STATE OF INDIANA INDIANA UTILITY REGULATORY COMMISSION

VERIFIED PETITION OF SOUTHERN INDIANA GAS AND ELECTRIC COMPANY D/B/A CENTERPOINT ENERGY INDIANA SOUTH ("CEI SOUTH") FOR (1) AUTHORITY TO MODIFY ITS RATES AND CHARGES FOR ELECTRIC UTILITY SERVICE THROUGH A PHASE-IN OF RATES, (2) APPROVAL OF NEW SCHEDULES OF RATES AND CHARGES, AND NEW AND REVISED RIDERS, INCLUDING BUT NOT LIMITED TO A NEW TAX ADJUSTMENT RIDER AND A NEW GREEN POWER RIDER (3) APPROVAL OF A CRITICAL PEAK PRICING ("CPP") PILOT PROGRAM, (4) APPROVAL OF REVISED DEPRECIATION RATES APPLICABLE TO ELECTRIC AND COMMON PLANT IN SERVICE, (5) APPROVAL OF NECESSARY AND APPROPRIATE ACCOUNTING RELIEF, INCLUDING AUTHORITY TO CAPITALIZE AS RATE BASE ALL CLOUD COMPUTING COSTS AND DEFER TO A REGULATORY ASSET AMOUNTS NOT ALREADY INCLUDED IN BASE RATES THAT ARE INCURRED FOR THIRD-PARTY CLOUD COMPUTING ARRANGEMENTS, AND (6) APPROVAL OF AN ALTERNATIVE REGULATORY PLAN GRANTING CEI SOUTH A WAIVER FROM 170 IAC 4-1-16(f) TO ALLOW FOR REMOTE DISCONNECTION FOR NON-PAYMENT	)	**CAUSE NO. 45990**

INDIANA OFFICE OF UTILITY CONSUMER COUNSELOR

PUBLIC'S EXHIBIT NO. 11

TESTIMONY OF OUCC WITNESS DAVID J. GARRETT

MARCH 12, 2024

Respectfully submitted,

T. Jason Haas
Deputy Consumer Counselor
Attorney No. 34983-29

STATE OF INDIANA INDIANA UTILITY REGULATORY COMMISSION

VERIFIED PETITION OF SOUTHERN INDIANA GAS AND ELECTRIC COMPANY D/B/A CENTERPOINT ENERGY INDIANA SOUTH ("CEI SOUTH") FOR (1) AUTHORITY TO MODIFY ITS RATES AND CHARGES FOR ELECTRIC UTILITY SERVICE THROUGH A PHASE-IN OF RATES, (2) APPROVAL OF NEW SCHEDULES OF RATES AND CHARGES, AND NEW AND REVISED RIDERS, INCLUDING BUT NOT LIMITED TO A NEW TAX ADJUSTMENT RIDER AND A NEW GREEN POWER RIDER (3) APPROVAL OF A CRITICAL PEAK PRICING ("CPP") PILOT PROGRAM, (4) APPROVAL OF REVISED DEPRECIATION RATES APPLICABLE TO ELECTRIC AND COMMON PLANT IN SERVICE, (5) APPROVAL OF NECESSARY AND APPROPRIATE ACCOUNTING RELIEF, INCLUDING AUTHORITY TO CAPITALIZE AS RATE BASE ALL CLOUD COMPUTING COSTS AND DEFER TO A REGULATORY ASSET AMOUNTS NOT ALREADY INCLUDED IN BASE RATES THAT ARE INCURRED FOR THIRD-PARTY CLOUD COMPUTING ARRANGEMENTS, AND (6) APPROVAL OF AN ALTERNATIVE REGULATORY PLAN GRANTING CEI SOUTH A WAIVER FROM 170 IAC 4-1-16(f) TO ALLOW FOR REMOTE DISCONNECTION FOR NON-PAYMENT.	**CAUSE NO. 45990**

OUCC PREFILED TESTIMONY
OF
DAVID J. GARRETT

PUBLIC'S EXHIBIT NO. 11

ON BEHALF OF THE
INDIANA OFFICE OF UTILITY CONSUMER COUNSELOR

MARCH 12, 2024

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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.

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. 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]

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").

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[1] Attachment DJG-1.

Q. Describe the scope and organization of your testimony.

A. My direct testimony addresses depreciation issues in response to the direct testimony of John J. Spanos, who sponsors the depreciation study conducted for Southern Indiana Gas and Electric Company d/b/a CenterPoint Energy Indiana South ("CEI" or the "Company"). I also address the Company's decommissioning studies sponsored in the direct testimony of Jeffrey T. Kopp.

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

A. No. Excluding any specific issues, adjustments, or amounts CEI 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. EXECUTIVE SUMMARY

Q. Summarize the key points of your testimony.

A. CEI is proposing a substantial increase to its annual depreciation accrual in the amount of $20.6 million, which represents an increase of 17% from current levels.[2] My analysis of the depreciation study 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.[3]

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[2] *See* Petitioner's Exhibit No. 20 - Schedule B-3.2.

[3] *See* Attachment DJG-2 – based on plant balances at December 31, 2022.

Figure 1:
Depreciation Accrual Comparison by Plant Function

Plant Function	Plant Balance 12/31/2022	Company Proposal Rate	Company Proposal Accrual	OUCC Proposal Rate	OUCC Proposal Accrual	OUCC Adjustment Rate	OUCC Adjustment Accrual
Steam Production	$ 838,522,754	4.35%	$ 36,464,420	4.16%	$ 34,920,331	-0.18%	$ (1,544,089)
Other Production	88,341,774	2.64%	2,334,143	2.42%	2,137,387	-0.22%	(196,756)
Transmission	583,090,045	2.40%	13,973,528	2.14%	12,479,226	-0.26%	(1,494,302)
Distribution	1,041,105,665	3.32%	34,568,544	3.14%	32,679,207	-0.18%	(1,889,337)
General	66,812,331	5.73%	3,826,131	5.70%	3,810,759	-0.02%	(15,372)
Total Plant Studied	**$ 2,617,872,569**	**3.48%**	**$ 91,166,766**	**3.29%**	**$ 86,026,910**	**-0.20%**	**$ (5,139,856)**

As shown in this table, adopting the OUCC's proposed adjustments would reduce the Company's proposed annual depreciation accrual by $5.1 million.[4]

Q. Please summarize the primary factors affecting your proposed depreciation rates.

A. My proposed depreciation rates are driven by three primary adjustments: (1) removing contingency costs from CEI's demolition cost estimates; (2) adjusting the Company's proposed service lives for mass property accounts; and (3) adjusting the Company's proposed net salvage rates for mass property accounts. The estimated impacts of these issues on the OUCC's proposed adjustment to the depreciation accrual are summarized in the table below.

[4] *See* Attachments DJG-4 and DJG-5 for detailed rate comparisons and calculations; *see also* Attachment DJG-13 for remaining life calculations.

Figure 2:
Broad Issue Impacts

Issue	Impact	
1. Remove contingency costs	$1.6	million
2. Adjust service lives for several T&D accounts	$2.1	million
3. Adjust net salvage rates for several T&D accounts	$1.4	million
Total	**$5.1**	**million**

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.[5]

Figure 3:
Depreciation Accrual Comparison by Plant Function

		Company Proposal				OUCC Proposal			
Account No.	Description	Iowa Curve	Salvage Rate	Depr Rate	Annual Accrual	Iowa Curve	Salvage Rate	Depr Rate	Annual Accrual
	Transmission Plant								
353.00	STATION EQUIPMENT	R2 - 52	-5%	1.89%	3,661,549	S0.5 - 57	-1%	1.59%	3,090,329
355.00	POLES AND FIXTURES	S1.5 - 43	-25%	2.87%	6,292,583	S1.5 - 48	-25%	2.51%	5,496,734
356.00	OH CONDUCTORS AND DEVICES	R3 - 45	-10%	2.76%	3,596,500	R3 - 45	-7%	2.66%	3,469,214
	Distribution Plant								
362.00	STATION EQUIPMENT	S0.5 - 50	-5%	1.82%	3,296,218	L1 - 54	2%	1.54%	2,794,316
367.00	UG CONDUCTORS AND DEVICES	R3 - 55	-30%	2.08%	2,691,317	S1.5 - 65	-30%	1.76%	2,277,626
368.00	LINE TRANSFORMERS	S1.5 - 45	-5%	1.73%	1,641,093	S1.5 - 45	-3%	1.67%	1,580,915
369.00	SERVICES	R3 - 60	-100%	2.93%	2,701,252	R2.5 - 65	-63%	1.93%	1,780,838

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."[6] The *Lindheimer* Court also recognized that the

[5] *See also* Attachment DJG-3 (adjusted parameters highlighted).

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

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

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

Thus, the Commission must ultimately determine if CEI 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

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

[8] *Id*. at 169.

property groups.[9] In this case, I used the straight-line method, the average life procedure, the remaining life technique, and the broad group model; this system would be denoted as an "SL-AL-RL-BG" system. This depreciation system conforms to the legal standards set forth above and is commonly used by depreciation analysts in regulatory proceedings. I provide a more detailed discussion of depreciation system parameters, theories, and equations in Appendix A.

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

A. Yes. Mr. Spanos 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.

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.

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[9] Wolf & W. Chester Fitch, Depreciation Systems 70, 140 (Iowa State University Press 1994).

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 CEI provide demolition studies for its production units in this case?

A. Yes. The Company provided demolition studies conducted by Burns & McDonnell and sponsored by Company witness Jeffrey Kopp.[10]

Q. What is the total amount of demolition costs included in the accounts you analyzed?

A. For the production units I analyzed, CEI's proposed demolition cost estimates total $40.8 million.[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.

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[10] Petitioner's Exhibit No. 11, Direct Testimony of Jeffrey T. Kopp, Attachment JTK-2.

[11] *See* Attachment DJG-7.

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

A. As discussed in Mr. Kopp's testimony, CEI's demolition studies include contingency factors that increase direct costs by 20%.[12]

Q. Are these contingency costs directly tied to a known and measurable cost estimate?

A. No. By definition, contingency costs are associated with unknown and uncertain costs. As stated in Mr. Kopp's testimony: "For decommissioning projects, there is uncertainty associated with work conditions and how the work will be performed. There is also some uncertainty associated with estimating the quantities for decommissioning of facilities."[13]

Q. Do you believe ratepayers should pay for contingency costs?

A. No. The amount of future demolition costs is already unknown. It is not fair to current ratepayers to charge them with an additional cost on the basis that the original cost estimate is uncertain. To say otherwise implies that Burns & McDonnell is underestimating its base demolition costs by 20%, which would be a significant underestimation.

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 fairly and 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"

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[12] Kopp Direct, p. 12, line 11.

[13] *Id*. at p. 10, lines 29-31.

factors that might reduce costs, as it would be to shareholders to increase such costs. However, I believe the most fair and reasonable approach is to disallow contingency factors in either direction.

Q. Are you aware of any other cost estimates in a rate proceeding that are increased by 20% because they are unknown?

A. No.

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

A. Yes. However, the Commission is not bound by its prior decisions on this issue. In my opinion, charging customers 20% more than the estimated base demolition costs for a cost that is unknown on its face is poor ratemaking policy. I am not aware of comparable cost estimates in a rate proceeding where it is considered acceptable to significantly increase the cost by an arbitrary percentage on the sole basis that the cost is "unknown." The Commission should, accordingly, reconsider its stance and reject the proposed contingency cost adder to CEI's base demolition cost estimates or reduce the proposed percentage increase being added. The Commission approved including contingency in two relatively recent litigated rate cases, Cause No. 45235 (I&M) and Cause No. 45253 (DEI). In both cases, the OUCC advocated for removing contingency from the decommissioning study. In Cause No. 45235, the rebuttal to the OUCC's position mainly indicated that including contingency within the depreciation study is Commission precedent.[14] In Cause No. 45253, in his rebuttal testimony, Mr. Spanos refuted a proposal which is not an issue here and also

[14] Cause No. 45235, Rebuttal Testimony of Jason Cash, p. 7, line 13 to p. 8, line 11 (September 17, 2019).

relied solely on the premise that this inclusion follows Commission precedent.[15] In both cases, the Commission approved including contingency.[16] What was not included, either in rebuttal or in the Commission's decision, was a substantive response to the OUCC's arguments against including an arbitrary percentage denoted as contingency. The Commission found in Cause No. 45235 that I was "asking the Commission to disregard our prior acceptance of contingency."[17] That is what I am again asking in this case in the absence of CEI having shown its propriety, its fairness to ratepayers, and that 20% is other than arbitrary. 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 a contingency adder in the depreciation study.

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.[18]

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[15] Cause No. 45253, Rebuttal Testimony of John Spanos, p. 31, line 1 to p. 36, line 10 (December 4, 2019).

[16] Cause No. 45235, Final Order at 32 (March 11, 2020); Cause No. 45253, Final Order at 91 (June 29, 2020).

[17] Cause No. 45235, Final Order at 32.

[18] *See* Attachment DJG-7.

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.[19] The retirement rate method is ultimately used to develop an observed life table ("OLT"), which

[19] The "vintage" year refers to the year 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).

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.[20] 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."[21] 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.

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 indicates 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

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

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

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 the most reasonable Iowa curve is selected.

Q. Do you always select the mathematically best-fitting curve?

A. Not necessarily. Mathematical fitting is an important part of the curve-fitting process because it promotes objective, unbiased results. Nevertheless, while mathematical curve-fitting is important, it may not always yield the optimum result. Professional judgment may also be warranted for specific situations. For example, if there is insufficient historical data in a particular account and the OLT curve derived from that data is relatively short and flat, the mathematically "best" curve may be one with a very long average life. However, when there is sufficient data available, mathematical curve fitting should be used as part of an objective service life analysis.

Q. Should every portion of the OLT curve be given equal weight?

A. Not necessarily. Many analysts have observed that the points comprising the "tail end" of the OLT curve may often have less analytical value than other portions of the curve. In fact, "[p]oints at the end of the curve are often based on fewer exposures and may be given less weight than points based on larger samples. The weight placed on those points will depend on the size of the exposures."[22] In accordance with this standard, an analyst may decide to truncate the tail end of the OLT curve at a certain percent of initial exposures, such as one percent. Using this approach puts greater emphasis on the most valuable portions of the curve. For my analysis in this case, I not only considered the entirety of the OLT curve, but also conducted further analyses that involved fitting Iowa curves to the most significant part of the OLT curve for certain accounts. In other words, to verify the accuracy of my curve selection, I narrowed the focus of my additional calculation to consider approximately the top 99% of the "exposures" (i.e., dollars exposed to retirement) and to eliminate the tail end of the curve representing the bottom 1% of exposures for some accounts, if necessary.

Q. Generally, describe the differences between the Company's service life proposals and your service life proposals.

A. For each of the accounts to which I propose adjustments, the Company's proposed average service life, as estimated through an Iowa curve, is too short to provide the most reasonable mortality characteristics of the account. Generally, for the accounts in which I propose a longer service life, that proposal is based on the objective approach of choosing an Iowa curve that provides a better mathematical fit to the observed historical retirement pattern derived from the Company's plant data. The historical retirement data that comprises the OLT curves in each of the graphs below is based on the Company's actual data. For each of the accounts below, the Iowa curve I select results in a closer mathematical fit to the

[22] Wolf & W. Chester Fitch, Depreciation Systems 46 (Iowa State University Press 1994).

retirement pattern derived from the Company's actual data, as seen in the OLT curve from each account.

Q. In your opinion, does Mr. Spanos's curve selection process materially differ from your process?

A. No, it does not appear so. Mr. Spanos appears to be primarily relying on the Company's historical retirement data in his curve selection process, which is similar to my approach. This can be seen in the graphs below where the Iowa curve selected by Mr. Spanos generally follows the pattern of the OLT curves in each account. It is not clear exactly how Mr. Spanos's judgement and other subjective, non-quantifiable factors influenced his curve selection process. Thus, the Commission should focus primarily on the statistical data when assessing the reasonableness of the proposed service lives in this case.

