BEFORE THE CORPORATION COMMISSION OF OKLAHOMA

APPLICATION OF PUBLIC SERVICE COMPANY OF OKLAHOMA, AN OKLAHOMA CORPORATION, FOR AN ADJUSTMENT IN ITS RATES AND CHARGES AND THE ELECTRIC SERVICE RULES, REGULATIONS AND CONDITIONS OF SERVICE FOR ELECTRIC SERVICE IN THE STATE OF OKLAHOMA	CAUSE NO. PUD 201700151

RESPONSIVE TESTIMONY OF

DAVID J. GARRETT

PART II – DEPRECIATION

ON BEHALF OF

OKLAHOMA INDUSTRIAL ENERGY CONSUMERS, WAL-MART STORES EAST, LP, AND SAM'S EAST, INC.

IN RESPONSE TO THE DIRECT TESTIMONIES OF JOHN J. SPANOS AND THOMAS J. MEEHAN

SEPTEMBER 21, 2017

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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. degree with a major in Finance, an M.B.A. degree, and a Juris Doctor degree 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 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 Commission, I formed Resolve Utility Consulting, PLLC, where I have represented various consumer groups and state agencies in utility regulatory proceedings, primarily in the areas of cost of capital and depreciation. I am a Certified Depreciation Professional through the Society of Depreciation Professionals. I am also a Certified Rate of Return Analyst through 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] Direct Exhibit DJG-2-1.

Q. On whose behalf are you testifying in this proceeding?

A. I am testifying on behalf of Oklahoma Industrial Energy Consumers ("OIEC") and Wal-Mart Stores East, LP, and Sam's East, Inc. (collectively, "Wal-Mart").

Q. Describe the purpose and scope of your testimony in this proceeding.

A. In this case I am testifying in response to the direct testimonies of four witnesses of Public Service Company of Oklahoma ("PSO" or the Company). Part I of my responsive testimony (a separate document) addresses the direct testimony of Pauline M. Ahern regarding general ratemaking theory and fair rate of return principles. Part II of my responsive testimony (this document) addresses the direct testimony of John J. Spanos regarding PSO's proposed depreciation rates, and it also addresses the direct testimony of Thomas J. Meehan regarding PSO's proposed decommissioning costs, which directly affects the Company's production net salvage and depreciation rates.

I. <u>EXECUTIVE SUMMARY</u>

Q. Summarize the key points of your testimony.

A. In this case, PSO is proposing a substantial increase to depreciation expense of about $40 million. As demonstrated by the evidence presented in this testimony, it would not be reasonable to accept PSO's filed position regarding depreciation expense. PSO's proposed increase to depreciation expense is unreasonable due to several factors, which are summarized as follows:

1. In contradiction to the Commission's recent order in PSO's prior rate case, PSO is proposing to add contingency and escalation factors to the Company's terminal decommissioning costs, which unreasonably increases the proposed depreciation expense for PSO's production accounts.[2]

2. For several transmission, distribution, and general accounts, PSO is proposing service lives that are shorter than those indicated by the Company's historical retirement data, which results in unreasonably high proposed depreciation rates for these accounts.

3. PSO chose to exclude a substantial account from its depreciation study – Account 303 – which includes a balance of more than $50 million for the Company's software systems. PSO is proposing an amortization period of only five years, and has offered virtually no support or justification for this position. PSO's own witness has recommended amortization periods of up to 15 years for this account.

For these reasons, it would not be reasonable to accept the Company's proposed increase to depreciation expense. OIEC and Wal-Mart are proposing two options for adjustments to PSO's proposed increase to depreciation expense, which are summarized as follows: (1) Option One involves accepting portions of PSO's proposed rate increases for its production accounts, as explained further below, while removing the escalation and contingency factors from its proposed decommissioning costs, pursuant to the Commission's recent order in PSO's prior rate case. In addition, the depreciation rates that were recently ordered for PSO's transmission, distribution, and general accounts would stay the same. Finally, Option One would also include OIEC and Wal-Mart's proposed adjustment to Account 303, since that issue was not addressed in PSO's prior rate case. Accepting Option One would result in an <u>increase</u> to PSO's current depreciation expense of about $9 million. (2) Option Two involves changing PSO's currently-approved depreciation rates based on the

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[2] Order No. 657877 p. 7, Cause No. PUD 201500208.

Company's proposal offered in this case with reasonable adjustments. Accepting Option Two would result in a substantial increase of about $22 million to PSO's current depreciation expense. Option One is the preferable choice in this case. Although accepting Option One would result in a substantial increase in depreciation expense for PSO, it would also provide more relief to rate payers than Option Two, in light of the significant base rate increase proposed by PSO in this case. The impact to depreciation expense resulting from both options is illustrated below in the following tables.

Figure 1:
Option One: Accept Rate Increases to Production Plant

Plant Function	Plant Balance 6/30/2017	PSO Proposal	OIEC Proposal	OIEC Adjustment
Intangible	$ 51,158,691	$ 10,002,988	$ 5,009,816	$ (4,993,173)
Production	1,562,178,971	59,052,499	53,223,445	(5,829,054)
Transmission	845,997,944	21,245,650	18,166,631	(3,079,019)
Distribution	2,389,887,504	78,220,567	65,282,209	(12,938,358)
General	169,512,415	5,952,814	3,730,822	(2,221,992)
Northeastern 4				(4,141,553)
Total	$ 5,018,735,525	$ 174,076,209	$ 145,014,613	**$ (33,203,149)**

Accepting Option One would increase PSO's current depreciation expense by about $9 million, and would be more reflective of the rates recently approved by the Commission.

Figure 2:
Option Two: Consider Rate Changes for All Accounts

Plant Function	Plant Balance 6/30/2017	PSO Proposal	OIEC Proposal	OIEC Adjustment
Intangible	$ 51,158,691	$ 10,002,988	$ 5,009,816	$ (4,993,173)
Production	1,562,178,971	59,052,499	53,223,445	(5,829,054)
Transmission	845,997,944	21,245,650	20,568,389	(677,261)
Distribution	2,389,887,504	78,220,567	74,351,620	(3,868,947)
General	169,512,415	5,952,814	5,560,389	(392,425)
Northeastern 4				(4,141,553)
Total	$ 5,018,735,525	$ 174,076,209	$ 158,315,350	**$ (19,902,412)**

Accepting Option Two would result in a substantial increase of about $22 million to PSO's depreciation expense.

Q. Why is it reasonable to adopt PSO's proposed rate increases for its production accounts as contemplated under Option One?

A. The depreciation rates for PSO's production accounts are determined under the life span method, which seeks to recover the investments in each production plant over its estimated life span. The basic formula to calculate these rates is dividing the original cost investments in each plant by the plant's estimated service life. When the Company makes investments in its production units between rate case, the numerator of the depreciation rate formula increases due to increased costs, however, the denominator decreases as the plants move toward their retirement dates. As a result, the depreciation rates must increase to recover more costs over a shorter amount of time. Thus, to the extent that PSO's production plant investments since its prior rate case are deemed prudent, the Company should be allowed to recover those costs (less reasonable adjustments to terminal net salvage pursuant to the Commission's prior order).

Q. Why is Option One the better option in this case?

A. Depreciation rates affect the timing of recovery for the Company's capital investments. Due to the nature of how depreciation rates are estimated and developed, they usually do not drastically change from year to year unless new information is available indicating otherwise. The issue of depreciation rates was highly contested in PSO's most recent rate case, and several witnesses representing various parties offered evidence and testimony in support of their positions. Ultimately, the ALJ and the Commission rejected PSO's proposal and chose to accept the rates proposed by PUD and OIEC. Specifically, the Commission ordered:

> The Commission adopts the distribution plant depreciation rates recommended by PUD Witness David Garrett and the production plant and transmission plant depreciation rates recommended by OIEC Witness Jack Pous. With respect to general plant, the Commission adopts the recommendations of David Garrett for life spans for salvage value."[3]

These depreciation rates approved by the Commission have not even been in place for a full year, yet PSO is proposing a substantial increase greater than $40 million to depreciation expense in this case, which represents a 35% increase. While Option One would also result in an increase to depreciation expense, it would at least partially mitigate the harmful financial impact to Oklahoma ratepayers while allowing the rates most recently approved by the Commission to remain in effect for more than a mere calendar year. Furthermore, Option One also considers two other important issues – the unreasonably short amortization period for Account 303, and the recovery of Northeastern Unit 4 assets.

Q. Mr. Spanos states that some of the depreciation rates approved by the Commission in PSO's last rate case are outside industry norms. Do you have any response to those assertions?

A. Yes. On page 7 of his direct testimony, Mr. Spanos states that some of the service lives approved by the Commission in PSO's last rate case exceed "the typical range of estimates for other utilities."[4] In support of this assertion, Mr. Spanos provides a table showing what he describes as an "industry range" for the accounts he discusses. However, these ranges provided by Mr. Spanos are based on recommendations made by Gannett Fleming in other

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[3] Order No. 657877 p. 7, Cause No. PUD 201500208.

[4] Direct Testimony of John J. Spanos, p. 7:3-4.

cases, and are not entirely based on service lives ordered in other jurisdictions. Of course, as is often the case, the service lives proposed by utility witnesses such as Gannett Fleming are often adjusted upward, which results in lower depreciation rates.

Q. Summarize the primary factors driving OIEC and Wal-Mart's adjustment.

A. As discussed above, it is OIEC and Wal-Mart's primary recommendation that the Commission accept Option One as proposed above and in the attached exhibits.[5] The remainder of this testimony primarily focuses on factors driving the adjustments considered in Option Two, though there is some overlap (e.g., adjustment to Account 303 – Software). There are four primary factors driving OIEC and Wal-Mart's adjustments in this case. These factors, along with their estimated dollar impact on the final adjustment are as follows: (1) adjusting PSO's proposed depreciation rates on its production units by removing the contingency and escalation factors from its proposed decommission costs ($5.8 million); (2) extending the proposed service lives for several of PSO's mass property accounts ($4.8 million); (3) extending the proposed service life of PSO's intangible software account ($5 million); and (4) removing the proposed depreciation expense associated with Northeastern Unit 4.[6]

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 required to provide service. Depreciation systems are designed to allocate those costs in a

[5] *See specifically* Exhibit DJG-2-3.

[6] *See* responsive testimony of Mark E. Garrett.

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. 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, which 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. 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. Moreover, since the Company's awarded and earned returns on equity are far above its true cost of equity, the Company's shareholders further benefit from the excess wealth transfer from ratepayers while these costs are in rate base. 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 that useful lives are overestimated rather than underestimated.

II. LEGAL 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."[7] The *Lindheimer* Court also recognized that the original cost of plant assets, rather than present value or some other measure, is the proper basis for calculating depreciation expense.[8] 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.[9]

Thus, the Commission must ultimately determine if the Company has met its burden of proof by making a convincing showing that its proposed depreciation rates are not excessive.

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

[8] *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."

[9] *Id.* at 169 (emphasis added).

Q. Should depreciation represent an allocated cost of capital to operation, 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 indicated that depreciation was primarily a mechanism to determine loss of value.[10] Adoption of this "value concept" would require annual appraisals of extensive utility plant, 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 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.[11] 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.[12]

Thus, the concept of depreciation as "the allocation of cost has proven to be the most useful and most widely used concept."[13]

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

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

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

[13] Wolf *supra* n. 7, at 73.

III. 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 legal standards set forth above do not mandate a specific procedure for conducting depreciation analysis. 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. 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.[14] 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 legal 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. Spanos use the same depreciation system that you used?

A. Yes.[15] Therefore, the differences in our depreciation rate proposals are driven by different service life and other parameter assumptions, rather by a difference in the depreciation system.

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[14] *See* Wolf *supra* n. 7, at 70, 140.

[15] *See* Direct Testimony of John J. Spanos, p. 14:1-6.

Q. Please describe the actuarial 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 scientists study historical human mortality data in order to predict how long a group of people will live, depreciation analysts study historical plant data in order to estimate the average lives of property groups. The most common actuarial 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.[16] 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.[17] 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."[18] A more detailed explanation of how the Iowa curves are used in the actuarial analysis of depreciable property is set forth in Appendix C.

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[16] 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).

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

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

Q. Please describe the Company's depreciable assets in this case.

A. The Company's depreciable assets can be divided into two main groups: life span property (i.e., production plant) and mass property (i.e., transmission and distribution plant). The analytical process is slightly different for each type of property, as discussed further below.

IV. LIFE SPAN PROPERTY ANALYSIS

Q. Describe the approach to analyzing life span property.

A. For life span property, there are essentially three steps to the analytical process. First, I reviewed the Company's proposed life spans for each of its production units and compared them to life span estimates of other similar production units in other jurisdictions. Second, I examined the Company's proposed interim retirement curves for each account in order to assess the remaining lives and depreciation rates for each production unit. Finally, I analyzed the weighted net salvage for each account, which involved reviewing the Company's weighting of interim and terminal retirements for each production account, as well as analyzing the Company's proposed interim and terminal net salvage rates.

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 concurrently as of the production unit's probable retirement date.

A. Interim Retirement Analysis

Q. Discuss the concept of interim retirements.

A. The individual components within a generating unit are retired and replaced throughout the life of the unit. This retirement rate is measured by "interim" survivor curves. Thus, a production plant's remaining life and depreciation rate are not only affected by the terminal retirement date of the entire plant, but also by the retirement rate of the plant's individual components, which are retired during the "interim" of the plant's useful life.

Q. Did you make any adjustments to the Company's proposed interim retirements?

A. No. I accepted the Company's proposed interim retirement curves as well as the Company's proposed weighting of interim and terminal retirements because they are within a reasonable range given the Company's data provided in this case.

B. Terminal Net Salvage Analysis (Decommissioning Costs)

Q. Describe terminal net salvage.

A. When a production plant reaches the end of its useful life, a utility may decide to decommission the plant. In that case, the utility may sell some of the remaining assets. The proceeds from this transaction are called "gross salvage." The corresponding expense associated with decommissioning the plant is called "cost of removal." The term "net salvage" equates to gross salvage less the cost of removal. When net salvage refers to production plants, it is often called "terminal net salvage," because the transaction will occur at the end of the plant's life.

Q. Describe how utilities estimate and justify the proposal of terminal net salvage recovery.

A. Typically, when a utility is requesting the recovery of a substantial amount of terminal net salvage costs, it supports those costs with site-specific decommissioning studies. Terminal net salvage costs are unlike other costs requested in a rate case. Specifically, while other proposed costs might be based on a recent test year involving actual expenses incurred by the utility, decommissioning costs are often estimated to occur many years or decades in the future. Moreover, the utility may never even incur the decommissioning costs they are proposing. For example, a utility may seek to recover $10 million in a current rate case for the complete demolition of a production plant to occur 10 years in the future. Thus, the utility would be requesting an additional $1 million per year in rates in addition to the other depreciation costs associated with the plant. If instead, the utility decides to repower the plant at a much lesser cost than a complete demolition, the utility would have recovered millions of dollars from rate payers for costs that never occurred. Thus, decommissioning costs are not as "known and measurable" as other costs proposed in a rate case. Furthermore, decommissioning studies are often overestimated, as they usually do not contemplate less expensive alternatives to complete demolition and often include substantial contingency factors that arbitrarily increase the cost estimate, as is the case here. Nonetheless, decommissioning studies provide some measurable basis upon which to estimate the utility's terminal net salvage, and should be viewed as a minimum prerequisite for any recovery of such costs.

Q. Did PSO provide decommissioning studies in this case in support its proposed terminal net salvage costs?

A. Yes. The decommissioning studies were conducted by Sargent & Lundy and sponsored in the direct testimony of Mr. Meehan.[19]

Q. Are the decommissioning studies offered by PSO in this case similar to the studies offered in the Company's prior rate case?

A. Yes. In PSO's prior rate case, PSO offered decommissioning studies performed by Sargent & Lundy ("S&L") and sponsored by Mr. Meehan, as the Company has in this case. Mr. Meehan has also acknowledged that S&L "performed a similar demolition study in 2015"[20] In fact, Mr. Meehan refers to the decommissioning studies filed in this case as an "update" to the studies filed in PSO's 2015 rate case.[21]

Q. In PSO's prior rate case, did the ALJ find that S&L had likely overestimated its demolition cost proposals?

A. Yes. In PSO's prior rate case, the ALJ found that "it is likely that S&L has overestimated the demolition cost."[22]

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[19] *See* Direct Testimony of Thomas J. Meehan (decommissioning studies included in Exhibit TJM-3).

[20] Direct Testimony of Thomas J. Meehan, p. 7:12-13.

[21] *Id.* at p.4:3.

[22] Report and Recommendation of the Administrative Law Judge p. 164, filed May 31, 2016 in Cause No. PUD 201500208.

Q. Describe how the Company's proposed demolition costs are likely overestimated again in this case.

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," which would be suitable for development of an industrial facility. In other words, the decommissioning studies do not consider the less costly alternatives, such as 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 factor. These are essentially the same assumptions and problems associated with the similar demolition studies filed in PSO's prior rate case, which resulted in the ALJ finding that PSO's demolition cost proposals were likely overestimated.

Q. Despite your concerns with the Company's decommissioning studies, are you recommending specific adjustments to PSO's proposed costs for labor, material, or indirect costs?

A. No. While as discussed above, PSO'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 other adjustments to decommissioning costs and terminal net salvage rates, as discussed further below.

Q. Do you agree with PSO's proposed decommissioning costs?

A. No. While I do not dispute the entirety of PSO's proposed decommissioning costs, there are two important adjustments that should be made to these proposed costs: (1) removing the contingency factor applied by Mr. Meehan; and (2) removing the escalation factor applied by Mr. Spanos. Both adjustments are discussed further below.

Q. Were the escalation and contingency factors specifically addressed by the ALJ and Commission in PSO's prior rate case?

A. Yes. In PSO's prior rate case, the Company proposed the inclusion of escalation and contingency factors in calculating PSO's terminal net salvage. In this case, the same witnesses for PSO are essentially making the same proposals. However, in the prior case, PUD and OIEC provided arguments against the escalation and contingency factors, and the ALJ and Commission agreed that the escalation and contingency factors should be rejected. First, in rejecting PSO's proposed escalation factor, the ALJ found as follows:

> The ALJ adopts Staff witness Garrett's recommendation that the Commission should deny the proposed escalation of demolition costs in this case because (1) the escalated costs do not appear to be calculated in the same manner as other calculations; (2) the Company did not offer any testimony in support of the escalation factor; (3) an escalation factor that does not consider any improvements in technology or economic efficiencies likely overstates future costs; (4) it is inappropriate to apply an escalation factor to demolition costs that are likely overstated; (5) asking ratepayers to pay for future costs that may not occur, are not known and measurable changes within the meaning of 17 O.S. § 284; and (6) the Commission has not approved escalated demolition costs in previous cases.[23]

Likewise, in rejecting PSO's proposed 15% contingency factors, the ALJ found as follows:

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[23] Report and Recommendation of the Administrative Law Judge p. 164, filed May 31, 2016 in Cause No. PUD 201500208.

> In its demolition cost study, S&L applied a 15% contingency factor to its cost estimates, and a negative 15% contingency factor to its scrap metal value estimates. The Company provides little justification for this contingency factor other than the plants might experience uncertainties and unplanned occurrences. This reasoning fails to consider the fact that certain occurrences could reduce estimated costs.[24]

PSO is essentially making the same arguments in this case as it did in its prior rate case regarding the escalation and contingency factors. For the reasons outlined by the ALJ above, as the reasons discussed in more detail below, the Commission should again reject the inclusion of the escalation and contingency factors in determining PSO's appropriate level of terminal net salvage.

1. Contingency Factor

Q. Describe the contingency factor applied by Mr. Meehan.

A. PSO's decommissioning studies include direct and indirect cost estimates to dismantle PSO's generating facilities, which include labor, material, and scrap value estimates.[25] However, in addition to these cost estimates, Mr. Meehan applied a "15% contingency on the labor, 15% contingency on material, a negative 15% contingency on scrap value and a 15% contingency on the indirect portions of the estimates."[26] These contingency factors were applied to the cost estimates for each one of PSO's generating facilities, and add an additional 15% of costs on top of the base dismantlement cost estimates (and reduce positive scrap value by 15%).

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[24] *Id.*

[25] *See generally* Exhibit TJM-3.

[26] Direct Testimony of Thomas J. Meehan, p. 15:17-20.

Q. How much additional costs do these contingency factors add to the total decommissioning cost estimates?

A. The total amount of the contingency factors is greater than $22 million.[27]

Q. Do you agree that contingency factors should be included in the decommissioning cost estimates that are charged through rates?

A. No. Mr. Meehan states that it is "common and expected standard industry practice to include a positive contingency to account for the amount of detail, unknowns, and uncertainties not included in a cost estimate."[28] However, the issue the Commission should consider is not whether contingency factors are standard industry practice among contractors, but rather whether contingency factors should be charged to ratepayers. Mr. Meehan's argument in favor of the use contingency factors among contractors highlights the exact reason why we should <u>not</u> include such contingency factors in ratemaking. That is, contingency factors are included to account for "unknows" and "uncertainties." In a ratemaking context, ratepayers should be not be charged for costs that are entirely "unknown" by definition. Furthermore, these contingency factors fail to account for the possibility that PSO's proposed decommissioning costs might be <u>overestimated</u> (and scrap value underestimated). For these reasons, it is not appropriate to include contingency factors in future estimated decommissioning costs to be charged through current rates.

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[27] *See generally* Exhibit TJM-3.

[28] *Id.* at 16:7-9.

Q. Did the Commission allow the contingency factors in PSO's previous case?

A. No. In PSO's previous rate case, the Commission adopted OIEC's proposed depreciation rates for the Company's production accounts, which did not include the contingency factors.[29]

Q. Do the depreciation rates you propose for PSO's production accounts exclude the contingency factors?

A. Yes. PSO's decommissioning costs affect the amounts of the net salvage and depreciation rates for the Company's production accounts. The rates I propose for these accounts have been calculated without inclusion of the contingency factors.[30]

2. <u>Escalation Factor</u>

Q. Describe the cost escalation factor applied by Mr. Spanos.

A. To calculate his proposed net salvage rates for PSO's production accounts, Mr. Spanos escalated the decommissioning cost estimates provided by Mr. Meehan by 2.5% each year until the estimated retirement year for each generating facility.[31]

Q. How much additional costs would the escalation factor add to PSO's proposed decommissioning costs if approved?

A. The escalation factor would add more than $100 million to PSO's proposed decommissioning costs.[32]

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[29] *See* Order No. 657877 entered in Cause No. PUD 201500208, p. 7.

[30] *See* Exhibit DJG-2-4 thru Exhibit DJG-2-7.

[31] *See* Direct Testimony of John J. Spanos p. 23:1-2.

[32] *See* Exhibit JSS-2 (depreciation study) p. VIII-6.

Q. Do you agree with Mr. Spanos's proposal to escalate the proposed decommissioning costs?

A. No. There are two important reasons the Commission should disallow the cost escalation factor applied by Mr. Spanos. First, it is not appropriate to escalate a cost that is likely overstated, is not known and measurable, and moreover, may never even occur as estimated by the Company. The discussion presented above should lead us to question whether to charge current ratepayers for future decommissioning costs at all, much less whether those costs should be escalated. The second problem with the Company's cost escalation factor is a technical one: It is not proper to charge current ratepayers for a future cost that has not been discounted to present value. The "time value of money" concept is a cornerstone of finance and valuation. For example, the DCF Model, which is used to estimate the cost of equity, applies a growth rate to a company's dividends many years into the future. However, that dividend stream is then discounted back to the current year by a discount rate in order to arrive at the present value of an asset. Likewise, accounting for asset retirement obligations involves escalating the present value of an estimated future cost, but then the cost is discounted back to present value by a discount rate. In contrast to these calculations, PSO proposes to escalate the present value of its decommissioning costs decades into the future, and expects current ratepayers to pay the future value of these costs with present-day dollars. This proposal completely disregards the elemental "time value of money" principle. For these reasons, the Commission should exclude the escalation factor applied by Mr. Spanos when determining appropriate net salvage and depreciation rates for PSO's production accounts.

Q. Did the Commission allow the escalation factor in PSO's previous case?

A. No. In PSO's previous rate case, the Commission adopted OIEC's proposed depreciation rates for the Company's production accounts, which did not include the escalation factor.[33]

Q. Do the depreciation rates you propose for PSO's production accounts exclude the escalation factor?

A. Yes. PSO's decommissioning costs affect the amounts of the net salvage and depreciation rates for the Company's production accounts. The rates I propose for these accounts have been calculated without inclusion of the escalation factor.[34]

V. MASS PROPERTY ANALYSIS

Q. Describe mass property.

A. Unlike life span property accounts, "mass" property accounts usually contain a large number of small units that will not be retired concurrently. For example, poles, conductors, transformers, and other transmission and distribution plant are usually classified as mass property. Estimating the service life of any single unit contained in a mass account would not require any actuarial analysis or curve-fitting techniques. Since we must develop a single rate for an entire group of assets, however, actuarial analysis is required to calculate the average remaining life of the group.

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[33] *See* Order No. 657877 entered in Cause No. PUD 201500208, p. 7.

[34] *See* Exhibit DJG-2-4 thru Exhibit DJG-2-7.

Q. How did you determine the depreciation rates for the mass property accounts?

A. To develop depreciation rates for the Company's mass property accounts, I obtained the Company's historical plant data to develop observed life tables for each account. I used Iowa curves to smooth and complete the observed data to calculate the average remaining life of each account. Finally, I analyzed the Company's proposed net salvage rates for each mass account by reviewing the historical salvage data. After estimating the remaining life and salvage rates for each account, I calculated the corresponding depreciation rates. Further details about the actuarial analysis and curve-fitting techniques involved in this process are presented in the attached appendices.

A. Service Life Estimates

Q. Please describe your approach in estimating the service lives of mass property.

A. I used all of the Company's 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). In order to calculate average life (the area under a curve), a complete survivor curve is needed. 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 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, mathematical 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.

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, however, it may not always yield the optimum result; therefore, it should not necessarily be adopted without further analysis. In fact, for some of the accounts in this case I selected Iowa curves that were not the mathematical best fit, and in every such instance, this decision resulted in shorter curves (higher depreciation rates) being chosen, as further illustrated below.

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."[35] In accordance with this standard, an analyst may decide to truncate the tail end of the OLT curve at a certain percent 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 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.

B. Detailed Analysis of Select Accounts

Q. Discuss your analysis of material accounts.

A. My analysis in this case included a review of all the Company's depreciable accounts. I approached my analysis of all mass property accounts the same way using the methods described in this testimony. For several accounts, however, I conducted additional analysis. The selected accounts discussed in this section are those involving either a significant amount of depreciation expense, or those that provide particularly good illustrations of the differences in my curve selection process and the Company's process. For some of these accounts, I conducted additional analyses that included both visual and mathematical curve fitting techniques not only for the entirety of the OLT curve, but also for the most significant portion of the curve which includes the top 99% of the dollars exposed to retirement, when applicable. By conducting additional analysis on the most

[35] Wolf *supra* n. 7, at 46.

significant portions of the OLT, I ensured that the Iowa curves I selected provide a good fit to the Company's data.

Q. Discuss the general differences between your service life estimates and the Company's service life estimates for these accounts

A. While the Company and I used similar curve-fitting approaches in this case, the curves I selected for these accounts provide a better mathematical fit to the observed data, and provide a more reasonable and accurate representation of the mortality characteristics for each account. In each of the following accounts, the Company has selected a curve that underestimates the average remaining life of the assets in the account, which results in unreasonably high depreciation rates. The analysis of each selected account is discussed below.

Q. Are you persuaded by the opinions of PSO's employees and other contractors regarding their estimates of the future mortality characteristics of any of these accounts?

A. No. In his testimony, Mr. Spanos stated that he had discussions with Company management and incorporated the information he received from these discussions in the "interpretation and extrapolation of the statistical analyses."[36] This statement indicates that discussions with Company personnel affected Mr. Spanos's interpretation of the quantitative statistical analysis involved with remaining service live estimates. In discovery, OIEC asked PSO the following question:

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[36] Direct Testimony of John J. Spanos, p. 21:11-12.

> Please specifically identify and describe any information obtained from any plant tour, field trip, or discussion with Company personnel, that would indicate that the average service lives of any life span or mass property would be shorter or longer than what is indicated by the retirement rate described by the Company's plant data.

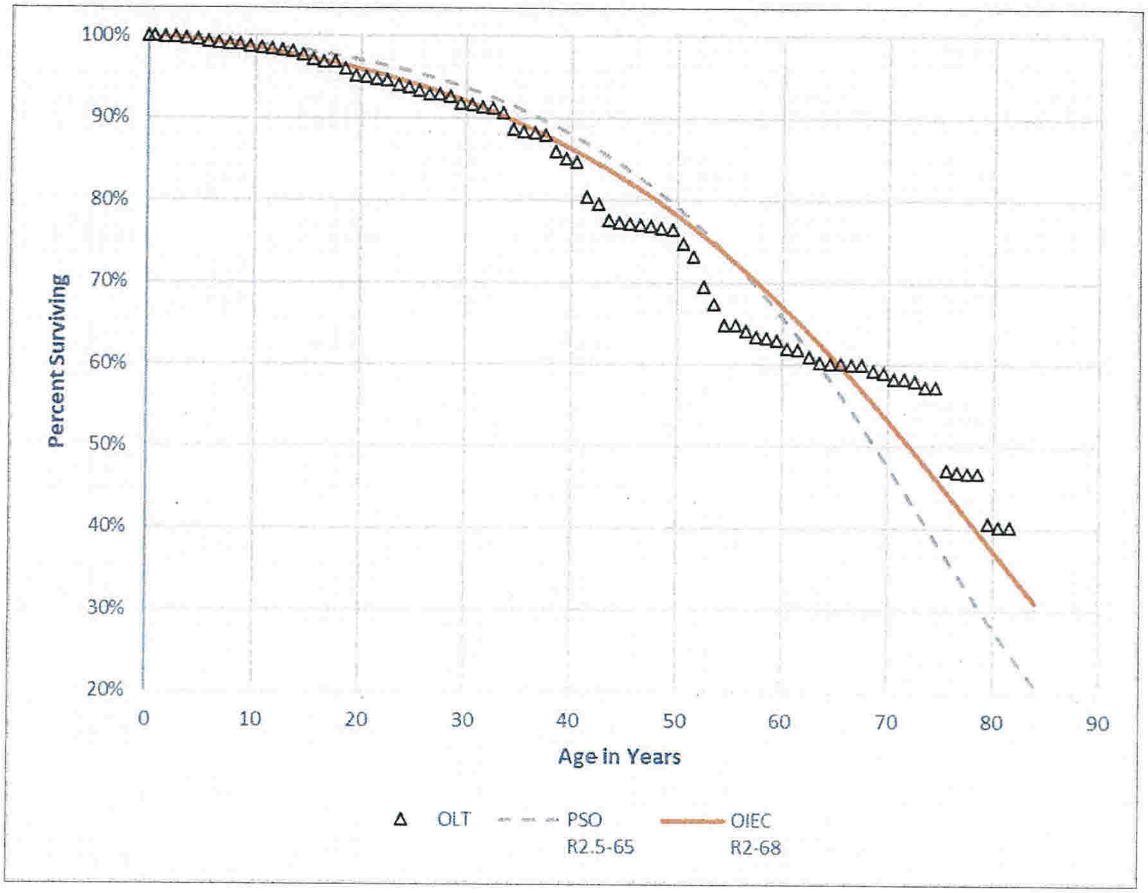
In response, Mr. Spanos referred to PSO's response to data request AG 4-18, which includes the information obtained from site visits and management meetings. However, this response did not specifically identify any information that would lead me to deviate from the results obtained through my statistical analysis. In other words, I did not see any information in Mr. Spanos's site visit notes that would persuade me to deviate from the remaining service lives indicated through analysis of PSO's historical property data in combination with visual and mathematical Iowa curve-fitting techniques, especially for accounts with sufficient retirement history and reliable observed survivor curves. In other words, while I agree with Mr. Spanos that depreciation analysis is not strictly a mathematical exercise, I did not incorporate any of the information provided by Mr. Spanos that was obtained from discussions with Company personnel into my analysis for these reasons. To the extent Mr. Spanos received valuable, relevant information from Company personnel that would affect the statistical analysis in this case, it was not provided to the other parties in response to their discovery requests. Therefore, the Commission should give little weight to Mr. Spanos's professional judgment to the extent that judgment was influenced by information that was not provided to other parties in the case in response to their discovery requests. Furthermore, even if such information had been provided, I would question the objectivity of the opinions rendered by employees of the applicant in this case, especially when such opinions have a direct impact on a substantial component of the Company's revenue requirement in this case. Therefore, in my opinion, the Commission should give more weight to the statistical analysis provided by the depreciation experts in this case than subjective elements of judgment, especially when there is sufficient data to conduct such statistical analysis. This approach will promote more objective, unbiased, and reasonable results.

1. Account 356 – Overhead Conductors and Devices

Q. Describe your service life estimate for this account, and compare it with the Company's estimate.

A. The OLT curve derived from PSO's historical property data for Account 356 is fairly suitable for traditional Iowa curve fitting techniques and contains sufficient retirement history. The Iowa curve I selected for this account is the R2-68 curve, and the curve the Company selected is the R2.5-65 curve. The graph below shows these two curves juxtaposed with the OLT curve.

Figure 3:
Account 356 – Overhead Conductors and Devices



Both of the selected Iowa curves are similar in shape and average life. PSO's R2.5-65 curve is slightly steeper and shorter than the R2-68 curve. It is visually apparent that the R2-68 curve provides a better fit through the majority of the OLT curve, however, we can use mathematical curve-fitting techniques to measure which curve provides a better fit.

Q. Does your selected curve provide a better fit to the observed data?

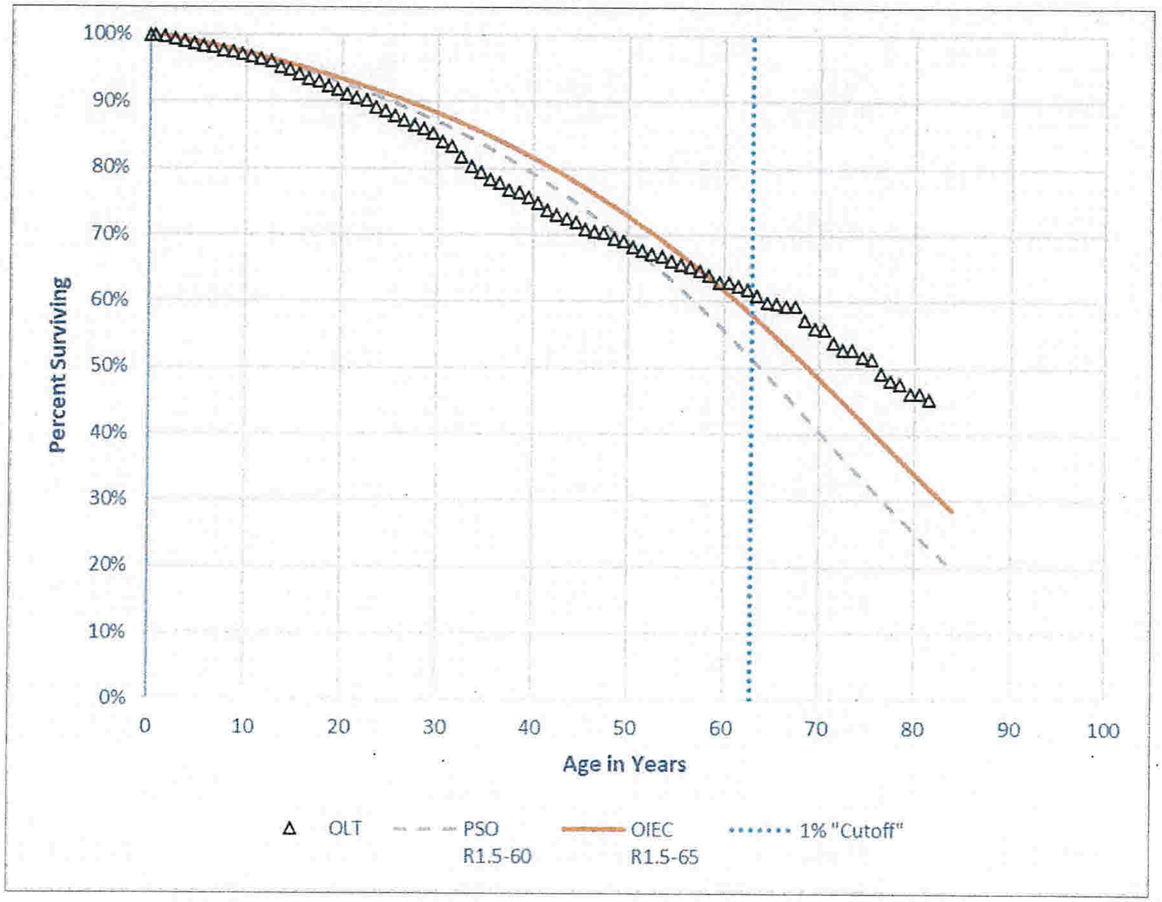
A. Yes. The best mathematically-fitted curve is the one that minimizes the distance between the OLT curve and the Iowa curve, thus providing the closest fit. The "distance" between the curves is calculated using the "sum-of-squared differences" ("SSD") technique. The curve with the lower SSD represents the better mathematical fit. Specifically, the SSD for the Company's curve is 0.4361, while the SSD for the better-fitting R2-68 curve is only 0.1417. Thus, the curve I selected for this account provides a better fit to the OLT and results in a more reasonable depreciation rate.

2. Account 362 – Station Equipment

Q. Describe your service life estimate for this account, and compare it with the Company's estimate.

A. For this account, I selected the R1.5-65 curve and the Company selected the R1.5-60 curve. Thus, both curves selected are of the same "shape" or type. However, there is a difference of five years for the average service life represented by the curves. The graph below shows these two curves along with the OLT curve.

Figure 4:
Account 362 – Station Equipment



As shown in the graph, the R1.5-65 appears to provide a better overall fit to the OLT curve. The vertical dotted line represents the 1% "cutoff" that may be used as general benchmark to determine which portion of the "tail" end of the curve is statistically irrelevant. The data points to the right of the vertical line represent the less significant "tail" end of this particular OLT curve. As we can see, neither one of the Iowa curves attempts to fit to this tail end. However, the curve selected by the Company appears to drop too early around age 50, and does not fit to the relevant data points between ages 50 – 63, a significant 13-year period.

Q. Does your selected curve provide a better mathematical fit to the observed data than the Company's curve?

A. Yes. Once again, the Company's curve is too short, which understates the average service life for this group of assets and overstates depreciation expense. This is true not only when conducting curve-fitting techniques on the entire OLT curve for this account, but also when considering the most statistically meaningful portion of the curve. As discussed above, the "tail" end of certain OLT curves can have less statistical value because they represent an insignificant amount of dollar exposures, as is the case here. All of the data points to the right of the vertical dotted line in the graph above represent dollar exposures that are less than one percent of beginning exposures in this account. Regardless, the R2.5-65 curve I selected provides a better fit to the data under either scenario than the curve proposed by the Company.[37]

Q. Is the Iowa curve you selected for this account the best mathematically-fitting curve?

A. No. The best mathematically-fitting curve for this data set is the L0-87 curve. Selecting this curve to calculate the service life for this account would result in a much lower depreciation expense than the curve I selected. The graph below shows the two Iowa curves discussed above, along with the L0-87 curve.

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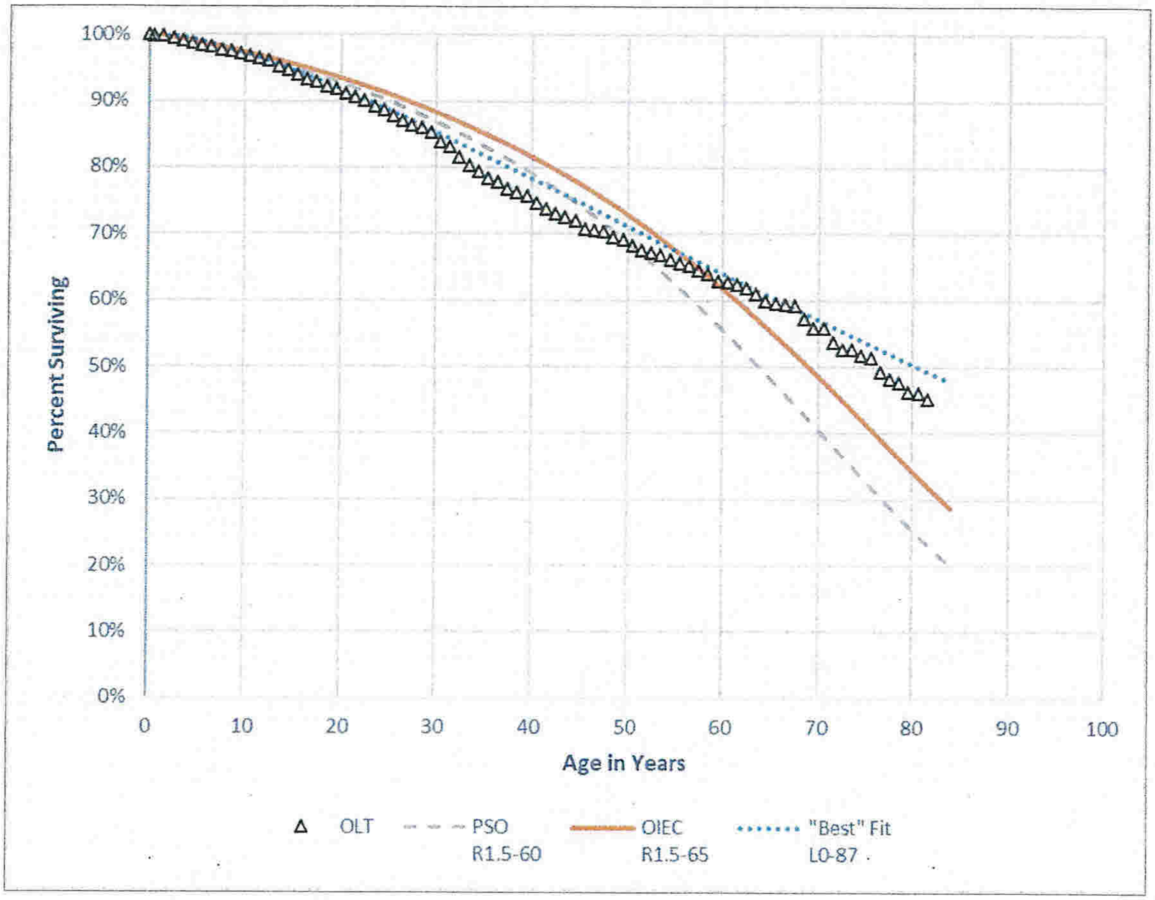
[37] Direct Exhibit DG 2-9.



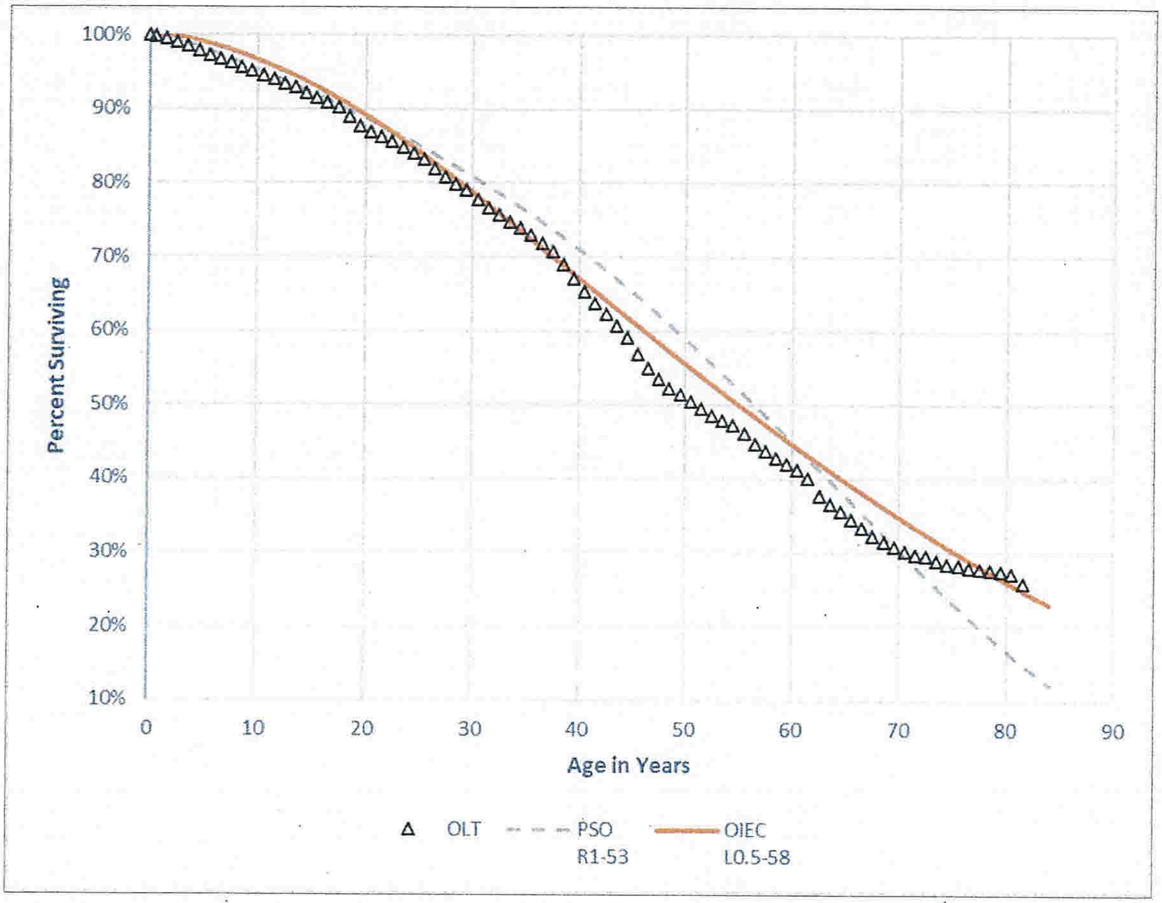
The R1.5-65 curve represents the best mathematical fit to the most relevant portions of the OLT curve.

3. <u>Account 364 – Poles, Towers and Fixtures</u>

Q. Describe your service life estimate for this account, and compare it with the Company's estimate.

A. I selected the L0.5-58 curve for this account and the Company selected the R1-53 curve. Both curves are within a reasonable range for this account, but the L0.5-58 curve is superior because it provides a better fit to the observed data for this account, and therefore also provides a better estimate of the future retirement characteristics for this account. The retirement history in this account is ideal for curve fitting because the OLT curve goes below 30% surviving and has a shape that is conducive to the Iowa curve-fitting process. The graph below shows these two Iowa curves juxtaposed with the OLT curve.

Figure 5:
Account 364 – Poles, Towers and Fixtures



Q. Does your selected curve provide a better mathematical fit to the observed data than the Company's curve?

A. Yes. Whether conducting the mathematical analysis on the entire OLT curve, or the OLT curve less the "tail" end, the L0.5-58 curve provides a better mathematical fit. Specifically, the SSD for the Company's curve is 0.1443, while the SSD for the L0.5-58 curve is 0.0263, which means it is a closer fit to the observed data.[38]

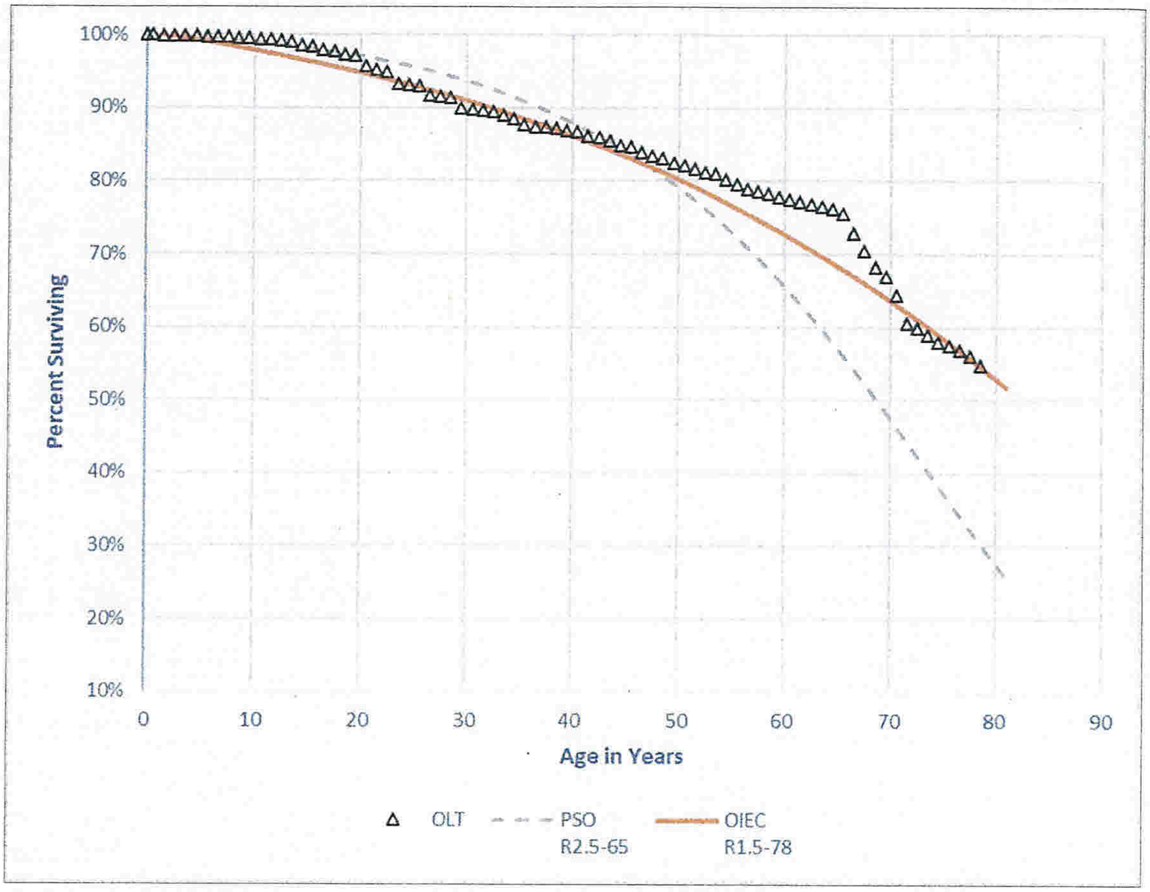
4. Account 366 – Underground Conduit

Q. Describe your service life estimate for this account, and compare it with the Company's estimate.

A. For Account 366, I selected the R1.5-78 curve and the Company selected the R2.5-65 curve. It is visually apparent that the R1.5-78 curve provides a better fit to the historical data. The R2.5-65 curve selected by the Company is too short, which results in a shorter service life estimate and higher depreciation rate. Specifically, the Company's curve continues a sharp decline around the 45-year age interval, while the OLT curve follows a more gradual decline, which is better represented by the R1.5-78 curve. The graph below shows these two curves along with the OLT curve.

[38] Exhibit DJG-2-11.

