STATE OF INDIANA

INDIANA UTILITY REGULATORY COMMISSION

PETITION OF INDIANA MICHIGAN POWER COMPANY, AN INDIANA CORPORATION, FOR AUTHORITY TO INCREASE ITS RATES AND CHARGES FOR ELECTRIC UTILITY SERVICE THROUGH A PHASE IN RATE ADJUSTMENT; AND FOR APPROVAL OF RELATED RELIEF INCLUDING: (1) REVISED DEPRECIATION RATES, INCLUDING COST OF REMOVAL LESS SALVAGE, AND UPDATED DEPRECIATION EXPENSE; (2) ACCOUNTING RELIEF, INCLUDING DEFERRALS AND AMORTIZATIONS; (3) INCLUSION OF CAPITAL INVESTMENT; (4) RATE ADJUSTMENT MECHANISM PROPOSALS, INCLUDING NEW GRANT PROJECTS RIDER AND MODIFIED TAX RIDER; (5) A VOLUNTARY RESIDENTIAL CUSTOMER POWERPAY PROGRAM; (6) WAIVER OR DECLINATION OF JURISDICTION WITH RESPECT TO CERTAIN RULES TO FACILITATE IMPLEMENTATION OF THE POWERPAY PROGRAM; (7) COST RECOVERY FOR COOK PLANT SUBSEQUENT LICENSE RENEWAL EVALUATION PROJECT; AND (8) NEW SCHEDULES OF RATES, RULES AND REGULATIONS	**CAUSE NO. 45933**

INDIANA OFFICE OF UTILITY CONSUMER COUNSELOR

PUBLIC'S EXHIBIT NO. 9

TESTIMONY OF OUCC WITNESS

DAVID J. GARRETT

NOVEMBER 15, 2023

Respectfully submitted,

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STATE OF INDIANA

INDIANA UTILITY REGULATORY COMMISSION

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OUCC PREFILED TESTIMONY
OF
DAVID J. GARRETT

PUBLIC'S EXHIBIT NO. 9

ON BEHALF OF THE
INDIANA OFFICE OF UTILITY CONSUMER COUNSELOR

NOVEMBER 15, 2023

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I. INTRODUCTION

Q. State your name and occupation.

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

Q. Summarize your educational background and professional experience.

A. I received a B.B.A. 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, where 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. In 2016 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 with the Society of Depreciation Professionals. I am also a Certified Rate of Return Analyst with the Society of Utility and Regulatory Financial Analysts. A more complete description of my qualifications and regulatory experience is included in my curriculum vitae.[1]

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[1] Attachment DJG-1.

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

A. I am testifying on behalf of the Indiana Office of Utility Consumer Counselor ("OUCC").

Q. Describe the scope and organization of your testimony.

A. My direct testimony addresses depreciation issues in response to the direct testimony of Indiana Michigan Power Company ("I&M"") witness Jason A. Cash, who sponsors the depreciation study conducted for I&M.

Q. To the extent you do not address a specific item or adjustment, should that be construed to mean you agree with I&M's proposal?

A. No. Excluding any specific issues, adjustments, or amounts I&M proposes does not indicate my approval of those issues, adjustments, or amounts. Rather, the scope of my testimony is limited to the specific items addressed herein.

II. <u>EXECUTIVE SUMMARY</u>

Q. Summarize the key points of your testimony.

A. I&M is proposing an $18.2 million annual increase in the depreciation accrual based on plant balances as of December 31, 2022. My analysis shows that several adjustments should be made to the Company's proposed net salvage rates and service lives. The table below compares the proposed annual depreciation accruals in this case.[2]

[2] *See* Attachment DJG-2.

Figure 1:
Depreciation Accrual Comparison by Plant Function

Plant Function	Plant Balance 12/31/2022	I&M Proposed Accrual	OUCC Proposed Accrual	**OUCC Accrual Adjustment**
Production	$ 5,056,557,412	$ 276,046,028	$ 272,890,538	$ (3,155,491)
Transmission	1,825,914,836	48,660,179	45,703,397	(2,956,782)
Distribution - IN	2,421,899,098	76,928,811	63,523,504	(13,405,307)
General	190,806,357	7,427,409	7,427,409	0
Total Plant Studied	$ 9,495,177,703	$ 409,062,428	$ 389,544,847	**$ (19,517,580)**

As shown in this table, adopting OUCC's proposed adjustments would reduce the Company's proposed annual depreciation accrual by $19.5 million.[3]

Q. Please summarize the primary factors driving OUCC's adjustment.

A. The OUCC's total proposed depreciation adjustment comprises two key issues: (1) removing the contingency and escalation factors from the Company's proposed terminal net salvage rates; and (2) adjusting the Company's proposed service lives for several of its transmission and distribution accounts. The estimated impacts of these issues on OUCC's proposed adjustment to the depreciation accrual are summarized in the table below.

[3] *See* Attachments DJG-4 and DJG-5 for detailed rate comparisons and calculations; *see also* Attachment DJG-11 for remaining life calculations.

Figure 2:
Broad Issue Impacts

Issue	Impact
1. Remove contingency costs	$2.7 million
2. Remove annual inflation rate for demolition costs	$0.5 million
3. Propose longer service lives for some T&D accounts	$16.3 million
Total	**$19.5 million**

A narrative summary of these issues is presented below:

1. Remove Contingency Costs

The Company's terminal net salvage costs are estimated through demolition studies for most of its generating units. The demolition studies include contingency costs to reflect uncertainties in future demolition estimates. However, contingency costs are unknown by definition and, therefore are not known and measurable and not appropriate to include in rates. Charging current ratepayers for speculative costs that may not even occur up to decades in the future is inherently problematic from a ratemaking perspective. Contingency costs add further expense to an already speculative future cost estimate. Although the dollar impacts of contingency costs in this particular case are relatively small, the Commission should reject the inclusion of contingency costs in the terminal net salvage estimates of generating units as a matter of ratemaking policy and principle.

2. Remove Escalation Factor

The Company's demolition cost estimates are based on present-day dollars. However, the Company escalated those cost estimates to the future retirement date of each generating unit by applying an annual cost inflation factor. The Company uses this escalated amount as the basis for current-day cost recovery. The problem with this approach is that current ratepayers are forced to pay for a future-value cost with present-day dollars. This violates basic time-value-of-money principles. If future escalated costs are allowed, they should then be discounted back to present-day dollars by the Company's weighted average cost of capital. A similar approach is used to account for asset retirement obligations. However, it would be more straight-forward and reasonable to simply disallow the escalation factors and base the Company's demolition costs on present value.

3. <u>Propose Longer Service Lives for Mass Property Accounts</u>

The majority of the Company's service life estimates for its transmission and distribution (or "mass property") accounts were based on the Simulated Plant Record Model. Simulated data is not as reliable as the actuarial data that is typically used to estimate service lives. Moreover, the metrics used to assess the value of the Company's simulated data show that the results of the simulated analysis are essentially valueless for several accounts. For these accounts, the Company has failed to present any evidence supporting its service life estimates. When a utility's data is not reliable for conducting service life analysis, it is necessary to compare the approved service lives of other utilities. A comparison of several of I&M's peers, including two of its sister companies, reveals that the Company's proposed service lives for several accounts are grossly understated. I propose several reasonable adjustments to these accounts to bring I&M's service life estimates closer to what is observed in the industry.

Each of these issues will be discussed in more detail in my testimony.

Q. Please describe why it is important not to overestimate depreciation rates.

A. 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 systematic and rational manner – specifically, over the service lives of the utility's assets. If depreciation rates are overestimated (i.e., service lives are underestimated), it may unintentionally incent economic inefficiency. When an asset is fully depreciated and no longer in rate base, but still used by a utility, the utility may be incented to retire and replace the asset to increase rate base, even though the retired asset may not have reached the end of its economic useful life. If, on the other hand, an asset must be retired before it is fully depreciated, there are regulatory mechanisms that can ensure the utility fully recovers its prudent investment in the retired asset. Thus, in my opinion, it is preferable for regulators to ensure that assets are not depreciated before the end of their economic useful lives.

Q. Please provide a depreciation parameter comparison of the accounts in dispute.

A. The following table compares the Iowa curves, depreciation rates, and annual accrual rates for the accounts in dispute.[4]

[4] *See also* Attachment DJG-3.

Figure 3:
Depreciation Accrual Comparison by Plant Function

		I&M Proposal			OUCC Proposal		
Account No.	Description	Iowa Curve	Depr Rate	Annual Accrual	Iowa Curve	Depr Rate	Annual Accrual
	TRANSMISSION PLANT						
354.00	Towers & Fixtures	R5 - 66	2.82%	6,521,673	R4 - 76	2.11%	4,873,694
356.00	OH Conductor & Devices	R4 - 67	2.30%	7,257,380	R3 - 75	1.89%	5,948,577
	DISTRIBUTION PLANT						
362.00	Station Equipment	L0.5 - 43	2.96%	12,607,554	L0 - 47	2.62%	11,172,400
364.00	Poles, Towers, & Fixtures	L0 - 42	4.60%	13,463,761	L0 - 54	3.45%	10,104,376
365.00	Overhead Conductor & Devices	L0 - 41	2.93%	14,104,877	L0 - 48	2.45%	11,810,547
366.00	Underground Conduit	R2 - 62	1.61%	2,709,068	R1.5 - 76	1.26%	2,119,126
367.00	Underground Conductor	R1 - 57	1.75%	4,927,687	R1 - 61	1.62%	4,544,841
368.00	Line Transformers	R0.5 - 27	3.42%	11,920,451	R0.5 - 43	1.89%	6,576,801

Each of these accounts will be discussed in more detail in my testimony.

III. REGULATORY STANDARDS

Q. Discuss the standard by which regulated utilities are allowed to recover depreciation expense.

A. In *Lindheimer v. Illinois Bell Telephone Co.*, the U.S. Supreme Court stated that "depreciation is the loss, not restored by current maintenance, which is due to all the factors causing the ultimate retirement of the property. These factors embrace wear and tear, decay, inadequacy, and obsolescence."[5] 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.[6] Moreover, the *Lindheimer* Court found:

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

[6] *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

> [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.[7]

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

Q. Please describe the depreciation system you used in this case to develop your proposed depreciation rates.

A. The regulatory 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 <u>method</u> of allocation; 2) a <u>procedure</u> for applying the method of allocation; 3) a <u>technique</u> of applying the depreciation rate; and 4) a <u>model</u> for analyzing the characteristics of vintage property groups. 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

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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."

[7] *Id*. at 169.

provide a more detailed discussion of depreciation system parameters, theories, and equations in Appendix A.

Q. Are you and Mr. Cash essentially using the same depreciation system to conduct your analyses?

A. Yes. Mr. Cash and I are essentially using the same depreciation system. Thus, the difference in our positions stems from our different opinions regarding production net salvage rates, interim retirements, and mass property service life estimates. It is also important to note that unlike some other Indiana utilities that have proposed depreciation rates using the Equal Life Group ("ELG") method, I&M is proposing depreciation rates under the Average Life Group ("ALG") method. As discussed in my testimonies filed in Cause Nos. 45159[8] and 45039,[9] it is my opinion the ALG method results in more fair and reasonable depreciation rates when compared to the ELG method. In short, the ELG method generally results in higher depreciation rates charged to customers in the earlier years of vintage group's life and lower depreciation rates in later years. Although depreciation rates developed under the ELG method can still be applied in a "straight-line" application, it effectively results in an accelerated method of expense recovery because depreciation rates are not adjusted every year. Thus, the more practical and reasonable approach in a ratemaking context (i.e., where depreciation rates are not adjusted every year) is to approve depreciation rates developed under the ALG method. Thus, while I have

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[8] *Petition of N. Ind. Pub. Serv. Co.*, Cause No. 45159, Final Order (Ind. Util. Regul. Comm'n Dec. 27, 2018).

[9] *Petition of Citizens Gas*, Cause No. 45039, Final Order (Ind. Util. Regul. Comm'n Dec. 4, 2019).

several disagreements with Mr. Cash's opinions on service life and net salvage in this case, I agree with his use of the ALG method.

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). I will discuss my analysis of the accounts in both types of property below.

IV. LIFE SPAN PROPERTY ANALYSIS

A. Introduction

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.

B. Terminal Net Salvage and Demolition Costs

Q. Describe the meaning of 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 demolishing 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 electric utilities typically support terminal net salvage recovery for production assets.

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 demolition studies.

Q. Did I&M provide demolition studies for its production units in this case?

A. Yes. The Company provided demolition studies conducted by Brandenberg (for steam production) and Sargent & Lundy (for hydraulic production) in support of its proposed demolition costs.[10]

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[10] *See* I&M Attachments JAC-2 and JAC-3.

Q. What is the total amount of present-value terminal net salvage included in the Company’s proposed depreciation rates?

A. I&M is proposing more than $40 million of present-value terminal net salvage to be included in its depreciation rates.[11]

Q. Did you identify any unreasonable assumptions included in the Company’s proposed terminal net salvage costs?

A. Yes. The Company’s proposed terminal net salvage costs include contingency costs. In addition, the Company is proposing to charge current customers with inflated future costs by escalating the present-value demolition cost estimates by an annual inflation factor. These two issues are further discussed below.

1. <u>Contingency Costs</u>

Q. Please describe the contingency costs included in the Company’s demolition studies.

A. The Company’s demolition studies include contingency factors that increase costs for labor, material, indirect, and subcontractor costs by 20%.[12]

Q. What is I&M’s argument for including contingency costs?

A. Mr. Cash correctly acknowledges that contingency costs are “intended to cover unknowns.”[13] However, this argument would be better support for the <u>exclusion</u> of contingency costs, especially in the context of ratemaking. Under basic ratemaking principles, current customers should not be charged for future costs occurring decades into

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[11] *See* Attachment DJG-6.

[12] *See* Direct Testimony of Jason A. Cash, Attachment JAC-3.

[13] Cash, p. 11, l. 6.

the future that are "unknown" by definition. Contingency costs are antithetical to known and measurable costs.

Q. Could the same argument in support of increased contingency costs be used to support decreased contingency costs?

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

Q. How much additional cost would be imposed on customers if contingency costs are allowed?

A. Contingency costs add $9.5 million to the base demolition cost estimates.[14] The inclusion of contingency costs in this case adds about $2.7 million annually to the depreciation accrual amount.

Q. Has the Commission allowed contingency costs in prior proceedings?

A. Yes. However, the Commission is not bound by its prior decisions on this issue. In my opinion, charging customers for a cost that is unknown on its face is poor ratemaking policy. I am not aware of any other cost estimates in a rate proceeding where it would be considered acceptable to significantly increase the cost by an arbitrary percentage on the

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[14] *See* Attachment DJG-6.

sole basis that the cost is "unknown." The Commission should reconsider its previous stance on this issue and reject the inclusion of contingency costs in demolition cost estimates. The Commission approved including contingency in two recently litigated rate cases, Cause No. 45235 (I&M) and Cause No. 45253 (DEI). In both cases, the OUCC proposed removing contingency from the decommissioning study. However, in Cause No. 45235, the rebuttal to this proposal mainly indicated including contingency within the depreciation study is Commission precedent.[15] In Cause No. 45253, Mr. Spanos' rebuttal testimony, other to refute a proposal which is not an issue here, solely relied on Commission precedent.[16] In both cases, the Commission agreed with including contingency.[17] What was not included, either in rebuttal or in the Commission's decision, was a substantive response to the arguments against including contingency. The Commission found in Cause No. 45235 that I was "asking the Commission to disregard our prior acceptance of contingency,"[18] and that is what I am asking in this case. As the Commission reconsidered its position on ELG in Cause No. 45235, I propose the Commission conduct a substantive review of this issue, based on the arguments against this proposal, and reconsider its position on allowing contingency in the depreciation study.

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[15] Cause No. 45235, Rebuttal Testimony of Jason Cash, p. 7, l. 13 - p. 8, l. 11 (Sept. 17, 2019).
[16] Cause No. 45253, Rebuttal Testimony of John Spanos, p. 31, l. 1 - p. 36, l. 10 (Dec. 4, 2019).
[17] Cause No. 45235, Final Order at 32 (Mar. 11, 2020); Cause No. 45253, Final Order at 91 (June 29, 2020).
[18] Cause No. 45235, Final Order at 32.

Q. Do your proposed net salvage rates exclude the Company's proposed contingency factors?

A. Yes, for the reasons discussed above, my proposed terminal net salvage rates exclude the contingency costs proposed in the Company's demolition studies.[19]

2. <u>Annual Escalation Rate</u>

Q. Please describe the specific problems with the escalation factor the Company applied to its demolition cost estimates.

A. The Company's demolition studies estimated costs in present value. However, Mr. Cash applied an annual inflation rate of 2.5% to the estimated demolition costs. It is not appropriate for the Company to escalate its demolition cost estimates. First, it is not reasonable to escalate a cost that already is not known and measurable. Moreover, because the demolition cost estimates are based on the escalated amount, current ratepayers should not be charged for a future cost that has not been discounted to present value. The concept of the time value of money is a cornerstone of finance and valuation. For example, the Gordon Growth Model (or DCF Model) is one of the most widely used valuation models. This model 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. In contrast to this approach, the Company has escalated the present value of its demolition costs decades into the future and is essentially asking current ratepayers to pay the future value of a cost with present-day

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[19] *See* Attachment DJG-6.

dollars. This arrangement ignores the time value of money principle and is inappropriate for that reason.

Q. Do the Company's asset retirement obligations discount future costs to present value?

A. Yes. The accounting for asset retirement obligations ("ARO") is governed by Statement of Financial Account Standards ("SFAS") 143. Under SFAS 143, estimated future costs that meet the requirements for an ARO are estimated at present value, then escalated to a future date when the cost is projected to be incurred. So far, this resembles the approach taken by the Company regarding its demolition cost estimates. However, under SFAS 143, the costs are then discounted back to present value using a discount rate – such as the weighted average cost of capital. Unlike the SFAS 143 approach, the Company did not discount its future demolition costs to present value. This means the Company expects current ratepayers to pay their present-value dollars for a future value cost. This approach violates the time-value-of-money principle and is at odds with the approach dictated by SFAS 143 regarding AROs.

Q. Do your proposed net salvage rates exclude the Company's proposed escalation factor?

A. Yes, for the reasons discussed above, my proposed terminal net salvage rates exclude the annual escalation factor Mr. Cash applied to the estimated demolition costs.[20]

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[20] *See* Attachment DJG-6 (terminal net salvage costs are not escalated to future retirement dates).

Q. Have other jurisdictions consistently rejected contingency and escalation factors in production net salvage rates?

A. Yes. The Oklahoma Corporation Commission has rejected the use of contingency and escalation factors in production net salvage rates. For example, in the 2015 rate case for Public Service Company of Oklahoma ("PSO"), a sister company of I&M, the company proposed the inclusion of escalation and contingency factors in calculating PSO's terminal net salvage. Like I&M, PSO hired Sargent & Lundy ("S&L") to conduct its demolition studies. 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.[21]

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

> 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. <u>This reasoning fails to consider the fact that certain occurrences could reduce estimated costs</u>.[22]

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[21] *Re Pub. Serv. Co. Okla.*, Cause No. PUD 201500208, Report and Recommendation of the Administrative Law Judge p. 164, (Okla. Corp. Comm'n May 31, 2016).

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

Based on the same reasoning, the Commission should also reject I&M's proposed contingency and escalation factors in this case.

V. MASS PROPERTY ANALYSIS

Q. Please 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.

Q. Describe the methodology used to estimate the service lives of grouped depreciable assets.

A. The study of retirement patterns of industrial property is derived from the same actuarial process used to study human mortality. Just as actuarial analysts study historical human mortality data to predict how long a group of people will live, depreciation analysts study historical plant data 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.[23] 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.[24] 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."[25] A more detailed explanation of how the Iowa curves are used in the actuarial analysis of depreciable property is set forth in Appendices B and C.

Q. Describe the process you used to estimate the service lives for the Company's depreciable accounts in this case.

A. To develop service life estimates for the Company's accounts, I obtained and analyzed the Company's actuarial and simulated plant data. I used the Simulated Plant Record ("SPR") method to analyze the same mass property accounts analyzed by Mr. Cash under the SPR method. Likewise, I used actuarial analysis to analyze the same mass property accounts analyzed by Mr. Cash under the actuarial method. Thus, the difference in proposed service

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[23] 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).

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

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

lives in this case are not due to the use of different analytical methods with regard to SPR and actuarial analysis.

A. Actuarial Analysis

Q. Please describe the actuarial analysis process.

A. I used the Company's historical property data and created an observed life table ("OLT") for each applicable account. The data points on the OLT can be plotted to form a curve (the "OLT curve"). The OLT curve is not a theoretical curve, rather, it is actual observed data from the Company's records that indicate the rate of retirement for each property group. An OLT curve by itself, however, is rarely a smooth curve, and is often not a "complete" curve (i.e., it does not end at zero percent surviving). To calculate average life (the area under a curve), a complete survivor curve is required. The Iowa curves are empirically derived curves based on the extensive studies of the actual mortality patterns of many different types of industrial property. The curve-fitting process involves selecting the best Iowa curve to fit the OLT curve. This can be accomplished through a combination of visual and mathematical curve-fitting techniques, as well as professional judgment. The first step of my approach to curve-fitting involves visually inspecting the OLT curve for any irregularities. For example, if the "tail" end of the curve is erratic and shows a sharp decline over a short period of time, it may indicate that this portion of the data is less reliable, as further discussed below. After visually inspecting the OLT curve, I use a mathematical curve-fitting technique which essentially involves measuring the distance between the OLT curve and the selected Iowa curve in order to get an objective assessment of how well the curve fits. After selecting an Iowa curve, I observe the OLT curve along with the Iowa curve on the same graph to determine how well the curve fits. I may repeat this process several times for any given account to ensure that the most reasonable Iowa curve is selected.

Q. Are you recommending adjustments to any of the Company's accounts based on your actuarial analysis?

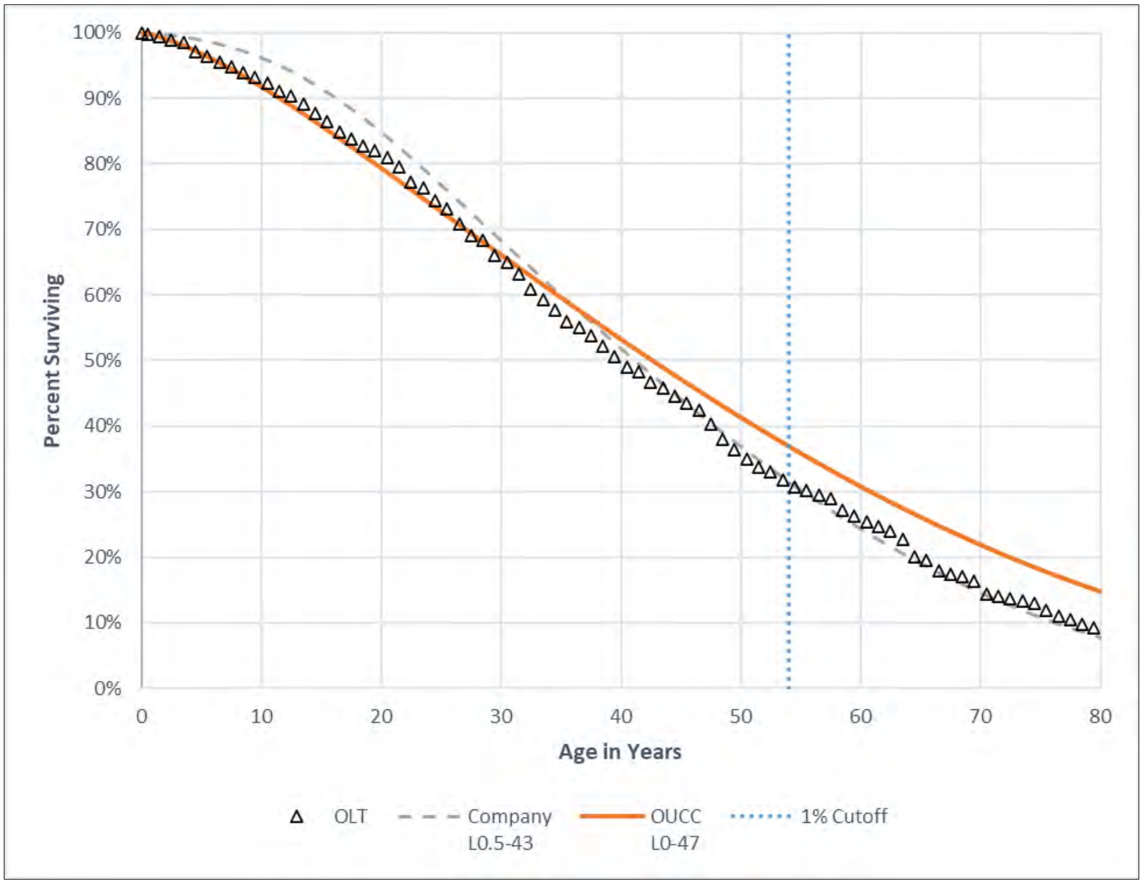
A. Yes. I recommend adjusting I&M's proposed service lives for two accounts based on actuarial analysis. Those accounts are discussed below.

1. <u>Account 362 – Station Equipment</u>

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

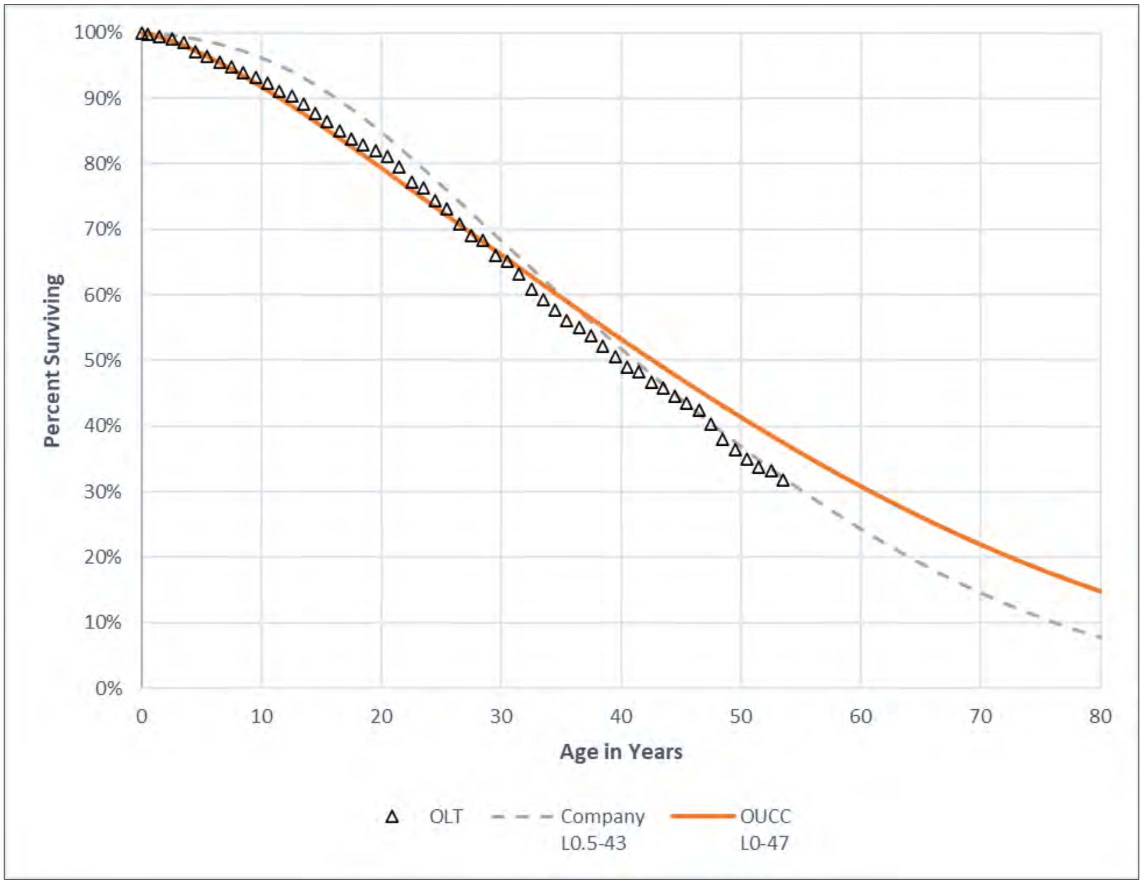
A. The observed survivor curve (OLT curve) derived from the Company's data for this account is presented in the graph below. The graph also shows the Iowa curves Mr. Cash and I selected to represent the average remaining life of the assets in this account. For this account, Mr. Cash selected the L0.5-43 Iowa curve, and I selected the L0-47 Iowa curve. Both of these curves are shown in the graph below along with the OLT curve.

Figure 4:
Account 362 – Station Equipment



The OLT curve for this account is fairly well-suited for conventional Iowa curve-fitting techniques because it is relatively smooth and displays a typical retirement pattern for utility property. As shown in the graph, the Iowa curve I selected results in a closer fit to the early and middle portions of the OLT curve, while Mr. Cash's Iowa curve results in a better fit to the latter portions of the OLT curve. The vertical line in the graph represents the truncation point based on the 1% of beginning exposures benchmark discussed above. That is, the data points occurring to the right of this line are effectively irrelevant from a statistical standpoint, based on this benchmark. The graph below shows the same OLT curve, except with the tail end of the curve truncated.

Figure 5:
Account 362 (With Truncated OLT Curve)



As shown in this graph, both Iowa curves provide relatively close fits to the OLT curve. We can use mathematical curve fitting techniques to further assess the results.

Q. Does your selected Iowa curve provide a better mathematical fit to the truncated OLT curve?

A. Yes. While visual curve-fitting techniques can help an analyst identify the most statistically relevant portions of the OLT curve for this account, mathematical curve-fitting techniques can help us determine which of the two Iowa curves provides the better fit. Mathematical curve-fitting essentially involves measuring the "distance" between the OLT curve and the selected Iowa curve. The best fitting curve from a mathematical standpoint 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. For this account, the SSD, or distance between the Company's Iowa curve and the truncated OLT curve is 0.0400, and the SSD between the L0-47 Iowa curve I selected, and the truncated OLT curve is 0.0372, which means it results in the closer fit.[26]

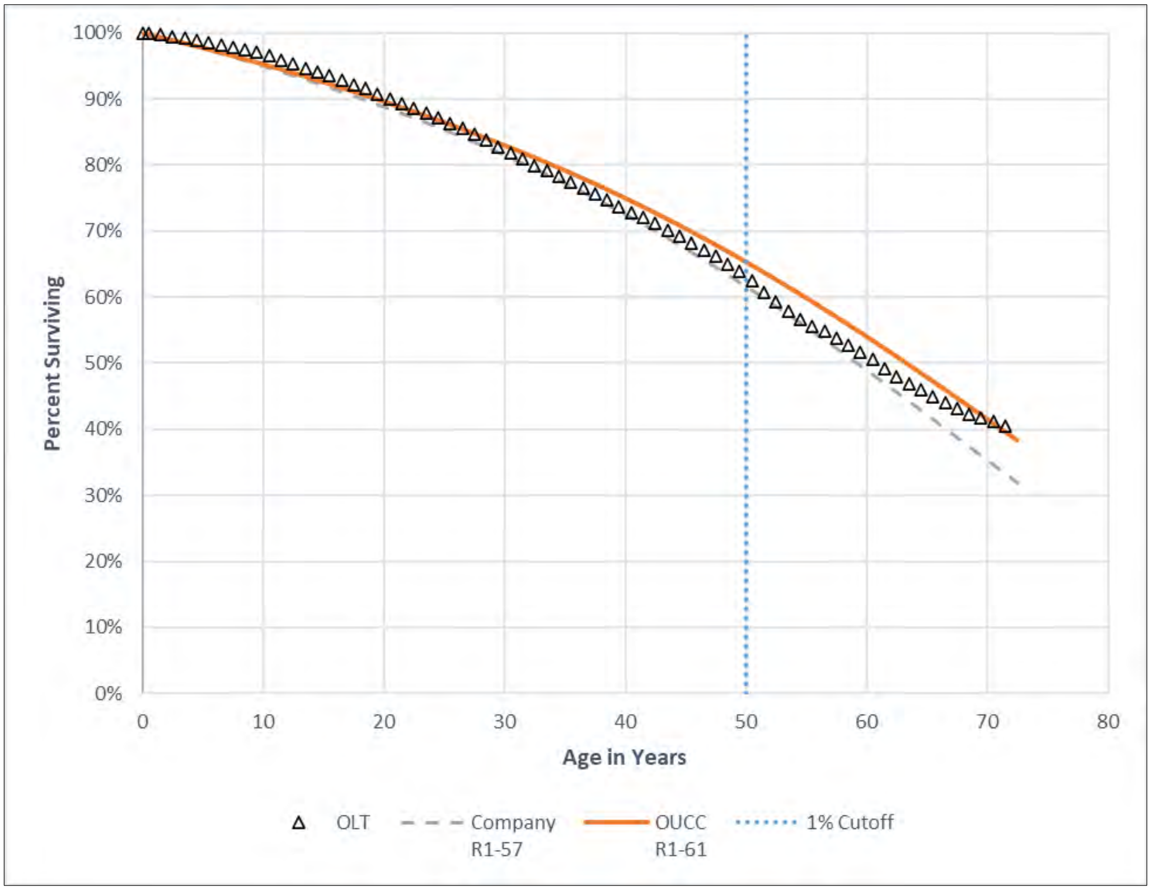
2. Account 367 – Underground Conductor

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

A. For this account, Mr. Cash selected the R1-57 curve, and I selected the R1-61 curve. Both of these Iowa curves are shown in the following graph with the OLT curve.

[26] Attachment DJG-7.