Q. Please describe how you incorporated professional judgement into your analytical process.

A. Primarily, service lives should be based on empirical evidence. The best empirical evidence to support a service life estimate is an adequate amount of aged retirement data, which are ultimately used to create observed survivor curves. However, strictly relying on mathematical analyses of the data without incorporating an appropriate amount of professional judgment can run the risk of leading to unreasonable results depending on the circumstance. In that regard, as part of my analyses I considered all of the evidence presented in the Company's testimony, depreciation study, and discovery responses that describe factors outside of the aged retirement data. For example, I consider a reasonable range of service lives that are recommended and approved for other utilities and similar industry statistics.

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

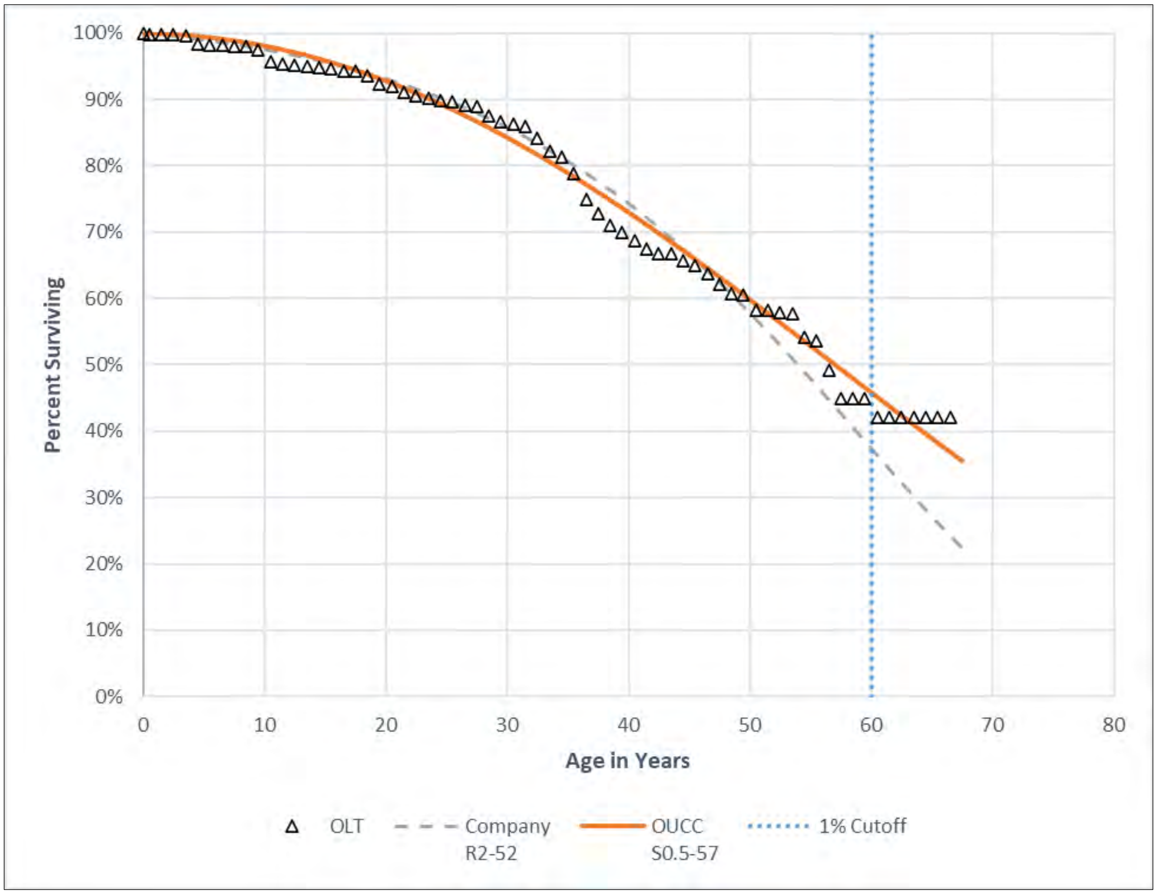
A. Yes. I recommend adjusting CEI's proposed service lives for five mass property accounts. These accounts are discussed below.

1. <u>Account 353 – Transmission Station Equipment</u>

Q. Please describe your service life estimate for Account 353 and compare it with the Company's estimate.

A. The OLT curve derived from the Company's aged plant data for this account is presented in the graph below. The graph also shows the Iowa curves Mr. Spanos and I selected to represent the average remaining life of the assets in this account. For this account, Mr. Spanos selected the R2-52 Iowa curve, and I selected the S0.5-57 Iowa curve. Both of these curves are shown in the graph below with the OLT curve.

Figure 4:
Account 353 – Transmission 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 appears to provide a closer fit to the observed data throughout most age intervals, though both curves are relatively close. The vertical dotted line in the graph represents the truncation point, based on the benchmark discussed above, in which the age intervals associated with less than 1% of the beginning dollars exposed to retirement would be excluded due to statistical irrelevance. For this particular account, the truncation line does not have a material impact on the analysis. Mathematical curve fitting techniques can be used 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. Professional judgment is also used to ensure the selected Iowa curve is not unreasonable based on industry norms and the range of service lives typically observed, recommended, and adopted for other utilities. 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 0.0430, and the SSD between the S0.5-57 Iowa curve I selected and the truncated OLT curve is 0.0204, which means it results in the closer fit.[23]

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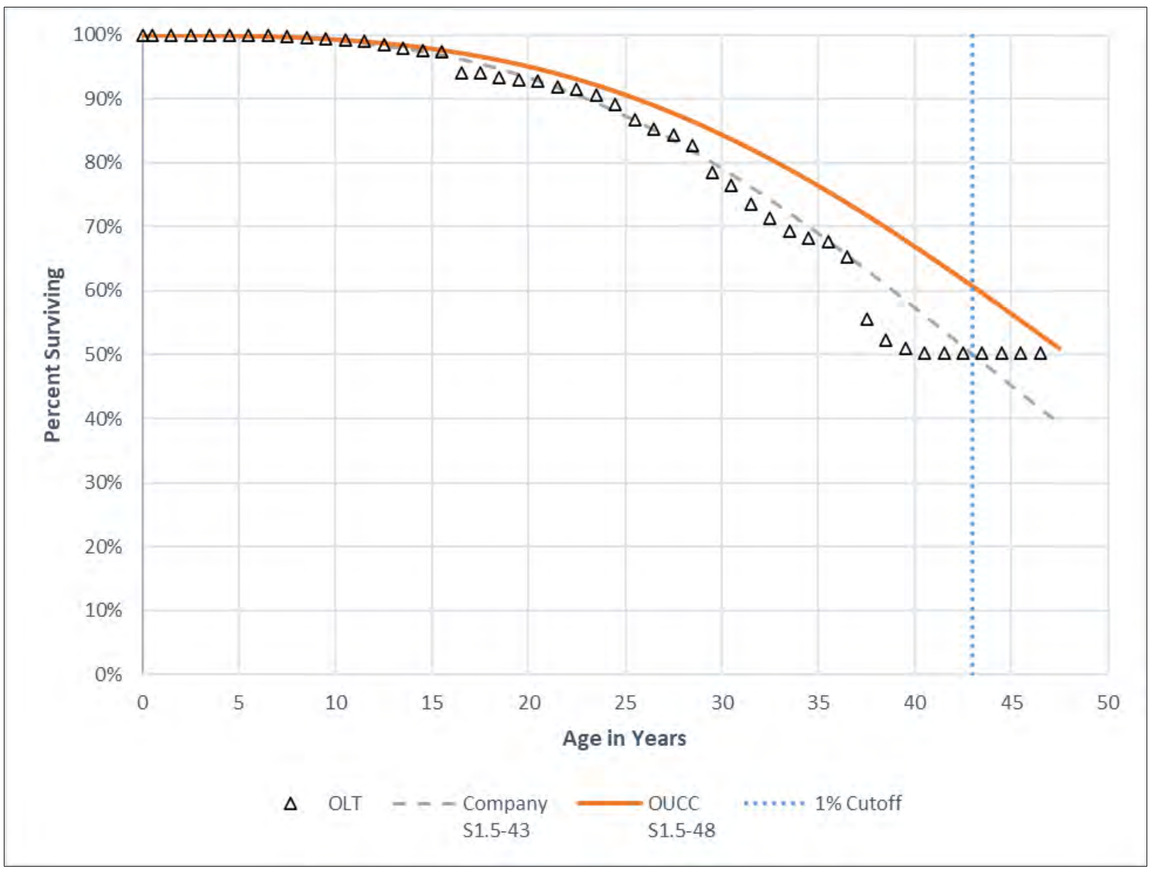
[23] Attachment DJG-8.

2. Account 355 – Poles and Fixtures

Q. Please describe your service life estimate for Account 355 and compare it with the Company's estimate.

A. For this account, Mr. Spanos selected the S1.5-43 curve, and I selected the S1.5-48 curve. Thus, both Iowa curves have the same curve shape and a five-year difference in average life. Both of these Iowa curves are shown in the following graph with the OLT curve.

Figure 5:
Account 355 – Poles and Fixtures



As shown in this graph, the S1.5-43 Iowa curve results in a fairly close fit to the historical retirement data, and as with Account 353 discussed above, the truncated data would not have had a material impact on the analysis.

Q. How does a 43-year average life compare with the average lives observed among other utilities in the industry for Account 355?

A. An average life of only 43 years is notably shorter than the average lives observed among other utilities for this account. According to industry data Gannett Fleming provided in discovery, the average life for Account 355 is closer to 56 years, which is significantly longer than 43 years, particularly given the large sample size of data provided.[24] In addition, it is my understanding the database Gannett Fleming provided represents their firm's recommended service lives by account in other utility proceedings – not necessarily the service lives that were ultimately adopted by the regulatory body. Thus, to the extent utility commissions have adopted any intervening party's position in which a longer service life was proposed, the average authorized lives for each account would be longer than those provided in the data base. Thus, the average *authorized* life for Account 355 is likely longer than 56 years.

Q. Are you suggesting that CEI's adopted service lives should be based on industry averages?

A. No.[25] I believe comparable analyses can be considered as part of the overall analytical process. I believe utility-specific aged data (to the extent available) should be the primary factor to consider when estimating service lives. However, comparable analyses should not be entirely ignored, particularly when there is a notably large discrepancy between the

[24] Attachment DJG-14: CEI's Response to OUCC 11.1.

[25] Exhibit DJG-9.

indicated service life derived from data analysis and the average life indicated by comparable analyses.

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

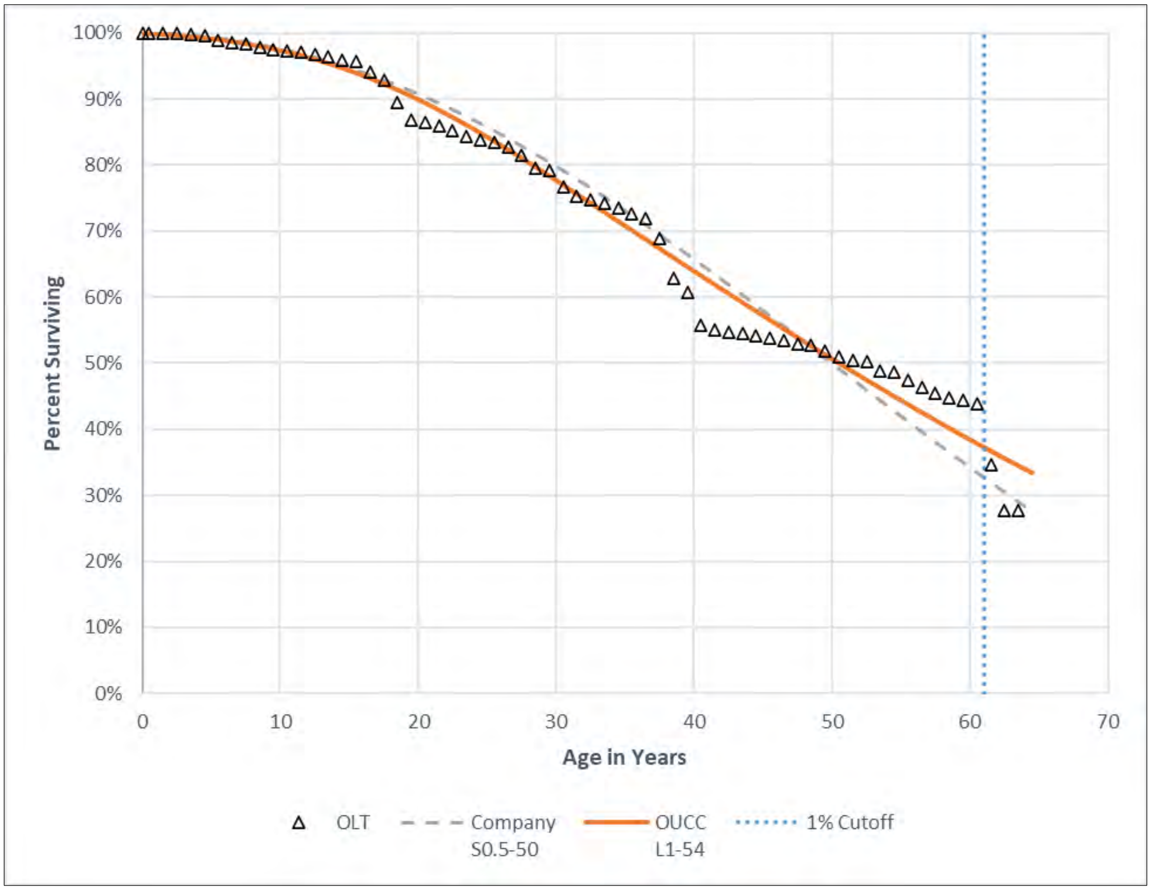
A. No. As discussed above, my recommendation takes into account the statistical data, as well as comparable industry data, and the overall depreciation rate increases proposed by the Company. In my opinion, a 48-year average life would be a reasonable outcome at this time in consideration of all these factors.

3. <u>Account 362 – Distribution Station Equipment</u>

Q. Please describe your service life estimate for Account 362 and compare it with the Company's estimate.

A. For this account, Mr. Spanos selected the S0.5-50 curve, and I selected the L1-54 curve. Both of these Iowa curves are shown in the following graph with the OLT curve.

Figure 6:
Account 362 – Distribution Station Equipment



As shown in this graph, both Iowa curves result in close fits to the OLT curve. Since no meaningful evidence was provided beyond the statistical data to support the Company's proposed service life for this account, mathematical curve fitting could be used to help select the better fitting curve.

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

A. Yes. For this account, the SSD between the Company's curve and the truncated OLT curve is 0.0936, and the SSD between the L1-54 curve I selected and the truncated OLT curve is

0.0444, which means it results in the closer fit.[26] In addition, given the substantial increase the Company proposed in this case, if CEI has not made a convincing showing that its proposed rates are not excessive, then a slightly longer proposed life that is directly supported by the evidence would result in a reasonable depreciation rate, particularly under this circumstance.