Figure 6:
Account 366 – Underground Conduit



Q. Does your selected curve provide a better mathematical fit to the observed data than the Company's curve?

A. Yes. Whether conducting the mathematical analysis on the entire OLT curve, or the OLT curve less the "tail" end, the R1.5-78 curve provides a better mathematical fit. Specifically, the SSD for the Company's curve is 0.9821, while the SSD for the R1.5-78 curve is 0.0883, which means it is a closer fit to the observed data and results in a more reasonable depreciation rate for this account.[39]

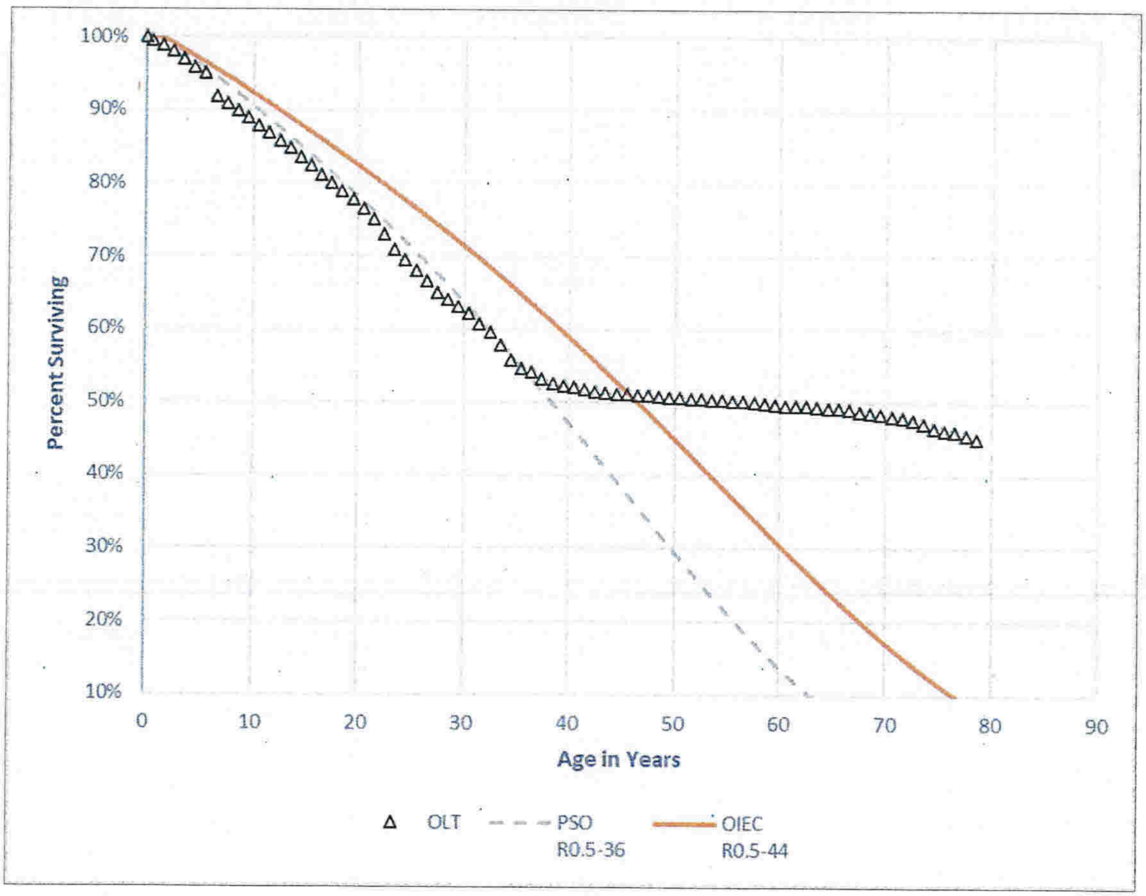
[39] Exhibit DJG-2-12.

5. Account 373 – Street Lighting and Signal Systems

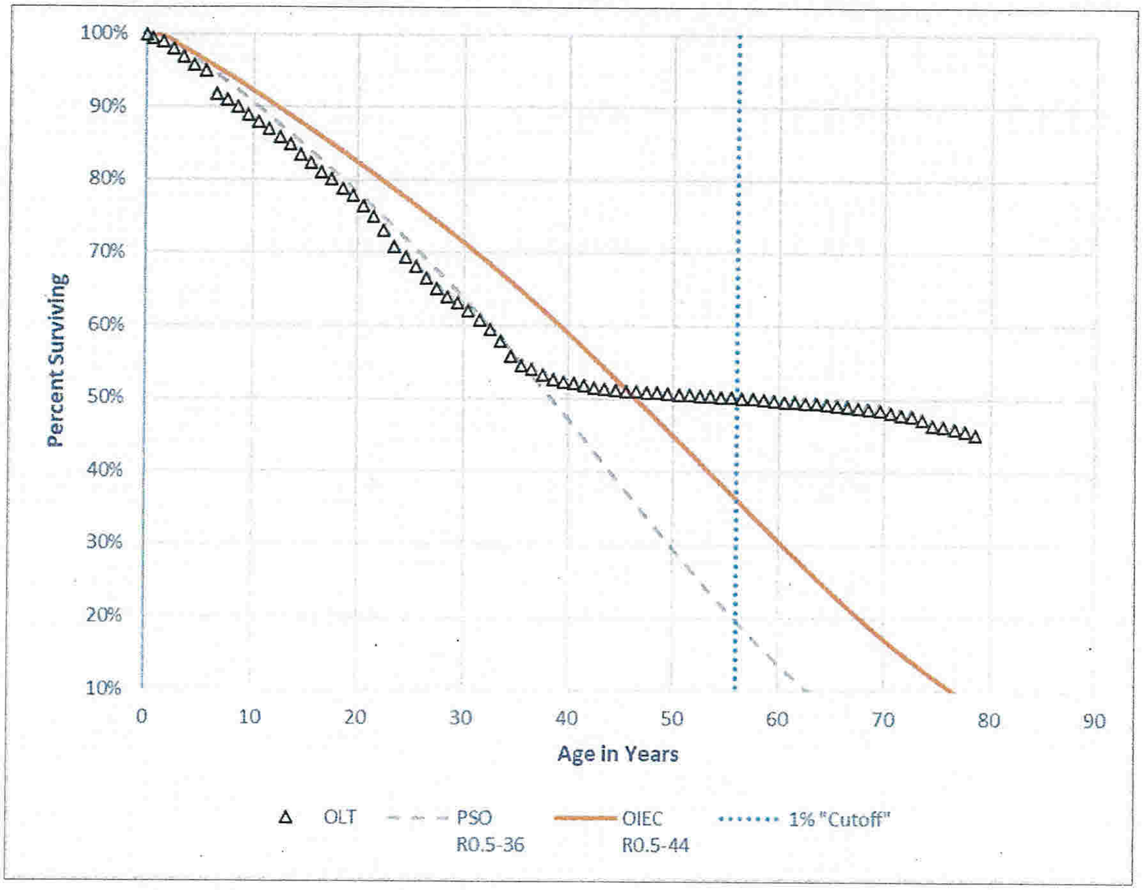
Q. Describe your service life estimate for this account, and compare it with the Company's estimate.

A. For Account 373, I selected the R0.5-44 curve and the Company selected the R0.5-36 curve. While both selected curves have the same shape, there is a different in average life estimates of eight years. The Company's curve provides a good fit to the observed data up to the 35-year age interval; however, it appears to ignore relevant historical data beyond that point. The graph below shows these two curves along with the OLT curve.

Figure 7:
Account 373 – Street Lighting and Signal Systems



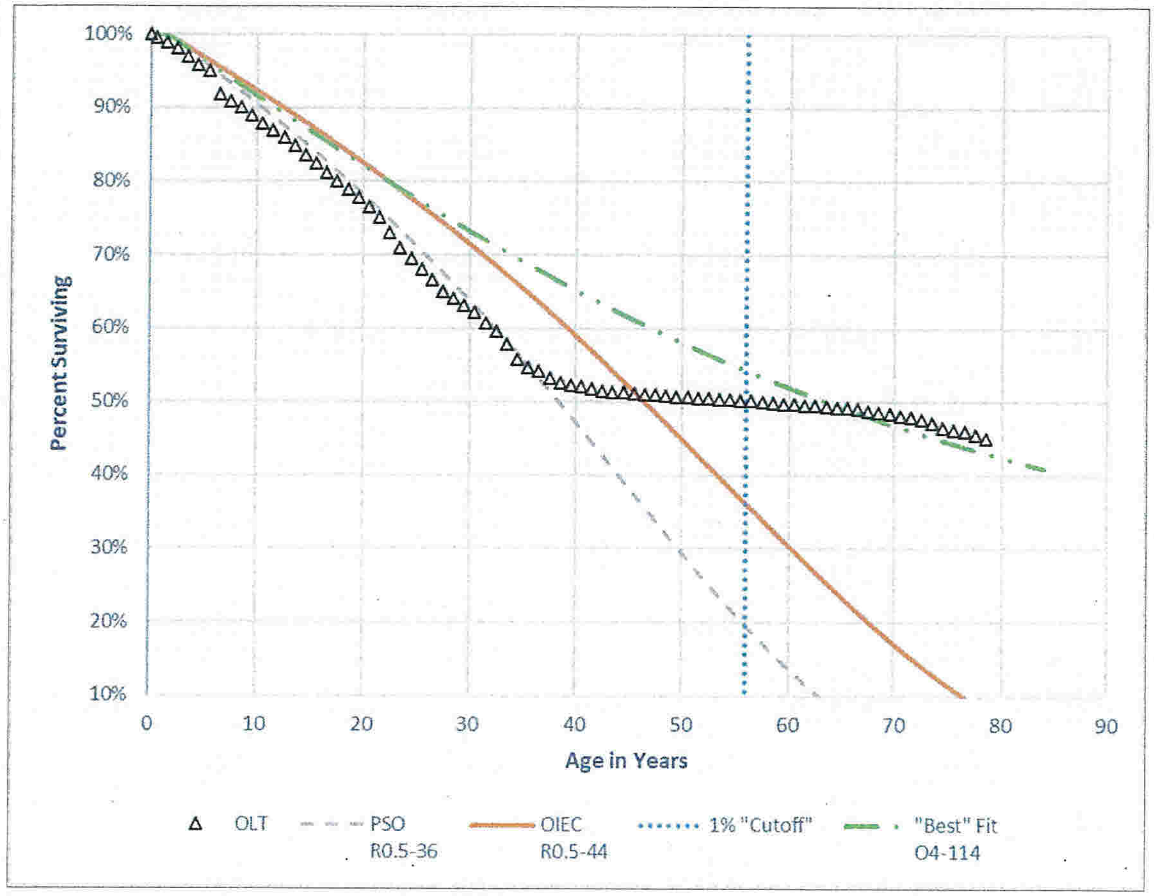
While it might be prudent to disregard the problematic "tail" end of the curve, the R0.5-36 curve selected by the Company ignores large, relevant portions of the OLT curve. The graph below shows the same curves along with the 1% cutoff line as a benchmark.



As shown in this graph, the R0.5-36 curve selected by the Company seems to disregard a substantial 20 years of retirement data for this account – from age intervals 35 – 55. The R0.5-44 curve I selected represents a balance between the OLT curve pattern observed in the first 35 years and the pattern observed in the following 20 years.

Q. Did you select the mathematically best-fitting curve for this account?

A. No. The mathematically best fitting curve for this account and data band is the O4-114 curve, which is shown in the graph below.



Selecting the O4-114 curve for this account would have resulted in a much lower depreciation rate recommendation.

Q. Why did you not select the O4-114 curve for this account?

A. Even though it is the mathematically best-fitting curve, I did not select the O4-114 curve for this account for several reasons. First, the OLT curve derived from the historical data for this account is less than ideal for strict mathematical curve-fitting techniques. In other words, the OLT curve does not represent a typical Iowa-type curve shape. Second, we do not typically observe "O" curve-type patterns for Account 373 among the data for other electric utilities. While I think it is best to focus on the data for the utility being analyzed rather than industry averages, when the historical data is not ideal for traditional curve-fitting techniques, as is the case with this account, it can be instructive to consider the results observed in the analysis of other utilities. Finally, the O4-114 curve is the "best" mathematically fitting curve, in part, because it tracks the statistically problematic "tail-end" of the OLT curve. Furthermore, while the O4-114 curve might provide the best mathematical fit, it is clearly a poor fit from a visual curve-fitting standpoint, as it does not track the entire middle-portion of the OLT curve. This account represents a good example why it is important to conduct both visual and mathematical curve-fitting techniques in actuarial analysis. In looking at the graph above, we see that the R0.5-44 curve I selected for this account provides a good balance between the mathematically best-fitting curve (which is problematic for the reasons discussed above) and the Company's selected curve (which is problematic because it ignores significant portions of relevant data).

Q. Does your selected curve provide a better mathematical fit to the observed data than the Company's curve?

A. Yes. Whether conducting the mathematical analysis on the entire OLT curve, or the OLT curve less the "tail" end, the R0.5-44 curve provides a better mathematical fit than the Company's curve. Specifically, the SSD for the Company's curve is 5.8492, while the SSD for the R0.5-44 curve is 2.8982.[40]

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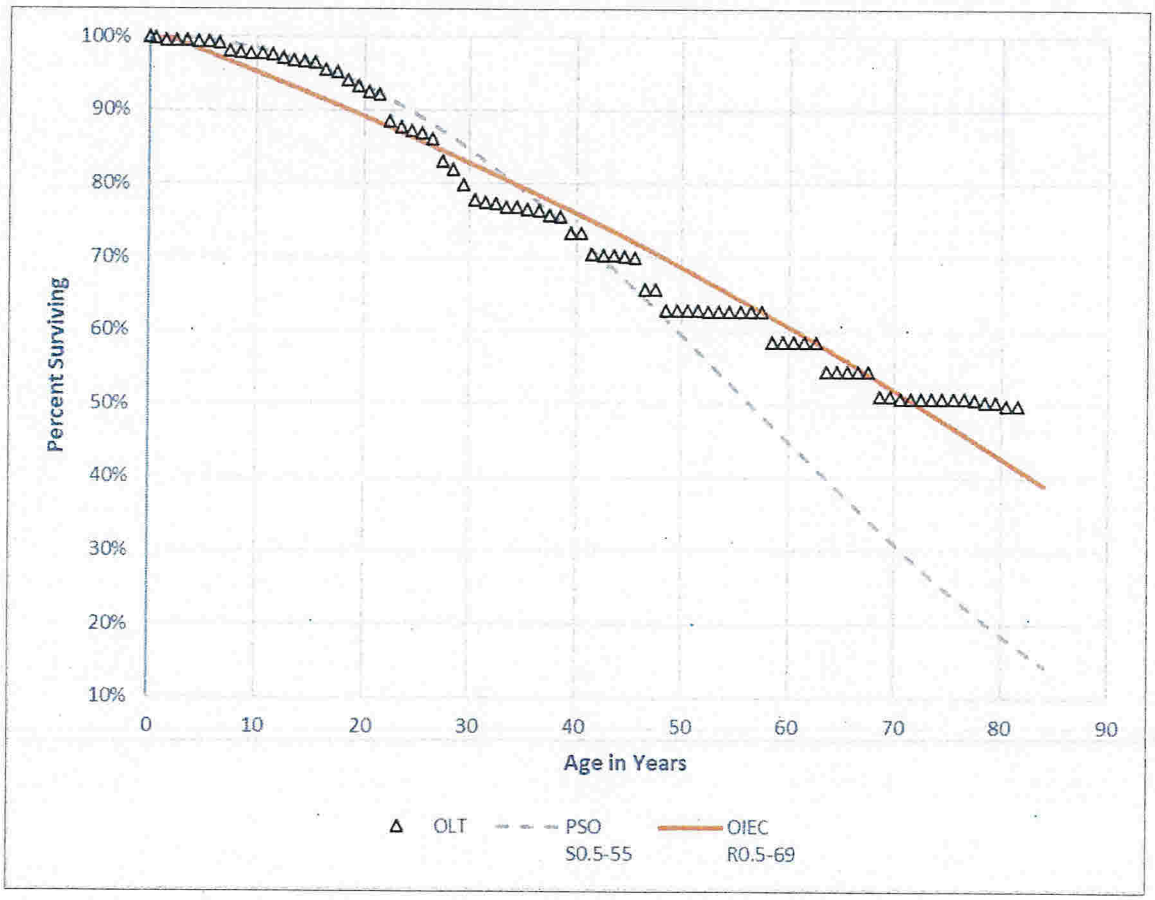
[40] Exhibit DJG-2-13.

6. <u>Account 390 – Structures and Improvements</u>

Q. Describe your service life estimate for this account, and compare it with the Company's estimate.

A. The Iowa curve I selected for this account is the R0.5-69 curve, and the curve the Company selected is the S0.5-55 curve. The graph below shows these two curves juxtaposed with the OLT curve.

Figure 8:
Account 390 – Structures and Improvements



As with the other accounts discussed above, the curve selected by the Company for this account is too short, which results in an underestimated service live and overestimated depreciation rate and expense. A visual observation shows that the R0.5-69 curve provides a better fit to the observed data than the Company's curve.

Q. Does your selected curve provide a better fit to the observed data?

A. Yes. The SSD for the Company's curve is 1.5882, while the SSD for the better-fitting R0.5-69 curve is only 0.1048. Thus, the curve I selected for this account provides a better fit to the OLT and results in a more reasonable depreciation rate.

VI. ACCOUNT 303 – SOFTWARE

Q. Describe the Company's position regarding Account 303.

A. Account 303 includes the Company's software systems. At December 31, 2016, there was a balance of $51.2 million in this account. Even though this account is the largest of the Company's amortized accounts, PSO chose not to include it in the depreciation study or provide any testimony in support of the five-year proposed amortization period. A five-year amortization period for this account results in an amortization expense of more than $10 million.[41]

Q. Has PSO met its burden of proof regarding the amortization period for Account 303?

A. No. The Company does not appear to have provided any support for the proposed five-year amortization period for this account. Account 303 has a balance of more than $50 million, which is significant, and should have been supported by evidence in this filing. Furthermore, Account 303 is often included in depreciation studies for other utilities, along with specific information regarding the annual balances and accruals associated with the account, and specific calculations regarding the proposed amortization rate.[42] However,

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[41] Schedule I-4_ Proposed.

[42] *See e.g.*, Direct Testimony of John J. Spanos, Exhibit JJS-2, filed December 18, 2015 in Cause No. PUD 201500273 (OG&E's 2015 rate case).

PSO failed to provide any such information for Account 303 in this case. As discussed above, the Supreme Court has clearly held that the utility bears the burden of making a "convincing showing" that its proposed depreciation rates are not excessive.[43] As further discussed below, there is evidence suggesting that the assets in this account could last up to 20 years.

Q. Do you agree with the Company's proposal regarding this account?

A. No. By choosing a five-year amortization period for Account 303, the Company is suggesting that its software programs will last only five years, on average, which results in an excessive proposed expense level. While a five-year service life estimate might be appropriate for basic consumer software systems, it is insufficient to accurately describe the service life of major software systems. Unlike basic consumer software systems, large enterprise software systems can be customized to the specific needs of the company. These modular systems require substantial upfront engineering costs along with periodic maintenance and support fees to ensure that the system performs reliably over a long period of time. For example, many utility companies rely on Enterprise Resource Planning ("ERP") systems comprising a suite of modular applications that collect and integrate data from different facets of the firm.

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

Q. Are you aware of service life estimates of Enterprise Resource Planning systems of 20 years or more?

A. Yes. ERP systems are designed to provide long term solutions to companies. SAP is one of several providers of ERP systems.[44] According to a report by CGI Consulting Services, SAP systems can last 25 – 30 years.[45] Given the extremely high installation costs for these complex systems as well as the annual maintenance fees, it is not surprising that companies using ERP systems would demand that the systems last longer than 10 years.

Q. Have utility companies recognized that their ERP systems can last at least 20 years?

A. Yes. Florida Power & Light ("FP&L") is one of many utilities that utilize ERP systems. In 2011, FP&L implemented SAP's ERP system to replace its previous accounting system.[46] FP&L had previously amortized its software over a five-year period. FP&L, however, requested that the amortization period be extended to 20 years in order to reflect the much longer lifespan of the new ERP system.[47] Kim Ousdahl, FP&L's Vice President, Controller and Chief Accounting Officer, gave the following testimony regarding FP&L's software account:

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[44] SAP ERP is enterprise resource planning software developed by the German company SAP SE.

[45] *Taking the Long View to SAP Value*, CGI, "Enlightened Managed Services Series," CGI Group Inc. 2011 p. 2.

[46] Petition for Rate Increase by Florida Power & Light Company, Docket No. 120015-EI, Testimony & Exhibits of Kim Ousdahl. p. 14.

[47] *Id.*

> In 2011, the Company implemented a new general ledger accounting system (SAP) to replace its legacy system. . . . FPL's policy for accounting for new software requires . . . amortization on a straight-line basis over a period of five years, which is the current amortization period approved for this account. The Company is requesting to extend the amortization period of this system from five to twenty years in order to more appropriately recognize the longer benefit period expected from this major business system.[48]

While a 10-year average life may have been appropriate for older, more basic software systems, it does not reflect the much longer service life of newer, more complex systems.

Q. Has PSO's depreciation witness recommended amortization periods up to 15 years for Account 303 in other depreciation studies?

A. Yes. Although Gannett Fleming did not include Account 303 in the depreciation study in this case, it has recommended amortization periods of up to 15 years for this account in other cases.[49]

Q. Are you recommending that the Company extend the service life of its software account to 15 or 20 years?

A. No. Although it would not be unreasonable to consider a 15 or 20-year amortization period for the assets in Account 303, I am recommending a more conservative 10-year amortization period for this account in the interest of reasonableness. I have calculated the amortization expense adjustment for this Account under a 10-year amortization period, which results in an adjustment in amortization expense of $4.9 million.[50]

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[48] *Id.*

[49] *See* Petition of NSTAR Electric Company and Western Massachusetts Electric Company each d/b/a Eversource Energy for Approval of an Increase in Base Distribution Rates for Electric Service Pursuant to G.L. c. 164 § 94 and 220 C.M.R. § 500, Exhibit ES-JJS-6, relevant portions attached hereto as Exhibit DJG-2-17.

[50] *See* Exhibit DJG-2-8.

VII. CONCLUSION AND RECOMMENDATION

Q. Summarize the key points of your testimony.

A. In this case, PSO is proposing an increase in depreciation expense in excess of $40 million despite the fact that the depreciation rates ordered by the Commission have been in effect for less than one year. It is clear that PSO's position cannot be accepted and that reasonable adjustments must be considered. OIEC and Wal-Mart propose two options for the Commission to consider in determining the level of depreciation expense to be authorized in this proceeding. Option One involves accepting portions of PSO's proposed rate increases for its production accounts, while removing the escalation and contingency factors from its proposed decommissioning costs, pursuant to the Commission's recent order in PSO's prior rate case. Option One would also adopt the depreciation rates recently ordered for PSO's transmission, distribution, and general accounts. Option Two involves changing PSO's currently-approved depreciation rates based on the Company's proposal in this case with reasonable modifications. Adopting Option Two would result in a substantial increase of about $22 million to PSO's current depreciation expense, while accepting Option One would result in an increase of about $9 million. Option One is preferable because although it would result in a substantial increase in depreciation expense, it would also provide more relief to rate payers in light of the significant base rate increase proposed by PSO in this case.

Q. What is OIEC and Wal-Mart's recommendation to the Commission with regard to PSO's proposed depreciation rates?

A. OIEC and Wal-Mart recommend the Commission adopt the proposed depreciation rates presented under Option One (See Exhibit DJG-2-3). Should the Commission not adopt this recommendation, OIEC and Wal-Mart recommend the Commission adopt the depreciation rates proposed under Option Two (See Exhibit DJG-2-3).

Q. Does this conclude your testimony?

A. Yes, including any exhibits, appendices, and other items attached hereto. 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.

Respectfully Submitted,

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AFFIDAVIT OF DAVID J. GARRETT

STATE OF OKLAHOMA)
)
COUNTY OF OKLAHOMA)

On the 21st day of September, 2017, before me appeared David J. Garrett, to me personally known, who, being by me first duly sworn, states that he is the managing member of Resolve Utility Consulting, PLLC, and acknowledges that he has read the above and foregoing document and believes that the statements therein are true and correct to the best of his information, knowledge and belief.

David J. Garrett

Subscribed and sworn to before me this 21st day of September, 2017.

GARRY GARRETT NOTARY # 17000773 EXP. 01/25/21 PUBLIC STATE OF OKLAHOMA

Notary Public

My Commission expires: 1/25/21

APPENDIX A:

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.[51] 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.[52] The figure below illustrates the basic concept of a depreciation system and includes some of the available parameters.[53]

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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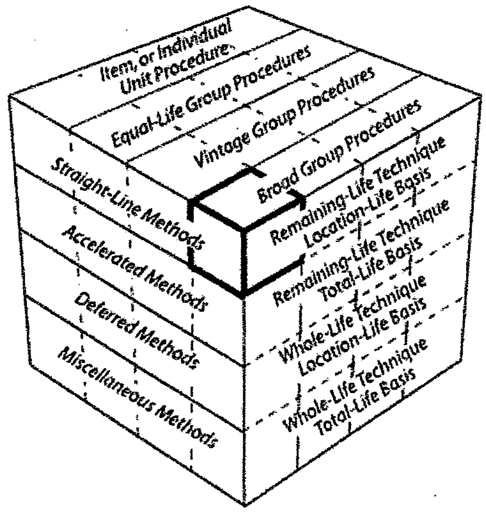
[51] Wolf *supra* n. 7, at 69-70.

[52] *Id.* at 70, 139-40.

[53] 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 9:
The Depreciation System Cube



1. Allocation Methods

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.[54] 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.[55] The basic formula for the straight-line method is as follows:[56]

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[54] NARUC *supra* n. 8, at 56.

[55] *Id.*

[56] *Id.*

Equation 1:
Straight-Line Accrual

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

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.[57] 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:[58]

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.[59] 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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[57] *Id.* at 57.

[58] *Id.* at 56.

[59] Wolf *supra* n. 7, 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.[60] 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.[61]

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.[62] 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.[63] Under the equal life procedure the property is divided into subgroups that each has a common life.[64]

3. Application Techniques

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 group, while the remaining life technique seeks to recover undepreciated costs over the remaining life of the plant.[65]

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[60] *Id.* at 74.

[61] NARUC *supra* n. 8, at 61-62.

[62] *See* Wolf *supra* n. 7, at 74-75.

[63] *Id.* at 75.

[64] *Id.*

[65] NARUC *supra* n. 8, 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.[66] 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 <u>current</u> depreciation parameters.[67] 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.[68] 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:[69]

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[66] Wolf *supra* n. 7, at 83.

[67] NARUC *supra* n. 8, at 325.

[68] NARUC *supra* n. 8, 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.").

[69] *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.[70]

4. <u>Analysis Model</u>

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.[71] 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 from 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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[70] Wolf *supra* n. 7, at 178.

[71] *See* Wolf *supra* n. 7, 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.

APPENDIX B:

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.[72] 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.[73] 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. <u>Development</u>

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.[74] They generalized the 65 curves

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[72] Wolf *supra* n. 7, at 276.

[73] *Id.* at 23.

[74] *Id.* at 34.

into 13 survivor curve types and published their results in *Bulletin 103: Life Characteristics of 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.[75] 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."[76] 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.[77] 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

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[75] *Id.*

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

[77] 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. 7, at 305-38 (publishing the percent surviving for each Iowa curve, including "O" type curve, at one percent intervals).

essentially repeated Winfrey's data collection, testing, and analysis methods used to develop the 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:[78]

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.[79]

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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[78] *See* Wolf *supra* n. 7, at 37.

[79] *Id.*

2. <u>Classification</u>

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).[80] 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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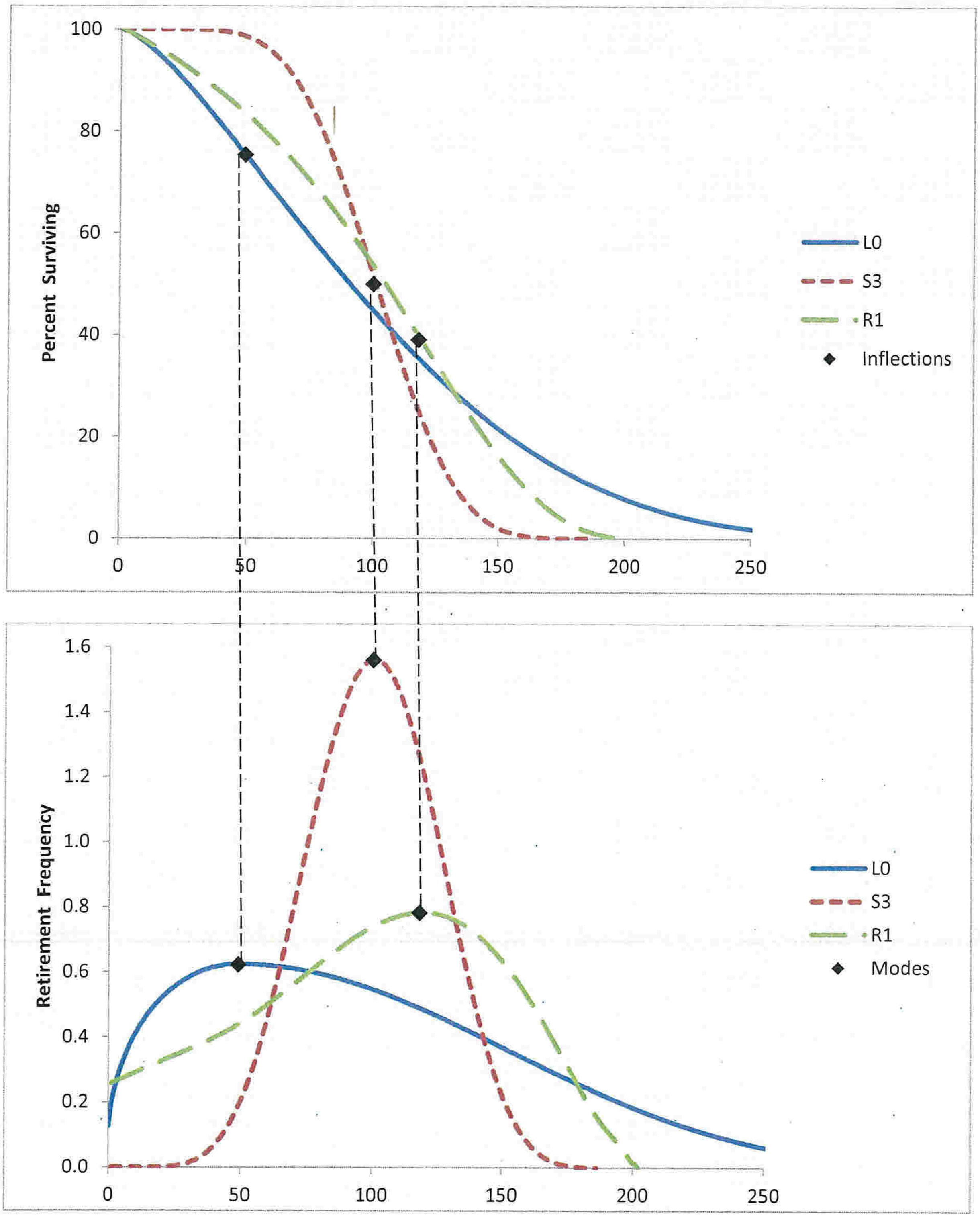
[80] In 1967, Harold A. Cowles added four origin-modal curves known as "O type" curves. There are also several "half" curves and a square curve, so the total amount of survivor curves commonly called "Iowa" curves is about 31 (see NARUC supra n. 8, at 68).

Figure 10:
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."[81]

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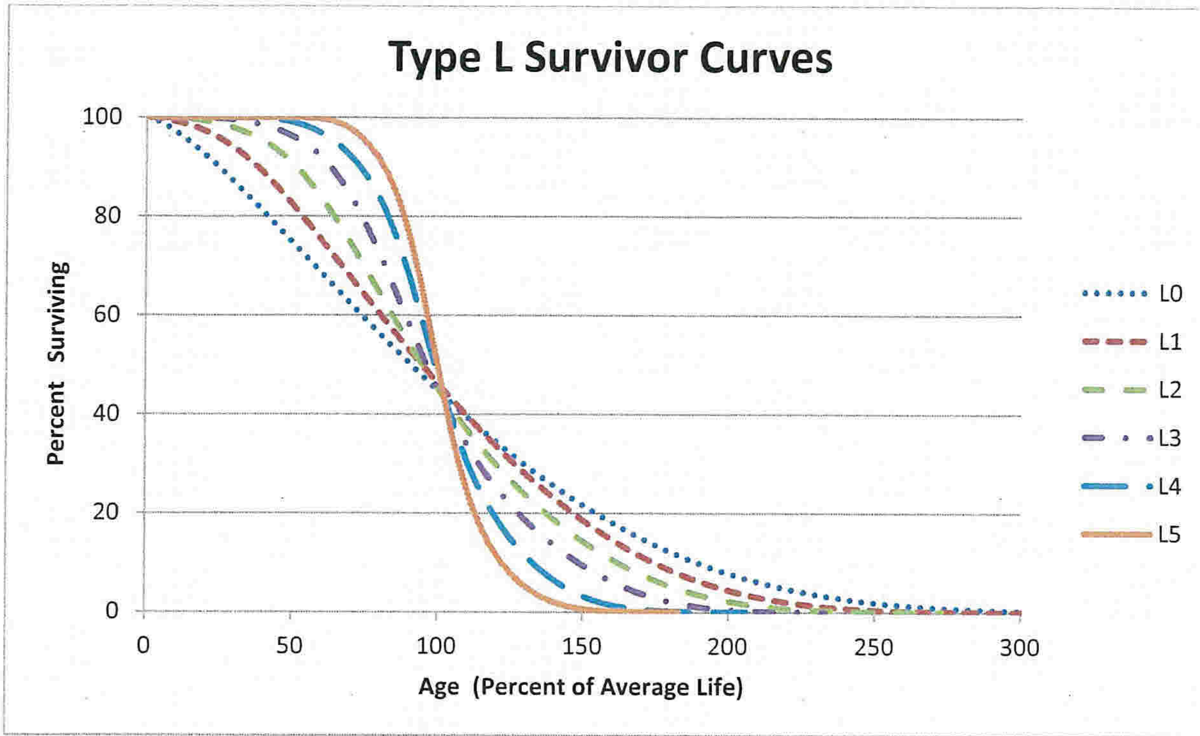
[81] Winfrey, *Bulletin 125: Statistical Analyses of Industrial Property Retirements* 60, Vol. XXXIV, No. 23 (Iowa State College of Agriculture and Mechanic Arts 1935).

Figure 11:
Type L Survivor and Frequency Curves



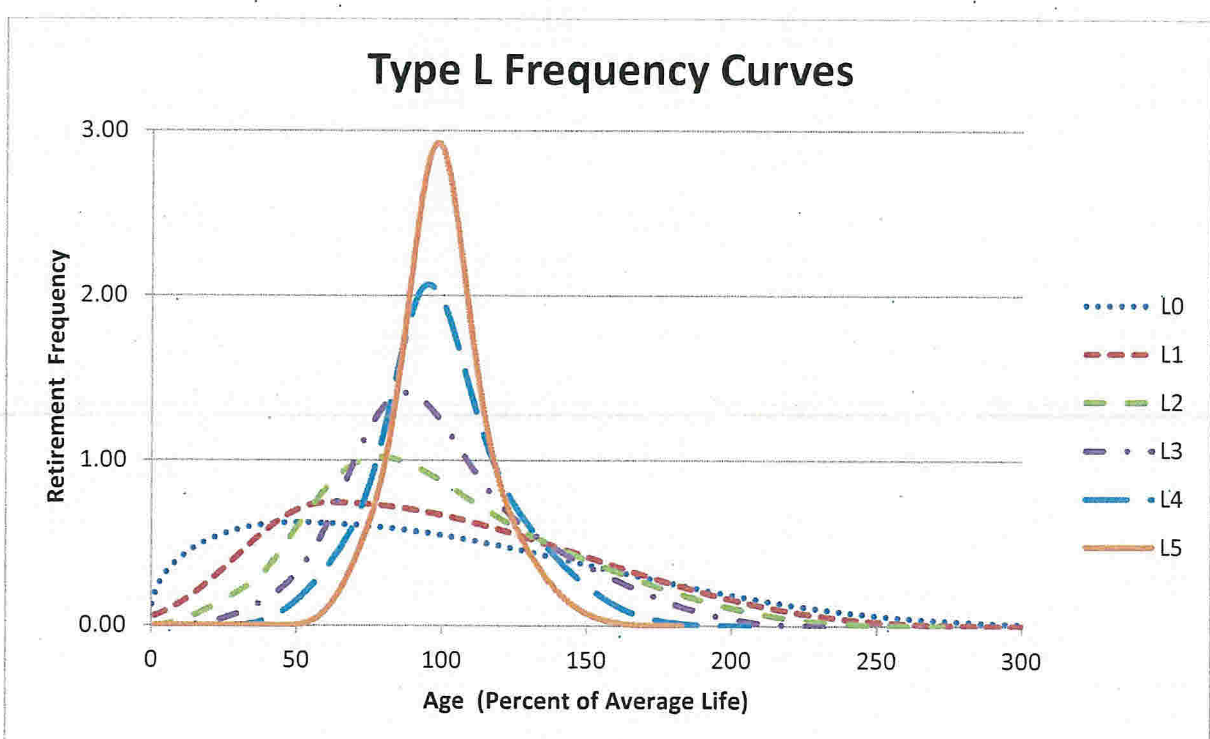
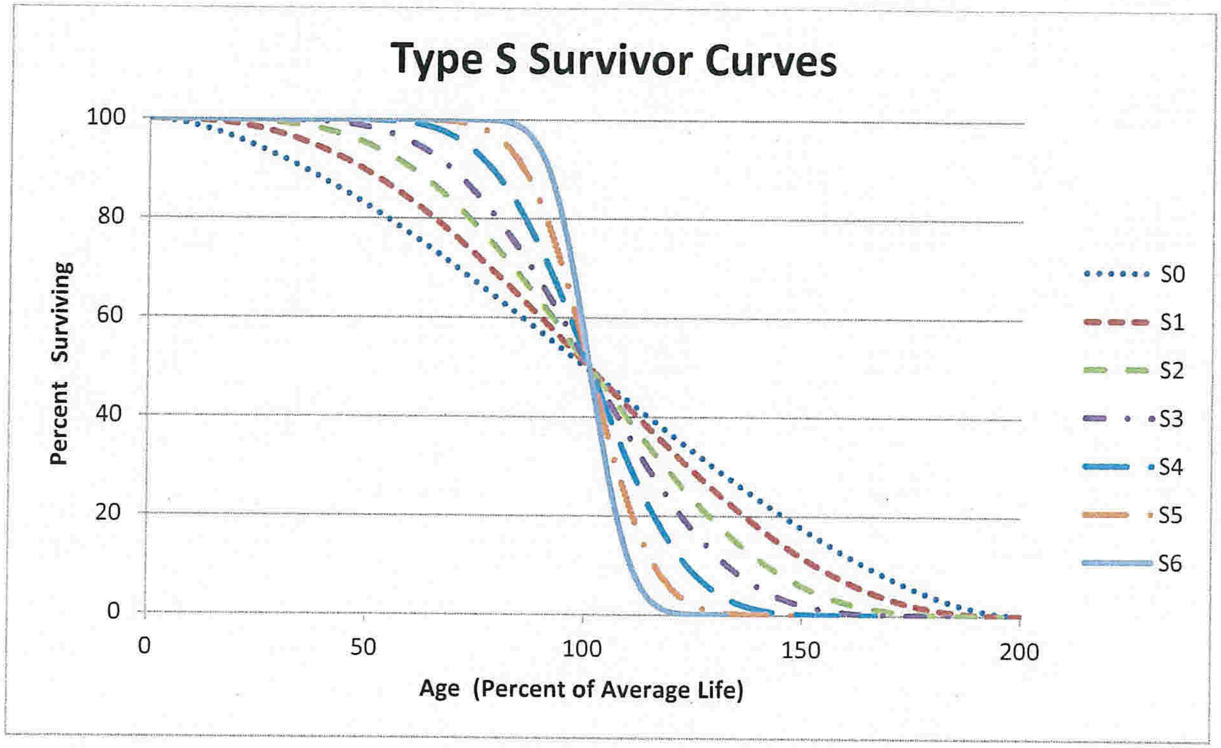


Figure 12:
Type S Survivor and Frequency Curves



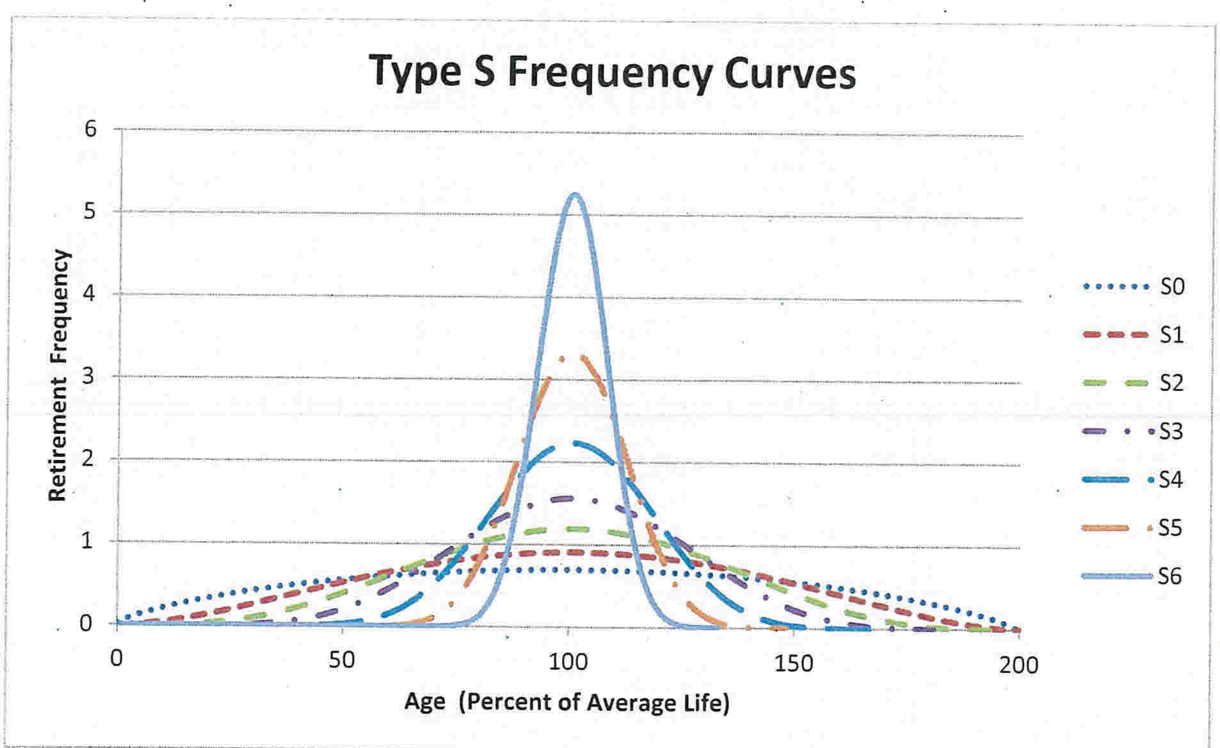
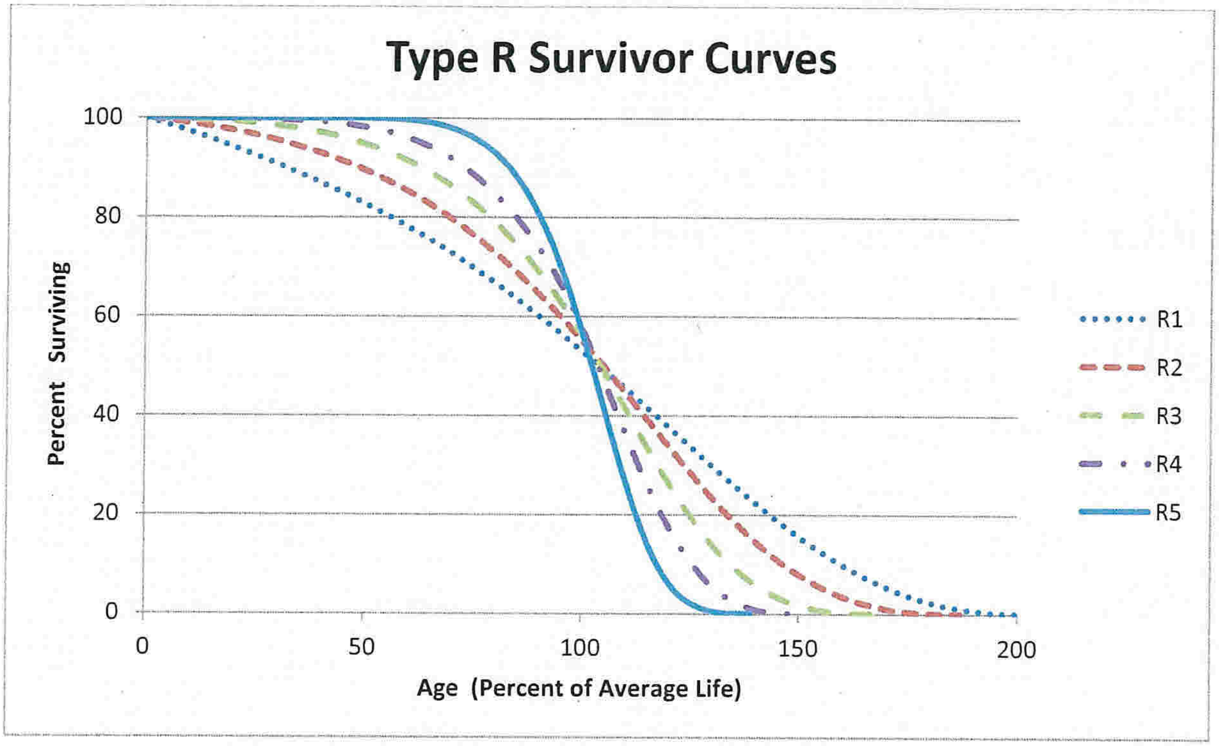
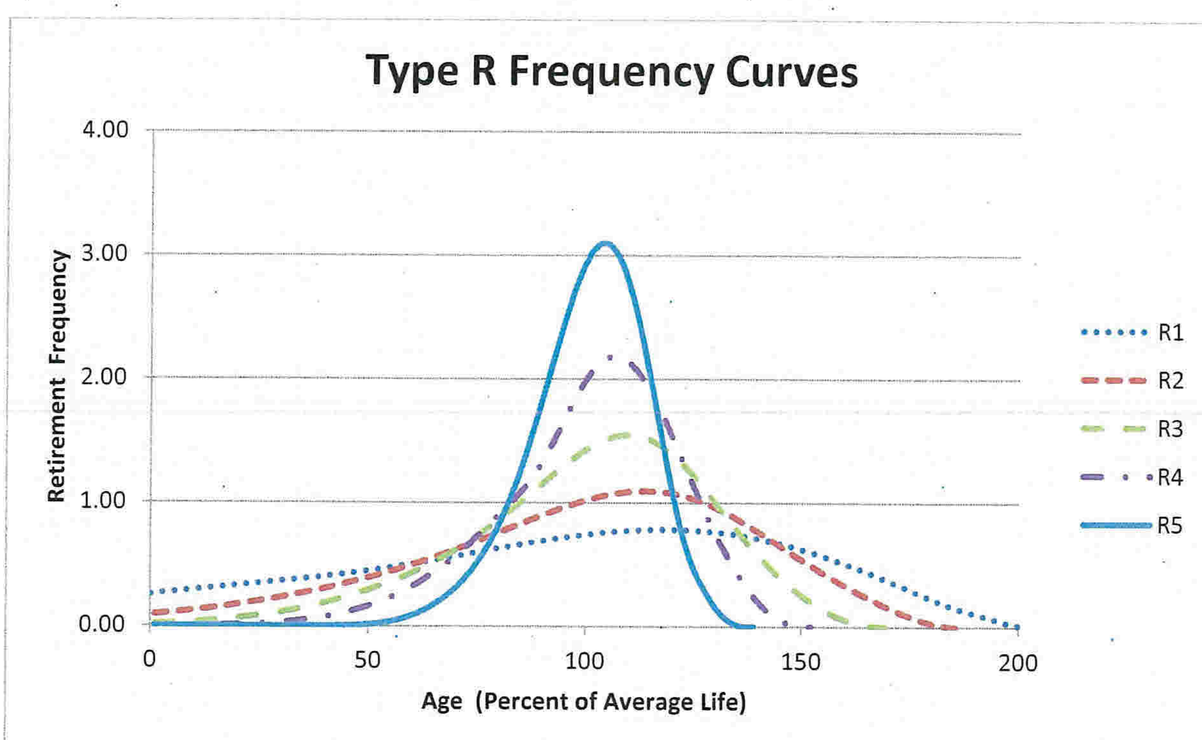


Figure 13:
Type R Survivor and Frequency Curves





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.[82]

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:[83]

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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[82] 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.

[83] *See* NARUC *supra* n. 8, 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.[84] 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.[85] 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 potion 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

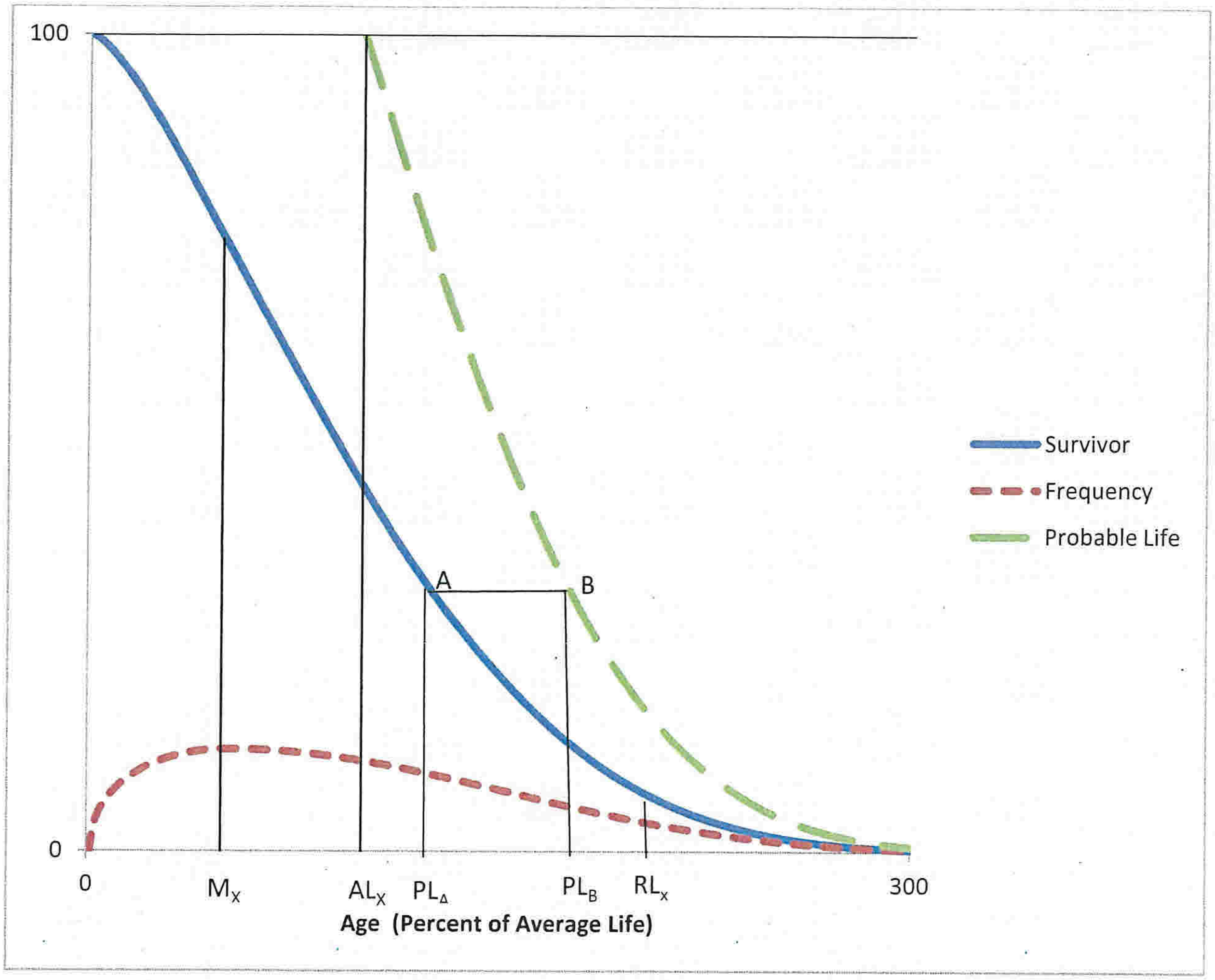
$$Average\ Remaining\ Life = \frac{Area\ Under\ Survivor\ Curve\ from\ Age\ x\ to\ Max\ Life}{S_X}$$

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

[84] *Id.* at 73.