Figure 6:
Account 367 – Underground Conductor



The OLT curve for this account is fairly well-suited for conventional Iowa curve-fitting techniques because it is relatively smooth and displays a typical retirement pattern for utility property. As shown in the graph, the Iowa curve I selected results in a closer fit to the early and middle portions of the OLT curve, while Mr. Cash's Iowa curve results in a better fit to the latter portions of the OLT curve. We can use mathematical curve fitting to further assess the results.

Q. Does your selected Iowa curve provide a better mathematical fit to the OLT curve for this account?

A. Yes. Regardless of whether the entire OLT curve or truncated OLT curve is measured, the Iowa curve I selected results in the closer fit. The SSD between the Company's Iowa curve and the truncated OLT curve is 0.0090, and the SSD between the R1-61 Iowa curve I selected, and the truncated OLT curve is 0.0077, which means it results in the closer fit.[27]

B. Simulated Plant Record Analysis

Q. Describe the Simulated Plant Record method of analysis.

A. As discussed above, when aged data is not available, we must "simulate" the actuarial data required for remaining life analysis. For most of the Company's transmission and distribution accounts, both Mr. Cash and I conducted an analysis using the simulated plant record ("SPR") model, because the Company does not keep aged data for these accounts. The SPR method involves analyzing the Company's unaged data by choosing an Iowa curve that best simulates the actual year-end account balances in the account.[28]

Q. Compared with results obtained through actuarial analysis, are results obtained through SPR analysis less reliable in general?

A. Yes. Ideally, a utility would keep aged data that is suitable to be analyzed under actuarial analysis and conventional Iowa curve fitting techniques. With aged data, the ages of the assets retired are known. In contrast, with unaged data, the ages of the assets retired are not known and thus must be "simulated" through the SPR method.

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[27] Attachment DJG-8.

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

Q. Describe the metrics used to assess the fit of a selected Iowa curve in the SPR model.

A. There are two primary metrics used to measure the fit of the Iowa curve selected to describe an SPR account. The first is the "conformance index" ("CI"). The CI is the average observed plant balance for the tested years, divided by the square root of the average sum of squared differences between the simulated and actual plant balances.[29] A higher CI indicates a better fit. Alex Bauhan, who developed the CI, also proposed a scale for measuring the value of the CI, as follows:

Figure 7:
Conformance Index Scale

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

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

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

Figure 8:
Retirement Experience Index Scale

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

According to Bauhan, "[i]n order for a life determination to be considered entirely satisfactory, it should be required that both the retirements experience index and the conformance index be 'Good' or better."[30]

Q. Do the Iowa curves selected by Mr. Cash provide "Good" or better results based on the CI and REI scales for all of the Company's accounts analyzed under SPR analysis?

A. No. For some of the Company's accounts, there is no Iowa curve available that produces a result of at least "Good" under both scales. This highlights the relative unreliability of the Company's simulated, unaged historical data for these accounts, and why it can be helpful to also consider the service life estimates approved for other utilities that were based on actuarial analyses of superior, aged data.

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

A. In this case, I am proposing service life adjustments to seven of the Company's transmission and distribution accounts based on SPR analysis. In my opinion, Mr. Cash's

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

proposed service lives for these accounts are too short and thus result in excessive depreciation accruals and expense. My opinions are based in part on the Company's historical data, but because the Company's data is relatively unreliable, I also considered the approved service lives for the transmission and distribution assets for electric utilities that keep aged data for these accounts. As discussed below, the service lives Mr. Cash estimated for some accounts are notably shorter than those approved for these other utilities.

Q. Please summarize the approved service lives of other utilities you considered when developing your recommendations in this case.

A. As discussed above, when the plant data a utility provides is generally unreliable, it can be instructive to consider the approved service lives of other utilities for the same accounts to develop an objective basis for estimating the service life of an asset or group of assets. In addition to relying upon my general experience in depreciation analysis and my review of numerous depreciation studies across the country, I also considered and present the specific approved service lives for two of I&M's sister companies, Southwestern Electric Power Company ("SWEPCO") and Public Service Company of Oklahoma ("PSO"). I also chose these companies for a peer comparison because I conducted depreciation analyses and filed testimony in their most recent rate cases; thus, I am familiar with the actuarial data upon which the approved service lives were based. The following table presents the service lives of each mass property account I propose adjustments to that were analyzed under the SPR method.[31]

**Figure 9:
Peer Group Comparison**

Acct	Description	I&M Proposed	SWEPCO	PSO	Peer Avg	Peer Avg Less I&M	OUCC Proposed
	TRANSMISSION PLANT						
354	Towers & Fixtures	66	74	75	75	9	76
356	OH Conductor & Devices	67	70	69	70	3	75
	DISTRIBUTION PLANT						
364	Poles, Towers, & Fixtures	42	55	53	54	12	54
365	OH Conductor & Devices	41	44	46	45	4	48
366	UG Conduit	62	80	78	79	17	76
368	Line Transformers	27	44	36	40	13	43
	Average	**51**	**61**	**60**	**61**	**10**	**62**

This figure compares I&M's proposed service life for each account, the approved service lives for the three peer companies, and my service life recommendations on behalf of the OUCC. This figure also shows the average approved service lives of the peer group as well as the difference between those averages and I&M's proposed service lives. It is pertinent to note that each one of I&M's proposed service lives for these accounts is notably shorter than the average service lives of the peer group (in the third column from the right). For example, in Account 366, I&M's proposed service life is 17 years shorter than the average approved service life of the peer group (62 years vs. 79 years). This is a significant discrepancy. The accounts in dispute are discussed in more detail below.

[31] *See also* Attachment DJG-9.

1. Account 354 – Towers and Fixtures

Q. Describe Mr. Cash's service life estimate for Account 354.

A. Mr. Cash selected the R5-66 curve for this account. According to the SPR analysis, this curve results in a CI score of 64 and an REI score of 100.[32] Unlike several of the accounts discussed below, several of the potential SPR results for this account, as indicated by the CI and REI scores, are both acceptable.[33]

Q. Do you agree with Mr. Cash's estimate?

A. No. The SPR results for this account show several Iowa curves that could be acceptable. However, because SPR analysis is relatively less reliable than actuarial analysis, it is instructive to consider the approved service lives of the peer group that were based on actuarial analysis. Furthermore, there are Iowa curves with higher ranking CI scores on the SPR list for this account, such as the Iowa R4-75 curve. The R4-75 curve has a CI score of 70 and an REI score of 100. Furthermore a 75-year service life is closer to the average approved service life of the peer group.

Q. Are you aware of an approved service life for Account 354 in excess of 70 years?

A. Yes. The currently approved service life for PSO's Account 354 is 75 years. This service life was recommended by PSO's witness based on the company's actuarial data.[34] No

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[32] Attachment DJG-10.

[33] *Id*.

[34] *See*, *Application of Pub. Serv. Co. of Okla*., Docket No. PUD 201700151, Final Order No. 672864, pp. 5-6 (Corp. Comm'n of Okla. Jan. 31, 2018); *see also Application of Pub. Serv. Co. of Okla.*, Docket No. PUD 201700151, Direct Testimony of John J. Cash, Exhibit JSS-2, p. VII-71 (Corp. Comm'n of Okla. Jun. 2017).

party opposed the PSO's recommendation for this account and it was adopted by the Oklahoma commission.[35]

Q. What is your recommendation for this account?

A. I recommend the Iowa R4-76 curve be applied to this account. The R4-76 curve has the same perfect REI score of 100 as the curve selected by Mr. Cash; however, the R4-76 has an even higher CI score than the Company's curve. Thus, based on the SPR analysis alone, the R4-76 curve is the better choice, and the results are satisfactory. Furthermore, a service life of 76 years is nearly identical to the peer group average of 75 years, and much closer than the 66-year average life proposed by Mr. Cash.[36]

2. Account 356 – Overhead Conductor and Devices

Q. Describe Mr. Cash's service life estimate for Account 356.

A. Mr. Cash selected the R4-67 curve for this account. According to the SPR analysis, this curve results in a CI score of less than 50 when using the full observation band (1920-2022), which means that the results are not satisfactory.[37]

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[35] *See Application of Pub. Serv. Co. of Okla.*, Docket No. PUD 201700151, Final Order No. 672864, pp. 5-6, Application of Public Service Company of Oklahoma, Docket No. PUD 201700151 (Corp. Comm'n of Okla. Jan. 31, 2018).

[36] *See* Attachment DJG-9.

[37] *See* Attachment DJG-10.

Q. Do you agree with Mr. Cash's proposed service life?

A. No. A 67-year average life is not outside the range of reasonableness for this account; however, I propose the R3-75 curve for this account. When the full observation band is used, the R3-75 curve has a good CI score and an excellent REI score. This means that the R3-75 curve meets the minimum requirements to be satisfactory under the SPR standards. The same cannot be said for the R4-67 curve when the full observation band is used. Thus, I believe the R3-75 curve is a more reasonable choice for this account given the data presented at this time.

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

Q. Describe Mr. Cash's service life estimate for Account 364.

A. Mr. Cash selected the L0-421 curve for this account. According to the SPR analysis, this curve has a CI score of only 10, which has no analytical value.[38]

Q. Do you agree with Mr. Cash's position?

A. No. Basing an approved service life on an Iowa curve with a CI score as low as 10 is not reasonable. A poor CI score renders the entire SPR analysis as unsatisfactory according to Bauhan.[39] When the SPR analysis is unreliable as it is here, it is necessary to consider the approved service lives for other utilities that were based on more reliable actuarial analysis.

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[38] See Attachment DJG-10.

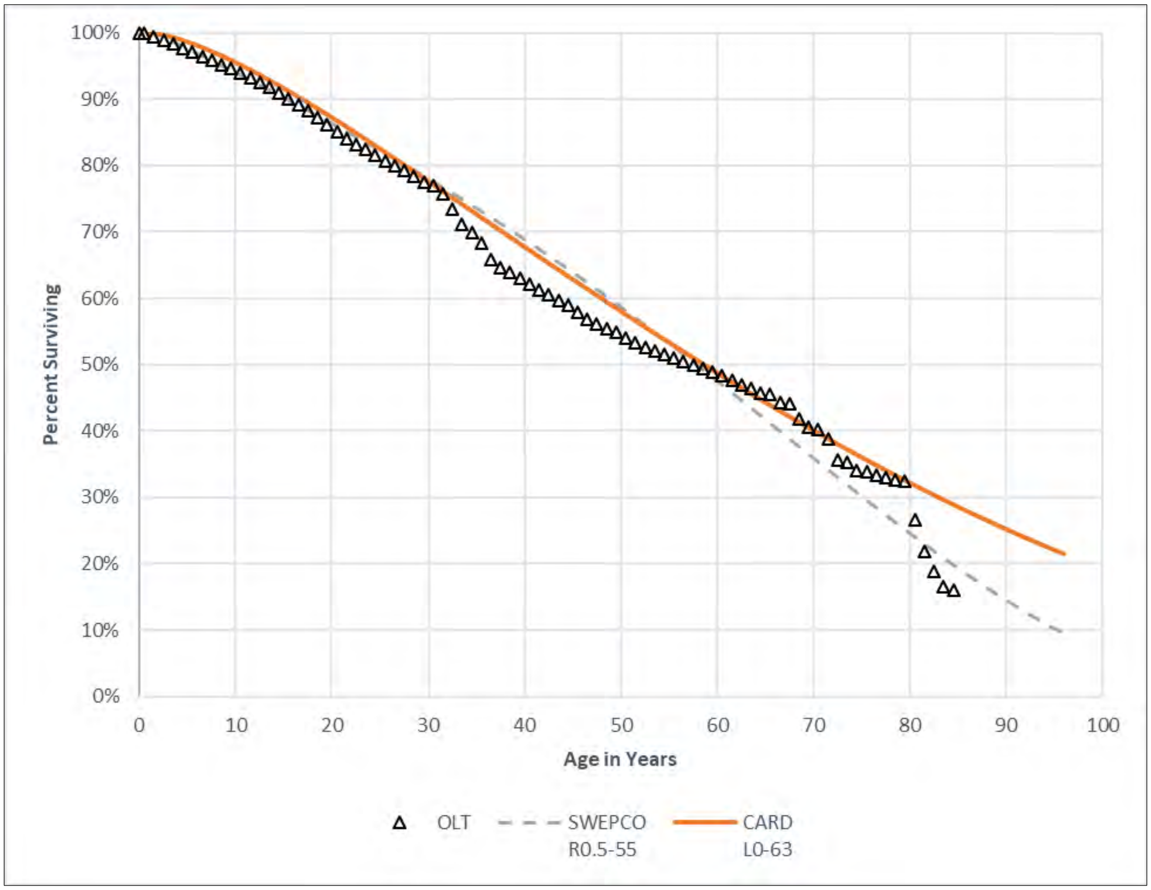
[39] Bauhan, A. E., "Life Analysis of Utility Plant for Depreciation Accounting Purposes by the Simulated Plant Record Method," 1947, Appendix of the EEl, 1952; *see also* Exhibit DJG-10.

Q. Do the approved service lives for the peer group show a significantly higher average life than that proposed by Mr. Cash?

A. Yes. The average approved service life for the peer group is 54 years, which is 13 years longer than the 41-year service life proposed by Mr. Cash. This is a significant discrepancy, especially considering that two of the peer companies I selected are sister companies to I&M. In SWEPCO's 2017 rate case in Texas, the Commission found that "[i]t is reasonable to apply an R0.5-55 Iowa-curve-life combination for FERC Account 364-*Distribution Poles*."[40] The mathematical Iowa curve analysis of SWEPCO's actuarial data for Account 364 indicated that the average service life could have been even higher – at 63 years. It is also worth noting that the analysis in the SWEPCO case was conducted on an observed survivor curve that was relatively smooth and had very sufficient retirement history. This analysis is illustrated in the graph below.

[40] *See Application of Sw. Elec. Power Co. for Authority to Change Rates*, Docket No. 46449, Order on Rehearing, Finding of Fact 187 (Pub. Util. Comm'n of Tex. Mar. 19, 2018).

Figure 10:
SWEPCO Account 364 Service Life Estimates Based on Aged Data



Although the Commission did not accept my recommended service life for this account made on behalf of CARD in the SWEPCO case, I acknowledged that SWEPCO's proposal of a 55-year service life was "within the range of reasonableness."[41] In contrast, I do not believe that Mr. Cash's 35-year estimate in this case, which is based on a "Poor" SPR analysis, is within the range of reasonableness for this account.

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[41] *See Application of Sw. Elec. Power Co. for Authority to Change Rates*, Docket No. 46449, Direct Testimony and Exhibits of David J. Garrett, p. 23, Fig 6 (Pub. Util. Comm'n of Tex. Apr. 25, 2017).

Q. What is your service life recommendation for account 364?

A. The 42-year service life recommended by Mr. Cash for this account is unreasonably short. Not only was it based on a poor and unsatisfactory SPR analysis, but it is also more than 10 years shorter than the approved service lives of I&M's sister companies. I recommend applying the L0-54 curve for this account. This curve retains the curve shape proposed by Mr. Cash, while equating the service life to the peer group average.

4. Account 365 – Overhead Conductor and Devices

Q. Describe Mr. Cash's service life estimate for Account 365.

A. Mr. Cash selected the L0-41 curve for this account. According to the SPR analysis, this curve results in a CI score of only 16, which is considered "Poor" on the CI Scale.[42]

Q. Do you agree with Mr. Cash's estimate?

A. No. A poor CI score renders the entire SPR analysis as unsatisfactory according to Bauhan.[43] When the SPR analysis is completely unreliable as it is here, it is necessary to consider the approved service lives for other utilities which were based on more reliable actuarial analysis.

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[42] *See* Attachment DJG-10.

[43] Bauhan, A. E., "Life Analysis of Utility Plant for Depreciation Accounting Purposes by the Simulated Plant Record Method," 1947, Appendix of the EEl, 1952; *see also* Exhibit DJG-10.

Q. Describe the approved service lives of the peer group and other utilities in the industry.

A. The average approved service lives for I&M's sister companies is 45 years. It is not uncommon in the industry to see proposed and approved service lives in excess of 50 years for this account.

Q. What is your recommendation for this account?

A. I recommend the L0-48 curve be applied to this account. This recommendation retains the curve shape proposed by Mr. Cash, while moving the service life closer to industry averages, since the SPR analysis is not reliable for this account.

5. Account 366 – Underground Conduit

Q. Describe Mr. Cash's service life estimate for Account 366.

A. Mr. Cash selected the R2-62 curve for this account. According to the SPR analysis, this curve results in a CI score of only 47 under the longest observation band.[44]

Q. Do you agree with Mr. Cash's position?

A. No. Although this CI score is better than the CI scores for several accounts discussed above, it nonetheless results in an overall SPR result that is not "satisfactory" according to the creator of the SPR method. According to Bauhan, "[i]n order for a life determination to be considered entirely satisfactory, it should be required that both the retirements experience index and the conformance index be 'Good' or better."[45] A CI score of only 47 is not

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[44] *See* Attachment DJG-10.

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

considered "Good." When the SPR analysis is not satisfactory, it is instructive to consider other objective measures upon which to assess a reasonable service life estimate, such as the approved service lives for other utilities that were based on more reliable actuarial analysis.

Q. Describe the approved service lives of the peer group.

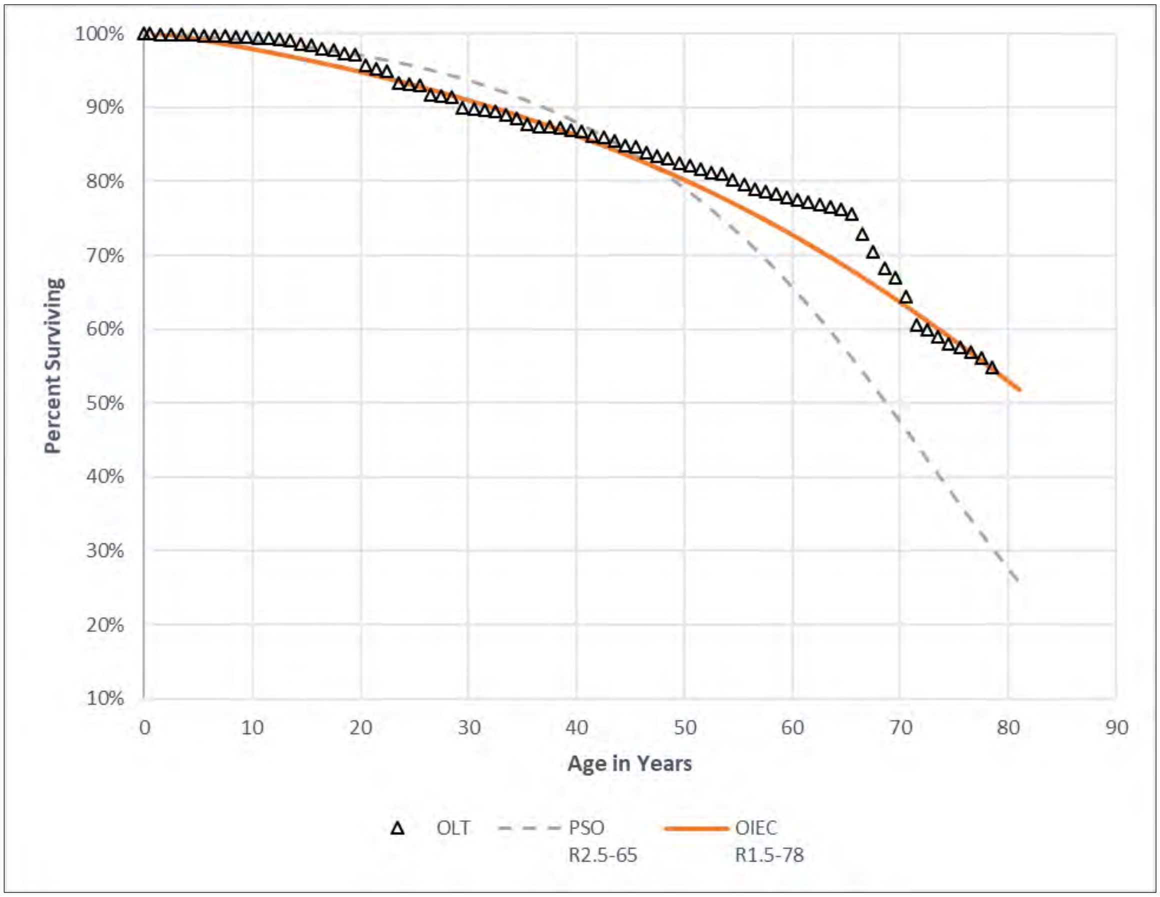
A. The peer group analysis shows that the approved service lives for I&M's sister companies, SWEPCO and PSO, are significantly longer at 80 and 78 years respectively.[46]

Q. Please illustrate the retirement rate you have observed in this account when such rate was derived from more reliable aged data through actuarial analysis.

A. In PSO's rate case, the company's witness recommended a 65-year average life for Account 366, and I recommended a 78-year average life as estimated through visual and mathematical Iowa curve-fitting techniques. The graph below shows the OLT curve (i.e., the curve derived from the utility's historical data in black triangles), along with the two Iowa curves proposed in the PSO case. As shown in the graph, the R1.5-78 curve tracks very well with the historical retirement pattern in this account (the curve labeled "OIEC" is the curve I recommended).

[46] Attachment DJG-9.

Figure 11:
PSO Account 366 Service Life Estimates Based on Aged Data



When a utility keeps adequate aged data, depreciation analysts can use the actuarial retirement rate method to develop observed survivor curves like the OLT curve shown above. These curves make average life estimates more accurate and reliable. The Oklahoma commission ultimately ordered a 78-year average service life for Account 366.

Q. What is your recommendation for this account?

A. I recommend the R1.5-76 Iowa curve be applied to this account. An average life of 76 years is much closer to the peer group average than the curve selected by Mr. Cash. Moreover, the R1.5-76 has a "good" CI score and "excellent" REI score according to the SPR analysis.[47] This fact alone makes it a more reasonable choice than the Iowa curve proposed by Mr. Cash.

6. <u>Account 368 – Line Transformers</u>

Q. Describe Mr. Cash's service life estimate for Account 368.

A. Mr. Cash selected the R0.5-27 curve for this account. According to the SPR analysis, this curve results in a CI score of only 12 under the longest observation band, which is considered "Poor" on the CI Scale.[48]

Q. Do you agree with Mr. Cash's estimate?

A. No. A CI score as low as 12 renders the SPR analysis for this account meaningless. When the SPR analysis is completely unreliable as it is here, it is necessary to consider the approved service lives for other utilities which were based on more reliable actuarial analysis.

Q. Describe the approved service lives of the peer group for Account 368.

A. The approved service life for I&M's sister company, SWEPCO, is 44 years, which is significantly longer than the service life proposed by Mr. Cash in this case.

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[47] *See* Attachment DGJ-10.

[48] *See* Attachment DJG-10.

Q. What is your recommendation for this account?

A. I recommend the R0.5-43 curve for this account. An average life of 43 years is much more reflective of the service lives observed in the industry for this account, including I&M's sister companies, especially compared with the 27-year life proposed by Mr. Cash.

Q. Does this conclude your testimony?

A. Yes.

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.[1] 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 <u>method</u> of allocation; 2) a <u>procedure</u> for applying the method of allocation to a group of property; 3) a <u>technique</u> for applying the depreciation rate; and 4) a <u>model</u> for analyzing the characteristics of vintage groups comprising a continuous property group.[2] The figure below illustrates the basic concept of a depreciation system and includes some of the available parameters.[3]

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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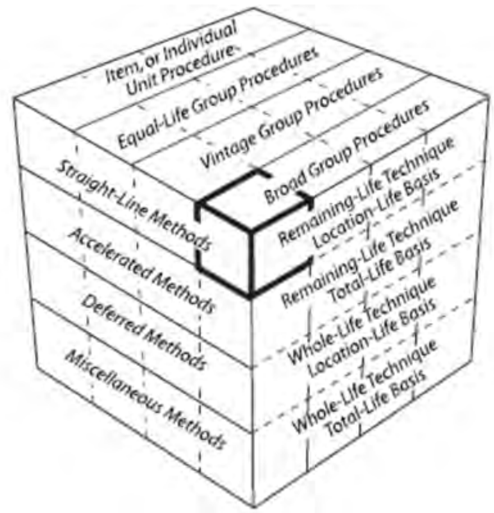
[1] Wolf & W. Chester Fitch, Depreciation Systems 69-70 (Iowa State University Press 1994).

[2] *Id.* at 70, 139–40.

[3] 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 because depreciation analysis is a relatively small and fragmented field. This diagram simply illustrates some of the available parameters of a depreciation system.

Figure 1:
The Depreciation System Cube



1. <u>Allocation Methods</u>

The "method" refers to the pattern of depreciation in relation to the accounting periods. The method most commonly used in the regulatory context is the "straight-line method"—a type of age-life method in which the depreciable cost of plant is charged in equal amounts to each accounting period over the service life of plant.[4] 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.[5] The basic formula for the straight-line method is as follows:[6]

[4] National Association of Regulatory Utility Commissioners, Public Utility Depreciation Practices 56 (NARUC 1996).

[5] *Id*.

[6] *Id*.

Equation 1:
Straight-Line Accrual

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

Gross plant is a known amount from the utility's records, while both net salvage and service life must be estimated 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.[7] In practice, the annual accrual is expressed as a rate which is applied to the original cost of plant to determine the annual accrual in dollars. The formula for determining the straight-line rate is as follows:[8]

Equation 2:
Straight-Line Rate

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

2. <u>Grouping Procedures</u>

The "procedure" refers to the way the allocation method is applied through subdividing the total property into groups.[9] 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 conducting calculations for each unit. Whereas an individual unit of property has a single life, a group of property displays a dispersion of lives and the life characteristics of the group must be

[7] *Id*. at 57.

[8] *Id*. at 56.

[9] Wolf *supra* n. 1, at 74-75.

described statistically.[10] 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.[11]

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.[12] Thus, the average life procedure treats each unit as though its life is equal to the average life of the group. By contrast, the equal life procedure treats each unit in the group as though its life was known.[13] Under the equal life procedure the property is divided into subgroups that each has a common life.[14]

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 a group, while the remaining life technique seeks to recover undepreciated costs over the remaining life of the plant.[15]

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

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[10] *Id*. at 74.

[11] NARUC *supra* n. 4, at 61–62.

[12] Wolf *supra* n. 1, at 74-75.

[13] *Id*. at 75.

[14] *Id*.

[15] NARUC *supra* n. 4, at 63–64.

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.[16] Analysts can calculate the level of imbalance in the accumulated depreciation account by determining the "calculated accumulated depreciation," (a.k.a. "theoretical reserve" and referred to in these appendices as "CAD"). The CAD is the calculated balance that would be in the accumulated depreciation account at a point in time using current depreciation parameters.[17] 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.[18] 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:[19]

[16] Wolf *supra* n. 1, at 83.

[17] NARUC *supra* n. 4, at 325.

[18] NARUC *supra* n. 4, 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.").

[19] *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.[20]

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

The broad group model views the continuous property group as a collection of vintage groups that each have the same life and salvage characteristics. Thus, a single survivor curve and a single salvage schedule are chosen to describe all the vintages in the continuous property group.

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[20] Wolf *supra* n. 1, at 178.

[21] *See* Wolf *supra* n. 1, at 139 (I added the term "model" to distinguish this fourth depreciation system parameter from the other three parameters).

By 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.[1] This history 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.[2] 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.[3] They generalized the 65 curves 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

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[1] Wolf & W. Chester Fitch, Depreciation Systems 276 (Iowa State University Press 1994).

[2] *Id*. at 23.

[3] *Id*. at 34.

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.[4] This research 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."[5] 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.[6] Rather than using the original formulas, analysts typically rely on the published tables containing the percentages surviving. This reliance is necessary because, absent knowledge of the integration technique applied to each age interval, it is not possible to recreate the exact original published table values. In the 1970s, John Russo collected data from over 2,000 property accounts reflecting observations during the period 1965 – 1975 as part of his Ph.D. dissertation at Iowa State. Russo essentially repeated Winfrey's data collection, testing, and analysis methods used to develop the original Iowa curves, except that Russo studied industrial property in service several decades after

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[4] *Id*.

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

[6] 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).

Winfrey published the original Iowa curves. Russo drew three major conclusions from his research:[7]

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.[8]

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.

2. Classification

The Iowa curves are classified by three variables: modal location, average life, and variation of life. First, the mode is the percent life that results in the highest point of the frequency

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[7] *See* Wolf *supra* n. 1, at 37.

[8] *Id*.

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).[9] 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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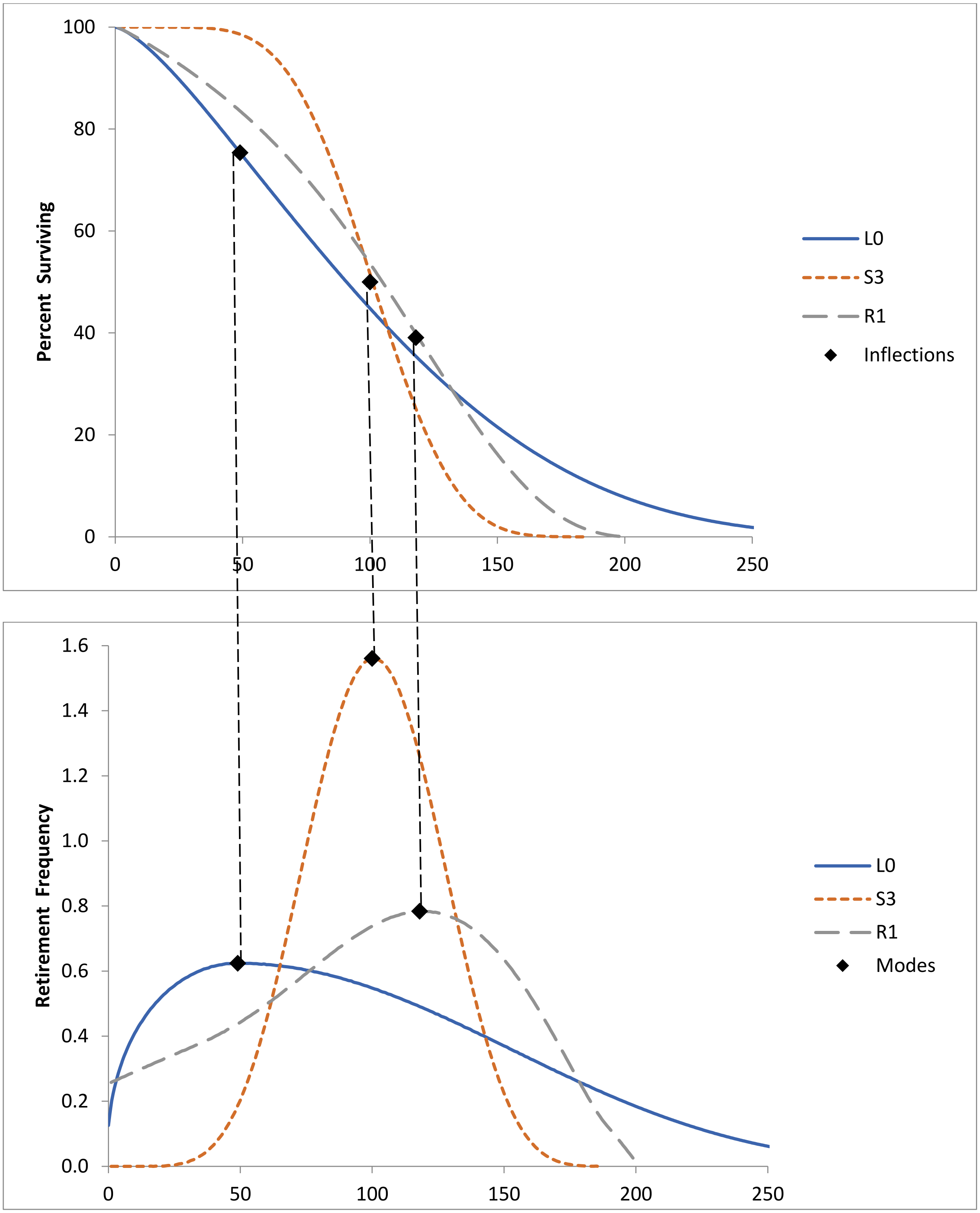
[9] In 1967, Harold A. Cowles added four origin-modal curves known as "O type" curves. There are also several "half" curves and a square curve, so the total amount of survivor curves commonly called "Iowa" curves is about 31.