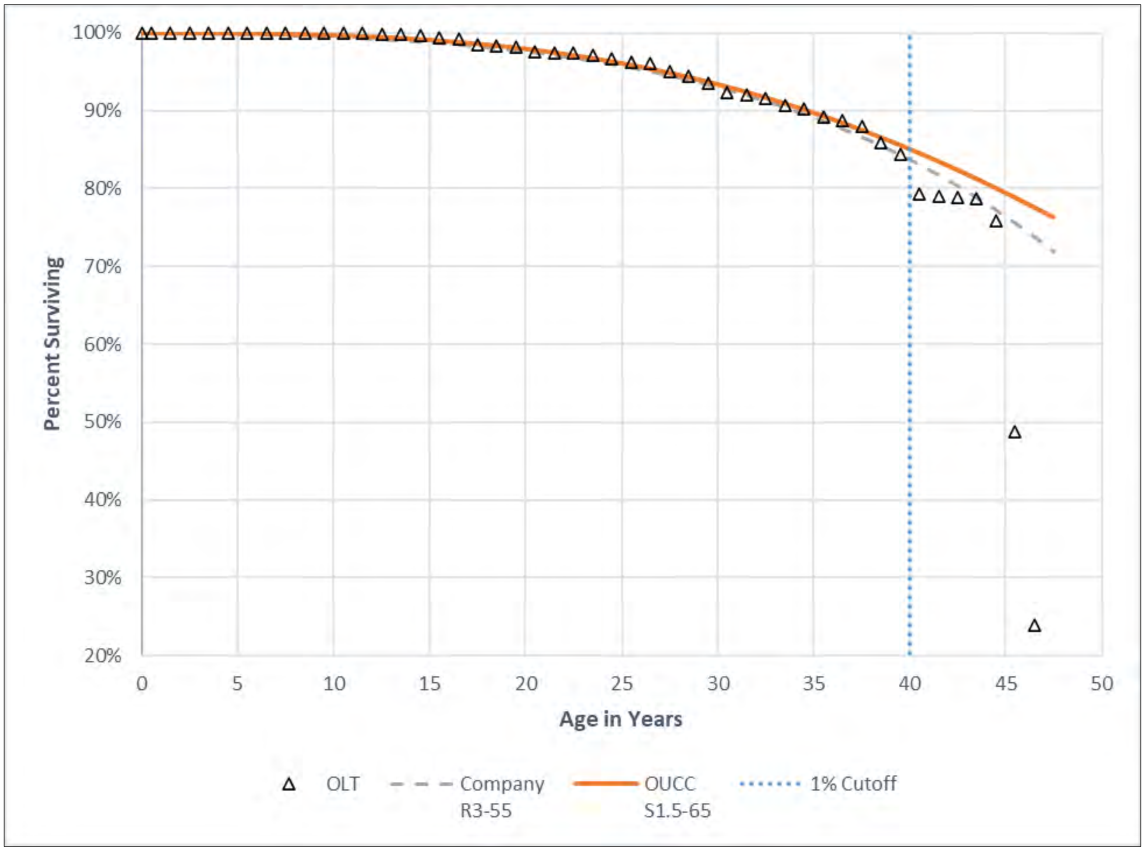
4. <u>Account 367 – Underground Conductors and Devices</u>

Q. Please describe your service life estimate for Account 367 and compare it with the Company's estimate.

A. For this account, Mr. Spanos selected the R3-55 curve, and I selected the S1.5-65 curve. Both of these Iowa curves are shown in the following graph with the OLT curve.

[26] Attachment DJG-10.

Figure 7:
Account 367 – Underground Conductors and Devices



The OLT curve for this account demonstrates an example of why it can be useful to use a truncation point to limit noisy data towards the tail end of the curve. In this case, the truncation benchmark I typically rely on results in the vertical truncation line being drawn at the point where the OLT curve visually begins to become erratic and unstable; the percent surviving then drops more than 60% in just a few age intervals. As more historical retirement data is accumulated over time, better indications of a retirement dispersion pattern can be developed. At this time, both of the selected Iowa curves result in relatively close fits to the observed data.

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

A. Yes, when measuring the truncated OLT curve. For this account, the SSD between the Company's curve and the truncated OLT curve is 0.0013, and the SSD between the S1.5-65 curve I selected and the truncated OLT curve is 0.0005, which means it results in the closer fit.[27]

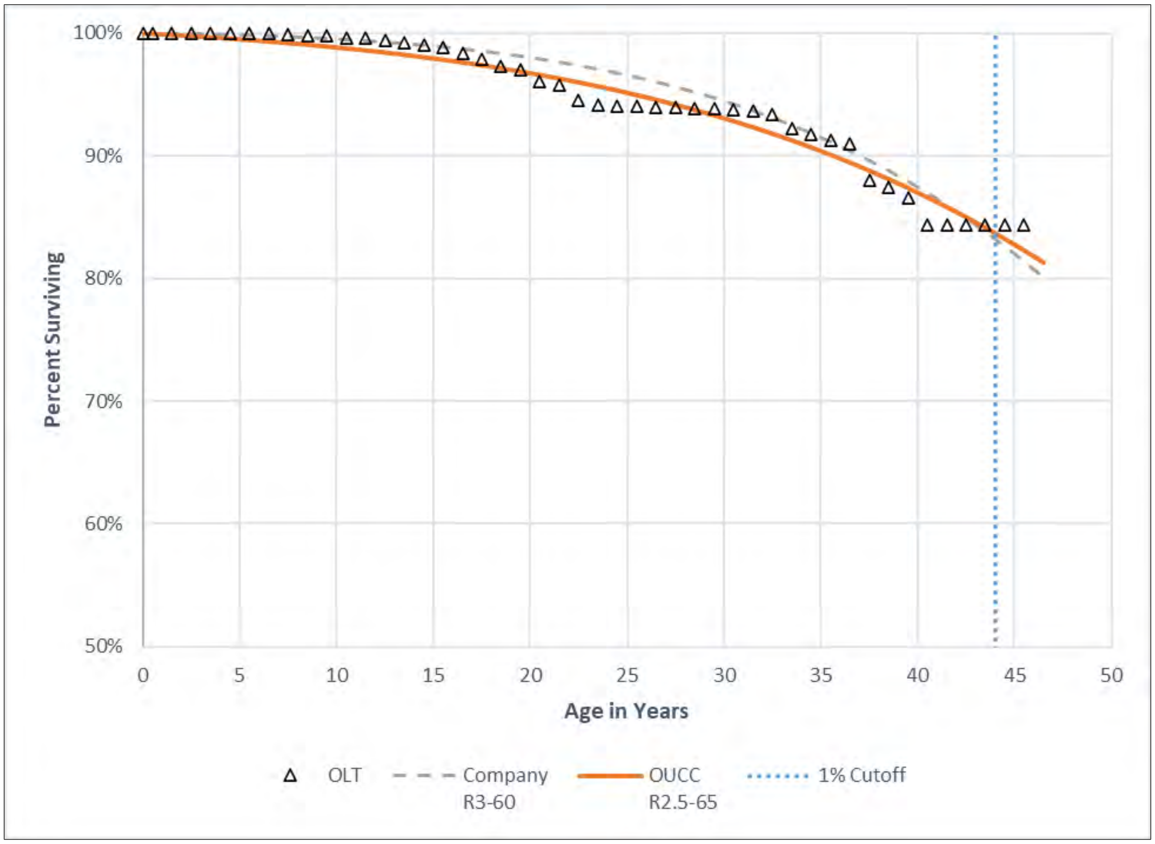
5. <u>Account 369 – Services</u>

Q. Please describe your service life estimate for Account 369 and compare it with the Company's estimate.

A. For this account, Mr. Spanos selected the R3-60 curve, and I selected the R2.5-65 curve. Both of these Iowa curves are shown in the following graph with the OLT curve.

[27] Attachment DJG-11.

Figure 8:
Account 369 – Services



As with Account 367 discussed above, both selected Iowa curves provide close fits to the observed data displayed in the OLT curve. As more historical retirement data is accumulated over time, better indications of a retirement dispersion pattern can be developed. Mathematical curve fitting can assist regarding which curve should ultimately be selected since there is no meaningful evidence outside the statistical data to support the Company's proposed service life.

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

A. Yes, when measuring the truncated OLT curve. For this account, the SSD between the Company's curve and the truncated OLT curve is 0.0067, and the SSD between the R2-65 curve I selected and the truncated OLT curve is 0.0038, which means it results in the closer fit.[28]

VI. NET SALVAGE ANALYSIS

Q. Please describe the concept of net salvage.

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

[28] Attachment DJG-12.

Q. Please summarize your proposed adjustments to the net salvage rates proposed by Mr. Spanos.

A. For most accounts in the depreciation study, I am not proposing any adjustments to the net salvage rates proposed in the depreciation study. However, for five of CEI's mass property accounts, I propose adjustments that are based on the historical net salvage experience in these accounts and result in reasonable overall depreciation rates. A comparison of the proposed net salvage rates for the accounts at issue is shown in the following figure.

Figure 9:
Net Salvage Comparison

Account No.	Description	CEI Net Salvage	OUCC Net Salvage
	Transmission Plant		
353.00	STATION EQUIPMENT	-5%	-1%
356.00	OH CONDUCTORS AND DEVICES	-10%	-7%
	Distribution Plant		
362.00	STATION EQUIPMENT	-5%	2%
368.00	LINE TRANSFORMERS	-5%	-3%
369.00	SERVICES	-100%	-63%

Q. Please describe the bases for your proposed net salvage rates.

A. The depreciation study includes summaries of historical net salvage experience for each account. Net salvage analysis can include looking at historical net salvage rates over different periods of time in order to assess probable future net salvage rates. For Accounts 353, 356, and 368, my proposed net salvage rate is equal to the total historical net salvage rates for each account. One benefit of taking a long-term historical average is an increased sample size of data and not allowing the results to be unduly influenced by more volatile rates during any shorter period of time. For Accounts 362 and 369, my proposed net salvage rates are equivalent to the most recent five years of historical net salvage experience. One benefit of using the most recent five years of experience is that the data analyzed is more recent and, thus, may provide more accurate indications of net salvage rates going forward.

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 method of allocation; 2) a procedure for applying the method of allocation to a group of property; 3) a technique for applying the depreciation rate; and 4) a model for analyzing the characteristics of vintage groups comprising a continuous property group.[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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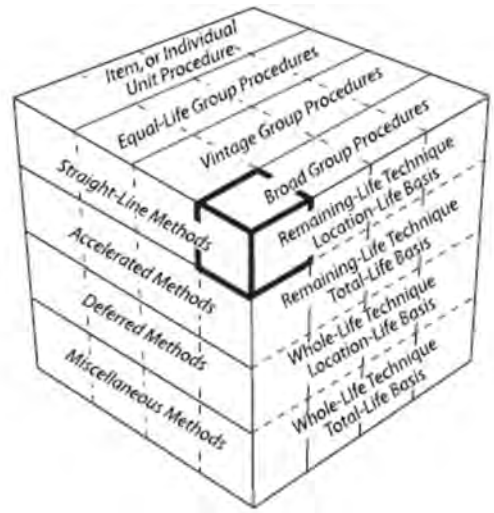
[1] Wolf & W. Chester Fitch, Depreciation Systems 69-70 (Iowa State University Press 1994).

[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. Allocation Methods

The "method" refers to the pattern of depreciation in relation to the accounting periods. The method most commonly used in the regulatory context is the "straight-line method"—a type of age-life method in which the depreciable cost of plant is charged in equal amounts to each accounting period over the service life of plant.[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. Grouping Procedures

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

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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]

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[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. Analysis Model

The fourth parameter of a depreciation system, the "model," relates to the way of viewing the life and salvage characteristics of the vintage groups that have been combined to form a continuous property group for depreciation purposes.[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.[22] 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.[23] 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.[24] They generalized the 65 curves into 13 survivor curve types and published their results in *Bulletin 103: Life Characteristics of*

[22] Wolf *supra* n. 1, at 276.

[23] *Id*. at 23.

[24] *Id*. at 34.

Physical Property. The 13 type curves were designed to be used as valuable aids in forecasting probable future service lives of industrial property. Over the next few years, Winfrey continued gathering additional data, particularly from public utility property and expanded the examined property groups from 65 to 176.[25] 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."[26] 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.[27] 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

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[25] *Id*.

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

[27] 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).

develop the original Iowa curves, except that Russo studied industrial property in service several decades after Winfrey published the original Iowa curves. Russo drew three major conclusions from his research:[28]

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.[29]

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

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

[29] *Id*.

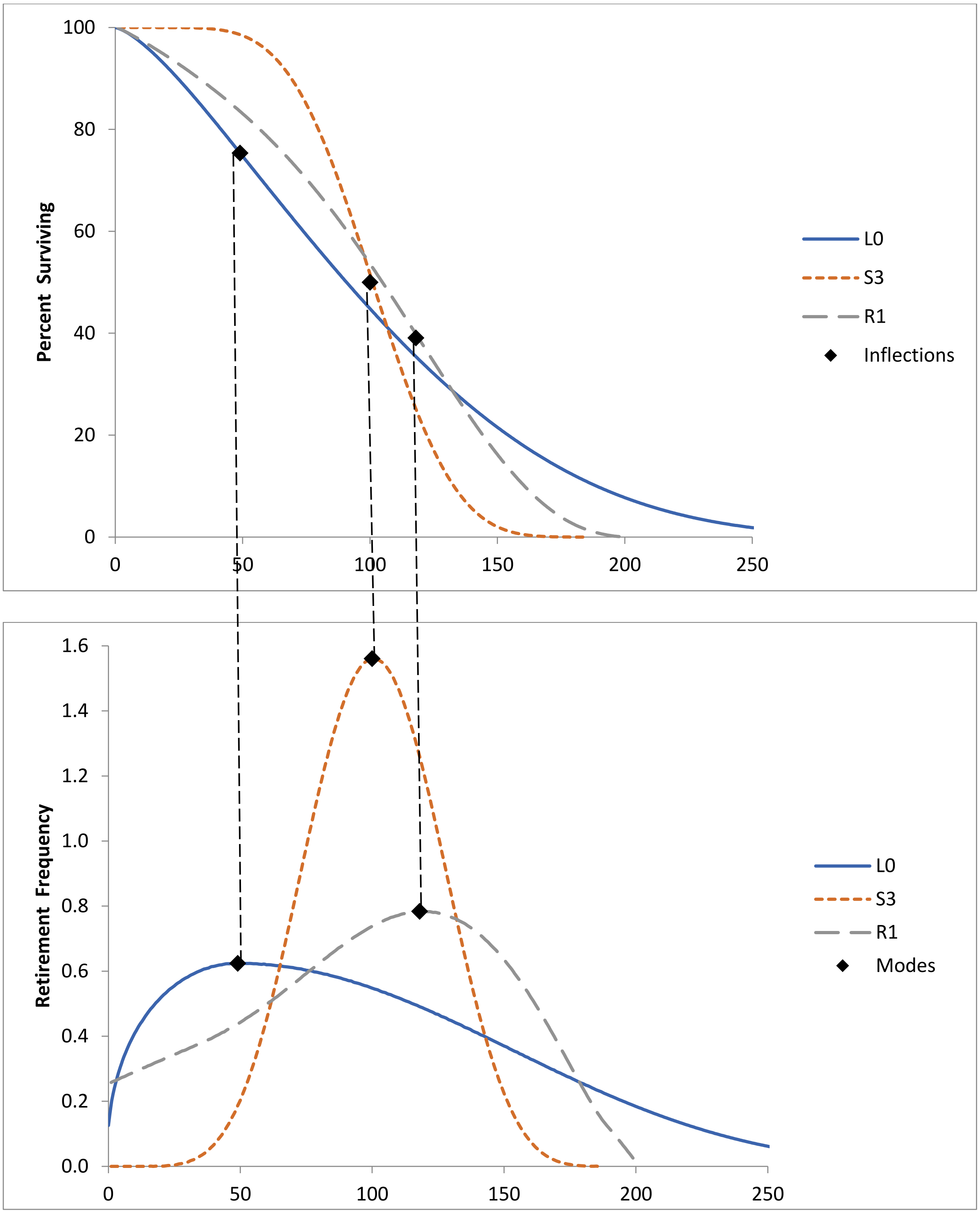
2. Classification

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

The classification of the survivor curves was made according to whether the mode of the retirement frequency curves was to the left, to the right, or coincident with average service life. There are three modal "families" of curves: six left modal curves (L0, L1, L2, L3, L4, L5); five right modal curves (R1, R2, R3, R4, R5); and seven symmetrical curves (S0, S1, S2, S3, S4, S5, S6).[30] 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.