[85] *Id.* at 74.

Figure 14:
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.[86] 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

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[86] Wolf *supra* n. 7, at 28.

the probable life curve, and back down to the age corresponding to point "B." It is no coincidence 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.

APPENDIX C:
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 of 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.[87]

Figure 15:
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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[87] NARUC *supra* n. 8, 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.[88] Historical data is used in the retirement rate actuarial method, which is discussed further below.

The Retirement Rate Method

There are several systematic actuarial methods that use historical data in order to calculating observed survivor curves for property groups. Of these methods, the retirement rate method is superior, and is widely employed by depreciation analysts.[89] 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

[88] *Id.* at 112-13.

[89] 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.[90] 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 16:
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	

[90] 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 17:
Retirement Matrix

Placement Years	Experience Years Retirments During the Year (Dollars in 000's) 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.[91] 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

91 Wolf *supra* n. 7, 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 18:
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			

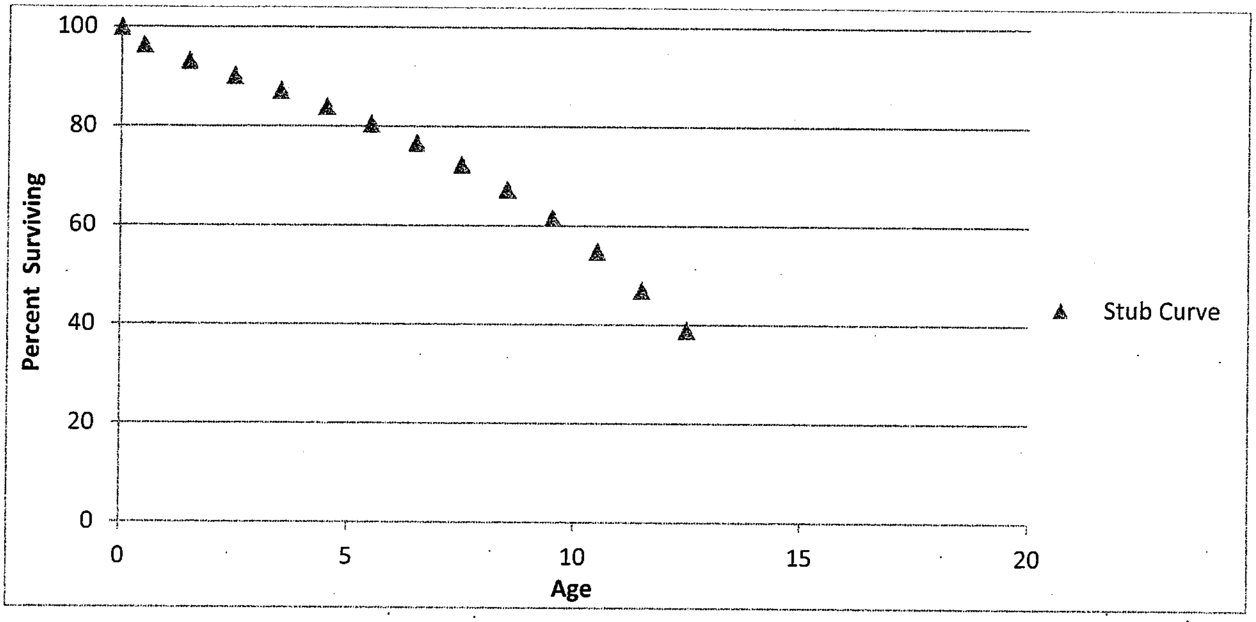
Column F on the right shows the percentages surviving at the beginning of each age interval. This column starts at 100% surviving. Each consecutive number below is calculated by multiplying the percent surviving from the previous age interval by the corresponding survivor ratio for that age interval. 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)[92].

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

[92] 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 19:
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.

<u>Banding</u>

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.[93] 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.[94]

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.

[93] NARUC *supra* n. 8, at 113.

[94] *Id.*

Figure 20:
Placement Bands

Placement Years	Experience Years Exposures at January 1 of Each Year (Dollars in 000's) 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.[95] 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

[95] Wolf *supra* n. 7, 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.[96]

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 21:
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

[96] NARUC *supra* n. 8, 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.[97] 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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[97] *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 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.

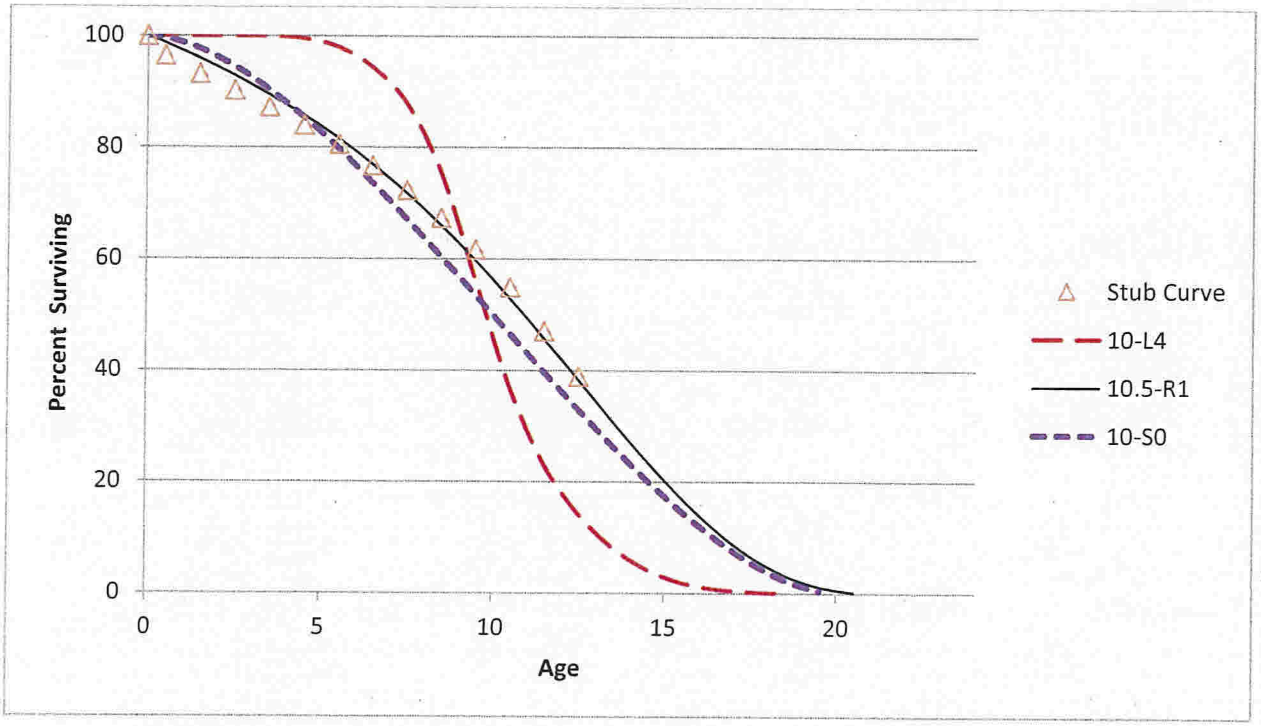
Curve Fitting

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."[98]

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.

[98] Wolf *supra* n. 7, at 46 (22 curves includes Winfrey's 18 original curves plus Cowles's four "O" type curves).

Figure 22:
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.[99]

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."[100]

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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[99] Wolf *supra* n. 7, at 47.

[100] *Id.* at 48.

Figure 23:
Mathematical Fitting

Age Interval	Stub Curve	Iowa Curves			Squared Differences		
		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**

BEFORE THE CORPORATION COMMISSION OF OKLAHOMA

APPLICATION OF PUBLIC SERVICE COMPANY OF OKLAHOMA, AN OKLAHOMA CORPORATION, FOR AN ADJUSTMENT IN ITS RATES AND CHARGES AND THE ELECTRIC SERVICE RULES, REGULATIONS AND CONDITIONS OF SERVICE FOR ELECTRIC SERVICE IN THE STATE OF OKLAHOMA	CAUSE NO. PUD 201700151

ERRATA TO THE RESPONSIVE TESTIMONY OF DAVID J. GARRETT, PART II - DEPRECIATION

Oklahoma Industrial Energy Consumer (OIEC") respectfully submits this Errata to attach Exhibits DJG-2-1 through DJG-2-18 to the Responsive Testimony of David J. Garrett, Part II – Depreciation, which Exhibits were inadvertently omitted from said testimony filed on September 21, 2017.

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SEP 26 2017
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CORPORATION COMMISSION
OF OKLAHOMA

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CERTIFICATE OF SERVICE

On this 26th day of September, 2017, a true and correct copy of the above and foregoing was sent via electronic mail to the following interested parties:

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Jack P. Fite and Joann Stevenson Worthington,
Attorneys *representing* Public Service Company of Oklahoma

Dara M. Derryberry, Deputy Attorney General,
Katy Evans Boren, Deputy Chief and Jared B. Haines, Assistant Attorney General
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Deborah R. Thompson,
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Rick D. Chamberlain,
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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 – Present
Participate in management of operations, attend meetings, review performance, compensation, and financial records. Assist in fundraising events.

<u>Group Facilitator & Fundraiser</u> — 2014 – Present
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

State	Regulatory Agency / Company-Applicant	Docket Number	Testimony / Analysis: Issues	Type	Date
TX	Railroad Commission of Texas Atmos Pipeline - Texas	GUD 10580	Depreciation rates, depreciation grouping procedure	Prefiled	3/22/2017
TX	Public Utility Commission of Texas Sharyland Utility Co.	PUC 45414	Depreciation rates, simulated and actuarial analysis	Prefiled	2/28/2017
OK	Oklahoma Corporation Commission Empire District Electric Co.	PUD 201600468	Cost of capital, depreciation rates, terminal salvage, lifespans	Prefiled	3/13/2017
TX	Railroad Commission of Texas CenterPoint Energy Texas Gas	GUD 10567	Depreciation rates, simulated and actuarial analysis	Prefiled	2/21/2017
AR	Arkansas Public Service Commission Oklahoma Gas & Electric Co.	160-159-GU	Cost of capital, depreciation rates, terminal salvage, lifespans	Prefiled	1/31/2017
FL	Florida Public Service Commission Peoples Gas	160-159-GU	Depreciation rates	Report	11/4/2016
AZ	Arizona Corporation Commission Arizona Public Service Co.	E-01345A-16-0036	Cost of capital, depreciation rates, terminal salvage, lifespans	Pre-filed	12/28/2016
NV	Nevada Public Utilities Commission Sierra Pacific Power Co.	16-06008	Depreciation rates, terminal salvage, lifespans, theoretical reserve	Pre-filed	9/23/2016
OK	Oklahoma Corporation Commission Oklahoma Gas & Electric Co.	PUD 201500273	Cost of capital, depreciation rates, terminal salvage, lifespans	Pre-filed Live	3/21/2016 5/3/2016
OK	Oklahoma Corporation Commission Public Service Co. of Oklahoma	PUD 201500208	Cost of capital, depreciation rates, terminal salvage, lifespans	Pre-filed Live	10/14/2015 12/8/2015
OK	Oklahoma Corporation Commission Oklahoma Natural Gas Co.	PUD 201500213	Cost of capital and depreciation rates	Pre-filed	10/19/2015

Utility Regulatory Proceedings

State	Regulatory Agency / Company-Applicant	Docket Number	Testimony / Analysis: Issues	Type	Date
OK	Oklahoma Corporation Commission Oak Hills Water System	PUD 201500123	Cost of capital and depreciation rates	Pre-filed Live	7/8/2015 8/14/2015
OK	Oklahoma Corporation Commission CenterPoint Energy Oklahoma Gas	PUD 201400227	Fuel prudence review and fuel adjustment clause	Pre-filed Live	11/3/2014 2/10/2015
OK	Oklahoma Corporation Commission Public Service Co. of Oklahoma	PUD 201400233	Certificate of authority to issue new debt securities	Pre-filed Live	9/12/2014 9/25/2014
OK	Oklahoma Corporation Commission Empire District Electric Co.	PUD 201400226	Fuel prudence review and fuel adjustment clause	Pre-filed Live	12/9/2014 1/22/2015
OK	Oklahoma Corporation Commission Fort Cobb Fuel Authority	PUD 201400219	Fuel prudence review and fuel adjustment clause	Pre-filed Live	 1/29/2015
OK	Oklahoma Corporation Commission Fort Cobb Fuel Authority	PUD 201400140	Outside services, legislative advocacy, payroll expense, and insurance expense	Pre-filed	12/16/2014
OK	Oklahoma Corporation Commission Public Service Co. of Oklahoma	PUD 201300201	Authorization of standby and supplemental tariff	Pre-filed Live	12/9/2013 12/19/2013
OK	Oklahoma Corporation Commission Fort Cobb Fuel Authority	PUD 201300134	Fuel prudence review and fuel adjustment clause	Pre-filed Live	10/23/2013 1/30/2014
OK	Oklahoma Corporation Commission Empire District Electric Co.	PUD 201300131	Fuel prudence review and fuel adjustment clause	Pre-filed Live	11/21/2013 12/19/2013
OK	Oklahoma Corporation Commission CenterPoint Energy Oklahoma Gas	PUD 201300127	Fuel prudence review and fuel adjustment clause	Pre-filed Live	10/21/2013 1/23/2014
OK	Oklahoma Corporation Commission	PUD 201200185	Gas transportation contract extension	Pre-filed	9/20/2012

Utility Regulatory Proceedings

State	Regulatory Agency / Company-Applicant	Docket Number	Testimony / Analysis: Issues	Type	Date
	Oklahoma Gas & Electric Co.			Live	10/9/2012
OK	Oklahoma Corporation Commission Empire District Electric Co.	PUD 201200170	Fuel prudence review and fuel adjustment clause	Pre-filed Live	10/31/2012 12/13/2012
OK	Oklahoma Corporation Commission Oklahoma Gas & Electric Co.	PUD 201200169	Fuel prudence review and fuel adjustment clause	Pre-filed Live	12/19/2012 4/4/2013

Summary Expense Adjustment

OPTION 1: LEAVE RATES THE SAME EXCEPT FOR NEW PRODUCTION PLANT*

Plant Function	Plant Balance 6/30/2017	PSO Proposal	OIEC Proposal	OIEC Adjustment
Intangible	$ 51,158,691	$ 10,002,988	$ 5,009,816	$ (4,993,173)
Production	1,562,178,971	59,052,499	53,223,445	(5,829,054)
Transmission	845,997,944	21,245,650	18,166,631	(3,079,019)
Distribution	2,389,887,504	78,220,567	65,282,209	(12,938,358)
General	169,512,415	5,952,814	3,730,822	(2,221,992)
Northeastern 4				(4,141,553) ***
Total	$ 5,018,735,525	$ 174,076,209	$ 145,014,613	**$ (33,203,149)**

OPTION 2: CHANGE RATES**

Plant Function	Plant Balance 6/30/2017	PSO Proposal	OIEC Proposal	OIEC Adjustment
Intangible	$ 51,158,691	$ 10,002,988	$ 5,009,816	$ (4,993,173)
Production	1,562,178,971	59,052,499	53,223,445	(5,829,054)
Transmission	845,997,944	21,245,650	20,568,389	(677,261)
Distribution	2,389,887,504	78,220,567	74,351,620	(3,868,947)
General	169,512,415	5,952,814	5,560,389	(392,425)
Northeastern 4				(4,141,553) ***
Total	$ 5,018,735,525	$ 174,076,209	$ 158,315,350	**$ (19,902,412)**

* Includes PSO's proposed production rates less contingency and escalation factors pursuant to prior order;
includes recently-approved rates for transmission, distribution, and general accounts;
also includes software adjustment (intangible Account 303) because issue not addressed in prior case

** Includes updated service life adjustments based on Iowa curve fitting while removing contingency and escalation factors from terminal net salvage consistent with current commission order

*** See testimony of Mark E. Garrett regarding removal of Northeastern 4 depreciation expense; see also response to DR AG-10 (Attachment 1 NE4 NBV and Depreciation Expense)

Detailed Expense Adjustment

Account No.	Description	Pro Forma Plant	PSO Proposal Rate	PSO Proposal Annualized Expense	OIEC Option #1 Rate	OIEC Option #1 Expense	OIEC Option #2 Rate	OIEC Option #2 Expense	Adjustment Option #1 Rate	Adjustment Option #1 Expense	Adjustment Option #2 Rate	Adjustment Option #2 Expense
	Intangible Plant											
303.00	Software	51,158,691	20.00%	10,002,988	10.00%	5,009,816	10.00%	5,009,816	-10.00%	(4,993,173)	-10.00%	(4,993,173)
	Steam Production											
	Oklaunion											
310.00	Land - Coal Fired	1,989,307										
311.00	Structures, Improvements-Coal	18,255,751	2.37%	432,661	1.99%	362,939	1.99%	362,939	-0.38%	(69,723)	-0.38%	(69,723)
312.00	Boiler Plant Equip-Coal	51,768,651	2.61%	1,351,162	2.20%	1,139,448	2.20%	1,139,448	-0.41%	(211,714)	-0.41%	(211,714)
314.00	Turbogenerator Units-Coal	15,515,075	2.27%	352,192	1.84%	286,225	1.84%	286,225	-0.43%	(65,968)	-0.43%	(65,968)
315.00	Accessory Elect Equip-Coal	6,588,583	1.94%	127,819	1.55%	102,024	1.55%	102,074	-0.39%	(25,795)	-0.39%	(25,795)
316.00	Misc Pwr Plant Equip-Coal	5,633,673	2.26%	127,320	1.80%	101,556	1.80%	101,556	-0.46%	(25,764)	-0.46%	(25,764)
	ARO#1 Oklaunion Ash Pond : PSO/AEPTN : PPOKLARO1	3,694,291		993,314		993,314		993,314		0		0
	ARO#2 Oklaunion Ash Pond : PSO/AEPTN : PPOKLARO2	1,680,688		452,343		452,343		452,343		0		0
	ARO#3 Oklaunion Ash Pond : PSO/AEPTN : PPOKLARO3	220,480		60,456		60,456		60,456		0		0
	ARO#4 Oklaunion Ash Pond : PSO/AEPTN : PPOKLARO4	220,480		60,455		60,455		60,455		0		0
317.00	ARO Steam Production Plant	15,619		405		405		405		0		0
		105,582,552		3,958,126		3,559,163		3,559,163		(398,963)		(398,963)
	Northeast Generating Plant - Units 3 & 4											
310.00	Land - Coal Fired	1,141,086		0		0		0		0		0
311.00	Structures, Improvements-Coal	19,529,269	2.84%	554,631	2.74%	535,921	2.74%	535,921	-0.10%	(18,710)	-0.10%	(18,710)
312.00	Boiler Plant Equip-Coal	376,009,689	4.09%	15,378,796	3.99%	14,984,117	3.99%	14,984,117	-0.10%	(394,679)	-0.10%	(394,679)
312.10	Coal Transportation Equip	5,392,509	0.14%	7,550	0.14%	7,725	0.14%	7,725	0.00%	175	0.00%	175
314.00	Turbogenerator Units-Coal	46,063,776	4.95%	2,280,157	4.84%	2,229,814	4.84%	2,229,814	-0.11%	(50,343)	-0.11%	(50,343)
315.00	Accessory Elect Equip-Coal	20,336,898	2.62%	532,827	2.52%	511,864	2.52%	511,864	-0.10%	(20,962)	-0.10%	(20,962)
316.00	Misc Pwr Plant Equip-Coal	17,732,132	3.47%	615,305	3.35%	593,812	3.35%	593,812	-0.12%	(21,493)	-0.12%	(21,493)
317.00	ARO Steam Production Plant	802,640		24,378		24,378		24,378		0		0
317.00	ARO Steam Production Plant - Ash Pond #1	8,826,819		343,756		343,756		343,756		0		0
317.00	ARO Steam Production Plant - Ash Pond #2	12,934,871		493,084		493,084		493,084		0		0
317.00	ARO Steam Production Plant - Rtn Pond	279,358		8,845		8,845		8,845		0		0
		509,049,047		20,239,328		19,733,316		19,733,316		(506,013)		(506,013)
	Northeast Generating Plant - Units 3 & 4 - Rail Spur											
310.00	Land - Coal Fired	1,880,041										
310.10	Land Rights - Coal Fired	939,196	3.77%	35,408	3.77%	35,408	3.77%	35,408	0.00%	0	0.00%	0
312.00	Rail Spur	22,359,915	1.53%	342,107	1.39%	311,563	1.39%	311,563	-0.14%	(30,544)	-0.14%	(30,544)
		25,179,152		377,514		346,971		346,971		(30,544)		(30,544)
	Eufaula Generating Plant											
310.00	Land - Coal Fired	0		0		0		0		0		0
	Total Steam Production - Coal	639,810,751		24,574,969		23,639,450		23,639,450		(935,519)		(935,519)
	Comanche											
310.30	Land - Oil/Gas	345,962		0		0		0		0		0
311.30	Struct, Improvements-Oil/Gas	5,471,580	2.69%	145,841	2.43%	131,857	2.43%	131,857	-0.26%	(13,983)	-0.26%	(13,983)
312.30	Boiler Plant Equip-Oil/Gas	64,327,219	5.14%	3,306,419	4.87%	3,132,054	4.87%	3,132,054	-0.27%	(174,365)	-0.27%	(174,365)
314.30	Turbogenator Units-Oil/Gas	63,891,314	2.71%	1,731,455	2.70%	1,728,118	2.70%	1,728,118	-0.01%	(3,337)	-0.01%	(3,337)
315.30	Accssry Elect Equip-Oil/Gas	6,626,040	2.18%	144,448	1.91%	126,881	1.91%	126,881	-0.27%	(17,566)	-0.27%	(17,566)
316.30	Misc Pwr Plt Equip-Oil/Gas	2,643,358	2.98%	78,772	2.71%	71,519	2.71%	71,519	-0.27%	(7,254)	-0.27%	(7,254)
317.00	RET#1 Comanche Retention Pond	683,326		50,622		50,622		50,622		0		0
317.30	ARO Steam Prod Plnt Oil/Gas	159,024		9,873		9,873		9,873		0		0
		144,097,823		5,467,429		5,250,925		5,250,925		(216,505)		(216,505)
	Northeast Generating Plant - Units 1 & 2											
310.30	Land - Oil/Gas	101,505		0		0		0		0		0
310.31	Land Rights - Oil/Gas	1		0		0		0		0		0
311.30	Struct, Improvements-Oil/Gas	11,736,363	3.72%	436,593	3.16%	371,107	3.16%	371,107	-0.56%	(65,486)	-0.56%	(65,486)
312.30	Boiler Plant Equip-Oil/Gas	93,461,086	3.78%	3,532,829	3.24%	3,024,679	3.24%	3,024,679	-0.54%	(508,150)	-0.54%	(508,150)
314.30	Turbogenator Units-Oil/Gas	135,531,457	2.67%	3,618,690	2.68%	3,633,225	2.68%	3,633,225	0.01%	14,535	0.01%	14,535
315.30	Accssry Elect Equip-Oil/Gas	14,446,763	3.27%	472,409	2.74%	395,912	2.74%	395,912	-0.53%	(76,497)	-0.53%	(76,497)
316.30	Misc Pwr Plt Equip-Oil/Gas	7,846,952	3.57%	280,136	3.00%	235,237	3.00%	235,237	-0.57%	(44,899)	-0.57%	(44,899)
317.00	ARO Steam Production Plant	609,488		5,242		5,242		5,242		0		0
		263,733,615		8,345,899		7,665,403		7,665,403		(680,496)		(680,496)
	Riverside Generating Plant - Units 1 & 2											
310.30	Land - Oil/Gas	1,376,358		0		0		0		0		0
311.30	Struct, Improvements-Oil/Gas	10,033,495	4.21%	422,326	3.13%	314,024	3.13%	314,024	-1.08%	(108,302)	-1.08%	(108,302)
312.30	Boiler Plant Equip Oil/Gas	75,927,629	3.49%	2,649,874	2.34%	1,777,040	2.34%	1,777,040	-1.15%	(872,834)	-1.15%	(872,834)
314.30	Turbogenator Units-Oil/Gas	70,682,383	4.05%	2,862,637	2.91%	2,054,892	2.91%	2,054,892	-1.14%	(807,745)	-1.14%	(807,745)
315.30	Accssry Elect Equip-Oil/Gas	10,496,573	3.33%	349,536	2.23%	234,587	2.23%	234,587	-1.10%	(114,949)	-1.10%	(114,949)
316.30	Misc Pwr Plt Equip-Oil/Gas	7,151,441	5.39%	385,463	4.22%	301,830	4.22%	301,830	-1.17%	(83,633)	-1.17%	(83,633)
317.30	ARO Steam Prod Plnt Oil/Gas	2,222,230		79,143		79,143		79,143		0		0
317.30	ARO Steam Prod Plnt Oil/Gas - Rtn Pond #1	996,332		38,937		38,937		38,937		0		0
		178,884,741		6,787,915		4,800,453		4,800,453		(1,987,463)		(1,987,463)
	Southwestern Generating Plant U1-5											
310.30	Land - Oil/Gas	191,512		0		0		0		0		0
311.30	Struct, Improvements-Oil/Gas	8,367,833	4.43%	370,695	3.61%	301,992	3.61%	301,992	-0.82%	(68,703)	-0.82%	(68,703)
312.30	Boiler Plant Equip-Oil/Gas	36,438,443	4.43%	1,614,223	3.58%	1,304,936	3.58%	1,304,936	-0.85%	(309,287)	-0.85%	(309,287)
314.30	Turbogenator Units-Oil/Gas	33,809,370	4.45%	1,504,517	3.60%	1,217,063	3.60%	1,217,063	-0.85%	(287,454)	-0.85%	(287,454)

Detailed Expense Adjustment

Account No.	Description	Pro Forma Plant	PSO Proposal Rate	PSO Proposal Annualized Expense	OIEC Option #1 Rate	OIEC Option #1 Expense	OIEC Option #2 Rate	OIEC Option #2 Expense	Adjustment Option #1 Rate	Adjustment Option #1 Expense	Adjustment Option #2 Rate	Adjustment Option #2 Expense
315.30	Accsry Elect Equip-Oil/Gas	10,116,451	4.41%	446,136	3.60%	363,782	3.60%	363,782	-0.81%	(82,354)	-0.81%	(82,354)
316.30	Misc Pwr Plt Equip-Oil/Gas	1,629,760	4.02%	65,496	3.15%	51,344	3.15%	51,344	-0.87%	(14,152)	-0.87%	(14,152)
317.30	ARO Steam Prod Plnt Oil/Gas	813,308		28,908		28,908		28,908		0		0
317.30	ARO Steam Prod Plnt Oil/Gas - Retn Pond #1	129,254		18,749		18,749		18,749		0		0
		91,495,432		4,048,724		3,286,775		3,286,775		(761,949)		(761,949)
	Tulsa Generating Plant Units 2 & 4											
310.30	Land - Oil/Gas	97,253		0		0		0		0		0
311.30	Struct, Improvements-Oil/Gas	7,740,930	4.92%	381,149	4.39%	340,068	4.39%	340,068	-0.53%	(41,081)	-0.53%	(41,081)
312.30	Boiler Plant Equip-Oil/Gas	24,666,909	3.86%	952,143	3.29%	812,298	3.29%	812,298	-0.57%	(139,844)	-0.57%	(139,844)
314.30	Turbogenerator Units-Oil/Gas	31,927,384	4.31%	1,376,070	3.78%	1,707,649	3.78%	1,707,649	-0.53%	(168,422)	-0.53%	(168,422)
315.30	Accsry Elect Equip-Oil/Gas	10,165,936	5.33%	541,844	4.80%	488,104	4.80%	488,104	-0.53%	(53,740)	-0.53%	(53,740)
316.30	Misc Pwr Plt Equip-Oil/Gas	2,976,011	5.02%	149,396	4.48%	133,206	4.48%	133,206	-0.54%	(16,190)	-0.54%	(16,190)
317.30	ARO Steam Prod Plnt Oil/Gas	3,248,543		201,248		201,248		201,248		0		0
317.30	ARO Steam Prod Plnt Oil/Gas - Retn Pond #1	247,987		17,005		17,005		17,005		0		0
		81,076,952		3,618,854		3,199,578		3,199,578		(419,277)		(419,277)
	Total Steam Production - Oil & Gas	759,288,063		28,268,822		24,203,133		24,203,133		(4,065,689)		(4,065,689)
	Other Production											
	Comanche											
342.00	Fuel Holders - Gas	2,994	2.60%	78	2.43%	73	2.43%	73	-0.17%	(5)	-0.17%	(5)
344.00	Generators - Gas	754,469	1.25%	9,431	1.05%	7,933	1.05%	7,933	-0.20%	(1,498)	-0.20%	(1,498)
346.00	Misc Power Plant Eq-Gas	17,858	0.02%	4	0.00%	0	0.00%	0	-0.02%	(4)	-0.02%	(4)
		775,321		9,512		8,006		8,006		(1,507)		(1,507)
	Northeast Generating Plant - Units 1 & 2											
342.00	Fuel Holders - Gas	63,289	1.40%	886	1.10%	698	1.10%	698	-0.30%	(188)	-0.30%	(188)
344.00	Generators - Gas	6,126,241	1.91%	117,011	1.61%	98,473	1.61%	98,473	-0.30%	(18,538)	-0.30%	(18,538)
345.00	Accessory Electric Eq-Gas	83,558	4.74%	3,961	4.21%	3,521	4.21%	3,521	-0.53%	(440)	-0.53%	(440)
346.00	Misc Power Plant Eq-Gas	3,019	1.62%	49	1.34%	41	1.34%	41	-0.28%	(8)	-0.28%	(8)
		6,276,107		121,907		102,732		102,732		(19,175)		(19,175)
	Riverside Generating Plant											
346.00	Misc Pwr Plt Equip Oil/Gas	182,933	4.19%	7,665	3.48%	6,367	3.48%	6,367	-0.71%	(1,298)	-0.71%	(1,298)
342.00	Fuel Holders - Gas	9,797,993	3.07%	300,798	2.49%	243,976	2.49%	243,976	-0.58%	(56,823)	-0.58%	(56,823)
344.00	Generators - Gas	48,141,767	3.32%	1,598,307	2.69%	1,297,014	2.69%	1,297,014	-0.63%	(301,293)	-0.63%	(301,293)
345.00	Accessory Electric Eq-Gas	4,685,572	7.02%	328,927	5.90%	276,269	5.90%	276,269	-1.12%	(52,658)	-1.12%	(52,658)
		62,808,265		2,235,697		1,823,625		1,823,625		(412,072)		(412,072)
	Southwestern Generating Plant U4&5											
341.00	Structures & Improvments-Gas	5,253,788	3.31%	173,900	2.98%	156,578	2.98%	156,578	-0.33%	(17,322)	-0.33%	(17,322)
344.00	Generators - Gas	44,888,652	2.88%	1,292,793	2.55%	1,146,422	2.55%	1,146,422	-0.33%	(146,371)	-0.33%	(146,371)
345.00	Accessory Electric Eq-Gas	9,643,297	5.92%	570,883	5.26%	507,110	5.26%	507,110	-0.66%	(63,774)	-0.66%	(63,774)
346.00	Accessory Electric Eq-Gas	35,412	3.65%	1,293	3.28%	1,163	3.28%	1,163	-0.37%	(130)	-0.37%	(130)
		59,821,149		2,038,869		1,811,273		1,811,273		(227,596)		(227,596)
	Weleetka Generating Plant											
340.00	Land	62,660		0		0		0		0		0
341.00	Structures & Improvments Gas	760,901	12.95%	98,537	12.40%	94,328	12.40%	94,328	-0.55%	(4,209)	-0.55%	(4,209)
342.00	Fuel Holders - Gas	2,074,691	3.98%	82,573	3.51%	72,848	3.51%	72,848	-0.47%	(9,724)	-0.47%	(9,724)
344.00	Generators - Gas	24,639,423	4.84%	1,192,548	4.31%	1,061,970	4.31%	1,061,970	-0.53%	(130,578)	-0.53%	(130,578)
345.00	Accessory Electric Eq-Gas	797,063	12.24%	97,561	11.65%	92,845	11.65%	92,845	-0.59%	(4,715)	-0.59%	(4,715)
346.00	Misc Power Plant Eq-Gas	2,407,424	10.10%	243,150	9.67%	232,808	9.67%	232,808	-0.43%	(10,341)	-0.43%	(10,341)
347.00	ARO Other Production	23,812		2,039		2,039		2,039		0		0
		30,765,974		1,716,407		1,556,839		1,556,839		(159,568)		(159,568)
	Total Other Production	160,448,816		6,122,392		5,302,475		5,302,475		(819,918)		(819,918)
	Diesel Production											
	Northeast Generating Plant - Units 3 & 4 - Diesel											
344.00	Generators - Gas	437,950	2.16%	9,460	2.05%	8,983	2.05%	8,983	-0.11%	(477)	-0.11%	(477)
		437,950		9,460		8,983		8,983		(477)		(477)
	Riverside Generating Plant - Diesel Unit											
342.00	Fuel Holders - Gas	24,392	5.21%	1,271	5.00%	1,220	5.00%	1,220	-0.21%	(51)	-0.21%	(51)
344.00	Generators - Gas	470,175	1.24%	5,830	1.04%	4,876	1.04%	4,876	-0.20%	(954)	-0.20%	(954)
345.00	Accessory Electric Eq-Gas	28,635	2.14%	613	1.71%	489	1.71%	489	-0.43%	(124)	-0.43%	(124)
		523,202		7,714		6,585		6,585		(1,129)		(1,129)
	Southwestern Generating Plant - Diesel											
342.00	Fuel Holders - Gas	67,057	4.01%	2,689	3.69%	2,475	3.69%	2,475	-0.32%	(214)	-0.32%	(214)
344.00	Generators - Gas	212,484	1.20%	2,550	0.94%	1,996	0.94%	1,996	-0.26%	(554)	-0.26%	(554)
		279,536		5,239		4,471		4,471		(768)		(768)
										0		0
	Tulsa Generating Plant - Diesel Unit									0		0
342.00	Fuel Holders - Gas	70,372	2.00%	1,407	1.53%	1,077	1.53%	1,077	-0.47%	(331)	-0.47%	(331)
344.00	Generators - Gas	608,404	1.96%	11,925	1.48%	9,010	1.48%	9,010	-0.48%	(2,915)	-0.48%	(2,915)
345.00	Accessory Electric Eq-Gas	0		0		0		0		0		0
		678,776		13,332		10,086		10,086		(3,246)		(3,246)
	Weleetka Generating Plant - Diesel Unit											
342.00	Fuel Holders - Gas	10,291	6.86%	706	6.61%	680	6.61%	680	-0.25%	(26)	-0.25%	(26)
344.00	Generators - Gas	666,380	7.02%	46,780	6.70%	44,672	6.70%	44,672	-0.32%	(2,108)	-0.32%	(2,108)

Detailed Expense Adjustment

Account No.	Description	Pro Forma Plant	PSO Proposal Rate	PSO Proposal Annualized Expense	OIEC Option #1 Rate	OIEC Option #1 Expense	OIEC Option #2 Rate	OIEC Option #2 Expense	Adjustment Option #1 Rate	Adjustment Option #1 Expense	Adjustment Option #2 Rate	Adjustment Option #2 Expense
345.00	Accessory Electric Eq-Gas	36,296	8.28%	3,005	7.81%	2,834	7.81%	2,834	-0.47%	(171)	-0.47%	(171)
346.00	Misc Power Plant Eq-Gas	911	8.79%	80	8.40%	76	8.40%	76	-0.39%	(4)	-0.39%	(4)
		713,878		50,571		48,262		48,262		(2,309)		(2,309)
	Total Diesel Production	2,833,341		86,315		78,387		78,387		(7,928)		(7,928)
	Total Production Plant	1,562,178,971		59,052,499		53,223,445		53,223,445		(5,829,054)		(5,829,054)
	Transmission Plant											
350.00	Land	3,150,433										
350.10	Land Rights	38,531,307	1.07%	412,285	0.77%	296,691	0.77%	295,117	-0.30%	(115,594)	-0.30%	(117,168)
352.00	Structures and Improvements	5,854,846	2.05%	120,024	1.75%	102,460	2.06%	120,379	-0.30%	(17,565)	0.01%	355
353.00	Station Equipment	381,655,942	1.72%	6,564,482	1.74%	6,640,813	1.71%	6,540,305	0.02%	76,331	-0.01%	(24,177)
354.00	Towers and Fixtures	17,759,669	2.23%	396,041	1.76%	312,570	2.24%	397,297	-0.47%	(83,470)	0.01%	1,256
355.00	Poles and Fixtures	230,361,398	3.92%	9,030,167	3.12%	7,187,276	3.91%	9,017,475	-0.80%	(1,842,891)	-0.01%	(12,692)
356.00	Overhead Conductors, Device	168,612,434	2.80%	4,721,148	2.15%	3,625,167	2.49%	4,196,311	-0.65%	(1,095,981)	-0.31%	(524,837)
358.00	Undergrnd Conductors Device	71,915	2.09%	1,503	2.30%	1,654	2.09%	1,505	0.21%	151	0.00%	2
	Total Transmission Plant	845,997,944		21,245,650		18,166,631		20,568,389		(2,401,758)		(677,261)
	Distribution Plant											
360.00	Land	7,687,853										
360.10	Land Rights	2,826,079	1.07%	30,239	0.62%	17,522	0.71%	20,172	-0.45%	(12,717)	-0.36%	(10,067)
361.00	Structures and Improvements	8,112,892	2.38%	193,087	3.37%	273,404	2.38%	192,902	0.99%	80,318	0.00%	(185)
362.00	Station Equipment	346,533,387	1.65%	5,717,801	1.05%	3,638,601	1.53%	5,290,240	-0.60%	(2,079,200)	-0.12%	(427,561)
364.00	Poles, Towers and Fixtures	405,576,131	4.14%	16,790,852	3.97%	16,101,372	3.58%	14,524,667	-0.17%	(689,479)	-0.56%	(2,266,185)
365.00	Overhead Conductors, Device	391,692,321	3.44%	13,474,216	3.31%	12,965,016	3.45%	13,506,124	-0.13%	(509,200)	0.01%	31,908
366.00	Underground Conduit	77,465,811	2.57%	1,990,871	2.06%	1,595,796	2.03%	1,575,713	-0.51%	(395,076)	-0.54%	(415,158)
367.00	Undergrnd Conductors,Device	336,855,290	3.12%	10,509,885	1.35%	4,547,546	3.12%	10,515,523	-1.77%	(5,962,339)	0.00%	5,638
368.00	Line Transformers	338,673,252	3.15%	10,668,208	2.79%	9,448,984	3.15%	10,671,775	-0.36%	(1,219,224)	0.00%	3,567
369.00	Services	259,128,411	2.85%	7,385,160	2.79%	7,229,683	2.86%	7,402,583	-0.06%	(155,477)	0.01%	17,473
370.00	Meters	12,087,420	9.58%	1,157,975	9.58%	1,157,975	5.75%	694,966	0.00%	0	-3.83%	(463,009)
370.16	AMI Meters	97,322,543	6.76%	6,579,004	6.84%	6,656,862	6.75%	6,567,052	0.08%	77,858	-0.01%	(11,952)
371.00	Installs Customer Premises	46,407,544	4.06%	1,884,146	2.40%	1,113,781	4.07%	1,887,136	-1.66%	(770,365)	0.01%	2,989
373.00	Street Lghtng & Signal Sys	59,518,563	3.09%	1,839,124	0.90%	535,667	2.52%	1,502,768	-2.19%	(1,303,457)	-0.57%	(336,355)
	Total Distribution Plant	2,389,887,504		78,220,567		65,282,209		74,351,620		(12,938,358)		(3,868,947)
	General Plant											
389.00	Land	6,904,714										
389.10	Land Rights	127,950	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0
390.00	Structures and Improvements	60,668,737	2.19%	1,328,645	0.56%	339,745	1.54%	936,220	-1.63%	(988,900)	-0.65%	(392,425)
391.00	Office Furniture, Equipment	3,865,574	2.44%	94,320	0.59%	22,785	2.44%	94,320	-1.85%	(71,535)	0.00%	0
391.11	Office Equip - Computers	223,317	20.00%	44,663	20.00%	44,663	20.00%	44,663	0.00%	0	0.00%	0
392.00	Transportation Equipment	1,951,777	6.67%	130,184	6.67%	130,184	6.67%	130,184	0.00%	0	0.00%	0
393.00	Stores Equipment	2,424,217	3.33%	80,726	3.33%	80,726	3.33%	80,726	0.00%	0	0.00%	0
394.00	Tools	24,563,777	4.00%	982,551	4.00%	982,551	4.00%	982,551	0.00%	0	0.00%	0
395.00	Laboratory Equipment	3,957,583	1.94%	76,777	0.95%	37,778	1.94%	76,777	-0.99%	(38,999)	0.00%	0
396.00	Power Operated Equipment	1,110,514	4.24%	47,086	3.29%	36,503	4.24%	47,086	-0.95%	(10,583)	0.00%	0
397.00	Communication Equipment	42,723,901	4.54%	1,939,665	1.99%	848,618	4.54%	1,939,665	-2.55%	(1,091,047)	0.00%	0
397.11	Comm Equip-Mobile Radios	659,669	4.54%	29,949	1.99%	13,103	4.54%	29,949	-2.55%	(16,846)	0.00%	0
397.12	Comm Equip-SCADA, RTU	159,864	4.54%	7,258	1.99%	3,175	4.54%	7,258	-2.55%	(4,082)	0.00%	0
397.16	Comm Equip-AMI	13,499,233	6.67%	900,399	6.67%	900,399	6.67%	900,399	0.00%	0	0.00%	0
398.00	Miscellaneous Equipment	5,585,187	5.00%	279,259	5.00%	279,259	5.00%	279,259	0.00%	0	0.00%	0
399.19	ARO General Plant Trans	-4,929		(1,914)		-1,914		-1,914		0		0
399.19	ARO General Plant	561,520		0		0		0		0		0
399.30	Other Tangible Property-Rail Maint Facility	529,811	2.50%	13,245	2.50%	13,245	2.50%	13,245	0.00%	0	0.00%	0
	Total General Plant	169,512,435		5,957,814		3,730,822		5,560,389		(2,221,992)		(397,475)
101.00	ELECTRIC PLANT IN SERVICE	4,967,576,834		164,471,530		140,403,107		153,703,843		(24,068,423)		(10,767,687)
	Less:											
	Depreciation charged to Clearing			13,245		13,245		13,245		0		0
	Depreciation charged to Inventory			385,064		385,064		385,064		0		0
	TOTAL DEPRECIATION / AMORTIZATION EXPENSE	5,018,735,525		174,076,209		145,014,613		158,315,350		(29,061,596)		(15,760,860)

Detailed Expense Adjustment

Account No.	Description	Pro Forma Plant	PSO Proposal Rate	PSO Proposal Annualized Expense	OIEC Option #1 Rate	OIEC Option #1 Expense	OIEC Option #2 Rate	OIEC Option #2 Expense	Adjustment Option #1 Rate	Adjustment Option #1 Expense	Adjustment Option #2 Rate	Adjustment Option #2 Expense

[1] PSO Depreciation Study pp. VI-4 - VI-8
[2] Sch. F-1
[3] PSO Depreciation Study pp. VI-4 - VI-8
[4] DG D-4
[5] = [4] - [2]
[6] = [4] - [3]

Detailed Rate Comparison

		[1]	[2]		[3]		[4]		[5]		[6]	
			Current Parameters		PSO Proposal		OIEC Proposal (Option #2)		OIEC less Present Rates		OIEC less Proposed Rates	
Account No.	Description	Original Cost	Rate	Annual Accrual	Rate	Annual Accrual	Rate	Annual Accrual	Rate	Annual Accrual	Rate	Annual Accrual
	Intangible Plant											
303.00	Software	51,158,691	20.00%	8,904,095	20.00%	10,002,988	10.00%	5,009,816	-10.00%	-3,894,279	-10.00%	-4,993,173
	Steam Production Plant											
310.10	Land and Land Rights - Coal											
	Northeast Rail Spur	939,196	2.26%	21,226	3.77%	35,390	3.77%	35,390	1.51%	14,164	0.00%	0
310.31	Land and Land Rights - Oil/Gas											
	Northeast Generating Plant - Units 1 and 2	1		0		0	0.00%	0	0.00%		0.00%	0
311.00	Structures and Improvements - Coal											
	Northeast Generating Plant - Units 3 and 4	19,475,445	2.14%	416,775	2.84%	553,792	2.74%	534,444	0.60%	117,669	-0.10%	-19,348
	Oklaunion Generating Plant	18,007,736	1.26%	226,897	2.37%	427,412	1.99%	358,008	0.73%	131,111	-0.38%	-69,404
	Total Structures and Improvements - Coal	37,483,181	1.72%	643,672	2.62%	981,204	2.38%	892,452	0.66%	248,780	-0.24%	-88,752
311.30	Structures and Improvements - Oil/Gas											
	Comanche Generating Plant	5,073,210	1.56%	79,142	2.69%	136,311	2.43%	123,384	0.87%	44,242	-0.26%	-12,927
	Northeast Generating Plant - Units 1 and 2	10,955,869	2.42%	265,132	3.72%	407,519	3.16%	346,427	0.74%	81,295	-0.56%	-61,092
	Riverside Generating Plant - Units 1 and 2	10,065,595	2.41%	242,581	4.21%	423,924	3.13%	315,091	0.72%	72,510	-1.08%	-108,833
	Southwestern Generating Plant - Units 1, 2, and 3	8,368,454	2.45%	205,027	4.43%	370,761	3.61%	302,014	1.16%	96,987	-0.82%	-68,747
	Tulsa Generating Plant - Units 2 and 4	7,582,582	2.83%	214,587	4.92%	373,288	4.39%	332,854	1.56%	118,267	-0.53%	-40,434
	Total Structures and Improvements - Oil/Gas	42,045,710	2.39%	1,006,469	4.07%	1,711,803	3.38%	1,419,771	0.98%	413,302	-0.69%	-292,032
312.00	Boiler Plant Equipment - Coal											
	Northeast Generating Plant - Units 3 and 4	374,956,995	1.85%	6,936,704	4.09%	15,318,251	3.99%	14,942,167	2.14%	8,005,462	-0.10%	-376,084
	Oklaunion Generating Plant	51,690,593	1.45%	749,514	2.61%	1,349,101	2.20%	1,137,730	0.75%	388,216	-0.41%	-211,371
	Total Boiler Plant Equipment - Coal	426,647,588	1.80%	7,686,218	3.91%	16,667,352	3.77%	16,079,896	1.97%	8,393,678	-0.14%	-587,456
312.11	Coal Transportation Equipment											
	Northeast Generating Plant - Units 3 and 4	5,392,509	0.04%	2,157	0.14%	7,736	0.14%	7,725	0.10%	5,568	0.00%	-11
312.12	Boiler Plant Equipment - Rail Spur											
	Northeast Rail Spur	22,359,915	1.14%	254,903	1.53%	341,353	1.39%	311,563	0.25%	56,660	-0.14%	-29,790
												0
312.30	Boiler Plant Equipment - Oil/Gas											0
	Comanche Generating Plant	63,584,177	2.76%	1,754,923	5.14%	3,269,077	4.87%	3,095,876	2.11%	1,340,953	-0.27%	-173,201
	Northeast Generating Plant - Units 1 and 2	93,281,477	2.57%	2,397,334	3.78%	3,528,920	3.24%	3,018,867	0.67%	621,533	-0.54%	-510,053
	Riverside Generating Plant - Units 1 and 2	75,536,294	1.64%	1,238,795	3.49%	2,639,001	2.34%	1,767,881	0.70%	529,086	-1.15%	-871,120
	Southwestern Generating Plant - Units 1, 2, and 3	36,415,151	2.96%	1,077,888	4.43%	1,612,536	3.58%	1,304,102	0.62%	226,214	-0.85%	-308,434
	Tulsa Generating Plant - Units 2 and 4	23,743,881	2.51%	595,971	3.86%	915,526	3.29%	781,902	0.78%	185,931	-0.57%	-133,624
	Total Boiler Plant Equipment - Oil/Gas	292,560,979	2.41%	7,064,912	4.09%	11,965,060	3.41%	9,968,629	0.99%	2,903,717	-0.68%	-1,996,431
314.00	Turbogenerator Units - Coal											
	Northeast Generating Plant - Units 3 and 4	46,047,432	2.13%	980,810	4.95%	2,278,669	4.84%	2,229,023	2.71%	1,248,213	-0.11%	-49,646
	Oklaunion Generating Plant	15,515,079	1.22%	189,284	2.27%	352,324	1.84%	286,225	0.62%	96,941	-0.43%	-66,099
	Total Turbogenerator Units - Coal	61,562,510	1.90%	1,170,094	4.27%	2,630,993	4.09%	2,515,247	2.19%	1,345,153	-0.19%	-115,746
314.30	Turbogenerator Units - Oil/Gas											
	Comanche Generating Plant	63,939,262	2.47%	1,579,300	2.71%	1,733,406	2.70%	1,729,415	0.23%	150,115	-0.01%	-3,991
	Northeast Generating Plant - Units 1 and 2	135,219,098	2.53%	3,421,043	2.67%	3,611,354	2.68%	3,624,852	0.15%	203,808	0.01%	13,498
	Riverside Generating Plant - Units 1 and 2	70,682,383	2.19%	1,547,944	4.05%	2,865,680	2.91%	2,054,892	0.72%	506,948	-1.14%	-810,788
	Southwestern Generating Plant - Units 1, 2, and 3	33,412,615	2.74%	915,506	4.45%	1,485,554	3.60%	1,202,781	0.86%	287,275	-0.85%	-282,773