Figure 1:
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 design was necessary for the curves to be of practical value. As Winfrey notes:

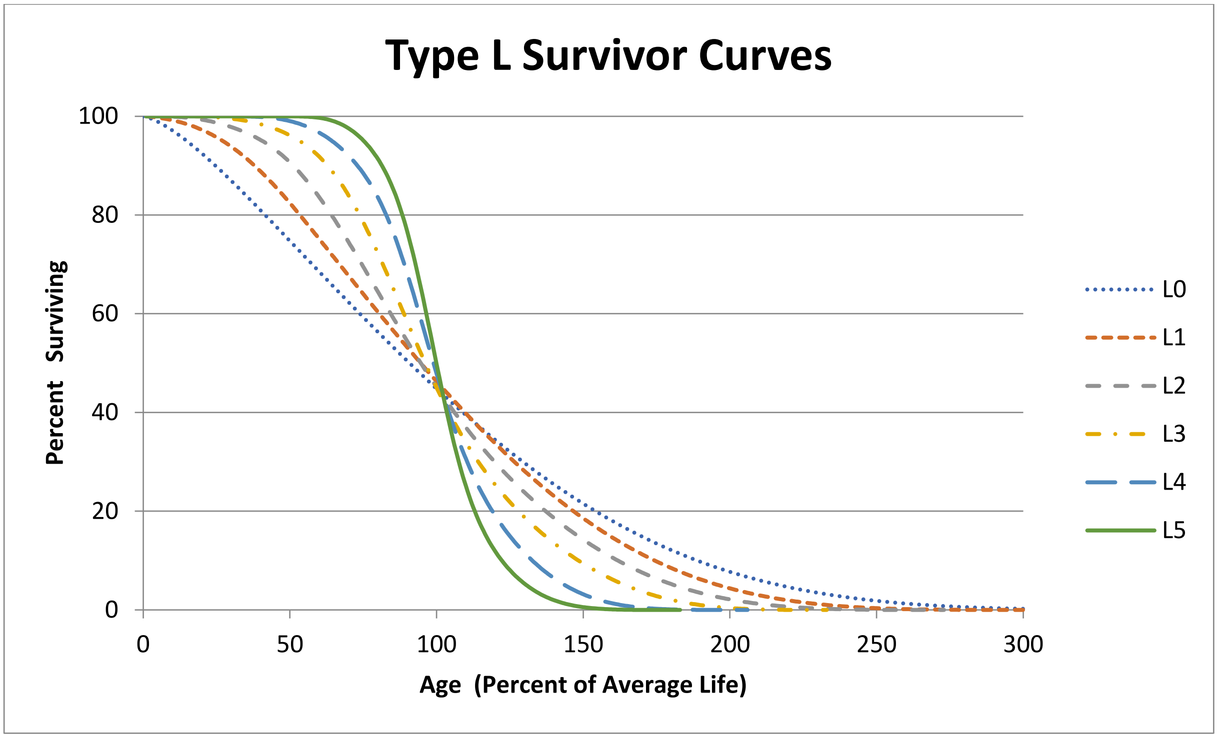
> Since the location of a particular survivor on a graph is affected by both its span in years and the shape of the curve, it is difficult to classify a group of curves unless one of these variables can be controlled. This is easily done by expressing the age in percent of average life."[10]

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.

[10] Winfrey *supra* n. 6, at 60.

Figure 2:
Type L Survivor and Frequency Curves



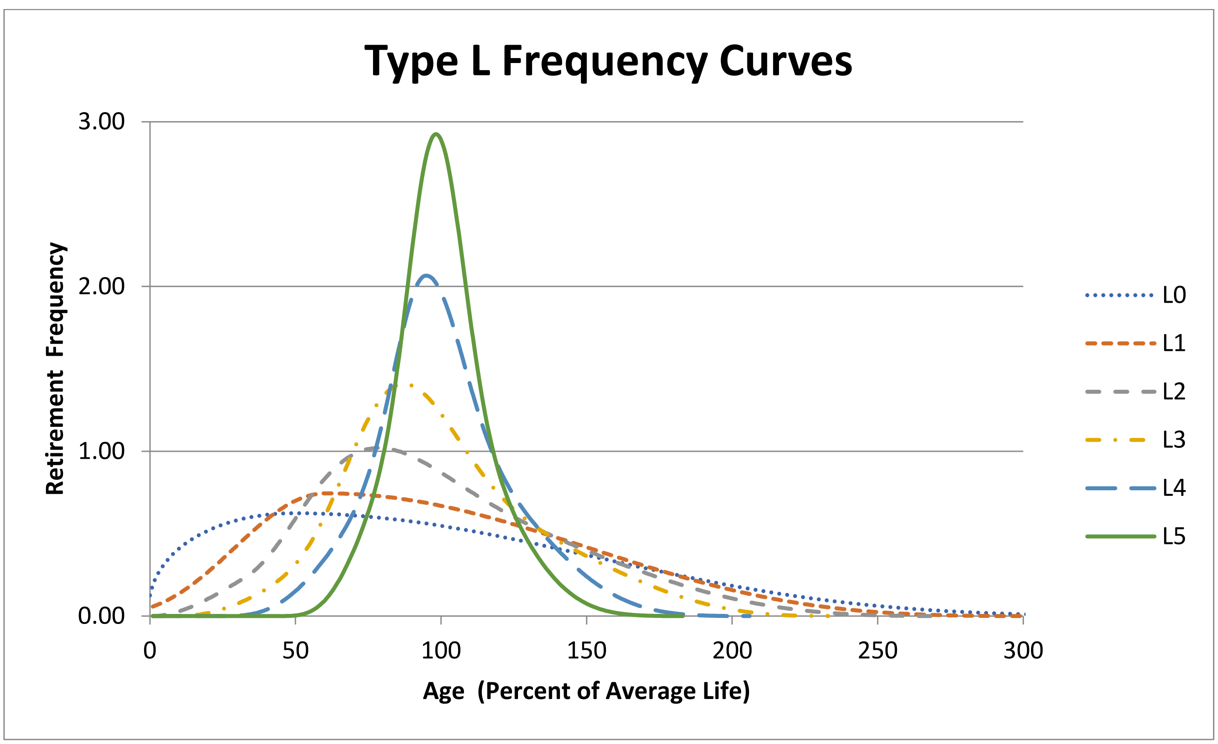
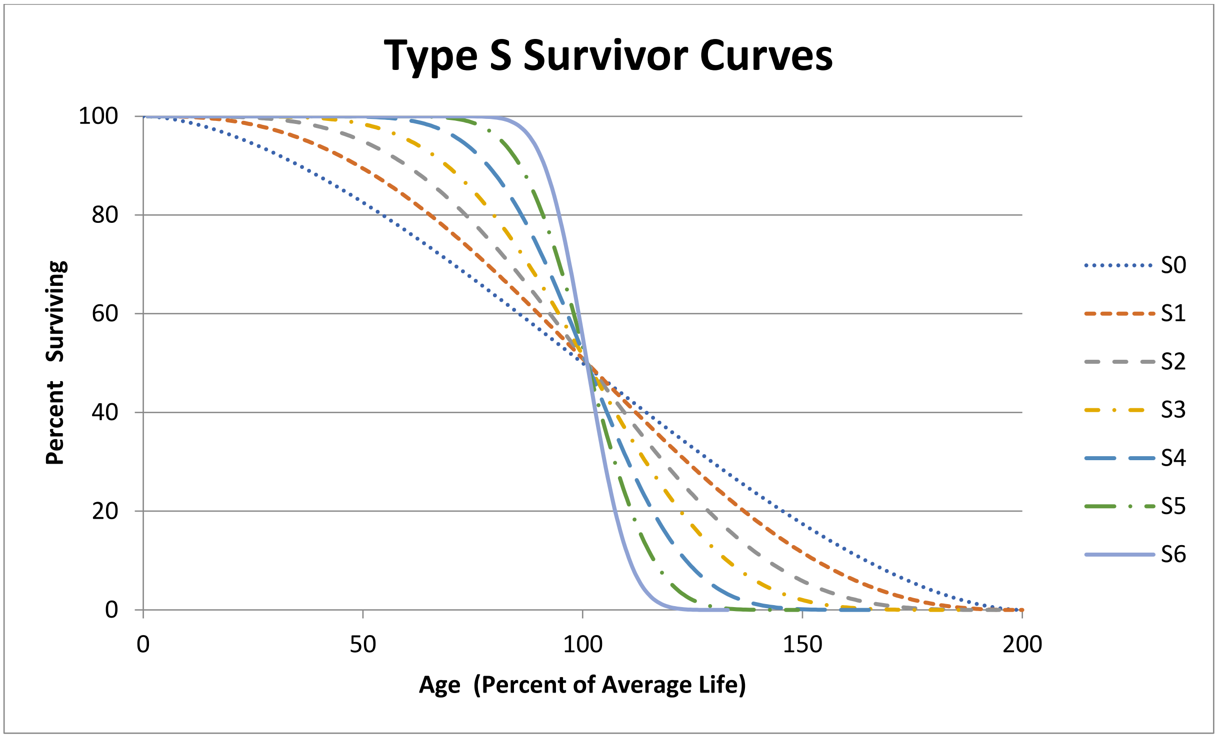


Figure 3:
Type S Survivor and Frequency Curves



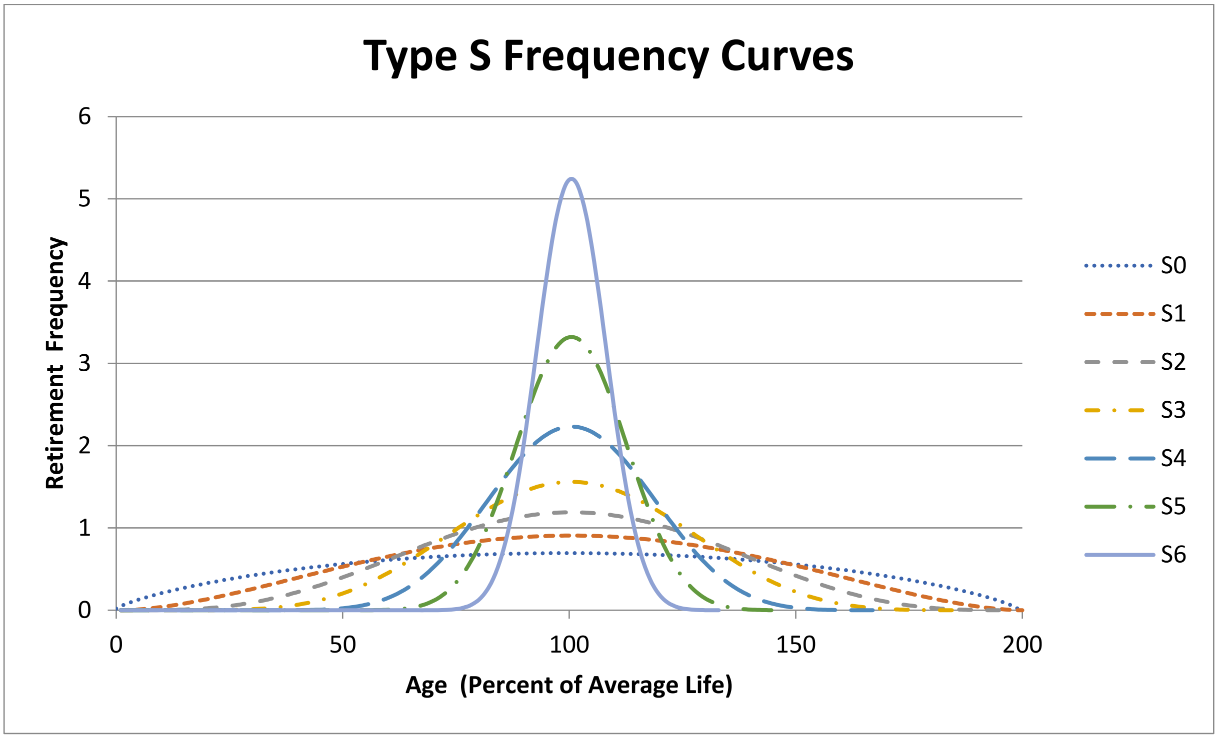
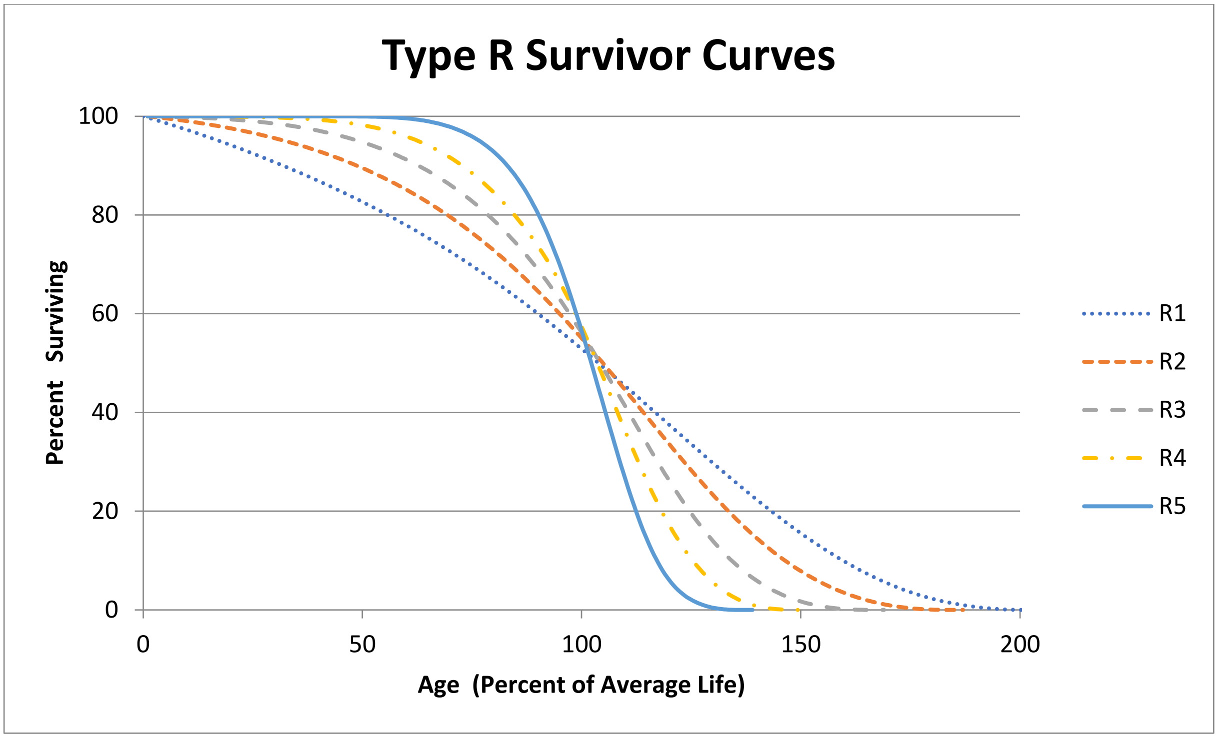
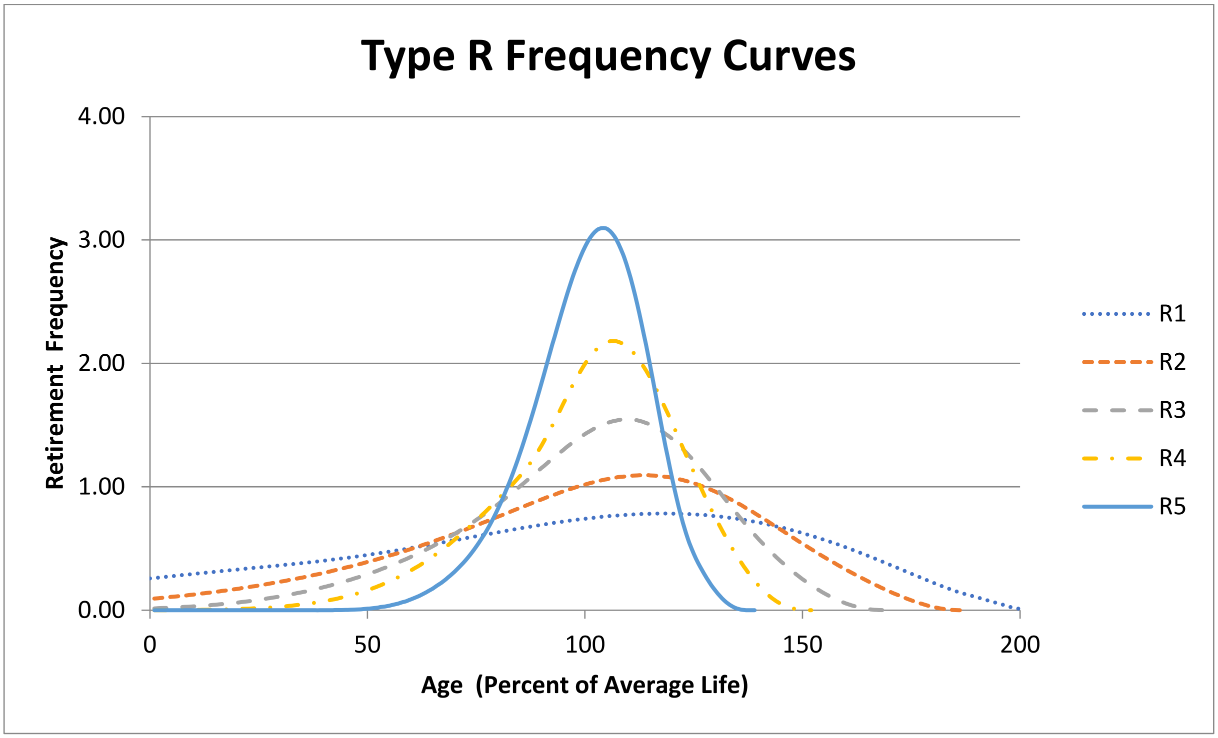


Figure 4:
Type R Survivor and Frequency Curves





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.[11]

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:[12]

Equation 1:
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 dynamic results in a "stub" survivor curve. Iowa curves are used to extend stub curves to maximum life in order to make the average life calculation (see Appendix C).

[11] 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.

[12] National Association of Regulatory Utility Commissioners, Public Utility Depreciation Practices 71 (NARUC 1996).

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.[13] 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.[14] Remaining life is sometimes referred to as "average remaining life" and "life expectancy." To calculate average remaining life at age x, the area under the estimated future portion of the survivor curve is divided by the percent surviving at age x (denoted S_X). Thus, the average remaining life formula is:

Equation 2:
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 to calculate the annual accrual under the remaining life technique.

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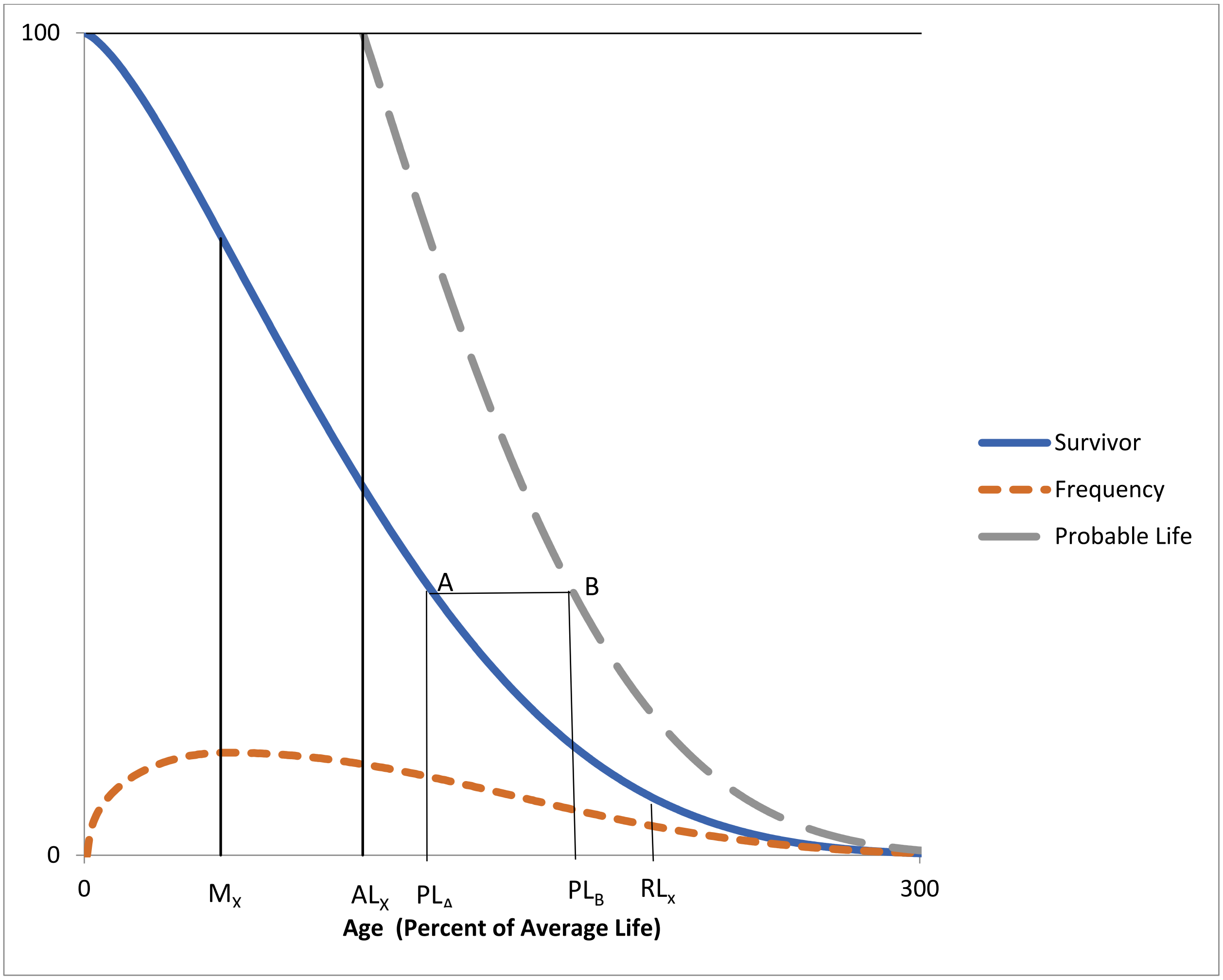
[13] *Id*. at 73.

[14] *Id*. at 74.

Figure 5:
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.[15] 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

[15] Wolf *supra* n. 1, 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 connection occurs 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 today will live. Insurance companies rely on actuarial analysis in determining premiums for life insurance policies.

The study of human mortality is analogous to estimating service lives of industrial property groups. While some humans die solely from chance, most deaths are related to age; that is, death rates generally increase as age increases. Similarly, physical plant is also subject to forces of retirement. These forces include physical, functional, and contingent factors, as shown in the table below.[1]

Figure 1:
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

[1] National Association of Regulatory Utility Commissioners, Public Utility Depreciation Practices 14-15 (NARUC 1996).

Property Records ("CPR"). Generally, a CPR should contain 1) an inventory of property record 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.[2] Historical data is used in the retirement rate actuarial method, which is discussed further below.

<u>The Retirement Rate Method</u>

There are several systematic actuarial methods that use historical data to calculate observed survivor curves for property groups. Of these methods, the retirement rate method is superior, and is widely employed by depreciation analysts.[3] 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 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 into service of a group of property. The experience year (a.k.a. "activity year") refers to the accounting data for a particular calendar year. The two matrices below use aged data—that is, data for which the dates of placements, retirements, transfers, and other transactions are known. Without aged data, the retirement rate actuarial method may not be employed. The first matrix is the exposure matrix, which shows the exposures

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[2] *Id*. at 112–13.

[3] 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.[4] 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 2012 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 were retired during 2012.

Figure 2:
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	

[4] 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 accounting period is called an "exposure" rather than an addition.

Figure 3:
Retirement Matrix

Placement Years	Experience Years Retirements During the Year (000's) 2008	2009	2010	2011	2012	2013	2014	2015	Total at Start of 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.[5] 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).

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[5] Frank K. Wolf & W. Chester Fitch, Depreciation Systems 22 (Iowa State University Press 1994).

The same calculation is applied to each number in the column. The amounts retired during the year 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 at the beginning of 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 4:
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			

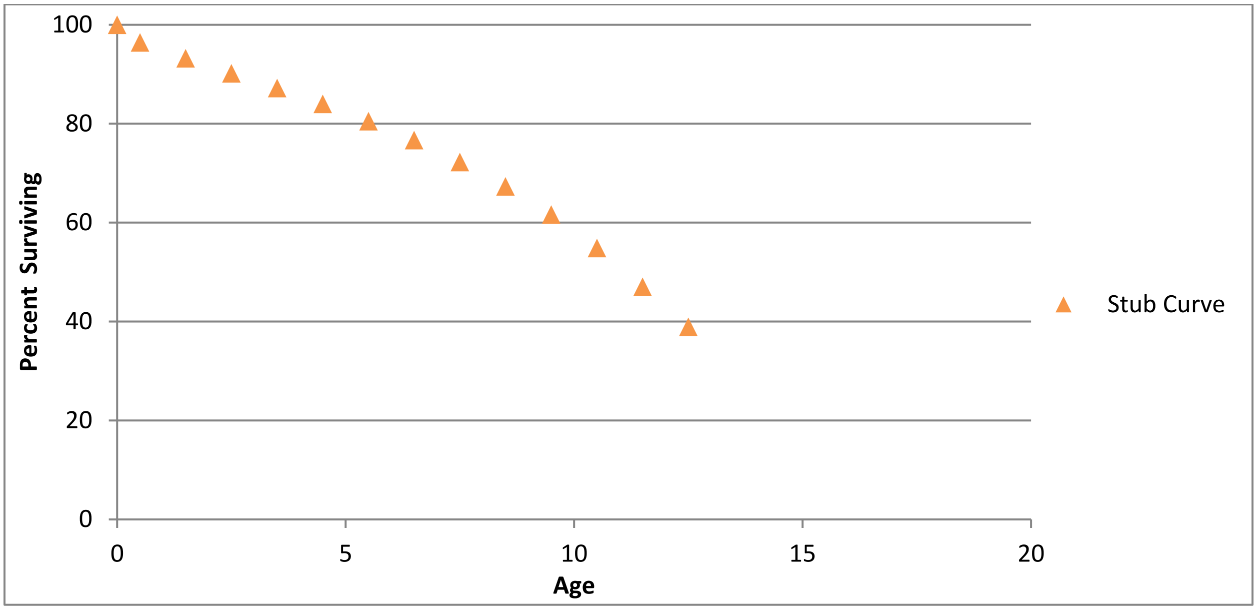
Column F on the right shows the percentages surviving at the beginning of each age interval. This column starts at 100 percent surviving. Each consecutive number below is calculated by multiplying the percent surviving from the previous age interval by the corresponding survivor ratio for that age interval. For example, the percent surviving at the start of age interval 1.5 is 93.21 percent, which was calculated by multiplying the percent surviving for age interval 0.5 (96.43 percent) by the survivor ratio for age interval 0.5 (0.967).[6]

The percentages surviving in Column F are the numbers that are used to form the original survivor curve. This particular curve starts at 100 percent surviving and ends at 38.91 percent surviving. An observed survivor curve such as this that does not reach zero percent surviving is

[6] Multiplying 96.43 by 0.967 does not equal 93.21 exactly due to rounding.

called a "stub" curve. The figure below illustrates the stub survivor curve derived from the OLT above.

Figure 5:
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.[7] 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.[8]

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.

[7] NARUC *supra* n. 1, at 113.

[8] *Id*.

Figure 6:
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 use 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.[9] 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 into service with a special chemical treatment that extended the service lives of those 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.

[9] Wolf *supra* n. 5, at 182.

A 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.[10]

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 7:
Experience Bands

Placement Years	Experience Years — Exposures at January 1 of Each Year (Dollars in 000's)								Total at Start of Age Interval	Age Interval
	2008	2009	2010	2011	2012	2013	2014	2015		
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

[10] NARUC *supra* n. 1, at 114.

covering the same experience years of 2011–2013. This use 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.[11] 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. They rarely reach zero percent because, as seen in the OLT above, relatively newer vintage groups have not yet been fully retired at the

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[11] *Id*.

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

Curve Fitting

Depreciation analysts typically use the survivor curve rather than the frequency curve to fit the observed stub curves. The most commonly used generalized survivor curves 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."[12]

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, the 10.5-R1 curve is clearly a better fit than the other two curves.

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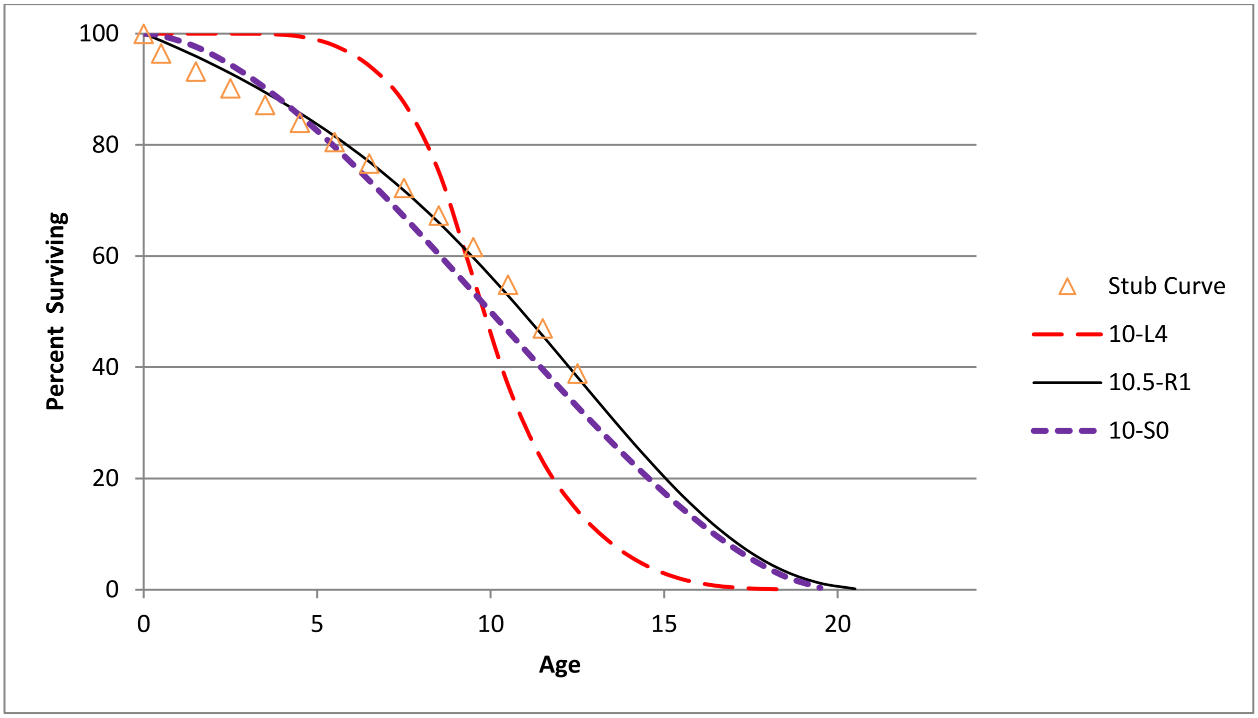
[12] Wolf *supra* n. 5, at 46 (22 curves includes Winfrey's 18 original curves plus Cowles's four "O" type curves).

**Figure 8:
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.[13]

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."[14]

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 for the other two curves. Curve 10-L4 is the worst fit, which was also confirmed visually.

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[13] Wolf *supra* n. 5, at 47.

[14] *Id*. at 48.

Figure 9:
Mathematical Fitting

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

APPENDIX D:

SIMULATED LIFE ANALYSIS

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

Figure 1:
Aged Data Matrix

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

The aged data matrix contains installation or "vintage" years in the first column and experience years in the top row. (Only every other year is shown in order to save space). This matrix contains aged data, meaning that the utility kept track of the age of plant when it was retired. In 2007, for example, $291 were remaining in service from the 2001 installation of $300. Likewise, in 2011, it was known that $57 were remaining in service from the 1999 vintage installation of $270. The amounts in each experience year column are added to arrive the year-end balances. Now assume that the amount of installations and retirements are the same for each year, but that the utility did not keep track of the age of plant when it was retired. The data matrix below contains the same data, except it is not aged. Thus, while the year-end balances are the same, the amount retired from each vintage in a given year is unknown.

Figure 2:
Unaged Data Matrix

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

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

The method that depreciation analysts use to examine unaged data is called the "simulated plant record" method ("SPR").[1] The SPR method is used to simulate the retirement pattern for each vintage and to indicate the Iowa curve that best represent the life characteristics of the property being analyzed.[2] In other words, the SPR model may be used to "fill in" the unaged data matrix with simulated vintage balances for each experience year. The SPR model assumes that all vintages' additions retire in accordance with the same retirement pattern.[3]

Unlike with actuarial analysis, which indicates the best fitting Iowa curve type based on the input data, the SPR model requires the analyst or computer program to first choose an Iowa curve and test the results. This process is repeated until the analyst finds the curve that best matches the observed data is found.[4] Although the SPR method may be conducted manually, analysts typically rely on computer programs to make the process more efficient.

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

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[1] Wolf & W. Chester Fitch, Depreciation Systems 220 (Iowa State University Press 1994). Cyrus Hill is generally credited with developing the principles used in the SPR method. In 1947, Alex Bauhan expanded the SPR method and developed several criteria used to measure the accuracy of simulated data, which he called the SPR method (See Bauhan, A. E., "Life Analysis of Utility Plant for Depreciation Accounting Purposes by the Simulated Plant Record Method," 1947, Appendix of the EEl, 1952.)

[2] National Association of Regulatory Utility Commissioners, Public Utility Depreciation Practices 106 (NARUC 1996).

[3] *Id*. at 107.

[4] Wolf *supra* n. 1, at 222.

Figure 3:
SPR Calculation Using Iowa Curve 10-S3

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

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

Figure 4:
SPR Calculation Using Iowa Curve 12-S3

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

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

Figure 5:
SPR: Curve 12-S3: 2009, 2011, 2013

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

SSD = 479,417 **MSD = 159,806** **√MSD = 400**

CI = Average Actual Bal / √MSD = 4,714 / 400 = **12** **IV =** 1000 / CI = **85**

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

Figure 6:
SPR: Curve 10-S3: 2009, 2011, 2013

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

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

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

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

There are several indices used to measure the fit of the chosen curve. Alex Bauhan developed the conformance index ("CI") to rank the optimal curves.[5] The CI is the average

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

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

Equation 1:
Conformance Index

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

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

Figure 7:
Conformance Index Scale

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

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

A related measure to the CI is the "index of variation" ("IV").[6] The IV is equal to 1,000 divided by the CI, as shown in the Figures above. Although the IV does not use a definite scale like the CI, it follows that the highest-ranking curves are those with the lowest IVs. When divided by ten, the IV approximates the average difference between simulated and actual balances expressed as a percent of the average actual balance.[7] The IV resulting from the 12-S3 curve is 85, while the IV from the 10-S3 is 50, as shown above.