[30] 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 2:
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:

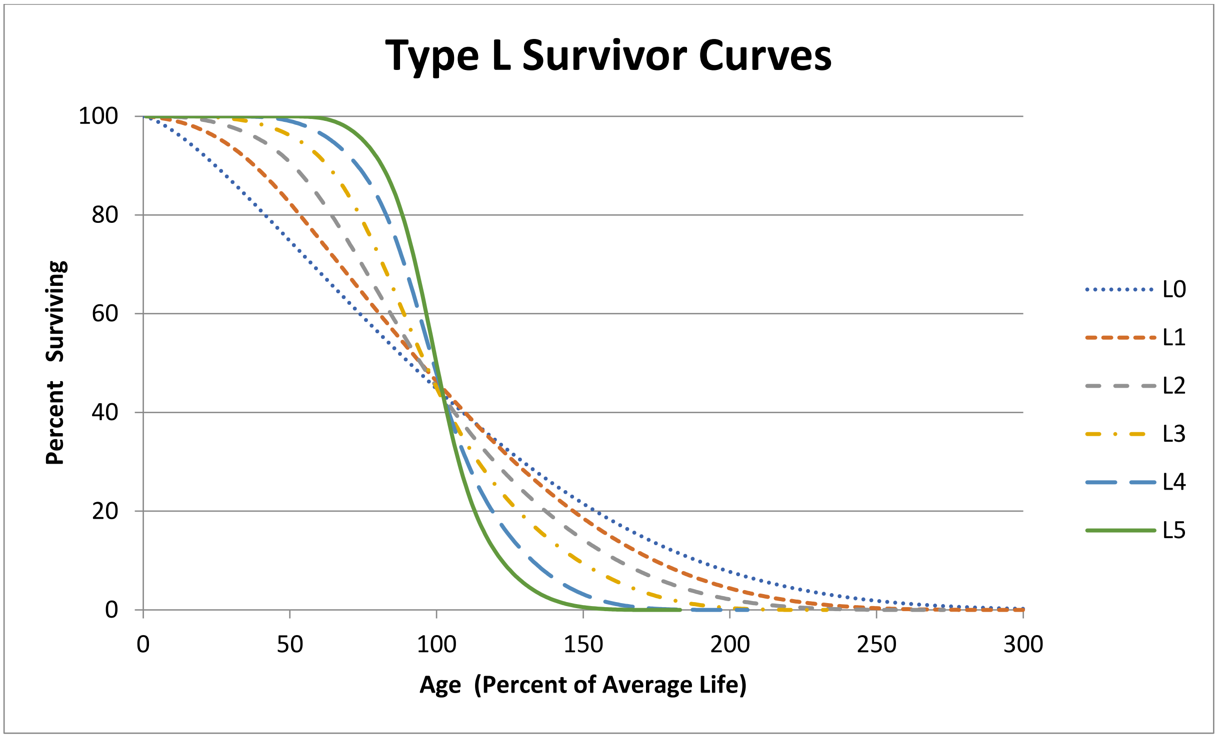
> Since the location of a particular survivor on a graph is affected by both its span in years and the shape of the curve, it is difficult to classify a group of curves unless one of these variables can be controlled. This is easily done by expressing the age in percent of average life."[31]

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.

[31] Winfrey *supra* n. 26, at 60.

Figure 3:
Type L Survivor and Frequency Curves



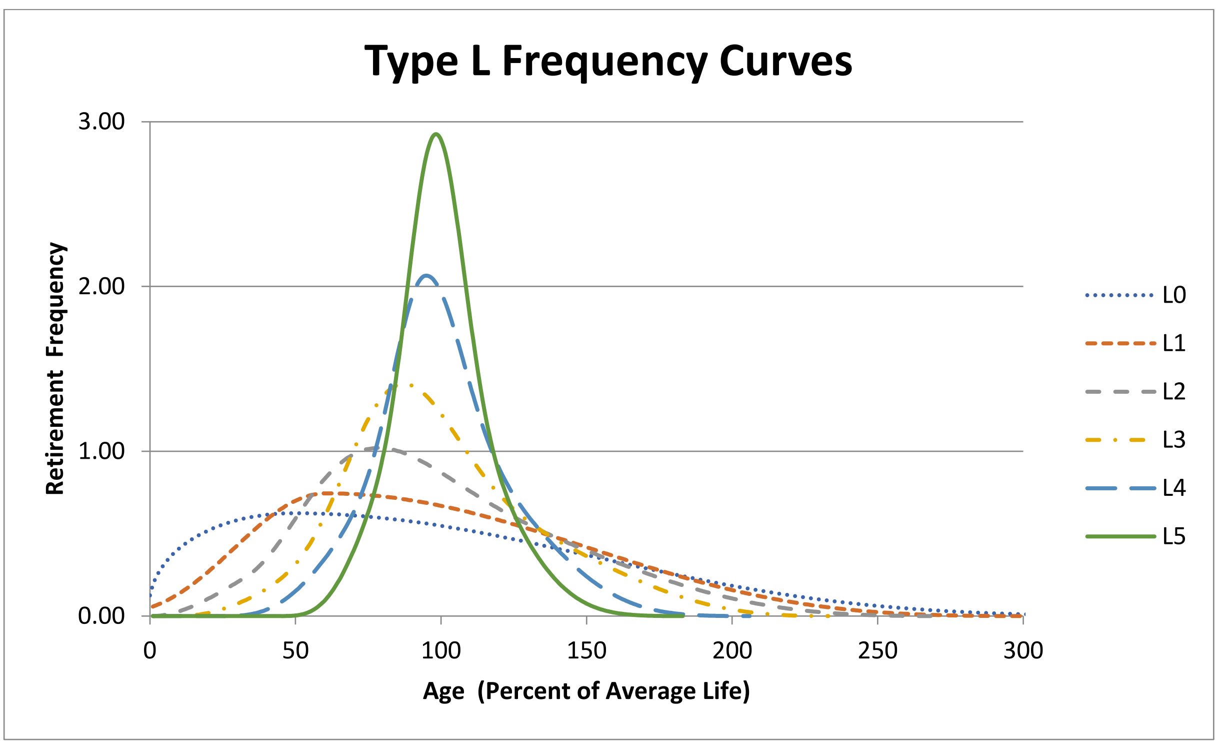
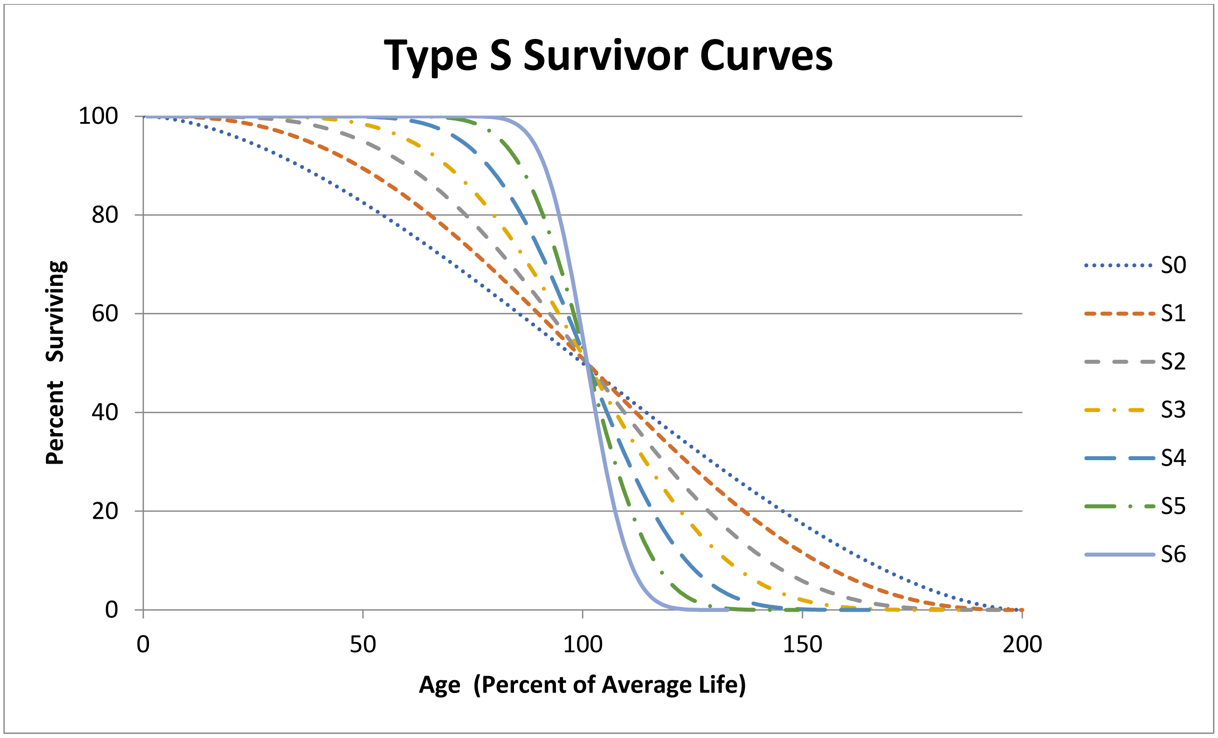


Figure 4:
Type S Survivor and Frequency Curves



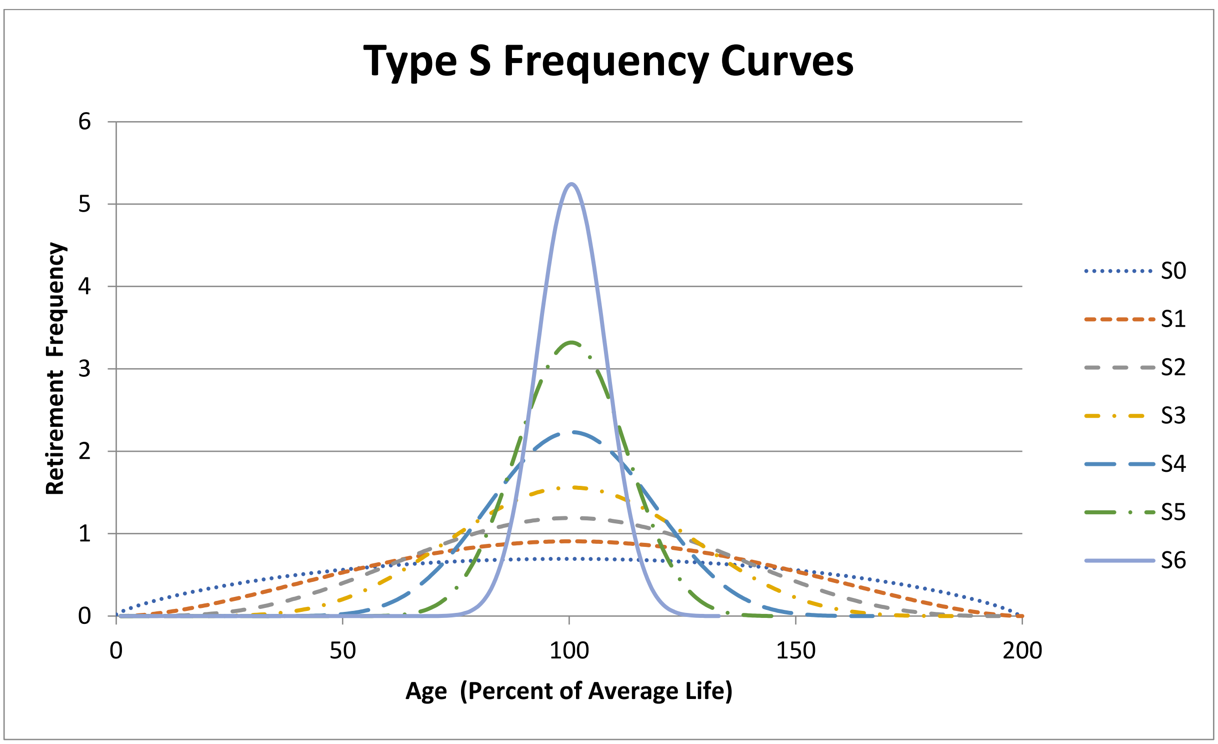
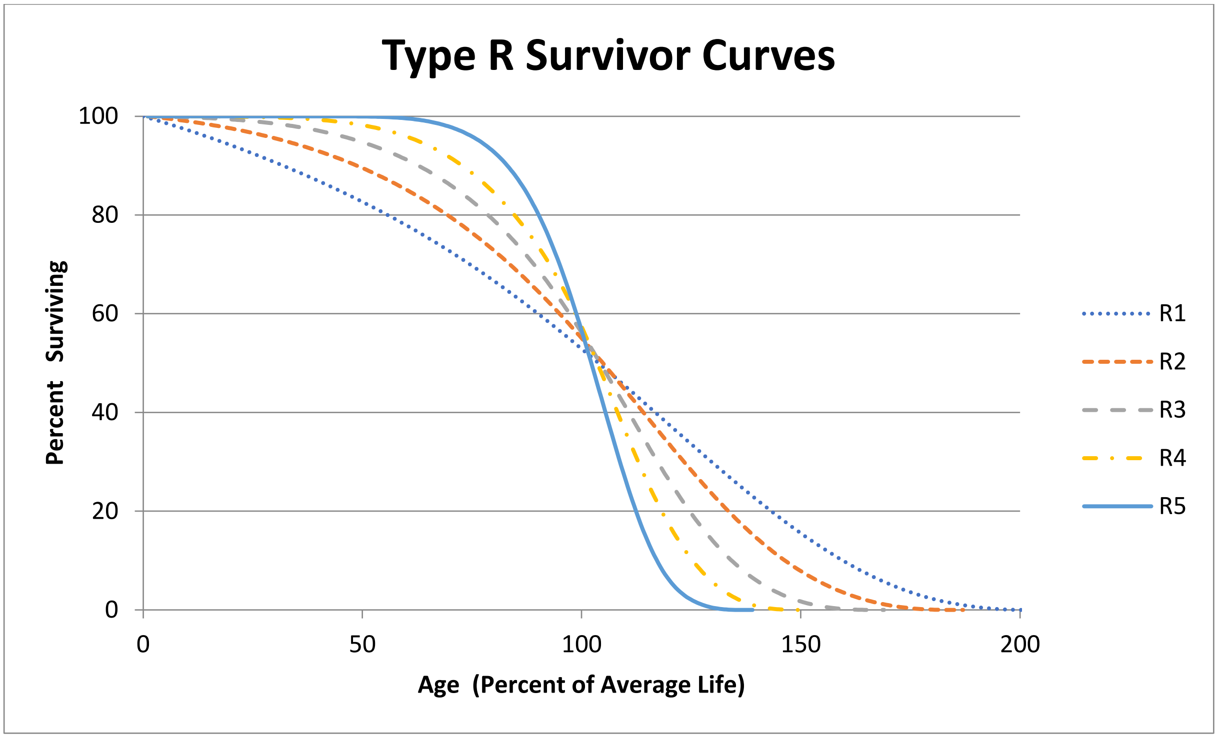
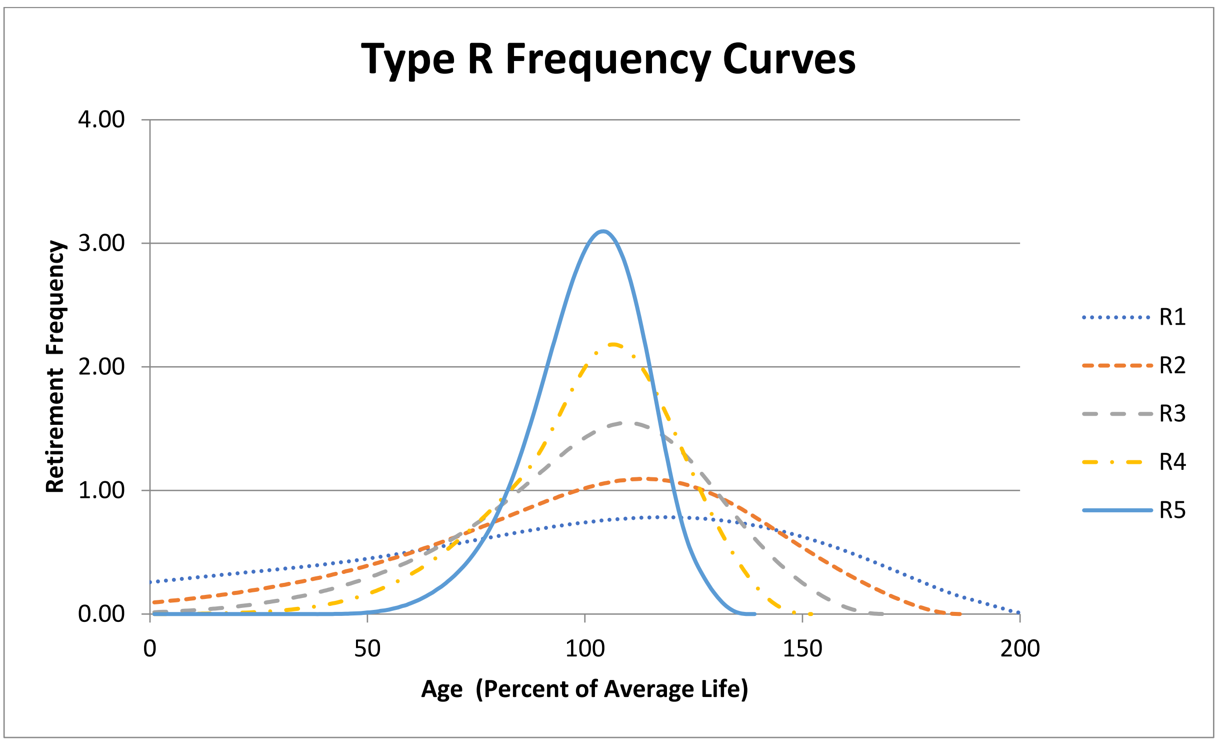


Figure 5:
Type R Survivor and Frequency Curves





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.[32]

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:[33]

Equation 4:
Average Life

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

Thus, average life may not be determined without a complete survivor curve. Many property groups being analyzed will not have experienced full retirement. This 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).