Detailed Rate Comparison

Account No.	Description	[1] Original Cost	[2] Current Parameters Rate	[2] Current Parameters Annual Accrual	[3] PSO Proposal Rate	[3] PSO Proposal Annual Accrual	[4] OIEC Proposal (Option #2) Rate	[4] OIEC Proposal (Option #2) Annual Accrual	[5] OIEC less Present Rates Rate	[5] OIEC less Present Rates Annual Accrual	[6] OIEC less Proposed Rates Rate	[6] OIEC less Proposed Rates Annual Accrual
	Tulsa Generating Plant - Units 2 and 4	31,960,805	2.72%	869,334	4.31%	1,378,582	3.78%	1,208,913	1.06%	339,579	-0.53%	-169,669
	Total Turbogenerator Units - Oil/Gas	335,214,164	2.49%	8,333,127	3.30%	11,074,576	2.93%	9,820,852	0.44%	1,487,726	-0.37%	-1,253,724
315.00	Accessory Electric Equipment - Coal											
	Northeast Generating Plant - Units 3 and 4	20,220,221	1.44%	291,171	2.62%	529,000	2.52%	508,928	1.08%	217,757	-0.10%	-20,072
	Oklaunion Generating Plant	6,569,594	0.99%	65,039	1.94%	127,523	1.55%	101,729	0.56%	36,690	-0.39%	-25,794
	Total Accessory Electric Equipment - Coal	26,789,814	1.33%	356,210	2.45%	656,523	2.28%	610,657	0.95%	254,447	-0.17%	-45,866
315.30	Accessory Electric Equipment - Oil/Gas											
	Comanche Generating Plant	6,248,673	1.62%	101,229	2.18%	136,101	1.91%	119,655	0.29%	18,427	-0.27%	-16,446
	Northeast Generating Plant - Units 1 and 2	14,113,277	1.97%	278,032	3.27%	461,936	2.74%	386,773	0.77%	108,741	-0.53%	-75,163
	Riverside Generating Plant - Units 1 and 2	10,964,770	1.42%	155,700	3.33%	365,609	2.23%	245,051	0.81%	89,351	-1.10%	-120,558
	Southwestern Generating Plant - Units 1, 2, and 3	10,054,536	2.90%	291,582	4.41%	443,146	3.60%	361,555	0.70%	69,974	-0.81%	-81,591
	Tulsa Generating Plant - Units 2 and 4	9,742,943	3.25%	316,646	5.33%	518,947	4.80%	467,795	1.55%	151,149	-0.53%	-51,152
	Total Accessory Electric Equipment - Oil/Gas	51,124,199	2.24%	1,143,187	3.77%	1,925,739	3.09%	1,580,829	0.86%	437,642	-0.67%	-344,910
316.00	Miscellaneous Power Plant Equipment - Coal											
	Northeast Generating Plant - Units 3 and 4	17,644,702	2.22%	391,712	3.47%	611,620	3.35%	590,884	1.13%	199,172	-0.12%	-20,736
	Oklaunion Generating Plant	5,633,623	1.04%	58,590	2.26%	127,305	1.80%	101,556	0.76%	42,967	-0.46%	-25,749
	Total Miscellaneous Power Plant Equipment - Coal	23,278,325	1.93%	450,302	3.17%	738,925	2.97%	692,440	1.04%	242,138	-0.20%	-46,485
316.30	Miscellaneous Power Plant Equipment - Oil/Gas											
	Comanche Generating Plant	2,649,268	1.60%	42,388	2.98%	78,873	2.71%	71,678	1.11%	29,290	-0.27%	-7,195
	Northeast Generating Plant - Units 1 and 2	7,717,395	2.30%	177,500	3.57%	275,736	3.00%	231,354	0.70%	53,853	-0.57%	-44,382
	Riverside Generating Plant - Units 1 and 2	7,010,717	3.03%	212,425	5.39%	377,597	4.22%	295,891	1.19%	83,466	-1.17%	-81,706
	Southwestern Generating Plant - Units 1, 2, and 3	1,462,987	2.58%	37,745	4.02%	58,806	3.15%	46,104	0.57%	8,359	-0.87%	-12,702
	Tulsa Generating Plant - Units 2 and 4	2,928,639	5.62%	164,590	5.02%	147,156	4.48%	131,085	-1.14%	-33,504	-0.54%	-16,071
	Total Miscellaneous Power Plant Equipment - Oil/Gas	21,769,007	2.92%	634,648	4.31%	938,168	3.57%	776,112	0.65%	141,465	-0.74%	-162,056
	Total Steam Production Plant	1,347,167,098	2.14%	28,767,125	3.69%	49,674,822	3.32%	44,711,564	1.18%	15,944,439	-0.37%	-4,963,258
	Other Production Plant											
341.00	Structures and Improvements											
	Southwest Generating Unit - Units 4 and 5	5,253,788	2.45%	128,718	3.31%	173,759	2.98%	156,578	0.53%	27,860	-0.33%	-17,181
	Weleetka Generating Plant	760,901	9.36%	71,220	12.95%	98,508	12.40%	94,328	3.04%	23,108	-0.55%	-4,180
	Total Structures and Improvements	6,014,688	3.32%	199,938	4.53%	272,267	4.17%	250,906	0.85%	50,968	-0.36%	-21,361
342.00	Fuel Holders, Producers and Accessories											
	Comanche Generating Plant - Diesel Unit	2,994	2.40%	72	2.60%	78	2.43%	73	0.03%	1	-0.17%	-5
	Northeast Generating Plant - Diesel Units 1 and 2	63,289	0.77%	487	1.40%	888	1.10%	698	0.33%	210	-0.30%	-190
	Riverside Generating Plant - Diesel Unit	24,392	3.10%	756	5.21%	1,272	5.00%	1,220	1.90%	464	-0.21%	-52
	Riverside Generating Plant - Units 3 and 4	9,797,993	2.25%	220,455	3.07%	300,835	2.49%	243,976	0.24%	23,521	-0.58%	-56,859
	Southwestern Generating Plant - Diesel Unit	67,052	2.50%	1,676	4.01%	2,686	3.69%	2,475	1.19%	798	-0.32%	-211
	Tulsa Generating Plant - Diesel Unit	70,372	0.92%	647	2.00%	1,408	1.53%	1,077	0.61%	429	-0.47%	-331
	Weleetka Generating Plant - Diesel Unit	10,291	7.20%	741	6.86%	706	6.61%	680	-0.59%	-61	-0.25%	-26
	Weleetka Generating Plant	2,134,695	2.93%	62,547	3.98%	85,044	3.51%	74,955	0.58%	12,409	-0.47%	-10,089
	Total Fuel Holders, Producers and Accessories	12,171,079	2.36%	287,381	3.23%	392,917	2.67%	325,152	0.31%	37,771	-0.56%	-67,765
344.00	Generators											
	Comanche Generating Plant - Diesel Unit	754,469	0.76%	5,734	1.25%	9,432	1.05%	7,933	0.29%	2,199	-0.20%	-1,499
	Northeast Generating Plant - Diesel Units 1 and 2	241,260	0.97%	2,340	1.91%	4,600	1.61%	3,878	0.64%	1,538	-0.30%	-722

Detailed Rate Comparison

Account No.	Description	[1] Original Cost	[2] Current Parameters Rate	[2] Current Parameters Annual Accrual	[3] PSO Proposal Rate	[3] PSO Proposal Annual Accrual	[4] OIEC Proposal (Option #2) Rate	[4] OIEC Proposal (Option #2) Annual Accrual	[5] OIEC less Present Rates Rate	[5] OIEC less Present Rates Annual Accrual	[6] OIEC less Proposed Rates Rate	[6] OIEC less Proposed Rates Annual Accrual
	Northeast Generating Plant - Diesel Units 3 and 4	437,950	0.73%	3,197	2.16%	9,460	2.05%	8,983	1.32%	5,786	-0.11%	-477
	Riverside Generating Plant - Diesel Unit	470,175	0.65%	3,056	1.24%	5,830	1.04%	4,876	0.39%	1,820	-0.20%	-954
	Riverside Generating Plant - Units 3 and 4	48,203,405	2.25%	1,084,577	3.32%	1,599,828	2.69%	1,298,674	0.44%	214,098	-0.63%	-301,154
	Southwestern Generating Plant - Diesel Unit	212,484	0.67%	1,424	1.20%	2,560	0.94%	1,996	0.27%	572	-0.26%	-564
	Southwestern Generating Plant - Units 4 and 5	44,917,876	2.12%	952,259	2.88%	1,292,506	2.55%	1,147,169	0.43%	194,910	-0.33%	-145,337
	Tulsa Generating Plant - Diesel Unit	608,404	0.87%	5,293	1.96%	11,926	1.48%	9,010	0.61%	3,717	-0.48%	-2,916
	Weleetka Generating Plant - Diesel Unit	666,380	7.12%	47,446	7.02%	46,760	6.70%	44,672	-0.42%	-2,775	-0.32%	-2,088
	Weleetka Generating Plant	24,639,423	2.80%	689,904	4.84%	1,192,148	4.31%	1,061,970	1.51%	372,066	-0.53%	-130,178
	Total Generators	121,151,826	2.31%	2,795,230	3.45%	4,175,050	2.96%	3,589,160	0.66%	793,930	-0.48%	-585,890
345.00	Accessory Electric Equipment											
	Northeast Generating Plant - Diesel Units 1 and 2	83,558	2.81%	2,348	4.74%	3,962	4.21%	3,521	1.40%	1,173	-0.53%	-441
	Riverside Generating Plant - Diesel Unit	28,635	0.73%	209	2.14%	614	1.71%	489	0.98%	280	-0.43%	-125
	Riverside Generating Plant - Units 3 and 4	4,730,554	2.27%	107,384	7.02%	332,126	5.90%	278,921	3.63%	171,537	-1.12%	-53,205
	Southwestern Generating Unit - Units 4 and 5	9,646,089	2.14%	206,426	5.92%	571,242	5.26%	507,256	3.12%	300,830	-0.66%	-63,986
	Weleetka Generating Plant - Diesel Unit	36,296	7.05%	2,559	8.28%	3,005	7.81%	2,834	0.76%	275	-0.47%	-171
	Weleetka Generating Plant	635,609	6.04%	38,391	12.24%	77,780	11.65%	74,038	5.61%	35,648	-0.59%	-3,742
	Total Accessory Electric Equipment	15,160,741	2.36%	357,317	6.52%	988,729	5.72%	867,060	3.36%	509,744	-0.80%	-121,669
346.00	Miscellaneous Power Plant Equipment											
	Comanche Generating Plant - Diesel Unit	17,858	3.19%	570	0.02%	4	0.00%	-29	-3.19%	-598	-0.02%	-33
	Northeast Generating Plant - Diesel Units 1 and 2	3,019	0.83%	25	1.62%	49	1.34%	41	0.51%	15	-0.28%	-8
	Riverside Generating Plant - Units 3 and 4	182,933	2.33%	4,262	4.19%	7,667	3.48%	6,367	1.15%	2,105	-0.71%	-1,300
	Southwestern Generating Unit - Units 4 and 5	6,188	2.42%	150	3.65%	226	3.28%	203	0.86%	53	-0.37%	-23
	Weleetka Generating Plant - Diesel Unit	911	0.48%	4	8.79%	80	8.40%	76	7.92%	72	-0.39%	-4
	Weleetka Generating Plant	2,407,424	6.89%	165,872	10.10%	243,068	9.67%	232,808	2.78%	66,937	-0.43%	-10,260
	Total Miscellaneous Power Plant Equipment	2,618,332	6.53%	170,883	9.59%	251,094	9.15%	239,467	2.62%	68,585	-0.44%	-11,627
	Total Other Production Plant	157,116,666	2.43%	3,810,749	3.87%	6,080,057	3.36%	5,271,746	0.93%	1,460,997	-0.51%	-808,311
	Transmission Plant											
350.10	Land and Land Rights	38,471,388	0.77%	296,230	1.07%	413,407	0.77%	294,658	0.00%	-1,572	-0.30%	-118,749
352.00	Structures and Improvements	5,155,458	1.75%	90,221	2.05%	105,938	2.06%	105,999	0.31%	15,779	0.01%	61
353.00	Station Equipment	370,807,885	1.74%	6,452,057	1.72%	6,360,201	1.71%	6,354,406	-0.03%	-97,651	-0.01%	-5,795
354.00	Towers and Fixtures	17,759,669	1.76%	312,570	2.23%	396,871	2.24%	397,297	0.48%	84,727	0.01%	426
355.00	Poles and Fixtures	228,798,914	3.12%	7,138,526	3.92%	8,958,288	3.91%	8,956,311	0.79%	1,817,785	-0.01%	-1,977
356.00	Overhead Conductors and Devices	168,562,530	2.15%	3,624,094	2.80%	4,714,568	2.49%	4,195,069	0.34%	570,974	-0.31%	-519,499
358.00	Underground Conductors and Devices	71,915	2.30%	1,654	2.09%	1,503	2.09%	1,505	-0.21%	-149	0.00%	2
	Total Transmission Plant	829,627,759	2.16%	17,915,352	2.53%	20,950,776	2.45%	20,305,246	0.29%	2,389,893	-0.08%	-645,530
	Distribution Plant											
360.10	Land and Land Rights	2,826,079	0.62%	17,522	1.07%	30,202	0.71%	20,172	0.09%	2,650	-0.36%	-10,030
361.00	Structures and Improvements	6,336,570	3.37%	213,542	2.38%	150,820	2.38%	150,666	-0.99%	-62,876	0.00%	-154
362.00	Station Equipment	325,393,298	1.05%	3,416,630	1.65%	5,357,634	1.53%	4,967,511	0.48%	1,550,882	-0.12%	-390,123
364.00	Poles, Towers and Fixtures	390,852,648	3.97%	15,516,850	4.14%	16,174,169	3.58%	13,997,383	-0.39%	-1,519,467	-0.56%	-2,176,786
365.00	Overhead Conductors and Devices	386,883,283	3.31%	12,805,837	3.44%	13,323,331	3.45%	13,340,301	0.14%	534,465	0.01%	16,970
366.00	Underground Conduit	76,453,540	2.06%	1,574,943	2.57%	1,961,505	2.03%	1,555,123	-0.03%	-19,820	-0.54%	-406,382
367.00	Underground Conductors and Devices	327,944,609	1.35%	4,427,252	3.12%	10,224,300	3.12%	10,237,361	1.77%	5,810,109	0.00%	13,061
368.00	Line Transformers	331,700,991	2.79%	9,254,458	3.15%	10,433,420	3.15%	10,452,075	0.36%	1,197,617	0.00%	18,655
369.00	Services	252,906,429	2.79%	7,056,089	2.85%	7,220,169	2.86%	7,224,838	0.07%	168,748	0.01%	4,669
370.00	Meters	12,172,649	9.58%	1,166,140	9.58%	1,166,140	5.75%	699,866	-3.83%	-466,273	-3.83%	-466,274
370.16	AMI Meters	96,507,750	6.84%	6,601,130	6.76%	6,528,018	6.75%	6,512,072	-0.09%	-89,058	-0.01%	-15,946

Detailed Rate Comparison

		[1]	[2]		[3]		[4]		[5]		[6]	
			Current Parameters		PSO Proposal		OIEC Proposal (Option #2)		OIEC less Present Rates		OIEC less Proposed Rates	
Account No.	Description	Original Cost	Rate	Annual Accrual	Rate	Annual Accrual	Rate	Annual Accrual	Rate	Annual Accrual	Rate	Annual Accrual
371.00	Installations on Customer Premises	45,491,350	2.40%	1,091,792	4.06%	1,848,173	4.07%	1,849,879	1.67%	758,087	0.01%	1,706
373.00	Street Lighting and Signal Systems	58,895,861	0.90%	530,063	3.09%	1,820,551	2.52%	1,487,046	1.62%	956,983	-0.57%	-333,505
	Total Distribution Plant	2,314,365,056	2.75%	63,672,248	3.29%	76,238,432	3.13%	72,494,293	0.38%	8,822,046	-0.16%	-3,744,139
	General Plant											
390.00	Structures and Improvements	58,000,103	0.56%	324,801	2.19%	1,271,743	1.54%	895,039	0.98%	570,238	-0.65%	-376,704
391.00	Office Furniture and Equipment											
	Fully Accrued	1,972,836		0		0	0.00%	0	0.00%	0	0.00%	0
	Amortized	1,873,829	1.21%	22,673	5.00%	93,729	5.00%	93,729	3.79%	71,056	0.00%	0
	Total Office Furniture and Equipment	3,846,665	0.59%	22,673	2.44%	93,729	2.44%	93,729	1.85%	71,056	0.00%	0
391.11	Office Furniture and Equipment - Computers	150,676	20.00%	30,135	20.00%	30,137	20.00%	30,137	0.00%	2	0.00%	0
392.00	Transportation Equipment	268,333	6.67%	17,898	6.67%	17,886	6.67%	17,886	0.00%	-12	0.00%	0
393.00	Stores Equipment	2,000,095	3.33%	66,603	3.33%	66,513	3.33%	66,513	0.00%	-90	0.00%	0
394.00	Tools, Shop and Garage Equipment	22,946,980	4.00%	917,879	4.00%	917,084	4.00%	917,084	0.00%	-795	0.00%	0
395.00	Laboratory Equipment											
	Fully Accrued	2,363,766		0		0	0.00%	0	0.00%	0	0.00%	0
	Amortized	1,498,862	2.46%	36,872	5.00%	74,900	5.00%	74,900	2.54%	38,028	0.00%	0
	Total Laboratory Equipment	3,862,627	0.95%	36,872	1.94%	74,900	1.94%	74,900	0.98%	38,028	0.00%	0
396.00	Power Operated Equipment											
	Fully Accrued	263,351		0		0	0.00%	0	0.00%	0	0.00%	0
	Amortized	846,235	4.31%	36,473	5.56%	47,056	5.56%	47,056	1.25%	10,583	0.00%	0
	Total Power Operated Equipment	1,109,586	3.29%	36,473	4.24%	47,056	4.24%	47,056	0.95%	10,583	0.00%	0
397.00	Communication Equipment											
	Fully Accrued	12,454,425		0		0	0.00%	0	0.00%	0	0.00%	0
	Amortized	26,494,208	2.92%	773,631	6.67%	1,767,739	6.67%	1,767,739	3.75%	994,108	0.00%	0
	Total Communication Equipment	38,948,633	1.99%	773,631	4.54%	1,767,739	4.54%	1,767,739	2.55%	994,108	0.00%	0
397.16	Communication Equipment - AMI	8,597,784	6.67%	573,472	6.67%	573,472	6.67%	573,472	0.00%	0	0.00%	0
398.00	Miscellaneous Equipment	5,397,743	5.00%	269,887	5.00%	269,977	5.00%	269,977	0.00%	90	0.00%	0
399.30	Other Tangible Property	529,811	2.50%	13,245	2.50%	13,263	2.50%	13,263	0.00%	18	0.00%	0
	Total General Plant	145,659,037	2.12%	3,083,570	3.53%	5,143,499	3.27%	4,766,795	1.16%	1,683,225	-0.26%	-376,704
	TOTAL DEPRECIABLE PLANT	4,793,935,617	2.45%	117,249,043	3.30%	158,087,586	3.08%	147,549,643	0.63%	30,300,600	-0.22%	-10,537,943

[1] PSO Depreciation Study pp. VI-4 - VI-8
[2] Sch. I-1
[3] PSO Depreciation Study pp. VI-4 - VI-8
[4] DG-D-4
[5] = [4] - [2]
[6] = [4] - [3]

Depreciation Rate Development

Account No.	Description	[1] Original Cost	[2] Iowa Curve Type	[2] Iowa Curve AL	[3] Net Salvage	[4] Depreciable Base	[5] Book Reserve	[6] Future Accruals	[7] Remaining Life	[8] Service Life Accrual	[9] Service Life Rate	[10] Net Salvage Accrual	[11] Net Salvage Rate	[12] Total Accrual	[13] Total Rate
	Intangible Plant														
303.00	Software	51,158,691	SQ	10	0%									5,009,816	10.00%
	Steam Production Plant														
310.10	Land and Land Rights - Coal														
	Northeast Rail Spur	939,196	SQ	-	0% *	939,196	107,542	831,654	23.50	35,390	3.77%	0	0.00%	35,390	3.77%
310.31	Land and Land Rights - Oil/Gas														
	Northeast Generating Plant - Units 1 and 2	1	SQ	-	0% *	1	0	1	0.00					0	0.00%
311.00	Structures and Improvements - Coal														
	Northeast Generating Plant - Units 3 and 4	19,475,445	R1.5	90	-5%	20,388,218	8,416,676	11,971,542	22.40	493,695	2.53%	40,749	0.21%	534,444	2.74%
	Oklaunion Generating Plant	18,007,736	R1.5	90	-14%	20,568,653	10,651,832	9,916,822	27.70	265,556	1.47%	92,452	0.51%	358,008	1.99%
	Total Structures and Improvements - Coal	37,483,181				40,956,872	19,068,508	21,888,364	24.53	759,251	2.03%	133,201	0.36%	892,452	2.38%
311.30	Structures and Improvements - Oil/Gas														
	Comanche Generating Plant	5,073,210	R1.5	90	-6%	5,396,200	3,199,957	2,196,243	17.80	105,239	2.07%	18,146	0.36%	123,384	2.43%
	Northeast Generating Plant - Units 1 and 2	10,955,869	R1.5	90	-12%	12,247,178	5,803,629	6,443,549	18.60	277,002	2.53%	69,425	0.63%	346,427	3.16%
	Riverside Generating Plant - Units 1 and 2	10,065,595	R1.5	90	-16%	11,676,757	4,335,135	7,341,622	23.30	245,943	2.44%	69,149	0.69%	315,091	3.13%
	Southwestern Generating Plant - Units 1, 2, and 3	8,368,454	R1.5	90	-10%	9,201,161	3,342,085	5,859,076	19.40	259,091	3.10%	42,923	0.51%	302,014	3.61%
	Tulsa Generating Plant - Units 2 and 4	7,582,582	R1.5	90	-13%	8,586,390	3,027,732	5,558,658	16.70	272,745	3.60%	60,108	0.79%	332,854	4.39%
	Total Structures and Improvements - Oil/Gas	42,045,710				47,107,686	19,708,539	27,399,148	19.30	1,160,020	2.76%	259,751	0.62%	1,419,771	3.38%
312.00	Boiler Plant Equipment - Coal														
	Northeast Generating Plant - Units 3 and 4	374,956,995	R1.5	65	-5%	392,530,443	63,802,778	328,727,665	22.00	14,143,373	3.77%	798,793	0.21%	14,942,167	3.99%
	Oklaunion Generating Plant	51,690,593	R1.5	65	-14%	59,041,619	29,119,326	29,922,293	26.30	858,223	1.66%	279,507	0.54%	1,137,730	2.20%
	Total Boiler Plant Equipment - Coal	426,647,588				451,572,062	92,922,104	358,649,958	22.30	15,001,597	3.52%	1,078,300	0.25%	16,079,896	3.77%
312.11	Coal Transportation Equipment														
	Northeast Generating Plant - Units 3 and 4	5,392,509	S3	35	0% *	5,392,509	5,214,840	177,669	23.00	7,725	0.14%	0	0.00%	7,725	0.14%
312.12	Boiler Plant Equipment - Rail Spur														
	Northeast Rail Spur	22,359,915	R3	55	-5%	23,500,142	16,739,221	6,760,921	21.70	259,018	1.16%	52,545	0.23%	311,563	1.39%
312.30	Boiler Plant Equipment - Oil/Gas														
	Comanche Generating Plant	63,584,177	R1.5	65	-6%	67,632,319	12,216,139	55,416,181	17.90	2,869,723	4.51%	226,153	0.36%	3,095,876	4.87%
	Northeast Generating Plant - Units 1 and 2	93,281,477	R1.5	65	-12%	104,276,061	48,728,912	55,547,149	18.40	2,421,335	2.60%	597,532	0.64%	3,018,867	3.24%
	Riverside Generating Plant - Units 1 and 2	75,536,294	R1.5	65	-16%	87,627,103	49,264,076	38,363,027	21.70	1,210,701	1.60%	557,180	0.74%	1,767,881	2.34%
	Southwestern Generating Plant - Units 1, 2, and 3	36,415,151	R1.5	65	-10%	40,038,659	15,130,305	24,908,354	19.10	1,114,390	3.06%	189,712	0.52%	1,304,102	3.58%
	Tulsa Generating Plant - Units 2 and 4	23,743,881	R1.5	65	-13%	26,887,178	14,454,928	12,432,250	15.90	584,211	2.46%	197,692	0.83%	781,902	3.29%
	Total Boiler Plant Equipment - Oil/Gas	292,560,979				326,461,319	139,794,360	186,666,959	18.73	8,200,360	2.80%	1,768,269	0.60%	9,968,629	3.41%
314.00	Turbogenerator Units - Coal														
	Northeast Generating Plant - Units 3 and 4	46,047,432	S1	65	-5%	48,205,578	1,619,002	46,586,577	20.90	2,125,762	4.62%	103,261	0.22%	2,229,023	4.84%
	Oklaunion Generating Plant	15,515,079	S1	65	-14%	17,721,510	10,422,784	7,298,726	25.50	199,698	1.29%	86,527	0.56%	286,225	1.84%
	Total Turbogenerator Units - Coal	61,562,510				65,927,088	12,041,786	53,885,303	21.42	2,325,460	3.78%	189,787	0.31%	2,515,247	4.09%
314.30	Turbogenerator Units - Oil/Gas														
	Comanche Generating Plant	63,939,262	S0	30	5%	60,695,623	33,716,750	26,978,873	15.60	1,937,341	3.03%	-207,926	-0.33%	1,729,415	2.70%
	Northeast Generating Plant - Units 1 and 2	135,219,098	S0	30	5%	128,500,061	71,589,891	56,910,171	15.70	4,052,816	3.00%	-427,964	-0.32%	3,624,852	2.68%
	Riverside Generating Plant - Units 1 and 2	70,682,383	S1	65	-16%	81,996,245	37,199,601	44,796,644	21.80	1,535,907	2.17%	518,984	0.73%	2,054,892	2.91%
	Southwestern Generating Plant - Units 1, 2, and 3	33,412,615	S1	65	-10%	36,737,354	14,125,072	22,612,282	18.80	1,025,933	3.07%	176,848	0.53%	1,202,781	3.60%
	Tulsa Generating Plant - Units 2 and 4	31,960,805	S1	65	-13%	36,191,887	16,607,498	19,584,389	16.20	947,735	2.97%	261,178	0.82%	1,208,913	3.78%
	Total Turbogenerator Units - Oil/Gas	335,214,164				344,121,171	173,238,812	170,882,359	17.40	9,499,732	2.83%	321,120	0.10%	9,820,852	2.93%
315.00	Accessory Electric Equipment - Coal														
	Northeast Generating Plant - Units 3 and 4	20,220,221	R2.5	75	-5%	21,167,900	9,869,702	11,298,198	22.20	466,240	2.31%	42,688	0.21%	508,928	2.52%

Depreciation Rate Development

		[1]	[2]		[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]	[12]	[13]
Account No.	Description	Original Cost	Iowa Curve Type	Iowa Curve AL	Net Salvage	Depreciable Base	Book Reserve	Future Accruals	Remaining Life	Service Life Accrual	Service Life Rate	Net Salvage Accrual	Net Salvage Rate	Total Accrual	Total Rate
	Oklaunion Generating Plant	6,569,594	R2.5	75	-14%	7,503,869	4,726,654	2,777,215	27.30	67,507	1.03%	34,223	0.52%	101,729	1.55%
	Total Accessory Electric Equipment - Coal	26,789,814				28,671,769	14,596,357	14,075,412	23.05	533,746	1.99%	76,911	0.29%	610,657	2.28%
315.30	Accessory Electric Equipment - Oil/Gas														
	Comanche Generating Plant	6,248,673	R2.5	75	-6%	6,646,500	4,504,672	2,141,828	17.90	97,430	1.56%	22,225	0.36%	119,655	1.91%
	Northeast Generating Plant - Units 1 and 2	14,113,277	R2.5	75	-12%	15,776,733	8,428,053	7,348,680	19.00	299,222	2.12%	87,550	0.62%	386,773	2.74%
	Riverside Generating Plant - Units 1 and 2	10,964,770	R2.5	75	-16%	12,719,859	7,132,706	5,587,153	22.80	168,073	1.53%	76,978	0.70%	245,051	2.23%
	Southwestern Generating Plant - Units 1, 2, and 3	10,054,536	R2.5	75	-10%	11,055,018	3,896,221	7,158,797	19.80	311,026	3.09%	50,529	0.50%	361,555	3.60%
	Tulsa Generating Plant - Units 2 and 4	9,742,943	R2.5	75	-13%	11,032,747	3,267,351	7,765,396	16.60	390,096	4.00%	77,699	0.80%	467,795	4.80%
	Total Accessory Electric Equipment - Oil/Gas	51,124,199				57,230,857	27,229,003	30,001,854	18.98	1,265,847	2.48%	314,981	0.62%	1,580,829	3.09%
316.00	Miscellaneous Power Plant Equipment - Coal														
	Northeast Generating Plant - Units 3 and 4	17,644,702	S0	50	-5%	18,471,672	6,476,726	11,994,946	20.30	550,147	3.12%	40,737	0.23%	590,884	3.35%
	Oklaunion Generating Plant	5,633,623	S0	50	-14%	6,434,792	4,048,221	2,386,571	23.50	67,464	1.20%	34,092	0.61%	101,556	1.80%
	Total Miscellaneous Power Plant Equipment - Coal	23,278,325				24,906,464	10,524,947	14,381,517	20.77	617,610	2.65%	74,830	0.32%	692,440	2.97%
316.30	Miscellaneous Power Plant Equipment - Oil/Gas														
	Comanche Generating Plant	2,649,268	S0	50	-6%	2,817,936	1,592,235	1,225,701	17.10	61,815	2.33%	9,864	0.37%	71,678	2.71%
	Northeast Generating Plant - Units 1 and 2	7,717,395	S0	50	-12%	8,627,003	4,555,180	4,071,823	17.60	179,671	2.33%	51,682	0.67%	231,354	3.00%
	Riverside Generating Plant - Units 1 and 2	7,010,717	S0	50	-16%	8,132,896	1,800,838	6,332,059	21.40	243,452	3.47%	52,438	0.75%	295,891	4.22%
	Southwestern Generating Plant - Units 1, 2, and 3	1,462,987	S0	50	-10%	1,608,562	764,854	843,708	18.30	38,149	2.61%	7,955	0.54%	46,104	3.15%
	Tulsa Generating Plant - Units 2 and 4	2,928,639	S0	50	-13%	3,316,342	1,192,760	2,123,583	16.20	107,153	3.66%	23,932	0.82%	131,085	4.48%
	Total Miscellaneous Power Plant Equipment - Oil/Gas	21,769,007				24,502,740	9,905,866	14,596,874	18.81	630,241	2.90%	145,871	0.67%	776,112	3.57%
	Total Steam Production Plant	1,347,167,098				1,441,289,877	541,091,884	900,197,992	20.13	40,295,997	2.99%	4,415,566	0.33%	44,711,564	3.32%
	Other Production Plant														
341.00	Structures and Improvements														
	Southwest Generating Unit - Units 4 and 5	5,253,788	R2	55	-7%	5,600,852	151,938	5,448,913	34.80	146,605	2.79%	9,973	0.19%	156,578	2.98%
	Weleetka Generating Plant	760,901	R2	55	-6%	808,447	299,076	509,372	5.40	85,523	11.24%	8,805	1.16%	94,328	12.40%
	Total Structures and Improvements	6,014,688				6,409,299	451,014	5,958,285	23.75	232,128	3.86%	18,778	0.31%	250,906	4.17%
342.00	Fuel Holders, Producers and Accessories														
	Comanche Generating Plant - Diesel Unit	2,994	R4	55	-4%	3,112	1,772	1,340	18.40	66	2.22%	6	0.21%	73	2.43%
	Northeast Generating Plant - Diesel Units 1 and 2	63,289	R4	55	-5%	66,309	56,542	9,767	14.00	482	0.76%	216	0.34%	698	1.10%
	Riverside Generating Plant - Diesel Unit	24,392	R4	55	-4%	25,439	5,556	19,884	16.30	1,156	4.74%	64	0.26%	1,220	5.00%
	Riverside Generating Plant - Units 3 and 4	9,797,993	R4	55	-11%	10,903,484	1,778,796	9,124,688	37.40	214,417	2.19%	29,559	0.30%	243,976	2.49%
	Southwestern Generating Plant - Diesel Unit	67,052	R4	55	-4%	69,982	32,613	37,369	15.10	2,281	3.40%	194	0.29%	2,475	3.69%
	Tulsa Generating Plant - Diesel Unit	70,372	R4	55	-6%	74,440	60,121	14,319	13.30	771	1.10%	306	0.43%	1,077	1.53%
	Weleetka Generating Plant - Diesel Unit	10,291	R4	55	-2%	10,540	6,868	3,672	5.40	634	6.16%	46	0.45%	680	6.61%
	Weleetka Generating Plant	2,134,695	R4	55	-6%	2,268,086	1,863,328	404,758	5.40	50,253	2.35%	24,702	1.16%	74,955	3.51%
	Total Fuel Holders, Producers and Accessories	12,171,079				13,421,392	3,805,596	9,615,796	29.57	270,059	2.22%	55,093	0.45%	325,152	2.67%
344.00	Generators														
	Comanche Generating Plant - Diesel Unit	754,469	R2	55	-4%	784,197	663,620	120,576	15.20	5,977	0.79%	1,956	0.26%	7,933	1.05%
	Northeast Generating Plant - Diesel Units 1 and 2	241,260	R2	55	-5%	252,773	197,706	55,068	14.20	3,067	1.27%	811	0.34%	3,878	1.61%
	Northeast Generating Plant - Diesel Units 3 and 4	437,950	R2	55	-1%	442,747	362,803	79,945	8.90	8,444	1.93%	539	0.12%	8,983	2.05%
	Riverside Generating Plant - Diesel Unit	470,175	R2	55	-4%	490,363	401,129	89,233	18.30	3,773	0.80%	1,103	0.23%	4,876	1.04%
	Riverside Generating Plant - Units 3 and 4	48,203,405	R2	55	-11%	53,642,112	8,448,248	45,193,864	34.80	1,142,390	2.37%	156,285	0.32%	1,298,674	2.69%
	Southwestern Generating Plant - Diesel Unit	212,484	R2	55	-4%	221,767	187,036	34,730	17.40	1,462	0.69%	534	0.25%	1,996	0.94%
	Southwestern Generating Plant - Units 4 and 5	44,917,876	R2	55	-7%	47,885,139	7,963,663	39,921,476	34.80	1,061,903	2.36%	85,266	0.19%	1,147,169	2.55%
	Tulsa Generating Plant - Diesel Unit	608,404	R2	55	-6%	643,570	525,541	118,029	13.10	6,325	1.04%	2,684	0.44%	9,010	1.48%
	Weleetka Generating Plant - Diesel Unit	666,380	R2	55	-2%	682,515	450,222	232,293	5.20	41,569	6.24%	3,103	0.47%	44,672	6.70%
	Weleetka Generating Plant	24,639,423	R2	55	-6%	26,179,073	20,444,436	5,734,637	5.40	776,849	3.15%	285,120	1.16%	1,061,970	4.31%
	Total Generators	121,151,826				131,224,256	39,644,404	91,579,852	25.52	3,051,759	2.52%	537,401	0.44%	3,589,160	2.96%

Depreciation Rate Development

Account No.	Description	[1] Original Cost	[2] Iowa Curve Type	[2] Iowa Curve AL	[3] Net Salvage	[4] Depreciable Base	[5] Book Reserve	[6] Future Accruals	[7] Remaining Life	[8] Service Life Accrual	[9] Service Life Rate	[10] Net Salvage Accrual	[11] Net Salvage Rate	[12] Total Accrual	[13] Total Rate
345.00	Accessory Electric Equipment														
	Northeast Generating Plant - Diesel Units 1 and 2	83,558	L2	25	-2%	85,581	41,571	44,010	12.50	3,359	4.02%	162	0.19%	3,521	4.21%
	Riverside Generating Plant - Diesel Unit	28,635	L2	25	-4%	29,865	25,707	4,158	8.50	345	1.20%	145	0.51%	489	1.71%
	Riverside Generating Plant - Units 3 and 4	4,730,554	L2	25	-11%	5,264,294	-35,204	5,299,498	19.00	250,829	5.30%	28,092	0.59%	278,921	5.90%
	Southwestern Generating Unit - Units 4 and 5	9,646,089	L2	25	-7%	10,283,307	1,609,221	8,674,086	17.10	469,992	4.87%	37,264	0.39%	507,256	5.26%
	Weleetka Generating Plant - Diesel Unit	36,296	L2	25	-2%	37,175	25,838	11,337	4.00	2,615	7.20%	220	0.61%	2,834	7.81%
	Weleetka Generating Plant	635,609	L2	25	-6%	675,327	275,520	399,807	5.40	66,683	10.49%	7,355	1.16%	74,038	11.65%
	Total Accessory Electric Equipment	15,160,741				16,375,548	1,942,652	14,432,896	16.65	793,823	5.24%	73,237	0.48%	867,060	5.72%
346.00	Miscellaneous Power Plant Equipment														
	Comanche Generating Plant - Diesel Unit	17,858	SO	40	-4%	18,561	19,041	-479	16.80	-70	-0.39%	42	0.39%	-29 *	0.00%
	Northeast Generating Plant - Diesel Units 1 and 2	3,019	SO	40	-5%	3,163	2,559	604	14.90	31	1.02%	10	0.32%	41	1.34%
	Riverside Generating Plant - Units 3 and 4	182,933	SO	40	-11%	203,572	7,462	196,110	30.80	5,697	3.11%	670	0.37%	6,367	3.48%
	Southwestern Generating Unit - Units 4 and 5	6,188	SO	40	-7%	6,597	379	6,218	30.60	190	3.07%	13	0.22%	203	3.28%
	Weleetka Generating Plant - Diesel Unit	911	SO	40	-2%	933	566	367	4.80	72	7.89%	5	0.50%	76	8.40%
	Weleetka Generating Plant	2,407,424	SO	40	-6%	2,557,857	1,323,973	1,233,884	5.30	204,425	8.49%	28,384	1.18%	232,808	9.67%
	Total Miscellaneous Power Plant Equipment	2,618,332				2,790,684	1,353,980	1,436,704	6.00	210,344	8.03%	29,123	1.11%	239,467	9.15%
	Total Other Production Plant	157,116,666				170,221,179	47,197,646	123,023,533	23.34	4,558,113	2.90%	713,632	0.45%	5,271,746	3.36%
	Transmission Plant														
350.10	Land and Land Rights	38,471,388	R4	100	0%	38,471,388	16,478,128	21,993,261	74.64	294,658	0.77%	0	0.00%	294,658	0.77%
352.00	Structures and Improvements	5,155,458	R3	60	-5%	5,413,231	823,456	4,589,775	43.30	100,046	1.94%	5,953	0.12%	105,999	2.06%
353.00	Station Equipment	370,807,885	R1.5	60	-5%	389,348,280	74,805,197	314,543,083	49.50	5,979,852	1.61%	374,553	0.10%	6,354,406	1.71%
354.00	Towers and Fixtures	17,759,669	R3	75	-40%	24,863,536	7,938,687	16,924,849	42.60	230,539	1.30%	166,757	0.94%	397,297	2.24%
355.00	Poles and Fixtures	228,798,914	R1.5	46	-60%	366,078,262	47,233,580	318,844,682	35.60	5,100,150	2.23%	3,856,161	1.69%	8,956,311	3.91%
356.00	Overhead Conductors and Devices	168,562,530	R2	68	-60%	269,700,048	59,862,704	209,837,344	50.02	2,173,127	1.29%	2,021,942	1.20%	4,195,069	2.49%
358.00	Underground Conductors and Devices	71,915	R4	45	0%	71,915	46,322	25,593	17.00	1,505	2.09%	0	0.00%	1,505	2.09%
	Total Transmission Plant	829,627,759				1,093,946,660	207,188,074	886,758,587	43.67	13,879,878	1.67%	6,425,367	0.77%	20,305,246	2.45%
	Distribution Plant														
360.10	Land and Land Rights	2,826,079	R4	100	0%	2,826,079	1,059,442	1,766,637	87.58	20,172	0.71%	0	0.00%	20,172	0.71%
361.00	Structures and Improvements	6,336,570	SO	45	-5%	6,653,399	1,319,813	5,333,585	35.40	141,716	2.24%	8,950	0.14%	150,666	2.38%
362.00	Station Equipment	325,393,298	R1.5	65	-5%	341,662,963	77,590,061	264,072,902	53.16	4,661,460	1.43%	306,051	0.09%	4,967,511	1.53%
364.00	Poles, Towers and Fixtures	390,852,648	L0.5	58	-100%	781,705,296	101,992,372	679,712,923	48.56	5,948,523	1.52%	8,048,860	2.06%	13,997,383	3.58%
365.00	Overhead Conductors and Devices	386,883,283	R0.5	46	-50%	580,324,924	76,061,531	504,263,393	37.80	8,222,798	2.13%	5,117,504	1.32%	13,340,301	3.45%
366.00	Underground Conduit	76,453,540	R1.5	78	-60%	122,325,665	12,549,542	109,776,123	70.59	905,284	1.18%	649,839	0.85%	1,555,123	2.03%
367.00	Underground Conductors and Devices	327,944,609	R1.5	45	-25%	409,930,761	59,813,016	350,117,744	34.20	7,840,105	2.39%	2,397,256	0.73%	10,237,361	3.12%
368.00	Line Transformers	331,700,991	R1	36	-15%	381,456,139	109,702,191	271,753,948	26.00	8,538,415	2.57%	1,913,660	0.58%	10,452,075	3.15%
369.00	Services	252,906,429	R1.5	60	-70%	429,940,929	79,536,294	350,404,635	48.50	3,574,642	1.41%	3,650,196	1.44%	7,224,838	2.86%
370.00	Meters	12,172,649	L0	15	-30%	15,824,443	7,733,987	8,090,457	11.56	383,967	3.15%	315,899	2.60%	699,866	5.75%
370.16	AMI Meters	96,507,750	S2.5	15	0%	96,507,750	9,245,990	87,261,761	13.40	6,512,072	6.75%	0	0.00%	6,512,072	6.75%
371.00	Installations on Customer Premises	45,491,350	O1	30	-30%	59,138,754	15,851,585	43,287,169	23.40	1,266,657	2.78%	583,222	1.28%	1,849,879	4.07%
373.00	Street Lighting and Signal Systems	58,895,861	R0.5	44	-35%	79,509,412	29,024,204	50,485,208	33.95	879,872	1.49%	607,174	1.03%	1,487,046	2.52%
	Total Distribution Plant	2,314,365,056				3,307,806,515	581,480,029	2,726,326,485	37.61	48,895,683	2.11%	23,598,610	1.02%	72,494,293	3.13%
	General Plant														
390.00	Structures and Improvements	58,000,103	R0.5	69	-10%	63,800,113	10,437,890	53,362,223	59.62	797,756	1.38%	97,283	0.17%	895,039	1.54%
391.00	Office Furniture and Equipment														
	Fully Accrued	1,972,836				1,972,836	1,972,836	0						0	0.00%
	Amortized	1,873,829	SQ	20	0%	1,873,829	979,000	894,829	9.50	94,193	5.03%	-464	-0.03%	93,729	5.00%
	Total Office Furniture and Equipment	3,846,665				3,846,665	2,951,836	894,829						93,729	2.44%
391.11	Office Furniture and Equipment - Computers	150,676	SQ	5	0%	150,676	90,350	60,326	2.00	30,163	20.02%	-26	-0.02%	30,137	20.00%
392.00	Transportation Equipment	268,333	SQ	15	0%	268,333	141,950	126,383	7.10	17,800	6.63%	86	0.04%	17,886	6.67%

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	Original Cost	Type	AL	Net Salvage	Depreciable Base	Book Reserve	Future Accruals	Remaining Life	Accrual	Rate	Accrual	Rate	Accrual	Rate
393.00	Stores Equipment	2,000,095	SQ	30	0%	2,000,095	1,379,000	621,095	9.30	66,784	3.34%	-271	-0.01%	66,513	3.33%
394.00	Tools, Shop and Garage Equipment	22,946,980	SQ	25	0%	22,946,980	6,650,000	16,296,980	17.80	915,561	3.99%	1,523	0.01%	917,084	4.00%
395.00	Laboratory Equipment														
	Fully Accrued	2,363,766				2,363,766	2,363,766	0						0	0.00%
	Amortized	1,498,862	SQ	20	0%	1,498,862	919,400	579,462	7.70	75,255	5.02%	-355	-0.02%	74,900	5.00%
	Total Laboratory Equipment	3,862,627				3,862,627	3,283,166	579,462						74,900	1.94%
396.00	Power Operated Equipment														
	Fully Accrued	263,351				263,351	263,351	0						0	0.00%
	Amortized	846,235	SQ	18	0%	846,235	523,200	323,035	6.90	46,817	5.53%	239	0.03%	47,056	5.56%
	Total Power Operated Equipment	1,109,586				1,109,586	786,551	323,035						47,056	4.24%
397.00	Communication Equipment														
	Fully Accrued	12,454,425				12,454,425	12,454,425	0						0	0.00%
	Amortized	26,494,208	SQ	15	0%	26,494,208	12,595,000	13,899,208	7.90	1,759,393	6.64%	8,346	0.03%	1,767,739	6.67%
	Total Communication Equipment	38,948,633				38,948,633	25,049,425	13,899,208						1,767,739	4.54%
397.16	Communication Equipment - AMI	8,597,784	SQ	15	0%	8,597,784	753,349	7,844,435	13.50	581,069	6.76%	-7,597	-0.09%	573,472	6.67%
398.00	Miscellaneous Equipment	5,397,743	SQ	20	0%	5,397,743	2,681,000	2,716,743	10.10	268,984	4.98%	993	0.02%	269,977	5.00%
399.30	Other Tangible Property	529,811	SQ	40	0%	529,811	461,200	68,611	5.20	13,194	2.49%	69	0.01%	13,263	2.50%
	Total General Plant	145,659,037				151,459,048	54,665,717	96,793,330	20.31	4,666,970	3.20%	99,825	0.07%	4,766,795	3.27%
	TOTAL DEPRECIABLE PLANT	4,793,935,617				6,164,723,278	1,431,623,350	4,733,099,928	32.08	104,816,713	2.19%	42,732,931	0.89%	147,549,643	3.08%

[1] DG&E Depreciation Study pp. VI-4 - VI-11
[2] Average life and Iowa curve shape developed through actuarial analysis and professional judgment
[3] Weighted net salvage for life span accounts from weighted net salvage exhibit; net salvage for mass accounts developed through statistical analysis and professional judgment
[4] = [1]*(1-[3])
[5] From Company accounting records
[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]. *Any negative rates adjusted up to zero.
* Unadjusted net salvage rates

Weighted Net Salvage

	[1]	[2]	[3]	[4]	[5]
	Terminal Retirements		Interim Retirements		Weighted
Location	Retirements	Net Salvage	Retirements	Net Salvage	Net Salvage
Comanche Generating Plant	91%	-5.0%	9%	-20%	-6.4%
Comanche Generating Plant - Account 314.3	49%	0.0%	51%	10%	5.1%
Northeast Generating Plant - Units 1 and 2	86%	-10.5%	14%	-20%	-11.8%
Northeast Generating Plant - Units 1 and 2 - Account 314.3	50%	0.0%	50%	10%	5.0%
Northeast Generating Plant - Unit 3	95%	-3.8%	5%	-20%	-4.7%
Northeast Rail Spur	96%	-4.4%	4%	-20%	-5.1%
Oklaunion Generating Plant	75%	-12.3%	25%	-20%	-14.2%
Riverside Generating Plant - Units 1 and 2	75%	-14.7%	25%	-20%	-16.0%
Southwestern Generating Plant - Units 1, 2, and 3	82%	-7.8%	18%	-20%	-10.0%
Tulsa Generating Plant - Units 2 and 4	81%	-11.6%	19%	-20%	-13.2%
Comanche Generating Plant - Diesel Unit	55%	-3.1%	45%	-5%	-3.9%
Northeast Generating Plant - Diesel Units 1 and 2	41%	-4.4%	60%	-5%	-4.8%
Northeast Generating Plant - Diesel Units 3 and 4	87%	-0.5%	13%	-5%	-1.1%
Riverside Generating Plant - Diesel Unit	43%	-3.3%	57%	-5%	-4.3%
Riverside Generating Plant - Units 3 and 4	65%	-14.7%	35%	-5%	-11.3%
Southwestern Generating Plant - Diesel Unit	51%	-3.8%	49%	-5%	-4.4%
Southwestern Generating Plant - Units 4 and 5	58%	-7.8%	42%	-5%	-6.6%
Tulsa Generating Plant - Diesel Unit	49%	-6.6%	51%	-5%	-5.8%
Weleetka Generating Plant - Diesel Unit	88%	-2.1%	12%	-5%	-2.4%
Weleetka Generating Plant	95%	-6.3%	5%	-5%	-6.2%

[1], [3] Accepted PSO's proposed weighting of interim and terminal retirements (see Depreciation Study)

[2] From DJG-2-7

[4] Accepted PSO's proposed interim net salvage rates (see Depreciation Study)

[5] = [1]*[2] + [3]*[4]

Terminal Net Salvage

Plant	[1] Decommissioning Cost	[2] Removed Contingency	[3] Terminal Retirements	[4] Terminal Net Salvage
Comanche Generating Plant				
Accounts 311.3, 312.3, 315.3, 316.3	4,536,510	3,504,447	70,390,043	-4.98%
Account 314.3	-	-	31,499,918	0.00%
Diesel Unit	24,724	13,158	427,499	-3.08%
Total	4,561,234	3,517,605	102,317,460	
Northeast Generating Plant - Units 1 and 2				
Accounts 311.3, 312.3, 315.3, 316.3)	15,069,199	11,341,357	108,478,640.42	-10.45%
Account 314.3	-	-	68,026,454.06	0.00%
Diesel Unit	13,416	7,029	158,398.06	-4.44%
Total	15,082,615	11,348,386	176,663,493	
Northeast Generating Plant - Unit 3				
Units 3	23,330,821	17,454,156	453,527,982	-3.85%
Rail Spur	1,423,484	943,463	21,376,159	-4.41%
Diesel Unit	4,959	1,900	379,996	-0.50%
Total	24,759,264	18,399,519	475,284,136	
Oklaunion Generating Plant	9,537,857	8,922,443 *	72,759,289	-12.26%
Riverside Generating Plant				
Units 1 & 2			131,001,955	
Units 3 &4			40,803,189	
Total Units 3 & 4	31,312,607	25,235,158	171,805,144	-14.69%
Diesel Unit	13,894	7,501	223,929	-3.35%
Total	31,326,501	25,242,659	172,029,073	

Terminal Net Salvage

Plant	[1] Decommissioning Cost	[2] Removed Contingency	[3] Terminal Retirements	[4] Terminal Net Salvage
Southwestern Generating Plant				
Units 1, 2, & 3			73,709,503	
Units 4 & 5			34,701,022	
Total Units 1-5	11,214,543	8,421,808	108,410,525	-7.77%
Diesel Unit	10,641	5,423	143,744	-3.77%
Total	11,225,184	8,427,231	108,554,269	
Tulsa Plant				
Units 2 & 4	9,450,719	7,126,570	61,312,684	-11.62%
Diesel Unit	41,806	21,907	332,246	-6.59%
Total	9,492,525	7,148,477	61,644,930	
Weleetka Generating Plant				
Weleetka	2,239,596	1,831,507	28,993,554	-6.32%
Diesel Unit	23,858	12,916	626,506	-2.06%
Total Weleetka	2,263,454	1,844,423	29,620,060	
TOTAL	108,248,634		1,198,872,711	

[1] Decommissioning costs from S&L study, unadjusted

[2] Removing 15% contingency from S&L study; diesel allocations from DJG-2-8

[3] Accepted PSO's proposed terminal retirements

[4] = [2] / [3]

Allocation of Diesel Decommissioning Cost

	[1]	[2]	[3]	[4]	[5]	[6]	[7]
Plant	Direct Cost	Diesel Labor Cost	Total Labor Cost	Diesel Labor Ratio	Indirect Cost	Diesel Indirect Cost	Total Diesel Allocation
Comanche	$ 10,802	$ 29,062	$ 4,226,448	0.688%	$ 342,645	$ 2,356	$ 13,158
Northeast Generating Plant - Units 1 & 2	5,755	15,715	14,623,109	0.107%	1,185,527	1,274	7,029
Northeast Generating Plant - Units 3 & 4	1,296	7,438	24,477,652	0.030%	1,988,714	604	1,900
Northeast Generating Plant - Rail Spur	848,621	1,167,341	24,477,652	4.769%	1,988,714	94,842	943,463
Riverside Generating Plant	6,138	16,762	26,468,680	0.063%	2,152,389	1,363	7,501
Southwestern Generating Plant	4,384	12,850	10,954,810	0.117%	885,803	1,039	5,423
Tulsa Plant	17,935	48,977	9,185,975	0.533%	744,992	3,972	21,907
Weleetka	10,550	28,810	1,847,482	1.559%	151,709	2,366	12,916

[1], [2], [3], [5] PSO Conceptual Demolition Cost Estimates
[4] = [2] / [3]
[6] = [4] * [5]
[7] = [1] + [6]

Account 303 (Software) Adjustment

Description	Plant Balance	PSO Proposed Rate	Test Year Expense	Proforma Expense	OIEC Proposed Rate	OIEC Expense	OIEC Adjustment
Miscellaneous Intangible Plant							
Capitalized Software - PSO-High Availability Data Ctr	$ 4,359,228	20%	$ 704,147	$ 871,846	10%	$ 435,923	$ (435,923)
Capitalized Software - PSO- Other	45,572,501	20%	8,235,641	9,114,500	10%	4,557,250	(4,557,250)
Riverside Generating Plant	844,148		17,246	17,246		17,246	-
Southwestern Generating Plant	382,814		7,165	7,165		7,165	-
Prior Period Correction-Ohio OPCO BU 160			(60,103)	(7,768)		(7,768)	-
Total Misc. Intangible Plant	$ 51,158,691		$ 8,904,095	$ 10,002,988		$ 5,009,816	$ **(4,993,173)**

*See Schedule I-4 Proposed

Account 356 Curve Fitting

[1] Age (Years)	[2] Exposures (Dollars)	[3] Observed Life Table (OLT)	[4] PSO R2.5-65	[5] OIEC R2-68	[6] PSO SSD	[7] OIEC SSD
0.0	183,245,313	100.00%	100.00%	100.00%	0.0000	0.0000
0.5	180,524,746	99.97%	99.96%	99.93%	0.0000	0.0000
1.5	175,818,710	99.89%	99.87%	99.79%	0.0000	0.0000
2.5	173,204,082	99.83%	99.78%	99.63%	0.0000	0.0000
3.5	168,519,974	99.69%	99.67%	99.48%	0.0000	0.0000
4.5	164,415,474	99.55%	99.57%	99.31%	0.0000	0.0000
5.5	159,275,835	99.36%	99.45%	99.13%	0.0000	0.0000
6.5	146,733,197	99.16%	99.33%	98.95%	0.0000	0.0000
7.5	141,636,972	99.05%	99.20%	98.76%	0.0000	0.0000
8.5	131,450,331	98.99%	99.07%	98.56%	0.0000	0.0000
9.5	120,509,150	98.81%	98.92%	98.35%	0.0000	0.0000
10.5	117,559,586	98.66%	98.77%	98.12%	0.0000	0.0000
11.5	116,701,315	98.43%	98.60%	97.89%	0.0000	0.0000
12.5	113,344,100	98.32%	98.43%	97.65%	0.0000	0.0000
13.5	110,510,305	98.19%	98.24%	97.40%	0.0000	0.0001
14.5	101,422,073	97.76%	98.05%	97.14%	0.0000	0.0000
15.5	96,794,915	97.14%	97.84%	96.86%	0.0000	0.0000
16.5	96,453,892	96.98%	97.62%	96.57%	0.0000	0.0000
17.5	95,354,405	96.84%	97.38%	96.27%	0.0000	0.0000
18.5	93,826,399	96.06%	97.13%	95.96%	0.0001	0.0000
19.5	91,270,547	95.20%	96.87%	95.63%	0.0003	0.0000
20.5	89,558,791	95.02%	96.59%	95.29%	0.0002	0.0000
21.5	89,332,620	94.78%	96.30%	94.94%	0.0002	0.0000
22.5	84,854,063	94.62%	95.99%	94.57%	0.0002	0.0000
23.5	80,629,602	94.02%	95.66%	94.19%	0.0003	0.0000
24.5	79,597,779	93.83%	95.32%	93.79%	0.0002	0.0000
25.5	71,818,731	93.40%	94.95%	93.37%	0.0002	0.0000
26.5	69,086,754	92.99%	94.57%	92.94%	0.0002	0.0000
27.5	65,946,937	92.90%	94.16%	92.49%	0.0002	0.0000
28.5	65,104,659	92.63%	93.74%	92.03%	0.0001	0.0000
29.5	63,864,859	91.86%	93.29%	91.54%	0.0002	0.0000
30.5	61,658,614	91.59%	92.81%	91.04%	0.0001	0.0000
31.5	60,226,160	91.43%	92.32%	90.52%	0.0001	0.0001
32.5	44,724,051	91.22%	91.80%	89.98%	0.0000	0.0002
33.5	43,528,844	90.71%	91.25%	89.41%	0.0000	0.0002
34.5	42,223,753	88.69%	90.67%	88.83%	0.0004	0.0000
35.5	41,407,798	88.42%	90.07%	88.23%	0.0003	0.0000
36.5	37,519,017	88.23%	89.44%	87.60%	0.0001	0.0000
37.5	33,330,228	88.03%	88.77%	86.95%	0.0001	0.0001
38.5	29,517,219	85.93%	88.08%	86.28%	0.0005	0.0000
39.5	27,104,485	85.18%	87.35%	85.59%	0.0005	0.0000
40.5	26,386,392	84.75%	86.59%	84.87%	0.0003	0.0000
41.5	23,139,183	80.38%	85.80%	84.12%	0.0029	0.0014
42.5	19,964,506	79.58%	84.97%	83.35%	0.0029	0.0014
43.5	19,064,664	77.63%	84.10%	82.56%	0.0042	0.0024
44.5	18,292,877	77.28%	83.20%	81.73%	0.0035	0.0020
45.5	14,994,168	77.20%	82.25%	80.88%	0.0026	0.0014
46.5	13,827,631	77.04%	81.26%	80.01%	0.0018	0.0009
47.5	13,194,153	76.90%	80.23%	79.10%	0.0011	0.0005
48.5	12,812,186	76.61%	79.16%	78.17%	0.0006	0.0002
49.5	10,252,535	76.48%	78.04%	77.20%	0.0002	0.0001
50.5	9,755,141	74.81%	76.88%	76.21%	0.0004	0.0002
51.5	8,406,257	73.24%	75.66%	75.19%	0.0006	0.0004
52.5	6,925,910	69.55%	74.40%	74.14%	0.0024	0.0021

Account 356 Curve Fitting

[1]	[2]	[3]	[4]	[5]	[6]	[7]
Age (Years)	Exposures (Dollars)	Observed Life Table (OLT)	PSO R2.5-65	OIEC R2-68	PSO SSD	OIEC SSD
53.5	6,482,467	67.41%	73.09%	73.06%	0.0032	0.0032
54.5	5,927,867	64.83%	71.73%	71.94%	0.0048	0.0051
55.5	5,449,600	64.76%	70.32%	70.80%	0.0031	0.0036
56.5	4,661,724	64.10%	68.85%	69.62%	0.0023	0.0031
57.5	4,453,409	63.40%	67.34%	68.42%	0.0015	0.0025
58.5	4,188,197	63.22%	65.77%	67.18%	0.0007	0.0016
59.5	3,606,616	62.93%	64.15%	65.92%	0.0001	0.0009
60.5	3,500,104	61.94%	62.48%	64.62%	0.0000	0.0007
61.5	3,437,299	61.89%	60.76%	63.30%	0.0001	0.0002
62.5	2,268,214	61.05%	58.99%	61.94%	0.0004	0.0001
63.5	1,994,061	60.33%	57.18%	60.56%	0.0010	0.0000
64.5	1,905,038	60.11%	55.32%	59.15%	0.0023	0.0001
65.5	1,855,589	60.07%	53.43%	57.72%	0.0044	0.0006
66.5	1,790,343	60.05%	51.50%	56.26%	0.0073	0.0014
67.5	1,601,134	60.04%	49.54%	54.77%	0.0110	0.0028
68.5	1,549,109	59.32%	47.56%	53.27%	0.0138	0.0037
69.5	1,541,795	59.04%	45.55%	51.74%	0.0182	0.0053
70.5	1,438,001	58.35%	43.53%	50.20%	0.0220	0.0066
71.5	1,434,885	58.23%	41.51%	48.64%	0.0280	0.0092
72.5	1,426,873	57.98%	39.48%	47.06%	0.0342	0.0119
73.5	1,403,156	57.36%	37.46%	45.47%	0.0396	0.0141
74.5	1,370,856	57.36%	35.46%	43.88%	0.0480	0.0182
75.5	721,587	47.28%	33.47%	42.27%	0.0191	0.0025
76.5	703,553	46.88%	31.51%	40.66%	0.0236	0.0039
77.5	690,988	46.86%	29.59%	39.05%	0.0298	0.0061
78.5	690,988	46.86%	27.71%	37.45%	0.0367	0.0089
79.5	595,620	40.69%	25.88%	35.85%	0.0219	0.0023
80.5	588,407	40.20%	24.11%	34.25%	0.0259	0.0035
81.5	474,715	40.20%	22.39%	32.67%	0.0317	0.0057
82.5		40.20%	20.73%	31.10%		
Sum of Squared Differences				[8]	0.4631	0.1417
Up to 1% of Beginning Exposures				[9]	0.0523	0.0356

[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.