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

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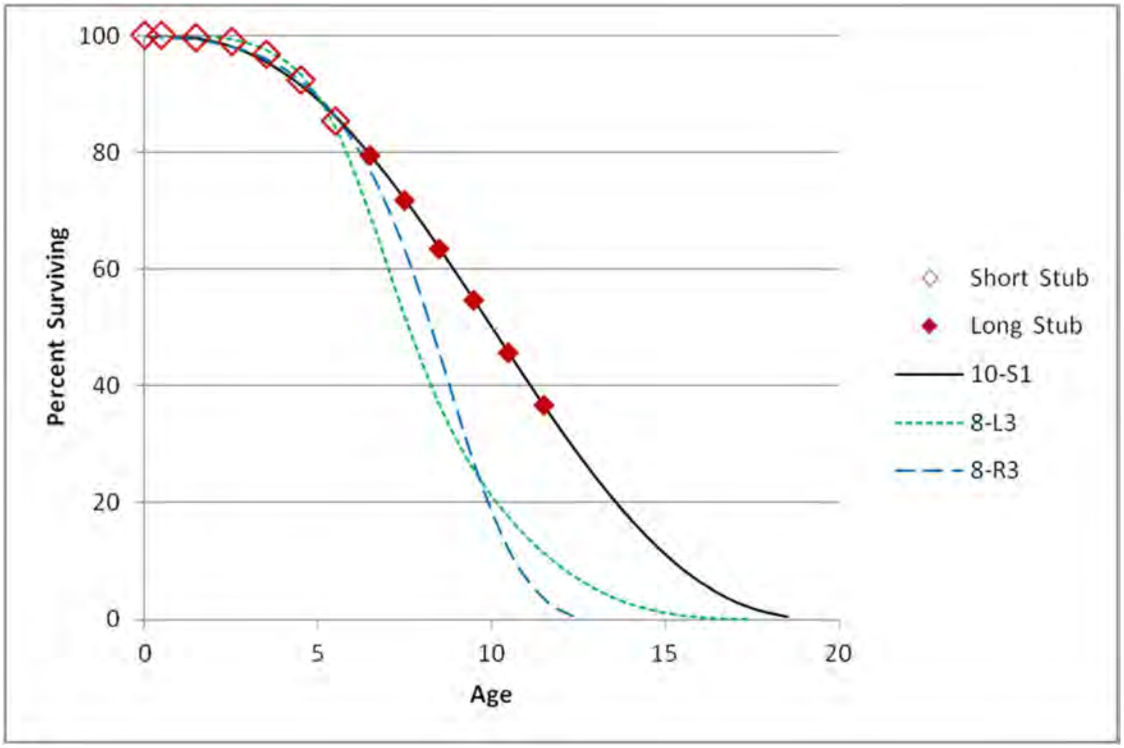
[6] White, R.E. and H. A. Cowles, "A Test Procedure for the Simulated Plant Record Method of Life Analysis," Journal of the American Statistical Association, vol. 70 (1970): 1204-1212.

[7] NARUC *supra* n. 2, at 111.

Figure 8:
REI Illustration



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

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

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

Figure 9:
REI Scale

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

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

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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

Utility Regulatory Proceedings

Regulatory Agency	Utility Applicant	Docket Number	Issues Addressed	Parties Represented
New Mexico Public Regulation Commission	Southwestern Public Service Company	22-00286-UT	Cost of capital, depreciation rates, net salvage	The New Mexico Large Customer Group; Occidental Permian
Public Utilities Commission of the State of California	Southern California Gas Company San Diego Gas & Electric Company	A.22-05-015 A.22-05-016	Depreciation rates, service lives, net salvage	The Utility Reform Network
Public Utilties Commission of the State of Colorado	Public Service Company of Colorado	22AL-0530E 22AL-0478E	Cost of capital, awarded rate of return, capital structure	Colorado Energy Consumers
New Mexico Public Regulatory Commission	Public Service Company of New Mexico	22-00270-UT	Cost of capital, depreciation rates, net salvage	The Albuquerque Bernalillo County Water Utility Authority
Florida Public Service Commission	Peoples Gas System	20230023-GU 20220219-GU 20220212-GU	Cost of capital, depreciation rates, net salvage	Florida Office of Public Counsel
Maryland Public Service Commission	Potomac Edison Company	9695	Cost of capital, depreciation rates, net salvage	Maryland Office of People's Counsel
Public Service Commission of the State of Montana	Montana-Dakota Utilities Company	2022.11.099	Depreciation rates, service lives, net salvage	Montana Consumer Counsel and Denbury Onshore
Indiana Utility Regulatory Commission	Indiana-American Water Company	45870	Depreciation rates, service lives, net salvage	Indiana Office of Utility Consumer Counselor
Public Service Commission of South Carolina	Dominion Energy South Carolina	2023-70-G	Depreciation rates, service lives, net salvage	South Carolina Office of Regulatory Staff
Maryland Public Service Commission	Columbia Gas of Maryland	9701	Cost of capital, awarded rate of return, capital structure	Maryland Office of People's Counsel
Pennsylvania Public Utility Commission	Columbia Water Company	R-2023-3040258	Cost of capital, awarded rate of return, capital structure	Pennsylvania Office of Consumer Advocate
Maryland Public Service Commission	Baltimore Gas and Electric Company	9692	Depreciation rates, service lives, net salvage	Maryland Office of People's Counsel
Arizona Corporation Commission	Arizona Public Service Company	E-01345A-22-0144	Cost of capital, awarded rate of return, capital structure	Residential Utility Consumer Office
Oklahoma Corporation Commission	Public Service Company of Oklahoma	PUD 2022-000093	Cost of capital, depreciation rates, net salvage	Oklahoma Industrial Energy Consumers

Utility Regulatory Proceedings

Regulatory Agency	Utility Applicant	Docket Number	Issues Addressed	Parties Represented
Public Service Commission of the State of Montana	NorthWestern Energy	2022.07.078	Cost of capital, depreciation rates, net salvage	Montana Consumer Counsel and Montana Large Customer Group
Indiana Utility Regulatory Commission	Northern Indiana Public Service Company	45772	Cost of capital, depreciation rates, net salvage	Indiana Office of Utility Consumer Counselor
Public Service Commission of South Carolina	Duke Energy Progress	2022-254-E	Depreciation rates, service lives, net salvage	South Carolina Office of Regulatory Staff
Wyoming Public Service Commission	Cheyenne Light, Fuel and Power Company D/B/A Black Hills Energy	20003-214-ER-22	Depreciation rates, service lives, net salvage	Wyoming Office of Consumer Advocate
Railroad Commission of Texas	Texas Gas Services Company	OS-22-00009896	Depreciation rates, service lives, net salvage	The City of El Paso
Public Utilities Commission of Nevada	Sierra Pacific Power Company	22-06014	Depreciation rates, service lives, net salvage	Bureau of Consumer Protection
Washington Utilities & Transportation Commission	Puget Sound Energy	UE-220066 UG-220067 UG-210918	Depreciation rates, service lives, net salvage	Washington Office of Attorney General
Public Utility Commission of Texas	Oncor Electric Delivery Company LLC	PUC 53601	Depreciation rates, service lives, net salvage	Alliance of Oncor Cities
Florida Public Service Commission	Florida Public Utilities Company	20220067-GU	Cost of capital, depreciation rates	Florida Office of Public Counsel
Public Utility Commission of Texas	Entergy Texas, Inc.	PUC 53719	Depreciation rates, decommissioning costs	Texas Municipal Group
Florida Public Service Commission	Florida City Gas	2020069-GU	Cost of capital, depreciation rates	Florida Office of Public Counsel
Connecticut Public Utilities Regulatory Authority	Aquarion Water Company of Connecticut	22-07-01	Depreciation rates, service lives, net salvage	PURA Staff
Washington Utilities & Transportation Commission	Avista Corporation	UE-220053 UG-220054 UE-210854	Cost of capital, awarded rate of return, capital structure	Washington Office of Attorney General
Federal Energy Regulatory Commission	ANR Pipeline Company	RP22-501-000	Depreciation rates, service lives, net salvage	Ascent Resources - Utica, LLC

Utility Regulatory Proceedings

Regulatory Agency	Utility Applicant	Docket Number	Issues Addressed	Parties Represented
Pennsylvania Public Utility Commission	Columbia Gas of Pennsylvania, Inc.	R-2022-3031211	Cost of capital, awarded rate of return, capital structure	Pennsylvania Office of Consumer Advocate
Public Service Commission of South Carolina	Piedmont Natural Gas Company	2022-89-G	Depreciation rates, service lives, net salvage	South Carolina Office of Regulatory Staff
Pennsylvania Public Utility Commission	UGI Utilities, Inc. - Gas Division	R-2021-3030218	Cost of capital, awarded rate of return, capital structure	Pennsylvania Office of Consumer Advocate
Public Utilities Commission of the State of California	Pacific Gas & Electric Company	A.21-06-021	Depreciation rates, service lives, net salvage	The Utility Reform Network
Pennsylvania Public Utility Commission	PECO Energy Company - Gas Division	R-2022-3031113	Cost of capital, awarded rate of return, capital structure	Pennsylvania Office of Consumer Advocate
Oklahoma Corporation Commission	Oklahoma Gas & Electric Company	PUD 202100164	Cost of capital, depreciation rates, net salvage	Oklahoma Industrial Energy Consumers
Massachusetts Department of Public Utilities	NSTAR Electric Company D/B/A Eversource Energy	D.P.U. 22-22	Depreciation rates, service lives, net salvage	Massachusetts Office of the Attorney General, Office of Ratepayer Advocacy
Michigan Public Service Company	DTE Electric Company	U-20836	Cost of capital, awarded rate of return, capital structure	Michigan Environmental Council and Citizens Utility Board of Michigan
New York State Public Service Commission	Consolidated Edison Company of New York, Inc.	22-E-0064 22-G-0065	Depreciation rates, service lives, net salvage, depreciation reserve	The City of New York
Pennsylvania Public Utility Commission	Aqua Pennsylvania Wastewater / East Whiteland Township	A-2021-3026132	Fair market value estimates for wastewater assets	Pennsylvania Office of Consumer Advocate
Public Service Commission of South Carolina	Kiawah Island Utility, Inc.	2021-324-WS	Cost of capital, awarded rate of return, capital structure	South Carolina Office of Regulatory Staff
Pennsylvania Public Utility Commission	Aqua Pennsylvania Wastewater / Willistown Township	A-2021-3027268	Fair market value estimates for wastewater assets	Pennsylvania Office of Consumer Advocate
Indiana Utility Regulatory Commission	Northern Indiana Public Service Company	45621	Depreciation rates, service lives, net salvage	Indiana Office of Utility Consumer Counselor
Arkansas Public Service Commission	Southwestern Electric Power Company	21-070-U	Cost of capital, depreciation rates, net salvage	Western Arkansas Large Energy Consumers

Utility Regulatory Proceedings

Regulatory Agency	Utility Applicant	Docket Number	Issues Addressed	Parties Represented
Federal Energy Regulatory Commission	Southern Star Central Gas Pipeline	RP21-778-002	Depreciation rates, service lives, net salvage	Consumer-Owned Shippers
Railroad Commission of Texas	Participating Texas gas utilities in consolidated proceeding	OS-21-00007061	Securitization of extraordinary gas costs arising from winter storms	The City of El Paso
Public Service Commission of South Carolina	Palmetto Wastewater Reclamation, Inc.	2021-153-S	Cost of capital, awarded rate of return, capital structure, ring-fencing	South Carolina Office of Regulatory Staff
Public Utilties Commission of the State of Colorado	Public Service Company of Colorado	21AL-0317E	Cost of capital, depreciation rates, net salvage	Colorado Energy Consumers
Pennsylvania Public Utility Commission	City of Lancaster - Water Department	R-2021-3026682	Cost of capital, awarded rate of return, capital structure	Pennsylvania Office of Consumer Advocate
Public Utility Commission of Texas	Southwestern Public Service Company	PUC 51802	Depreciation rates, service lives, net salvage	The Alliance of Xcel Municipalities
Pennsylvania Public Utility Commission	The Borough of Hanover - Hanover Municipal Waterworks	R-2021-3026116	Cost of capital, awarded rate of return, capital structure	Pennsylvania Office of Consumer Advocate
Maryland Public Service Commission	Delmarva Power & Light Company	9670	Cost of capital and authorized rate of return	Maryland Office of People's Counsel
Oklahoma Corporation Commission	Oklahoma Natural Gas Company	PUD 202100063	Cost of capital, awarded rate of return, capital structure	Oklahoma Industrial Energy Consumers
Indiana Utility Regulatory Commission	Indiana Michigan Power Company	45576	Depreciation rates, service lives, net salvage	Indiana Office of Utility Consumer Counselor
Public Utility Commission of Texas	El Paso Electric Company	PUC 52195	Depreciation rates, service lives, net salvage	The City of El Paso
Pennsylvania Public Utility Commission	Aqua Pennsylvania	R-2021-3027385	Cost of capital, awarded rate of return, capital structure	Pennsylvania Office of Consumer Advocate
Public Service Commission of the State of Montana	NorthWestern Energy	D2021.02.022	Cost of capital, awarded rate of return, capital structure	Montana Consumer Counsel
Pennsylvania Public Utility Commission	PECO Energy Company	R-2021-3024601	Cost of capital, awarded rate of return, capital structure	Pennsylvania Office of Consumer Advocate

Utility Regulatory Proceedings

Regulatory Agency	Utility Applicant	Docket Number	Issues Addressed	Parties Represented
New Mexico Public Regulation Commission	Southwestern Public Service Company	20-00238-UT	Cost of capital and authorized rate of return	The New Mexico Large Customer Group; Occidental Permian
Oklahoma Corporation Commission	Public Service Company of Oklahoma	PUD 202100055	Cost of capital, depreciation rates, net salvage	Oklahoma Industrial Energy Consumers
Pennsylvania Public Utility Commission	Duquesne Light Company	R-2021-3024750	Cost of capital, awarded rate of return, capital structure	Pennsylvania Office of Consumer Advocate
Maryland Public Service Commission	Columbia Gas of Maryland	9664	Cost of capital and authorized rate of return	Maryland Office of People's Counsel
Indiana Utility Regulatory Commission	Southern Indiana Gas Company, d/b/a Vectren Energy Delivery of Indiana, Inc.	45447	Depreciation rates, service lives, net salvage	Indiana Office of Utility Consumer Counselor
Public Utility Commission of Texas	Southwestern Electric Power Company	PUC 51415	Depreciation rates, service lives, net salvage	Cities Advocating Reasonable Deregulation
New Mexico Public Regulatory Commission	Avangrid, Inc., Avangrid Networks, Inc., NM Green Holdings, Inc., PNM, and PNM Resources	20-00222-UT	Ring fencing and capital structure	The Albuquerque Bernalillo County Water Utility Authority
Indiana Utility Regulatory Commission	Indiana Gas Company, d/b/a Vectren Energy Delivery of Indiana, Inc.	45468	Depreciation rates, service lives, net salvage	Indiana Office of Utility Consumer Counselor
Public Utilities Commission of Nevada	Nevada Power Company and Sierra Pacific Power Company, d/b/a NV Energy	20-07023	Construction work in progress	MGM Resorts International, Caesars Enterprise Services, LLC, and the Southern Nevada Water Authority
Massachusetts Department of Public Utilities	Boston Gas Company, d/b/a National Grid	D.P.U. 20-120	Depreciation rates, service lives, net salvage	Massachusetts Office of the Attorney General, Office of Ratepayer Advocacy
Public Service Commission of the State of Montana	ABACO Energy Services, LLC	D2020.07.082	Cost of capital and authorized rate of return	Montana Consumer Counsel
Maryland Public Service Commission	Washington Gas Light Company	9651	Cost of capital and authorized rate of return	Maryland Office of People's Counsel
Florida Public Service Commission	Utilities, Inc. of Florida	20200139-WS	Cost of capital and authorized rate of return	Florida Office of Public Counsel
New Mexico Public Regulatory Commission	El Paso Electric Company	20-00104-UT	Cost of capital, depreciation rates, net salvage	City of Las Cruces and Doña Ana County

Utility Regulatory Proceedings

Regulatory Agency	Utility Applicant	Docket Number	Issues Addressed	Parties Represented
Public Utilities Commission of Nevada	Nevada Power Company	20-06003	Cost of capital, awarded rate of return, capital structure, earnings sharing	MGM Resorts International, Caesars Enterprise Services, LLC, Wynn Las Vegas, LLC, Smart Energy Alliance, and Circus Circus Las Vegas, LLC
Wyoming Public Service Commission	Rocky Mountain Power	20000-578-ER-20	Cost of capital and authorized rate of return	Wyoming Industrial Energy Consumers
Florida Public Service Commission	Peoples Gas System	20200051-GU 20200166-GU	Cost of capital, depreciation rates, net salvage	Florida Office of Public Counsel
Wyoming Public Service Commission	Rocky Mountain Power	20000-539-EA-18	Depreciation rates, service lives, net salvage	Wyoming Industrial Energy Consumers
Public Service Commission of South Carolina	Dominion Energy South Carolina	2020-125-E	Depreciation rates, service lives, net salvage	South Carolina Office of Regulatory Staff
Pennsylvania Public Utility Commission	The City of Bethlehem	2020-3020256	Cost of capital, awarded rate of return, capital structure	Pennsylvania Office of Consumer Advocate
Railroad Commission of Texas	Texas Gas Services Company	GUD 10928	Depreciation rates, service lives, net salvage	Gulf Coast Service Area Steering Committee
Public Utilities Commission of the State of California	Southern California Edison	A.19-08-013	Depreciation rates, service lives, net salvage	The Utility Reform Network
Massachusetts Department of Public Utilities	NSTAR Gas Company	D.P.U. 19-120	Depreciation rates, service lives, net salvage	Massachusetts Office of the Attorney General, Office of Ratepayer Advocacy
Georgia Public Service Commission	Liberty Utilities (Peach State Natural Gas)	42959	Depreciation rates, service lives, net salvage	Public Interest Advocacy Staff
Florida Public Service Commission	Florida Public Utilities Company	20190155-El 20190156-El 20190174-El	Depreciation rates, service lives, net salvage	Florida Office of Public Counsel
Illinois Commerce Commission	Commonwealth Edison Company	20-0393	Depreciation rates, service lives, net salvage	The Office of the Illinois Attorney General
Public Utility Commission of Texas	Southwestern Public Service Company	PUC 49831	Depreciation rates, service lives, net salvage	Alliance of Xcel Municipalities
Public Service Commission of South Carolina	Blue Granite Water Company	2019-290-WS	Depreciation rates, service lives, net salvage	South Carolina Office of Regulatory Staff

Utility Regulatory Proceedings

Regulatory Agency	Utility Applicant	Docket Number	Issues Addressed	Parties Represented
Railroad Commission of Texas	CenterPoint Energy Resources	GUD 10920	Depreciation rates and grouping procedure	Alliance of CenterPoint Municipalities
Pennsylvania Public Utility Commission	Aqua Pennsylvania Wastewater / East Norriton Township	A-2019-3009052	Fair market value estimates for wastewater assets	Pennsylvania Office of Consumer Advocate
New Mexico Public Regulation Commission	Southwestern Public Service Company	19-00170-UT	Cost of capital and authorized rate of return	The New Mexico Large Customer Group; Occidental Permian
Indiana Utility Regulatory Commission	Duke Energy Indiana	45253	Cost of capital, depreciation rates, net salvage	Indiana Office of Utility Consumer Counselor
Maryland Public Service Commission	Columbia Gas of Maryland	9609	Depreciation rates, service lives, net salvage	Maryland Office of People's Counsel
Washington Utilities & Transportation Commission	Avista Corporation	UE-190334	Cost of capital, awarded rate of return, capital structure	Washington Office of Attorney General
Indiana Utility Regulatory Commission	Indiana Michigan Power Company	45235	Cost of capital, depreciation rates, net salvage	Indiana Office of Utility Consumer Counselor
Public Utilities Commission of the State of California	Pacific Gas & Electric Company	18-12-009	Depreciation rates, service lives, net salvage	The Utility Reform Network
Oklahoma Corporation Commission	The Empire District Electric Company	PUD 201800133	Cost of capital, authorized ROE, depreciation rates	Oklahoma Industrial Energy Consumers and Oklahoma Energy Results
Arkansas Public Service Commission	Southwestern Electric Power Company	19-008-U	Cost of capital, depreciation rates, net salvage	Western Arkansas Large Energy Consumers
Public Utility Commission of Texas	CenterPoint Energy Houston Electric	PUC 49421	Depreciation rates, service lives, net salvage	Texas Coast Utilities Coalition
Massachusetts Department of Public Utilities	Massachusetts Electric Company and Nantucket Electric Company	D.P.U. 18-150	Depreciation rates, service lives, net salvage	Massachusetts Office of the Attorney General, Office of Ratepayer Advocacy
Oklahoma Corporation Commission	Oklahoma Gas & Electric Company	PUD 201800140	Cost of capital, authorized ROE, depreciation rates	Oklahoma Industrial Energy Consumers and Oklahoma Energy Results
Public Service Commission of the State of Montana	Montana-Dakota Utilities Company	D2018.9.60	Depreciation rates, service lives, net salvage	Montana Consumer Counsel and Denbury Onshore

Utility Regulatory Proceedings

Regulatory Agency	Utility Applicant	Docket Number	Issues Addressed	Parties Represented
Indiana Utility Regulatory Commission	Northern Indiana Public Service Company	45159	Depreciation rates, grouping procedure, demolition costs	Indiana Office of Utility Consumer Counselor
Public Service Commission of the State of Montana	NorthWestern Energy	D2018.2.12	Depreciation rates, service lives, net salvage	Montana Consumer Counsel
Oklahoma Corporation Commission	Public Service Company of Oklahoma	PUD 201800097	Depreciation rates, service lives, net salvage	Oklahoma Industrial Energy Consumers and Wal-Mart
Nevada Public Utilities Commission	Southwest Gas Corporation	18-05031	Depreciation rates, service lives, net salvage	Nevada Bureau of Consumer Protection
Public Utility Commission of Texas	Texas-New Mexico Power Company	PUC 48401	Depreciation rates, service lives, net salvage	Alliance of Texas-New Mexico Power Municipalities
Oklahoma Corporation Commission	Oklahoma Gas & Electric Company	PUD 201700496	Depreciation rates, service lives, net salvage	Oklahoma Industrial Energy Consumers and Oklahoma Energy Results
Maryland Public Service Commission	Washington Gas Light Company	9481	Depreciation rates, service lives, net salvage	Maryland Office of People's Counsel
Indiana Utility Regulatory Commission	Citizens Energy Group	45039	Depreciation rates, service lives, net salvage	Indiana Office of Utility Consumer Counselor
Public Utility Commission of Texas	Entergy Texas, Inc.	PUC 48371	Depreciation rates, decommissioning costs	Texas Municipal Group
Washington Utilities & Transportation Commission	Avista Corporation	UE-180167	Depreciation rates, service lives, net salvage	Washington Office of Attorney General
New Mexico Public Regulation Commission	Southwestern Public Service Company	17-00255-UT	Cost of capital and authorized rate of return	HollyFrontier Navajo Refining; Occidental Permian
Public Utility Commission of Texas	Southwestern Public Service Company	PUC 47527	Depreciation rates, plant service lives	Alliance of Xcel Municipalities
Public Service Commission of the State of Montana	Montana-Dakota Utilities Company	D2017.9.79	Depreciation rates, service lives, net salvage	Montana Consumer Counsel
Florida Public Service Commission	Florida City Gas	20170179-GU	Cost of capital, depreciation rates	Florida Office of Public Counsel

Utility Regulatory Proceedings

Regulatory Agency	Utility Applicant	Docket Number	Issues Addressed	Parties Represented
Washington Utilities & Transportation Commission	Avista Corporation	UE-170485	Cost of capital and authorized rate of return	Washington Office of Attorney General
Wyoming Public Service Commission	Powder River Energy Corporation	10014-182-CA-17	Credit analysis, cost of capital	Private customer
Oklahoma Corporation Commission	Public Service Co. of Oklahoma	PUD 201700151	Depreciation, terminal salvage, risk analysis	Oklahoma Industrial Energy Consumers
Public Utility Commission of Texas	Oncor Electric Delivery Company	PUC 46957	Depreciation rates, simulated analysis	Alliance of Oncor Cities
Nevada Public Utilities Commission	Nevada Power Company	17-06004	Depreciation rates, service lives, net salvage	Nevada Bureau of Consumer Protection
Public Utility Commission of Texas	El Paso Electric Company	PUC 46831	Depreciation rates, interim retirements	City of El Paso
Idaho Public Utilities Commission	Idaho Power Company	IPC-E-16-24	Accelerated depreciation of North Valmy plant	Micron Technology, Inc.
Idaho Public Utilities Commission	Idaho Power Company	IPC-E-16-23	Depreciation rates, service lives, net salvage	Micron Technology, Inc.
Public Utility Commission of Texas	Southwestern Electric Power Company	PUC 46449	Depreciation rates, decommissioning costs	Cities Advocating Reasonable Deregulation
Massachusetts Department of Public Utilities	Eversource Energy	D.P.U. 17-05	Cost of capital, capital structure, and rate of return	Sunrun Inc.; Energy Freedom Coalition of America
Railroad Commission of Texas	Atmos Pipeline - Texas	GUD 10580	Depreciation rates, grouping procedure	City of Dallas
Public Utility Commission of Texas	Sharyland Utility Company	PUC 45414	Depreciation rates, simulated analysis	City of Mission
Oklahoma Corporation Commission	Empire District Electric Company	PUD 201600468	Cost of capital, depreciation rates	Oklahoma Industrial Energy Consumers
Railroad Commission of Texas	CenterPoint Energy Texas Gas	GUD 10567	Depreciation rates, simulated plant analysis	Texas Coast Utilities Coalition

Utility Regulatory Proceedings

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

Summary Accrual Adjustment

	[1]	[2]	[3]	[4]
Plant Function	Plant Balance 12/31/2022	I&M Proposed Accrual	OUCC Proposed Accrual	**OUCC Accrual Adjustment**
Production	$ 5,056,557,412	$ 276,046,028	$ 272,890,538	$ (3,155,491)
Transmission	1,825,914,836	48,660,179	45,703,397	(2,956,782)
Distribution - IN	2,421,899,098	76,928,811	63,523,504	(13,405,307)
General	190,806,357	7,427,409	7,427,409	0
Total Plant Studied	$ 9,495,177,703	$ 409,062,428	$ 389,544,847	**$ (19,517,580)**

[1], [2] From depreciation study

[3] From Attachment DJG-4

[4] = [3] - [2]

Depreciation Parameter Comparison

Account No.	Description	I&M Proposal Iowa Curve	I&M Proposal Depr Rate	I&M Proposal Annual Accrual	OUCC Proposal Iowa Curve	OUCC Proposal Depr Rate	OUCC Proposal Annual Accrual
	TRANSMISSION PLANT						
354.00	Towers & Fixtures	R5 - 66	2.82%	6,521,673	R4 - 76	2.11%	4,873,694
356.00	OH Conductor & Devices	R4 - 67	2.30%	7,257,380	R3 - 75	1.89%	5,948,577
	DISTRIBUTION PLANT						
362.00	Station Equipment	L0.5 - 43	2.96%	12,607,554	L0 - 47	2.62%	11,172,400
364.00	Poles, Towers, & Fixtures	L0 - 42	4.60%	13,463,761	L0 - 54	3.45%	10,104,376
365.00	Overhead Conductor & Devices	L0 - 41	2.93%	14,104,877	L0 - 48	2.45%	11,810,547
366.00	Underground Conduit	R2 - 62	1.61%	2,709,068	R1.5 - 76	1.26%	2,119,126
367.00	Underground Conductor	R1 - 57	1.75%	4,927,687	R1 - 61	1.62%	4,544,841
368.00	Line Transformers	R0.5 - 27	3.42%	11,920,451	R0.5 - 43	1.89%	6,576,801

Detailed Rate Comparison

		[1]	[2]		[3]		[4]	
			I&M Proposal		OUCC Proposal		Difference	
Account No.	Description	Plant 12/31/2022	Rate	Annual Accrual	Rate	Annual Accrual	Rate	Annual Accrual
	STEAM PRODUCTION PLANT							
	Rockport Unit 1							
311.00	Structures & Improvements	109,167,264	7.02%	7,667,552	6.77%	7,386,032	-0.26%	-281,520
312.00	Boiler Plant Equipment	851,851,600	8.26%	70,390,277	8.00%	68,174,478	-0.26%	-2,215,799
314.00	Turbogenerator Units	109,246,674	7.71%	8,417,576	7.44%	8,131,757	-0.26%	-285,820
315.00	Accessory Electrical Equipment	62,421,661	6.84%	4,268,434	6.58%	4,106,999	-0.26%	-161,435
316.00	Miscellaneous Power Plant Equip.	25,490,857	7.43%	1,894,234	7.17%	1,827,543	-0.26%	-66,691
	Total	1,158,178,056	8.00%	92,638,074	7.74%	89,626,809	-0.26%	-3,011,265
	Total Steam Production Plant	1,158,178,056	8.00%	92,638,074	7.74%	89,626,809	-0.26%	-3,011,265
	NUCLEAR PRODUCTION PLANT							
	Cook Unit 1							
321.00	Structures & Improvements	87,160,034	3.79%	3,303,941	3.79%	3,303,941	0.00%	0
322.00	Reactor Plant Equipment	778,636,649	5.04%	39,232,291	5.04%	39,232,291	0.00%	0
323.00	Turbogenerator Units	308,891,808	5.53%	17,096,110	5.53%	17,096,110	0.00%	0
324.00	Accessory Electrical Equipment	146,111,370	4.63%	6,763,507	4.63%	6,763,507	0.00%	0
325.00	Miscellaneous Power Plant Equip.	36,609,290	4.98%	1,822,215	4.98%	1,822,215	0.00%	0
	Total	1,357,409,151	5.03%	68,218,065	5.03%	68,218,065	0.00%	0
	Cook Unit 2							
321.00	Structures & Improvements	393,960,583	3.78%	14,887,978	3.78%	14,887,978	0.00%	0
322.00	Reactor Plant Equipment	1,066,938,458	4.46%	47,566,410	4.46%	47,566,410	0.00%	0
323.00	Turbogenerator Units	423,603,653	4.97%	21,065,026	4.97%	21,065,026	0.00%	0
324.00	Accessory Electrical Equipment	214,402,807	4.46%	9,568,323	4.46%	9,568,323	0.00%	0
325.00	Miscellaneous Power Plant Equip.	268,391,790	4.51%	12,095,647	4.51%	12,095,647	0.00%	0
	Total	2,367,297,291	4.44%	105,183,384	4.44%	105,183,384	0.00%	0
	Total Nuclear Production Plant	3,724,706,442	4.66%	173,401,448	4.66%	173,401,448	0.00%	0

Detailed Rate Comparison

		[1]	[2]		[3]		[4]	
			I&M Proposal		OUCC Proposal		Difference	
Account No.	Description	Plant 12/31/2022	Rate	Annual Accrual	Rate	Annual Accrual	Rate	Annual Accrual
	HYDRAULIC PRODUCTION PLANT							
	Berrien Springs							
331.00	Structures & Improvements	2,284,067	6.27%	143,275	6.23%	142,272	-0.04%	-1,004
332.00	Reservoirs, Dams & Waterways	6,232,447	4.32%	269,179	4.28%	266,453	-0.04%	-2,726
333.00	Waterwheels, Turbines & Generators	8,270,419	4.65%	384,253	4.60%	380,594	-0.04%	-3,659
334.00	Accessory Electrical Equip.	1,399,758	4.55%	63,640	4.50%	63,014	-0.04%	-626
335.00	Misc. Power Plant Equip.	926,016	4.82%	44,638	4.78%	44,230	-0.04%	-408
	Total	19,112,707	4.73%	904,986	4.69%	896,563	-0.04%	-8,423
	Buchanan							
331.00	Structures & Improvements	633,338	4.84%	30,682	4.73%	29,959	-0.11%	-723
332.00	Reservoirs, Dams & Waterways	4,944,983	4.16%	205,732	4.05%	200,108	-0.11%	-5,624
333.00	Waterwheels, Turbines & Generators	1,596,255	4.31%	68,725	4.19%	66,889	-0.12%	-1,836
334.00	Accessory Electrical Equip.	1,063,665	4.32%	45,988	4.21%	44,751	-0.12%	-1,237
335.00	Misc. Power Plant Equip.	299,147	4.84%	14,489	4.73%	14,147	-0.11%	-343
	Total	8,537,388	4.28%	365,617	4.17%	355,853	-0.11%	-9,764
	Elkhart							
331.00	Structures & Improvements	3,475,752	10.16%	353,200	10.11%	351,294	-0.05%	-1,906
332.00	Reservoirs, Dams & Waterways	23,472,975	10.73%	2,519,748	10.68%	2,506,898	-0.05%	-12,850
333.00	Waterwheels, Turbines & Generators	1,863,479	9.20%	171,392	9.14%	170,366	-0.06%	-1,026
334.00	Accessory Electrical Equip.	1,637,531	9.36%	153,286	9.31%	152,381	-0.06%	-905
335.00	Misc. Power Plant Equip.	741,936	11.63%	86,300	11.58%	85,893	-0.05%	-407
	Total	31,191,673	10.53%	3,283,926	10.47%	3,266,832	-0.05%	-17,094
	Twin Branch							
331.00	Structures & Improvements	2,015,464	5.91%	119,028	5.84%	117,788	-0.06%	-1,240
332.00	Reservoirs, Dams & Waterways	11,889,255	5.26%	625,936	5.20%	618,655	-0.06%	-7,281
333.00	Waterwheels, Turbines & Generators	13,977,965	5.54%	774,548	5.48%	765,889	-0.06%	-8,659
334.00	Accessory Electrical Equip.	4,057,046	5.49%	222,768	5.43%	220,228	-0.06%	-2,540
335.00	Misc. Power Plant Equip.	1,538,045	6.33%	97,405	6.27%	96,456	-0.06%	-949

