg. Service Life (3)	Avg. Annual Accrual (4)	Avg. Remaining Life (5)	Future Annual Accruals (6)
1993	210,700.56	57.00	3,696.45	40.83	150,918.56
1994	211,040.90	57.00	3,702.42	41.28	152,817.64
1995	505,689.83	57.00	8,871.62	41.73	370,247.99
1996	1,921,497.18	57.00	33,709.99	42.21	1,422,736.19
1997	1,031,364.53	57.00	18,093.85	42.69	772,391.39
1998	159,776.91	57.00	2,803.06	43.19	121,054.42
1999	373,960.05	57.00	6,560.61	43.70	286,690.10
2000	279,564.21	57.00	4,904.56	44.23	216,904.84
2001	197,464.53	57.00	3,464.24	44.76	155,074.70
2002	216,915.00	57.00	3,805.47	45.32	172,468.85
2003	2,528,602.01	57.00	44,360.80	45.89	2,035,858.56
2004	2,401,545.42	57.00	42,131.77	46.48	1,958,298.73
2005	476,179.21	57.00	8,353.90	47.08	393,311.02
2006	926,326.21	57.00	16,251.10	47.70	775,190.26
2007	433,203.04	57.00	7,599.94	48.34	367,353.16
2008	1,674,539.25	57.00	29,377.46	48.99	1,439,139.43
2009	1,472,528.89	57.00	25,833.47	49.65	1,282,727.63
2010	6,324,835.50	57.00	110,960.43	50.34	5,585,722.55
2011	2,805,809.61	57.00	49,224.02	51.04	2,512,535.73
2012	3,162,491.36	57.00	55,481.51	51.76	2,871,921.31
2013	2,067,942.14	57.00	36,279.17	52.50	1,904,660.99
2014	6,292,735.96	57.00	110,397.29	53.26	5,879,786.49
2015	2,078,316.43	57.00	36,461.17	54.04	1,970,413.02
2016	3,300,755.00	57.00	57,907.15	54.85	3,175,980.83
2017	1,804,355.90	57.00	31,654.91	55.67	1,762,360.15
2018	642,367.94	57.00	11,269.45	56.54	637,222.43

SPS

Electric Division

390.00 Structures and Improvements

Original Cost Of Utility Plant In Service

And Development Of Composite Remaining Life as of December 31, 2018

Based Upon Broad Group/Remaining Life Procedure and Technique

Average Service Life: 57 **Survivor Curve:** L0.5

Year (1)	Original Cost (2)	Avg. Service Life (3)	Avg. Annual Accrual (4)	Avg. Remaining Life (5)	Future Annual Accruals (6)
Total	68,728,411.83	57.00	1,205,744.28	45.52	54,880,519.34

Composite Average Remaining Life ... 45.52 Years

SOAH DOCKET NO. 473-19-6677
PUC DOCKET NO. 49831

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DIRECT TESTIMONY AND EXHIBITS
OF
DAVID J. GARRETT

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