[32] 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.

[33] NARUC *supra* n. 4, at 71.

Realized life is similar to average life, except that realized life is the average years of service experienced to date from the vintage's original installations.[34] 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.[35] Remaining life is sometimes referred to as "average remaining life" and "life expectancy." To calculate average remaining life at age x, the area under the estimated future portion of the survivor curve is divided by the percent surviving at age x (denoted S_X). Thus, the average remaining life formula is:

Equation 5:
Average Remaining Life

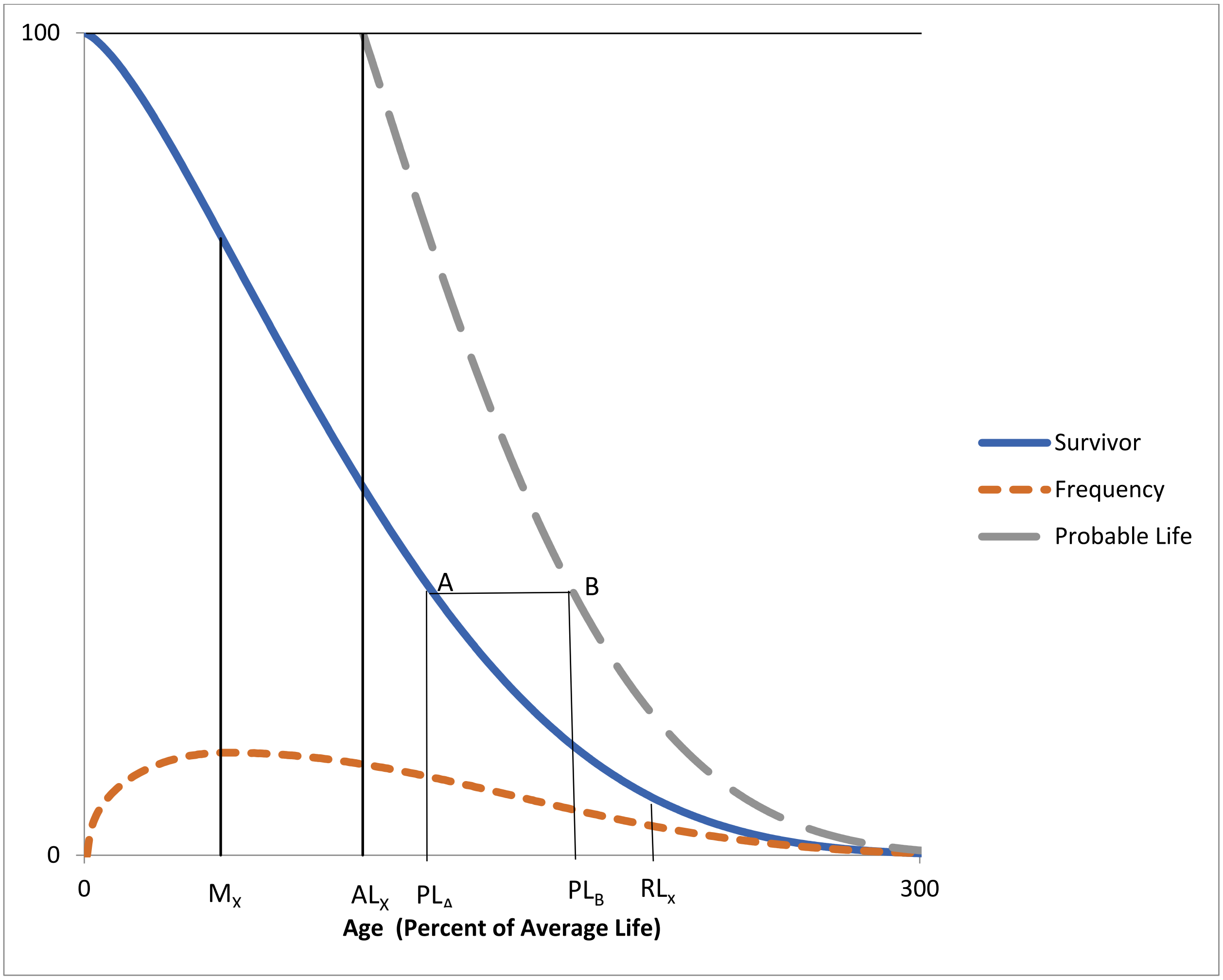
$$Average\ Remaining\ Life\ = \frac{Area\ Under\ Survivor\ Curve\ from\ Age\ x\ to\ Max\ Life}{S_X}$$

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

[34] *Id*. at 73.

[35] *Id*. at 74.

Figure 6:
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.[36] 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

[36] 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.[37]

Figure 7:
Forces of Retirement

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

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

[37] NARUC *supra* n. 4, at 14-15.

units; 2) the association of costs with such units; and 3) the dates of installation and removal of plant. Since actuarial analysis includes the examination of historical data to forecast future retirements, the historical data used in the analysis should not contain events that are anomalous or unlikely to recur.[38] Historical data is used in the retirement rate actuarial method, which is discussed further below.

The Retirement Rate Method

There are several systematic actuarial methods that use historical data to calculate observed survivor curves for property groups. Of these methods, the retirement rate method is superior, and is widely employed by depreciation analysts.[39] 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

[38] *Id*. at 112–13.

[39] 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.[40] 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 8:
Exposure Matrix

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	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	

[40] 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 9:
Retirement Matrix

	Experience Years									
	Retirements During the Year (000's)									
Placement Years	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.[41] Adoption of the half-year convention leads to age intervals of 0–0.5 years, 0.5–1.5 years, etc., as shown in the matrices.

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

[41] Wolf *supra* n. 1, at 22.

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.

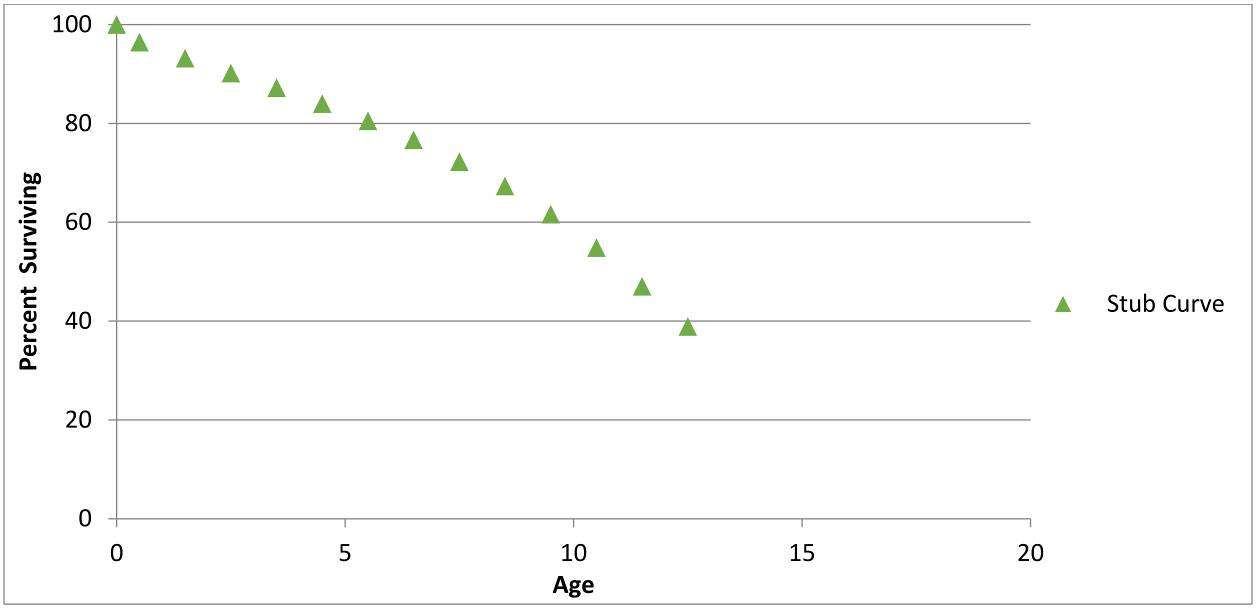
Figure 10:
Observed Life Table

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).

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

Figure 11:
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.[42] There are three primary benefits of using bands in depreciation analysis:

[42] NARUC *supra* n. 4, at 113.

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.[43]

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.

Figure 12:
Placement Bands

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

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

[43] *Id*.

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.[44] 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. 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.[45]

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.

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[44] Wolf *supra* n. 1, at 182.

[45] NARUC *supra* n. 4, at 114.

Figure 13:
Experience 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	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 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.[46] 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

[46] *Id*.

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 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.

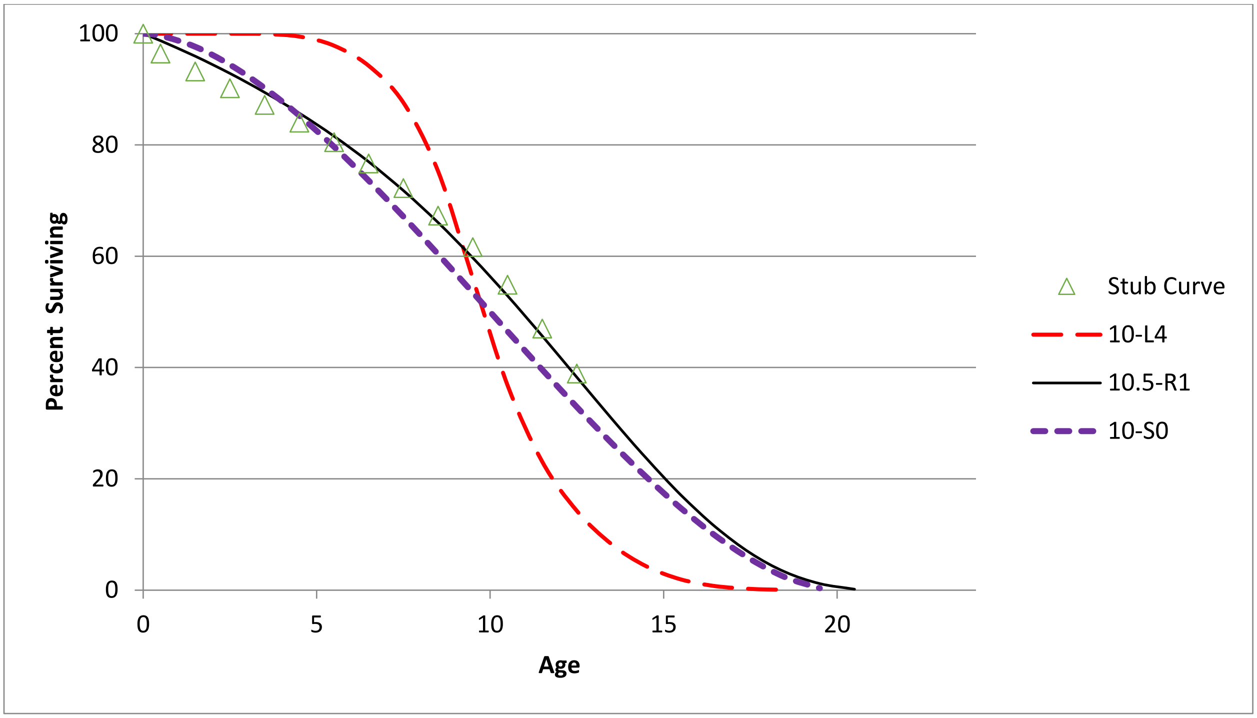
Curve Fitting

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."[47]

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.

[47] Wolf *supra* n. 1, at 46 (22 curves includes Winfrey's 18 original curves plus Cowles's four "O" type curves).

Figure 14:
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.[48]

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."[49]

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.

---

[48] Wolf *supra* n. 1, at 47.

[49] *Id*. at 48.

Figure 15:
Mathematical Fitting

Age Interval	Stub Curve	Iowa Curves 10-L4	Iowa Curves 10-S0	Iowa Curves 10.5-R1	Squared Differences 10-L4	Squared Differences 10-S0	Squared Differences 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**

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

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Provide expert analysis and testimony specializing in depreciation and cost of capital issues for clients in utility regulatory proceedings.

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

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Managing Member — 2009 – 2011
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Adjunct Instructor – "Ethics in Leadership"

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

PROFESSIONAL ASSOCIATIONS

Oklahoma Bar Association — 2007 – Present

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

Society of Utility Regulatory Financial Analysts — 2014 – Present

Utility Regulatory Proceedings

Regulatory Agency	Utility Applicant	Docket Number	Issues Addressed	Parties Represented
Maryland Public Service Commission	Washington Gas Light Company	9704	Cost of capital, awarded rate of return, capital structure	Maryland Office of People's Counsel
Delaware Public Service Commission	Veolia Water Delaware Inc.	23-0598	Cost of capital, awarded rate of return, capital structure	Division of the Public Advocate
Connecticut Public Utilities Regulatory Authority	United Illuminating Company	22-08-08	Depreciation rates, service lives, net salvage	PURA Staff
Public Utility Commission of Texas	Southwestern Public Service Company	PUC 54634	Depreciation rates, service lives, net salvage	Alliance of Xcel Municipalities
Railroad Commission of Texas	SiEnergy, LP	OS-23-00013504	Depreciation rates, service lives, net salvage	Texas municipal intervenor group
Pennsylvania Public Utility Commission	Aqua Pennsylvania, Inc.	A-2022-3034143	Fair market value review	Pennsylvania Office of Consumer Advocate
Wyoming Public Service Commission	Rocky Mountain Power	20000-633-ER-23	Cost of capital and authorized rate of return	Wyoming Industrial Energy Consumers
Maryland Public Service Commission	Potomac Electric Power Company	9702	Depreciation rates, service lives, net salvage	Maryland Office of People's Counsel
Public Utilities Commission of Nevada	Nevada Power Company d/b/a NV Energy	23-06007 23-06008	Depreciation rates, service lives, net salvage	Bureau of Consumer Protection
Public Utilities Commission of Ohio	Northeast Ohio Natural Gas Corp.	23-0154-GA-AIR	Cost of capital, awarded rate of return, capital structure	Office of the Ohio Consumers' Counsel
New York State Public Service Commission	The Brooklyn Untion Gas Company and Keyspan Gas East Corporation d/b/a Nation Grid	23-G-0225 23-G-0226	Depreciation rates, service lives, net salvage, depreciation reserve	The City of New York
Idaho Public Utilities Commission	Idaho Power Company	IPC-E-23-11	Cost of capital, awarded rate of return, capital structure	Micron Technology, Inc.
Indiana Utility Regulatory Commission	Indiana Michigan Power Company	45933	Depreciation rates, service lives, net salvage	Indiana Office of Utility Consumer Counselor
Massachusetts Department of Public Utilities	Fitchburg Gas and Electric Company d/b/a Unitil	D.P.U. 23-80; D.P.U. 23-81	Depreciation rates, service lives, net salvage	Massachusetts Office of the Attorney General, Office of Ratepayer Advocacy
Kansas Corporation Commission	Evergy Kansas Central, Evergy Kansas South, and Evergy Metro	23-EKCE-775-RTS	Depreciation rates, service lives, net salvage	The Citizens' Utility Ratepayer Board