Detailed Rate Comparison

		[1]	[2]		[3]		[4]	
			I&M Proposal		OUCC Proposal		Difference	
Account No.	Description	Plant 12/31/2022	Rate	Annual Accrual	Rate	Annual Accrual	Rate	Annual Accrual
	Total	33,477,775	5.50%	1,839,685	5.43%	1,819,016	-0.06%	-20,669
	Constantine							
331.00	Structures & Improvements	591,746	2.97%	17,603	2.65%	15,664	-0.33%	-1,939
332.00	Reservoirs, Dams & Waterways	2,079,173	2.88%	59,897	2.56%	53,151	-0.32%	-6,745
333.00	Waterwheels, Turbines & Generators	1,247,869	2.86%	35,675	2.52%	31,506	-0.33%	-4,169
334.00	Accessory Electrical Equip.	844,196	3.44%	29,066	3.10%	26,168	-0.34%	-2,898
335.00	Misc. Power Plant Equip.	597,703	3.44%	20,544	3.11%	18,574	-0.33%	-1,970
	Total	5,360,687	3.04%	162,785	2.71%	145,065	-0.33%	-17,721
	Mottville							
331.00	Structures & Improvements	937,078	6.11%	57,224	6.00%	56,225	-0.11%	-999
332.00	Reservoirs, Dams & Waterways	2,678,406	5.55%	148,754	5.45%	145,905	-0.11%	-2,849
333.00	Waterwheels, Turbines & Generators	740,671	5.36%	39,710	5.25%	38,915	-0.11%	-795
334.00	Accessory Electrical Equip.	918,568	6.10%	56,021	5.99%	55,027	-0.11%	-994
335.00	Misc. Power Plant Equip.	473,807	6.82%	32,306	6.71%	31,799	-0.11%	-506
336.00	Roads, Railroads & Bridges	1,044	4.64%	48	4.53%	47	-0.11%	-1
	Total	5,749,574	5.81%	334,063	5.70%	327,919	-0.11%	-6,144
	Crew Service Center							
331.00	Structures & Improvements	417,303	1.90%	7,913	1.90%	7,913	0.00%	0
335.00	Misc. Power Plant Equip.	126,865	1.89%	2,392	1.89%	2,392	0.00%	0
	Total	544,168	1.89%	10,305	1.89%	10,305	0.00%	0
	Total Hydraulic Production Plant	103,973,972	6.64%	6,901,367	6.56%	6,821,552	-0.08%	-79,815
	OTHER PRODUCTION PLANT							
	Deer Creek Solar Facility							
344.00	Generators	5,668,204	5.31%	300,995	5.21%	295,597	-0.10%	-5,398
345.00	Accessory Electric Equip.	720,502	6.55%	47,221	6.46%	46,535	-0.10%	-686

Detailed Rate Comparison

		[1]	[2]		[3]		[4]	
			I&M Proposal		OUCC Proposal		Difference	
Account No.	Description	Plant 12/31/2022	Rate	Annual Accrual	Rate	Annual Accrual	Rate	Annual Accrual
346.00	Misc. Power Plant Equip.	10,893	6.57%	716	6.47%	705	-0.10%	-10
	Total	6,399,599	5.45%	348,932	5.36%	342,837	-0.10%	-6,095
	Olive Solar Facility							
341.00	Structures & Improvements	376,687	5.33%	20,086	5.18%	19,529	-0.15%	-557
344.00	Generators	11,184,837	5.33%	596,395	5.18%	579,861	-0.15%	-16,534
345.00	Accessory Electric Equip.	269,062	5.33%	14,347	5.18%	13,949	-0.15%	-398
346.00	Misc. Power Plant Equip.	215,250	5.33%	11,477	5.18%	11,159	-0.15%	-318
	Total	12,045,836	5.33%	642,305	5.18%	624,498	-0.15%	-17,807
	Twin Branch Solar Facility							
344.00	Generators	7,013,108	5.35%	374,992	5.23%	366,455	-0.12%	-8,538
	Total	7,013,108	5.35%	374,992	5.23%	366,455	-0.12%	-8,538
	Watervliet Facility							
341.00	Structures & Improvements	358,604	5.33%	19,131	5.18%	18,570	-0.16%	-561
344.00	Generators	11,118,727	5.33%	593,161	5.18%	575,758	-0.16%	-17,403
346.00	Misc. Power Plant Equip.	353,961	5.37%	19,016	5.22%	18,462	-0.16%	-554
	Total	11,831,292	5.34%	631,308	5.18%	612,790	-0.16%	-18,519
	St. Joseph Solar Facility							
344.00	Generators	28,019,932	3.42%	957,595	3.38%	945,964	-0.04%	-11,631
345.00	Accessory Electric Equip.	4,169,716	3.42%	142,502	3.38%	140,771	-0.04%	-1,731
346.00	Misc. Power Plant Equip.	219,459	3.42%	7,505	3.38%	7,414	-0.04%	-91
	Total	32,409,107	3.42%	1,107,602	3.38%	1,094,149	-0.04%	-13,453
	Total Other Production Plant	69,698,942	4.46%	3,105,139	4.36%	3,040,728	-0.09%	-64,411
	Total Production Plant	**5,056,557,412**	**5.46%**	**276,046,028**	**5.40%**	**272,890,538**	**-0.06%**	**-3,155,491**

Detailed Rate Comparison

		[1]	[2]		[3]		[4]	
			I&M Proposal		OUCC Proposal		Difference	
Account No.	Description	Plant 12/31/2022	Rate	Annual Accrual	Rate	Annual Accrual	Rate	Annual Accrual
	TRANSMISSION PLANT							
350.10	Land Rights	64,064,915	1.77%	1,136,418	1.77%	1,136,418	0.00%	0
352.00	Structures & Improvements	81,317,493	1.86%	1,510,581	1.86%	1,510,581	0.00%	0
353.00	Station Equipment	869,619,205	2.72%	23,626,469	2.72%	23,626,469	0.00%	0
354.00	Towers & Fixtures	231,461,520	2.82%	6,521,673	2.11%	4,873,694	-0.71%	-1,647,979
355.00	Poles & Fixtures	246,283,528	3.35%	8,253,774	3.35%	8,253,774	0.00%	0
356.00	OH Conductor & Devices	315,493,916	2.30%	7,257,380	1.89%	5,948,577	-0.41%	-1,308,803
357.00	Underground Conduit	9,301,350	1.88%	175,300	1.88%	175,300	0.00%	0
358.00	Underground Conductor	8,281,750	2.14%	177,030	2.14%	177,030	0.00%	0
359.00	Roads and Trails	91,159	1.70%	1,554	1.70%	1,554	0.00%	0
	Total Transmission Plant	**1,825,914,836**	**2.66%**	**48,660,179**	**2.50%**	**45,703,397**	**-0.16%**	**-2,956,782**
	DISTRIBUTION PLANT - INDIANA							
360.10	Land Rights	13,375,221	1.50%	201,141	1.50%	201,141	0.00%	0
361.00	Structures & Improvements	48,277,855	2.38%	1,147,480	2.38%	1,147,480	0.00%	0
362.00	Station Equipment	426,065,190	2.96%	12,607,554	2.62%	11,172,400	-0.34%	-1,435,154
363.00	Storage Battery Equipment	5,606,730	9.61%	538,970	9.61%	538,970	0.00%	0
364.00	Poles, Towers, & Fixtures	292,977,351	4.60%	13,463,761	3.45%	10,104,376	-1.15%	-3,359,385
365.00	Overhead Conductor & Devices	481,814,461	2.93%	14,104,877	2.45%	11,810,547	-0.48%	-2,294,330
366.00	Underground Conduit	168,383,859	1.61%	2,709,068	1.26%	2,119,126	-0.35%	-589,943
367.00	Underground Conductor	280,815,903	1.75%	4,927,687	1.62%	4,544,841	-0.14%	-382,846
368.00	Line Transformers	348,521,033	3.42%	11,920,451	1.89%	6,576,801	-1.53%	-5,343,651
369.00	Services	185,596,560	2.62%	4,869,644	2.62%	4,869,644	0.00%	0
370.00	Meters	121,402,803	6.72%	8,158,373	6.72%	8,158,373	0.00%	0
371.00	Installations on Custs. Prem.	22,616,730	4.63%	1,046,453	4.63%	1,046,453	0.00%	0
373.00	Street Lighting & Signal Sys.	26,445,402	4.66%	1,233,353	4.66%	1,233,353	0.00%	0
	Total Distribution Plant - Indiana	2,421,899,098	3.18%	76,928,811	2.62%	63,523,504	-0.55%	-13,405,307
	DISTRIBUTION PLANT - MICHIGAN							
360.10	Land Rights	6,553,884	1.50%	98,559	1.50%	98,559	0.00%	0

Detailed Rate Comparison

		[1]	[2]		[3]		[4]	
			I&M Proposal		OUCC Proposal		Difference	
Account No.	Description	Plant 12/31/2022	Rate	Annual Accrual	Rate	Annual Accrual	Rate	Annual Accrual
361.00	Structures & Improvements	6,893,081	2.38%	163,836	2.38%	163,836	0.00%	0
362.00	Station Equipment	111,247,494	2.96%	3,291,888	2.62%	2,917,163	-0.34%	-374,725
363.00	Storage Battery Equipment	0	0.00%	0	9.61%	0	9.61%	0
364.00	Poles, Towers, & Fixtures	96,677,876	4.60%	4,442,827	3.45%	3,334,284	-1.15%	-1,108,544
365.00	Overhead Conductor & Devices	157,949,552	2.93%	4,623,894	2.45%	3,871,761	-0.48%	-752,133
366.00	Underground Conduit	16,520,088	1.61%	265,786	1.26%	207,907	-0.35%	-57,879
367.00	Underground Conductor	40,962,693	1.75%	718,803	1.62%	662,957	-0.14%	-55,846
368.00	Line Transformers	59,094,048	3.42%	2,021,191	1.89%	1,115,140	-1.53%	-906,051
369.00	Services	36,759,380	2.62%	964,485	2.62%	964,485	0.00%	0
370.00	Meters	36,834,121	6.72%	2,475,285	6.72%	2,475,285	0.00%	0
371.00	Installations on Custs. Prem.	8,654,863	4.63%	400,452	4.63%	400,452	0.00%	0
373.00	Street Lighting & Signal Sys.	5,601,300	4.66%	261,232	4.66%	261,232	0.00%	0
	Total Distribution Plant - Michigan	583,748,380	3.38%	19,728,238	2.82%	16,473,061	-0.56%	-3,255,177
	Total Distribution Plant	**3,005,647,478**	**3.22%**	**96,657,050**	**2.66%**	**79,996,565**	**-0.55%**	**-16,660,485**
	GENERAL PLANT							
390.00	Structures & Improvements	77,307,445	2.45%	1,895,718	2.45%	1,895,718	0.00%	0
391.00	Office Furniture & Equipment	5,703,382	5.56%	317,129	5.56%	317,129	0.00%	0
392.00	Transportation Equipment	72,626	5.10%	3,701	5.10%	3,701	0.00%	0
393.00	Stores Equipment	1,371,646	7.93%	108,837	7.93%	108,837	0.00%	0
394.00	Tools Shop & Garage Equipment	19,185,176	7.45%	1,429,574	7.45%	1,429,574	0.00%	0
395.00	Laboratory Equipment	349,600	5.91%	20,653	5.91%	20,653	0.00%	0
396.00	Power Operated Equipment	543,715	6.85%	37,255	6.85%	37,255	0.00%	0
397.00	Communication Equipment	73,174,224	4.28%	3,130,040	4.28%	3,130,040	0.00%	0
398.00	Miscellaneous Equipment	13,098,543	3.70%	484,502	3.70%	484,502	0.00%	0
	Total General Plant	**190,806,357**	**3.89%**	**7,427,409**	**3.89%**	**7,427,409**	**0.00%**	**0**
	TOTAL DEPRECIABLE PLANT	**$ 10,078,926,083**	**4.25%**	**$ 428,790,666**	**4.03%**	**$ 406,017,908**	**-0.23%**	**$ (22,772,758)**

[1], [2] From depreciation study (Attachment JAC-1)

Detailed Rate Comparison

		[1]	[2]		[3]		[4]	
			I&M Proposal		OUCC Proposal		Difference	
Account No.	Description	Plant 12/31/2022	Rate	Annual Accrual	Rate	Annual Accrual	Rate	Annual Accrual

[3] From Attachment DJG-5
[4] = [3] - [2]

Depreciation Rate Development

Account No.	Description	[1] Plant 12/31/2022	[2] Iowa Curve Type	[2] Iowa Curve AL	[3] Net Salvage	[4] Depreciable Base	[5] Book Reserve	[6] Future Accruals	[7] Remaining Life	[8] Total Accrual	[9] Total Rate
	STEAM PRODUCTION PLANT										
	Rockport Unit 1										
311.00	Structures & Improvements	109,167,264			-3.1%	112,551,449	86,774,197	25,777,252	3.49	7,386,032	**6.77%**
312.00	Boiler Plant Equipment	851,851,600			-3.1%	878,259,000	642,375,305	235,883,695	3.46	68,174,478	**8.00%**
314.00	Turbogenerator Units	109,246,674			-3.1%	112,633,321	84,660,078	27,973,243	3.44	8,131,757	**7.44%**
315.00	Accessory Electrical Equipment	62,421,661			-3.1%	64,356,732	50,064,376	14,292,356	3.48	4,106,999	**6.58%**
316.00	Miscellaneous Power Plant Equip.	25,490,857			-3.1%	26,281,074	19,994,327	6,286,747	3.44	1,827,543	**7.17%**
	Total	1,158,178,056			-3.1%	1,194,081,576	883,868,283	310,213,293	3.46	89,626,809	**7.74%**
	Total Steam Production Plant	1,158,178,056			-3.1%	1,194,081,576	883,868,283	310,213,293	3.46	89,626,809	**7.74%**
	NUCLEAR PRODUCTION PLANT										
	Cook Unit 1										
321.00	Structures & Improvements	87,160,034			-1.0%	88,031,634	57,205,862	30,825,772	9.33	3,303,941	**3.79%**
322.00	Reactor Plant Equipment	778,636,649			-2.0%	794,209,382	436,018,563	358,190,819	9.13	39,232,291	**5.04%**
323.00	Turbogenerator Units	308,891,808			-2.0%	315,069,644	164,452,912	150,616,732	8.81	17,096,110	**5.53%**
324.00	Accessory Electrical Equipment	146,111,370			0.0%	146,111,370	83,616,563	62,494,807	9.24	6,763,507	**4.63%**
325.00	Miscellaneous Power Plant Equip.	36,609,290			0.0%	36,609,290	20,045,359	16,563,931	9.09	1,822,215	**4.98%**
	Total	1,357,409,151			-1.7%	1,380,031,320	761,339,259	618,692,061	9.07	68,218,065	**5.03%**
	Cook Unit 2										
321.00	Structures & Improvements	393,960,583			-2.0%	401,839,795	220,057,584	181,782,211	12.21	14,887,978	**3.78%**
322.00	Reactor Plant Equipment	1,066,938,458			-3.0%	1,098,946,612	535,284,658	563,661,954	11.85	47,566,410	**4.46%**
323.00	Turbogenerator Units	423,603,653			-3.0%	436,311,763	198,066,313	238,245,450	11.31	21,065,026	**4.97%**
324.00	Accessory Electrical Equipment	214,402,807			0.0%	214,402,807	99,008,832	115,393,975	12.06	9,568,323	**4.46%**
325.00	Miscellaneous Power Plant Equip.	268,391,790			0.0%	268,391,790	125,784,116	142,607,674	11.79	12,095,647	**4.51%**
	Total	2,367,297,291			-2.2%	2,419,892,766	1,178,201,503	1,241,691,263	11.81	105,183,384	**4.44%**
	Total Nuclear Production Plant	3,724,706,442			-2.0%	3,799,924,086	1,939,540,762	1,860,383,324	10.73	173,401,448	**4.66%**
	HYDRAULIC PRODUCTION PLANT										
	Berrien Springs										
331.00	Structures & Improvements	2,284,067			-2.5%	2,341,169	722,118	1,619,051	11.38	142,272	**6.23%**
332.00	Reservoirs, Dams & Waterways	6,232,447			-2.5%	6,388,258	3,342,701	3,045,557	11.43	266,453	**4.28%**
333.00	Waterwheels, Turbines & Generators	8,270,419			-2.5%	8,477,179	4,176,471	4,300,708	11.30	380,594	**4.60%**
334.00	Accessory Electrical Equip.	1,399,758			-2.5%	1,434,752	730,252	704,500	11.18	63,014	**4.50%**
335.00	Misc. Power Plant Equip.	926,016			-2.5%	949,166	447,156	502,010	11.35	44,230	**4.78%**
	Total	19,112,707			-2.5%	19,590,525	9,418,698	10,171,827	11.35	896,563	**4.69%**

Depreciation Rate Development

Account No.	Description	[1] Plant 12/31/2022	[2] Iowa Curve Type	[2] Iowa Curve AL	[3] Net Salvage	[4] Depreciable Base	[5] Book Reserve	[6] Future Accruals	[7] Remaining Life	[8] Total Accrual	[9] Total Rate
	Buchanan										
331.00	Structures & Improvements	633,338			-2.7%	650,438	309,506	340,932	11.38	29,959	**4.73%**
332.00	Reservoirs, Dams & Waterways	4,944,983			-2.7%	5,078,498	2,791,268	2,287,230	11.43	200,108	**4.05%**
333.00	Waterwheels, Turbines & Generators	1,596,255			-2.7%	1,639,354	883,512	755,842	11.30	66,889	**4.19%**
334.00	Accessory Electrical Equip.	1,063,665			-2.7%	1,092,384	592,063	500,321	11.18	44,751	**4.21%**
335.00	Misc. Power Plant Equip.	299,147			-2.7%	307,224	146,659	160,565	11.35	14,147	**4.73%**
	Total	8,537,388			-2.7%	8,767,897	4,723,008	4,044,889	11.37	355,853	**4.17%**
	Elkhart										
331.00	Structures & Improvements	3,475,752			-0.7%	3,500,082	1,578,505	1,921,577	5.47	351,294	**10.11%**
332.00	Reservoirs, Dams & Waterways	23,472,975			-0.7%	23,637,286	9,899,487	13,737,799	5.48	2,506,898	**10.68%**
333.00	Waterwheels, Turbines & Generators	1,863,479			-0.7%	1,876,523	948,029	928,494	5.45	170,366	**9.14%**
334.00	Accessory Electrical Equip.	1,637,531			-0.7%	1,648,994	821,563	827,431	5.43	152,381	**9.31%**
335.00	Misc. Power Plant Equip.	741,936			-0.7%	747,130	277,294	469,836	5.47	85,893	**11.58%**
	Total	31,191,673			-0.7%	31,410,015	13,524,878	17,885,137	5.47	3,266,832	**10.47%**
	Twin Branch										
331.00	Structures & Improvements	2,015,464			-2.3%	2,061,820	721,393	1,340,427	11.38	117,788	**5.84%**
332.00	Reservoirs, Dams & Waterways	11,889,255			-2.3%	12,162,708	5,091,486	7,071,222	11.43	618,655	**5.20%**
333.00	Waterwheels, Turbines & Generators	13,977,965			-2.3%	14,299,458	5,644,910	8,654,548	11.30	765,889	**5.48%**
334.00	Accessory Electrical Equip.	4,057,046			-2.3%	4,150,358	1,688,206	2,462,152	11.18	220,228	**5.43%**
335.00	Misc. Power Plant Equip.	1,538,045			-2.3%	1,573,420	478,640	1,094,780	11.35	96,456	**6.27%**
	Total	33,477,775			-2.3%	34,247,764	13,624,635	20,623,129	11.34	1,819,016	**5.43%**
	Constantine										
331.00	Structures & Improvements	591,746			-8.9%	644,411	209,416	434,995	27.77	15,664	**2.65%**
332.00	Reservoirs, Dams & Waterways	2,079,173			-8.9%	2,264,219	773,322	1,490,897	28.05	53,151	**2.56%**
333.00	Waterwheels, Turbines & Generators	1,247,869			-8.9%	1,358,929	500,701	858,228	27.24	31,506	**2.52%**
334.00	Accessory Electrical Equip.	844,196			-8.9%	919,329	225,605	693,724	26.51	26,168	**3.10%**
335.00	Misc. Power Plant Equip.	597,703			-8.9%	650,899	138,062	512,837	27.61	18,574	**3.11%**
	Total	5,360,687			-8.9%	5,837,788	1,847,106	3,990,682	27.51	145,065	**2.71%**
	Mottville										
331.00	Structures & Improvements	937,078			-2.1%	956,757	482,221	474,536	8.44	56,225	**6.00%**
332.00	Reservoirs, Dams & Waterways	2,678,406			-2.1%	2,734,653	1,500,299	1,234,354	8.46	145,905	**5.45%**
333.00	Waterwheels, Turbines & Generators	740,671			-2.1%	756,225	429,725	326,500	8.39	38,915	**5.25%**
334.00	Accessory Electrical Equip.	918,568			-2.1%	937,858	480,031	457,827	8.32	55,027	**5.99%**
335.00	Misc. Power Plant Equip.	473,807			-2.1%	483,757	216,006	267,751	8.42	31,799	**6.71%**
336.00	Roads, Railroads & Bridges	1,044			-2.1%	1,066	664	402	8.50	47	**4.53%**
	Total	5,749,574			-2.1%	5,870,315	3,108,946	2,761,369	8.42	327,919	**5.70%**

Depreciation Rate Development

		[1]	[2]		[3]	[4]	[5]	[6]	[7]	[8]	[9]
Account No.	Description	Plant 12/31/2022	Iowa Curve Type	AL	Net Salvage	Depreciable Base	Book Reserve	Future Accruals	Remaining Life	Total Accrual	Rate
	Crew Service Center										
331.00	Structures & Improvements	417,303			-4.0%	433,995	214,243	219,752	27.77	7,913	**1.90%**
335.00	Misc. Power Plant Equip.	126,865			-4.0%	131,940	65,900	66,040	27.61	2,392	**1.89%**
	Total	544,168			-4.0%	565,935	280,143	285,792	27.73	10,305	**1.89%**
	Total Hydraulic Production Plant	103,973,972			-2.2%	106,290,239	46,527,414	59,762,825	8.76	6,821,552	**6.56%**
	OTHER PRODUCTION PLANT										
	Deer Creek Solar Facility										
344.00	Generators	5,668,204			-2.0%	5,781,568	2,677,802	3,103,766	10.50	295,597	**5.21%**
345.00	Accessory Electric Equip.	720,502			-2.0%	734,912	246,294	488,618	10.50	46,535	**6.46%**
346.00	Misc. Power Plant Equip.	10,893			-2.0%	11,111	3,706	7,405	10.50	705	**6.47%**
	Total	6,399,599			-2.0%	6,527,591	2,927,802	3,599,789	10.50	342,837	**5.36%**
	Olive Solar Facility										
341.00	Structures & Improvements	376,687			-2.3%	385,351	160,770	224,581	11.50	19,529	**5.18%**
344.00	Generators	11,184,837			-2.3%	11,442,088	4,773,689	6,668,399	11.50	579,861	**5.18%**
345.00	Accessory Electric Equip.	269,062			-2.3%	275,250	114,835	160,415	11.50	13,949	**5.18%**
346.00	Misc. Power Plant Equip.	215,250			-2.3%	220,201	91,869	128,332	11.50	11,159	**5.18%**
	Total	12,045,836			-2.3%	12,322,890	5,141,163	7,181,727	11.50	624,498	**5.18%**
	Twin Branch Solar Facility										
344.00	Generators	7,013,108			-2.6%	7,195,449	2,981,222	4,214,227	11.50	366,455	**5.23%**
	Total	7,013,108			-2.6%	7,195,449	2,981,222	4,214,227	11.50	366,455	**5.23%**
	Watervliet Facility										
341.00	Structures & Improvements	358,604			-2.2%	366,493	152,944	213,549	11.50	18,570	**5.18%**
344.00	Generators	11,118,727			-2.2%	11,363,339	4,742,122	6,621,217	11.50	575,758	**5.18%**
346.00	Misc. Power Plant Equip.	353,961			-2.2%	361,748	149,435	212,313	11.50	18,462	**5.22%**
	Total	11,831,292			-2.2%	12,091,580	5,044,501	7,047,079	11.50	612,790	**5.18%**
	St. Joseph Solar Facility										
344.00	Generators	28,019,932			-0.9%	28,272,111	3,204,066	25,068,045	26.50	945,964	**3.38%**
345.00	Accessory Electric Equip.	4,169,716			-0.9%	4,207,243	476,805	3,730,438	26.50	140,771	**3.38%**
346.00	Misc. Power Plant Equip.	219,459			-0.9%	221,434	24,965	196,469	26.50	7,414	**3.38%**
	Total	32,409,107			-0.9%	32,700,789	3,705,836	28,994,953	26.50	1,094,149	**3.38%**

Depreciation Rate Development

		[1]	[2]		[3]	[4]	[5]	[6]	[7]	[8]	[9]
Account No.	Description	Plant 12/31/2022	Iowa Curve Type	AL	Net Salvage	Depreciable Base	Book Reserve	Future Accruals	Remaining Life	Total Accrual	Total Rate
	Total Other Production Plant	69,698,942			-1.6%	70,838,299	19,800,524	51,037,775	16.78	3,040,728	**4.36%**
	Total Production Plant	**5,056,557,412**			**-2.3%**	**5,171,134,200**	**2,889,736,983**	**2,281,397,217**	**8.36**	**272,890,538**	**5.40%**
	TRANSMISSION PLANT										
350.10	Land Rights	64,064,915	R5	65	0.0%	64,064,915	19,346,882	44,718,033	39.35	1,136,418	**1.77%**
352.00	Structures & Improvements	81,317,493	L2	60	-8.0%	87,822,892	8,079,330	79,743,562	52.79	1,510,581	**1.86%**
353.00	Station Equipment	869,619,205	L1	44	-11.0%	965,277,318	182,532,388	782,744,930	33.13	23,626,469	**2.72%**
354.00	Towers & Fixtures	231,461,520	R4	76	-39.0%	321,731,513	145,255,035	176,476,478	36.21	4,873,694	**2.11%**
355.00	Poles & Fixtures	246,283,528	L0	50	-63.0%	401,442,151	32,746,071	368,696,080	44.67	8,253,774	**3.35%**
356.00	OH Conductor & Devices	315,493,916	R3	75	-34.0%	422,761,847	126,225,292	296,536,555	49.85	5,948,577	**1.89%**
357.00	Underground Conduit	9,301,350	R5	55	0.0%	9,301,350	960,571	8,340,779	47.58	175,300	**1.88%**
358.00	Underground Conductor	8,281,750	L1.5	55	-12.0%	9,275,560	1,238,397	8,037,163	45.40	177,030	**2.14%**
359.00	Roads and Trails	91,159	R5	65	0.0%	91,159	21,956	69,203	44.54	1,554	**1.70%**
	Total Transmission Plant	**1,825,914,836**			**-25.0%**	**2,281,768,705**	**516,405,922**	**1,765,362,783**	**38.63**	**45,703,397**	**2.50%**
	DISTRIBUTION PLANT - INDIANA										
360.10	Land Rights	13,375,221	R5	65	0.0%	13,375,221	3,147,203	10,228,018	50.85	201,141	**1.50%**
361.00	Structures & Improvements	48,277,855	L1.5	65	-48.0%	71,451,225	3,394,198	68,057,027	59.31	1,147,480	**2.38%**
362.00	Station Equipment	426,065,190	L0	47	-18.0%	502,756,924	37,538,195	465,218,729	41.64	11,172,400	**2.62%**
363.00	Storage Battery Equipment	5,606,730	SQ	15	0.0%	5,606,730	4,717,430	889,300	1.65	538,970	**9.61%**
364.00	Poles, Towers, & Fixtures	292,977,351	L0	54	-100.0%	585,954,702	119,031,476	466,923,226	46.21	10,104,376	**3.45%**
365.00	Overhead Conductor & Devices	481,814,461	L0	48	-23.0%	592,631,787	101,076,818	491,554,969	41.62	11,810,547	**2.45%**
366.00	Underground Conduit	168,383,859	R1.5	76	0.0%	168,383,859	25,724,316	142,659,543	67.32	2,119,126	**1.26%**
367.00	Underground Conductor	280,815,903	R1	61	0.0%	280,815,903	49,165,340	231,650,563	50.97	4,544,841	**1.62%**
368.00	Line Transformers	348,521,033	R0.5	43	-8.0%	376,402,716	145,622,782	230,779,934	35.09	6,576,801	**1.89%**
369.00	Services	185,596,560	R0.5	45	-26.0%	233,851,666	66,920,282	166,931,384	34.28	4,869,644	**2.62%**
370.00	Meters	121,402,803	L0	15	-17.0%	142,041,280	43,080,212	98,961,068	12.13	8,158,373	**6.72%**
371.00	Installations on Custs. Prem.	22,616,730	L0	18	-23.0%	27,818,578	14,675,128	13,143,450	12.56	1,046,453	**4.63%**
373.00	Street Lighting & Signal Sys.	26,445,402	R0.5	22	-19.0%	31,470,028	12,846,404	18,623,624	15.10	1,233,353	**4.66%**
	Total Distribution Plant - Indiana	2,421,899,098			-25.2%	3,032,560,619	626,939,784	2,405,620,835	37.87	63,523,504	2.62%
	DISTRIBUTION PLANT - MICHIGAN										
360.10	Land Rights	6,553,884	R5	65	0.0%	6,553,884	1,473,228	5,080,656	50.85	98,559	**1.50%**
361.00	Structures & Improvements	6,893,081	L1.5	65	-48.0%	10,201,760	374,777	9,826,983	59.31	163,836	**2.38%**
362.00	Station Equipment	111,247,494	L0	47	-18.0%	131,272,043	10,933,814	120,338,229	41.64	2,917,163	**2.62%**
363.00	Storage Battery Equipment	0	SQ	15	0.0%		0		1.65		**9.61%**
364.00	Poles, Towers, & Fixtures	96,677,876	L0	54	-100.0%	193,355,752	39,113,117	154,242,635	46.21	3,334,284	**3.45%**
365.00	Overhead Conductor & Devices	157,949,552	L0	48	-23.0%	194,277,949	29,372,245	164,905,704	41.62	3,871,761	**2.45%**
366.00	Underground Conduit	16,520,088	R1.5	76	0.0%	16,520,088	2,865,244	13,654,844	67.32	207,907	**1.26%**
367.00	Underground Conductor	40,962,693	R1	61	0.0%	40,962,693	11,855,227	29,107,466	50.97	662,957	**1.62%**

Depreciation Rate Development

		[1]	[2]		[3]	[4]	[5]	[6]	[7]	[8]	[9]
Account No.	Description	Plant 12/31/2022	Iowa Curve Type	AL	Net Salvage	Depreciable Base	Book Reserve	Future Accruals	Remaining Life	Total Accrual	Rate
368.00	Line Transformers	59,094,048	R0.5	43	-8.0%	63,821,572	21,388,547	42,433,025	35.09	1,115,140	**1.89%**
369.00	Services	36,759,380	R0.5	45	-26.0%	46,316,819	13,230,320	33,086,499	34.28	964,485	**2.62%**
370.00	Meters	36,834,121	L0	15	-17.0%	43,095,922	6,263,942	36,831,980	12.13	2,475,285	**6.72%**
371.00	Installations on Custs. Prem.	8,654,863	L0	18	-23.0%	10,645,481	6,220,893	4,424,588	12.56	400,452	**4.63%**
373.00	Street Lighting & Signal Sys.	5,601,300	R0.5	22	-19.0%	6,665,547	1,205,385	5,460,162	15.10	261,232	**4.66%**
	Total Distribution Plant - Michigan	583,748,380			-30.8%	763,689,509	144,296,739	619,392,770	37.60	16,473,061	2.82%
	Total Distribution Plant	**3,005,647,478**			**-26.3%**	**3,796,250,128**	**771,236,523**	**3,025,013,605**	**37.81**	**79,996,565**	**2.66%**
	GENERAL PLANT										
390.00	Structures & Improvements	77,307,445	L1	45	-4.0%	80,399,743	12,021,186	68,378,557	36.07	1,895,718	**2.45%**
391.00	Office Furniture & Equipment	5,703,382	SQ	22	2.0%	5,589,314	2,113,580	3,475,734	10.96	317,129	**5.56%**
392.00	Transportation Equipment	72,626	SQ	20	0.0%	72,626	3,931	68,695	18.56	3,701	**5.10%**
393.00	Stores Equipment	1,371,646	SQ	14	0.0%	1,371,646	320,281	1,051,365	9.66	108,837	**7.93%**
394.00	Tools Shop & Garage Equipment	19,185,176	SQ	16	0.0%	19,185,176	6,333,306	12,851,870	8.99	1,429,574	**7.45%**
395.00	Laboratory Equipment	349,600	SQ	20	1.0%	346,104	114,796	231,308	11.20	20,653	**5.91%**
396.00	Power Operated Equipment	543,715	SQ	25	-2.0%	554,589	306,843	247,746	6.65	37,255	**6.85%**
397.00	Communication Equipment	73,174,224	SQ	27	-4.0%	76,101,193	17,788,552	58,312,641	18.63	3,130,040	**4.28%**
398.00	Miscellaneous Equipment	13,098,543	SQ	30	5.0%	12,443,616	3,800,093	8,643,523	17.84	484,502	**3.70%**
	Total General Plant	**190,806,357**			**-2.8%**	**196,064,007**	**42,802,568**	**153,261,439**	**20.63**	**7,427,409**	**3.89%**
	TOTAL DEPRECIABLE PLANT	**$ 10,078,926,083**			**-13.6%**	**$ 11,445,217,040**	**$ 4,220,181,996**	**$ 7,225,035,044**	**17.79**	**$ 406,017,908**	**4.03%**