Account 362 Curve Fitting

[1] Age (Years)	[2] Exposures (Dollars)	[3] Observed Life Table (OLT)	[4] PSO R1.5-60	[5] OIEC R1.5-65	[6] "Best" Fit L0-87	[7] PSO SSD	[8] OIEC SSD
0.0	358,824,750	100.00%	100.00%	100.00%	100.00%	0.0000	0.0000
0.5	337,195,038	99.95%	99.85%	99.86%	99.93%	0.0000	0.0000
1.5	312,364,056	99.84%	99.55%	99.59%	99.74%	0.0000	0.0000
2.5	280,627,966	99.44%	99.24%	99.30%	99.48%	0.0000	0.0000
3.5	243,924,737	99.10%	98.92%	99.01%	99.18%	0.0000	0.0000
4.5	236,972,381	98.78%	98.59%	98.71%	98.84%	0.0000	0.0000
5.5	224,498,054	98.47%	98.25%	98.39%	98.47%	0.0000	0.0000
6.5	214,353,165	98.26%	97.90%	98.07%	98.07%	0.0000	0.0000
7.5	198,816,545	97.74%	97.53%	97.74%	97.64%	0.0000	0.0000
8.5	187,598,965	97.54%	97.16%	97.41%	97.20%	0.0000	0.0000
9.5	172,661,539	97.19%	96.78%	97.06%	96.73%	0.0000	0.0000
10.5	164,071,855	96.77%	96.38%	96.70%	96.24%	0.0000	0.0000
11.5	159,002,832	96.44%	95.97%	96.33%	95.73%	0.0000	0.0000
12.5	154,702,519	96.10%	95.55%	95.95%	95.21%	0.0000	0.0000
13.5	146,227,690	95.17%	95.12%	95.57%	94.68%	0.0000	0.0000
14.5	140,998,711	94.77%	94.67%	95.17%	94.13%	0.0000	0.0000
15.5	135,342,168	94.07%	94.21%	94.76%	93.56%	0.0000	0.0000
16.5	132,165,316	93.36%	93.74%	94.34%	92.99%	0.0000	0.0001
17.5	124,913,803	93.02%	93.26%	93.91%	92.40%	0.0000	0.0001
18.5	117,737,337	92.32%	92.76%	93.46%	91.80%	0.0000	0.0001
19.5	112,000,595	91.79%	92.25%	93.01%	91.19%	0.0000	0.0001
20.5	107,144,307	91.12%	91.72%	92.54%	90.57%	0.0000	0.0002
21.5	106,479,556	90.55%	91.18%	92.07%	89.94%	0.0000	0.0002
22.5	102,089,325	90.15%	90.62%	91.58%	89.30%	0.0000	0.0002
23.5	97,300,586	89.23%	90.05%	91.07%	88.66%	0.0001	0.0003
24.5	93,254,093	88.69%	89.46%	90.56%	88.01%	0.0001	0.0003
25.5	85,421,699	87.87%	88.85%	90.03%	87.35%	0.0001	0.0005
26.5	78,958,015	87.13%	88.23%	89.48%	86.68%	0.0001	0.0006
27.5	74,076,251	86.42%	87.59%	88.92%	86.01%	0.0001	0.0006
28.5	71,654,573	86.05%	86.92%	88.35%	85.33%	0.0001	0.0005
29.5	70,104,393	85.29%	86.24%	87.76%	84.65%	0.0001	0.0006
30.5	67,515,594	83.93%	85.54%	87.16%	83.96%	0.0003	0.0010
31.5	65,013,230	83.25%	84.82%	86.53%	83.27%	0.0002	0.0011
32.5	61,433,398	81.65%	84.08%	85.90%	82.57%	0.0006	0.0018
33.5	57,711,437	80.37%	83.31%	85.24%	81.87%	0.0009	0.0024
34.5	54,265,070	79.42%	82.52%	84.56%	81.17%	0.0010	0.0026
35.5	53,176,866	78.38%	81.71%	83.87%	80.46%	0.0011	0.0030
36.5	50,526,092	77.77%	80.87%	83.16%	79.75%	0.0010	0.0029
37.5	47,996,290	76.72%	80.01%	82.43%	79.04%	0.0011	0.0033
38.5	43,902,291	76.33%	79.12%	81.67%	78.33%	0.0008	0.0029
39.5	42,355,913	75.71%	78.21%	80.90%	77.61%	0.0006	0.0027
40.5	39,421,497	74.70%	77.27%	80.11%	76.89%	0.0007	0.0029
41.5	35,479,270	73.76%	76.31%	79.29%	76.18%	0.0006	0.0031
42.5	33,525,441	73.05%	75.31%	78.46%	75.46%	0.0005	0.0029
43.5	31,477,863	72.54%	74.29%	77.60%	74.74%	0.0003	0.0026
44.5	29,073,905	71.92%	73.24%	76.72%	74.02%	0.0002	0.0023
45.5	27,663,799	70.82%	72.17%	75.81%	73.31%	0.0002	0.0025
46.5	26,410,479	70.57%	71.06%	74.88%	72.59%	0.0000	0.0019
47.5	24,941,894	70.37%	69.93%	73.93%	71.87%	0.0000	0.0013
48.5	22,607,831	69.47%	68.77%	72.96%	71.16%	0.0000	0.0012
49.5	21,398,862	69.14%	67.58%	71.96%	70.44%	0.0002	0.0008
50.5	19,668,055	68.28%	66.36%	70.93%	69.73%	0.0004	0.0007
51.5	17,661,372	67.60%	65.11%	69.89%	69.01%	0.0006	0.0005
52.5	16,417,212	67.16%	63.84%	68.81%	68.30%	0.0011	0.0003
53.5	15,583,212	66.85%	62.54%	67.72%	67.59%	0.0019	0.0001
54.5	14,472,821	66.08%	61.21%	66.60%	66.87%	0.0024	0.0000
55.5	13,339,819	65.59%	59.85%	65.45%	66.16%	0.0033	0.0000
56.5	12,259,778	65.22%	58.47%	64.28%	65.45%	0.0046	0.0001

Account 362 Curve Fitting

[1] Age (Years)	[2] Exposures (Dollars)	[3] Observed Life Table (OLT)	[4] PSO R1.5-60	[5] OIEC R1.5-65	[6] "Best" Fit L0-87	[7] PSO SSD	[8] OIEC SSD
57.5	11,011,293	64.62%	57.07%	63.09%	64.74%	0.0057	0.0002
58.5	9,571,183	63.99%	55.64%	61.88%	64.04%	0.0070	0.0004
59.5	7,756,845	62.97%	54.19%	60.64%	63.33%	0.0077	0.0005
60.5	6,700,066	62.85%	52.72%	59.38%	62.63%	0.0103	0.0012
61.5	5,445,926	62.43%	51.23%	58.10%	61.93%	0.0125	0.0019
62.5	4,109,891	61.89%	49.73%	56.80%	61.22%	0.0148	0.0026
63.5	3,227,447	60.98%	48.21%	55.47%	60.53%	0.0163	0.0030
64.5	2,422,275	59.92%	46.67%	54.14%	59.83%	0.0176	0.0033
65.5	2,131,463	59.65%	45.13%	52.78%	59.13%	0.0211	0.0047
66.5	1,732,772	59.43%	43.57%	51.41%	58.44%	0.0251	0.0064
67.5	1,312,587	59.26%	42.02%	50.02%	57.75%	0.0297	0.0085
68.5	1,011,670	57.19%	40.45%	48.62%	57.06%	0.0280	0.0074
69.5	885,634	55.89%	38.89%	47.20%	56.37%	0.0289	0.0075
70.5	871,221	55.78%	37.33%	45.78%	55.69%	0.0340	0.0100
71.5	799,021	53.80%	35.78%	44.35%	55.01%	0.0325	0.0089
72.5	725,284	52.73%	34.23%	42.92%	54.33%	0.0342	0.0096
73.5	711,436	52.73%	32.70%	41.48%	53.65%	0.0401	0.0127
74.5	604,424	51.75%	31.18%	40.03%	52.98%	0.0423	0.0137
75.5	577,303	51.33%	29.68%	38.59%	52.31%	0.0469	0.0162
76.5	543,351	49.29%	28.20%	37.15%	51.64%	0.0445	0.0147
77.5	480,020	48.19%	26.75%	35.72%	50.98%	0.0460	0.0155
78.5	422,807	47.60%	25.31%	34.29%	50.31%	0.0497	0.0177
79.5	286,915	46.27%	23.91%	32.88%	49.66%	0.0500	0.0179
80.5	268,535	46.16%	22.54%	31.47%	49.00%	0.0558	0.0216
81.5	150,037	45.28%	21.21%	30.08%	48.35%	0.0580	0.0231
82.5		44.66%	19.91%	28.71%	47.70%		
Sum of Squared Differences				[9]		0.7839	0.2811
Up to 1% of Beginning Exposures				[10]		0.0834	0.0583

[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] = The "best" mathematically fitting curve (not selected).
[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.

Account 364 Curve Fitting

[1] Age (Years)	[2] Exposures (Dollars)	[3] Observed Life Table (OLT)	[4] PSO R1-53	[5] OIEC L0.5-58	[6] PSO SSD	[7] OIEC SSD
0.0	446,058,811	100.00%	100.00%	100.00%	0.0000	0.0000
0.5	422,467,463	99.85%	99.76%	99.92%	0.0000	0.0000
1.5	397,796,830	99.50%	99.26%	99.69%	0.0000	0.0000
2.5	366,794,466	99.11%	98.75%	99.40%	0.0000	0.0000
3.5	347,629,748	98.62%	98.23%	99.05%	0.0000	0.0000
4.5	325,658,152	97.94%	97.69%	98.65%	0.0000	0.0001
5.5	306,661,107	97.40%	97.14%	98.22%	0.0000	0.0001
6.5	292,418,628	96.84%	96.58%	97.74%	0.0000	0.0001
7.5	280,707,943	96.36%	96.01%	97.22%	0.0000	0.0001
8.5	261,339,423	95.80%	95.42%	96.67%	0.0000	0.0001
9.5	244,514,965	95.17%	94.82%	96.08%	0.0000	0.0001
10.5	228,963,918	94.62%	94.21%	95.45%	0.0000	0.0001
11.5	215,606,392	94.10%	93.59%	94.79%	0.0000	0.0000
12.5	201,583,524	93.55%	92.95%	94.09%	0.0000	0.0000
13.5	193,441,043	92.97%	92.30%	93.36%	0.0000	0.0000
14.5	187,273,283	92.22%	91.64%	92.60%	0.0000	0.0000
15.5	176,108,262	91.57%	90.97%	91.80%	0.0000	0.0000
16.5	162,171,898	90.96%	90.28%	90.96%	0.0000	0.0000
17.5	149,736,964	90.32%	89.58%	90.10%	0.0001	0.0000
18.5	136,547,923	89.02%	88.87%	89.20%	0.0000	0.0000
19.5	126,410,557	87.80%	88.15%	88.27%	0.0000	0.0000
20.5	113,621,307	86.95%	87.41%	87.32%	0.0000	0.0000
21.5	106,901,174	86.28%	86.66%	86.34%	0.0000	0.0000
22.5	101,186,126	85.65%	85.89%	85.32%	0.0000	0.0000
23.5	95,127,180	84.89%	85.11%	84.29%	0.0000	0.0000
24.5	90,094,477	84.12%	84.31%	83.23%	0.0000	0.0001
25.5	85,191,287	83.31%	83.50%	82.15%	0.0000	0.0001
26.5	80,427,118	82.00%	82.67%	81.05%	0.0000	0.0001
27.5	75,209,424	80.85%	81.81%	79.93%	0.0001	0.0001
28.5	70,506,342	79.89%	80.95%	78.80%	0.0001	0.0001
29.5	65,588,265	79.04%	80.06%	77.65%	0.0001	0.0002
30.5	61,015,228	77.88%	79.15%	76.50%	0.0002	0.0002
31.5	56,256,726	76.68%	78.22%	75.33%	0.0002	0.0002
32.5	51,361,806	75.78%	77.27%	74.16%	0.0002	0.0003
33.5	47,482,287	74.86%	76.30%	72.99%	0.0002	0.0004
34.5	42,761,044	73.97%	75.30%	71.81%	0.0002	0.0005
35.5	39,798,081	73.06%	74.29%	70.63%	0.0002	0.0006
36.5	37,203,753	71.99%	73.25%	69.46%	0.0002	0.0006
37.5	33,957,731	70.82%	72.19%	68.28%	0.0002	0.0006
38.5	31,115,731	69.01%	71.10%	67.11%	0.0004	0.0004
39.5	28,827,596	67.20%	70.00%	65.94%	0.0008	0.0002
40.5	26,670,416	65.35%	68.86%	64.77%	0.0012	0.0000
41.5	24,848,436	63.79%	67.71%	63.61%	0.0015	0.0000
42.5	22,937,234	62.42%	66.53%	62.45%	0.0017	0.0000
43.5	21,004,839	60.82%	65.33%	61.29%	0.0020	0.0000
44.5	19,223,854	59.20%	64.11%	60.14%	0.0024	0.0001
45.5	17,283,328	56.87%	62.87%	59.00%	0.0036	0.0005
46.5	15,585,817	54.99%	61.60%	57.85%	0.0044	0.0008
47.5	14,109,007	53.52%	60.31%	56.72%	0.0046	0.0010
48.5	12,778,519	52.35%	59.01%	55.59%	0.0044	0.0011
49.5	12,077,965	51.42%	57.68%	54.47%	0.0039	0.0009
50.5	11,299,881	50.55%	56.33%	53.35%	0.0033	0.0008
51.5	10,207,373	49.49%	54.97%	52.24%	0.0030	0.0008
52.5	9,891,612	48.68%	53.59%	51.14%	0.0024	0.0006

Account 364 Curve Fitting

[1] Age (Years)	[2] Exposures (Dollars)	[3] Observed Life Table (OLT)	[4] PSO R1-53	[5] OIEC L0.5-58	[6] PSO SSD	[7] OIEC SSD
53.5	8,983,137	47.99%	52.19%	50.05%	0.0018	0.0004
54.5	8,123,981	47.29%	50.78%	48.96%	0.0012	0.0003
55.5	7,214,185	46.27%	49.36%	47.89%	0.0010	0.0003
56.5	6,326,018	44.74%	47.92%	46.82%	0.0010	0.0004
57.5	5,688,869	43.76%	46.47%	45.76%	0.0007	0.0004
58.5	5,014,870	42.81%	45.02%	44.71%	0.0005	0.0004
59.5	4,324,428	41.99%	43.55%	43.67%	0.0002	0.0003
60.5	3,746,667	41.20%	42.08%	42.64%	0.0001	0.0002
61.5	3,254,643	40.09%	40.61%	41.62%	0.0000	0.0002
62.5	2,749,331	37.73%	39.13%	40.61%	0.0002	0.0008
63.5	2,175,471	36.68%	37.65%	39.62%	0.0001	0.0009
64.5	1,799,281	35.66%	36.17%	38.63%	0.0000	0.0009
65.5	1,417,706	34.49%	34.70%	37.66%	0.0000	0.0010
66.5	1,079,205	33.42%	33.23%	36.69%	0.0000	0.0011
67.5	765,143	32.37%	31.76%	35.74%	0.0000	0.0011
68.5	511,288	31.55%	30.31%	34.81%	0.0002	0.0011
69.5	332,499	30.83%	28.87%	33.88%	0.0004	0.0009
70.5	269,542	30.24%	27.44%	32.97%	0.0008	0.0007
71.5	248,839	29.82%	26.03%	32.07%	0.0014	0.0005
72.5	230,153	29.57%	24.63%	31.18%	0.0024	0.0003
73.5	212,719	28.98%	23.26%	30.30%	0.0033	0.0002
74.5	198,030	28.55%	21.90%	29.44%	0.0044	0.0001
75.5	192,762	28.30%	20.58%	28.59%	0.0060	0.0000
76.5	185,400	28.05%	19.28%	27.76%	0.0077	0.0000
77.5	178,168	27.91%	18.00%	26.94%	0.0098	0.0001
78.5	171,483	27.74%	16.76%	26.13%	0.0121	0.0003
79.5	157,826	27.52%	15.56%	25.34%	0.0143	0.0005
80.5	148,163	27.15%	14.38%	24.56%	0.0163	0.0007
81.5	30,818	25.99%	13.25%	23.80%	0.0162	0.0005
82.5		24.59%	12.16%	23.05%		
Sum of Squared Differences				[8]	0.1443	0.0263
Up to 1% of Beginning Exposures				[9]	0.0483	0.0140

[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.

Account 366 Curve Fitting

[1] Age (Years)	[2] Exposures (Dollars)	[3] Observed Life Table (OLT)	[4] PSO R2.5-65	[5] OIEC R1.5-78	[6] PSO SSD	[7] OIEC SSD
0.0	77,664,275	100.00%	100.00%	100.00%	0.0000	0.0000
0.5	72,240,771	99.99%	99.96%	99.89%	0.0000	0.0000
1.5	67,333,215	99.95%	99.87%	99.66%	0.0000	0.0000
2.5	57,343,433	99.91%	99.78%	99.42%	0.0000	0.0000
3.5	54,861,235	99.87%	99.67%	99.18%	0.0000	0.0000
4.5	50,810,791	99.81%	99.57%	98.93%	0.0000	0.0001
5.5	48,295,972	99.77%	99.45%	98.68%	0.0000	0.0001
6.5	44,352,439	99.74%	99.33%	98.42%	0.0000	0.0002
7.5	34,078,260	99.69%	99.20%	98.16%	0.0000	0.0002
8.5	27,509,665	99.62%	99.07%	97.88%	0.0000	0.0003
9.5	23,899,086	99.54%	98.92%	97.60%	0.0000	0.0004
10.5	21,601,430	99.42%	98.77%	97.32%	0.0000	0.0004
11.5	20,003,156	99.35%	98.60%	97.03%	0.0001	0.0005
12.5	18,559,639	99.20%	98.43%	96.73%	0.0001	0.0006
13.5	14,394,257	99.04%	98.24%	96.42%	0.0001	0.0007
14.5	9,408,492	98.58%	98.05%	96.11%	0.0000	0.0006
15.5	8,847,970	98.41%	97.84%	95.79%	0.0000	0.0007
16.5	8,292,057	98.02%	97.62%	95.47%	0.0000	0.0007
17.5	7,684,607	97.77%	97.38%	95.13%	0.0000	0.0007
18.5	6,577,269	97.30%	97.13%	94.79%	0.0000	0.0006
19.5	5,750,329	97.12%	96.87%	94.44%	0.0000	0.0007
20.5	4,604,083	95.74%	96.59%	94.09%	0.0001	0.0003
21.5	4,491,069	95.29%	96.30%	93.72%	0.0001	0.0002
22.5	4,446,812	95.00%	95.99%	93.35%	0.0001	0.0003
23.5	4,365,949	93.27%	95.66%	92.97%	0.0006	0.0000
24.5	4,356,580	93.19%	95.32%	92.58%	0.0005	0.0000
25.5	4,304,344	93.03%	94.95%	92.19%	0.0004	0.0001
26.5	3,859,432	91.71%	94.57%	91.78%	0.0008	0.0000
27.5	3,848,472	91.53%	94.16%	91.37%	0.0007	0.0000
28.5	3,843,853	91.43%	93.74%	90.95%	0.0005	0.0000
29.5	3,424,236	89.97%	93.29%	90.51%	0.0011	0.0000
30.5	3,325,078	89.84%	92.81%	90.07%	0.0009	0.0000
31.5	3,312,221	89.63%	92.32%	89.62%	0.0007	0.0000
32.5	3,141,044	89.47%	91.80%	89.16%	0.0005	0.0000
33.5	2,964,144	89.05%	91.25%	88.69%	0.0005	0.0000
34.5	2,928,578	88.49%	90.67%	88.21%	0.0005	0.0000
35.5	2,897,678	87.67%	90.07%	87.71%	0.0006	0.0000
36.5	2,822,998	87.46%	89.44%	87.21%	0.0004	0.0000
37.5	2,517,514	87.35%	88.77%	86.69%	0.0002	0.0000
38.5	2,401,094	87.20%	88.08%	86.16%	0.0001	0.0001
39.5	2,244,174	86.88%	87.35%	85.62%	0.0000	0.0002
40.5	2,204,327	86.73%	86.59%	85.07%	0.0000	0.0003
41.5	2,038,290	86.16%	85.80%	84.51%	0.0000	0.0003
42.5	2,014,038	85.97%	84.97%	83.93%	0.0001	0.0004
43.5	1,732,279	85.43%	84.10%	83.34%	0.0002	0.0004
44.5	1,605,161	84.87%	83.20%	82.73%	0.0003	0.0005
45.5	1,584,149	84.65%	82.25%	82.12%	0.0006	0.0006
46.5	1,568,695	83.83%	81.26%	81.48%	0.0007	0.0006
47.5	1,550,467	83.49%	80.23%	80.84%	0.0011	0.0007
48.5	1,514,810	83.14%	79.16%	80.18%	0.0016	0.0009
49.5	1,466,963	82.52%	78.04%	79.50%	0.0020	0.0009
50.5	1,441,961	82.20%	76.88%	78.81%	0.0028	0.0012

Account 366 Curve Fitting

[1] Age (Years)	[2] Exposures (Dollars)	[3] Observed Life Table (OLT)	[4] PSO R2.5-65	[5] OIEC R1.5-78	[6] PSO SSD	[7] OIEC SSD
51.5	1,413,239	81.61%	75.66%	78.10%	0.0035	0.0012
52.5	1,347,449	81.24%	74.40%	77.38%	0.0047	0.0015
53.5	1,320,877	80.95%	73.09%	76.64%	0.0062	0.0019
54.5	1,297,672	80.22%	71.73%	75.89%	0.0072	0.0019
55.5	1,229,521	79.64%	70.32%	75.12%	0.0087	0.0020
56.5	1,132,656	79.03%	68.85%	74.33%	0.0104	0.0022
57.5	1,058,782	78.66%	67.34%	73.53%	0.0128	0.0026
58.5	1,009,492	78.27%	65.77%	72.71%	0.0156	0.0031
59.5	874,155	77.78%	64.15%	71.87%	0.0186	0.0035
60.5	744,561	77.49%	62.48%	71.02%	0.0225	0.0042
61.5	741,343	77.16%	60.76%	70.15%	0.0269	0.0049
62.5	464,304	76.80%	58.99%	69.26%	0.0317	0.0057
63.5	458,194	76.55%	57.18%	68.36%	0.0375	0.0067
64.5	455,949	76.18%	55.32%	67.44%	0.0435	0.0076
65.5	450,992	75.59%	53.43%	66.50%	0.0491	0.0083
66.5	301,588	72.91%	51.50%	65.55%	0.0458	0.0054
67.5	176,666	70.55%	49.54%	64.58%	0.0441	0.0036
68.5	170,985	68.28%	47.56%	63.59%	0.0429	0.0022
69.5	167,841	67.03%	45.55%	62.59%	0.0461	0.0020
70.5	158,293	64.34%	43.53%	61.57%	0.0433	0.0008
71.5	148,931	60.53%	41.51%	60.53%	0.0362	0.0000
72.5	147,462	59.94%	39.48%	59.48%	0.0419	0.0000
73.5	145,301	59.06%	37.46%	58.42%	0.0467	0.0000
74.5	142,817	58.05%	35.46%	57.34%	0.0511	0.0001
75.5	141,410	57.49%	33.47%	56.25%	0.0577	0.0002
76.5	139,176	56.94%	31.51%	55.14%	0.0646	0.0003
77.5	134,971	56.14%	29.59%	54.02%	0.0705	0.0004
78.5	121,978	54.80%	27.71%	52.89%	0.0734	0.0004
79.5		53.79%	25.88%	51.75%		
Sum of Squared Differences				[8]	0.9821	0.0883
Up to 1% of Beginning Exposures				[9]	0.1066	0.0355

[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.

Account 373 Curve Fitting

[1] Age (Years)	[2] Exposures (Dollars)	[3] Observed Life Table (OLT)	[4] PSO R0.5-36	[5] OIEC R0.5-44	[6] "Best" Fit O4-114	[7] PSO SSD	[8] OIEC SSD
0.0	75,884,929	100.00%	100.00%	100.00%	100.00%	0.0000	0.0000
0.5	73,098,137	99.51%	99.47%	99.57%	99.50%	0.0000	0.0000
1.5	70,877,490	98.92%	98.41%	98.70%	98.51%	0.0000	0.0000
2.5	68,403,256	98.10%	97.33%	97.82%	97.52%	0.0001	0.0000
3.5	65,451,782	96.97%	96.24%	96.93%	96.53%	0.0001	0.0000
4.5	62,906,426	95.87%	95.13%	96.04%	95.55%	0.0001	0.0000
5.5	60,909,773	95.07%	94.01%	95.13%	94.56%	0.0001	0.0000
6.5	57,335,156	91.83%	92.88%	94.22%	93.59%	0.0001	0.0006
7.5	54,967,394	91.00%	91.73%	93.29%	92.61%	0.0001	0.0005
8.5	48,470,341	90.05%	90.57%	92.36%	91.64%	0.0000	0.0005
9.5	45,768,625	88.97%	89.39%	91.41%	90.67%	0.0000	0.0006
10.5	43,874,397	87.92%	88.21%	90.46%	89.70%	0.0000	0.0006
11.5	42,321,090	86.94%	87.00%	89.50%	88.74%	0.0000	0.0007
12.5	39,932,379	85.90%	85.79%	88.53%	87.79%	0.0000	0.0007
13.5	37,951,570	84.86%	84.56%	87.55%	86.84%	0.0000	0.0007
14.5	36,881,095	83.54%	83.32%	86.56%	85.89%	0.0000	0.0009
15.5	34,715,674	82.39%	82.06%	85.57%	84.95%	0.0000	0.0010
16.5	32,931,487	81.17%	80.78%	84.56%	84.01%	0.0000	0.0011
17.5	30,211,056	80.08%	79.49%	83.54%	83.08%	0.0000	0.0012
18.5	27,633,346	78.93%	78.17%	82.52%	82.16%	0.0001	0.0013
19.5	25,549,675	77.83%	76.84%	81.48%	81.24%	0.0001	0.0013
20.5	21,399,225	76.54%	75.49%	80.43%	80.32%	0.0001	0.0015
21.5	20,704,273	75.10%	74.11%	79.37%	79.42%	0.0001	0.0018
22.5	18,715,251	73.08%	72.71%	78.29%	78.52%	0.0000	0.0027
23.5	16,517,635	70.94%	71.28%	77.21%	77.62%	0.0000	0.0039
24.5	15,075,211	69.47%	69.84%	76.10%	76.74%	0.0000	0.0044
25.5	13,759,604	68.14%	68.36%	74.99%	75.86%	0.0000	0.0047
26.5	12,513,068	66.58%	66.87%	73.85%	74.99%	0.0000	0.0053
27.5	11,211,259	65.08%	65.34%	72.71%	74.12%	0.0000	0.0058
28.5	9,984,065	64.04%	63.80%	71.54%	73.27%	0.0000	0.0056
29.5	9,381,141	63.16%	62.22%	70.37%	72.42%	0.0001	0.0052
30.5	8,727,997	62.17%	60.63%	69.17%	71.58%	0.0002	0.0049
31.5	7,978,829	60.78%	59.01%	67.96%	70.75%	0.0003	0.0052
32.5	7,357,329	59.56%	57.36%	66.73%	69.93%	0.0005	0.0051
33.5	6,777,943	57.90%	55.70%	65.48%	69.12%	0.0005	0.0058
34.5	6,256,117	55.82%	54.01%	64.22%	68.32%	0.0003	0.0071
35.5	5,571,768	54.65%	52.31%	62.94%	67.52%	0.0005	0.0069
36.5	5,090,242	54.15%	50.58%	61.65%	66.74%	0.0013	0.0056
37.5	4,641,186	53.25%	48.85%	60.33%	65.96%	0.0019	0.0050
38.5	4,247,700	52.64%	47.09%	59.01%	65.20%	0.0031	0.0041
39.5	3,828,141	52.31%	45.33%	57.66%	64.44%	0.0049	0.0029
40.5	3,642,322	52.13%	43.56%	56.31%	63.70%	0.0073	0.0017
41.5	3,291,043	51.87%	41.78%	54.93%	62.96%	0.0102	0.0009
42.5	2,991,607	51.48%	40.00%	53.55%	62.23%	0.0132	0.0004
43.5	2,663,532	51.35%	38.22%	52.15%	61.52%	0.0172	0.0001
44.5	2,450,832	51.24%	36.44%	50.74%	60.81%	0.0219	0.0000
45.5	2,254,781	51.15%	34.66%	49.32%	60.12%	0.0272	0.0003
46.5	2,103,099	51.04%	32.89%	47.89%	59.43%	0.0329	0.0010
47.5	1,896,841	50.93%	31.14%	46.46%	58.75%	0.0392	0.0020
48.5	1,626,931	50.84%	29.40%	45.01%	58.09%	0.0460	0.0034
49.5	1,401,921	50.74%	27.68%	43.56%	57.43%	0.0532	0.0052
50.5	1,199,554	50.63%	25.99%	42.10%	56.79%	0.0607	0.0073
51.5	1,090,564	50.56%	24.32%	40.65%	56.15%	0.0689	0.0098
52.5	1,023,515	50.49%	22.68%	39.19%	55.53%	0.0774	0.0128
53.5	966,917	50.41%	21.07%	37.73%	54.91%	0.0861	0.0161
54.5	877,201	50.34%	19.50%	36.27%	54.31%	0.0951	0.0198
55.5	787,434	50.27%	17.97%	34.82%	53.71%	0.1043	0.0239
56.5	632,480	50.18%	16.48%	33.38%	53.13%	0.1136	0.0282

Account 373 Curve Fitting

[1] Age (Years)	[2] Exposures (Dollars)	[3] Observed Life Table (OLT)	[4] PSO R0.5-36	[5] OIEC R0.5-44	[6] "Best" Fit O4-114	[7] PSO SSD	[8] OIEC SSD
57.5	605,648	50.04%	15.04%	31.94%	52.55%	0.1225	0.0328
58.5	542,421	49.88%	13.65%	30.51%	51.99%	0.1313	0.0375
59.5	455,976	49.75%	12.31%	29.09%	51.43%	0.1402	0.0427
60.5	406,123	49.64%	11.03%	27.68%	50.88%	0.1491	0.0482
61.5	382,476	49.59%	9.80%	26.29%	50.34%	0.1584	0.0543
62.5	338,891	49.54%	8.62%	24.92%	49.81%	0.1674	0.0606
63.5	259,420	49.47%	7.51%	23.57%	49.29%	0.1761	0.0671
64.5	231,950	49.31%	6.44%	22.23%	48.78%	0.1837	0.0733
65.5	197,667	49.23%	5.44%	20.92%	48.28%	0.1918	0.0801
66.5	156,653	49.07%	4.49%	19.64%	47.79%	0.1988	0.0866
67.5	140,773	48.82%	3.58%	18.38%	47.31%	0.2046	0.0926
68.5	127,059	48.65%	2.72%	17.15%	46.83%	0.2110	0.0992
69.5	120,955	48.44%	1.89%	15.95%	46.36%	0.2166	0.1055
70.5	119,680	48.18%	1.11%	14.79%	45.90%	0.2216	0.1115
71.5	114,988	47.93%	0.36%	13.65%	45.45%	0.2263	0.1175
72.5	114,381	47.68%	0.00%	12.55%	45.01%	0.2273	0.1234
73.5	113,153	47.17%	0.00%	11.49%	44.57%	0.2225	0.1273
74.5	110,008	46.51%	0.00%	10.46%	44.14%	0.2163	0.1300
75.5	108,599	46.28%	0.00%	9.47%	43.72%	0.2142	0.1355
76.5	107,202	46.00%	0.00%	8.52%	43.31%	0.2116	0.1405
77.5	106,231	45.63%	0.00%	7.60%	42.90%	0.2082	0.1446
78.5	102,770	45.09%	0.00%	6.73%	42.50%	0.2033	0.1472
79.5	101,295	44.44%	0.00%	5.89%	42.11%	0.1975	0.1486
80.5	99,829	43.80%	0.00%	5.09%	41.73%	0.1918	0.1499
81.5	64,400	43.19%	0.00%	4.32%	41.35%	0.1865	0.1511
82.5	121,982	42.61%	0.00%	3.58%	40.98%	0.1816	0.1523
Sum of Squared Differences				[9]		5.8492	2.8982
Up to 1% of Beginning Exposures				[10]		0.7755	0.2100

[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] "Best" mathematical curve (not selected).
[7] = ([4] - [3])^2. This is the squared difference between each point on the Company's curve and the observed survivor curve.
[8] = ([5] - [3])^2. This is the squared difference between each point on my curve and the observed survivor curve.
[9] = Sum of squared differences. The smallest SSD represents the best mathematical fit.

Account 390 Curve Fitting

[1]	[2]	[3]	[4]	[5]	[6]	[7]
Age (Years)	Exposures (Dollars)	Observed Life Table (OLT)	PSO S0.5-55	OIEC R0.5-69	PSO SSD	OIEC SSD
0.0	70,914,081	100.00%	100.00%	100.00%	0.0000	0.0000
0.5	67,972,231	99.92%	99.99%	99.73%	0.0000	0.0000
1.5	66,122,271	99.61%	99.94%	99.17%	0.0000	0.0000
2.5	53,364,253	99.56%	99.84%	98.62%	0.0000	0.0001
3.5	50,865,617	99.49%	99.71%	98.06%	0.0000	0.0002
4.5	47,119,692	99.37%	99.54%	97.50%	0.0000	0.0004
5.5	45,384,765	99.33%	99.34%	96.93%	0.0000	0.0006
6.5	44,656,935	99.24%	99.10%	96.36%	0.0000	0.0008
7.5	43,542,569	98.16%	98.82%	95.78%	0.0000	0.0006
8.5	41,333,224	98.01%	98.51%	95.20%	0.0000	0.0008
9.5	38,331,154	97.84%	98.16%	94.62%	0.0000	0.0010
10.5	36,822,782	97.80%	97.78%	94.04%	0.0000	0.0014
11.5	36,583,959	97.72%	97.36%	93.45%	0.0000	0.0018
12.5	35,484,032	97.14%	96.90%	92.85%	0.0000	0.0018
13.5	35,017,698	96.81%	96.40%	92.25%	0.0000	0.0021
14.5	34,684,876	96.68%	95.87%	91.65%	0.0001	0.0025
15.5	34,135,755	96.51%	95.30%	91.05%	0.0001	0.0030
16.5	33,216,282	95.53%	94.70%	90.44%	0.0001	0.0026
17.5	29,867,978	95.22%	94.06%	89.83%	0.0001	0.0029
18.5	27,779,187	94.15%	93.38%	89.21%	0.0001	0.0024
19.5	27,515,997	93.39%	92.67%	88.59%	0.0001	0.0023
20.5	26,821,296	92.49%	91.92%	87.97%	0.0000	0.0020
21.5	26,754,032	92.25%	91.14%	87.35%	0.0001	0.0024
22.5	25,096,400	88.59%	90.32%	86.72%	0.0003	0.0004
23.5	23,308,005	87.80%	89.47%	86.08%	0.0003	0.0003
24.5	22,604,857	87.18%	88.58%	85.44%	0.0002	0.0003
25.5	19,158,675	86.89%	87.66%	84.80%	0.0001	0.0004
26.5	16,481,839	86.19%	86.71%	84.16%	0.0000	0.0004
27.5	14,545,269	83.14%	85.73%	83.51%	0.0007	0.0000
28.5	12,955,223	81.94%	84.72%	82.85%	0.0008	0.0001
29.5	10,854,315	79.86%	83.68%	82.20%	0.0015	0.0005
30.5	9,331,323	77.84%	82.60%	81.53%	0.0023	0.0014
31.5	8,301,089	77.49%	81.50%	80.87%	0.0016	0.0011
32.5	7,586,990	77.34%	80.38%	80.19%	0.0009	0.0008
33.5	6,862,756	76.88%	79.22%	79.52%	0.0005	0.0007
34.5	5,650,432	76.86%	78.04%	78.83%	0.0001	0.0004
35.5	5,428,621	76.59%	76.84%	78.14%	0.0000	0.0002
36.5	4,701,750	76.44%	75.61%	77.45%	0.0001	0.0001
37.5	4,636,456	75.75%	74.35%	76.75%	0.0002	0.0001
38.5	4,576,646	75.63%	73.08%	76.05%	0.0006	0.0000
39.5	4,425,143	73.42%	71.79%	75.34%	0.0003	0.0004
40.5	4,415,455	73.41%	70.47%	74.62%	0.0009	0.0001
41.5	3,602,871	70.46%	69.14%	73.90%	0.0002	0.0012
42.5	3,329,908	70.35%	67.80%	73.17%	0.0007	0.0008
43.5	3,274,715	70.30%	66.43%	72.43%	0.0015	0.0005
44.5	3,222,453	70.11%	65.05%	71.69%	0.0026	0.0002
45.5	3,084,914	70.08%	63.66%	70.94%	0.0041	0.0001
46.5	2,316,490	65.76%	62.25%	70.18%	0.0012	0.0020
47.5	1,848,869	65.74%	60.84%	69.42%	0.0024	0.0014
48.5	1,176,018	62.80%	59.41%	68.65%	0.0011	0.0034
49.5	1,162,651	62.80%	57.98%	67.88%	0.0023	0.0026
50.5	1,060,621	62.80%	56.54%	67.10%	0.0039	0.0018
51.5	995,903	62.76%	55.09%	66.31%	0.0059	0.0013
52.5	930,230	62.71%	53.64%	65.51%	0.0082	0.0008

Account 390 Curve Fitting

[1] Age (Years)	[2] Exposures (Dollars)	[3] Observed Life Table (OLT)	[4] PSO S0.5-55	[5] OIEC R0.5-69	[6] PSO SSD	[7] OIEC SSD
53.5	883,429	62.71%	52.19%	64.71%	0.0111	0.0004
54.5	704,711	62.71%	50.73%	63.90%	0.0144	0.0001
55.5	698,925	62.71%	49.27%	63.08%	0.0181	0.0000
56.5	692,748	62.71%	47.81%	62.26%	0.0222	0.0000
57.5	671,172	62.71%	46.36%	61.43%	0.0267	0.0002
58.5	609,739	58.51%	44.91%	60.59%	0.0185	0.0004
59.5	609,420	58.51%	43.46%	59.75%	0.0226	0.0002
60.5	603,651	58.51%	42.02%	58.90%	0.0272	0.0000
61.5	310,104	58.51%	40.59%	58.04%	0.0321	0.0000
62.5	301,200	58.51%	39.16%	57.18%	0.0374	0.0002
63.5	252,451	54.51%	37.75%	56.32%	0.0281	0.0003
64.5	233,233	54.49%	36.34%	55.44%	0.0329	0.0001
65.5	196,617	54.49%	34.95%	54.56%	0.0382	0.0000
66.5	196,617	54.49%	33.57%	53.68%	0.0438	0.0001
67.5	183,404	54.49%	32.20%	52.79%	0.0497	0.0003
68.5	159,723	51.12%	30.86%	51.90%	0.0411	0.0001
69.5	151,993	51.12%	29.53%	51.00%	0.0466	0.0000
70.5	145,730	50.83%	28.21%	50.09%	0.0512	0.0001
71.5	145,405	50.83%	26.92%	49.19%	0.0572	0.0003
72.5	145,405	50.83%	25.65%	48.28%	0.0634	0.0007
73.5	145,405	50.83%	24.39%	47.36%	0.0699	0.0012
74.5	145,340	50.83%	23.16%	46.44%	0.0765	0.0019
75.5	145,330	50.83%	21.96%	45.52%	0.0834	0.0028
76.5	134,106	50.83%	20.78%	44.60%	0.0903	0.0039
77.5	133,759	50.70%	19.62%	43.68%	0.0966	0.0049
78.5	132,752	50.32%	18.50%	42.75%	0.1013	0.0057
79.5	132,570	50.32%	17.40%	41.82%	0.1084	0.0072
80.5	131,560	49.94%	16.32%	40.89%	0.1130	0.0082
81.5	103,173	49.94%	15.28%	39.96%	0.1201	0.0100
82.5		49.10%	14.27%	39.03%		
Sum of Squared Differences				[8]	1.5882	0.1048
Up to 1% of Beginning Exposures				[9]	0.0573	0.0560

[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.