Utility Regulatory Proceedings

Regulatory Agency	Utility Applicant	Docket Number	Issues Addressed	Parties Represented
Delaware Public Service Commission	Delmarva Power & Light Company	22-0897	Cost of capital, awarded rate of return, capital structure	Division of the Public Advocate
Connecticut Public Utilities Regulatory Authority	Connecticut Water Company	23-08-32	Depreciation rates, service lives, net salvage	PURA Staff
Connecticut Public Utilities Regulatory Authority	Connecticut Natural Gas Corporation and The Southern Connecticut Gas Company	23-11-02	Depreciation rates, service lives, net salvage	PURA Staff
Railroad Commission of Texas	Atmos Pipeline – Texas	OS-23-00013758	Depreciation rates, service lives, net salvage	Atmos Texas Municipalities
Wyoming Public Service Commission	Black Hills Wyoming Gas	30026-78-GR-23	Depreciation rates, service lives, net salvage	Wyoming Office of Consumer Advocate
Indiana Utility Regulatory Commission	Indianapolis Power & Light Company d/b/a AES Indiana	45911	Depreciation rates, service lives, net salvage	Indiana Office of Utility Consumer Counselor
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

Utility Regulatory Proceedings

Regulatory Agency	Utility Applicant	Docket Number	Issues Addressed	Parties Represented
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
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

Utility Regulatory Proceedings

Regulatory Agency	Utility Applicant	Docket Number	Issues Addressed	Parties Represented
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
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
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

Utility Regulatory Proceedings

Regulatory Agency	Utility Applicant	Docket Number	Issues Addressed	Parties Represented
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
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

Utility Regulatory Proceedings

Regulatory Agency	Utility Applicant	Docket Number	Issues Addressed	Parties Represented
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
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

Utility Regulatory Proceedings

Regulatory Agency	Utility Applicant	Docket Number	Issues Addressed	Parties Represented
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
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

Utility Regulatory Proceedings

Regulatory Agency	Utility Applicant	Docket Number	Issues Addressed	Parties Represented
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
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

Utility Regulatory Proceedings

Regulatory Agency	Utility Applicant	Docket Number	Issues Addressed	Parties Represented
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
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 Rate and Accrual Adjustment

Plant Function	Plant Balance 12/31/2022	Company Proposal Rate	Company Proposal Accrual	OUCC Proposal Rate	OUCC Proposal Accrual	OUCC Adjustment Rate	OUCC Adjustment Accrual
Steam Production	$ 838,522,754	4.35%	$ 36,464,420	4.16%	$ 34,920,331	-0.18%	$ (1,544,089)
Other Production	88,341,774	2.64%	2,334,143	2.42%	2,137,387	-0.22%	(196,756)
Transmission	583,090,045	2.40%	13,973,528	2.14%	12,479,226	-0.26%	(1,494,302)
Distribution	1,041,105,665	3.32%	34,568,544	3.14%	32,679,207	-0.18%	(1,889,337)
General	66,812,331	5.73%	3,826,131	5.70%	3,810,759	-0.02%	(15,372)
Total Plant Studied	**$ 2,617,872,569**	**3.48%**	**$ 91,166,766**	**3.29%**	**$ 86,026,910**	**-0.20%**	**$ (5,139,856)**

Mass Property Parameter Comparison

Account No.	Description	Company Proposal Iowa Curve	Company Proposal Salvage Rate	Company Proposal Depr Rate	Company Proposal Annual Accrual	OUCC Proposal Iowa Curve	OUCC Proposal Salvage Rate	OUCC Proposal Depr Rate	OUCC Proposal Annual Accrual
	Transmission Plant								
353.00	STATION EQUIPMENT	R2 - 52	-5%	1.89%	3,661,549	S0.5 - 57	-1%	1.59%	3,090,329
355.00	POLES AND FIXTURES	S1.5 - 43	-25%	2.87%	6,292,583	S1.5 - 48	-25%	2.51%	5,496,734
356.00	OH CONDUCTORS AND DEVICES	R3 - 45	-10%	2.76%	3,596,500	R3 - 45	-7%	2.66%	3,469,214
	Distribution Plant								
362.00	STATION EQUIPMENT	S0.5 - 50	-5%	1.82%	3,296,218	L1 - 54	2%	1.54%	2,794,316
367.00	UG CONDUCTORS AND DEVICES	R3 - 55	-30%	2.08%	2,691,317	S1.5 - 65	-30%	1.76%	2,277,626
368.00	LINE TRANSFORMERS	S1.5 - 45	-5%	1.73%	1,641,093	S1.5 - 45	-3%	1.67%	1,580,915
369.00	SERVICES	R3 - 60	-100%	2.93%	2,701,252	R2.5 - 65	-63%	1.93%	1,780,838

Detailed Rate Comparison

		[1]	[2]		[3]		[4]	
			Company Proposal		OUCC Proposal		OUCC Adjustment	
Account No.	Description	Plant 12/31/2022	Rate	Annual Accrual	Rate	Annual Accrual	Rate	Annual Accrual
	Steam Production Plant							
311.00	STRUCTURES AND IMPROVEMENTS							
	A.B. BROWN 1	24,294,188	3.49%	847,311	3.38%	820,541	-0.11%	-26,770
	A.B. BROWN 2	6,446,036	2.63%	169,372	2.51%	161,988	-0.12%	-7,384
	A.B. BROWN GENERATING PLANT	16,198,611	10.84%	1,756,632	10.73%	1,738,612	-0.11%	-18,020
	F.B. CULLEY 2	5,100,827	5.32%	271,354	4.62%	235,792	-0.70%	-35,562
	F.B. CULLEY 3	10,612,364	2.43%	257,563	2.27%	241,244	-0.16%	-16,319
	F.B. CULLEY GENERATING PLANT	13,142,868	2.90%	380,825	2.75%	361,677	-0.15%	-19,148
	WARRICK 4	1,347,210	2.47%	33,216	2.47%	33,216	0.00%	0
	TOTAL ACCOUNT 311.00	77,142,102	4.82%	3,716,273	4.66%	3,593,069	-0.16%	-123,204
312.10	BOILER PLANT EQUIPMENT							
	A.B. BROWN 1	1,364,060	4.43%	60,387	4.31%	58,801	-0.12%	-1,586
	A.B. BROWN 2	816,877	3.44%	28,090	3.34%	27,250	-0.10%	-840
	A.B. BROWN GENERATING PLANT	176,067	2.70%	4,758	2.60%	4,571	-0.10%	-187
	F.B. CULLEY 2	75,782,770	9.90%	7,500,979	9.19%	6,963,975	-0.71%	-537,004
	F.B. CULLEY 3	128,043,691	4.16%	5,327,626	4.01%	5,129,772	-0.15%	-197,854
	F.B. CULLEY GENERATING PLANT	12,056,819	4.42%	533,317	4.28%	515,612	-0.14%	-17,705
	WAGNER CENTER	21,724	2.30%	499	2.30%	500	0.00%	1
	WARRICK 4	39,730,378	2.94%	1,166,942	2.94%	1,166,942	0.00%	0
	TOTAL ACCOUNT 312.10	257,992,385	5.67%	14,622,598	5.38%	13,867,421	-0.29%	-755,177
312.20	BOILER PLANT - SO2 REMOVAL SYSTEM							
	A.B. BROWN 1	214,127	11.14%	23,848	11.01%	23,584	-0.13%	-264
	A.B. BROWN GENERATING PLANT	1,846,577	11.14%	205,663	11.01%	203,382	-0.13%	-2,281
	F.B. CULLEY 2	25,507,990	3.52%	896,677	2.80%	713,280	-0.72%	-183,397
	F.B. CULLEY 3	78,744,808	0.83%	657,286	0.68%	537,308	-0.15%	-119,978
	F.B. CULLEY GENERATING PLANT	8,264,517	3.59%	296,956	3.44%	284,416	-0.15%	-12,540
	TOTAL ACCOUNT 312.20	114,578,020	1.82%	2,080,430	1.54%	1,761,970	-0.28%	-318,460
312.40	BOILER PLANT - NOX REMOVAL SYSTEM							
	A.B. BROWN 1	1,146,407	13.72%	157,299	13.72%	157,299	0.00%	0
	A.B. BROWN 2	4,690,745	0.00%	0	0.00%	0	0.00%	0

Detailed Rate Comparison

		[1]	[2]		[3]		[4]	
			Company Proposal		OUCC Proposal		OUCC Adjustment	
Account No.	Description	Plant 12/31/2022	Rate	Annual Accrual	Rate	Annual Accrual	Rate	Annual Accrual
	F.B. CULLEY 3	64,323,183	3.95%	2,542,611	4.01%	2,579,075	0.06%	36,464
	WARRICK 4	26,716,402	5.58%	1,490,205	5.58%	1,490,205	0.00%	0
	TOTAL ACCOUNT 312.40	96,876,737	4.33%	4,190,115	4.36%	4,226,578	0.04%	36,463
312.50	BOILER PLANT - MP REMOVAL SYSTEM							
	F.B. CULLEY 3	48,952,012	2.06%	1,009,408	1.90%	930,496	-0.16%	-78,912
	WARRICK 4	98,932,567	5.56%	5,499,552	5.56%	5,499,552	0.00%	0
	TOTAL ACCOUNT 312.50	147,884,579	4.40%	6,508,960	4.35%	6,430,048	-0.05%	-78,912
314.00	TURBOGENERATOR UNITS							
	A.B. BROWN 2	659,891	8.00%	52,776	7.87%	51,921	-0.13%	-855
	A.B. BROWN GENERATING PLANT	43,575	10.60%	4,619	10.54%	4,593	-0.06%	-26
	F.B. CULLEY 2	15,703,032	3.34%	524,121	2.62%	411,980	-0.72%	-112,141
	F.B. CULLEY 3	43,720,812	2.07%	906,786	1.91%	833,883	-0.16%	-72,903
	F.B. CULLEY GENERATING PLANT	386,853	0.47%	1,826	0.30%	1,176	-0.17%	-650
	WARRICK 4	17,919,873	2.49%	445,321	2.49%	445,322	0.00%	1
	TOTAL ACCOUNT 314.00	78,434,035	2.47%	1,935,449	2.23%	1,748,874	-0.24%	-186,575
315.00	ACCESSORY ELECTRIC EQUIPMENT							
	A.B. BROWN 1	9,506,713	6.16%	586,004	6.05%	575,624	-0.11%	-10,380
	A.B. BROWN 2	8,863,225	6.30%	558,218	6.18%	547,811	-0.12%	-10,407
	A.B. BROWN GENERATING PLANT	178,424	9.89%	17,638	9.75%	17,391	-0.14%	-247
	F.B. CULLEY 2	4,965,606	9.75%	484,325	8.96%	444,896	-0.79%	-39,429
	F.B. CULLEY 3	9,530,997	4.74%	451,514	4.57%	435,393	-0.17%	-16,121
	F.B. CULLEY GENERATING PLANT	228,842	5.55%	12,692	5.41%	12,378	-0.14%	-314
	WARRICK 4	11,888,310	3.25%	385,784	3.25%	385,784	0.00%	0
	TOTAL ACCOUNT 315.00	45,162,118	5.53%	2,496,175	5.36%	2,419,276	-0.17%	-76,899
316.00	MISCELLANEOUS POWER PLANT EQUIPMENT							
	A.B. BROWN 1	3,160,852	5.95%	188,009	5.87%	185,621	-0.08%	-2,388
	A.B. BROWN 2	481,226	3.68%	17,715	3.58%	17,213	-0.10%	-502
	A.B. BROWN GENERATING PLANT	1,627,439	9.48%	154,279	9.37%	152,412	-0.11%	-1,867
	F.B. CULLEY 2	2,837,078	4.43%	125,603	3.73%	105,705	-0.70%	-19,898

Detailed Rate Comparison

Account No.	Description	[1] Plant 12/31/2022	[2] Company Proposal Rate	Company Proposal Annual Accrual	[3] OUCC Proposal Rate	OUCC Proposal Annual Accrual	[4] OUCC Adjustment Rate	OUCC Adjustment Annual Accrual
	F.B. CULLEY 3	3,175,973	3.35%	106,383	3.21%	101,820	-0.14%	-4,563
	F.B. CULLEY GENERATING PLANT	7,787,733	3.57%	278,032	3.41%	265,942	-0.16%	-12,090
	WAGNER CENTER	1,205,446	2.41%	29,071	2.41%	29,055	0.00%	-16
	WARRICK 4	177,030	8.66%	15,328	8.66%	15,328	0.00%	0
	TOTAL ACCOUNT 316.00	20,452,777	4.47%	914,420	4.27%	873,095	-0.20%	-41,325
	Total Steam Production Plant	838,522,754	4.35%	36,464,420	4.16%	34,920,331	-0.18%	-1,544,089
	Other Production Plant							
341.00	STRUCTURES AND IMPROVEMENTS							
	BROWN GT NO. 3 GENERATING PLANT	776,008	4.18%	32,469	3.85%	29,886	-0.33%	-2,583
	BROWN GT NO. 4 GENERATING PLANT	926,129	2.92%	27,040	2.70%	25,012	-0.22%	-2,028
	VOLKMAN SOLAR	301,423	3.93%	11,853	3.81%	11,478	-0.12%	-375
	OAK HILL SOLAR	281,165	3.83%	10,775	3.72%	10,450	-0.11%	-325
	TOTAL ACCOUNT 341.00	2,284,726	3.60%	82,137	3.36%	76,826	-0.23%	-5,311
342.00	FUEL HOLDERS, PRODUCERS AND ACCESSORIES							
	BROWN GT NO. 3 GENERATING PLANT	1,903,627	2.14%	40,716	1.82%	34,681	-0.32%	-6,035
	BROWN GT NO. 4 GENERATING PLANT	2,197,839	1.86%	40,904	1.65%	36,166	-0.21%	-4,738
	TOTAL ACCOUNT 342.00	4,101,467	1.99%	81,620	1.73%	70,847	-0.26%	-10,773
343.00	PRIME MOVERS							
	BROWN GT NO. 3 GENERATING PLANT	18,454,261	1.09%	201,872	0.77%	141,972	-0.32%	-59,900
	BROWN GT NO. 4 GENERATING PLANT	18,105,345	1.86%	337,355	1.65%	298,566	-0.21%	-38,789
	TOTAL ACCOUNT 343.00	36,559,606	1.47%	539,227	1.20%	440,538	-0.27%	-98,689
343.10	PRIME MOVERS - BLACKFOOT	11,703,364	3.49%	408,976	3.44%	402,439	-0.05%	-6,537
344.00	GENERATORS							
	BROWN GT NO. 3 GENERATING PLANT	9,645,660	4.21%	406,079	3.89%	374,740	-0.32%	-31,339
	BROWN GT NO. 4 GENERATING PLANT	7,850,587	2.51%	196,787	2.28%	178,914	-0.23%	-17,873