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

Terminal Net Salvage

[1] Production Units	[2] Plant Balance 12/31/2022	[3] Terminal Net Salvage Est.	[4] Contingency Cost	[5] Net Salvage Less Contingency Costs	[6] Add Interim Net Salvage	[7] Adjusted Net Salvage	[8] Adjusted Net Salvage Rate
Rockport	$ 1,164,818,406	$ 39,942,805	$ 9,299,050	$ 30,643,755	$ 5,495,577	$ 36,139,332	-3.1%
Berrien Springs	19,112,707	124,024	53,600	70,424	400,409	470,833	-2.5%
Buchanan	8,537,388	118,633	42,600	76,033	153,094	229,127	-2.7%
Constantine	5,360,687	258,723	67,700	191,023	283,853	474,876	-8.9%
Elkhart	31,191,673	48,005	20,000	28,005	190,036	218,041	-0.7%
Mottville	5,749,574	59,300	18,200	41,100	79,821	120,921	-2.1%
Twin Branch	33,477,775	85,247	40,000	45,247	733,202	778,449	-2.3%
Deer Creek	6,399,599	129,808	-	129,808		129,808	-2.0%
Olive	12,045,836	271,480	-	271,480		271,480	-2.3%
Twin Branch	7,013,108	185,680	-	185,680		185,680	-2.6%
Watervliet	11,831,292	260,380	-	260,380		260,380	-2.2%
St. Joseph	32,409,107	277,000		277,000		277,000	-0.9%
Total	$ 1,337,947,152	$ 41,761,085	$ 9,541,150	$ 32,219,935	$ 7,335,992	$ 39,555,927	

[1], [2] From depreciation study

[3], [4] From decommissioning studies; Rockport contingency = $18,598,100 x I&M's 50% share = $9,299050

[5] = [4] - [3]

[6] Add interim net salvage from depreciation study

[7] = [5] + [6]

[8] = [7] / [2] * -1 ; does not include escalation or inflation of present value demolition costs

Account 362 Curve Fitting

[1] Age (Years)	[2] Exposures (Dollars)	[3] Observed Life Table (OLT)	[4] Company L0.5-43	[5] OUCC L0-47	[6] Company SSD	[7] OUCC SSD
0.0	616,730,766	100.00%	100.00%	100.00%	0.0000	0.0000
0.5	582,628,083	99.74%	99.93%	99.86%	0.0000	0.0000
1.5	539,786,359	99.35%	99.77%	99.40%	0.0000	0.0000
2.5	497,890,244	98.97%	99.57%	98.79%	0.0000	0.0000
3.5	432,532,418	98.53%	99.32%	98.07%	0.0001	0.0000
4.5	350,265,851	97.07%	99.02%	97.27%	0.0004	0.0000
5.5	283,158,522	96.40%	98.66%	96.39%	0.0005	0.0000
6.5	265,011,061	95.58%	98.24%	95.46%	0.0007	0.0000
7.5	239,698,618	94.74%	97.74%	94.46%	0.0009	0.0000
8.5	222,775,955	93.92%	97.17%	93.42%	0.0011	0.0000
9.5	215,682,720	93.13%	96.53%	92.34%	0.0012	0.0001
10.5	204,768,326	92.34%	95.80%	91.22%	0.0012	0.0001
11.5	183,325,373	91.09%	94.99%	90.07%	0.0015	0.0001
12.5	175,854,788	90.34%	94.10%	88.89%	0.0014	0.0002
13.5	165,072,641	89.10%	93.12%	87.68%	0.0016	0.0002
14.5	140,676,089	87.71%	92.06%	86.45%	0.0019	0.0002
15.5	123,123,822	86.48%	90.91%	85.20%	0.0020	0.0002
16.5	111,177,626	84.95%	89.69%	83.92%	0.0022	0.0001
17.5	106,230,219	83.83%	88.38%	82.64%	0.0021	0.0001
18.5	102,940,905	82.82%	87.01%	81.34%	0.0018	0.0002
19.5	100,211,163	81.98%	85.57%	80.03%	0.0013	0.0004
20.5	97,370,887	81.05%	84.07%	78.71%	0.0009	0.0005
21.5	91,815,282	79.52%	82.51%	77.39%	0.0009	0.0005
22.5	77,896,870	77.28%	80.91%	76.07%	0.0013	0.0001
23.5	72,884,951	76.28%	79.27%	74.74%	0.0009	0.0002
24.5	66,004,965	74.47%	77.61%	73.41%	0.0010	0.0001
25.5	60,123,630	73.15%	75.92%	72.08%	0.0008	0.0001
26.5	56,084,980	70.79%	74.23%	70.76%	0.0012	0.0000
27.5	54,059,782	69.12%	72.54%	69.43%	0.0012	0.0000
28.5	52,466,980	68.34%	70.85%	68.11%	0.0006	0.0000
29.5	49,934,719	66.10%	69.16%	66.79%	0.0009	0.0000
30.5	48,171,871	65.07%	67.47%	65.48%	0.0006	0.0000
31.5	43,517,224	63.14%	65.79%	64.17%	0.0007	0.0001
32.5	40,091,933	60.97%	64.12%	62.86%	0.0010	0.0004
33.5	36,600,267	59.24%	62.45%	61.56%	0.0010	0.0005
34.5	32,201,186	57.66%	60.79%	60.27%	0.0010	0.0007
35.5	30,738,777	56.03%	59.14%	58.98%	0.0010	0.0009
36.5	29,968,612	55.11%	57.50%	57.70%	0.0006	0.0007
37.5	28,841,535	53.81%	55.87%	56.43%	0.0004	0.0007
38.5	27,628,211	52.19%	54.26%	55.16%	0.0004	0.0009
39.5	26,168,000	50.54%	52.66%	53.91%	0.0004	0.0011
40.5	25,116,741	49.04%	51.07%	52.66%	0.0004	0.0013
41.5	24,057,464	48.33%	49.50%	51.42%	0.0001	0.0010
42.5	21,859,569	46.72%	47.95%	50.20%	0.0002	0.0012
43.5	21,001,257	45.83%	46.41%	48.98%	0.0000	0.0010
44.5	19,661,701	44.60%	44.89%	47.78%	0.0000	0.0010
45.5	18,884,121	43.50%	43.40%	46.58%	0.0000	0.0009
46.5	17,598,111	42.45%	41.92%	45.40%	0.0000	0.0009
47.5	13,340,204	40.35%	40.46%	44.23%	0.0000	0.0015
48.5	11,279,851	37.96%	39.03%	43.08%	0.0001	0.0026
49.5	9,424,797	36.36%	37.62%	41.93%	0.0002	0.0031
50.5	7,802,044	34.96%	36.23%	40.80%	0.0002	0.0034
51.5	7,376,220	33.79%	34.87%	39.69%	0.0001	0.0035
52.5	6,966,189	33.13%	33.53%	38.59%	0.0000	0.0030
53.5	6,182,754	31.87%	32.22%	37.50%	0.0000	0.0032
54.5	5,464,988	30.78%	30.94%	36.43%	0.0000	0.0032
55.5	5,298,406	30.18%	29.68%	35.37%	0.0000	0.0027
56.5	4,877,290	29.43%	28.44%	34.33%	0.0001	0.0024
57.5	4,660,457	28.99%	27.24%	33.31%	0.0003	0.0019
58.5	4,278,486	27.24%	26.06%	32.30%	0.0001	0.0026
59.5	3,917,797	26.27%	24.91%	31.31%	0.0002	0.0025
60.5	3,569,353	25.36%	23.79%	30.33%	0.0002	0.0025
61.5	3,434,621	24.77%	22.70%	29.38%	0.0004	0.0021
62.5	3,086,406	23.98%	21.64%	28.43%	0.0005	0.0020
63.5	2,856,509	22.82%	20.61%	27.51%	0.0005	0.0022
64.5	2,082,160	20.08%	19.61%	26.60%	0.0000	0.0043
65.5	1,885,876	19.50%	18.63%	25.71%	0.0001	0.0039
66.5	1,684,134	17.99%	17.69%	24.84%	0.0000	0.0047
67.5	1,578,233	17.39%	16.78%	23.99%	0.0000	0.0044
68.5	1,424,865	17.08%	15.89%	23.15%	0.0001	0.0037
69.5	1,106,405	16.30%	15.04%	22.33%	0.0002	0.0036
70.5	881,218	14.33%	14.21%	21.53%	0.0000	0.0052
71.5	860,080	14.08%	13.42%	20.75%	0.0000	0.0044
72.5	778,243	13.76%	12.65%	19.98%	0.0001	0.0039
73.5	712,725	13.40%	11.91%	19.24%	0.0002	0.0034

Account 362 Curve Fitting

[1]	[2]	[3]	[4]	[5]	[6]	[7]
Age (Years)	**Exposures (Dollars)**	**Observed Life Table (OLT)**	**Company L0.5-43**	**OUCC L0-47**	**Company SSD**	**OUCC SSD**
74.5	656,545	12.97%	11.20%	18.51%	0.0003	0.0031
75.5	597,417	11.91%	10.52%	17.80%	0.0002	0.0035
76.5	550,129	10.97%	9.87%	17.10%	0.0001	0.0038
77.5	517,198	10.57%	9.24%	16.43%	0.0002	0.0034
78.5	464,071	9.75%	8.65%	15.77%	0.0001	0.0036
79.5	418,988	9.25%	8.07%	15.13%	0.0001	0.0035
80.5	364,420	8.04%	7.53%	14.51%	0.0000	0.0042
81.5	333,610	7.36%	7.01%	13.90%	0.0000	0.0043
82.5	303,146	6.69%	6.52%	13.31%	0.0000	0.0044
83.5	289,163	6.38%	6.05%	12.74%	0.0000	0.0040
84.5	280,223	6.19%	5.60%	12.19%	0.0000	0.0036
85.5	237,462	5.37%	5.18%	11.65%	0.0000	0.0039
86.5	232,288	5.26%	4.78%	11.13%	0.0000	0.0035
87.5	229,411	5.19%	4.40%	10.63%	0.0001	0.0030
88.5	208,803	4.73%	4.05%	10.14%	0.0000	0.0029
89.5	205,954	4.66%	3.72%	9.67%	0.0001	0.0025
90.5	202,316	4.58%	3.40%	9.21%	0.0001	0.0021
91.5	111,020	2.51%	3.11%	8.77%	0.0000	0.0039
92.5	101,252	2.46%	2.83%	8.34%	0.0000	0.0035
93.5	96,501	2.34%	2.58%	7.93%	0.0000	0.0031
94.5	84,714	2.20%	2.34%	7.54%	0.0000	0.0028
95.5	52,717	1.37%	2.12%	7.16%	0.0001	0.0033
96.5	36,834	0.96%	1.91%	6.79%	0.0001	0.0034
97.5	29,270	0.76%	1.72%	6.44%	0.0001	0.0032
98.5	23,804	0.62%	1.54%	6.10%	0.0001	0.0030
99.5	23,804	0.62%	1.38%	5.77%	0.0001	0.0027
100.5	23,804	0.62%	1.23%	5.46%	0.0000	0.0023
101.5	23,804	0.62%	1.09%	5.16%	0.0000	0.0021
102.5	21,747	0.57%	0.97%	4.87%	0.0000	0.0019
103.5	21,747	0.57%	0.97%	4.60%	0.0000	0.0016
104.5	21,747	0.57%	0.97%	4.33%	0.0000	0.0014
105.5	21,747	0.57%	0.97%	4.08%	0.0000	0.0012
106.5	21,747	0.57%	0.97%	3.84%	0.0000	0.0011
107.5	15,932	0.41%	0.97%	3.61%	0.0000	0.0010
108.5	15,932	0.41%	0.97%	3.39%	0.0000	0.0009
109.5	15,909	0.41%	0.97%	3.19%	0.0000	0.0008
110.5	15,909	0.41%	0.97%	2.99%	0.0000	0.0007
111.5	15,909	0.41%	0.97%	2.80%	0.0000	0.0006
112.5	15,909	0.41%	0.97%	2.62%	0.0000	0.0005
113.5	15,909	0.41%	0.97%	2.45%	0.0000	0.0004
114.5	15,909	0.41%	0.97%	2.29%	0.0000	0.0004
115.5	15,909	0.41%	0.97%	2.13%	0.0000	0.0003
116.5	15,909	0.41%	0.97%	1.99%	0.0000	0.0002
117.5	15,909	0.41%	0.97%	1.85%	0.0000	0.0002
118.5	15,909	0.41%	0.97%	1.72%	0.0000	0.0002
119.5	15,909	0.41%	0.97%	1.60%	0.0000	0.0001
120.5	15,908	0.41%	0.86%	1.48%	0.0000	0.0001
121.5	15,908	0.41%	0.75%	1.38%	0.0000	0.0001
122.5			0.50%	1.27%		
Sum of Squared Differences for Entire OLT Curve				[8]	0.0458	0.2089
SSD for Truncated OLT Curve (Up to 1% of Beginning Exposures)				[9]	0.0400	0.0372

[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 367 Curve Fitting

[1]	[2]	[3]	[4]	[5]	[6]	[7]
Age (Years)	**Exposures (Dollars)**	**Observed Life Table (OLT)**	**Company R1-57**	**OUCC R1-61**	**Company SSD**	**OUCC SSD**
0.0	254,978,974	100.00%	100.00%	100.00%	0.0000	0.0000
0.5	247,355,974	99.96%	99.77%	99.79%	0.0000	0.0000
1.5	238,830,234	99.76%	99.31%	99.36%	0.0000	0.0000
2.5	231,866,158	99.49%	98.84%	98.92%	0.0000	0.0000
3.5	215,390,638	99.21%	98.36%	98.47%	0.0001	0.0001
4.5	204,233,881	98.89%	97.86%	98.01%	0.0001	0.0001
5.5	184,199,131	98.58%	97.36%	97.54%	0.0001	0.0001
6.5	169,743,209	98.26%	96.84%	97.06%	0.0002	0.0001
7.5	158,929,168	97.91%	96.31%	96.57%	0.0003	0.0002
8.5	154,550,262	97.53%	95.77%	96.08%	0.0003	0.0002
9.5	152,440,271	97.04%	95.22%	95.57%	0.0003	0.0002
10.5	151,429,752	96.50%	94.66%	95.05%	0.0003	0.0002
11.5	145,880,975	95.92%	94.09%	94.52%	0.0003	0.0002
12.5	143,219,669	95.31%	93.51%	93.99%	0.0003	0.0002
13.5	139,844,617	94.71%	92.92%	93.44%	0.0003	0.0002
14.5	129,944,536	94.11%	92.31%	92.89%	0.0003	0.0001
15.5	119,855,675	93.50%	91.70%	92.32%	0.0003	0.0001
16.5	112,132,043	92.87%	91.07%	91.75%	0.0003	0.0001
17.5	102,995,128	92.21%	90.44%	91.17%	0.0003	0.0001
18.5	94,289,005	91.55%	89.79%	90.57%	0.0003	0.0001
19.5	87,702,249	90.77%	89.13%	89.97%	0.0003	0.0001
20.5	80,171,018	90.03%	88.47%	89.36%	0.0002	0.0000
21.5	75,571,003	89.32%	87.79%	88.74%	0.0002	0.0000
22.5	67,964,992	88.61%	87.10%	88.11%	0.0002	0.0000
23.5	62,057,605	87.92%	86.39%	87.47%	0.0002	0.0000
24.5	57,330,768	87.16%	85.67%	86.82%	0.0002	0.0000
25.5	51,871,765	86.36%	84.94%	86.16%	0.0002	0.0000
26.5	47,299,500	85.51%	84.20%	85.48%	0.0002	0.0000
27.5	45,257,404	84.64%	83.44%	84.80%	0.0001	0.0000
28.5	41,539,784	83.73%	82.67%	84.10%	0.0001	0.0000
29.5	36,812,537	82.79%	81.88%	83.39%	0.0001	0.0000
30.5	34,117,333	81.89%	81.07%	82.67%	0.0001	0.0001
31.5	29,889,983	80.98%	80.25%	81.93%	0.0001	0.0001
32.5	25,408,962	79.98%	79.41%	81.18%	0.0000	0.0001
33.5	22,570,758	79.12%	78.55%	80.41%	0.0000	0.0002
34.5	19,318,491	78.25%	77.67%	79.63%	0.0000	0.0002
35.5	16,269,162	77.36%	76.78%	78.83%	0.0000	0.0002
36.5	14,470,436	76.49%	75.87%	78.02%	0.0000	0.0002
37.5	13,183,075	75.60%	74.93%	77.19%	0.0000	0.0003
38.5	12,505,640	74.67%	73.98%	76.35%	0.0000	0.0003
39.5	11,591,476	73.77%	73.01%	75.49%	0.0001	0.0003
40.5	11,137,227	72.89%	72.02%	74.61%	0.0001	0.0003
41.5	10,174,908	72.01%	71.01%	73.71%	0.0001	0.0003
42.5	8,354,759	71.13%	69.98%	72.80%	0.0001	0.0003
43.5	7,068,977	70.20%	68.93%	71.87%	0.0002	0.0003
44.5	5,909,819	69.24%	67.85%	70.92%	0.0002	0.0003
45.5	5,272,240	68.23%	66.76%	69.96%	0.0002	0.0003
46.5	4,796,116	67.18%	65.65%	68.98%	0.0002	0.0003
47.5	4,239,102	66.15%	64.52%	67.98%	0.0003	0.0003

Account 367 Curve Fitting

[1] Age (Years)	[2] Exposures (Dollars)	[3] Observed Life Table (OLT)	[4] Company R1-57	[5] OUCC R1-61	[6] Company SSD	[7] OUCC SSD
48.5	3,779,504	65.06%	63.37%	66.96%	0.0003	0.0004
49.5	2,850,595	63.98%	62.21%	65.93%	0.0003	0.0004
50.5	1,965,231	62.42%	61.02%	64.88%	0.0002	0.0006
51.5	1,539,972	60.74%	59.81%	63.81%	0.0001	0.0009
52.5	1,220,626	59.26%	58.59%	62.72%	0.0000	0.0012
53.5	897,313	57.93%	57.35%	61.62%	0.0000	0.0014
54.5	677,226	56.62%	56.10%	60.51%	0.0000	0.0015
55.5	472,177	55.66%	54.83%	59.38%	0.0001	0.0014
56.5	368,557	54.79%	53.54%	58.23%	0.0002	0.0012
57.5	337,341	53.80%	52.25%	57.07%	0.0002	0.0011
58.5	256,529	52.81%	50.93%	55.89%	0.0004	0.0009
59.5	235,538	51.70%	49.61%	54.70%	0.0004	0.0009
60.5	219,250	50.66%	48.28%	53.50%	0.0006	0.0008
61.5	203,714	49.15%	46.93%	52.29%	0.0005	0.0010
62.5	166,226	47.93%	45.58%	51.06%	0.0006	0.0010
63.5	79,445	46.93%	44.22%	49.83%	0.0007	0.0008
64.5	57,929	45.97%	42.86%	48.58%	0.0010	0.0007
65.5	42,596	45.01%	41.49%	47.33%	0.0012	0.0005
66.5	25,044	44.03%	40.11%	46.07%	0.0015	0.0004
67.5	17,767	43.09%	38.74%	44.80%	0.0019	0.0003
68.5	5,864	42.35%	37.36%	43.53%	0.0025	0.0001
69.5	3,518	41.74%	35.99%	42.25%	0.0033	0.0000
70.5	1,980	41.22%	34.62%	40.97%	0.0044	0.0000
71.5	1,037	40.57%	33.25%	39.69%	0.0054	0.0001
72.5			31.89%	38.40%		
Sum of Squared Differences for Entire OLT Curve				[8]	0.0341	0.0246
SSD for Truncated OLT Curve (Up to 1% of Beginning Exposures)				[9]	0.0090	0.0077

[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.

Peer Group Life Comparison

Acct	Description	[1] I&M Proposed	[2] SWEPCO	[3] PSO	[4] Peer Avg	[5] Peer Avg Less I&M	[6] OUCC Proposed
	TRANSMISSION PLANT						
354	Towers & Fixtures	66	74	75	75	9	76
356	OH Conductor & Devices	67	70	69	70	3	75
	DISTRIBUTION PLANT						
364	Poles, Towers, & Fixtures	42	55	53	54	12	54
365	OH Conductor & Devices	41	44	46	45	4	48
366	UG Conduit	62	80	78	79	17	76
368	Line Transformers	27	44	36	40	13	43
	Average	**51**	**61**	**60**	**61**	**10**	**62**

[1] Company proposed average service lives from depreciation study

[2] Application of Southwestern Electric Power Company, Docket No. 51415, Order (Jan 14, 2022), for accounts in dispute.

[3] Final Order No. 672864, pp. 5-6, Application of Public Service Company of Oklahoma, Docket No. PUD 201700151,
Before the Corporation Commission of Oklahoma (January 31, 2018).

INDIANA MICHIGAN POWER COMPANY
SIMULATED PLANT RECORD ANALYSIS
DEPRECIATION STUDY AS OF DECEMBER 31, 2022

Account 354, Towers and Fixtures, Using 123 Test Points

Simulated Plant Record Analysis
Indiana Michigan Power - Transm

Account: I&M 101/6 354
Version: I&M Transmission 2022
Method: Simulated Balances

No. of Test Points: 123 Interval: 0 Observation Band: 1900 - 2022

Dispersion	Avg Service Life	Sum of Squared Differences	Index of Variation	Conformance Index	Retirement Experience Index
R2.5	117.5	6.21E+13	8.5679	116.71	51.01
R2	148.8	6.32E+13	8.6460	115.66	29.76
L0.5	236.7	6.66E+13	8.8727	112.71	22.95
L1	171.5	6.74E+13	8.9290	111.99	34.08
L0	310.7	6.83E+13	8.9835	111.32	18.69
R1.5	211.6	7.04E+13	9.1202	109.65	17.68
S-.5	321.1	7.17E+13	9.2063	108.62	15.16
S0	190.4	7.19E+13	9.2200	108.46	26.00
R1	286.2	7.42E+13	9.3663	106.77	14.26
S0.5	151.8	7.58E+13	9.4651	105.65	34.78
L1.5	140.9	7.67E+13	9.5236	105.00	44.45
R0.5	394.8	7.74E+13	9.5653	104.54	12.60
SC	507.3	7.87E+13	9.6439	103.69	12.07
R3	93.7	8.62E+13	10.0932	99.08	87.83
S1	121.0	1.03E+14	11.0365	90.61	51.09
R3.5	84.3	1.07E+14	11.2597	88.81	98.52
L2	113.5	1.08E+14	11.3053	88.45	62.24
S1.5	105.1	1.14E+14	11.5854	86.32	66.91
L2.5	100.5	1.21E+14	11.9438	83.73	74.39
S2	92.2	1.52E+14	13.4197	74.52	84.37
L3	87.8	1.55E+14	13.5497	73.80	86.67
R4	76.2	1.60E+14	13.7543	72.70	100.00
S2.5	84.8	1.63E+14	13.8648	72.13	94.32
L3.5	80.9	1.68E+14	14.0961	70.94	94.42
S3	78.0	1.92E+14	15.0824	66.30	99.29
L4	74.8	1.94E+14	15.1518	66.00	99.18
S3.5	73.6	1.95E+14	15.2007	65.79	99.93
R5	66.2	2.00E+14	15.3789	65.02	100.00
L5	67.6	2.10E+14	15.7711	63.41	100.00
S4	69.1	2.13E+14	15.8804	62.97	100.00
S5	65.0	2.13E+14	15.8862	62.95	100.00
S6	63.4	2.24E+14	16.2867	61.40	100.00
SQ	61.8	2.64E+14	17.6665	56.60	100.00
O1	65.5	2.00E+18	1538.3045	0.65	100.00

INDIANA MICHIGAN POWER COMPANY
SIMULATED PLANT RECORD ANALYSIS
DEPRECIATION STUDY AS OF DECEMBER 31, 2022

Account 356, Overhead Conductor and Devices, Using 103 Test Points

Simulated Plant Record Analysis
Indiana Michigan Power - Transm

Account: I&M 101/6 356
Version: I&M Transmission 2022
Method: Simulated Balances

No. of Test Points: 103 Interval: 0 Observation Band: 1920 - 2022

Dispersion	Avg Service Life	Sum of Squared Differences	Index of Variation	Conformance Index	Retirement Experience Index
R1.5	124.4	1.79E+14	13.9938	71.46	32.93
R1	157.6	1.79E+14	14.0159	71.35	25.01
R0.5	206.9	1.81E+14	14.0835	71.01	21.18
S-.5	182.2	1.82E+14	14.1154	70.84	24.90
SC	261.6	1.83E+14	14.1398	70.72	19.79
R2	99.2	1.95E+14	14.6139	68.43	50.52
L0	193.1	1.97E+14	14.7001	68.03	27.51
L0.5	153.9	2.01E+14	14.8509	67.34	33.51
S0	128.1	2.24E+14	15.6519	63.89	36.76
R2.5	85.3	2.30E+14	15.8677	63.02	73.00
L1	122.7	2.37E+14	16.1021	62.10	43.49
S0.5	108.4	2.47E+14	16.4529	60.78	46.35
L1.5	105.5	2.70E+14	17.1793	58.21	53.56
S1	93.2	3.21E+14	18.7601	53.30	59.91
R3	75.5	3.30E+14	18.9975	52.64	92.83
L2	90.7	3.56E+14	19.7375	50.66	66.78
S1.5	84.3	3.61E+14	19.8827	50.29	72.79
L2.5	83.0	3.95E+14	20.8019	48.07	76.17
R3.5	71.0	3.97E+14	20.8485	47.97	98.59
S2	76.9	4.52E+14	22.2538	44.94	85.66
L3	76.0	4.82E+14	22.9850	43.51	85.07
S2.5	72.6	4.92E+14	23.2107	43.08	93.47
R4	66.9	5.05E+14	23.5202	42.52	100.00
L3.5	71.4	5.16E+14	23.7787	42.05	92.40
S3	68.8	5.65E+14	24.8790	40.19	98.29
L4	67.4	5.87E+14	25.3423	39.46	97.83
S3.5	66.2	5.92E+14	25.4647	39.27	99.60
R5	61.7	6.47E+14	26.6219	37.56	100.00
S4	63.4	6.54E+14	26.7568	37.37	100.00
L5	62.7	6.71E+14	27.1102	36.89	99.96
S5	61.2	7.02E+14	27.7277	36.07	100.00
S6	59.7	7.44E+14	28.5357	35.04	100.00
SQ	59.4	8.42E+14	30.3690	32.93	100.00
O1	61.1	1.87E+18	1431.4033	0.70	100.00

INDIANA MICHIGAN POWER COMPANY
SIMULATED PLANT RECORD ANALYSIS
DEPRECIATION STUDY AS OF DECEMBER 31, 2022

Account 356, Overhead Conductor and Devices, Using 20 Test Points

Simulated Plant Record Analysis
Indiana Michigan Power - Transm

Account: I&M 101/6 356
Version: I&M Transmission 2022
Method: Simulated Balances

No. of Test Points: 20 Interval: 0 Observation Band: 2003 - 2022

Dispersion	Avg Service Life	Sum of Squared Differences	Index of Variation	Conformance Index	Retirement Experience Index
R3	76.7	7.67E+13	8.0574	124.11	91.32
R3.5	71.8	7.79E+13	8.1230	123.11	98.27
L2	93.1	8.03E+13	8.2451	121.28	64.72
L2.5	84.7	8.03E+13	8.2482	121.24	74.58
S1.5	86.0	8.09E+13	8.2779	120.80	70.53
S1	95.2	8.43E+13	8.4482	118.37	57.92
R2.5	87.5	8.48E+13	8.4751	117.99	69.28
L1.5	108.2	8.57E+13	8.5197	117.38	51.63
S2	78.5	8.62E+13	8.5441	117.04	83.57
L3	77.2	9.05E+13	8.7557	114.21	84.02
S2.5	74.1	9.12E+13	8.7865	113.81	92.01
R4	67.3	9.13E+13	8.7931	113.73	100.00
L1	125.9	9.30E+13	8.8751	112.67	41.98
S0.5	111.8	9.52E+13	8.9793	111.37	44.08
L3.5	72.1	9.52E+13	8.9804	111.35	91.86
R2	100.7	1.01E+14	9.2561	108.04	48.83
S3	70.2	1.07E+14	9.5191	105.05	97.58
S0	132.1	1.07E+14	9.5214	105.03	35.14
L0.5	157.9	1.13E+14	9.7695	102.36	32.37
L4	67.7	1.13E+14	9.7853	102.19	97.67
S3.5	66.9	1.15E+14	9.8490	101.53	99.49
L0	198.0	1.24E+14	10.2392	97.66	26.68
R1.5	127.6	1.24E+14	10.2492	97.57	31.43
S-.5	185.9	1.33E+14	10.6232	94.13	24.28
R1	160.0	1.36E+14	10.7429	93.08	24.47
S4	64.1	1.39E+14	10.8665	92.03	100.00
R0.5	210.1	1.45E+14	11.0664	90.36	20.82
R5	62.0	1.46E+14	11.1016	90.08	100.00
SC	266.9	1.48E+14	11.2015	89.27	19.39
L5	63.0	1.58E+14	11.5709	86.42	99.95
S5	61.3	1.82E+14	12.4268	80.47	100.00
S6	60.3	2.31E+14	13.9886	71.49	100.00
SQ	59.4	3.29E+14	16.6800	59.95	100.00
O1	61.4	1.21E+18	1011.5487	0.99	100.00

 4/28/2023

INDIANA MICHIGAN POWER COMPANY
SIMULATED PLANT RECORD ANALYSIS
DEPRECIATION STUDY AS OF DECEMBER 31, 2022

Account 364, Poles, Towers, & Fixtures, Using 74 Test Points

Simulated Plant Record Analysis
Indiana Michigan Power - Distr

Account: I&M 101/6 364
Version: I&M Distribution 2022
Method: Simulated Balances

No. of Test Points: 76 Interval: 0 Observation Band: 1947 - 2022

Dispersion	Avg Service Life	Sum of Squared Differences	Index of Variation	Conformance Index	Retirement Experience Index
SC	41.8	5.41E+15	91.6539	10.91	100.00
R0.5	38.4	6.12E+15	97.5261	10.25	100.00
L0	41.8	6.20E+15	98.1021	10.19	99.67
S-.5	38.1	6.38E+15	99.5232	10.05	100.00
L0.5	38.9	6.90E+15	103.5254	9.66	99.95
R1	35.7	7.02E+15	104.3945	9.58	100.00
S0	35.5	7.51E+15	108.0034	9.26	100.00
L1	36.6	7.72E+15	109.4839	9.13	100.00
R1.5	33.8	7.84E+15	110.3258	9.06	100.00
S0.5	33.9	8.25E+15	113.2125	8.83	100.00
L1.5	35.0	8.42E+15	114.3605	8.74	100.00
R2	32.6	8.70E+15	116.2767	8.60	100.00
S1	32.7	9.05E+15	118.5366	8.44	100.00
L2	33.4	9.22E+15	119.6892	8.35	100.00
R2.5	31.5	9.31E+15	120.2445	8.32	100.00
S1.5	31.9	9.57E+15	121.9523	8.20	100.00
L2.5	32.3	9.71E+15	122.8092	8.14	100.00
R3	30.7	9.94E+15	124.2519	8.05	100.00
S2	31.1	1.01E+16	125.4830	7.97	100.00
R3.5	30.2	1.03E+16	126.1941	7.92	100.00
L3	31.4	1.03E+16	126.3015	7.92	100.00
S2.5	30.8	1.04E+16	127.2887	7.86	100.00
L3.5	30.6	1.05E+16	127.9787	7.81	100.00
R4	29.7	1.06E+16	128.3055	7.79	100.00
S3	30.0	1.07E+16	129.1857	7.74	100.00
L4	30.0	1.08E+16	129.8043	7.70	100.00
S3.5	29.7	1.09E+16	129.9773	7.69	100.00
R5	29.2	1.10E+16	130.6560	7.65	100.00
S4	29.6	1.10E+16	130.9990	7.63	100.00
S6	29.0	1.11E+16	131.1244	7.63	100.00
S5	29.1	1.11E+16	131.2081	7.62	100.00
L5	29.3	1.11E+16	131.2723	7.62	100.00
SQ	30.9	1.34E+16	144.3486	6.93	100.00
O1	28.9	1.44E+18	1495.5285	0.67	100.00