PSO

Electric Division

350.10 Land and Land Rights

Observed Life Table

Retirement Expr. 1966 TO 2016
Placement Years 1934 TO 2016

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	$35,979,412.48	$0.00	0.00000	100.00
0.5 - 1.5	$36,128,842.84	$0.00	0.00000	100.00
1.5 - 2.5	$36,343,321.84	$0.00	0.00000	100.00
2.5 - 3.5	$35,959,694.33	$15,000.00	0.00042	100.00
3.5 - 4.5	$35,448,052.68	$0.00	0.00000	99.96
4.5 - 5.5	$34,917,580.09	$0.00	0.00000	99.96
5.5 - 6.5	$34,598,276.49	$0.00	0.00000	99.96
6.5 - 7.5	$34,825,553.91	$0.00	0.00000	99.96
7.5 - 8.5	$35,050,144.84	$0.00	0.00000	99.96
8.5 - 9.5	$33,169,196.98	$0.00	0.00000	99.96
9.5 - 10.5	$29,305,803.99	$15,393.00	0.00053	99.96
10.5 - 11.5	$27,707,915.78	$3,929.00	0.00014	99.91
11.5 - 12.5	$27,849,768.84	$837.00	0.00003	99.89
12.5 - 13.5	$27,766,430.46	$0.00	0.00000	99.89
13.5 - 14.5	$27,584,143.66	$0.00	0.00000	99.89
14.5 - 15.5	$26,640,352.72	$227.00	0.00001	99.89
15.5 - 16.5	$26,091,144.25	$0.00	0.00000	99.89
16.5 - 17.5	$26,034,149.31	$0.00	0.00000	99.89
17.5 - 18.5	$24,786,618.41	$0.00	0.00000	99.89
18.5 - 19.5	$24,471,562.71	$3,225.00	0.00013	99.89
19.5 - 20.5	$23,314,831.53	$0.00	0.00000	99.87
20.5 - 21.5	$20,871,377.61	$0.00	0.00000	99.87
21.5 - 22.5	$20,890,463.13	$0.00	0.00000	99.87
22.5 - 23.5	$20,580,924.91	$0.00	0.00000	99.87
23.5 - 24.5	$18,192,487.15	$0.00	0.00000	99.87
24.5 - 25.5	$15,439,649.73	$0.00	0.00000	99.87
25.5 - 26.5	$15,438,866.51	$0.00	0.00000	99.87
26.5 - 27.5	$15,379,337.32	$0.00	0.00000	99.87
27.5 - 28.5	$14,832,625.64	$0.00	0.00000	99.87
28.5 - 29.5	$14,784,830.28	$0.00	0.00000	99.87
29.5 - 30.5	$14,784,513.37	$0.00	0.00000	99.87
30.5 - 31.5	$14,587,991.47	$13,955.00	0.00096	99.87
31.5 - 32.5	$13,509,987.46	$0.00	0.00000	99.78
32.5 - 33.5	$13,442,025.61	$0.00	0.00000	99.78
33.5 - 34.5	$11,350,434.71	$3,685.00	0.00032	99.78
34.5 - 35.5	$8,892,458.53	$0.00	0.00000	99.75
35.5 - 36.5	$8,828,574.20	$0.00	0.00000	99.75

PSO

Electric Division

350.10 Land and Land Rights

Observed Life Table

Retirement Expr. 1966 TO 2016
Placement Years 1934 TO 2016

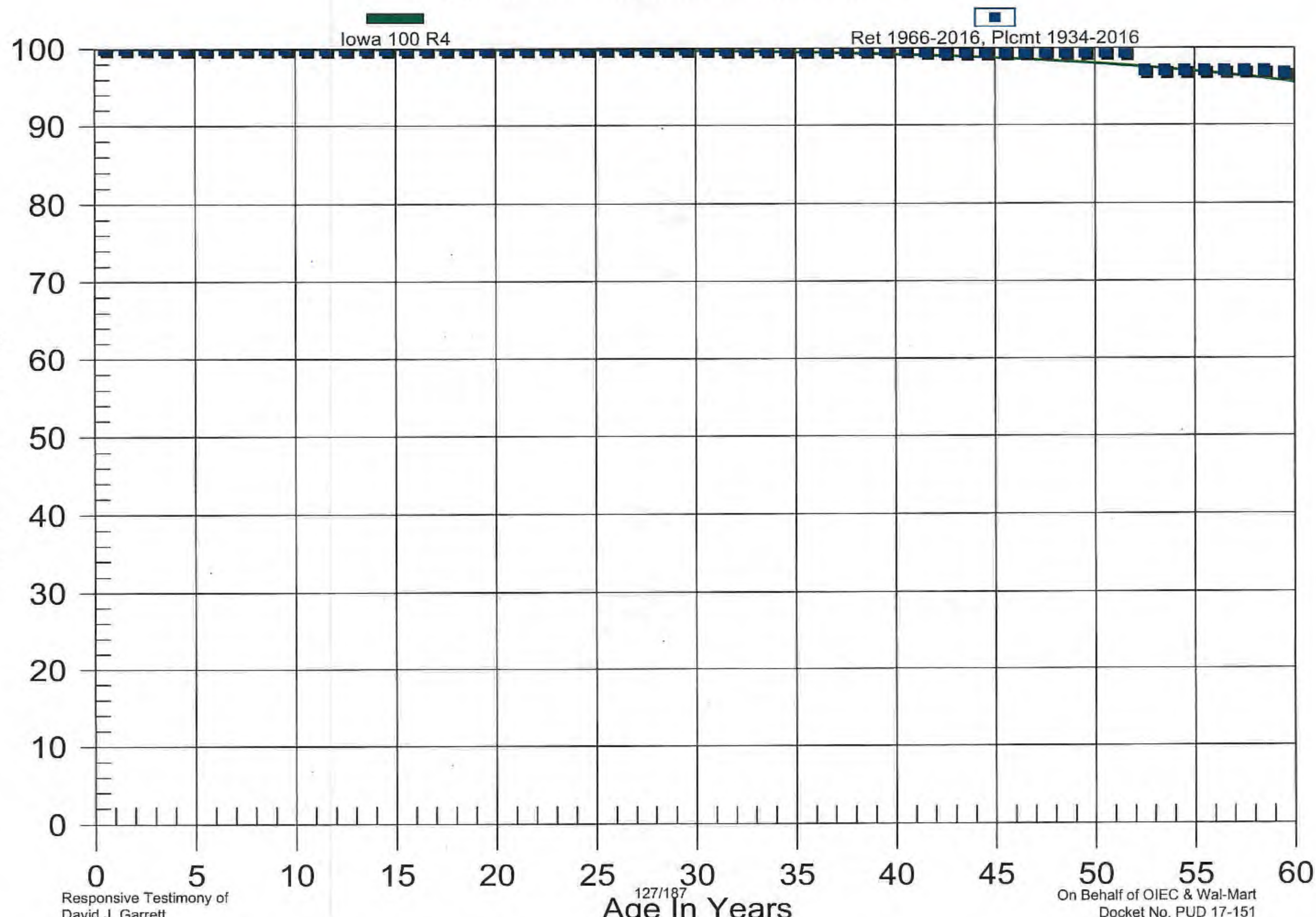
Age Interval	*$ Surviving At Beginning of Age Interval*	*$ Retired During The Age Interval*	*Retirement Ratio*	*% Surviving At Beginning of Age Interval*
36.5 - 37.5	$8,745,492.52	$0.00	0.00000	99.75
37.5 - 38.5	$8,293,928.24	$0.00	0.00000	99.75
38.5 - 39.5	$8,060,932.34	$0.00	0.00000	99.75
39.5 - 40.5	$7,381,836.63	$0.00	0.00000	99.75
40.5 - 41.5	$6,170,653.72	$12,626.00	0.00205	99.75
41.5 - 42.5	$5,866,339.72	$5,099.00	0.00087	99.54
42.5 - 43.5	$5,645,642.72	$0.00	0.00000	99.46
43.5 - 44.5	$5,037,071.72	$0.00	0.00000	99.46
44.5 - 45.5	$4,716,773.72	$0.00	0.00000	99.46
45.5 - 46.5	$4,006,236.72	$0.00	0.00000	99.46
46.5 - 47.5	$3,561,239.72	$0.00	0.00000	99.46
47.5 - 48.5	$3,374,631.72	$0.00	0.00000	99.46
48.5 - 49.5	$3,199,030.72	$0.00	0.00000	99.46
49.5 - 50.5	$3,048,660.72	$0.00	0.00000	99.46
50.5 - 51.5	$2,586,349.72	$272.00	0.00011	99.46
51.5 - 52.5	$2,314,377.72	$54,216.00	0.02343	99.45
52.5 - 53.5	$2,045,682.72	$32.00	0.00002	97.12
53.5 - 54.5	$1,982,759.72	$0.00	0.00000	97.11
54.5 - 55.5	$1,854,553.72	$0.00	0.00000	97.11
55.5 - 56.5	$1,800,015.72	$0.00	0.00000	97.11
56.5 - 57.5	$1,582,240.72	$0.00	0.00000	97.11
57.5 - 58.5	$1,332,866.46	$0.00	0.00000	97.11
58.5 - 59.5	$986,650.04	$3,154.00	0.00320	97.11
59.5 - 60.5	$762,769.68	$0.00	0.00000	96.80
60.5 - 61.5	$726,071.53	$0.00	0.00000	96.80
61.5 - 62.5	$709,607.87	$0.00	0.00000	96.80
62.5 - 63.5	$533,542.62	$0.00	0.00000	96.80
63.5 - 64.5	$484,717.95	$0.00	0.00000	96.80
64.5 - 65.5	$462,082.76	$0.00	0.00000	96.80
65.5 - 66.5	$422,226.80	$0.00	0.00000	96.80
66.5 - 67.5	$396,952.90	$0.00	0.00000	96.80
67.5 - 68.5	$378,502.76	$0.00	0.00000	96.80
68.5 - 69.5	$378,502.76	$0.00	0.00000	96.80
69.5 - 70.5	$376,214.46	$0.00	0.00000	96.80
70.5 - 71.5	$364,624.47	$0.00	0.00000	96.80
71.5 - 72.5	$363,079.34	$0.00	0.00000	96.80
72.5 - 73.5	$343,993.82	$0.00	0.00000	96.80

PSO
Electric Division
350.10 Land and Land Rights
Observed Life Table
Retirement Expr. 1966 TO 2016
Placement Years 1934 TO 2016

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	$331,535.91	$0.00	0.00000	96.80
74.5 - 75.5	$324,893.49	$0.00	0.00000	96.80
75.5 - 76.5	$218,488.74	$0.00	0.00000	96.80
76.5 - 77.5	$218,488.74	$0.00	0.00000	96.80
77.5 - 78.5	$202,112.89	$0.00	0.00000	96.80
78.5 - 79.5	$202,097.89	$0.00	0.00000	96.80
79.5 - 80.5	$194,555.98	$0.00	0.00000	96.80
80.5 - 81.5	$194,455.98	$0.00	0.00000	96.80
81.5 - 82.5	$171,929.55	$0.00	0.00000	96.80

PSO

Electric Division
350.10 Land and Land Rights
Original And Smooth Survivor Curves



PSO

Electric Division

356.00 Overhead Conductors and Devices

Observed Life Table

Retirement Expr. 1966 TO 2016
Placement Years 1934 TO 2016

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	$171,065,845.79	$15,444.00	0.00009	100.00
0.5 - 1.5	$168,423,311.53	$101,247.88	0.00060	99.99
1.5 - 2.5	$164,958,974.72	$66,718.87	0.00040	99.93
2.5 - 3.5	$162,840,256.64	$150,350.53	0.00092	99.89
3.5 - 4.5	$158,643,014.10	$181,137.62	0.00114	99.80
4.5 - 5.5	$155,121,593.64	$290,998.69	0.00188	99.68
5.5 - 6.5	$150,865,086.12	$274,144.53	0.00182	99.50
6.5 - 7.5	$138,615,273.23	$98,287.60	0.00071	99.32
7.5 - 8.5	$134,581,586.01	$55,872.87	0.00042	99.25
8.5 - 9.5	$125,419,894.12	$165,422.97	0.00132	99.20
9.5 - 10.5	$114,683,332.69	$149,103.43	0.00130	99.07
10.5 - 11.5	$111,848,675.25	$182,045.32	0.00163	98.95
11.5 - 12.5	$112,466,644.58	$61,070.16	0.00054	98.78
12.5 - 13.5	$109,482,649.76	$101,503.43	0.00093	98.73
13.5 - 14.5	$106,884,670.76	$460,826.07	0.00431	98.64
14.5 - 15.5	$98,001,872.23	$553,970.25	0.00565	98.21
15.5 - 16.5	$93,658,842.14	$90,015.20	0.00096	97.66
16.5 - 17.5	$93,579,276.80	$113,861.62	0.00122	97.56
17.5 - 18.5	$92,591,508.86	$597,758.94	0.00646	97.45
18.5 - 19.5	$91,238,524.33	$772,842.50	0.00847	96.82
19.5 - 20.5	$88,847,182.19	$143,074.71	0.00161	96.00
20.5 - 21.5	$87,167,457.46	$124,688.59	0.00143	95.84
21.5 - 22.5	$87,077,646.01	$66,449.27	0.00076	95.71
22.5 - 23.5	$82,715,106.61	$501,659.10	0.00606	95.63
23.5 - 24.5	$78,587,560.96	$142,637.46	0.00182	95.05
24.5 - 25.5	$78,331,598.11	$323,268.45	0.00413	94.88
25.5 - 26.5	$70,607,211.30	$297,369.25	0.00421	94.49
26.5 - 27.5	$67,936,362.87	$52,236.01	0.00077	94.09
27.5 - 28.5	$64,810,602.33	$110,079.77	0.00170	94.02
28.5 - 29.5	$64,057,605.75	$437,168.24	0.00682	93.86
29.5 - 30.5	$62,921,559.57	$165,923.93	0.00264	93.22
30.5 - 31.5	$60,929,198.05	$85,763.31	0.00141	92.97
31.5 - 32.5	$60,167,794.72	$137,862.96	0.00229	92.84
32.5 - 33.5	$44,670,266.62	$249,927.04	0.00559	92.63
33.5 - 34.5	$43,475,059.80	$968,414.41	0.02228	92.11
34.5 - 35.5	$42,169,968.38	$150,614.10	0.00357	90.06
35.5 - 36.5	$41,332,989.25	$112,907.48	0.00273	89.74

PSO

Electric Division

356.00 Overhead Conductors and Devices

Observed Life Table

Retirement Expr. 1966 TO 2016
Placement Years 1934 TO 2016

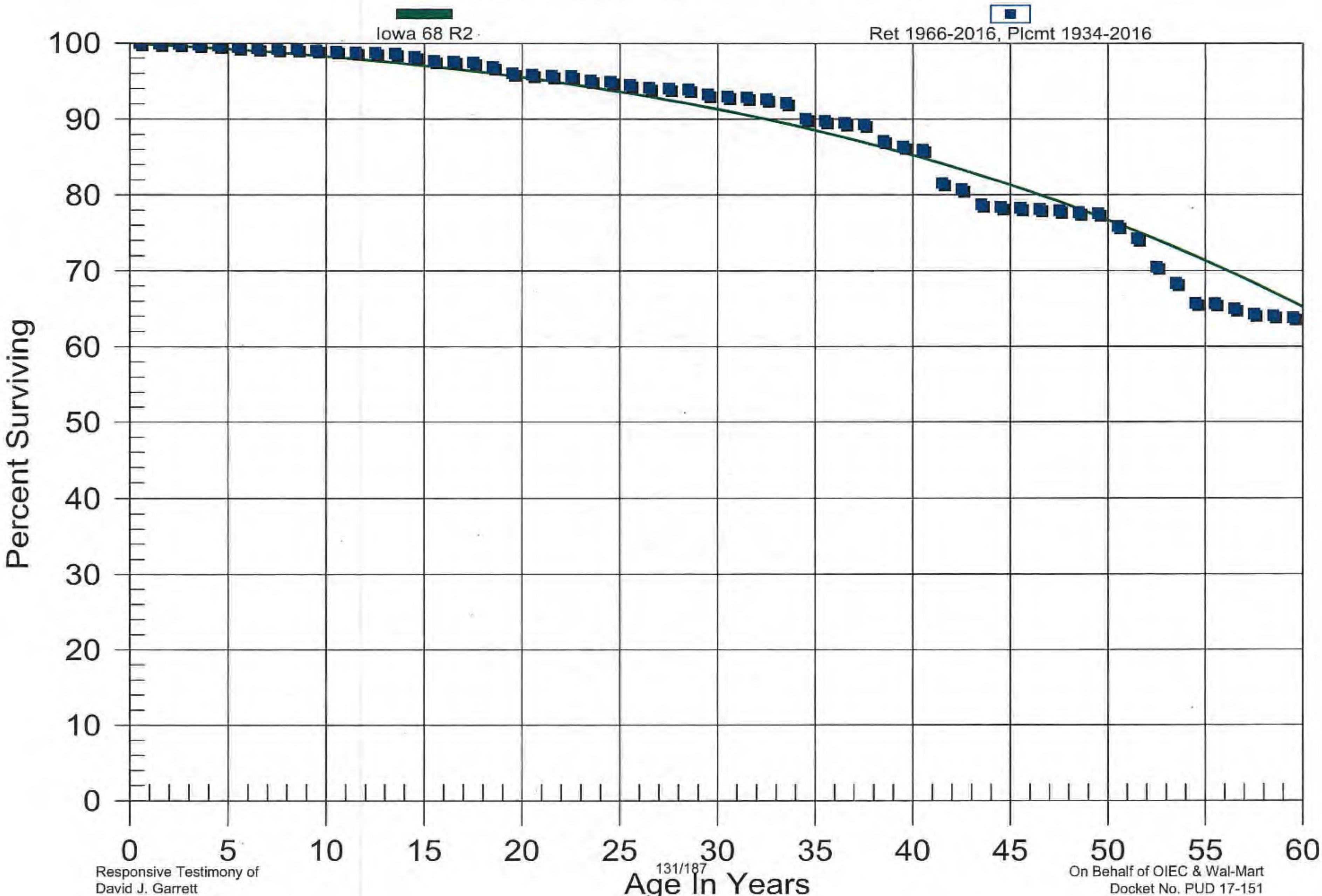
Age Interval	$ Surviving At Beginning of Age Interval	$ Retired During The Age Interval	Retirement Ratio	% Surviving At Beginning of Age Interval
36.5 - 37.5	$37,417,456.63	$84,636.42	0.00226	89.49
37.5 - 38.5	$33,228,667.58	$796,587.36	0.02397	89.29
38.5 - 39.5	$29,517,219.39	$256,524.08	0.00869	87.15
39.5 - 40.5	$27,104,485.20	$137,661.90	0.00508	86.39
40.5 - 41.5	$26,386,392.27	$1,362,009.46	0.05162	85.95
41.5 - 42.5	$23,139,182.84	$229,974.85	0.00994	81.52
42.5 - 43.5	$19,964,506.22	$487,539.91	0.02442	80.71
43.5 - 44.5	$19,064,663.89	$86,126.93	0.00452	78.73
44.5 - 45.5	$18,292,876.61	$20,180.58	0.00110	78.38
45.5 - 46.5	$14,994,167.56	$30,841.14	0.00206	78.29
46.5 - 47.5	$13,836,998.37	$25,286.07	0.00183	78.13
47.5 - 48.5	$13,203,618.26	$49,765.78	0.00377	77.99
48.5 - 49.5	$12,812,284.09	$21,846.39	0.00171	77.69
49.5 - 50.5	$10,244,514.79	$223,594.84	0.02183	77.56
50.5 - 51.5	$9,747,120.72	$204,900.87	0.02102	75.87
51.5 - 52.5	$8,406,256.20	$423,672.38	0.05040	74.27
52.5 - 53.5	$6,925,812.41	$212,792.30	0.03072	70.53
53.5 - 54.5	$6,482,369.77	$248,316.00	0.03831	68.36
54.5 - 55.5	$5,927,867.16	$6,416.48	0.00108	65.75
55.5 - 56.5	$5,449,599.85	$55,016.53	0.01010	65.67
56.5 - 57.5	$4,661,360.15	$51,272.96	0.01100	65.01
57.5 - 58.5	$4,453,044.96	$12,391.71	0.00278	64.30
58.5 - 59.5	$4,188,197.09	$19,500.26	0.00466	64.12
59.5 - 60.5	$3,606,616.24	$56,760.26	0.01574	63.82
60.5 - 61.5	$3,480,467.12	$2,918.91	0.00084	62.81
61.5 - 62.5	$3,417,661.71	$46,397.79	0.01358	62.76
62.5 - 63.5	$2,268,213.92	$26,632.07	0.01174	61.91
63.5 - 64.5	$1,994,060.84	$7,406.77	0.00371	61.18
64.5 - 65.5	$1,905,038.00	$1,384.21	0.00073	60.96
65.5 - 66.5	$1,855,589.13	$592.45	0.00032	60.91
66.5 - 67.5	$1,790,342.58	$330.00	0.00018	60.89
67.5 - 68.5	$1,601,134.04	$18,998.28	0.01187	60.88
68.5 - 69.5	$1,549,109.43	$7,314.47	0.00472	60.16
69.5 - 70.5	$1,541,794.96	$17,975.88	0.01166	59.87
70.5 - 71.5	$1,438,000.85	$3,115.83	0.00217	59.18
71.5 - 72.5	$1,435,248.82	$6,580.05	0.00458	59.05
72.5 - 73.5	$1,426,864.65	$14,808.34	0.01038	58.78

PSO
Electric Division
356.00 Overhead Conductors and Devices
Observed Life Table
Retirement Expr. 1966 TO 2016
Placement Years 1934 TO 2016

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	$1,403,156.20	$3.00	0.00000	58.17
74.5 - 75.5	$1,370,856.45	$240,901.06	0.17573	58.17
75.5 - 76.5	$721,587.12	$6,149.11	0.00852	47.95
76.5 - 77.5	$703,552.51	$292.04	0.00042	47.54
77.5 - 78.5	$690,987.70	$0.00	0.00000	47.52
78.5 - 79.5	$690,987.70	$90,873.58	0.13151	47.52
79.5 - 80.5	$595,620.24	$7,212.79	0.01211	41.27
80.5 - 81.5	$588,407.45	$1.00	0.00000	40.77
81.5 - 82.5	$474,715.46	$0.00	0.00000	40.77

PSO

Electric Division
356.00 Overhead Conductors and Devices
Original And Smooth Survivor Curves



PSO
Electric Division
360.10 Land and Land Rights
Observed Life Table
Retirement Expr. 1966 TO 2016
Placement Years 1953 TO 2015

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	$2,825,798.57	$0.00	0.00000	100.00
0.5 - 1.5	$2,825,798.57	$0.00	0.00000	100.00
1.5 - 2.5	$2,547,150.09	$0.00	0.00000	100.00
2.5 - 3.5	$2,523,941.26	$0.00	0.00000	100.00
3.5 - 4.5	$2,482,411.17	$0.00	0.00000	100.00
4.5 - 5.5	$2,443,520.02	$0.00	0.00000	100.00
5.5 - 6.5	$2,443,520.02	$0.00	0.00000	100.00
6.5 - 7.5	$2,411,414.99	$600.00	0.00025	100.00
7.5 - 8.5	$2,120,596.31	$0.00	0.00000	99.98
8.5 - 9.5	$1,946,227.22	$0.00	0.00000	99.98
9.5 - 10.5	$1,816,610.03	$0.00	0.00000	99.98
10.5 - 11.5	$1,816,610.03	$0.00	0.00000	99.98
11.5 - 12.5	$1,691,590.82	$0.00	0.00000	99.98
12.5 - 13.5	$1,622,509.95	$0.00	0.00000	99.98
13.5 - 14.5	$1,622,509.95	$0.00	0.00000	99.98
14.5 - 15.5	$1,604,695.13	$0.00	0.00000	99.98
15.5 - 16.5	$1,026,573.55	$0.00	0.00000	99.98
16.5 - 17.5	$725,008.78	$0.00	0.00000	99.98
17.5 - 18.5	$72,297.44	$0.00	0.00000	99.98
18.5 - 19.5	$60,322.48	$0.00	0.00000	99.98
19.5 - 20.5	$4,948.34	$0.00	0.00000	99.98
20.5 - 21.5	$880.50	$0.00	0.00000	99.98
21.5 - 22.5	$880.50	$0.00	0.00000	99.98
22.5 - 23.5	$880.50	$0.00	0.00000	99.98
23.5 - 24.5	$880.50	$0.00	0.00000	99.98
24.5 - 25.5	$880.50	$0.00	0.00000	99.98
25.5 - 26.5	$880.50	$0.00	0.00000	99.98
26.5 - 27.5	$880.50	$0.00	0.00000	99.98
27.5 - 28.5	$880.50	$0.00	0.00000	99.98
28.5 - 29.5	$880.50	$0.00	0.00000	99.98
29.5 - 30.5	$880.50	$0.00	0.00000	99.98
30.5 - 31.5	$880.50	$0.00	0.00000	99.98
31.5 - 32.5	$880.50	$0.00	0.00000	99.98
32.5 - 33.5	$880.50	$0.00	0.00000	99.98
33.5 - 34.5	$880.50	$0.00	0.00000	99.98
34.5 - 35.5	$880.50	$0.00	0.00000	99.98
35.5 - 36.5	$880.50	$0.00	0.00000	99.98

PSO

Electric Division

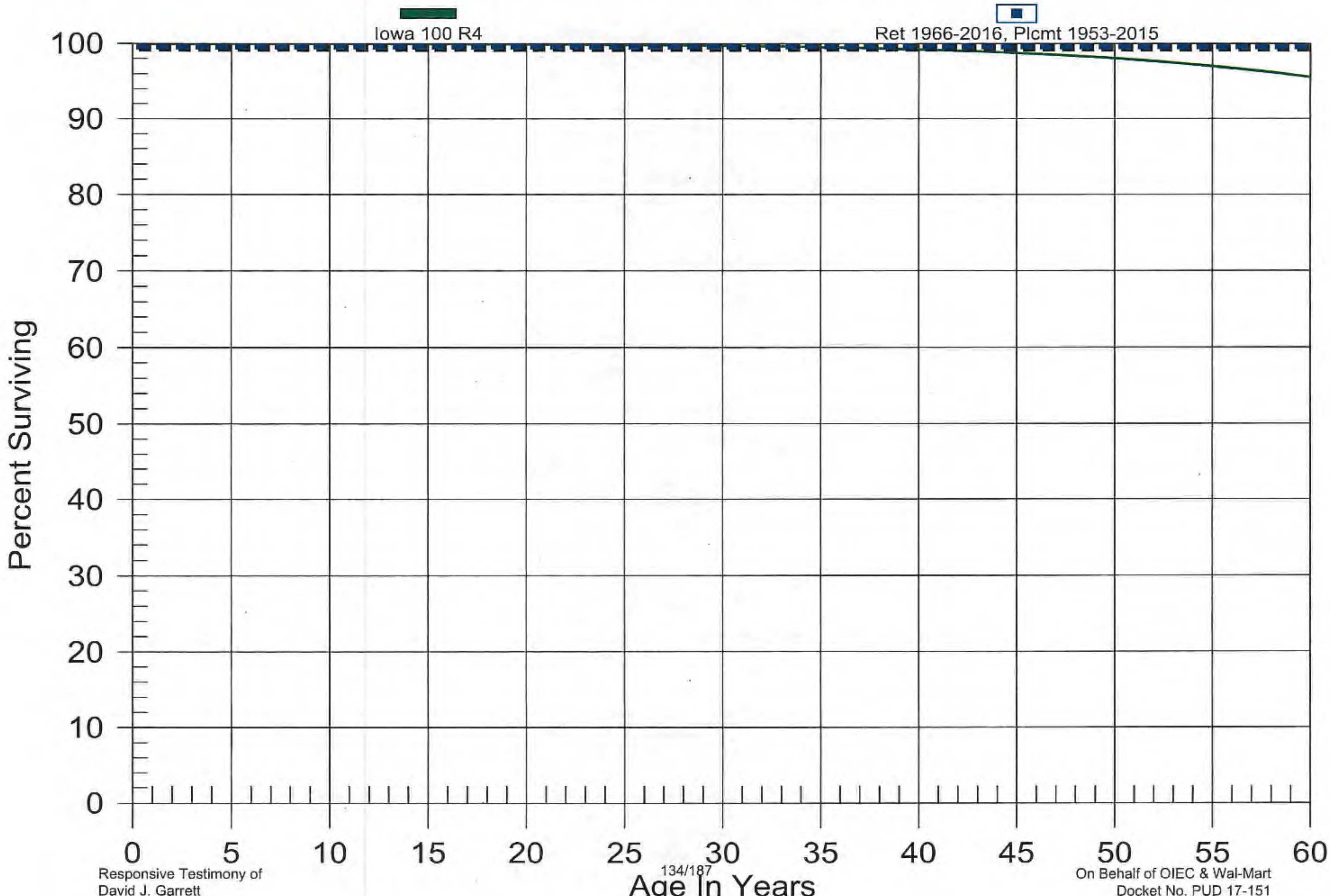
360.10 Land and Land Rights

Observed Life Table

Retirement Expr. 1966 TO 2016
Placement Years 1953 TO 2015

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	$880.50	$0.00	0.00000	99.98
37.5 - 38.5	$880.50	$0.00	0.00000	99.98
38.5 - 39.5	$880.50	$0.00	0.00000	99.98
39.5 - 40.5	$880.50	$0.00	0.00000	99.98
40.5 - 41.5	$880.50	$0.00	0.00000	99.98
41.5 - 42.5	$880.50	$0.00	0.00000	99.98
42.5 - 43.5	$880.50	$0.00	0.00000	99.98
43.5 - 44.5	$880.50	$0.00	0.00000	99.98
44.5 - 45.5	$880.50	$0.00	0.00000	99.98
45.5 - 46.5	$880.50	$0.00	0.00000	99.98
46.5 - 47.5	$880.50	$0.00	0.00000	99.98
47.5 - 48.5	$880.50	$0.00	0.00000	99.98
48.5 - 49.5	$880.50	$0.00	0.00000	99.98
49.5 - 50.5	$880.50	$0.00	0.00000	99.98
50.5 - 51.5	$880.50	$0.00	0.00000	99.98
51.5 - 52.5	$880.50	$0.00	0.00000	99.98
52.5 - 53.5	$880.50	$0.00	0.00000	99.98
53.5 - 54.5	$880.50	$0.00	0.00000	99.98
54.5 - 55.5	$310.50	$0.00	0.00000	99.98
55.5 - 56.5	$310.50	$0.00	0.00000	99.98
56.5 - 57.5	$310.50	$0.00	0.00000	99.98
57.5 - 58.5	$310.50	$0.00	0.00000	99.98
58.5 - 59.5	$310.50	$0.00	0.00000	99.98
59.5 - 60.5	$310.50	$0.00	0.00000	99.98
60.5 - 61.5	$310.50	$0.00	0.00000	99.98
61.5 - 62.5	$310.50	$0.00	0.00000	99.98
62.5 - 63.5	$310.50	$0.00	0.00000	99.98

PSO
Electric Division
360.10 Land and Land Rights
Original And Smooth Survivor Curves



Responsive Testimony of
David J. Garrett
Part II - Depreciation

On Behalf of OIEC & Wal-Mart
Docket No. PUD 17-151
September 21, 2017

PSO

Electric Division

362.00 Station Equipment

Observed Life Table

Retirement Expr. 1966 TO 2016
Placement Years 1934 TO 2016

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	$326,766,618.97	$158,197.50	0.00048	100.00
0.5 - 1.5	$307,592,084.58	$271,181.18	0.00088	99.95
1.5 - 2.5	$284,510,208.32	$1,095,754.46	0.00385	99.86
2.5 - 3.5	$254,338,896.37	$751,872.32	0.00296	99.48
3.5 - 4.5	$219,236,147.00	$684,221.29	0.00312	99.18
4.5 - 5.5	$214,243,819.28	$700,483.94	0.00327	98.88
5.5 - 6.5	$203,085,166.89	$407,313.39	0.00201	98.55
6.5 - 7.5	$194,495,968.28	$959,602.76	0.00493	98.35
7.5 - 8.5	$181,133,935.13	$349,695.81	0.00193	97.87
8.5 - 9.5	$171,992,691.01	$564,508.66	0.00328	97.68
9.5 - 10.5	$158,506,678.48	$635,020.75	0.00401	97.36
10.5 - 11.5	$152,209,799.83	$460,593.84	0.00303	96.97
11.5 - 12.5	$149,321,062.73	$331,245.09	0.00222	96.68
12.5 - 13.5	$146,407,571.11	$1,352,305.03	0.00924	96.46
13.5 - 14.5	$139,444,689.58	$579,297.33	0.00415	95.57
14.5 - 15.5	$134,828,579.18	$1,009,503.12	0.00749	95.17
15.5 - 16.5	$129,735,573.49	$913,806.28	0.00704	94.46
16.5 - 17.5	$127,788,037.69	$446,337.43	0.00349	93.80
17.5 - 18.5	$121,033,710.16	$902,633.86	0.00746	93.47
18.5 - 19.5	$114,130,323.84	$541,719.72	0.00475	92.77
19.5 - 20.5	$108,544,124.50	$799,607.11	0.00737	92.33
20.5 - 21.5	$103,802,560.94	$550,700.01	0.00531	91.65
21.5 - 22.5	$103,336,038.27	$433,027.23	0.00419	91.16
22.5 - 23.5	$99,045,825.33	$1,023,082.55	0.01033	90.78
23.5 - 24.5	$94,558,393.19	$534,439.72	0.00565	89.84
24.5 - 25.5	$90,610,066.30	$808,938.12	0.00893	89.34
25.5 - 26.5	$82,914,990.78	$647,543.10	0.00781	88.54
26.5 - 27.5	$76,644,129.24	$555,224.49	0.00724	87.85
27.5 - 28.5	$72,019,010.77	$280,707.71	0.00390	87.21
28.5 - 29.5	$69,970,070.18	$522,492.61	0.00747	86.87
29.5 - 30.5	$68,642,311.23	$1,046,452.53	0.01525	86.22
30.5 - 31.5	$66,506,935.48	$481,411.33	0.00724	84.91
31.5 - 32.5	$65,013,229.68	$1,254,603.26	0.01930	84.29
32.5 - 33.5	$61,433,398.08	$962,762.25	0.01567	82.67
33.5 - 34.5	$57,711,437.27	$678,026.71	0.01175	81.37
34.5 - 35.5	$54,265,069.62	$715,930.75	0.01319	80.42
35.5 - 36.5	$53,176,865.99	$411,216.53	0.00773	79.35

PSO

Electric Division

362.00 Station Equipment

Observed Life Table

Retirement Expr. 1966 TO 2016
Placement Years 1934 TO 2016

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	$50,526,091.94	$683,870.06	0.01353	78.74
37.5 - 38.5	$47,996,289.64	$243,618.10	0.00508	77.68
38.5 - 39.5	$43,902,291.00	$357,514.04	0.00814	77.28
39.5 - 40.5	$42,355,912.66	$564,391.76	0.01332	76.65
40.5 - 41.5	$39,421,497.07	$492,511.47	0.01249	75.63
41.5 - 42.5	$35,479,269.54	$344,307.09	0.00970	74.69
42.5 - 43.5	$33,525,441.06	$234,861.26	0.00701	73.96
43.5 - 44.5	$31,477,863.49	$269,132.25	0.00855	73.44
44.5 - 45.5	$29,073,904.69	$442,020.30	0.01520	72.81
45.5 - 46.5	$27,663,798.63	$98,576.23	0.00356	71.71
46.5 - 47.5	$26,410,478.59	$73,407.90	0.00278	71.45
47.5 - 48.5	$24,941,893.60	$318,829.07	0.01278	71.25
48.5 - 49.5	$22,607,831.46	$108,871.00	0.00482	70.34
49.5 - 50.5	$21,398,862.25	$266,325.58	0.01245	70.00
50.5 - 51.5	$19,668,055.24	$194,572.86	0.00989	69.13
51.5 - 52.5	$17,661,372.34	$115,027.01	0.00651	68.45
52.5 - 53.5	$16,417,211.71	$77,704.75	0.00473	68.00
53.5 - 54.5	$15,583,212.28	$177,432.57	0.01139	67.68
54.5 - 55.5	$14,472,820.70	$107,823.01	0.00745	66.91
55.5 - 56.5	$13,339,818.74	$76,235.66	0.00571	66.41
56.5 - 57.5	$12,259,778.36	$112,122.26	0.00915	66.03
57.5 - 58.5	$11,010,793.01	$107,746.84	0.00979	65.43
58.5 - 59.5	$9,570,683.24	$152,402.42	0.01592	64.79
59.5 - 60.5	$7,756,845.23	$14,160.87	0.00183	63.76
60.5 - 61.5	$6,700,874.22	$45,649.04	0.00681	63.64
61.5 - 62.5	$5,446,608.19	$46,702.34	0.00857	63.21
62.5 - 63.5	$4,109,082.79	$60,554.11	0.01474	62.66
63.5 - 64.5	$3,226,764.42	$55,883.28	0.01732	61.74
64.5 - 65.5	$2,422,274.65	$10,941.52	0.00452	60.67
65.5 - 66.5	$2,131,463.39	$7,920.30	0.00372	60.40
66.5 - 67.5	$1,732,772.27	$4,985.22	0.00288	60.17
67.5 - 68.5	$1,312,586.76	$45,907.00	0.03497	60.00
68.5 - 69.5	$1,011,670.07	$22,969.41	0.02270	57.90
69.5 - 70.5	$885,633.53	$1,800.00	0.00203	56.59
70.5 - 71.5	$871,220.81	$30,795.47	0.03535	56.47
71.5 - 72.5	$799,020.59	$15,901.32	0.01990	54.48
72.5 - 73.5	$725,283.88	$0.00	0.00000	53.39

PSO

Electric Division

362.00 Station Equipment

Observed Life Table

Retirement Expr. 1966 TO 2016
Placement Years 1934 TO 2016

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	$711,435.66	$13,257.13	0.01863	53.39
74.5 - 75.5	$604,424.07	$4,955.56	0.00820	52.40
75.5 - 76.5	$577,303.16	$22,937.04	0.03973	51.97
76.5 - 77.5	$543,350.58	$12,069.66	0.02221	49.90
77.5 - 78.5	$480,020.34	$5,939.55	0.01237	48.79
78.5 - 79.5	$422,807.36	$11,797.17	0.02790	48.19
79.5 - 80.5	$286,914.81	$661.77	0.00231	46.85
80.5 - 81.5	$268,534.55	$5,130.14	0.01910	46.74
81.5 - 82.5	$150,036.76	$2,045.74	0.01363	45.84

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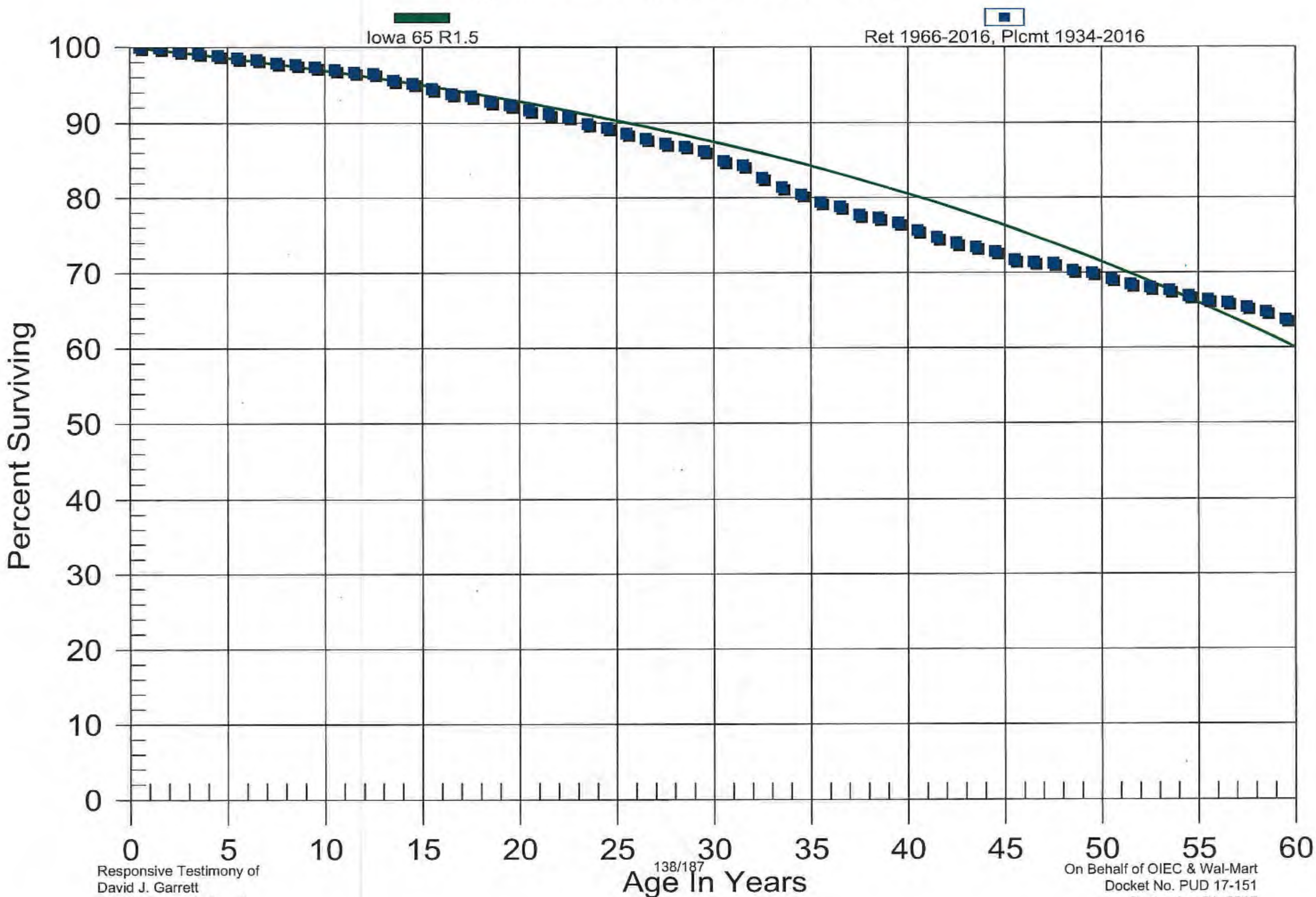
Electric Division
362.00 Station Equipment
Original And Smooth Survivor Curves



Responsive Testimony of
David J. Garrett
Part II - Depreciation

On Behalf of OIEC & Wal-Mart
Docket No. PUD 17-151
September 21, 2017

PSO

Electric Division

364.00 Poles, Towers, and Fixtures

Observed Life Table

Retirement Expr. 1966 TO 2016
Placement Years 1934 TO 2016

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	$419,624,609.73	$630,897.92	0.00150	100.00
0.5 - 1.5	$397,877,507.77	$1,284,810.42	0.00323	99.85
1.5 - 2.5	$374,709,036.11	$1,363,081.39	0.00364	99.53
2.5 - 3.5	$345,289,011.17	$1,543,634.55	0.00447	99.17
3.5 - 4.5	$327,495,141.83	$2,087,072.91	0.00637	98.72
4.5 - 5.5	$307,039,971.30	$1,506,947.38	0.00491	98.09
5.5 - 6.5	$289,489,621.82	$1,478,867.40	0.00511	97.61
6.5 - 7.5	$276,407,910.68	$1,246,387.34	0.00451	97.11
7.5 - 8.5	$265,822,166.99	$1,435,353.44	0.00540	96.67
8.5 - 9.5	$247,671,853.69	$1,553,558.73	0.00627	96.15
9.5 - 10.5	$232,188,527.67	$1,272,828.46	0.00548	95.55
10.5 - 11.5	$217,860,834.27	$1,187,586.43	0.00545	95.03
11.5 - 12.5	$205,343,093.40	$1,132,133.54	0.00551	94.51
12.5 - 13.5	$192,381,055.13	$1,113,281.11	0.00579	93.99
13.5 - 14.5	$185,051,832.81	$1,452,378.48	0.00785	93.44
14.5 - 15.5	$179,707,984.41	$1,202,743.86	0.00669	92.71
15.5 - 16.5	$169,404,826.11	$1,099,392.49	0.00649	92.09
16.5 - 17.5	$156,292,165.67	$1,025,453.41	0.00656	91.49
17.5 - 18.5	$144,541,691.75	$2,021,031.25	0.01398	90.89
18.5 - 19.5	$132,124,397.32	$1,785,503.28	0.01351	89.62
19.5 - 20.5	$122,311,177.12	$1,146,314.02	0.00937	88.41
20.5 - 21.5	$109,770,599.34	$815,791.48	0.00743	87.58
21.5 - 22.5	$103,283,575.46	$707,076.69	0.00685	86.93
22.5 - 23.5	$97,759,703.99	$728,602.83	0.00745	86.33
23.5 - 24.5	$91,990,068.60	$689,732.23	0.00750	85.69
24.5 - 25.5	$87,259,457.40	$698,946.48	0.00801	85.05
25.5 - 26.5	$82,661,976.40	$1,115,020.34	0.01349	84.37
26.5 - 27.5	$78,206,195.46	$945,162.14	0.01209	83.23
27.5 - 28.5	$73,278,550.84	$626,741.65	0.00855	82.22
28.5 - 29.5	$68,948,729.97	$573,804.54	0.00832	81.52
29.5 - 30.5	$64,242,353.81	$717,645.22	0.01117	80.84
30.5 - 31.5	$60,459,822.16	$829,653.37	0.01372	79.94
31.5 - 32.5	$56,256,725.55	$663,981.86	0.01180	78.84
32.5 - 33.5	$51,361,806.00	$618,736.21	0.01205	77.91
33.5 - 34.5	$47,482,286.51	$567,638.64	0.01195	76.97
34.5 - 35.5	$42,761,044.01	$524,465.24	0.01227	76.05
35.5 - 36.5	$39,798,080.76	$582,498.31	0.01464	75.12

PSO

Electric Division

364.00 Poles, Towers, and Fixtures

Observed Life Table

Retirement Expr. 1966 TO 2016
Placement Years 1934 TO 2016

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	$37,203,753.31	$606,055.95	0.01629	74.02
37.5 - 38.5	$33,957,730.92	$868,063.12	0.02556	72.81
38.5 - 39.5	$31,115,730.86	$814,427.17	0.02617	70.95
39.5 - 40.5	$28,827,596.35	$795,112.51	0.02758	69.10
40.5 - 41.5	$26,670,416.38	$636,726.94	0.02387	67.19
41.5 - 42.5	$24,848,436.41	$531,657.62	0.02140	65.59
42.5 - 43.5	$22,937,234.16	$588,394.08	0.02565	64.18
43.5 - 44.5	$21,004,838.84	$559,136.10	0.02662	62.54
44.5 - 45.5	$19,223,853.74	$759,393.34	0.03950	60.87
45.5 - 46.5	$17,283,327.53	$570,230.20	0.03299	58.47
46.5 - 47.5	$15,585,816.91	$417,655.94	0.02680	56.54
47.5 - 48.5	$14,109,006.88	$306,427.20	0.02172	55.02
48.5 - 49.5	$12,778,518.68	$228,310.56	0.01787	53.83
49.5 - 50.5	$12,077,964.63	$204,143.22	0.01690	52.87
50.5 - 51.5	$11,299,881.39	$236,182.58	0.02090	51.97
51.5 - 52.5	$10,207,373.00	$168,163.49	0.01647	50.89
52.5 - 53.5	$9,891,611.72	$138,934.59	0.01405	50.05
53.5 - 54.5	$8,983,136.78	$131,502.88	0.01464	49.35
54.5 - 55.5	$8,123,980.55	$175,731.07	0.02163	48.62
55.5 - 56.5	$7,214,184.59	$238,899.33	0.03312	47.57
56.5 - 57.5	$6,326,017.57	$138,002.67	0.02182	46.00
57.5 - 58.5	$5,688,868.67	$123,039.66	0.02163	44.99
58.5 - 59.5	$5,014,869.60	$96,892.71	0.01932	44.02
59.5 - 60.5	$4,324,428.37	$81,022.54	0.01874	43.17
60.5 - 61.5	$3,746,666.51	$101,332.42	0.02705	42.36
61.5 - 62.5	$3,254,642.97	$191,265.36	0.05877	41.21
62.5 - 63.5	$2,749,330.91	$76,498.45	0.02782	38.79
63.5 - 64.5	$2,175,470.96	$60,238.67	0.02769	37.71
64.5 - 65.5	$1,799,281.38	$59,360.43	0.03299	36.67
65.5 - 66.5	$1,417,706.28	$43,693.93	0.03082	35.46
66.5 - 67.5	$1,079,205.11	$33,922.08	0.03143	34.37
67.5 - 68.5	$765,142.56	$19,422.41	0.02538	33.29
68.5 - 69.5	$511,288.39	$11,713.78	0.02291	32.44
69.5 - 70.5	$332,499.37	$6,334.34	0.01905	31.70
70.5 - 71.5	$269,542.43	$3,726.94	0.01383	31.09
71.5 - 72.5	$248,838.59	$2,091.51	0.00841	30.66
72.5 - 73.5	$230,152.81	$4,614.02	0.02005	30.41

PSO

Electric Division

364.00 Poles, Towers, and Fixtures

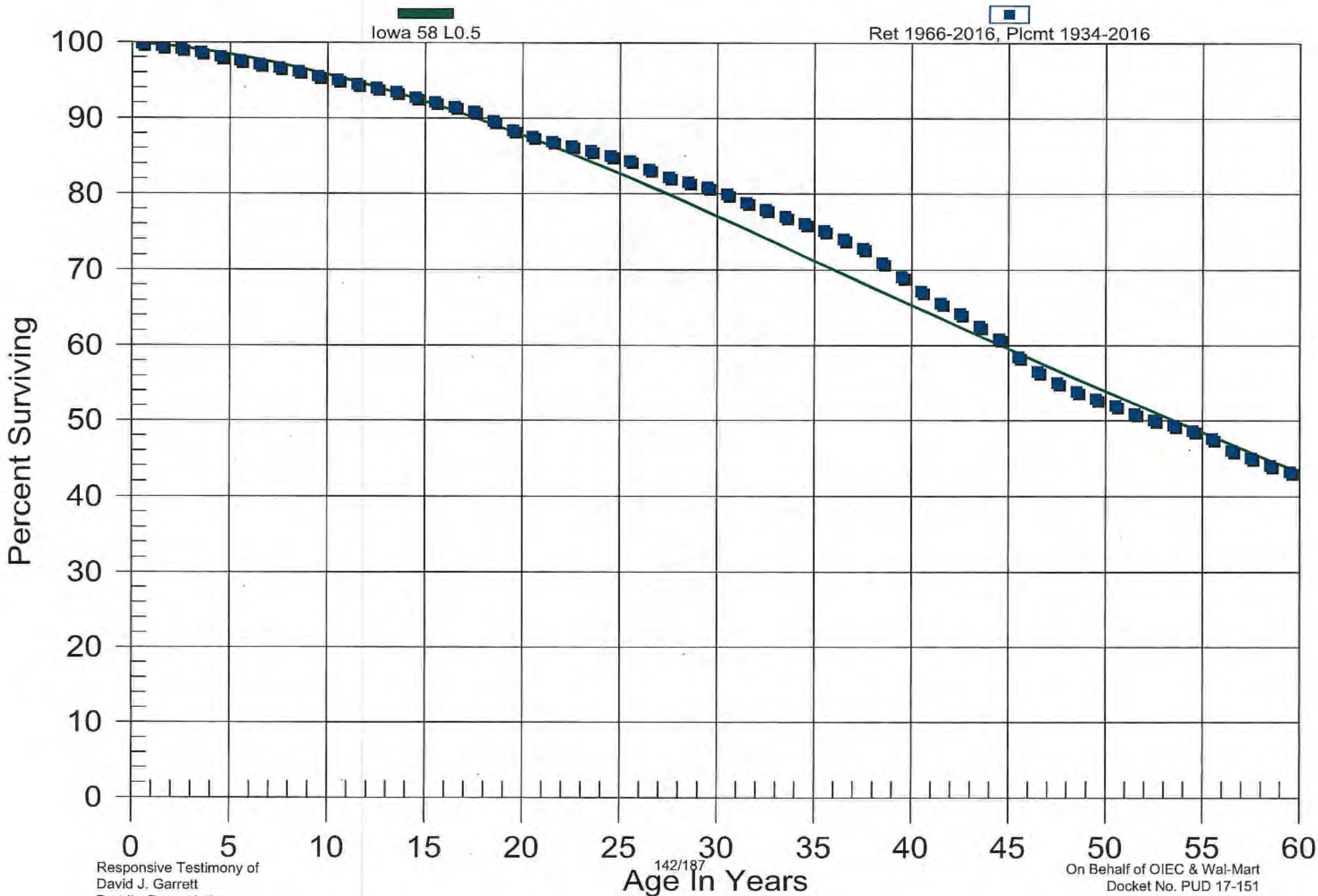
Observed Life Table

Retirement Expr. 1966 TO 2016
Placement Years 1934 TO 2016

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	$212,719.36	$3,140.21	0.01476	29.80
74.5 - 75.5	$198,029.51	$1,785.62	0.00902	29.36
75.5 - 76.5	$192,762.14	$1,641.31	0.00851	29.09
76.5 - 77.5	$185,400.40	$927.97	0.00501	28.84
77.5 - 78.5	$178,167.52	$1,110.11	0.00623	28.70
78.5 - 79.5	$171,482.63	$1,378.38	0.00804	28.52
79.5 - 80.5	$157,825.56	$2,090.64	0.01325	28.29
80.5 - 81.5	$148,163.08	$6,351.71	0.04287	27.92
81.5 - 82.5	$30,817.87	$1,652.74	0.05363	26.72

PSO

Electric Division
364.00 Poles, Towers, and Fixtures
Original And Smooth Survivor Curves



PSO

Electric Division

366.00 Underground Conduit

Observed Life Table

Retirement Expr. 1966 TO 2016
Placement Years 1937 TO 2016

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	$75,913,601.72	$4,522.15	0.00006	100.00
0.5 - 1.5	$70,533,321.90	$32,659.98	0.00046	99.99
1.5 - 2.5	$65,693,512.36	$23,928.72	0.00036	99.95
2.5 - 3.5	$55,736,131.71	$23,863.88	0.00043	99.91
3.5 - 4.5	$53,267,023.85	$35,483.66	0.00067	99.87
4.5 - 5.5	$49,303,852.33	$15,912.64	0.00032	99.80
5.5 - 6.5	$46,897,675.97	$18,479.38	0.00039	99.77
6.5 - 7.5	$43,028,384.43	$20,489.62	0.00048	99.73
7.5 - 8.5	$32,802,213.90	$24,741.50	0.00075	99.68
8.5 - 9.5	$26,409,806.34	$21,251.88	0.00080	99.61
9.5 - 10.5	$22,942,662.41	$29,569.73	0.00129	99.53
10.5 - 11.5	$20,645,005.90	$14,198.50	0.00069	99.40
11.5 - 12.5	$19,429,569.84	$30,660.61	0.00158	99.33
12.5 - 13.5	$17,992,384.98	$30,787.76	0.00171	99.17
13.5 - 14.5	$13,827,003.20	$65,992.97	0.00477	99.00
14.5 - 15.5	$8,845,095.91	$16,178.12	0.00183	98.53
15.5 - 16.5	$8,430,690.53	$34,991.81	0.00415	98.35
16.5 - 17.5	$8,034,882.94	$20,945.23	0.00261	97.94
17.5 - 18.5	$7,433,183.54	$36,963.92	0.00497	97.69
18.5 - 19.5	$6,326,820.52	$12,544.28	0.00198	97.20
19.5 - 20.5	$5,511,956.20	$81,667.49	0.01482	97.01
20.5 - 21.5	$4,365,709.75	$21,664.04	0.00496	95.57
21.5 - 22.5	$4,252,695.96	$13,786.80	0.00324	95.10
22.5 - 23.5	$4,208,439.70	$80,530.17	0.01914	94.79
23.5 - 24.5	$4,127,583.80	$4,024.30	0.00097	92.98
24.5 - 25.5	$4,118,276.43	$7,232.73	0.00176	92.89
25.5 - 26.5	$4,070,475.67	$61,265.02	0.01505	92.72
26.5 - 27.5	$3,630,685.02	$7,600.33	0.00209	91.33
27.5 - 28.5	$3,656,083.06	$4,220.49	0.00115	91.14
28.5 - 29.5	$3,843,852.90	$61,125.66	0.01590	91.03
29.5 - 30.5	$3,424,235.66	$5,290.78	0.00155	89.58
30.5 - 31.5	$3,325,077.95	$7,436.68	0.00224	89.44
31.5 - 32.5	$3,312,221.27	$6,030.43	0.00182	89.24
32.5 - 33.5	$3,141,043.52	$14,786.85	0.00471	89.08
33.5 - 34.5	$2,964,144.25	$18,565.93	0.00626	88.66
34.5 - 35.5	$2,928,578.32	$27,197.13	0.00929	88.11
35.5 - 36.5	$2,897,678.24	$7,053.59	0.00243	87.29