Detailed Rate Comparison

		[1]	[2]		[3]		[4]	
			Company Proposal		OUCC Proposal		OUCC Adjustment	
Account No.	Description	Plant 12/31/2022	Rate	Annual Accrual	Rate	Annual Accrual	Rate	Annual Accrual
	TOTAL ACCOUNT 344.00	17,496,247	3.45%	602,866	3.16%	553,653	-0.28%	-49,213
345.00	ACCESSORY ELECTRIC EQUIPMENT							
	BROWN GT NO. 3 GENERATING PLANT	1,857,919	3.04%	56,509	2.72%	50,514	-0.32%	-5,995
	BROWN GT NO. 4 GENERATING PLANT	1,219,815	2.54%	30,930	2.32%	28,311	-0.22%	-2,619
	VOLKMAN SOLAR	2,185,726	2.81%	61,509	2.69%	58,774	-0.12%	-2,735
	TOTAL ACCOUNT 345.00	5,263,460	2.83%	148,948	2.61%	137,600	-0.22%	-11,348
346.00	MISCELLANEOUS POWER PLANT EQUIPMENT							
	BROWN GT NO. 3 GENERATING PLANT	308,272	8.30%	25,589	7.98%	24,603	-0.32%	-986
	BROWN GT NO. 4 GENERATING PLANT	1,108,958	5.94%	65,905	5.72%	63,397	-0.22%	-2,508
	SUPPORT SERVICES CENTER	4,006	4.14%	166	4.13%	166	-0.01%	0
	VOLKMAN SOLAR	4,421,122	3.98%	176,149	3.86%	170,850	-0.12%	-5,299
	OAK HILL SOLAR	5,090,548	3.98%	202,560	3.86%	196,469	-0.12%	-6,091
	TOTAL ACCOUNT 346.00	10,932,905	4.30%	470,369	4.17%	455,485	-0.14%	-14,884
	Total Other Production Plant	88,341,774	2.64%	2,334,143	2.42%	2,137,387	-0.22%	-196,756
	Transmission Plant							
350.20	LAND RIGHTS	24,417,331	1.19%	291,194	1.19%	291,294	0.00%	100
352.00	STRUCTURES AND IMPROVEMENTS	5,975,413	1.42%	84,774	1.42%	84,743	0.00%	-31
353.00	STATION EQUIPMENT	193,788,249	1.89%	3,661,549	1.59%	3,090,329	-0.30%	-571,220
354.00	TOWERS AND FIXTURES	6,885,068	0.34%	23,492	0.34%	23,485	0.00%	-7
355.00	POLES AND FIXTURES	219,226,142	2.87%	6,292,583	2.51%	5,496,734	-0.36%	-795,849
356.00	OVERHEAD CONDUCTORS AND DEVICES	130,260,223	2.76%	3,596,500	2.66%	3,469,214	-0.10%	-127,286
357.00	UNDERGROUND CONDUIT	1,180,974	1.19%	14,016	1.19%	14,023	0.00%	7
358.00	UNDERGROUND CONDUCTORS AND DEVICES	1,356,646	0.69%	9,420	0.69%	9,404	0.00%	-16
	Total Transmission Plant	583,090,045	2.40%	13,973,528	2.14%	12,479,226	-0.26%	-1,494,302
	Distribution Plant							

Detailed Rate Comparison

		[1]	[2]		[3]		[4]	
			Company Proposal		OUCC Proposal		OUCC Adjustment	
Account No.	Description	Plant 12/31/2022	Rate	Annual Accrual	Rate	Annual Accrual	Rate	Annual Accrual
360.20	LAND RIGHTS	102,312	1.15%	1,176	1.15%	1,176	0.00%	0
361.00	STRUCTURES AND IMPROVEMENTS	1,500,732	1.28%	19,206	1.28%	19,226	0.00%	20
362.00	STATION EQUIPMENT	181,387,856	1.82%	3,296,218	1.54%	2,794,316	-0.28%	-501,902
364.00	POLES, TOWERS AND FIXTURES	222,233,051	5.04%	11,204,973	5.04%	11,205,221	0.00%	248
365.00	OVERHEAD CONDUCTORS AND DEVICES	229,917,349	4.26%	9,791,681	4.26%	9,802,814	0.00%	11,133
366.00	UNDERGROUND CONDUIT	39,767,836	2.13%	848,067	2.13%	847,693	0.00%	-374
367.00	UNDERGROUND CONDUCTORS AND DEVICES	129,193,115	2.08%	2,691,317	1.76%	2,277,626	-0.32%	-413,691
368.00	LINE TRANSFORMERS	94,842,397	1.73%	1,641,093	1.67%	1,580,915	-0.06%	-60,178
369.00	SERVICES	92,272,127	2.93%	2,701,252	1.93%	1,780,838	-1.00%	-920,414
370.00	METERS	25,442,154	7.06%	1,794,963	7.04%	1,790,486	-0.02%	-4,477
371.00	INSTALLATIONS ON CUSTOMERS' PREMISES	5,938,595	3.24%	192,325	3.24%	192,348	0.00%	23
373.00	STREET LIGHTING AND SIGNAL SYSTEMS	18,508,141	2.09%	386,273	2.09%	386,549	0.00%	276
	Total Distribution Plant	1,041,105,665	3.32%	34,568,544	3.14%	32,679,207	-0.18%	-1,889,337
	General Plant							
390.00	STRUCTURES AND IMPROVEMENTS							
	INDIANA SOUTH - UNDERGROUND STORAGE	219,759	0.37%	814	0.37%	815	0.00%	1
	WAGNER COMPLEX	462,508	2.47%	11,424	2.47%	11,415	0.00%	-9
	OTHER STRUCTURES	3,347,740	1.62%	54,121	1.62%	54,152	0.00%	31
	TOTAL ACCOUNT 390.00	4,030,007	1.65%	66,359	1.65%	66,382	0.00%	23
391.10	ELECTRONIC EQUIPMENT	6,840,958	6.67%	456,241	6.66%	455,363	-0.01%	-878
391.20	OFFICE FURNITURE AND FIXTURES	469,968	5.00%	23,511	5.00%	23,505	0.00%	-6
392.10	AUTOMOBILES	2,309,806	0.00%	0	0.00%	0	0.00%	0
392.20	LIGHT TRUCKS	5,710,827	3.21%	183,151	3.20%	182,610	-0.01%	-541
392.30	TRAILERS	1,535,786	3.16%	48,556	3.16%	48,523	0.00%	-33
392.40	HEAVY TRUCKS	12,903,893	9.78%	1,261,815	9.71%	1,253,203	-0.07%	-8,612
393.00	STORES EQUIPMENT	32,556	3.33%	1,085	3.34%	1,088	0.01%	3
394.00	TOOLS, SHOP AND GARAGE EQUIPMENT	6,988,335	4.00%	279,527	4.00%	279,735	0.00%	208
395.00	LABORATORY EQUIPMENT	1,755,603	5.00%	87,727	4.95%	86,942	-0.05%	-785
396.00	POWER OPERATED EQUIPMENT	4,048,828	3.38%	136,790	3.37%	136,523	-0.01%	-267
397.00	COMMUNICATION EQUIPMENT	16,282,315	6.67%	1,086,240	6.64%	1,081,525	-0.03%	-4,715

Detailed Rate Comparison

		[1]	[2]		[3]		[4]	
			Company Proposal		**OUCC Proposal**		**OUCC Adjustment**	
Account No.	**Description**	**Plant 12/31/2022**	**Rate**	**Annual Accrual**	**Rate**	**Annual Accrual**	**Rate**	**Annual Accrual**
398.00	MISCELLANEOUS EQUIPMENT	824,853	5.00%	41,273	4.99%	41,167	-0.01%	-106
398.10	MISCELLANEOUS EQUIPMENT - DLC	3,078,597	5.00%	153,856	5.01%	154,194	0.01%	338
	Total General Plant	66,812,331	5.73%	3,826,131	5.70%	3,810,759	-0.02%	-15,372
	TOTAL PLANT STUDIED	**2,617,872,569**	**3.48%**	**91,166,766**	**3.29%**	**86,026,910**	**-0.20%**	**-5,139,856**

[1], [2] From Company depreciation study
[3] From Attach. DJG-5
[4] = [3] - [2]

Depreciation Rate Development

Account No.	Description	[1] Plant 12/31/2022	[2] Iowa Curve Type	AL	[3] Net Salvage	[4] Depreciable Base	[5] Book Reserve	[6] Future Accruals	[7] Remaining Life	[8] Total Accrual	[9] Rate
	Steam Production Plant										
311.00	STRUCTURES AND IMPROVEMENTS										
	A.B. BROWN 1	24,294,188	S1	90	-12%	27,209,491	19,168,187	8,041,304	9.80	820,541	**3.38%**
	A.B. BROWN 2	6,446,036	S1	90	-12%	7,219,560	5,632,080	1,587,480	9.80	161,988	**2.51%**
	A.B. BROWN GENERATING PLANT	16,198,611	S1	90	-12%	18,142,444	756,321	17,386,123	10.00	1,738,612	**10.73%**
	F.B. CULLEY 2	5,100,827	S1	90	-4%	5,304,860	4,597,484	707,376	3.00	235,792	**4.62%**
	F.B. CULLEY 3	10,612,364	S1	90	-12%	11,885,847	7,060,970	4,824,877	20.00	241,244	**2.27%**
	F.B. CULLEY GENERATING PLANT	13,142,868	S1	90	-12%	14,720,012	7,414,143	7,305,869	20.20	361,677	**2.75%**
	WARRICK 4	1,347,210	S1	90	0%	1,347,210	1,313,994	33,216	1.00	33,216	**2.47%**
	TOTAL ACCOUNT 311.00	77,142,102			-11%	85,829,423	45,943,179	39,886,244	11.10	3,593,069	**4.66%**
312.10	BOILER PLANT EQUIPMENT										
	A.B. BROWN 1	1,364,060	S0	60	-12%	1,527,747	969,141	558,606	9.50	58,801	**4.31%**
	A.B. BROWN 2	816,877	S0	60	-12%	914,902	661,477	253,425	9.30	27,250	**3.34%**
	A.B. BROWN GENERATING PLANT	176,067	S0	60	-12%	197,195	151,942	45,253	9.90	4,571	**2.60%**
	F.B. CULLEY 2	75,782,770	S0	60	-4%	78,814,080	57,922,156	20,891,924	3.00	6,963,975	**9.19%**
	F.B. CULLEY 3	128,043,691	S0	60	-12%	143,408,934	45,430,288	97,978,646	19.10	5,129,772	**4.01%**
	F.B. CULLEY GENERATING PLANT	12,056,819	S0	60	-12%	13,503,638	3,655,458	9,848,180	19.10	515,612	**4.28%**
	WAGNER CENTER	21,724	S0	60	0%	21,724	6,789	14,935	29.90	500	**2.30%**
	WARRICK 4	39,730,378	S0	60	0%	39,730,378	38,563,436	1,166,942	1.00	1,166,942	**2.94%**
	TOTAL ACCOUNT 312.10	257,992,385			-8%	278,118,597	147,360,687	130,757,911	9.43	13,867,421	**5.38%**
312.20	BOILER PLANT - SO2 REMOVAL SYSTEM										
	A.B. BROWN 1	214,127	S0	60	-12%	239,822	6,341	233,481	9.90	23,584	**11.01%**
	A.B. BROWN GENERATING PLANT	1,846,577	S0	60	-12%	2,068,166	54,685	2,013,481	9.90	203,382	**11.01%**
	F.B. CULLEY 2	25,507,990	S0	60	-4%	26,528,310	24,388,470	2,139,840	3.00	713,280	**2.80%**
	F.B. CULLEY 3	78,744,808	S0	60	-12%	88,194,185	77,662,955	10,531,230	19.60	537,308	**0.68%**
	F.B. CULLEY GENERATING PLANT	8,264,517	S0	60	-12%	9,256,259	3,681,706	5,574,553	19.60	284,416	**3.44%**
	TOTAL ACCOUNT 312.20	114,578,020			-10%	126,286,743	105,794,157	20,492,586	11.63	1,761,970	**1.54%**
312.40	BOILER PLANT - NOX REMOVAL SYSTEM										
	A.B. BROWN 1	1,146,407	SQ	18	-10%	1,261,048	1,103,749	157,299	1.00	157,299	**13.72%**
	A.B. BROWN 2	4,690,745	SQ	18	-10%	5,159,820	5,159,820	0			
	F.B. CULLEY 3	64,323,183	SQ	18	-10%	70,755,502	64,307,815	6,447,687	2.50	2,579,075	**4.01%**
	WARRICK 4	26,716,402	SQ	18	0%	26,716,402	25,226,197	1,490,205	1.00	1,490,205	**5.58%**
	TOTAL ACCOUNT 312.40	96,876,737			-7%	103,892,771	95,797,581	8,095,190	1.92	4,226,578	**4.36%**
312.50	BOILER PLANT - MP REMOVAL SYSTEM										
	F.B. CULLEY 3	48,952,012	S0	60	-12%	54,826,253	36,960,728	17,865,525	19.20	930,496	**1.90%**
	WARRICK 4	98,932,567	S0	60	0%	98,932,567	93,433,015	5,499,552	1.00	5,499,552	**5.56%**

Depreciation Rate Development

Account No.	Description	[1] Plant 12/31/2022	[2] Iowa Curve Type	AL	[3] Net Salvage	[4] Depreciable Base	[5] Book Reserve	[6] Future Accruals	[7] Remaining Life	[8] Total Accrual	[9] Rate
	TOTAL ACCOUNT 312.50	147,884,579			-4%	153,758,820	130,393,743	23,365,077	0.00	6,430,048	**4.35%**
314.00	TURBOGENERATOR UNITS										
	A.B. BROWN 2	659,891	S0.5	- 50	-12%	739,078	240,641	498,437	9.60	51,921	**7.87%**
	A.B. BROWN GENERATING PLANT	43,575	S0.5	- 50	-12%	48,804	3,789	45,015	9.80	4,593	**10.54%**
	F.B. CULLEY 2	15,703,032	S0.5	- 50	-4%	16,331,153	15,095,214	1,235,939	3.00	411,980	**2.62%**
	F.B. CULLEY 3	43,720,812	S0.5	- 50	-12%	48,967,309	33,707,258	15,260,051	18.30	833,883	**1.91%**
	F.B. CULLEY GENERATING PLANT	386,853	S0.5	- 50	-12%	433,275	412,347	20,928	17.80	1,176	**0.30%**
	WARRICK 4	17,919,873	S0.5	- 50	0%	17,919,873	17,474,551	445,322	1.00	445,322	**2.49%**
	TOTAL ACCOUNT 314.00	78,434,035			-8%	84,439,492	66,933,800	17,505,692	10.01	1,748,874	**2.23%**
315.00	ACCESSORY ELECTRIC EQUIPMENT										
	A.B. BROWN 1	9,506,713	R2	- 50	-12%	10,647,519	5,294,219	5,353,300	9.30	575,624	**6.05%**
	A.B. BROWN 2	8,863,225	R2	- 50	-12%	9,926,812	4,777,392	5,149,420	9.40	547,811	**6.18%**
	A.B. BROWN GENERATING PLANT	178,424	R2	- 50	-12%	199,835	27,661	172,174	9.90	17,391	**9.75%**
	F.B. CULLEY 2	4,965,606	R2	- 50	-4%	5,164,230	3,829,542	1,334,688	3.00	444,896	**8.96%**
	F.B. CULLEY 3	9,530,997	R2	- 50	-12%	10,674,717	2,663,486	8,011,231	18.40	435,393	**4.57%**
	F.B. CULLEY GENERATING PLANT	228,842	R2	- 50	-12%	256,303	6,274	250,029	20.20	12,378	**5.41%**
	WARRICK 4	11,888,310	R2	- 50	0%	11,888,310	11,502,526	385,784	1.00	385,784	**3.25%**
	TOTAL ACCOUNT 315.00	45,162,118			-8%	48,757,726	28,101,100	20,656,626	8.54	2,419,276	**5.36%**
316.00	MISCELLANEOUS POWER PLANT EQUIPMENT										
	A.B. BROWN 1	3,160,852	R2	- 60	-12%	3,540,154	1,758,193	1,781,961	9.60	185,621	**5.87%**
	A.B. BROWN 2	481,226	R2	- 60	-12%	538,973	375,453	163,520	9.50	17,213	**3.58%**
	A.B. BROWN GENERATING PLANT	1,627,439	R2	- 60	-12%	1,822,731	313,848	1,508,883	9.90	152,412	**9.37%**
	F.B. CULLEY 2	2,837,078	R2	- 60	-4%	2,950,561	2,633,447	317,114	3.00	105,705	**3.73%**
	F.B. CULLEY 3	3,175,973	R2	- 60	-12%	3,557,090	1,520,699	2,036,391	20.00	101,820	**3.21%**
	F.B. CULLEY GENERATING PLANT	7,787,733	R2	- 60	-12%	8,722,261	3,350,236	5,372,025	20.20	265,942	**3.41%**
	WAGNER CENTER	1,205,446	R2	- 60	0%	1,205,446	322,188	883,258	30.40	29,055	**2.41%**
	WARRICK 4	177,030	R2	- 60	0%	177,030	161,702	15,328	1.00	15,328	**8.66%**
	TOTAL ACCOUNT 316.00	20,452,777			-10%	22,514,247	10,435,766	12,078,481	13.83	873,095	**4.27%**
	Total Steam Production Plant	838,522,754			-8%	903,597,820	630,760,013	272,837,808	7.81	34,920,331	**4.16%**
	Other Production Plant										
341.00	STRUCTURES AND IMPROVEMENTS										
	BROWN GT NO. 3 GENERATING PLANT	776,008	S2.5	- 55	-3%	799,289	530,317	268,972	9.00	29,886	**3.85%**
	BROWN GT NO. 4 GENERATING PLANT	926,129	S2.5	- 55	-5%	972,435	512,215	460,220	18.40	25,012	**2.70%**
	VOLKMAN SOLAR	301,423	S2.5	- 55	-8%	325,537	35,135	290,402	25.30	11,478	**3.81%**
	OAK HILL SOLAR	281,165	S2.5	- 55	-8%	303,658	40,326	263,332	25.20	10,450	**3.72%**