INDIANA MICHIGAN POWER COMPANY
SIMULATED PLANT RECORD ANALYSIS
DEPRECIATION STUDY AS OF DECEMBER 31, 2022

Account 365, Overhead Conductor & Devices, Using 88 Test Points

Simulated Plant Record Analysis

Indiana Michigan Power - Distr

Account: I&M 101/6 365
Version: I&M Distribution 2022
Method: Simulated Balances

No. of Test Points: 88 Interval: 0 Observation Band: 1935 - 2022

Dispersion	Avg Service Life	Sum of Squared Differences	Index of Variation	Conformance Index	Retirement Experience Index
S3	26.7	2.62E+15	54.6658	18.29	100.00
S3.5	26.3	2.63E+15	54.7512	18.26	100.00
S4	26.0	2.65E+15	54.9993	18.18	100.00
R4	26.3	2.65E+15	55.0191	18.18	100.00
L4	26.5	2.66E+15	55.0875	18.15	100.00
S2.5	27.3	2.69E+15	55.3883	18.05	100.00
L3.5	27.2	2.69E+15	55.3921	18.05	100.00
R3.5	27.0	2.70E+15	55.5207	18.01	100.00
L5	25.9	2.71E+15	55.5835	17.99	100.00
L3	27.7	2.73E+15	55.7816	17.93	100.00
R5	25.6	2.74E+15	55.9015	17.89	100.00
S2	27.7	2.77E+15	56.1843	17.80	100.00
R3	27.5	2.78E+15	56.2653	17.77	100.00
S5	25.6	2.80E+15	56.5388	17.69	100.00
L2.5	29.0	2.81E+15	56.5649	17.68	100.00
L2	30.1	2.87E+15	57.2105	17.48	100.00
S1.5	28.7	2.91E+15	57.5911	17.36	100.00
S6	25.5	2.94E+15	57.9304	17.26	100.00
R2.5	28.8	2.95E+15	57.9626	17.25	100.00
L1.5	32.0	3.01E+15	58.5543	17.08	100.00
S1	29.7	3.05E+15	58.9310	16.97	100.00
L1	34.0	3.10E+15	59.4691	16.82	100.00
R2	30.1	3.14E+15	59.8386	16.71	100.00
L0.5	36.9	3.17E+15	60.0979	16.64	99.97
S0.5	31.6	3.19E+15	60.2881	16.59	100.00
L0	40.5	3.21E+15	60.5077	16.53	99.74
S0	33.2	3.28E+15	61.1741	16.35	100.00
SC	41.9	3.28E+15	61.1779	16.35	100.00
S-.5	37.1	3.32E+15	61.5122	16.26	100.00
R1.5	32.0	3.32E+15	61.5358	16.25	100.00
R0.5	37.7	3.38E+15	62.1215	16.10	100.00
R1	34.0	3.42E+15	62.4667	16.01	100.00
SQ	27.2	4.37E+15	70.5999	14.16	100.00
O1	25.3	2.96E+18	1837.5488	0.54	100.00

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INDIANA MICHIGAN POWER COMPANY
SIMULATED PLANT RECORD ANALYSIS
DEPRECIATION STUDY AS OF DECEMBER 31, 2022

Account 366, Underground Conduit, Using 97 Test Points

Simulated Plant Record Analysis
Indiana Michigan Power - Distr

Account: I&M 101/6 366
Version: I&M Distribution 2022
Method: Simulated Balances

No. of Test Points: 97 Interval: 0 Observation Band: 1926 - 2022

Dispersion	Avg Service Life	Sum of Squared Differences	Index of Variation	Conformance Index	Retirement Experience Index
SC	154.4	1.80E+13	19.1204	52.30	38.05
R0.5	122.4	1.82E+13	19.2223	52.02	46.10
S-.5	107.5	1.87E+13	19.4728	51.35	55.52
R1	93.8	1.87E+13	19.4769	51.34	66.66
L0	112.9	1.88E+13	19.5323	51.20	57.37
R1.5	76.3	1.96E+13	19.9450	50.14	90.79
L0.5	91.9	2.00E+13	20.1392	49.65	70.29
S0	76.4	2.03E+13	20.3160	49.22	84.62
R2	62.0	2.15E+13	20.8846	47.88	100.00
S0.5	66.4	2.21E+13	21.1823	47.21	96.85
L1	74.7	2.26E+13	21.4246	46.68	84.71
R2.5	54.4	2.34E+13	21.7942	45.88	100.00
L1.5	64.9	2.44E+13	22.2706	44.90	93.60
S1	57.6	2.52E+13	22.6363	44.18	100.00
S1.5	53.1	2.76E+13	23.6605	42.26	100.00
R3	48.7	2.78E+13	23.7729	42.06	100.00
L2	56.9	2.84E+13	24.0279	41.62	98.56
L2.5	52.8	3.11E+13	25.1166	39.81	99.74
S2	49.0	3.16E+13	25.3435	39.46	100.00
R3.5	46.4	3.24E+13	25.6297	39.02	100.00
S2.5	46.9	3.47E+13	26.5421	37.68	100.00
L3	48.9	3.62E+13	27.1231	36.87	100.00
S3	45.1	3.94E+13	28.2684	35.38	100.00
L3.5	46.8	3.94E+13	28.2690	35.37	100.00
R4	44.0	3.95E+13	28.3236	35.31	100.00
S3.5	43.7	4.44E+13	30.0379	33.29	100.00
L4	44.7	4.54E+13	30.3672	32.93	100.00
S4	42.7	5.13E+13	32.2693	30.99	100.00
L5	42.7	5.74E+13	34.1328	29.30	100.00
R5	42.0	5.80E+13	34.3141	29.14	100.00
S5	41.6	6.43E+13	36.1218	27.68	100.00
S6	41.4	7.70E+13	39.5466	25.29	100.00
SQ	42.0	1.02E+14	45.5582	21.95	100.00
O1	41.6	1.99E+17	2011.4538	0.50	100.00

INDIANA MICHIGAN POWER COMPANY
SIMULATED PLANT RECORD ANALYSIS
DEPRECIATION STUDY AS OF DECEMBER 31, 2022

Account 368, Line Transformers, Using 74 Test Points

Simulated Plant Record Analysis
Indiana Michigan Power - Distr

Account: I&M 101/6 368
Version: I&M Distribution 2022
Method: Simulated Balances

No. of Test Points: 74 Interval: 0 Observation Band: 1949 - 2022

Dispersion	Avg Service Life	Sum of Squared Differences	Index of Variation	Conformance Index	Retirement Experience Index
SC	28.8	5.20E+15	75.5950	13.23	100.00
L0	29.4	6.26E+15	82.9440	12.06	100.00
R0.5	27.4	6.69E+15	85.7786	11.66	100.00
S-.5	27.4	6.98E+15	87.6003	11.42	100.00
L0.5	28.1	7.60E+15	91.3887	10.94	100.00
R1	25.9	8.48E+15	96.5358	10.36	100.00
S0	26.1	9.07E+15	99.8576	10.01	100.00
L1	26.9	9.14E+15	100.2302	9.98	100.00
R1.5	25.3	1.02E+16	105.8612	9.45	100.00
S0.5	25.5	1.06E+16	108.0442	9.26	100.00
L1.5	26.0	1.08E+16	108.9102	9.18	100.00
R2	24.6	1.22E+16	115.5836	8.65	100.00
S1	24.9	1.23E+16	116.3555	8.59	100.00
L2	25.3	1.26E+16	117.8149	8.49	100.00
S1.5	24.5	1.38E+16	123.1139	8.12	100.00
R2.5	24.3	1.40E+16	124.1219	8.06	100.00
L2.5	24.8	1.42E+16	124.8832	8.01	100.00
S2	24.1	1.54E+16	130.0740	7.69	100.00
L3	24.2	1.59E+16	132.2564	7.56	100.00
R3	23.9	1.61E+16	132.9097	7.52	100.00
S2.5	23.8	1.67E+16	135.4112	7.38	100.00
L3.5	23.9	1.74E+16	138.2643	7.23	100.00
R3.5	23.6	1.76E+16	139.2598	7.18	100.00
S3	23.7	1.81E+16	140.9642	7.09	100.00
L4	23.6	1.90E+16	144.6977	6.91	100.00
R4	23.5	1.93E+16	145.6258	6.87	100.00
S3.5	23.5	1.94E+16	146.0805	6.85	100.00
S4	23.4	2.09E+16	151.4046	6.60	100.00
L5	23.2	2.15E+16	153.7725	6.50	100.00
R5	23.2	2.22E+16	156.3324	6.40	100.00
S5	23.3	2.29E+16	158.5962	6.31	100.00
S6	23.1	2.41E+16	162.8250	6.14	100.00
SQ	25.2	3.12E+16	185.1270	5.40	100.00
O1	22.9	1.98E+18	1475.0221	0.68	100.00

INDIANA MICHIGAN POWER COMPANY
SIMULATED PLANT RECORD ANALYSIS
DEPRECIATION STUDY AS OF DECEMBER 31, 2022

Account 368, Line Transformers, Using 20 Test Points

Simulated Plant Record Analysis
Indiana Michigan Power - Distr

Account: I&M 101/6 368
Version: I&M Distribution 2022
Method: Simulated Balances

No. of Test Points: 20 Interval: 0 Observation Band: 2003 - 2022

Dispersion	Avg Service Life	Sum of Squared Differences	Index of Variation	Conformance Index	Retirement Experience Index
SC	29.4	1.92E+15	34.7251	28.80	100.00
L0	30.2	2.30E+15	37.9807	26.33	100.00
R0.5	27.8	2.66E+15	40.8108	24.50	100.00
S-.5	27.8	2.74E+15	41.4469	24.13	100.00
L0.5	28.9	2.93E+15	42.8186	23.35	100.00
R1	26.6	3.54E+15	47.0817	21.24	100.00
L1	27.6	3.63E+15	47.6654	20.98	100.00
S0	26.8	3.69E+15	48.0523	20.81	100.00
R1.5	25.9	4.40E+15	52.5036	19.05	100.00
S0.5	25.9	4.46E+15	52.8333	18.93	100.00
L1.5	26.6	4.51E+15	53.1314	18.82	100.00
S1	25.5	5.30E+15	57.5997	17.36	100.00
R2	25.3	5.38E+15	58.0768	17.22	100.00
L2	26.0	5.49E+15	58.6255	17.06	100.00
S1.5	25.1	6.14E+15	62.0026	16.13	100.00
R2.5	24.9	6.45E+15	63.5484	15.74	100.00
L2.5	25.3	6.46E+15	63.6128	15.72	100.00
S2	24.8	7.06E+15	66.5141	15.03	100.00
L3	24.8	7.53E+15	68.6950	14.56	100.00
R3	24.5	7.65E+15	69.2204	14.45	100.00
S2.5	24.6	7.94E+15	70.5279	14.18	100.00
L3.5	24.4	8.56E+15	73.2447	13.65	100.00
R3.5	24.3	8.72E+15	73.8937	13.53	100.00
S3	24.1	8.88E+15	74.5741	13.41	100.00
L4	24.2	9.73E+15	78.0663	12.81	100.00
R4	24.2	9.88E+15	78.6731	12.71	100.00
S3.5	24.2	9.95E+15	78.9558	12.67	100.00
S4	24.0	1.11E+16	83.3471	12.00	100.00
L5	23.8	1.17E+16	85.5808	11.68	100.00
R5	23.8	1.23E+16	87.7257	11.40	100.00
S5	23.6	1.29E+16	89.8334	11.13	100.00
S6	23.8	1.40E+16	93.7153	10.67	100.00
SQ	25.9	2.30E+16	120.0404	8.33	100.00
O1	23.6	1.68E+18	1024.6396	0.98	100.00

I&M
Electric Division
354.00 Towers and Fixtures

Original Cost Of Utility Plant In Service
And Development Of Composite Remaining Life as of December 31, 2022
Based Upon Broad Group/Remaining Life Procedure and Technique

Average Service Life: 76 *Survivor Curve:* R4

Year (1)	Original Cost (2)	Avg. Service Life (3)	Avg. Annual Accrual (4)	Avg. Remaining Life (5)	Future Annual Accruals (6)
1925	259,266.78	76.00	3,411.40	4.15	14,154.34
1929	16,301.58	76.00	214.49	5.21	1,116.72
1930	47,146.40	76.00	620.35	5.48	3,401.12
1931	8,569.99	76.00	112.76	5.75	647.96
1940	48,793.00	76.00	642.01	8.50	5,457.75
1941	148,489.17	76.00	1,953.80	8.86	17,303.22
1943	7,840.02	76.00	103.16	9.62	992.13
1948	88,016.00	76.00	1,158.10	11.85	13,718.83
1951	2,449,718.82	76.00	32,233.06	13.43	433,050.12
1952	748,596.91	76.00	9,849.94	14.00	137,941.89
1953	205,627.00	76.00	2,705.61	14.60	39,502.18
1954	20,130.88	76.00	264.88	15.21	4,028.69
1955	95,510.82	76.00	1,256.72	15.83	19,899.95
1956	4,913,620.06	76.00	64,652.74	16.48	1,065,491.62
1957	693,958.08	76.00	9,131.00	17.14	156,462.48
1958	147,321.00	76.00	1,938.43	17.80	34,505.88
1959	4,602,044.15	76.00	60,553.06	18.48	1,118,773.16
1960	5,249.25	76.00	69.07	19.17	1,323.76
1961	8,283,128.37	76.00	108,988.26	19.86	2,164,458.81
1962	18,083.00	76.00	237.93	20.56	4,892.26
1963	45,352.00	76.00	596.74	21.28	12,697.29
1964	81,646.00	76.00	1,074.29	22.00	23,633.76
1965	472,401.25	76.00	6,215.79	22.73	141,284.20
1966	3,651,023.39	76.00	48,039.66	23.48	1,127,733.00
1967	422,439.90	76.00	5,558.41	24.23	134,658.66
1968	280,727.84	76.00	3,693.78	24.99	92,294.12
1969	4,969,642.02	76.00	65,389.87	25.76	1,684,506.85

I&M
Electric Division
354.00 Towers and Fixtures

Original Cost Of Utility Plant In Service
And Development Of Composite Remaining Life as of December 31, 2022
Based Upon Broad Group/Remaining Life Procedure and Technique

Average Service Life: 76 **Survivor Curve:** R4

Year (1)	Original Cost (2)	Avg. Service Life (3)	Avg. Annual Accrual (4)	Avg. Remaining Life (5)	Future Annual Accruals (6)
1970	18,622,215.78	76.00	245,028.55	26.54	6,503,582.99
1971	5,293,306.27	76.00	69,648.60	27.33	1,903,666.66
1972	13,043,802.15	76.00	171,628.55	28.14	4,828,996.57
1973	683,251.56	76.00	8,990.13	28.95	260,238.46
1974	7,166,963.25	76.00	94,301.92	29.77	2,807,065.68
1975	3,349,796.00	76.00	44,076.15	30.60	1,348,520.21
1976	2,413,172.48	76.00	31,752.19	31.44	998,234.42
1977	611,326.50	76.00	8,043.75	32.29	259,699.38
1978	7,379,589.00	76.00	97,099.62	33.14	3,218,040.94
1979	12,891,580.16	76.00	169,625.64	34.01	5,769,049.22
1980	787,234.38	76.00	10,358.32	34.88	361,338.80
1983	758,652.37	76.00	9,982.24	37.55	374,873.18
1984	52,563,307.82	76.00	691,620.77	38.46	26,598,019.62
1985	246,038.00	76.00	3,237.33	39.37	127,456.22
1986	38,824,803.84	76.00	510,851.42	40.29	20,581,296.28
1987	1,062,533.00	76.00	13,980.66	41.21	576,164.51
1988	2,247,996.56	76.00	29,578.83	42.14	1,246,538.36
1989	869,422.00	76.00	11,439.73	43.08	492,803.48
1990	809,356.00	76.00	10,649.39	44.02	468,770.24
1991	7,654,379.01	76.00	100,715.27	44.97	4,528,692.80
1992	25,668.00	76.00	337.74	45.92	15,507.36
1993	117,541.00	76.00	1,546.59	46.87	72,488.64
1994	368,290.00	76.00	4,845.91	47.83	231,778.21
1995	40,573.00	76.00	533.85	48.79	26,047.96
1996	153,016.60	76.00	2,013.37	49.76	100,181.85
1997	34,691.49	76.00	456.47	50.73	23,155.30
1998	133,213.58	76.00	1,752.81	51.70	90,621.50

I&M

Electric Division

354.00 Towers and Fixtures

Original Cost Of Utility Plant In Service

And Development Of Composite Remaining Life as of December 31, 2022

Based Upon Broad Group/Remaining Life Procedure and Technique

Average Service Life: 76 **Survivor Curve: R4**

Year (1)	Original Cost (2)	Avg. Service Life (3)	Avg. Annual Accrual (4)	Avg. Remaining Life (5)	Future Annual Accruals (6)
1999	473,738.34	76.00	6,233.38	52.68	328,349.56
2000	167,981.44	76.00	2,210.28	53.65	118,589.21
2001	135,028.33	76.00	1,776.68	54.63	97,068.18
2002	934,167.19	76.00	12,291.64	55.62	683,621.05
2003	341,016.10	76.00	4,487.04	56.60	253,970.54
2006	896,702.71	76.00	11,798.69	59.56	702,779.06
2007	3.30	76.00	0.04	60.55	2.63
2008	27,696.19	76.00	364.42	61.55	22,428.97
2009	214,725.31	76.00	2,825.33	62.54	176,693.68
2010	380,655.64	76.00	5,008.61	63.53	318,212.63
2011	10,082.82	76.00	132.67	64.53	8,560.76
2012	554,398.45	76.00	7,294.70	65.52	477,968.50
2013	10,717,639.66	76.00	141,021.23	66.52	9,380,524.91
2014	1,363,953.49	76.00	17,946.71	67.52	1,211,675.50
2015	28,383.91	76.00	373.47	68.51	25,587.33
2016	348,033.29	76.00	4,579.37	69.51	318,309.92
2017	701,966.42	76.00	9,236.38	70.51	651,232.93
2018	54,654.05	76.00	719.13	71.51	51,421.79
2019	33,936.88	76.00	446.54	72.50	32,375.66
2020	59,317.35	76.00	780.49	73.50	57,368.04
2021	596,717.82	76.00	7,851.53	74.50	584,950.98
2022	2,538,357.47	76.00	33,399.36	75.50	2,521,670.34
Total	231,461,519.64	76.00	3,045,538.81	36.21	110,290,121.78

Composite Average Remaining Life ... 36.21 Years

I&M
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, 2022
Based Upon Broad Group/Remaining Life Procedure and Technique

Average Service Life: 75 **Survivor Curve:** R3

Year (1)	Original Cost (2)	Avg. Service Life (3)	Avg. Annual Accrual (4)	Avg. Remaining Life (5)	Future Annual Accruals (6)
1925	241,021.25	75.00	3,213.62	7.31	23,491.73
1926	0.01	75.00	0.00	7.58	0.00
1927	0.03	75.00	0.00	7.84	0.00
1928	0.02	75.00	0.00	8.12	0.00
1929	0.03	75.00	0.00	8.40	0.00
1930	0.03	75.00	0.00	8.68	0.00
1931	0.02	75.00	0.00	8.97	0.00
1934	156,731.00	75.00	2,089.75	9.88	20,655.08
1937	38,001.22	75.00	506.68	10.88	5,510.57
1938	0.01	75.00	0.00	11.23	0.00
1939	0.01	75.00	0.00	11.59	0.00
1940	6,033.00	75.00	80.44	11.96	962.02
1941	110,745.91	75.00	1,476.61	12.34	18,225.97
1942	0.03	75.00	0.00	12.74	0.01
1944	6,941.50	75.00	92.55	13.56	1,255.43
1946	6,528.00	75.00	87.04	14.44	1,256.97
1947	68,190.52	75.00	909.21	14.90	13,544.60
1948	282,866.95	75.00	3,771.56	15.37	57,964.18
1949	91,942.00	75.00	1,225.89	15.85	19,430.99
1950	38,491.35	75.00	513.22	16.34	8,388.10
1951	1,844,276.63	75.00	24,590.35	16.85	414,455.65
1952	111,519.58	75.00	1,486.93	17.37	25,833.91
1953	1,254,527.47	75.00	16,727.03	17.91	299,502.40
1954	333,214.15	75.00	4,442.86	18.45	81,985.92
1955	405,268.19	75.00	5,403.58	19.01	102,722.76
1956	3,410,156.65	75.00	45,468.75	19.58	890,188.79
1957	390,682.51	75.00	5,209.10	20.16	105,028.58

I&M
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, 2022
Based Upon Broad Group/Remaining Life Procedure and Technique

Average Service Life: 75 **Survivor Curve:** R3

Year (1)	Original Cost (2)	Avg. Service Life (3)	Avg. Annual Accrual (4)	Avg. Remaining Life (5)	Future Annual Accruals (6)
1958	286,963.47	75.00	3,826.18	20.75	79,411.69
1959	3,616,629.32	75.00	48,221.72	21.36	1,029,904.12
1960	27,724.12	75.00	369.65	21.98	8,123.72
1961	9,043,771.90	75.00	120,583.62	22.60	2,725,479.08
1962	59,041.00	75.00	787.21	23.24	18,293.38
1963	1,930,759.34	75.00	25,743.46	23.89	614,984.92
1964	428,887.95	75.00	5,718.51	24.55	140,367.91
1965	1,489,240.14	75.00	19,856.53	25.21	500,635.69
1966	3,454,679.20	75.00	46,062.39	25.89	1,192,700.37
1967	326,652.11	75.00	4,355.36	26.58	115,763.43
1968	429,368.33	75.00	5,724.91	27.27	156,143.06
1969	2,871,898.74	75.00	38,291.98	27.98	1,071,497.28
1970	15,143,085.54	75.00	201,907.79	28.70	5,793,872.94
1971	4,123,626.71	75.00	54,981.69	29.42	1,617,385.54
1972	6,731,328.64	75.00	89,751.04	30.15	2,706,018.10
1973	927,627.02	75.00	12,368.36	30.89	382,043.06
1974	3,994,556.19	75.00	53,260.75	31.63	1,684,878.12
1975	1,715,392.25	75.00	22,871.90	32.39	740,862.68
1976	3,433,166.88	75.00	45,775.56	33.15	1,517,636.88
1977	522,898.76	75.00	6,971.98	33.92	236,509.21
1978	4,363,796.41	75.00	58,183.95	34.70	2,019,135.87
1979	7,533,025.57	75.00	100,440.33	35.49	3,564,321.72
1980	780,832.41	75.00	10,411.10	36.28	377,692.24
1981	215,466.89	75.00	2,872.89	37.08	106,524.18
1982	374,071.44	75.00	4,987.62	37.88	188,954.21
1983	313,197.01	75.00	4,175.96	38.70	161,595.07
1984	35,846,295.89	75.00	477,950.58	39.52	18,887,742.13

I&M
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, 2022
Based Upon Broad Group/Remaining Life Procedure and Technique

Average Service Life: 75 **Survivor Curve:** R3

Year (1)	Original Cost (2)	Avg. Service Life (3)	Avg. Annual Accrual (4)	Avg. Remaining Life (5)	Future Annual Accruals (6)
1985	290,634.54	75.00	3,875.13	40.34	156,338.44
1986	28,561,730.77	75.00	380,823.05	41.18	15,680,771.68
1987	385,473.01	75.00	5,139.64	42.02	215,953.61
1988	1,876,040.24	75.00	25,013.87	42.86	1,072,159.54
1989	984,608.02	75.00	13,128.11	43.71	573,878.21
1990	825,285.00	75.00	11,003.80	44.57	490,479.62
1991	6,314,550.84	75.00	84,194.01	45.44	3,825,568.19
1992	610,617.68	75.00	8,141.57	46.31	377,010.81
1993	1,315,569.85	75.00	17,540.93	47.18	827,661.54
1994	2,679,826.60	75.00	35,731.02	48.07	1,717,447.66
1995	4,568,496.32	75.00	60,913.28	48.95	2,981,864.61
1996	2,636,725.90	75.00	35,156.34	49.85	1,752,437.35
1997	1,430,643.26	75.00	19,075.24	50.74	967,970.55
1998	46,910.62	75.00	625.47	51.65	32,304.27
1999	2,424,151.60	75.00	32,322.02	52.56	1,698,762.34
2000	2,214,918.20	75.00	29,532.24	53.47	1,579,106.12
2001	986,445.40	75.00	13,152.60	54.39	715,346.11
2002	2,248,684.75	75.00	29,982.46	55.31	1,658,397.30
2003	1,075,122.96	75.00	14,334.97	56.24	806,189.42
2004	559,748.38	75.00	7,463.31	57.17	426,681.04
2005	923,969.84	75.00	12,319.60	58.11	715,859.99
2006	3,775,012.60	75.00	50,333.50	59.05	2,972,046.75
2007	977,307.37	75.00	13,030.76	59.99	781,720.42
2008	17,276,311.66	75.00	230,350.81	60.94	14,037,297.67
2009	3,834,313.08	75.00	51,124.17	61.89	3,164,055.39
2010	4,690,106.70	75.00	62,534.75	62.84	3,929,910.47
2011	6,960,316.21	75.00	92,804.21	63.80	5,921,102.10

I&M
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, 2022
Based Upon Broad Group/Remaining Life Procedure and Technique

Average Service Life: 75 **Survivor Curve:** R3

Year (1)	Original Cost (2)	Avg. Service Life (3)	Avg. Annual Accrual (4)	Avg. Remaining Life (5)	Future Annual Accruals (6)
2012	2,865,440.42	75.00	38,205.87	64.76	2,474,313.81
2013	4,572,669.02	75.00	60,968.92	65.73	4,007,242.22
2014	8,250,252.78	75.00	110,003.36	66.69	7,336,466.27
2015	5,692,643.80	75.00	75,901.91	67.66	5,135,678.66
2016	7,242,126.80	75.00	96,561.68	68.63	6,627,347.91
2017	7,206,579.91	75.00	96,087.73	69.61	6,688,451.86
2018	3,748,412.31	75.00	49,978.83	70.58	3,527,692.86
2019	11,875,946.40	75.00	158,345.94	71.56	11,331,499.56
2020	19,317,971.35	75.00	257,572.93	72.54	18,684,907.72
2021	15,372,529.80	75.00	204,967.05	73.52	15,069,997.78
2022	10,094,700.81	75.00	134,596.00	74.51	10,028,395.59
Total	315,493,916.10	75.00	4,206,585.28	49.85	209,719,195.73

Composite Average Remaining Life ... 49.85 Years

I&M
Electric Division
362.00 Station Equipment

Original Cost Of Utility Plant In Service
And Development Of Composite Remaining Life as of December 31, 2022
Based Upon Broad Group/Remaining Life Procedure and Technique

Average Service Life: 47 **Survivor Curve:** L0

Year (1)	Original Cost (2)	Avg. Service Life (3)	Avg. Annual Accrual (4)	Avg. Remaining Life (5)	Future Annual Accruals (6)
1900	15,907.75	47.00	338.47	10.85	3,672.96
1928	6,070.92	47.00	129.17	15.69	2,027.28
1930	7,263.00	47.00	154.54	16.08	2,485.25
1937	5,944.96	47.00	126.49	17.49	2,211.78
1943	21,160.00	47.00	450.23	18.76	8,444.29
1944	13,120.29	47.00	279.16	18.97	5,296.90
1945	12,813.46	47.00	272.64	19.19	5,233.14
1947	5,840.00	47.00	124.26	19.64	2,440.65
1948	33,208.49	47.00	706.59	19.87	14,038.54
1949	45,403.02	47.00	966.05	20.09	19,412.05
1950	61,733.64	47.00	1,313.52	20.32	26,696.74
1951	5,807.20	47.00	123.56	20.56	2,540.05
1952	91,531.61	47.00	1,947.54	20.79	40,492.60
1953	253,410.61	47.00	5,391.89	21.03	113,383.09
1954	125,346.67	47.00	2,667.04	21.27	56,721.22
1955	49,928.46	47.00	1,062.34	21.51	22,849.70
1956	55,556.58	47.00	1,182.09	21.75	25,711.30
1957	136,156.65	47.00	2,897.04	22.00	63,724.03
1958	431,041.41	47.00	9,171.39	22.24	204,009.91
1959	81,747.15	47.00	1,739.36	22.49	39,125.96
1960	238,064.38	47.00	5,065.36	22.75	115,223.03
1961	51,528.34	47.00	1,096.38	23.00	25,219.48
1962	212,898.85	47.00	4,529.91	23.26	105,366.17
1963	208,860.74	47.00	4,443.99	23.52	104,523.93
1964	100,610.81	47.00	2,140.72	23.78	50,909.92
1965	142,966.34	47.00	3,041.93	24.05	73,148.56
1966	289,758.62	47.00	6,165.27	24.31	149,905.24

I&M
Electric Division
362.00 Station Equipment

Original Cost Of Utility Plant In Service
And Development Of Composite Remaining Life as of December 31, 2022
Based Upon Broad Group/Remaining Life Procedure and Technique

Average Service Life: 47 **Survivor Curve:** L0

Year (1)	Original Cost (2)	Avg. Service Life (3)	Avg. Annual Accrual (4)	Avg. Remaining Life (5)	Future Annual Accruals (6)
1967	60,607.60	47.00	1,289.56	24.58	31,703.74
1968	505,717.04	47.00	10,760.28	24.86	267,478.43
1969	518,727.50	47.00	11,037.11	25.13	277,404.14
1970	266,383.70	47.00	5,667.92	25.41	144,035.35
1971	164,918.10	47.00	3,509.01	25.69	90,159.76
1972	1,259,233.58	47.00	26,793.06	25.98	696,003.36
1973	1,379,300.38	47.00	29,347.76	26.26	770,789.29
1974	1,270,503.24	47.00	27,032.85	26.55	717,828.68
1975	3,387,345.72	47.00	72,073.50	26.85	1,934,947.58
1976	828,950.00	47.00	17,637.80	27.14	478,739.59
1977	294,516.28	47.00	6,266.50	27.44	171,964.40
1978	775,357.02	47.00	16,497.49	27.74	457,705.47
1979	442,992.98	47.00	9,425.68	28.05	264,383.00
1980	1,397,082.39	47.00	29,726.11	28.36	842,940.27
1981	692,386.21	47.00	14,732.09	28.67	422,346.71
1982	275,937.03	47.00	5,871.19	28.98	170,166.70
1983	587,602.80	47.00	12,502.59	29.30	366,345.12
1984	344,291.03	47.00	7,325.58	29.62	217,006.45
1985	416,616.35	47.00	8,864.46	29.95	265,473.98
1986	270,180.37	47.00	5,748.70	30.28	174,051.08
1987	552,726.58	47.00	11,760.52	30.61	359,972.43
1988	3,423,061.99	47.00	72,833.44	30.94	2,253,731.30
1989	2,349,814.46	47.00	49,997.65	31.28	1,564,063.26
1990	1,930,464.10	47.00	41,075.02	31.63	1,299,017.86
1991	3,224,140.21	47.00	68,600.93	31.97	2,193,307.02
1992	985,029.02	47.00	20,958.74	32.32	677,432.81
1993	818,940.86	47.00	17,424.83	32.68	569,378.35

I&M
Electric Division
362.00 Station Equipment

Original Cost Of Utility Plant In Service
And Development Of Composite Remaining Life as of December 31, 2022
Based Upon Broad Group/Remaining Life Procedure and Technique

Average Service Life: 47 **Survivor Curve:** L0

Year (1)	Original Cost (2)	Avg. Service Life (3)	Avg. Annual Accrual (4)	Avg. Remaining Life (5)	Future Annual Accruals (6)
1994	979,579.89	47.00	20,842.79	33.03	688,524.29
1995	699,744.54	47.00	14,888.66	33.40	497,221.49
1996	2,099,535.20	47.00	44,672.39	33.76	1,508,212.60
1997	4,710,645.67	47.00	100,229.72	34.13	3,420,983.36
1998	5,151,191.49	47.00	109,603.33	34.51	3,781,896.30
1999	4,005,250.28	47.00	85,220.82	34.88	2,972,783.81
2000	11,327,928.90	47.00	241,027.49	35.27	8,499,961.30
2001	3,724,689.04	47.00	79,251.24	35.65	2,825,501.54
2002	1,701,559.83	47.00	36,204.56	36.04	1,304,986.90
2003	1,685,770.11	47.00	35,868.60	36.44	1,307,185.91
2004	2,012,365.38	47.00	42,817.66	36.85	1,577,802.35
2005	3,476,538.21	47.00	73,971.27	37.26	2,756,357.26
2006	9,764,594.48	47.00	207,763.99	37.68	7,829,387.64
2007	15,573,962.12	47.00	331,371.52	38.11	12,630,088.11
2008	21,833,281.83	47.00	464,552.80	38.55	17,910,800.08
2009	8,368,657.65	47.00	178,062.25	39.01	6,945,477.50
2010	5,961,098.85	47.00	126,835.96	39.47	5,006,005.37
2011	18,665,240.04	47.00	397,145.50	39.94	15,863,869.34
2012	9,073,968.65	47.00	193,069.35	40.43	7,806,507.90
2013	5,234,788.71	47.00	111,382.05	40.94	4,559,704.46
2014	14,828,956.16	47.00	315,519.82	41.46	13,080,698.35
2015	23,002,713.47	47.00	489,435.12	42.00	20,554,160.50
2016	15,721,176.81	47.00	334,503.84	42.55	14,234,387.33
2017	64,714,523.09	47.00	1,376,948.88	43.13	59,393,702.86
2018	75,829,713.81	47.00	1,613,449.88	43.74	70,573,178.25
2019	63,175,706.39	47.00	1,344,207.05	44.38	59,657,549.51
2020	39,799,956.17	47.00	846,834.72	45.06	38,154,561.81

I&M
Electric Division
362.00 Station Equipment

Original Cost Of Utility Plant In Service
And Development Of Composite Remaining Life as of December 31, 2022
Based Upon Broad Group/Remaining Life Procedure and Technique

Average Service Life: 47 *Survivor Curve:* L0

Year (1)	Original Cost (2)	Avg. Service Life (3)	Avg. Annual Accrual (4)	Avg. Remaining Life (5)	Future Annual Accruals (6)
2021	40,567,627.16	47.00	863,168.67	45.78	39,512,669.88
2022	32,495,413.98	47.00	691,413.95	46.56	32,194,442.79
Total	537,312,684.40	47.00	11,432,551.19	41.64	476,011,798.68

Composite Average Remaining Life ... 41.64 Years

I&M
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, 2022
Based Upon Broad Group/Remaining Life Procedure and Technique