PSO

Electric Division

366.00 Underground Conduit

Observed Life Table

Retirement Expr. 1966 TO 2016
Placement Years 1937 TO 2016

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	$2,822,997.61	$3,541.22	0.00125	87.08
37.5 - 38.5	$2,517,514.18	$4,173.10	0.00166	86.97
38.5 - 39.5	$2,401,094.42	$8,932.87	0.00372	86.82
39.5 - 40.5	$2,244,173.78	$3,783.81	0.00169	86.50
40.5 - 41.5	$2,204,327.32	$14,512.24	0.00658	86.35
41.5 - 42.5	$2,038,289.65	$4,629.04	0.00227	85.79
42.5 - 43.5	$2,014,037.82	$12,520.04	0.00622	85.59
43.5 - 44.5	$1,732,278.66	$11,309.03	0.00653	85.06
44.5 - 45.5	$1,605,160.72	$4,161.32	0.00259	84.50
45.5 - 46.5	$1,584,148.75	$15,454.11	0.00976	84.28
46.5 - 47.5	$1,568,694.64	$6,313.39	0.00402	83.46
47.5 - 48.5	$1,550,466.94	$6,559.28	0.00423	83.13
48.5 - 49.5	$1,514,809.52	$11,269.33	0.00744	82.77
49.5 - 50.5	$1,466,963.06	$5,664.30	0.00386	82.16
50.5 - 51.5	$1,441,960.50	$10,412.35	0.00722	81.84
51.5 - 52.5	$1,413,238.83	$6,318.96	0.00447	81.25
52.5 - 53.5	$1,347,448.92	$4,851.97	0.00360	80.89
53.5 - 54.5	$1,320,877.13	$11,944.68	0.00904	80.60
54.5 - 55.5	$1,297,672.32	$9,343.81	0.00720	79.87
55.5 - 56.5	$1,229,521.17	$9,351.67	0.00761	79.29
56.5 - 57.5	$1,132,656.27	$5,361.90	0.00473	78.69
57.5 - 58.5	$1,058,781.81	$5,238.81	0.00495	78.32
58.5 - 59.5	$1,009,491.88	$6,347.47	0.00629	77.93
59.5 - 60.5	$874,155.14	$3,230.69	0.00370	77.44
60.5 - 61.5	$744,561.28	$3,217.82	0.00432	77.15
61.5 - 62.5	$741,343.46	$3,456.54	0.00466	76.82
62.5 - 63.5	$464,303.61	$1,480.15	0.00319	76.46
63.5 - 64.5	$458,194.13	$2,245.57	0.00490	76.22
64.5 - 65.5	$455,948.56	$3,496.32	0.00767	75.84
65.5 - 66.5	$450,991.80	$16,000.52	0.03548	75.26
66.5 - 67.5	$301,588.23	$9,774.44	0.03241	72.59
67.5 - 68.5	$176,665.69	$5,681.02	0.03216	70.24
68.5 - 69.5	$170,984.67	$3,135.80	0.01834	67.98
69.5 - 70.5	$167,841.11	$6,731.95	0.04011	66.73
70.5 - 71.5	$158,293.41	$9,361.92	0.05914	64.06
71.5 - 72.5	$148,931.49	$1,469.49	0.00987	60.27
72.5 - 73.5	$147,462.00	$2,161.00	0.01465	59.67

PSO

Electric Division

366.00 Underground Conduit

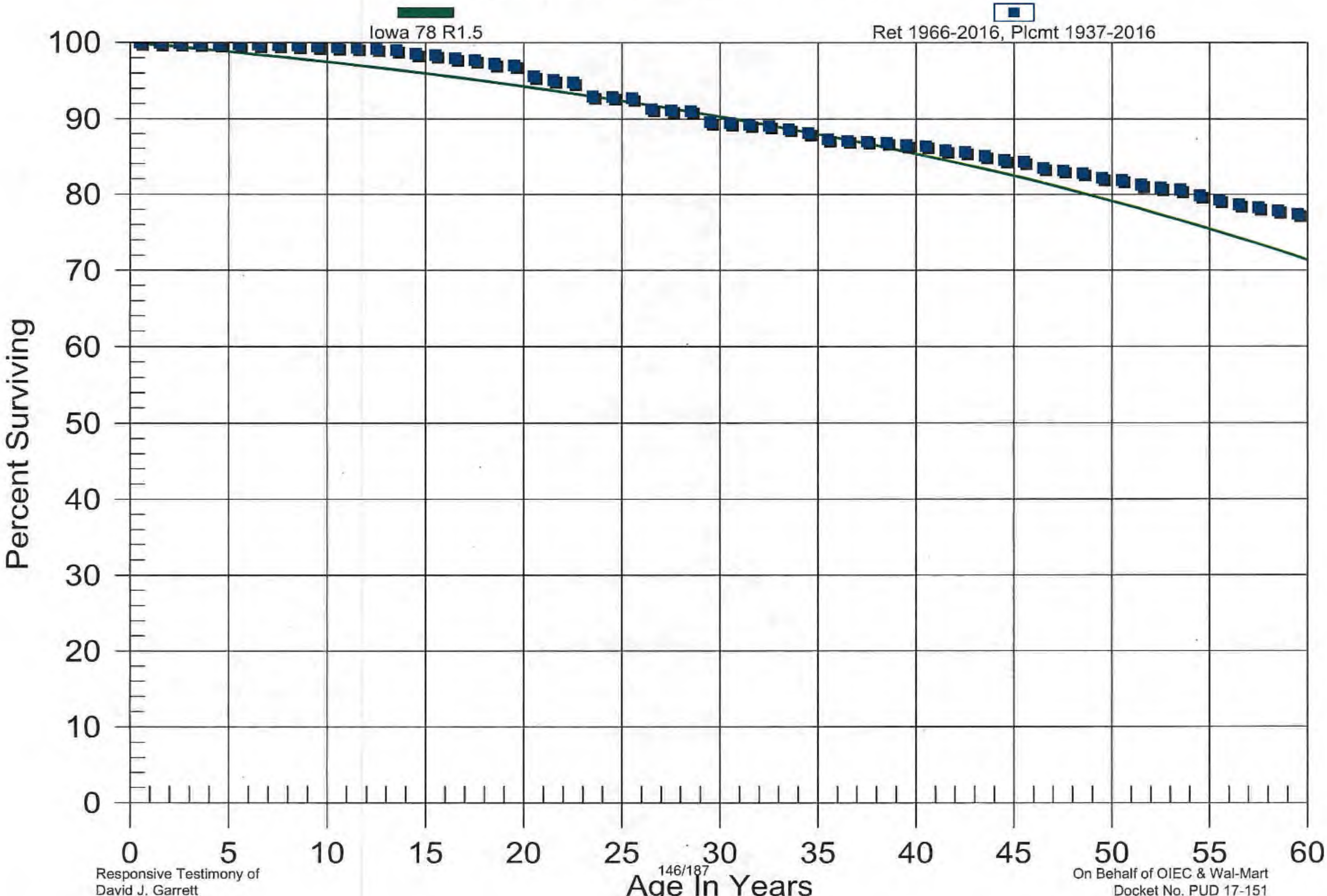
Observed Life Table

Retirement Expr. 1966 TO 2016
Placement Years 1937 TO 2016

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	$145,301.00	$2,483.85	0.01709	58.80
74.5 - 75.5	$142,817.15	$1,366.69	0.00957	57.79
75.5 - 76.5	$141,409.85	$1,364.70	0.00965	57.24
76.5 - 77.5	$139,176.18	$1,957.97	0.01407	56.69
77.5 - 78.5	$134,970.73	$3,201.14	0.02372	55.89
78.5 - 79.5	$121,977.82	$2,259.82	0.01853	54.57

PSO

Electric Division
366.00 Underground Conduit
Original And Smooth Survivor Curves



PSO
Electric Division
370.00 Meters

Observed Life Table
Retirement Expr. 1966 TO 2016
Placement Years 1934 TO 2016

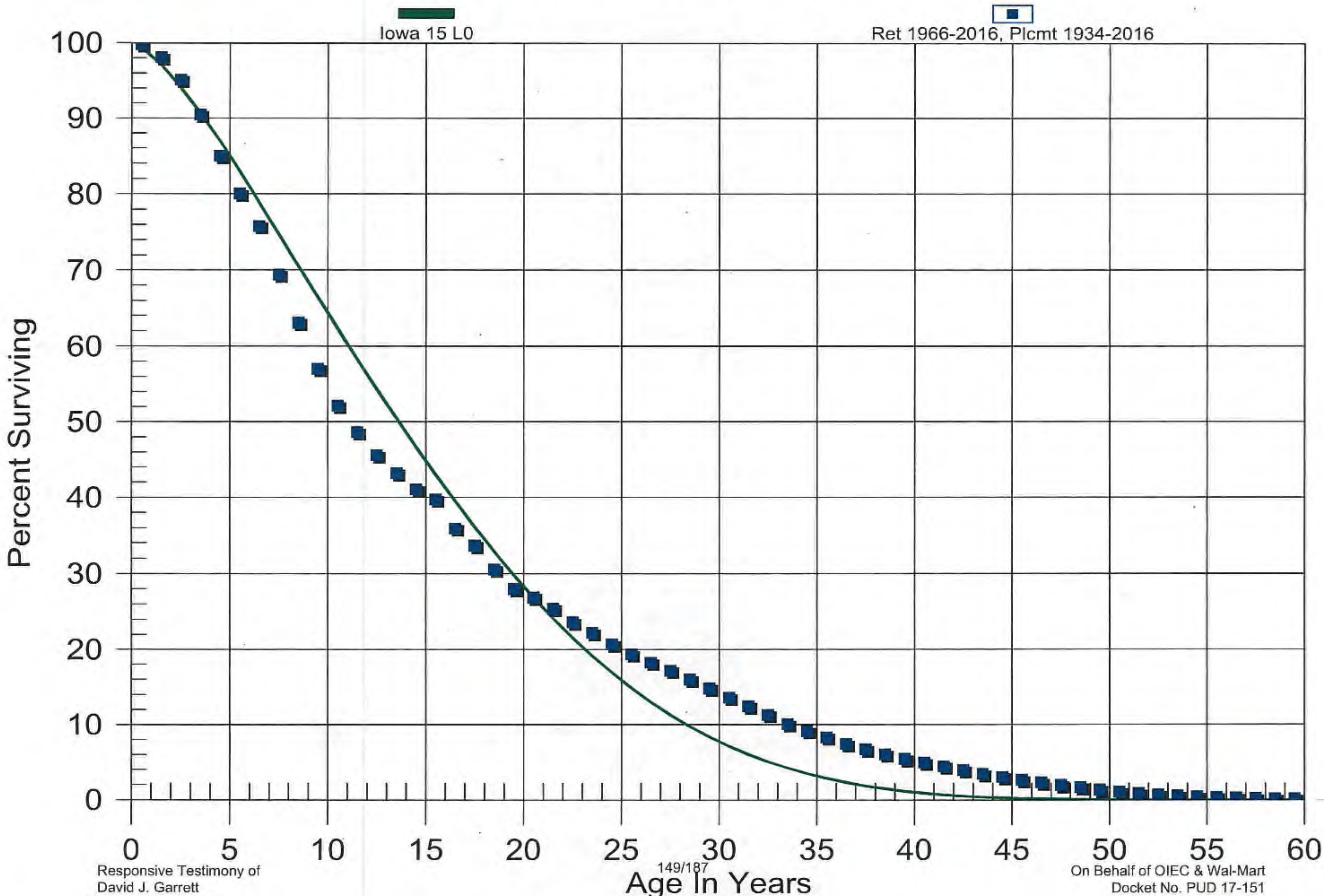
Age Interval	$ Surviving At Beginning of Age Interval	$ Retired During The Age Interval	Retirement Ratio	% Surviving At Beginning of Age Interval
0.0 - 0.5	$112,027,324.34	$229,462.12	0.00205	100.00
0.5 - 1.5	$108,780,225.94	$1,853,855.45	0.01704	99.80
1.5 - 2.5	$106,815,976.16	$3,200,918.49	0.02997	98.09
2.5 - 3.5	$102,252,082.05	$5,042,328.67	0.04931	95.15
3.5 - 4.5	$96,062,387.71	$5,807,811.36	0.06046	90.46
4.5 - 5.5	$82,219,830.50	$4,795,673.67	0.05833	84.99
5.5 - 6.5	$84,011,446.68	$4,422,313.66	0.05264	80.04
6.5 - 7.5	$79,765,063.52	$6,763,026.07	0.08479	75.82
7.5 - 8.5	$73,179,855.15	$6,650,998.66	0.09089	69.39
8.5 - 9.5	$66,666,490.04	$6,409,684.61	0.09615	63.09
9.5 - 10.5	$60,646,843.25	$5,207,112.31	0.08586	57.02
10.5 - 11.5	$55,943,717.65	$3,791,427.71	0.06777	52.13
11.5 - 12.5	$52,719,981.20	$3,288,024.06	0.06237	48.59
12.5 - 13.5	$47,693,406.11	$2,492,690.37	0.05226	45.56
13.5 - 14.5	$47,547,714.39	$2,394,303.32	0.05036	43.18
14.5 - 15.5	$45,275,830.33	$1,452,638.30	0.03208	41.01
15.5 - 16.5	$42,995,690.65	$4,121,663.66	0.09586	39.69
16.5 - 17.5	$39,007,555.28	$2,461,882.66	0.06311	35.89
17.5 - 18.5	$36,376,295.98	$3,351,081.93	0.09212	33.62
18.5 - 19.5	$33,068,919.00	$2,779,928.90	0.08406	30.52
19.5 - 20.5	$30,214,218.27	$1,217,414.46	0.04029	27.96
20.5 - 21.5	$28,872,240.32	$1,566,123.97	0.05424	26.83
21.5 - 22.5	$27,325,758.60	$1,946,852.73	0.07125	25.38
22.5 - 23.5	$25,364,504.00	$1,478,991.20	0.05831	23.57
23.5 - 24.5	$23,609,890.57	$1,616,194.63	0.06845	22.19
24.5 - 25.5	$21,873,334.08	$1,427,005.31	0.06524	20.67
25.5 - 26.5	$20,040,991.76	$1,177,875.03	0.05877	19.33
26.5 - 27.5	$18,544,119.19	$1,097,231.05	0.05917	18.19
27.5 - 28.5	$17,322,514.86	$1,155,552.18	0.06671	17.11
28.5 - 29.5	$15,985,544.69	$1,167,439.86	0.07303	15.97
29.5 - 30.5	$14,740,175.64	$1,218,287.35	0.08265	14.81
30.5 - 31.5	$13,458,476.95	$1,145,196.08	0.08509	13.58
31.5 - 32.5	$12,263,906.41	$1,142,501.48	0.09316	12.43
32.5 - 33.5	$11,097,722.33	$1,195,876.85	0.10776	11.27
33.5 - 34.5	$9,887,070.47	$915,699.92	0.09262	10.05
34.5 - 35.5	$8,967,399.42	$830,131.34	0.09257	9.12
35.5 - 36.5	$8,134,719.46	$861,734.12	0.10593	8.28

PSO
Electric Division
370.00 Meters
Observed Life Table
Retirement Expr. 1966 TO 2016
Placement Years 1934 TO 2016

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	$7,272,985.34	$692,837.87	0.09526	7.40
37.5 - 38.5	$6,580,147.47	$662,414.81	0.10067	6.70
38.5 - 39.5	$5,917,732.66	$611,372.85	0.10331	6.02
39.5 - 40.5	$5,305,039.88	$467,418.99	0.08811	5.40
40.5 - 41.5	$4,836,470.38	$497,528.56	0.10287	4.92
41.5 - 42.5	$4,338,941.82	$481,516.62	0.11098	4.42
42.5 - 43.5	$3,857,425.20	$530,497.97	0.13753	3.93
43.5 - 44.5	$3,326,927.23	$389,812.43	0.11717	3.39
44.5 - 45.5	$2,937,114.80	$371,645.62	0.12653	2.99
45.5 - 46.5	$2,565,469.18	$326,001.36	0.12707	2.61
46.5 - 47.5	$2,239,467.82	$333,480.13	0.14891	2.28
47.5 - 48.5	$1,905,987.69	$269,552.07	0.14142	1.94
48.5 - 49.5	$1,636,435.62	$309,444.01	0.18910	1.67
49.5 - 50.5	$1,326,991.61	$275,964.86	0.20796	1.35
50.5 - 51.5	$1,051,026.75	$203,427.37	0.19355	1.07
51.5 - 52.5	$847,599.38	$174,080.56	0.20538	0.86
52.5 - 53.5	$673,518.82	$129,318.87	0.19200	0.69
53.5 - 54.5	$544,199.95	$99,790.54	0.18337	0.55
54.5 - 55.5	$444,409.41	$84,007.05	0.18903	0.45
55.5 - 56.5	$360,402.36	$72,099.88	0.20005	0.37
56.5 - 57.5	$288,302.48	$58,731.95	0.20372	0.29
57.5 - 58.5	$229,570.53	$40,500.39	0.17642	0.23
58.5 - 59.5	$189,070.14	$23,876.43	0.12628	0.19
59.5 - 60.5	$165,193.71	$19,246.81	0.11651	0.17
60.5 - 61.5	$145,946.90	$19,514.89	0.13371	0.15
61.5 - 62.5	$126,432.01	$21,456.60	0.16971	0.13
62.5 - 63.5	$104,975.41	$20,579.89	0.19604	0.11
63.5 - 64.5	$84,395.52	$17,901.93	0.21212	0.09
64.5 - 65.5	$66,493.59	$10,797.70	0.16239	0.07
65.5 - 66.5	$59,815.48	$15,551.17	0.25999	0.06
66.5 - 67.5	$40,144.72	$18,554.59	0.46219	0.04
67.5 - 68.5	$21,590.13	$8,903.08	0.41237	0.02
68.5 - 69.5	$12,687.05	$4,284.31	0.33769	0.01
69.5 - 70.5	$8,402.74	$4,425.48	0.52667	0.01
70.5 - 71.5	$3,977.26	$251.77	0.06330	0.00

PSO

Electric Division
370.00 Meters
Original And Smooth Survivor Curves



PSO

Electric Division

373.00 Street Lighting and Signal Systems

Observed Life Table

Retirement Expr. 1966 TO 2016
Placement Years 1926 TO 2016

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	$70,569,750.86	$367,033.03	0.00520	100.00
0.5 - 1.5	$68,199,862.85	$419,180.69	0.00615	99.48
1.5 - 2.5	$66,181,449.20	$561,947.13	0.00849	98.87
2.5 - 3.5	$63,953,691.19	$761,681.59	0.01191	98.03
3.5 - 4.5	$61,207,072.26	$698,014.09	0.01140	96.86
4.5 - 5.5	$58,968,588.82	$498,801.91	0.00846	95.76
5.5 - 6.5	$57,315,470.48	$2,051,790.29	0.03580	94.95
6.5 - 7.5	$53,848,639.84	$483,855.66	0.00899	91.55
7.5 - 8.5	$51,709,385.12	$483,769.28	0.00936	90.73
8.5 - 9.5	$45,597,178.59	$462,626.76	0.01015	89.88
9.5 - 10.5	$43,235,364.26	$466,121.56	0.01078	88.96
10.5 - 11.5	$41,562,103.63	$464,832.72	0.01118	88.01
11.5 - 12.5	$40,226,038.57	$444,665.17	0.01105	87.02
12.5 - 13.5	$38,137,982.65	$459,112.71	0.01204	86.06
13.5 - 14.5	$36,284,173.10	$550,409.36	0.01517	85.02
14.5 - 15.5	$35,337,927.11	$479,031.12	0.01356	83.73
15.5 - 16.5	$33,321,744.78	$492,372.87	0.01478	82.60
16.5 - 17.5	$31,623,243.97	$423,081.99	0.01338	81.38
17.5 - 18.5	$28,984,132.52	$413,980.75	0.01428	80.29
18.5 - 19.5	$26,448,471.64	$375,245.55	0.01419	79.14
19.5 - 20.5	$24,383,000.72	$359,917.30	0.01476	78.02
20.5 - 21.5	$20,375,398.50	$379,426.12	0.01862	76.87
21.5 - 22.5	$19,705,328.31	$550,848.91	0.02795	75.44
22.5 - 23.5	$17,726,619.76	$494,103.41	0.02787	73.33
23.5 - 24.5	$15,587,267.68	$316,093.06	0.02028	71.28
24.5 - 25.5	$14,173,482.21	$260,483.53	0.01838	69.84
25.5 - 26.5	$12,894,254.93	$271,438.10	0.02105	68.55
26.5 - 27.5	$11,694,836.42	$220,670.91	0.01887	67.11
27.5 - 28.5	$10,462,102.83	$164,375.40	0.01571	65.85
28.5 - 29.5	$9,252,987.26	$118,001.48	0.01275	64.81
29.5 - 30.5	$8,671,218.34	$84,525.02	0.00975	63.98
30.5 - 31.5	$8,189,380.69	$106,293.20	0.01298	63.36
31.5 - 32.5	$7,807,648.82	$156,640.77	0.02006	62.54
32.5 - 33.5	$7,190,334.57	$192,494.08	0.02677	61.28
33.5 - 34.5	$6,622,803.53	$169,588.84	0.02561	59.64
34.5 - 35.5	$6,175,437.99	$112,370.71	0.01820	58.12
35.5 - 36.5	$5,509,819.75	$36,545.08	0.00663	57.06

PSO

Electric Division

373.00 Street Lighting and Signal Systems

Observed Life Table

Retirement Expr. 1966 TO 2016
Placement Years 1926 TO 2016

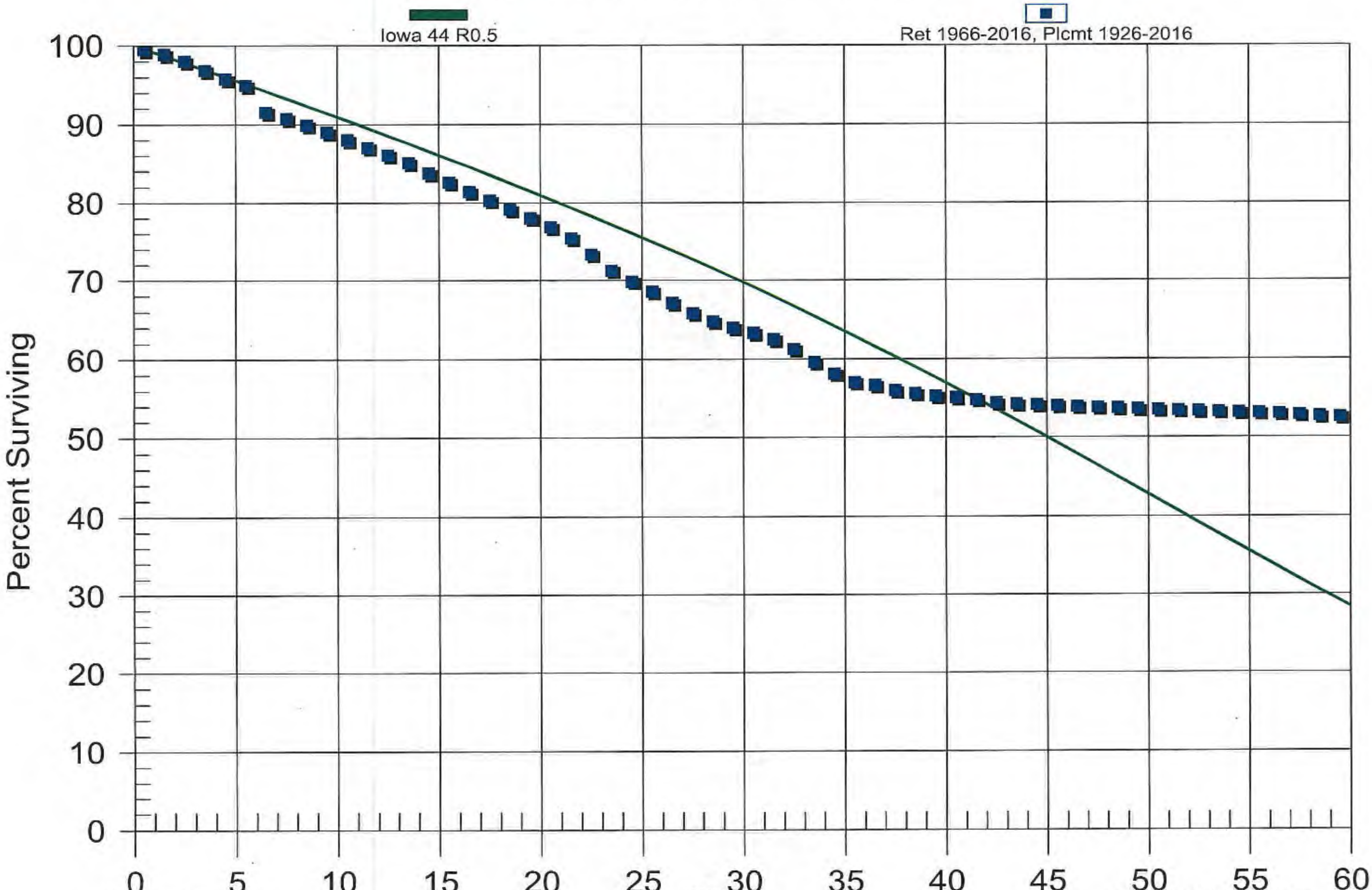
Age Interval	$ Surviving At Beginning of Age Interval	$ Retired During The Age Interval	Retirement Ratio	% Surviving At Beginning of Age Interval
36.5 - 37.5	$5,042,789.32	$60,733.43	0.01204	56.68
37.5 - 38.5	$4,617,530.61	$29,108.14	0.00630	56.00
38.5 - 39.5	$4,247,700.45	$26,838.53	0.00632	55.64
39.5 - 40.5	$3,828,140.93	$13,009.83	0.00340	55.29
40.5 - 41.5	$3,642,322.28	$18,253.55	0.00501	55.10
41.5 - 42.5	$3,291,042.63	$24,459.84	0.00743	54.83
42.5 - 43.5	$2,991,607.44	$7,827.71	0.00262	54.42
43.5 - 44.5	$2,663,531.87	$5,519.70	0.00207	54.28
44.5 - 45.5	$2,450,831.76	$4,613.07	0.00188	54.17
45.5 - 46.5	$2,254,781.26	$4,718.31	0.00209	54.06
46.5 - 47.5	$2,103,099.40	$4,547.16	0.00216	53.95
47.5 - 48.5	$1,896,840.65	$3,144.68	0.00166	53.83
48.5 - 49.5	$1,626,931.40	$3,451.58	0.00212	53.75
49.5 - 50.5	$1,401,921.06	$2,955.37	0.00211	53.63
50.5 - 51.5	$1,199,554.27	$1,606.08	0.00134	53.52
51.5 - 52.5	$1,090,563.83	$1,590.06	0.00146	53.45
52.5 - 53.5	$1,023,514.99	$1,528.44	0.00149	53.37
53.5 - 54.5	$966,916.95	$1,418.06	0.00147	53.29
54.5 - 55.5	$877,200.72	$1,159.43	0.00132	53.21
55.5 - 56.5	$787,433.93	$1,461.80	0.00186	53.14
56.5 - 57.5	$632,479.98	$1,764.53	0.00279	53.04
57.5 - 58.5	$605,647.82	$1,871.11	0.00309	52.89
58.5 - 59.5	$542,421.26	$1,441.14	0.00266	52.73
59.5 - 60.5	$455,976.01	$1,026.28	0.00225	52.59
60.5 - 61.5	$406,122.51	$447.77	0.00110	52.47
61.5 - 62.5	$382,476.27	$385.44	0.00101	52.41
62.5 - 63.5	$338,891.26	$440.59	0.00130	52.36
63.5 - 64.5	$259,420.08	$858.82	0.00331	52.29
64.5 - 65.5	$231,950.06	$370.62	0.00160	52.12
65.5 - 66.5	$197,666.89	$644.15	0.00326	52.04
66.5 - 67.5	$156,653.47	$783.19	0.00500	51.87
67.5 - 68.5	$140,773.20	$484.88	0.00344	51.61
68.5 - 69.5	$127,058.94	$551.92	0.00434	51.43
69.5 - 70.5	$120,955.38	$659.19	0.00545	51.21
70.5 - 71.5	$119,679.56	$610.03	0.00510	50.93
71.5 - 72.5	$114,988.20	$607.56	0.00528	50.67
72.5 - 73.5	$114,380.64	$1,227.50	0.01073	50.40

PSO
Electric Division
373.00 Street Lighting and Signal Systems
Observed Life Table
Retirement Expr. 1966 TO 2016
Placement Years 1926 TO 2016

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	$113,153.14	$1,569.50	0.01387	49.86
74.5 - 75.5	$110,008.28	$546.44	0.00497	49.17
75.5 - 76.5	$108,599.21	$675.33	0.00622	48.92
76.5 - 77.5	$107,201.79	$851.99	0.00795	48.62
77.5 - 78.5	$106,231.38	$1,264.91	0.01191	48.23
78.5 - 79.5	$102,770.20	$1,475.68	0.01436	47.66
79.5 - 80.5	$101,294.52	$1,466.02	0.01447	46.97
80.5 - 81.5	$99,828.50	$1,393.31	0.01396	46.29
81.5 - 82.5	$64,400.35	$860.88	0.01337	45.65
82.5 - 83.5	$0.00	$0.00	0.00000	45.04
83.5 - 84.5	$0.00	$0.00	0.00000	45.04
84.5 - 85.5	$0.00	$0.00	0.00000	45.04
85.5 - 86.5	$0.00	$0.00	0.00000	45.04
86.5 - 87.5	$0.00	$0.00	0.00000	45.04
87.5 - 88.5	$0.00	$0.00	0.00000	45.04
88.5 - 89.5	$0.00	$0.00	0.00000	45.04
89.5 - 90.5	$0.00	$0.00	0.00000	45.04

PSO

Electric Division
373.00 Street Lighting and Signal Systems
Original And Smooth Survivor Curves



PSO

Electric Division

390.00 Structures and Improvements

Observed Life Table

Retirement Expr. 1966 TO 2016
Placement Years 1934 TO 2016

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	$63,026,896.22	$0.00	0.00000	100.00
0.5 - 1.5	$60,340,842.06	$205,055.00	0.00340	100.00
1.5 - 2.5	$58,352,864.13	$35,033.55	0.00060	99.66
2.5 - 3.5	$45,728,992.07	$5,539.00	0.00012	99.60
3.5 - 4.5	$43,583,018.37	$24,032.05	0.00055	99.59
4.5 - 5.5	$39,878,765.22	$13,712.20	0.00034	99.53
5.5 - 6.5	$38,558,885.57	$39,955.96	0.00104	99.50
6.5 - 7.5	$37,894,915.67	$486,640.71	0.01284	99.40
7.5 - 8.5	$36,810,875.69	$50,066.52	0.00136	98.12
8.5 - 9.5	$34,624,174.30	$40,607.17	0.00117	97.99
9.5 - 10.5	$33,702,980.91	$14,888.67	0.00044	97.87
10.5 - 11.5	$32,595,417.44	$30,420.55	0.00093	97.83
11.5 - 12.5	$32,477,097.61	$208,275.63	0.00641	97.74
12.5 - 13.5	$32,164,943.85	$119,338.25	0.00371	97.11
13.5 - 14.5	$31,742,518.07	$43,799.25	0.00138	96.75
14.5 - 15.5	$31,514,982.45	$60,263.04	0.00191	96.62
15.5 - 16.5	$30,980,965.40	$343,942.86	0.01110	96.43
16.5 - 17.5	$30,093,141.93	$107,187.90	0.00356	95.36
17.5 - 18.5	$26,759,122.24	$334,524.90	0.01250	95.02
18.5 - 19.5	$25,381,708.09	$222,639.24	0.00877	93.83
19.5 - 20.5	$25,174,832.35	$266,316.22	0.01058	93.01
20.5 - 21.5	$24,507,939.78	$66,573.14	0.00272	92.03
21.5 - 22.5	$24,441,366.64	$1,062,032.64	0.04345	91.78
22.5 - 23.5	$22,868,481.40	$222,622.76	0.00973	87.79
23.5 - 24.5	$21,113,149.49	$164,495.13	0.00779	86.93
24.5 - 25.5	$20,458,492.77	$72,466.53	0.00354	86.26
25.5 - 26.5	$17,344,385.79	$155,564.31	0.00897	85.95
26.5 - 27.5	$14,728,192.32	$487,368.78	0.03309	85.18
27.5 - 28.5	$12,895,991.53	$170,741.73	0.01324	82.36
28.5 - 29.5	$11,345,374.05	$328,204.05	0.02893	81.27
29.5 - 30.5	$9,483,321.12	$265,529.83	0.02800	78.92
30.5 - 31.5	$8,006,997.30	$34,446.50	0.00430	76.71
31.5 - 32.5	$7,192,649.09	$15,250.65	0.00212	76.38
32.5 - 33.5	$6,742,051.38	$45,220.54	0.00671	76.22
33.5 - 34.5	$6,075,439.58	$1,889.00	0.00031	75.71
34.5 - 35.5	$4,863,115.54	$19,752.61	0.00406	75.68
35.5 - 36.5	$4,744,603.60	$11,022.69	0.00232	75.38

PSO
Electric Division
390.00 Structures and Improvements
Observed Life Table
Retirement Expr. 1966 TO 2016
Placement Years 1934 TO 2016

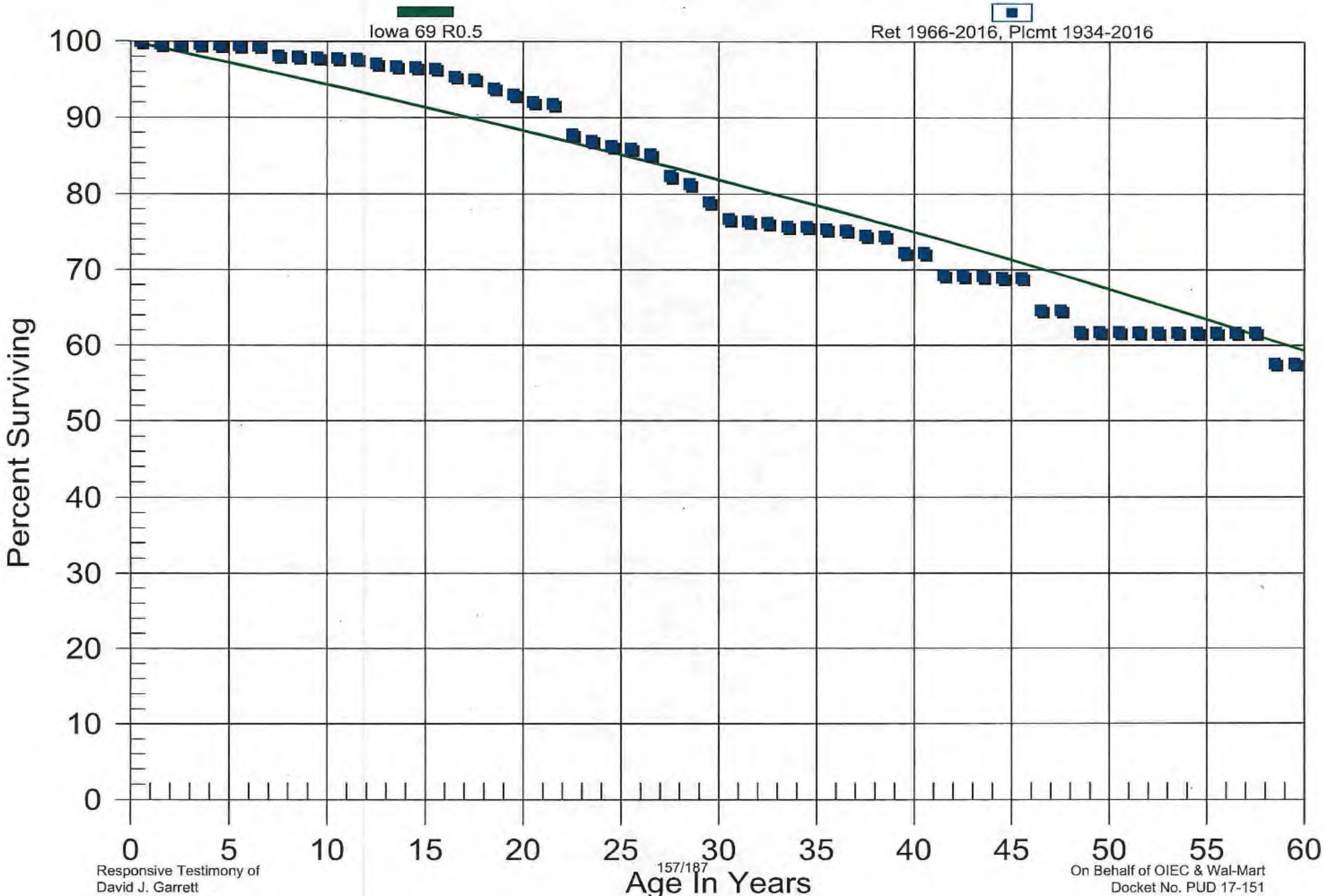
Age Interval	$ Surviving At Beginning of Age Interval	$ Retired During The Age Interval	Retirement Ratio	% Surviving At Beginning of Age Interval
36.5 - 37.5	$4,701,749.87	$41,966.28	0.00893	75.20
37.5 - 38.5	$4,636,455.71	$7,605.78	0.00164	74.53
38.5 - 39.5	$4,576,645.96	$133,650.46	0.02920	74.41
39.5 - 40.5	$4,425,142.97	$624.00	0.00014	72.23
40.5 - 41.5	$4,415,454.51	$177,767.25	0.04026	72.22
41.5 - 42.5	$3,602,871.23	$5,252.00	0.00146	69.32
42.5 - 43.5	$3,329,907.97	$2,366.00	0.00071	69.22
43.5 - 44.5	$3,274,124.01	$9,058.09	0.00277	69.17
44.5 - 45.5	$3,221,861.92	$1,477.00	0.00046	68.97
45.5 - 46.5	$3,084,913.95	$190,042.14	0.06160	68.94
46.5 - 47.5	$2,316,489.77	$635.00	0.00027	64.70
47.5 - 48.5	$1,848,868.97	$82,669.24	0.04471	64.68
48.5 - 49.5	$1,176,017.78	$49.00	0.00004	61.79
49.5 - 50.5	$1,162,650.78	$0.00	0.00000	61.78
50.5 - 51.5	$1,060,620.78	$650.00	0.00061	61.78
51.5 - 52.5	$995,902.78	$801.00	0.00080	61.75
52.5 - 53.5	$930,229.78	$0.00	0.00000	61.70
53.5 - 54.5	$883,428.78	$0.00	0.00000	61.70
54.5 - 55.5	$704,710.78	$0.00	0.00000	61.70
55.5 - 56.5	$698,924.78	$0.00	0.00000	61.70
56.5 - 57.5	$692,747.78	$0.00	0.00000	61.70
57.5 - 58.5	$671,171.76	$44,933.00	0.06695	61.70
58.5 - 59.5	$609,738.85	$0.00	0.00000	57.57
59.5 - 60.5	$609,419.85	$0.00	0.00000	57.57
60.5 - 61.5	$603,650.84	$0.00	0.00000	57.57
61.5 - 62.5	$310,103.76	$0.00	0.00000	57.57
62.5 - 63.5	$301,199.54	$20,605.00	0.06841	57.57
63.5 - 64.5	$252,450.53	$100.54	0.00040	53.63
64.5 - 65.5	$233,232.63	$0.00	0.00000	53.61
65.5 - 66.5	$196,617.14	$0.00	0.00000	53.61
66.5 - 67.5	$196,617.14	$0.00	0.00000	53.61
67.5 - 68.5	$183,404.03	$11,337.37	0.06182	53.61
68.5 - 69.5	$159,722.55	$0.00	0.00000	50.29
69.5 - 70.5	$151,993.31	$855.10	0.00563	50.29
70.5 - 71.5	$145,730.04	$0.00	0.00000	50.01
71.5 - 72.5	$145,405.28	$0.00	0.00000	50.01
72.5 - 73.5	$145,405.28	$0.00	0.00000	50.01

PSO
Electric Division
390.00 Structures and Improvements
Observed Life Table
Retirement Expr. 1966 TO 2016
Placement Years 1934 TO 2016

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	$145,405.28	$0.00	0.00000	50.01
74.5 - 75.5	$145,340.14	$0.00	0.00000	50.01
75.5 - 76.5	$145,330.12	$0.00	0.00000	50.01
76.5 - 77.5	$134,105.56	$346.72	0.00259	50.01
77.5 - 78.5	$133,758.84	$1,006.57	0.00753	49.88
78.5 - 79.5	$132,752.27	$0.00	0.00000	49.51
79.5 - 80.5	$132,569.77	$1,009.90	0.00762	49.51
80.5 - 81.5	$131,559.87	$0.00	0.00000	49.13
81.5 - 82.5	$103,172.61	$1,729.96	0.01677	49.13

PSO

Electric Division
390.00 Structures and Improvements
Original And Smooth Survivor Curves



PSO

Electric Division

350.10 Land and Land Rights

Original Cost Of Utility Plant In Service

And Development Of Composite Remaining Life as of December 31, 2016

Based Upon Broad Group/Remaining Life Procedure and Technique

Average Service Life: ***100*** *Survivor Curve:* ***R4***

Year (1)	Original Cost (2)	Avg. Service Life (3)	Avg. Annual Accrual (4)	Avg. Remaining Life (5)	Future Annual Accruals (6)
1934	171,929.55	100.00	1,719.30	25.03	43,032.20
1935	22,526.43	100.00	225.26	25.73	5,795.36
1936	100.00	100.00	1.00	26.42	26.42
1937	7,541.91	100.00	75.42	27.13	2,046.24
1938	15.00	100.00	0.15	27.84	4.18
1939	16,375.85	100.00	163.76	28.56	4,677.69
1941	106,404.75	100.00	1,064.05	30.03	31,949.69
1942	6,642.42	100.00	66.42	30.76	2,043.40
1943	12,457.91	100.00	124.58	31.52	3,926.54
1944	19,085.52	100.00	190.86	32.27	6,158.87
1945	1,545.13	100.00	15.45	33.04	510.52
1946	11,589.99	100.00	115.90	33.81	3,918.25
1947	2,288.30	100.00	22.88	34.59	791.59
1949	18,450.14	100.00	184.50	36.18	6,674.41
1950	25,273.90	100.00	252.74	36,97	9,344.39
1951	39,855.96	100.00	398.56	37.79	15,060.67
1952	22,635.19	100.00	226.35	38.60	8,737.12
1953	48,824.67	100.00	488.25	39.43	19,251.25
1954	176,065.25	100.00	1,760.66	40.26	70,876.64
1955	16,463.66	100.00	164.64	41.10	6,766.47
1956	36,698.15	100.00	366.98	41.94	15,391.24
1957	220,726.36	100.00	2,207.27	42.80	94,464.42
1958	346,216.42	100.00	3,462.17	43.65	151,128.41
1959	249,374.26	100.00	2,493.75	44.52	111,024.56
1960	217,775.00	100.00	2,177.76	45.39	98,854.36
1961	54,538.00	100.00	545.38	46.27	25,232.91
1962	128,206.00	100.00	1,282.06	47.15	60,450.06

PSO

Electric Division

350.10 Land and Land Rights

Original Cost Of Utility Plant In Service

And Development Of Composite Remaining Life as of December 31, 2016

Based Upon Broad Group/Remaining Life Procedure and Technique

Average Service Life: 100 *Survivor Curve: R4*

Year (1)	Original Cost (2)	Avg. Service Life (3)	Avg. Annual Accrual (4)	Avg. Remaining Life (5)	Future Annual Accruals (6)
1963	62,891.00	100.00	628.91	48.04	30,215.63
1964	214,479.00	100.00	2,144.80	48.94	104,957.88
1965	271,700.00	100.00	2,717.01	49.84	135,417.59
1966	462,311.00	100.00	4,623.12	50.74	234,593.89
1967	150,370.00	100.00	1,503.70	51.66	77,679.05
1968	175,601.00	100.00	1,756.02	52.57	92,316.80
1969	186,608.00	100.00	1,866.09	53.50	99,828.37
1970	444,997.00	100.00	4,449.98	54.42	242,164.18
1971	710,537.00	100.00	7,105.39	55.35	393,299.78
1972	320,298.00	100.00	3,202.99	56.28	180,277.86
1973	608,571.00	100.00	6,085.73	57.23	348,258.80
1974	215,598.00	100.00	2,155.99	58.17	125,404.40
1975	291,688.00	100.00	2,916.89	59.11	172,429.80
1976	1,211,182.91	100.00	12,111.87	60.06	727,462.47
1977	679,095.71	100.00	6,790.98	61.02	414,367.02
1978	232,995.90	100.00	2,329.97	61.97	144,392.14
1979	451,564.28	100.00	4,515.66	62.93	284,184.40
1980	83,081.68	100.00	830.82	63.89	53,084.18
1981	63,884.33	100.00	638.85	64.86	41,435.84
1982	2,454,291.18	100.00	24,542.98	65.83	1,615,583.25
1983	2,091,590.90	100.00	20,915.97	66.80	1,397,150.62
1984	67,961.85	100.00	679.62	67.77	46,057.41
1985	1,239,132.56	100.00	12,391.36	68.75	851,846.11
1986	219,048.33	100.00	2,190.49	69.72	152,722.17
1987	416.91	100.00	4.17	70.70	294.76
1988	55,337.27	100.00	553.37	71.68	39,666.05
1989	546,726.68	100.00	5,467.28	72.66	397,259.65

PSO

Electric Division

350.10 Land and Land Rights

Original Cost Of Utility Plant In Service

And Development Of Composite Remaining Life as of December 31, 2016

Based Upon Broad Group/Remaining Life Procedure and Technique

Average Service Life: 100 *Survivor Curve: R4*

Year (1)	Original Cost (2)	Avg. Service Life (3)	Avg. Annual Accrual (4)	Avg. Remaining Life (5)	Future Annual Accruals (6)
1990	75,905.04	100.00	759.05	73.64	55,900.22
1991	815.22	100.00	8.15	74.63	608.40
1992	2,859,242.17	100.00	28,592.51	75.62	2,162,046.59
1993	2,395,352.18	100.00	23,953.59	76.60	1,834,940.26
1994	321,996.13	100.00	3,219.97	77.59	249,843.57
1996	2,444,999.05	100.00	24,450.06	79.57	1,945,544.03
1997	1,165,096.17	100.00	11,651.00	80.56	938,652.64
1998	317,344.00	100.00	3,173.45	81.56	258,813.86
1999	1,247,530.90	100.00	12,475.35	82.55	1,029,833.75
2000	75,445.08	100.00	754.45	83.54	63,029.19
2001	579,354.37	100.00	5,793.56	84.54	489,774.03
2002	983,646.90	100.00	9,836.50	85.53	841,341.39
2003	208,606.99	100.00	2,086.08	86.53	180,504.23
2004	131,326.05	100.00	1,313.26	87.52	114,941.94
2005	30,510.19	100.00	305.10	88.52	27,007.85
2006	1,598,958.87	100.00	15,989.64	89.52	1,431,345.77
2007	3,900,091.14	100.00	39,001.03	90.51	3,530,157.21
2008	2,101,674.22	100.00	21,016.80	91.51	1,923,285.35
2009	186,926.49	100.00	1,869.27	92.51	172,925.72
2010	22,096.84	100.00	220.97	93.51	20,662.29
2011	537,078.60	100.00	5,370.80	94.51	507,573.26
2012	585,010.59	100.00	5,850.12	95.50	558,712.63
2013	638,802.65	100.00	6,388.05	96.50	616,466.79
2014	446,518.51	100.00	4,465.20	97.50	435,365.47
2016	125,494.64	100.00	1,254.95	99.50	124,867.59

PSO

Electric Division

350.10 Land and Land Rights

Original Cost Of Utility Plant In Service

And Development Of Composite Remaining Life as of December 31, 2016

Based Upon Broad Group/Remaining Life Procedure and Technique

Average Service Life: 100 *Survivor Curve: R4*

Year (1)	Original Cost (2)	Avg. Service Life (3)	Avg. Annual Accrual (4)	Avg. Remaining Life (5)	Future Annual Accruals (6)
Total	38,471,388.20	100.00	384,715.03	74.64	28,714,632.00

Composite Average Remaining Life ... 74.64 Years

PSO

Electric Division

356.00 Overhead Conductors and Devices

Original Cost Of Utility Plant In Service

And Development Of Composite Remaining Life as of December 31, 2016

Based Upon Broad Group/Remaining Life Procedure and Technique

Average Service Life: 68 *Survivor Curve: R2*

Year (1)	Original Cost (2)	Avg. Service Life (3)	Avg. Annual Accrual (4)	Avg. Remaining Life (5)	Future Annual Accruals (6)
1934	474,715.46	68.00	6,981.09	12.80	89,360.23
1935	113,690.99	68.00	1,671.92	13.16	22,006.78
1937	4,493.88	68.00	66.09	13.91	919.07
1939	12,272.77	68.00	180.48	14.68	2,649.82
1940	11,885.50	68.00	174.79	15.08	2,635.99
1941	408,368.27	68.00	6,005.40	15.49	93,014.64
1942	32,296.75	68.00	474.95	15.90	7,553.49
1943	8,900.11	68.00	130.88	16.33	2,137.06
1944	1,804.12	68.00	26.53	16.76	444.65
1946	85,818.23	68.00	1,262.03	17.65	22,274.81
1948	33,026.33	68.00	485.68	18.57	9,021.50
1949	188,878.54	68.00	2,777.62	19.05	52,917.70
1950	64,654.10	68.00	950.79	19.54	18,573.77
1951	48,064.66	68.00	706.83	20.03	14,157.18
1952	81,616.07	68.00	1,200.23	20.53	24,641.05
1953	247,521.01	68.00	3,640.01	21.04	76,592.19
1954	1,103,050.00	68.00	16,221.29	21.56	349,738.64
1955	59,886.50	68.00	880.68	22.09	19,453.75
1956	49,751.79	68.00	731.64	22.63	16,553.84
1957	562,080.59	68.00	8,265.87	23.17	191,534.52
1958	252,456.16	68.00	3,712.58	23.73	88,081.78
1959	157,042.23	68.00	2,309.44	24.29	56,087.34
1960	732,859.36	68.00	10,777.32	24.86	267,912.72
1961	471,850.82	68.00	6,938.97	25.44	176,504.94
1962	306,186.62	68.00	4,502.73	26.03	117,188.67
1963	230,650.34	68.00	3,391.91	26.62	90,294.55
1964	1,056,673.69	68.00	15,539.28	27.23	423,074.04

PSO

Electric Division

356.00 Overhead Conductors and Devices

Original Cost Of Utility Plant In Service

And Development Of Composite Remaining Life as of December 31, 2016

Based Upon Broad Group/Remaining Life Procedure and Technique

Average Service Life: 68 *Survivor Curve: R2*

Year (1)	Original Cost (2)	Avg. Service Life (3)	Avg. Annual Accrual (4)	Avg. Remaining Life (5)	Future Annual Accruals (6)
1965	1,135,963.65	68.00	16,705.31	27.84	465,023.18
1966	273,799.23	68.00	4,026.45	28.46	114,585.49
1967	2,537,902.67	68.00	37,322.01	29.08	1,085,506.15
1968	341,568.39	68.00	5,023.05	29.72	149,293.41
1969	608,191.76	68.00	8,943.98	30.36	271,573.90
1970	1,135,695.46	68.00	16,701.36	31.02	518,004.63
1971	3,278,528.47	68.00	48,213.54	31.67	1,527,072.96
1972	685,660.35	68.00	10,083.22	32.34	326,086.87
1973	412,302.42	68.00	6,063.26	33.01	200,158.69
1974	2,944,701.77	68.00	43,304.34	33.69	1,458,924.66
1975	1,885,199.97	68.00	27,723.46	34.38	953,106.80
1976	580,431.03	68.00	8,535.73	35.07	299,361.20
1977	2,156,210.11	68.00	31,708.90	35.77	1,134,360.14
1978	2,914,860.83	68.00	42,865.50	36.48	1,563,754.00
1979	4,104,152.63	68.00	60,355.04	37.20	2,244,988.62
1980	3,802,625.14	68.00	55,920.83	37.92	2,120,297.39
1981	686,365.03	68.00	10,093.58	38.64	390,064.68
1982	336,677.01	68.00	4,951.12	39.38	194,963.06
1983	945,279.78	68.00	13,901.14	40.12	557,697.79
1984	15,359,665.14	68.00	225,876.90	40.86	9,230,289.48
1985	1,319,046.93	68.00	19,397.70	41.62	807,288.06
1986	2,018,270.70	68.00	29,680.38	42.38	1,257,718.69
1987	699,268.94	68.00	10,283.34	43.14	443,630.83
1988	655,236.81	68.00	9,635.81	43.91	423,112.41
1989	3,073,524.53	68.00	45,198.78	44.69	2,019,807.92
1990	2,410,478.95	68.00	35,448.14	45.47	1,611,774.46
1991	7,413,728.86	68.00	109,025.17	46.26	5,043,126.70

PSO

Electric Division

356.00 Overhead Conductors and Devices

Original Cost Of Utility Plant In Service

And Development Of Composite Remaining Life as of December 31, 2016

Based Upon Broad Group/Remaining Life Procedure and Technique

Average Service Life: 68 *Survivor Curve: R2*

Year *(1)*	*Original Cost* *(2)*	*Avg. Service Life* *(3)*	*Avg. Annual Accrual* *(4)*	*Avg. Remaining Life* *(5)*	*Future Annual Accruals* *(6)*
1992	873,253.33	68.00	12,841.93	47.05	604,201.93
1993	3,683,826.38	68.00	54,173.79	47.85	2,592,023.33
1994	4,326,004.65	68.00	63,617.57	48.65	3,095,101.21
1995	1,795.43	68.00	26.40	49.46	1,305.90
1996	1,536,650.02	68.00	22,597.74	50.28	1,136,111.49
1997	1,718,944.00	68.00	25,278.53	51.09	1,291,584.24
1998	754,788.86	68.00	11,099.81	51.92	576,300.41
1999	962,469.78	68.00	14,153.93	52.75	746,602.24
2000	208,568.12	68.00	3,067.17	53.58	164,352.13
2001	3,979,985.58	68.00	58,529.06	54.42	3,185,332.08
2002	8,613,569.89	68.00	126,669.85	55.27	7,000,804.22
2003	2,681,626.76	68.00	39,435.60	56.12	2,212,988.87
2004	3,225,616.30	68.00	47,435.42	56.97	2,702,432.88
2005	577,331.17	68.00	8,490.14	57.83	490,972.17
2006	2,771,363.58	68.00	40,755.25	58.69	2,391,992.50
2007	10,701,679.24	68.00	157,377.27	59.56	9,373,126.35
2008	10,068,105.23	68.00	148,060.02	60.43	8,947,082.12
2009	4,937,473.72	68.00	72,609.74	61.31	4,451,373.82
2010	12,218,544.55	68.00	179,684.06	62.18	11,173,547.21
2011	4,828,919.77	68.00	71,013.36	63.07	4,478,758.85
2012	3,860,877.48	68.00	56,777.48	63.96	3,631,283.69
2013	4,442,053.41	68.00	65,324.16	64.85	4,236,210.22
2014	2,512,011.65	68.00	36,941.26	65.74	2,428,670.05
2015	4,567,476.45	68.00	67,168.61	66.64	4,476,402.42
2016	3,993,763.22	68.00	58,731.67	67.55	3,967,139.78

PSO

Electric Division

356.00 Overhead Conductors and Devices

Original Cost Of Utility Plant In Service

And Development Of Composite Remaining Life as of December 31, 2016

Based Upon Broad Group/Remaining Life Procedure and Technique

Average Service Life: 68 *Survivor Curve: R2*

Year	Original Cost	Avg. Service Life	Avg. Annual Accrual	Avg. Remaining Life	Future Annual Accruals
(1)	(2)	(3)	(4)	(5)	(6)
Total	168,562,530.02	68.00	2,478,854.92	50.02	124,002,596.99

Composite Average Remaining Life ... 50.02 Years

PSO

Electric Division

360.10 Land and Land Rights

Original Cost Of Utility Plant In Service

And Development Of Composite Remaining Life as of December 31, 2016

Based Upon Broad Group/Remaining Life Procedure and Technique

Average Service Life: 100 *Survivor Curve: R4*

Year (1)	Original Cost (2)	Avg. Service Life (3)	Avg. Annual Accrual (4)	Avg. Remaining Life (5)	Future Annual Accruals (6)
1953	310.50	100.00	3.11	39.43	122.43
1962	570.00	100.00	5.70	47.15	268.76
1996	4,067.84	100.00	40.68	79.57	3,236.88
1997	55,374.14	100.00	553.74	80.56	44,611.84
1998	11,974.96	100.00	119.75	81.56	9,766.33
1999	652,711.34	100.00	6,527.13	82.55	538,811.64
2000	301,564.77	100.00	3,015.66	83.54	251,936.69
2001	578,121.58	100.00	5,781.23	84.54	488,731.85
2002	17,814.82	100.00	178.15	85.53	15,237.53
2004	69,391.37	100.00	693.92	87.52	60,734.17
2005	125,019.21	100.00	1,250.20	88.52	110,667.95
2007	129,617.19	100.00	1,296.18	90.51	117,322.66
2008	164,158.96	100.00	1,641.59	91.51	150,225.24
2009	290,218.68	100.00	2,902.20	92.51	268,481.33
2010	32,105.03	100.00	321.05	93.51	30,020.75
2012	38,891.15	100.00	388.91	95.50	37,142.88
2013	42,100.09	100.00	421.00	96.50	40,628.05
2014	33,418.96	100.00	334.19	97.50	32,584.23
2015	278,648.48	100.00	2,786.49	98.50	274,472.37
Total	2,826,079.07	100.00	28,260.87	87.58	2,475,003.57

Composite Average Remaining Life ... 87.58 Years

PSO

Electric Division

362.00 Station Equipment

Original Cost Of Utility Plant In Service

And Development Of Composite Remaining Life as of December 31, 2016

Based Upon Broad Group/Remaining Life Procedure and Technique

Average Service Life: 65 *Survivor Curve: R1.5*

Year (1)	Original Cost (2)	Avg. Service Life (3)	Avg. Annual Accrual (4)	Avg. Remaining Life (5)	Future Annual Accruals (6)
1934	147,991.02	65.00	2,276.76	13.85	31,543.04
1935	113,367.65	65.00	1,744.10	14.20	24,764.21
1936	17,718.46	65.00	272.59	14.55	3,966.32
1937	124,095.38	65.00	1,909.14	14.91	28,460.04
1938	51,273.43	65.00	788.81	15.27	12,046.33
1939	51,260.58	65.00	788.62	15.64	12,335.02
1940	11,015.54	65.00	169.47	16.02	2,714.68
1941	22,165.35	65.00	341.00	16.40	5,593.38
1942	93,754.46	65.00	1,442.36	16.79	24,223.46
1943	13,848.22	65.00	213.05	17.19	3,662.93
1944	57,835.39	65.00	889.77	17.60	15,659.13
1945	41,404.75	65.00	636.99	18.01	11,474.26
1946	12,612.72	65.00	194.04	18.44	3,577.14
1947	103,067.13	65.00	1,585.63	18.86	29,911.92
1948	255,009.69	65.00	3,923.19	19.30	75,725.53
1949	415,200.29	65.00	6,387.63	19.75	126,136.64
1950	390,770.82	65.00	6,011.80	20.20	121,443.47
1951	279,869.74	65.00	4,305.64	20.66	88,961.93
1952	748,606.49	65.00	11,516.90	21.13	243,373.54
1953	821,764.26	65.00	12,642.40	21.61	273,185.02
1954	1,290,140.51	65.00	19,848.11	22.10	438,547.49
1955	1,208,491.21	65.00	18,591.98	22.59	419,953.81
1956	1,042,618.44	65.00	16,040.12	23.09	370,378.86
1957	1,661,435.50	65.00	25,560.28	23.60	603,206.45
1958	1,332,362.93	65.00	20,497.68	24.12	494,372.59
1959	1,136,363.09	65.00	17,482.33	24.64	430,847.67
1960	1,003,804.72	65.00	15,442.99	25.18	388,820.82

PSO

Electric Division

362.00 Station Equipment

Original Cost Of Utility Plant In Service

And Development Of Composite Remaining Life as of December 31, 2016

Based Upon Broad Group/Remaining Life Procedure and Technique

Average Service Life: 65 *Survivor Curve:* R1.5

Year (1)	Original Cost (2)	Avg. Service Life (3)	Avg. Annual Accrual (4)	Avg. Remaining Life (5)	Future Annual Accruals (6)
1961	1,025,178.89	65.00	15,771.82	25.72	405,650.96
1962	932,959.01	65.00	14,353.07	26.27	377,032.99
1963	756,294.68	65.00	11,635.18	26.83	312,128.14
1964	1,129,133.62	65.00	17,371.11	27.39	475,791.61
1965	1,812,110.04	65.00	27,878.33	27.96	779,558.97
1966	1,464,481.43	65.00	22,530.25	28.54	643,042.00
1967	1,100,098.21	65.00	16,924.41	29.13	492,996.30
1968	2,015,233.07	65.00	31,003.26	29.72	921,482.07
1969	1,395,177.09	65.00	21,464.04	30.32	650,890.16
1970	1,154,743.81	65.00	17,765.10	30.93	549,501.61
1971	968,085.76	65.00	14,893.47	31.55	469,862.69
1972	2,134,826.55	65.00	32,843.14	32.17	1,056,592.18
1973	1,812,716.31	65.00	27,887.65	32.80	914,688.06
1974	1,609,521.39	65.00	24,761.61	33.44	827,907.49
1975	3,449,716.06	65.00	53,072.00	34.08	1,808,494.32
1976	2,370,023.83	65.00	36,461.53	34.73	1,266,138.45
1977	1,188,864.30	65.00	18,290.03	35.38	647,081.67
1978	3,850,380.54	65.00	59,236.01	36.04	2,134,896.22
1979	1,845,932.24	65.00	28,398.66	36.71	1,042,404.54
1980	2,239,557.52	65.00	34,454.37	37.38	1,287,894.21
1981	372,272.88	65.00	5,727.22	38.06	217,959.51
1982	2,768,340.94	65.00	42,589.42	38.74	1,649,993.75
1983	2,759,198.56	65.00	42,448.77	39.43	1,673,754.18
1984	2,325,228.34	65.00	35,772.37	40.13	1,435,402.11
1985	1,958,012.17	65.00	30,122.95	40.83	1,229,812.65
1986	1,473,867.53	65.00	22,674.65	41.53	941,700.46
1987	917,236.57	65.00	14,111.18	42.24	596,078.91

PSO

Electric Division

362.00 Station Equipment

Original Cost Of Utility Plant In Service

And Development Of Composite Remaining Life as of December 31, 2016

Based Upon Broad Group/Remaining Life Procedure and Technique

Average Service Life: 65 *Survivor Curve: R1.5*

Year (1)	Original Cost (2)	Avg. Service Life (3)	Avg. Annual Accrual (4)	Avg. Remaining Life (5)	Future Annual Accruals (6)
1988	2,102,346.74	65.00	32,343.46	42.96	1,389,340.16
1989	4,241,730.43	65.00	65,256.71	43.68	2,850,156.99
1990	5,738,432.81	65.00	88,282.66	44.40	3,919,705.39
1991	6,966,755.93	65.00	107,179.74	45.13	4,836,899.02
1992	3,462,274.27	65.00	53,265.20	45.86	2,442,793.66
1993	3,740,669.80	65.00	57,548.17	46.60	2,681,683.54
1994	3,925,458.81	65.00	60,391.04	47.34	2,858,869.00
1996	4,027,006.90	65.00	61,953.31	48.83	3,025,403.30
1997	5,068,096.34	65.00	77,969.90	49.59	3,866,335.62
1998	6,232,529.55	65.00	95,884.07	50.34	4,827,246.99
1999	6,767,984.13	65.00	104,121.75	51.10	5,321,105.40
2000	2,152,054.47	65.00	33,108.19	51.87	1,717,295.62
2001	4,625,309.96	65.00	71,157.87	52.64	3,745,502.48
2002	4,546,579.46	65.00	69,946.65	53.41	3,735,746.74
2003	6,967,652.55	65.00	107,193.54	54.18	5,808,072.53
2004	3,755,858.23	65.00	57,781.83	54.96	3,175,830.19
2005	4,494,520.47	65.00	69,145.75	55.74	3,854,471.70
2006	7,853,460.82	65.00	120,821.22	56.53	6,830,129.76
2007	14,473,592.40	65.00	222,668.33	57.32	12,763,296.89
2008	10,803,036.91	65.00	166,198.84	58.11	9,658,442.92
2009	14,400,385.31	65.00	221,542.08	58.91	13,050,995.04
2010	9,747,054.39	65.00	149,953.12	59.71	8,953,858.56
2011	11,720,065.81	65.00	180,306.83	60.52	10,911,336.37
2012	6,184,388.28	65.00	95,143.44	61.32	5,834,442.73
2013	35,745,084.21	65.00	549,918.64	62.13	34,168,703.96
2014	30,449,453.28	65.00	468,448.25	62.95	29,488,033.45
2015	24,468,758.00	65.00	376,438.51	63.77	24,004,351.12

PSO

Electric Division

362.00 Station Equipment

Original Cost Of Utility Plant In Service

And Development Of Composite Remaining Life as of December 31, 2016

Based Upon Broad Group/Remaining Life Procedure and Technique

Average Service Life: 65 *Survivor Curve: R1.5*

Year (1)	*Original Cost* (2)	*Avg. Service Life* (3)	*Avg. Annual Accrual* (4)	*Avg. Remaining Life* (5)	*Future Annual Accruals* (6)
2016	21,455,718.52	65.00	330,084.54	64.59	21,319,559.13
Total	325,393,297.89	65.00	5,005,998.59	53.16	266,133,230.15

Composite Average Remaining Life ... 53.16 Years

PSO

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, 2016

Based Upon Broad Group/Remaining Life Procedure and Technique

Average Service Life: 58 *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)
1934	29,165.13	58.00	502.84	23.67	11,901.27
1935	110,993.50	58.00	1,913.65	23.91	45,751.77
1936	7,571.84	58.00	130.55	24.15	3,152.33
1937	12,278.69	58.00	211.70	24.39	5,163.08
1938	5,574.78	58.00	96.12	24.63	2,367.65
1939	6,304.91	58.00	108.70	24.88	2,704.80
1940	5,720.43	58.00	98.63	25.13	2,478.60
1941	3,481.75	58.00	60.03	25.38	1,523.71
1942	11,549.64	58.00	199.13	25.64	5,105.09
1943	12,819.43	58.00	221.02	25.90	5,723.42
1944	16,594.27	58.00	286.10	26.15	7,482.81
1945	16,976.90	58.00	292.70	26.42	7,731.93
1946	56,622.60	58.00	976.24	26.68	26,047.81
1947	167,075.24	58.00	2,880.56	26.95	77,625.76
1948	234,431.76	58.00	4,041.86	27.22	110,008.53
1949	280,140.47	58.00	4,829.93	27.49	132,771.42
1950	294,807.24	58.00	5,082.80	27.77	141,125.04
1951	322,214.67	58.00	5,555.34	28.04	155,783.00
1952	315,950.91	58.00	5,447.34	28.32	154,278.61
1953	497,361.50	58.00	8,575.06	28.60	245,285.31
1954	314,046.70	58.00	5,414.51	28.89	156,429.13
1955	390,691.12	58.00	6,735.95	29.18	196,544.70
1956	496,739.32	58.00	8,564.34	29.47	252,384.30
1957	593,548.52	58.00	10,233.44	29.76	304,586.87
1958	550,959.41	58.00	9,499.15	30.06	285,543.56
1959	499,146.23	58.00	8,605.84	30.36	261,264.33
1960	649,267.69	58.00	11,194.10	30.66	343,223.20

PSO

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, 2016

Based Upon Broad Group/Remaining Life Procedure and Technique

Average Service Life: 58 *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)
1961	734,064.89	58.00	12,656.09	30.97	391,919.40
1962	727,653.35	58.00	12,545.55	31.27	392,356.07
1963	769,540.35	58.00	13,267.73	31.59	419,065.41
1964	147,597.79	58.00	2,544.75	31.90	81,177.60
1965	856,325.81	58.00	14,764.01	32.22	475,645.87
1966	573,940.02	58.00	9,895.36	32.54	321,959.06
1967	472,243.49	58.00	8,142.00	32.86	267,540.77
1968	1,024,061.00	58.00	17,655.95	33.19	585,930.55
1969	1,059,154.09	58.00	18,260.99	33.52	612,018.14
1970	1,127,280.42	58.00	19,435.57	33.85	657,843.46
1971	1,181,132.87	58.00	20,364.04	34.18	696,105.31
1972	1,221,849.00	58.00	21,066.03	34.52	727,247.96
1973	1,344,001.24	58.00	23,172.07	34.86	807,879.03
1974	1,379,544.63	58.00	23,784.88	35.21	837,460.49
1975	1,185,253.03	58.00	20,435.08	35.56	726,650.09
1976	1,362,067.46	58.00	23,483.56	35.91	843,318.75
1977	1,473,707.34	58.00	25,408.35	36.27	921,474.67
1978	1,973,936.94	58.00	34,032.87	36.63	1,246,477.45
1979	2,639,966.44	58.00	45,515.95	36.99	1,683,565.00
1980	2,011,829.14	58.00	34,686.17	37.35	1,295,685.19
1981	2,438,498.01	58.00	42,042.41	37.72	1,586,016.83
1982	4,153,603.86	58.00	71,612.74	38.10	2,728,269.85
1983	3,260,783.28	58.00	56,219.53	38.47	2,163,037.32
1984	4,230,937.69	58.00	72,946.07	38.86	2,834,476.29
1985	3,819,288.42	58.00	65,848.78	39.25	2,584,259.64
1986	3,614,699.86	58.00	62,321.44	39.64	2,470,404.66
1987	4,165,250.68	58.00	71,813.55	40.04	2,875,587.54

PSO

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, 2016

Based Upon Broad Group/Remaining Life Procedure and Technique

Average Service Life: 58 *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)
1988	3,813,141.51	58.00	65,742.80	40.45	2,659,521.45
1989	4,082,123.47	58.00	70,380.34	40.87	2,876,684.79
1990	3,429,455.29	58.00	59,127.62	41.30	2,442,100.32
1991	4,032,251.65	58.00	69,520.50	41.74	2,901,997.59
1992	4,169,985.66	58.00	71,895.19	42.20	3,033,624.34
1993	5,164,313.99	58.00	89,038.51	42.66	3,798,117.98
1994	4,938,405.85	58.00	85,143.60	43.13	3,672,591.50
1995	5,833,386.98	58.00	100,574.07	43.62	4,387,443.10
1996	11,566,747.08	58.00	199,423.57	44.13	8,799,992.61
1997	8,267,487.28	58.00	142,540.67	44.64	6,363,302.77
1998	11,039,833.38	58.00	190,338.99	45.17	8,598,373.86
1999	11,289,889.17	58.00	194,650.23	45.72	8,899,459.76
2000	12,759,384.66	58.00	219,985.97	46.28	10,181,174.47
2001	9,855,338.27	58.00	169,916.98	46.85	7,961,452.35
2002	4,600,484.43	58.00	79,317.46	47.45	3,763,368.42
2003	6,900,153.31	58.00	118,966.31	48.05	5,716,807.81
2004	12,762,425.81	58.00	220,038.40	48.67	10,710,096.08
2005	12,084,111.86	58.00	208,343.51	49.31	10,274,119.01
2006	14,146,636.14	58.00	243,903.72	49.97	12,187,551.41
2007	15,094,907.59	58.00	260,252.98	50.64	13,179,214.81
2008	17,749,324.96	58.00	306,018.08	51.33	15,706,497.30
2009	10,263,085.04	58.00	176,946.99	52.03	9,206,812.91
2010	12,490,507.39	58.00	215,350.22	52.75	11,360,765.35
2011	17,191,528.26	58.00	296,401.05	53.50	15,856,331.27
2012	19,572,441.61	58.00	337,450.64	54.25	18,308,302.30
2013	17,368,177.04	58.00	299,446.67	55.04	16,480,898.10
2014	29,409,373.70	58.00	507,050.27	55.84	28,315,773.29

PSO

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, 2016

Based Upon Broad Group/Remaining Life Procedure and Technique

Average Service Life: 58 *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)
2015	23,216,296.64	58.00	400,274.75	56.67	22,684,694.66
2016	22,911,204.18	58.00	395,014.61	57.54	22,730,707.60
Total	390,852,647.95	58.00	6,738,733.86	48.56	327,235,137.60

Composite Average Remaining Life ... 48.56 Years

PSO

Electric Division

366.00 Underground Conduit

Original Cost Of Utility Plant In Service

And Development Of Composite Remaining Life as of December 31, 2016

Based Upon Broad Group/Remaining Life Procedure and Technique

Average Service Life: 78 *Survivor Curve: R1.5*

Year (1)	*Original Cost* (2)	*Avg. Service Life* (3)	*Avg. Annual Accrual* (4)	*Avg. Remaining Life* (5)	*Future Annual Accruals* (6)
1937	119,718.00	78.00	1,534.83	24.38	37,415.08
1938	9,791.77	78.00	125.53	24.84	3,118.21
1939	2,247.48	78.00	28.81	25.31	729.28
1940	868.97	78.00	11.14	25.79	287.27
1941	40.61	78.00	0.52	26.27	13.68
1946	2,815.75	78.00	36.10	28.79	1,039.14
1947	7.76	78.00	0.10	29.31	2.92
1949	115,148.10	78.00	1,476.24	30.37	44,838.03
1950	133,403.05	78.00	1,710.28	30.92	52,878.34
1951	1,460.44	78.00	18.72	31.47	589.16
1953	4,629.33	78.00	59.35	32.59	1,933.93
1954	273,583.31	78.00	3,507.45	33.15	116,283.40
1956	126,363.17	78.00	1,620.03	34.31	55,578.12
1957	128,989.27	78.00	1,653.69	34.90	57,707.19
1958	44,051.12	78.00	564.75	35.49	20,042.17
1959	68,512.56	78.00	878.36	36.09	31,696.84
1960	87,513.23	78.00	1,121.95	36.69	41,167.69
1961	58,807.34	78.00	753.93	37.30	28,124.15
1962	11,260.13	78.00	144.36	37.92	5,473.96
1963	21,719.82	78.00	278.46	38.54	10,731.75
1964	59,470.95	78.00	762.44	39.17	29,864.68
1965	18,309.32	78.00	234.73	39.80	9,342.98
1966	19,338.26	78.00	247.92	40.44	10,026.18
1967	36,577.13	78.00	468.93	41.09	19,266.59
1968	29,098.14	78.00	373.05	41.74	15,569.27
1969	11,914.31	78.00	152.75	42.39	6,474.77
1971	16,850.65	78.00	216.03	43.71	9,443.68

PSO

Electric Division

366.00 Underground Conduit

Original Cost Of Utility Plant In Service

And Development Of Composite Remaining Life as of December 31, 2016

Based Upon Broad Group/Remaining Life Procedure and Technique

Average Service Life: 78 *Survivor Curve:* R1.5

Year (1)	Original Cost (2)	Avg. Service Life (3)	Avg. Annual Accrual (4)	Avg. Remaining Life (5)	Future Annual Accruals (6)
1972	115,808.91	78.00	1,484.72	44.38	65,896.96
1973	269,239.12	78.00	3,451.75	45.06	155,526.69
1974	19,622.79	78.00	251.57	45.74	11,506.34
1975	151,525.43	78.00	1,942.62	46.42	90,179.19
1976	36,062.65	78.00	462.34	47.11	21,780.50
1977	147,987.77	78.00	1,897.26	47.80	90,692.35
1978	112,246.66	78.00	1,439.05	48.50	69,794.70
1979	301,942.21	78.00	3,871.02	49.20	190,462.10
1980	67,627.04	78.00	867.01	49.91	43,269.97
1981	3,702.95	78.00	47.47	50.62	2,402.93
1982	17,000.00	78.00	217.95	51.33	11,187.74
1983	162,112.42	78.00	2,078.34	52.05	108,178.08
1984	165,147.32	78.00	2,117.25	52.77	111,730.25
1985	5,420.00	78.00	69.49	53.50	3,717.41
1986	93,866.93	78.00	1,203.41	54.23	65,257.85
1987	358,491.58	78.00	4,596.00	54.96	252,595.57
1988	383.00	78.00	4.91	55.70	273.48
1989	3,359.76	78.00	43.07	56.44	2,430.94
1990	383,646.59	78.00	4,918.50	57.18	281,239.44
1991	45,002.90	78.00	576.95	57.93	33,420.63
1992	5,344.54	78.00	68.52	58.68	4,020.48
1993	325.73	78.00	4.18	59.43	248.18
1994	30,469.46	78.00	390.63	60.19	23,510.20
1995	91,349.75	78.00	1,171.14	60.94	71,373.72
1996	1,064,578.96	78.00	13,648.32	61.71	842,202.86
1997	814,396.14	78.00	10,440.88	62.47	652,267.80
1998	1,070,373.34	78.00	13,722.61	63.24	867,823.12

PSO

Electric Division

366.00 Underground Conduit

Original Cost Of Utility Plant In Service

And Development Of Composite Remaining Life as of December 31, 2016

Based Upon Broad Group/Remaining Life Procedure and Technique

Average Service Life: 78 *Survivor Curve: R1.5*

Year (1)	Original Cost (2)	Avg. Service Life (3)	Avg. Annual Accrual (4)	Avg. Remaining Life (5)	Future Annual Accruals (6)
1999	586,505.17	78.00	7,519.23	64.01	481,327.05
2000	520,920.74	78.00	6,678.41	64.79	432,675.45
2001	544,343.96	78.00	6,978.70	65.56	457,554.48
2002	4,919,572.62	78.00	63,070.85	66.34	4,184,396.42
2003	4,134,594.02	78.00	53,007.11	67.13	3,558,326.37
2004	1,412,856.22	78.00	18,113.37	67.92	1,230,180.55
2005	1,584,075.61	78.00	20,308.47	68.70	1,395,289.31
2006	2,268,086.78	78.00	29,077.76	69.50	2,020,855.14
2007	3,589,326.53	78.00	46,016.57	70.29	3,234,681.70
2008	6,543,742.95	78.00	83,893.35	71.09	5,964,158.40
2009	10,253,688.95	78.00	131,456.30	71.89	9,450,815.88
2010	3,925,053.63	78.00	50,320.72	72.70	3,658,262.51
2011	2,498,723.91	78.00	32,034.62	73.51	2,354,745.68
2012	4,014,959.71	78.00	51,473.35	74.32	3,825,313.29
2013	2,458,334.55	78.00	31,516.81	75.13	2,367,877.97
2014	9,965,852.91	78.00	127,766.13	75.95	9,703,450.19
2015	4,874,111.10	78.00	62,488.01	76.77	4,796,957.23
2016	5,419,267.06	78.00	69,477.12	77.59	5,390,579.35
Total	76,453,540.34	78.00	980,164.30	70.59	69,190,074.93

Composite Average Remaining Life ... 70.59 Years

PSO

Electric Division

370.00 Meters

Original Cost Of Utility Plant In Service

And Development Of Composite Remaining Life as of December 31, 2016

Based Upon Broad Group/Remaining Life Procedure and Technique

Average Service Life: 15 *Survivor Curve: L0*

Year (1)	Original Cost (2)	Avg. Service Life (3)	Avg. Annual Accrual (4)	Avg. Remaining Life (5)	Future Annual Accruals (6)
1983	11,334.41	15.00	755.59	4.41	3,330.09
1984	19,440.96	15.00	1,296.01	4.59	5,944.18
1985	93,942.59	15.00	6,262.56	4.77	29,864.66
1986	65,815.95	15.00	4,387.54	4.96	21,744.12
1987	88,758.63	15.00	5,916.98	5.15	30,464.32
1988	200,429.42	15.00	13,361.37	5.35	71,418.38
1989	134,928.75	15.00	8,994.85	5.55	49,895.65
1990	342,697.01	15.00	22,845.46	5.76	131,481.44
1991	435,838.76	15.00	29,054.63	5.97	173,400.25
1992	173,458.24	15.00	11,563.37	6.19	71,543.22
1993	298,949.80	15.00	19,929.11	6.41	127,801.42
1994	5,354.32	15.00	356.94	6.64	2,371.59
1996	180,517.47	15.00	12,033.97	7.13	85,785.87
1997	203,356.78	15.00	13,556.52	7.38	100,066.53
1998	148,014.24	15.00	9,867.18	7.64	75,406.28
1999	334,523.67	15.00	22,300.59	7.91	176,426.41
2001	1,257,869.72	15.00	83,854.27	8.47	710,641.30
2002	164,747.48	15.00	10,982.68	8.77	96,323.14
2003	23,479.59	15.00	1,565.24	9.08	14,205.50
2004	2,326.64	15.00	155.10	9.39	1,456.57
2005	6,539.35	15.00	435.94	9.72	4,236.08
2006	48,528.45	15.00	3,235.09	10.05	32,526.40
2007	7,638.24	15.00	509.19	10.40	5,297.12
2008	267,004.44	15.00	17,799.51	10.76	191,590.01
2009	221,573.23	15.00	14,770.90	11.14	164,505.57
2010	262,432.11	15.00	17,494.70	11.52	201,617.78
2011	601,453.55	15.00	40,095.13	11.93	478,392.28

PSO

Electric Division

370.00 Meters

Original Cost Of Utility Plant In Service

And Development Of Composite Remaining Life as of December 31, 2016

Based Upon Broad Group/Remaining Life Procedure and Technique

Average Service Life: 15 *Survivor Curve: L0*

Year (1)	*Original Cost* (2)	*Avg. Service Life* (3)	*Avg. Annual Accrual* (4)	*Avg. Remaining Life* (5)	*Future Annual Accruals* (6)
2012	1,568,202.87	15.00	104,542.23	12.37	1,292,699.48
2013	1,513,124.62	15.00	100,870.51	12.83	1,294,567.34
2014	1,812,135.39	15.00	120,803.68	13.35	1,612,395.60
2015	586,744.80	15.00	39,114.59	13.92	544,592.68
2016	3,664,406.20	15.00	244,282.94	14.60	3,565,317.66
Total	14,745,567.68	15.00	982,994.36	11.56	11,367,308.92

Composite Average Remaining Life ... 11.56 Years

PSO

Electric Division

373.00 Street Lighting and Signal Systems

Original Cost Of Utility Plant In Service

And Development Of Composite Remaining Life as of December 31, 2016

Based Upon Broad Group/Remaining Life Procedure and Technique

Average Service Life: 44 *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)
1934	63,539.47	44.00	1,444.04	2.67	3,859.93
1935	34,034.84	44.00	773.50	3.13	2,422.98
1938	2,196.27	44.00	49.91	4.46	222.78
1939	118.42	44.00	2.69	4.89	13.17
1940	722.09	44.00	16.41	5.31	87.21
1941	862.63	44.00	19.60	5.73	112.34
1942	1,575.36	44.00	35.80	6.14	219.79
1945	4,081.33	44.00	92.75	7.35	681.69
1946	616.63	44.00	14.01	7.75	108.55
1947	5,551.64	44.00	126.17	8.14	1,027.33
1948	13,229.38	44.00	300.66	8.54	2,567.23
1949	15,097.08	44.00	343.11	8.93	3,065.03
1950	40,369.27	44.00	917.46	9.33	8,559.12
1951	33,912.55	44.00	770.72	9.73	7,496.02
1952	26,611.20	44.00	604.78	10.12	6,122.89
1953	79,030.59	44.00	1,796.10	10.52	18,899.63
1954	43,199.57	44.00	981.78	10.92	10,725.00
1955	23,198.47	44.00	527.22	11.33	5,972.27
1956	48,827.22	44.00	1,109.68	11.73	13,020.48
1957	85,004.11	44.00	1,931.86	12.14	23,457.84
1958	61,355.45	44.00	1,394.40	12.55	17,506.60
1959	25,067.63	44.00	569.70	12.97	7,389.37
1960	153,492.15	44.00	3,488.36	13.39	46,707.25
1961	88,607.36	44.00	2,013.75	13.81	27,814.78
1962	88,298.17	44.00	2,006.72	14.24	28,574.57
1963	55,069.60	44.00	1,251.55	14.67	18,360.91
1964	65,458.78	44.00	1,487.66	15.11	22,472.50

PSO

Electric Division

373.00 Street Lighting and Signal Systems

Original Cost Of Utility Plant In Service

And Development Of Composite Remaining Life as of December 31, 2016

Based Upon Broad Group/Remaining Life Procedure and Technique

Average Service Life: 44 *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)
1965	107,384.36	44.00	2,440.48	15.55	37,939.50
1966	199,411.42	44.00	4,531.95	15.99	72,467.66
1967	221,558.76	44.00	5,035.28	16.44	82,777.95
1968	266,764.57	44.00	6,062.66	16.89	102,421.52
1969	201,711.59	44.00	4,584.22	17.35	79,549.23
1970	146,963.55	44.00	3,339.99	17.82	59,507.81
1971	191,437.43	44.00	4,350.73	18.29	79,558.04
1972	207,180.41	44.00	4,708.51	18.76	88,333.72
1973	320,247.86	44.00	7,278.15	19.24	140,030.61
1974	274,975.35	44.00	6,249.26	19.72	123,263.25
1975	333,026.10	44.00	7,568.56	20.21	152,997.34
1976	172,808.82	44.00	3,927.36	20.71	81,336.08
1977	392,720.99	44.00	8,925.22	21.21	189,309.03
1978	340,722.02	44.00	7,743.46	21.72	168,162.79
1979	364,525.28	44.00	8,284.43	22.23	184,145.07
1980	430,485.35	44.00	9,783.48	22.74	222,516.28
1981	553,247.53	44.00	12,573.45	23.27	292,526.28
1982	277,776.70	44.00	6,312.93	23.79	150,199.70
1983	375,036.96	44.00	8,523.32	24.32	207,320.95
1984	460,673.48	44.00	10,469.55	24.86	260,276.73
1985	554,599.56	44.00	12,604.18	25.40	320,164.52
1986	505,492.07	44.00	11,488.13	25.95	298,093.99
1987	465,179.44	44.00	10,571.96	26.50	280,141.15
1988	1,049,496.17	44.00	23,851.50	27.05	645,262.67
1989	1,019,150.60	44.00	23,161.85	27.61	639,552.71
1990	931,003.81	44.00	21,158.57	28.18	596,168.19
1991	1,027,898.41	44.00	23,360.66	28.74	671,462.01

PSO

Electric Division

373.00 Street Lighting and Signal Systems

Original Cost Of Utility Plant In Service

And Development Of Composite Remaining Life as of December 31, 2016

Based Upon Broad Group/Remaining Life Procedure and Technique

Average Service Life: 44 *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)
1992	1,100,045.67	44.00	25,000.32	29.31	732,858.87
1993	1,650,176.03	44.00	37,502.93	29.89	1,120,913.81
1994	1,430,825.64	44.00	32,517.84	30.47	990,697.07
1995	291,641.07	44.00	6,628.02	31.05	205,778.77
1996	3,728,052.60	44.00	84,726.05	31.63	2,679,895.28
1997	1,697,302.97	44.00	38,573.97	32.22	1,242,721.74
1998	2,146,824.73	44.00	48,790.08	32.80	1,600,558.33
1999	2,278,186.23	44.00	51,775.48	33.40	1,729,068.80
2000	1,269,890.57	44.00	28,860.33	33.99	980,914.92
2001	1,654,720.82	44.00	37,606.22	34.58	1,300,525.36
2002	482,111.40	44.00	10,956.76	35.18	385,444.38
2003	1,496,522.07	44.00	34,010.89	35.78	1,216,776.18
2004	1,883,521.71	44.00	42,806.09	36.38	1,557,082.82
2005	1,063,963.02	44.00	24,180.29	36.98	894,080.38
2006	1,355,409.34	44.00	30,803.88	37.58	1,157,527.60
2007	2,119,819.35	44.00	48,176.34	38.18	1,839,400.00
2008	5,922,424.63	44.00	134,596.72	38.79	5,220,450.51
2009	1,851,169.14	44.00	42,070.82	39.39	1,657,273.97
2010	1,497,890.09	44.00	34,041.98	40.00	1,361,705.79
2011	1,469,859.45	44.00	33,404.94	40.61	1,356,601.59
2012	1,801,147.53	44.00	40,934.00	41.22	1,687,430.94
2013	2,166,761.17	44.00	49,243.17	41.84	2,060,188.72
2014	1,886,473.47	44.00	42,873.17	42.45	1,820,084.79
2015	1,789,117.08	44.00	40,660.59	43.07	1,751,286.58
2016	2,411,399.22	44.00	54,802.96	43.69	2,394,376.16

PSO

Electric Division

373.00 Street Lighting and Signal Systems

Original Cost Of Utility Plant In Service

And Development Of Composite Remaining Life as of December 31, 2016

Based Upon Broad Group/Remaining Life Procedure and Technique

Average Service Life: 44 *Survivor Curve: R0.5*

Year	*Original Cost*	*Avg. Service Life*	*Avg. Annual Accrual*	*Avg. Remaining Life*	*Future Annual Accruals*
(1)	*(2)*	*(3)*	*(4)*	*(5)*	*(6)*
Total	58,895,860.85	44.00	1,338,504.08	33.95	45,446,595.36

Composite Average Remaining Life ... 33.95 Years

PSO

Electric Division

390.00 Structures and Improvements

Original Cost Of Utility Plant In Service

And Development Of Composite Remaining Life as of December 31, 2016

Based Upon Broad Group/Remaining Life Procedure and Technique

Average Service Life: 69 *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)
1934	101,442.65	69.00	1,470.16	23.61	34,711.93
1935	28,387.26	69.00	411.40	24.05	9,894.09
1937	182.50	69.00	2.64	24.94	65.95
1940	11,224.56	69.00	162.67	26.29	4,276.25
1941	10.02	69.00	0.15	26.74	3.88
1942	65.14	69.00	0.94	27.20	25.68
1945	324.76	69.00	4.71	28.60	134.62
1946	5,408.17	69.00	78.38	29.08	2,278.97
1947	7,729.24	69.00	112.02	29.55	3,310.37
1948	12,344.11	69.00	178.90	30.03	5,372.73
1949	13,213.11	69.00	191.49	30.52	5,843.39
1951	36,615.49	69.00	530.65	31.49	16,710.81
1952	19,117.36	69.00	277.06	31.98	8,861.56
1953	28,144.01	69.00	407.88	32.48	13,248.12
1954	8,904.22	69.00	129.04	32.98	4,255.88
1955	293,547.08	69.00	4,254.24	33.48	142,447.08
1956	5,769.01	69.00	83.61	33.99	2,841.79
1957	319.00	69.00	4.62	34.50	159.50
1958	16,499.91	69.00	239.13	35.01	8,372.43
1959	21,576.02	69.00	312.69	35.53	11,109.79
1960	6,177.00	69.00	89.52	36.05	3,227.13
1961	5,786.00	69.00	83.85	36.57	3,066.74
1962	178,718.00	69.00	2,590.07	37.10	96,087.94
1963	46,801.00	69.00	678.26	37.63	25,521.33
1964	64,872.00	69.00	940.16	38.16	35,877.21
1965	64,068.00	69.00	928.51	38.70	35,929.57
1966	102,030.00	69.00	1,478.67	39.24	58,016.57

PSO

Electric Division

390.00 Structures and Improvements

Original Cost Of Utility Plant In Service

And Development Of Composite Remaining Life as of December 31, 2016

Based Upon Broad Group/Remaining Life Procedure and Technique

Average Service Life: 69 *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)
1967	13,318.00	69.00	193.01	39.78	7,677.43
1968	590,181.95	69.00	8,553.22	40.32	344,887.75
1969	466,985.80	69.00	6,767.80	40.87	276,600.47
1970	578,382.04	69.00	8,382.21	41.42	347,201.68
1971	135,470.97	69.00	1,963.32	41.97	82,409.31
1972	43,204.00	69.00	626.13	42.53	26,630.26
1973	52,827.00	69.00	765.60	43.09	32,989.58
1974	267,711.26	69.00	3,879.81	43.65	169,358.22
1975	634,816.03	69.00	9,200.08	44.22	406,791.02
1976	9,064.46	69.00	131.37	44.78	5,882.90
1977	17,852.53	69.00	258.73	45.35	11,733.80
1978	52,203.97	69.00	756.57	45.92	34,743.72
1979	23,327.88	69.00	338.08	46.50	15,719.65
1980	31,831.04	69.00	461.31	47.07	21,715.02
1981	98,759.33	69.00	1,431.27	47.65	68,200.67
1982	1,210,435.04	69.00	17,542.26	48.23	846,062.22
1983	621,391.26	69.00	9,005.53	48.81	439,569.56
1984	435,347.06	69.00	6,309.28	49.40	311,647.21
1985	987,818.32	69.00	14,315.98	49.98	715,509.13
1986	1,235,176.79	69.00	17,900.83	50.57	905,189.54
1987	1,533,848.88	69.00	22,229.34	51.15	1,137,137.41
1988	1,380,023.37	69.00	20,000.02	51.74	1,034,896.68
1989	1,345,838.58	69.00	19,504.59	52.34	1,020,782.74
1990	2,460,629.16	69.00	35,660.72	52.93	1,887,450.41
1991	3,062,608.00	69.00	44,384.91	53.52	2,375,534.99
1992	490,171.61	69.00	7,103.82	54.12	384,425.77
1993	1,532,774.29	69.00	22,213.76	54.71	1,215,345.72

PSO

Electric Division

390.00 Structures and Improvements

Original Cost Of Utility Plant In Service

And Development Of Composite Remaining Life as of December 31, 2016

Based Upon Broad Group/Remaining Life Procedure and Technique

Average Service Life: 69 *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)
1994	510,852.60	69.00	7,403.54	55.31	409,472.18
1996	400,901.11	69.00	5,810.07	56.50	328,290.00
1997	8,204.14	69.00	118.90	57.10	6,789.50
1998	1,050,618.49	69.00	15,226.11	57.70	878,596.03
1999	3,239,224.90	69.00	46,944.54	58.30	2,737,084.34
2000	563,750.72	69.00	8,170.17	58.91	481,276.49
2001	473,754.01	69.00	6,865.89	59.51	408,587.92
2002	230,038.86	69.00	3,333.84	60.11	200,409.94
2003	337,072.43	69.00	4,885.03	60.72	296,611.83
2004	137,971.14	69.00	1,999.55	61.33	122,622.72
2005	96,803.50	69.00	1,402.93	61.93	86,886.24
2006	1,386,221.88	69.00	20,089.85	62.54	1,256,437.27
2007	894,868.16	69.00	12,968.90	63.15	818,987.91
2008	2,140,733.87	69.00	31,024.63	63.76	1,978,166.26
2009	613,899.18	69.00	8,896.95	64.37	572,721.44
2010	654,840.96	69.00	9,490.30	64.99	616,737.37
2011	1,312,344.45	69.00	19,019.18	65.60	1,247,661.96
2012	3,686,607.10	69.00	53,428.23	66.22	3,537,766.47
2013	2,319,752.70	69.00	33,619.07	66.83	2,246,846.84
2014	12,717,889.51	69.00	184,314.29	67.45	12,432,029.56
2015	1,944,377.93	69.00	28,178.94	68.07	1,918,136.44
2016	2,888,101.25	69.00	41,855.87	68.69	2,875,084.86
Total	58,000,103.13	69.00	840,567.74	59.62	50,114,947.74

Composite Average Remaining Life ... 59.62 Years

NSTAR ELECTRIC COMPANY

TABLE 1. SUMMARY OF ESTIMATED SURVIVOR CURVES, NET SALVAGE, ORIGINAL COST, BOOK RESERVE AND CALCULATED ANNUAL DEPRECIATION ACCRUALS RELATED TO ELECTRIC PLANT AS OF JUNE 30, 2016

	ACCOUNT (1)	PROBABLE RETIREMENT YEAR (2)	SURVIVOR CURVE (3)	NET SALVAGE (4)	ORIGINAL COST (5)	BOOK RESERVE (6)	FUTURE ACCRUALS (7)	CALCULATED ANNUAL ACCRUAL AMOUNT (8)	CALCULATED ANNUAL ACCRUAL RATE (9)=(8)/(5)	COMPOSITE REMAINING LIFE (10)=(7)/(8)
	ELECTRIC PLANT									
	MISCELLANEOUS INTANGIBLE PLANT									
303.2	MISCELLANEOUS INTANGIBLE PLANT - 10 YEAR		10-SQ	0	23,012,006.34	13,656,346	9,355,660	1,404,926	*	
303.3	MISCELLANEOUS INTANGIBLE PLANT - 15 YEAR		15-SQ	0	19,465,032.04	3,073,199	16,391,833	1,182,836	*	
	TOTAL MISCELLANEOUS INTANGIBLE PLANT				42,477,038.38	16,729,545	25,747,493	2,587,762		
	DISTRIBUTION PLANT									
361	STRUCTURES AND IMPROVEMENTS		70-R3	(15)	96,196,616.50	38,163,149	72,462,960	1,413,060	1.47	51.3
362	STATION EQUIPMENT		60-R2.5	(25)	746,186,586.40	243,316,698	689,416,535	14,341,683	1.92	48.1
364	POLES, TOWERS AND FIXTURES		58-S0.5	(75)	360,418,875.67	118,031,528	512,701,504	11,260,659	3.12	45.5
365	OVERHEAD CONDUCTORS AND DEVICES		48-R0.5	(40)	666,549,305.35	161,082,588	772,086,439	20,550,498	3.08	37.6
366	UNDERGROUND CONDUIT		75-R3	(60)	616,466,881.77	204,229,947	782,117,064	12,821,738	2.08	61.0
367	UNDERGROUND CONDUCTORS AND DEVICES		45-R0.5	(40)	1,362,580,636.47	455,820,994	1,451,791,897	39,951,272	2.93	36.3
368	LINE TRANSFORMERS		36-R1	(15)	540,284,360.76	158,709,449	462,617,566	17,173,547	3.18	26.9
369.1	SERVICES - OVERHEAD		55-R1.5	(40)	90,659,808.73	41,151,342	85,772,390	2,136,472	2.36	40.1
369.2	SERVICES - UNDERGROUND		60-R2	(75)	223,576,107.18	85,213,158	306,045,030	6,527,205	2.92	46.9
370	METERS		23-R1.5	(2)	203,693,435.30	62,575,991	145,191,313	11,004,571	5.40	13.2
373	STREET LIGHTING AND SIGNAL SYSTEMS									
	ACTON		20-L0	(10)	89,325.47	60,688	37,570	2,515	2.82	14.9
	ACUSHNET		20-L0	(10)	212,533.08	174,591	59,195	4,791	2.25	12.4
	AQUINNAH		20-L0	(10)	1,343.74	832	646	44	3.27	14.7
	ARLINGTON		20-L0	(10)	133,385.26	120,105	26,619	1,866	1.40	14.3
	ASHLAND		20-L0	(10)	26,186.83	23,893	4,913	381	1.45	12.9
	BARNSTABLE		20-L0	(10)	752,615.64	582,892	244,985	18,998	2.52	12.9
	BEDFORD		20-L0	(10)	33,966.28	26,206	11,157	831	2.45	13.4
	BELLINGHAM		20-L0	(10)	52,675.59	50,038	7,905	582	1.10	13.6
	BOSTON		20-L0	(10)	3,911,177.64	3,074,418	1,227,877	80,196	2.05	15.3
	BOURNE		20-L0	(10)	172,765.88	113,196	76,846	5,375	3.11	14.3
	BREWSTER		20-L0	(10)	27,711.88	22,737	7,746	644	2.32	12.0
	BROOKLINE		20-L0	(10)	764,303.73	840,734	0	0	-	-
	BURLINGTON		20-L0	(10)	73,471.54	49,263	31,556	2,117	2.88	14.9
	CAMBRIDGE		20-L0	(10)	773,459.00	612,359	238,446	19,274	2.49	12.4
	CANTON		20-L0	(10)	106,325.73	81,938	35,020	2,683	2.52	13.1
	CARLISLE		20-L0	(10)	6,229.11	4,511	2,341	130	2.09	18.0
	CARVER		20-L0	(10)	37,782.27	18,452	23,108	1,496	3.96	15.4
	CHATHAM		20-L0	(10)	24,338.12	19,843	6,929	551	2.26	12.6
	CHELSEA		20-L0	(10)	260,324.56	219,286	67,071	4,399	1.69	15.2
	CHILMARK		20-L0	(10)	524.08	357	219	18	3.43	12.2
	DARTMOUTH		20-L0	(10)	129,565.56	85,371	57,151	4,228	3.26	13.5
	DEDHAM		20-L0	(10)	126,319.95	122,575	16,377	1,140	0.90	14.4
	DENNIS		20-L0	(10)	93,833.21	60,630	42,587	3,138	3.34	13.6
	DOVER		20-L0	(10)	3,016.85	2,527	792	56	1.86	14.1
	DUXBURY		20-L0	(10)	118,416.11	80,289	49,969	3,607	3.05	13.9
	EASTHAM		20-L0	(10)	42,093.16	27,382	18,920	1,340	3.18	14.1
	EDGARTOWN		20-L0	(10)	4,312.78	2,892	1,852	120	2.78	15.4
	EVERETT		20-L0	(10)	655.51	571	150	15	2.29	10.0
	FAIRHAVEN		20-L0	(10)	61,407.35	34,925	32,623	2,219	3.61	14.7
	FALMOUTH		20-L0	(10)	259,914.33	185,087	100,819	7,542	2.90	13.4
	FOXBORO		20-L0	(10)	22,303.40	18,928	5,606	541	2.43	10.4
	FRAMINGHAM		20-L0	(10)	162,664.01	128,506	50,424	3,676	2.26	13.7
	FRANKLIN		20-L0	(10)	1,690.58	1,649	211	23	1.36	9.2
	FREETOWN		20-L0	(10)	108,260.87	71,871	47,216	3,341	3.09	14.1
	HARWICH		20-L0	(10)	53,947.95	32,132	27,211	1,957	3.63	13.9
	HOLLISTON		20-L0	(10)	611,607.21	398,066	274,702	19,943	3.26	13.8
	HOPKINTON		20-L0	(10)	28,861.47	25,393	6,355	389	1.35	16.3
	KINGSTON		20-L0	(10)	178,736.44	117,988	78,622	5,724	3.20	13.7
	LAKEVILLE		20-L0	(10)	4,743.74	3,589	1,629	133	2.80	12.2
	LEXINGTON		20-L0	(10)	294,535.36	279,662	44,327	3,282	1.11	13.5
	LINCOLN		20-L0	(10)	46,318.61	45,009	5,941	359	0.78	16.5
	MANSFIELD		20-L0	(10)	933.80	965	62	7	0.75	8.9