Average Service Life: 54 *Survivor Curve:* L0

Year (1)	Original Cost (2)	Avg. Service Life (3)	Avg. Annual Accrual (4)	Avg. Remaining Life (5)	Future Annual Accruals (6)
1950	4,411.00	54.00	81.69	25.96	2,120.53
1951	7,214.19	54.00	133.60	26.21	3,501.97
1952	14,738.26	54.00	272.94	26.47	7,224.51
1953	26,208.25	54.00	485.35	26.73	12,971.76
1954	42,814.00	54.00	792.88	26.99	21,396.46
1955	53,801.54	54.00	996.36	27.25	27,148.30
1956	113,075.60	54.00	2,094.06	27.51	57,610.95
1957	115,380.62	54.00	2,136.75	27.78	59,354.51
1958	105,111.59	54.00	1,946.57	28.05	54,594.98
1959	97,562.66	54.00	1,806.77	28.32	51,165.85
1960	125,001.95	54.00	2,314.92	28.59	66,188.21
1961	206,186.78	54.00	3,818.39	28.87	110,227.29
1962	141,034.81	54.00	2,611.84	29.15	76,123.15
1963	206,005.82	54.00	3,815.04	29.43	112,261.10
1964	255,643.73	54.00	4,734.29	29.71	140,650.71
1965	292,157.79	54.00	5,410.50	29.99	162,285.08
1966	298,606.30	54.00	5,529.92	30.28	167,464.66
1967	730,124.51	54.00	13,521.25	30.57	413,395.27
1968	771,167.05	54.00	14,281.32	30.87	440,818.24
1969	675,427.94	54.00	12,508.32	31.16	389,790.19
1970	823,723.57	54.00	15,254.62	31.46	479,924.04
1971	1,269,769.36	54.00	23,514.99	31.76	746,884.10
1972	1,622,640.82	54.00	30,049.85	32.07	963,601.00
1973	1,523,741.71	54.00	28,218.33	32.37	913,516.33
1974	884,952.25	54.00	16,388.52	32.68	535,616.45
1975	1,370,082.97	54.00	25,372.70	32.99	837,160.95
1976	1,191,468.64	54.00	22,064.93	33.31	734,973.54

I&M
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, 2022
Based Upon Broad Group/Remaining Life Procedure and Technique

Average Service Life: 54 *Survivor Curve:* L0

Year (1)	Original Cost (2)	Avg. Service Life (3)	Avg. Annual Accrual (4)	Avg. Remaining Life (5)	Future Annual Accruals (6)
1977	1,613,786.16	54.00	29,885.87	33.63	1,004,988.47
1978	1,727,839.67	54.00	31,998.04	33.95	1,086,284.82
1979	1,600,311.22	54.00	29,636.32	34.27	1,015,722.88
1980	1,550,860.69	54.00	28,720.54	34.60	993,720.61
1981	2,107,704.80	54.00	39,032.80	34.93	1,363,394.85
1982	2,091,681.92	54.00	38,736.07	35.26	1,365,926.99
1983	2,400,144.70	54.00	44,448.52	35.60	1,582,299.99
1984	1,241,365.48	54.00	22,988.97	35.94	826,171.74
1985	1,813,985.16	54.00	33,593.37	36.28	1,218,774.44
1986	2,534,884.27	54.00	46,943.78	36.63	1,719,370.78
1987	2,696,445.84	54.00	49,935.75	36.98	1,846,375.34
1988	3,367,453.59	54.00	62,362.21	37.33	2,327,807.60
1989	2,150,772.06	54.00	39,830.36	37.68	1,500,918.35
1990	4,183,218.17	54.00	77,469.44	38.04	2,947,070.34
1991	4,573,219.87	54.00	84,691.92	38.40	3,252,516.97
1992	4,611,269.17	54.00	85,396.55	38.77	3,310,821.06
1993	4,778,384.09	54.00	88,491.37	39.14	3,463,497.62
1994	5,815,539.73	54.00	107,698.56	39.51	4,255,411.31
1995	4,904,602.08	54.00	90,828.82	39.89	3,623,043.11
1996	5,932,858.50	54.00	109,871.20	40.27	4,424,379.23
1997	6,189,846.97	54.00	114,630.39	40.65	4,660,034.33
1998	7,846,463.51	54.00	145,309.44	41.04	5,963,638.66
1999	6,782,781.15	54.00	125,611.00	41.43	5,204,539.92
2000	9,293,124.02	54.00	172,100.29	41.83	7,199,366.44
2001	4,605,357.15	54.00	85,287.07	42.24	3,602,267.62
2002	4,752,981.46	54.00	88,020.94	42.65	3,753,924.79
2003	3,922,669.19	54.00	72,644.30	43.07	3,128,518.16

I&M
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, 2022
Based Upon Broad Group/Remaining Life Procedure and Technique

Average Service Life: 54 **Survivor Curve:** L0

Year (1)	Original Cost (2)	Avg. Service Life (3)	Avg. Annual Accrual (4)	Avg. Remaining Life (5)	Future Annual Accruals (6)
2004	5,477,776.03	54.00	101,443.48	43.49	4,411,981.25
2005	8,101,590.12	54.00	150,034.16	43.93	6,590,387.96
2006	8,730,701.41	54.00	161,684.73	44.37	7,173,552.76
2007	11,224,394.92	54.00	207,865.69	44.82	9,316,498.10
2008	11,837,610.40	54.00	219,221.89	45.28	9,926,835.82
2009	10,058,651.38	54.00	186,277.17	45.76	8,523,164.15
2010	9,411,930.31	54.00	174,300.48	46.24	8,059,662.54
2011	7,201,186.56	54.00	133,359.49	46.74	6,232,865.86
2012	7,573,425.76	54.00	140,253.03	47.25	6,626,689.28
2013	7,798,790.67	54.00	144,426.58	47.77	6,899,491.92
2014	8,163,994.53	54.00	151,189.83	48.31	7,304,533.56
2015	12,307,519.21	54.00	227,924.18	48.87	11,139,429.79
2016	14,087,112.12	54.00	260,880.64	49.45	12,901,278.79
2017	15,952,389.51	54.00	295,423.90	50.05	14,787,230.42
2018	18,531,118.47	54.00	343,179.64	50.68	17,392,651.41
2019	24,314,838.77	54.00	450,288.93	51.34	23,116,372.94
2020	28,432,312.47	54.00	526,540.84	52.02	27,392,231.56
2021	31,763,537.54	54.00	588,232.13	52.76	31,034,687.41
2022	30,628,742.82	54.00	567,216.75	53.56	30,379,342.79
Total	389,655,227.33	54.00	7,216,064.10	46.21	333,437,644.82

Composite Average Remaining Life ... 46.21 Years

I&M
Electric Division
365.00 Overhead Conductors and Devices
Original Cost Of Utility Plant In Service
And Development Of Composite Remaining Life as of December 31, 2022
Based Upon Broad Group/Remaining Life Procedure and Technique

Average Service Life: 48 **Survivor Curve:** L0

Year (1)	Original Cost (2)	Avg. Service Life (3)	Avg. Annual Accrual (4)	Avg. Remaining Life (5)	Future Annual Accruals (6)
1947	1,609.21	48.00	33.53	20.42	684.67
1948	4,350.84	48.00	90.65	20.65	1,871.95
1949	7,694.35	48.00	160.30	20.88	3,347.61
1950	10,063.78	48.00	209.67	21.12	4,427.45
1951	17,709.37	48.00	368.96	21.35	7,877.98
1952	30,902.15	48.00	643.82	21.59	13,899.86
1953	48,983.97	48.00	1,020.53	21.83	22,277.98
1954	71,758.83	48.00	1,495.02	22.07	32,998.03
1955	84,697.02	48.00	1,764.58	22.32	39,378.80
1956	145,617.67	48.00	3,033.80	22.56	68,451.26
1957	165,607.72	48.00	3,450.27	22.81	78,700.85
1958	217,070.51	48.00	4,522.45	23.06	104,292.71
1959	179,063.38	48.00	3,730.61	23.31	86,977.45
1960	201,653.09	48.00	4,201.24	23.57	99,024.89
1961	333,931.63	48.00	6,957.13	23.83	165,779.08
1962	309,010.74	48.00	6,437.93	24.09	155,085.70
1963	406,808.64	48.00	8,475.45	24.35	206,399.15
1964	428,491.34	48.00	8,927.19	24.62	219,772.51
1965	527,518.16	48.00	10,990.32	24.89	273,511.94
1966	612,876.24	48.00	12,768.67	25.16	321,228.06
1967	848,878.73	48.00	17,685.55	25.43	449,762.14
1968	611,040.77	48.00	12,730.43	25.71	327,264.29
1969	676,746.73	48.00	14,099.35	25.98	366,371.49
1970	834,119.32	48.00	17,378.05	26.27	456,461.49
1971	1,273,308.77	48.00	26,528.12	26.55	704,345.99
1972	1,555,559.60	48.00	32,408.54	26.84	869,783.67
1973	1,249,774.56	48.00	26,037.81	27.13	706,358.02

I&M
Electric Division
365.00 Overhead Conductors and Devices

Original Cost Of Utility Plant In Service
And Development Of Composite Remaining Life as of December 31, 2022
Based Upon Broad Group/Remaining Life Procedure and Technique

Average Service Life: 48 **Survivor Curve:** L0

Year (1)	Original Cost (2)	Avg. Service Life (3)	Avg. Annual Accrual (4)	Avg. Remaining Life (5)	Future Annual Accruals (6)
1974	718,136.64	48.00	14,961.66	27.42	410,265.74
1975	1,238,273.33	48.00	25,798.20	27.72	715,049.81
1976	1,005,135.20	48.00	20,940.99	28.02	586,682.00
1977	1,071,540.18	48.00	22,324.48	28.32	632,182.07
1978	1,157,458.45	48.00	24,114.50	28.62	690,226.74
1979	1,170,046.29	48.00	24,376.75	28.93	705,244.21
1980	1,128,696.60	48.00	23,515.27	29.24	687,640.39
1981	1,249,574.82	48.00	26,033.65	29.56	769,453.26
1982	1,054,330.07	48.00	21,965.92	29.87	656,204.98
1983	1,149,296.87	48.00	23,944.46	30.19	722,996.97
1984	718,717.63	48.00	14,973.77	30.52	456,985.34
1985	1,229,074.74	48.00	25,606.55	30.85	789,879.09
1986	1,738,973.15	48.00	36,229.78	31.18	1,129,567.80
1987	2,075,360.55	48.00	43,238.08	31.51	1,362,539.00
1988	2,512,733.20	48.00	52,350.30	31.85	1,667,389.04
1989	2,786,227.54	48.00	58,048.28	32.19	1,868,707.65
1990	4,670,269.17	48.00	97,300.42	32.54	3,165,922.49
1991	4,043,079.52	48.00	84,233.55	32.89	2,770,151.82
1992	4,519,173.47	48.00	94,152.49	33.24	3,129,557.84
1993	3,700,635.77	48.00	77,099.07	33.60	2,590,179.98
1994	5,338,330.72	48.00	111,218.82	33.96	3,776,516.48
1995	3,672,009.75	48.00	76,502.68	34.32	2,625,560.45
1996	4,793,106.46	48.00	99,859.61	34.69	3,463,919.25
1997	6,613,763.72	48.00	137,791.20	35.06	4,830,944.67
1998	5,585,671.13	48.00	116,371.91	35.44	4,123,745.06
1999	4,361,445.13	48.00	90,866.38	35.82	3,254,469.98
2000	6,547,491.26	48.00	136,410.48	36.20	4,938,111.77

I&M
Electric Division
365.00 Overhead Conductors and Devices
Original Cost Of Utility Plant In Service
And Development Of Composite Remaining Life as of December 31, 2022
Based Upon Broad Group/Remaining Life Procedure and Technique

Average Service Life: 48 **Survivor Curve: L0**

Year (1)	Original Cost (2)	Avg. Service Life (3)	Avg. Annual Accrual (4)	Avg. Remaining Life (5)	Future Annual Accruals (6)
2001	3,193,099.71	48.00	66,525.06	36.59	2,434,135.28
2002	3,420,674.82	48.00	71,266.36	36.98	2,635,770.43
2003	3,695,825.91	48.00	76,998.86	37.39	2,878,689.87
2004	6,532,562.57	48.00	136,099.45	37.79	5,143,814.61
2005	12,723,458.66	48.00	265,080.63	38.21	10,129,079.83
2006	36,307,752.25	48.00	756,435.96	38.64	29,225,668.47
2007	19,778,964.48	48.00	412,075.08	39.07	16,099,708.09
2008	36,277,300.47	48.00	755,801.53	39.51	29,864,403.40
2009	24,238,657.24	48.00	504,988.35	39.97	20,183,357.19
2010	16,149,232.19	48.00	336,453.22	40.43	13,604,127.49
2011	7,306,216.12	48.00	152,217.76	40.91	6,227,600.24
2012	20,454,507.80	48.00	426,149.36	41.40	17,644,522.55
2013	36,335,587.44	48.00	757,015.88	41.91	31,727,660.17
2014	26,742,725.40	48.00	557,158.13	42.43	23,642,827.72
2015	26,295,551.08	48.00	547,841.70	42.98	23,543,940.66
2016	23,917,052.29	48.00	498,288.04	43.54	21,693,902.89
2017	29,720,984.67	48.00	619,207.20	44.12	27,321,685.44
2018	26,645,953.31	48.00	555,141.98	44.73	24,833,608.27
2019	36,732,657.54	48.00	765,288.44	45.37	34,724,294.66
2020	46,600,135.71	48.00	970,867.55	46.05	44,709,288.60
2021	52,670,577.40	48.00	1,097,339.18	46.77	51,326,785.04
2022	57,321,137.55	48.00	1,194,228.98	47.56	56,800,543.33
Total	639,764,013.09	48.00	13,328,847.93	41.62	554,701,843.13

Composite Average Remaining Life ... 41.62 Years

I&M
Electric Division
366.00 Underground Conduit

Original Cost Of Utility Plant In Service
And Development Of Composite Remaining Life as of December 31, 2022
Based Upon Broad Group/Remaining Life Procedure and Technique

Average Service Life: 76 **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)
1927	4,733.12	76.00	62.28	16.53	1,029.44
1928	4,861.43	76.00	63.97	16.88	1,079.61
1930	10,028.39	76.00	131.95	17.59	2,321.54
1931	6,082.07	76.00	80.03	17.96	1,437.19
1932	119,737.96	76.00	1,575.48	18.33	28,879.56
1939	32,192.01	76.00	423.57	21.10	8,938.53
1942	25,991.58	76.00	341.99	22.39	7,656.54
1943	13,375.83	76.00	176.00	22.83	4,017.92
1948	4,736.29	76.00	62.32	25.14	1,566.93
1950	14,522.34	76.00	191.08	26.12	4,990.62
1951	41,113.32	76.00	540.96	26.61	14,397.45
1952	24,138.95	76.00	317.61	27.12	8,613.08
1953	29,849.91	76.00	392.76	27.63	10,851.95
1954	15,268.51	76.00	200.90	28.15	5,654.84
1955	12,262.22	76.00	161.34	28.67	4,625.95
1956	29,194.39	76.00	384.13	29.20	11,218.16
1957	10,459.35	76.00	137.62	29.74	4,093.10
1958	6,243.62	76.00	82.15	30.29	2,488.04
1959	69,729.39	76.00	917.48	30.84	28,291.44
1960	34,367.59	76.00	452.20	31.40	14,197.20
1961	24,031.64	76.00	316.20	31.96	10,105.70
1962	9,696.54	76.00	127.58	32.53	4,150.25
1963	14,546.74	76.00	191.40	33.11	6,337.03
1964	47,418.20	76.00	623.92	33.69	21,020.65
1965	6,411.49	76.00	84.36	34.28	2,891.90
1966	38,740.87	76.00	509.74	34.88	17,778.72
1967	102,869.92	76.00	1,353.54	35.48	48,022.69

I&M
Electric Division
366.00 Underground Conduit

Original Cost Of Utility Plant In Service
And Development Of Composite Remaining Life as of December 31, 2022
Based Upon Broad Group/Remaining Life Procedure and Technique

Average Service Life: 76 **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)
1968	108,766.30	76.00	1,431.12	36.09	51,644.19
1969	84,021.98	76.00	1,105.54	36.70	40,575.62
1970	73,223.23	76.00	963.45	37.32	35,957.58
1971	152,781.28	76.00	2,010.26	37.95	76,282.06
1972	491,049.93	76.00	6,461.12	38.58	249,263.78
1973	777,092.42	76.00	10,224.80	39.22	400,972.91
1974	306,579.20	76.00	4,033.90	39.86	160,781.05
1975	244,374.88	76.00	3,215.43	40.50	130,238.60
1976	45,728.49	76.00	601.68	41.16	24,765.19
1977	68,215.39	76.00	897.56	41.82	37,533.96
1978	3,088,953.66	76.00	40,643.72	42.48	1,726,561.13
1979	495,710.08	76.00	6,522.44	43.15	281,450.55
1980	647,953.42	76.00	8,525.62	43.82	373,630.38
1981	375,379.70	76.00	4,939.16	44.50	219,803.45
1982	56,038.01	76.00	737.33	45.19	33,318.27
1983	286,088.35	76.00	3,764.28	45.88	172,687.37
1984	790,429.58	76.00	10,400.29	46.57	484,312.83
1985	341,849.92	76.00	4,497.98	47.27	212,602.01
1986	370,255.05	76.00	4,871.73	47.97	233,684.88
1987	692,850.69	76.00	9,116.37	48.67	443,720.38
1988	1,055,279.45	76.00	13,885.12	49.38	685,710.35
1989	1,123,792.83	76.00	14,786.60	50.10	740,790.54
1990	1,387,742.64	76.00	18,259.59	50.82	927,891.83
1991	1,264,355.96	76.00	16,636.10	51.54	857,427.82
1992	1,188,852.15	76.00	15,642.64	52.27	817,583.33
1993	1,213,400.28	76.00	15,965.63	53.00	846,113.23
1994	2,046,127.96	76.00	26,922.47	53.73	1,446,558.53

I&M
Electric Division
366.00 Underground Conduit

Original Cost Of Utility Plant In Service
And Development Of Composite Remaining Life as of December 31, 2022
Based Upon Broad Group/Remaining Life Procedure and Technique

Average Service Life: 76 **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)
1995	727,467.54	76.00	9,571.85	54.47	521,357.00
1996	877,266.10	76.00	11,542.86	55.21	637,260.23
1997	1,403,444.26	76.00	18,466.19	55.95	1,033,215.03
1998	1,466,317.98	76.00	19,293.47	56.70	1,093,954.67
1999	1,548,397.03	76.00	20,373.44	57.45	1,170,482.21
2000	3,715,923.01	76.00	48,893.24	58.20	2,845,826.46
2001	3,689,381.27	76.00	48,544.01	58.96	2,862,326.13
2002	3,269,136.67	76.00	43,014.53	59.72	2,568,990.55
2003	449,916.33	76.00	5,919.89	60.49	358,076.06
2004	1,317,517.91	76.00	17,335.59	61.25	1,061,889.15
2005	3,881,348.54	76.00	51,069.87	62.02	3,167,589.46
2006	3,406,564.72	76.00	44,822.77	62.80	2,814,745.79
2007	3,477,890.87	76.00	45,761.27	63.57	2,909,247.19
2008	5,567,409.70	76.00	73,254.66	64.35	4,714,203.23
2009	1,863,135.89	76.00	24,514.70	65.14	1,596,780.85
2010	1,897,507.49	76.00	24,966.96	65.92	1,645,872.99
2011	3,884,167.24	76.00	51,106.96	66.71	3,409,375.51
2012	1,830,241.72	76.00	24,081.89	67.50	1,625,574.17
2013	2,679,198.55	76.00	35,252.26	68.30	2,407,591.91
2014	3,232,958.97	76.00	42,538.51	69.10	2,939,213.01
2015	5,957,496.61	76.00	78,387.33	69.90	5,478,957.31
2016	12,420,735.75	76.00	163,429.11	70.70	11,554,334.92
2017	18,490,764.41	76.00	243,297.11	71.51	17,397,603.01
2018	21,853,212.56	76.00	287,539.41	72.32	20,794,116.70
2019	18,211,873.75	76.00	239,627.53	73.13	17,523,970.50
2020	11,692,907.94	76.00	153,852.52	73.95	11,376,975.07
2021	12,740,075.63	76.00	167,630.91	74.77	12,533,129.37

I&M
Electric Division
366.00 Underground Conduit

Original Cost Of Utility Plant In Service
And Development Of Composite Remaining Life as of December 31, 2022
Based Upon Broad Group/Remaining Life Procedure and Technique

Average Service Life: ***76*** *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)
2022	13,822,192.18	76.00	181,869.14	75.59	13,747,108.46
Total	184,903,947.12	76.00	2,432,922.46	67.32	163,778,284.81

Composite Average Remaining Life ... 67.32 Years

I&M
Electric Division
367.00 Underground Conductors and Devices
Original Cost Of Utility Plant In Service
And Development Of Composite Remaining Life as of December 31, 2022
Based Upon Broad Group/Remaining Life Procedure and Technique

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

Year (1)	Original Cost (2)	Avg. Service Life (3)	Avg. Annual Accrual (4)	Avg. Remaining Life (5)	Future Annual Accruals (6)
1950	709.79	61.00	11.64	17.17	199.76
1951	911.37	61.00	14.94	17.60	262.88
1952	1,494.91	61.00	24.51	18.03	441.81
1953	2,261.35	61.00	37.07	18.47	684.57
1954	11,597.22	61.00	190.11	18.91	3,595.06
1955	6,743.02	61.00	110.54	19.36	2,139.83
1956	16,624.57	61.00	272.53	19.81	5,399.32
1957	14,124.90	61.00	231.55	20.27	4,693.77
1958	19,880.39	61.00	325.90	20.73	6,757.52
1959	83,315.48	61.00	1,365.80	21.20	28,961.47
1960	32,431.47	61.00	531.65	21.68	11,526.21
1961	9,022.68	61.00	147.91	22.16	3,277.70
1962	11,561.26	61.00	189.53	22.65	4,292.08
1963	15,726.13	61.00	257.80	23.14	5,964.82
1964	75,278.76	61.00	1,234.05	23.64	29,167.01
1965	27,351.55	61.00	448.38	24.14	10,823.07
1966	96,316.08	61.00	1,578.92	24.65	38,914.15
1967	193,593.73	61.00	3,173.61	25.16	79,850.49
1968	199,956.52	61.00	3,277.91	25.68	84,180.10
1969	295,891.06	61.00	4,850.58	26.21	127,113.80
1970	282,072.57	61.00	4,624.05	26.74	123,637.08
1971	373,508.34	61.00	6,122.97	27.28	167,005.01
1972	824,727.67	61.00	13,519.87	27.82	376,086.73
1973	876,768.75	61.00	14,372.98	28.37	407,710.14
1974	407,475.25	61.00	6,679.80	28.92	193,176.62
1975	509,526.56	61.00	8,352.74	29.48	246,241.50
1976	438,261.24	61.00	7,184.47	30.05	215,867.91

I&M
Electric Division
367.00 Underground Conductors and Devices

Original Cost Of Utility Plant In Service
And Development Of Composite Remaining Life as of December 31, 2022
Based Upon Broad Group/Remaining Life Procedure and Technique

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

Year (1)	Original Cost (2)	Avg. Service Life (3)	Avg. Annual Accrual (4)	Avg. Remaining Life (5)	Future Annual Accruals (6)
1977	561,311.29	61.00	9,201.65	30.62	281,723.81
1978	1,089,242.11	61.00	17,856.09	31.19	557,008.13
1979	1,197,786.26	61.00	19,635.47	31.78	623,957.72
1980	1,726,227.64	61.00	28,298.28	32.36	915,846.39
1981	954,597.82	61.00	15,648.85	32.96	515,754.76
1982	363,493.75	61.00	5,958.80	33.56	199,959.07
1983	776,836.12	61.00	12,734.78	34.16	435,020.56
1984	532,842.57	61.00	8,734.96	34.77	303,711.65
1985	1,141,005.64	61.00	18,704.65	35.38	661,845.16
1986	1,724,127.06	61.00	28,263.84	36.00	1,017,566.68
1987	2,868,428.52	61.00	47,022.52	36.63	1,722,284.19
1988	3,139,771.61	61.00	51,470.69	37.25	1,917,505.42
1989	2,836,343.08	61.00	46,496.54	37.89	1,761,672.34
1990	4,388,274.20	61.00	71,937.55	38.53	2,771,482.04
1991	4,258,896.00	61.00	69,816.64	39.17	2,734,524.44
1992	2,718,724.63	61.00	44,568.41	39.81	1,774,441.65
1993	4,772,933.56	61.00	78,243.32	40.46	3,166,049.93
1994	4,350,026.89	61.00	71,310.56	41.12	2,932,096.06
1995	2,741,137.71	61.00	44,935.83	41.78	1,877,206.07
1996	4,605,676.46	61.00	75,501.46	42.44	3,204,010.67
1997	5,614,298.22	61.00	92,035.93	43.10	3,966,764.11
1998	4,774,623.50	61.00	78,271.03	43.77	3,425,768.92
1999	6,111,120.56	61.00	100,180.40	44.44	4,451,782.91
2000	8,419,070.24	61.00	138,014.92	45.11	6,226,075.47
2001	5,522,952.38	61.00	90,538.48	45.79	4,145,576.56
2002	9,016,999.50	61.00	147,816.85	46.47	6,868,462.82
2003	6,996,930.33	61.00	114,701.60	47.15	5,407,923.21

I&M
Electric Division
367.00 Underground Conductors and Devices

Original Cost Of Utility Plant In Service
And Development Of Composite Remaining Life as of December 31, 2022
Based Upon Broad Group/Remaining Life Procedure and Technique

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

Year (1)	Original Cost (2)	Avg. Service Life (3)	Avg. Annual Accrual (4)	Avg. Remaining Life (5)	Future Annual Accruals (6)
2004	8,434,417.70	61.00	138,266.51	47.83	6,613,520.65
2005	9,317,855.82	61.00	152,748.83	48.52	7,410,951.41
2006	7,585,021.87	61.00	124,342.26	49.21	6,118,412.90
2007	10,672,451.87	61.00	174,954.90	49.90	8,729,809.34
2008	11,126,739.84	61.00	182,402.10	50.59	9,227,849.77
2009	5,967,681.38	61.00	97,828.98	51.29	5,017,404.39
2010	5,537,239.69	61.00	90,772.70	51.99	4,718,989.13
2011	8,055,976.95	61.00	132,062.68	52.69	6,958,202.30
2012	5,419,971.34	61.00	88,850.30	53.39	4,744,084.74
2013	6,367,111.18	61.00	104,376.89	54.10	5,646,958.06
2014	6,999,880.99	61.00	114,749.97	54.81	6,289,860.00
2015	15,779,240.23	61.00	258,671.15	55.53	14,363,650.22
2016	18,909,661.11	61.00	309,988.55	56.25	17,435,611.35
2017	22,551,080.36	61.00	369,682.81	56.97	21,060,089.10
2018	15,697,345.89	61.00	257,328.65	57.69	14,846,125.20
2019	22,205,865.14	61.00	364,023.65	58.42	21,266,721.75
2020	11,667,688.38	61.00	191,269.94	59.15	11,314,383.10
2021	14,747,247.37	61.00	241,753.56	59.89	14,478,670.79
2022	16,705,309.12	61.00	273,852.32	60.63	16,603,542.07
Total	321,778,596.50	61.00	5,274,958.66	50.97	268,888,827.40

Composite Average Remaining Life ... 50.97 Years

I&M
Electric Division
368.00 Line Transformers

Original Cost Of Utility Plant In Service
And Development Of Composite Remaining Life as of December 31, 2022
Based Upon Broad Group/Remaining Life Procedure and Technique

Average Service Life: 43 **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)
1952	320.00	43.00	7.44	6.93	51.58
1953	684.35	43.00	15.91	7.33	116.68
1954	1,641.00	43.00	38.16	7.73	294.89
1955	2,667.00	43.00	62.02	8.12	503.85
1956	2,566.25	43.00	59.68	8.52	508.46
1957	2,376.50	43.00	55.27	8.91	492.67
1958	3,383.44	43.00	78.68	9.31	732.61
1959	3,318.50	43.00	77.17	9.71	749.23
1960	6,104.04	43.00	141.95	10.11	1,434.60
1961	11,331.66	43.00	263.52	10.51	2,768.77
1962	8,776.53	43.00	204.10	10.91	2,226.67
1963	9,368.18	43.00	217.86	11.31	2,464.93
1964	10,236.02	43.00	238.04	11.72	2,790.40
1965	13,963.07	43.00	324.71	12.13	3,939.94
1966	16,829.63	43.00	391.38	12.55	4,910.87
1967	60,387.71	43.00	1,404.33	12.97	18,208.23
1968	104,445.12	43.00	2,428.89	13.39	32,517.41
1969	93,908.16	43.00	2,183.85	13.81	30,166.71
1970	97,851.46	43.00	2,275.55	14.24	32,412.29
1971	124,006.76	43.00	2,883.80	14.68	42,329.10
1972	158,321.45	43.00	3,681.79	15.12	55,658.81
1973	272,287.32	43.00	6,332.08	15.56	98,534.16
1974	402,401.77	43.00	9,357.91	16.01	149,816.92
1975	165,012.28	43.00	3,837.39	16.46	63,175.90
1976	185,863.55	43.00	4,322.28	16.92	73,140.93
1977	383,033.20	43.00	8,907.49	17.39	154,860.77
1978	595,621.12	43.00	13,851.26	17.85	247,307.43

I&M
Electric Division
368.00 Line Transformers

Original Cost Of Utility Plant In Service
And Development Of Composite Remaining Life as of December 31, 2022
Based Upon Broad Group/Remaining Life Procedure and Technique

Average Service Life: 43 **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)
1979	519,536.72	43.00	12,081.90	18.33	221,445.31
1980	493,583.65	43.00	11,478.36	18.81	215,885.92
1981	569,012.53	43.00	13,232.47	19.29	255,290.75
1982	405,437.10	43.00	9,428.50	19.78	186,528.06
1983	443,035.85	43.00	10,302.86	20.28	208,931.64
1984	1,452,764.56	43.00	33,784.26	20.78	702,031.33
1985	2,387,160.09	43.00	55,513.76	21.29	1,181,709.63
1986	2,729,467.33	43.00	63,474.17	21.80	1,383,642.04
1987	3,018,624.69	43.00	70,198.57	22.32	1,566,511.02
1988	3,669,363.70	43.00	85,331.60	22.84	1,948,834.58
1989	5,626,310.08	43.00	130,840.68	23.37	3,057,206.67
1990	4,581,048.58	43.00	106,532.97	23.90	2,545,964.51
1991	3,852,381.57	43.00	89,587.71	24.44	2,189,222.39
1992	4,743,648.82	43.00	110,314.26	24.98	2,755,557.56
1993	5,573,645.55	43.00	129,615.96	25.53	3,308,620.31
1994	6,857,263.02	43.00	159,466.68	26.08	4,158,706.66
1995	5,358,835.72	43.00	124,620.52	26.64	3,319,293.44
1996	5,372,370.07	43.00	124,935.27	27.20	3,397,706.75
1997	5,560,223.63	43.00	129,303.83	27.76	3,589,607.95
1998	8,534,147.63	43.00	198,462.88	28.33	5,622,388.64
1999	4,565,017.49	43.00	106,160.16	28.90	3,068,229.95
2000	8,888,990.66	43.00	206,714.81	29.48	6,093,574.16
2001	7,192,139.52	43.00	167,254.28	30.06	5,027,195.96
2002	7,990,097.82	43.00	185,810.92	30.64	5,693,090.42
2003	7,135,818.06	43.00	165,944.51	31.22	5,181,514.75
2004	7,371,404.44	43.00	171,423.11	31.81	5,453,268.22
2005	9,892,135.54	43.00	230,043.09	32.40	7,453,705.95

I&M
Electric Division
368.00 Line Transformers

Original Cost Of Utility Plant In Service
And Development Of Composite Remaining Life as of December 31, 2022
Based Upon Broad Group/Remaining Life Procedure and Technique

Average Service Life: 43 **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)
2006	14,649,011.08	43.00	340,664.94	32.99	11,239,715.65
2007	12,403,808.80	43.00	288,452.43	33.59	9,688,293.66
2008	16,128,135.98	43.00	375,062.21	34.18	12,820,556.56
2009	7,640,004.52	43.00	177,669.45	34.78	6,179,298.31
2010	8,011,498.96	43.00	186,308.60	35.38	6,591,265.75
2011	11,989,165.88	43.00	278,809.84	35.98	10,031,035.42
2012	14,414,630.34	43.00	335,214.38	36.58	12,262,044.59
2013	12,206,878.66	43.00	283,872.79	37.18	10,555,149.16
2014	12,994,639.40	43.00	302,192.28	37.79	11,418,998.62
2015	14,067,340.20	43.00	327,138.10	38.39	12,560,059.80
2016	13,535,782.49	43.00	314,776.64	39.00	12,276,865.73
2017	19,320,102.76	43.00	449,291.87	39.61	17,797,193.79
2018	29,393,180.86	43.00	683,542.81	40.22	27,494,601.71
2019	20,337,269.53	43.00	472,946.24	40.84	19,313,881.21
2020	20,328,407.58	43.00	472,740.15	41.45	19,596,481.75
2021	23,430,982.36	43.00	544,890.99	42.07	22,924,046.60
2022	29,244,071.04	43.00	680,075.24	42.69	29,032,832.18
Total	407,615,080.93	43.00	9,479,149.57	35.09	332,590,099.86

Composite Average Remaining Life ... 35.09 Years

AFFIRMATION

I affirm, under the penalties for perjury, that the foregoing representations are true.

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David J. Garrett
Resolve Utility Consulting, Inc.
Indiana Office of Utility Consumer Counselor
Cause No. 45933
Indiana Michigan Power Company

November 15, 2023
Date

CERTIFICATE OF SERVICE

This is to certify that a copy of the foregoing ***Indiana Office of Utility Consumer Counselor Public's Exhibit No. 9 Testimony of OUCC Witness David J. Garrett*** has been served upon the following counsel of record in the captioned proceeding by electronic service on November 15, 2023.

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