Depreciation Rate Development

Account No.	Description	[1] Plant 12/31/2022	[2] Iowa Curve Type	AL	[3] Net Salvage	[4] Depreciable Base	[5] Book Reserve	[6] Future Accruals	[7] Remaining Life	[8] Total Accrual	[9] Rate
	TOTAL ACCOUNT 341.00	2,284,726			-5%	2,400,919	1,117,993	1,282,926	16.70	76,826	**3.36%**
342.00	FUEL HOLDERS, PRODUCERS AND ACCESSORIES										
	BROWN GT NO. 3 GENERATING PLANT	1,903,627	R4	55	-3%	1,960,736	1,641,672	319,064	9.20	34,681	**1.82%**
	BROWN GT NO. 4 GENERATING PLANT	2,197,839	R4	55	-5%	2,307,731	1,624,194	683,537	18.90	36,166	**1.65%**
	TOTAL ACCOUNT 342.00	4,101,467			-4%	4,268,467	3,265,866	1,002,601	14.15	70,847	**1.73%**
343.00	PRIME MOVERS										
	BROWN GT NO. 3 GENERATING PLANT	18,454,261	R3	55	-3%	19,007,889	17,687,552	1,320,337	9.30	141,972	**0.77%**
	BROWN GT NO. 4 GENERATING PLANT	18,105,345	R3	55	-5%	19,010,612	13,516,999	5,493,613	18.40	298,566	**1.65%**
	TOTAL ACCOUNT 343.00	36,559,606			-4%	38,018,501	31,204,551	6,813,950	15.47	440,538	**1.20%**
343.10	PRIME MOVERS - BLACKFOOT	11,703,364	R3	55	-2%	11,937,432	5,458,162	6,479,270	16.10	402,439	**3.44%**
344.00	GENERATORS										
	BROWN GT NO. 3 GENERATING PLANT	9,645,660	R2.5	55	-3%	9,935,030	6,449,952	3,485,078	9.30	374,740	**3.89%**
	BROWN GT NO. 4 GENERATING PLANT	7,850,587	R2.5	55	-5%	8,243,116	5,040,562	3,202,554	17.90	178,914	**2.28%**
	TOTAL ACCOUNT 344.00	17,496,247			-4%	18,178,146	11,490,514	6,687,632	12.08	553,653	**3.16%**
345.00	ACCESSORY ELECTRIC EQUIPMENT										
	BROWN GT NO. 3 GENERATING PLANT	1,857,919	R3	60	-3%	1,913,656	1,443,878	469,778	9.30	50,514	**2.72%**
	BROWN GT NO. 4 GENERATING PLANT	1,219,815	R3	60	-5%	1,280,806	751,385	529,421	18.70	28,311	**2.32%**
	VOLKMAN SOLAR	2,185,726	R3	60	-8%	2,360,584	885,345	1,475,239	25.10	58,774	**2.69%**
	TOTAL ACCOUNT 345.00	5,263,460			-6%	5,555,046	3,080,608	2,474,438	17.98	137,600	**2.61%**
346.00	MISCELLANEOUS POWER PLANT EQUIPMENT										
	BROWN GT NO. 3 GENERATING PLANT	308,272	R2	45	-3%	317,520	88,711	228,809	9.30	24,603	**7.98%**
	BROWN GT NO. 4 GENERATING PLANT	1,108,958	R2	45	-5%	1,164,406	67,636	1,096,770	17.30	63,397	**5.72%**
	SUPPORT SERVICES CENTER	4,006	R2	45	0%	4,006	1,142	2,864	17.30	166	**4.13%**
	VOLKMAN SOLAR	4,421,122	R2	45	-8%	4,774,811	725,671	4,049,140	23.70	170,850	**3.86%**
	OAK HILL SOLAR	5,090,548	R2	45	-8%	5,497,792	841,471	4,656,321	23.70	196,469	**3.86%**
	TOTAL ACCOUNT 346.00	10,932,905			-8%	11,758,534	1,724,631	10,033,903	22.03	455,485	**4.17%**
	Total Other Production Plant	88,341,774			-4%	92,117,046	57,342,325	34,774,721	16.27	2,137,387	**2.42%**
	Transmission Plant										
350.20	LAND RIGHTS	24,417,331	R4	75	0%	24,417,331	7,027,090	17,390,241	59.70	291,294	**1.19%**
352.00	STRUCTURES AND IMPROVEMENTS	5,975,413	R3	65	-5%	6,274,183	2,223,448	4,050,735	47.80	84,743	**1.42%**
353.00	STATION EQUIPMENT	193,788,249	S0.5	57	-1%	195,726,132	61,544,036	134,182,096	43.42	3,090,329	**1.59%**

Depreciation Rate Development

Account No.	Description	[1] Plant 12/31/2022	[2] Iowa Curve Type	AL	[3] Net Salvage	[4] Depreciable Base	[5] Book Reserve	[6] Future Accruals	[7] Remaining Life	[8] Total Accrual	[9] Total Rate
354.00	TOWERS AND FIXTURES	6,885,068	R4	80	-5%	7,229,321	5,601,836	1,627,485	69.30	23,485	**0.34%**
355.00	POLES AND FIXTURES	219,226,142	S1.5	48	-25%	274,032,677	67,355,495	206,677,182	37.60	5,496,734	**2.51%**
356.00	OVERHEAD CONDUCTORS AND DEVICES	130,260,223	R3	45	-7%	139,378,439	34,955,085	104,423,354	30.10	3,469,214	**2.66%**
357.00	UNDERGROUND CONDUIT	1,180,974	R2.5	50	0%	1,180,974	886,493	294,481	21.00	14,023	**1.19%**
358.00	UNDERGROUND CONDUCTORS AND DEVICES	1,356,646	R2	40	0%	1,356,646	1,145,064	211,582	22.50	9,404	**0.69%**
	Total Transmission Plant	583,090,045			-11%	649,595,703	180,738,547	468,857,156	37.57	12,479,226	**2.14%**
	Distribution Plant										
360.20	LAND RIGHTS	102,312	R4	75	0%	102,312	25,965	76,347	64.90	1,176	**1.15%**
361.00	STRUCTURES AND IMPROVEMENTS	1,500,732	R2	50	-5%	1,575,768	752,901	822,867	42.80	19,226	**1.28%**
362.00	STATION EQUIPMENT	181,387,856	L1	54	2%	177,760,099	52,379,159	125,380,940	44.87	2,794,316	**1.54%**
364.00	POLES, TOWERS AND FIXTURES	222,233,051	R3	44	-100%	444,466,101	71,332,251	373,133,850	33.30	11,205,221	**5.04%**
365.00	OVERHEAD CONDUCTORS AND DEVICES	229,917,349	S1.5	50	-100%	459,834,699	72,623,559	387,211,140	39.50	9,802,814	**4.26%**
366.00	UNDERGROUND CONDUIT	39,767,836	R3	65	-50%	59,651,753	16,080,318	43,571,435	51.40	847,693	**2.13%**
367.00	UNDERGROUND CONDUCTORS AND DEVICES	129,193,115	S1.5	65	-30%	167,951,049	44,890,939	123,060,110	54.03	2,277,626	**1.76%**
368.00	LINE TRANSFORMERS	94,842,397	S1.5	45	-3%	97,687,669	47,098,387	50,589,282	32.00	1,580,915	**1.67%**
369.00	SERVICES	92,272,127	R2.5	65	-63%	150,403,567	61,521,936	88,881,631	49.91	1,780,838	**1.93%**
370.00	METERS	25,442,154	R2	25	0%	25,442,154	375,347	25,066,807	14.00	1,790,486	**7.04%**
371.00	INSTALLATIONS ON CUSTOMERS' PREMISES	5,938,595	S0.5	27	-30%	7,720,173	3,642,392	4,077,781	21.20	192,348	**3.24%**
373.00	STREET LIGHTING AND SIGNAL SYSTEMS	18,508,141	R2.5	45	-30%	24,060,583	11,884,298	12,176,285	31.50	386,549	**2.09%**
	Total Distribution Plant	1,041,105,665			-55%	1,616,655,929	382,607,452	1,234,048,477	37.76	32,679,207	**3.14%**
	General Plant										
390.00	STRUCTURES AND IMPROVEMENTS										
	INDIANA SOUTH - UNDERGROUND STORAGE	219,759	R2	70	-5%	230,747	215,833	14,914	18.30	815	**0.37%**
	WAGNER COMPLEX	462,508	R2	70	-5%	485,633	103,226	382,407	33.50	11,415	**2.47%**
	OTHER STRUCTURES	3,347,740	R2.5	55	-5%	3,515,127	1,094,552	2,420,575	44.70	54,152	**1.62%**
	TOTAL ACCOUNT 390.00	4,030,007			-5%	4,231,507	1,413,611	2,817,896	42.45	66,382	**1.65%**
391.10	ELECTRONIC EQUIPMENT	6,840,958	SQ	15	0%	6,840,958	1,877,500	4,963,458	10.90	455,363	**6.66%**
391.20	OFFICE FURNITURE AND FIXTURES	469,968	SQ	20	0%	469,968	131,500	338,468	14.40	23,505	**5.00%**
392.10	AUTOMOBILES	2,309,806	S1.5	S1.5	10%	2,078,826	2,078,826	0	0.00		
392.20	LIGHT TRUCKS	5,710,827	L3	L3	5%	5,425,286	3,288,753	2,136,533	11.70	182,610	**3.20%**
392.30	TRAILERS	1,535,786	S0.5	S0.5	15%	1,305,418	315,544	989,874	20.40	48,523	**3.16%**
392.40	HEAVY TRUCKS	12,903,893	L3	L3	5%	12,258,698	3,862,236	8,396,462	6.70	1,253,203	**9.71%**
393.00	STORES EQUIPMENT	32,556	SQ	30	0%	32,556	17,653	14,903	13.70	1,088	**3.34%**
394.00	TOOLS, SHOP AND GARAGE EQUIPMENT	6,988,335	SQ	25	0%	6,988,335	2,065,000	4,923,335	17.60	279,735	**4.00%**
395.00	LABORATORY EQUIPMENT	1,755,603	SQ	20	0%	1,755,603	1,460,000	295,603	3.40	86,942	**4.95%**
396.00	POWER OPERATED EQUIPMENT	4,048,828	S2.5	20	10%	3,643,945	1,609,754	2,034,191	14.90	136,523	**3.37%**

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**
397.00	COMMUNICATION EQUIPMENT	16,282,315	SQ -	15	0%	16,282,315	4,710,000	11,572,315	10.70	1,081,525	**6.64%**
398.00	MISCELLANEOUS EQUIPMENT	824,853	SQ -	20	0%	824,853	195,000	629,853	15.30	41,167	**4.99%**
398.10	MISCELLANEOUS EQUIPMENT - DLC	3,078,597	SQ -	20	0%	3,078,597	1,567,500	1,511,097	9.80	154,194	**5.01%**
	Total General Plant	66,812,331			2%	65,216,864	24,592,877	40,623,987	10.66	3,810,759	**5.70%**
	TOTAL PLANT STUDIED	**2,617,872,569**			**-27%**	**3,327,183,363**	**1,276,041,214**	**2,051,142,149**	**23.84**	**86,026,910**	**3.29%**

[1] From Company depreciation study
[2] Average life and Iowa curve shape developed through actuarial analysis and professional judgment
[3] Weighted net salvage for life span accounts from weighted net salvage exhibit; net salvage for mass accounts developed through statistical analysis and professional judgment
[4] = [1]*(1-[3])
[5] From 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]

Weighted Production Net Salvage Calculation

	[1]	[2]	[3]	[4]	[5]
	Terminal Retirements		**Interim Retirements**		**Weighted**
Unit	**Retirements**	**Net Salvage**	**Retirements**	**Net Salvage**	**Net Salvage**
Steam Production					
A.B. BROWN GENERATING PLANT	94%	-12.2%	6%	-15.0%	-12.0%
F.B. CULLEY 2	98%	-3.6%	2%	-15.0%	-4.0%
F.B. CULLEY 3 AND COMMON	79%	-11.4%	21%	-15.0%	-12.0%
WARRICK 4	100%	0.0%	0%	-15.0%	0.0%
Other Production					
BROWN GT NO. 3 GENERATING PLANT	93%	-3.3%	7%	-4.0%	-3.0%
BROWN GT NO. 4 GENERATING PLANT	85%	-4.9%	15%	-4.0%	-5.0%
BLACKFOOT LANDFILL	94%	-1.4%	6%	-4.0%	-2.0%
VOLKMAN (HIGHWAY 41) SOLAR	87%	-8.7%	13%	-4.0%	-8.0%
OAK HILL SOLAR	83%	-9.2%	17%	-4.0%	-8.0%

[1], [3] Accepted Company's proposed weighting of interim and terminal retirements (see response to OUCC DR 10.02 Attach. 3 - Report Table 2)

[2] From Attachment DJG-7

[4] Accepted Company's proposed interim net salvage rates (see response to OUCC DR 10.02 Attach. 3 - Report Table 2)

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

Terminal Net Salvage Adjustment

Plant 2022	[1] Company Demo Cost Estimate	[2] Company Demo Cost Estimate	[3] Less Contingency	[4] Adjusted Demo Cost	[5] Escalated Demo Cost	[6] Terminal Retirements	[7] Terminal Net Salvage
Steam Production							
A.B. BROWN GENERATING PLANT	2032	6,798,916	-	6,798,916	8,703,187	(71,247,177)	-12.2%
F.B. CULLEY 2	2025	5,529,000	1,205,951	4,323,049	4,655,451	(127,819,461)	-3.6%
F.B. CULLEY 3 AND COMMON	2043	24,923,000	5,436,049	19,486,951	32,729,929	(287,484,305)	-11.4%
WARRICK 4	2023	-	-	-	-	(169,995,367)	0.0%
					-		
Other Production					-		
					-		
BROWN GT NO. 3 GENERATING PLANT	2032	1,393,650	603,600	790,050	1,011,331	(30,566,171)	-3.3%
BROWN GT NO. 4 GENERATING PLANT	2042	1,393,650	603,600	790,050	1,294,589	(26,672,743)	-4.9%
BLACKFOOT LANDFILL	2039	146,000	47,000	99,000	150,640	(11,055,835)	-1.4%
VOLKMAN (HIGHWAY 41) SOLAR	2048	349,400	73,200	276,200	524,861	(6,013,429)	-8.7%
OAK HILL SOLAR	2048	273,900	57,400	216,500	411,413	(4,472,693)	-9.2%

[1] Company demolition cost estimates (see response to OUCC DR 10.01 Attach. 3 - Report Table 2; see also Attach. JTK-2 - Decommissioning Cost Estimate Study)
[2] Company demolition cost estimates (see response to OUCC DR 10.01 Attach. 3 - Report Table 2; see also Attach. JTK-2 - Decommissioning Cost Estimate Study)
[3] Contingency costs (see response to OUCC DR 31.01c Attach. - Cost Less Contingency; contingency cost for F.B. Culley 2 and 3 allocated per demo cost estimate)
[4] = [2] - [3]; also does not include any escalation of demolition cost estimates
[5] = demolition cost escalated by 2.5% annual rate to future retirement date for each unit
[6] Terminal retirements (see response to OUCC DR 10.01 Attach. 3 - Report Table 2)
[7] = [5] / [6]

Account 353 Curve Fitting

[1] Age (Years)	[2] Exposures (Dollars)	[3] Observed Life Table (OLT)	[4] Company R2-52	[5] OUCC S0.5-57	[6] Company SSD	[7] OUCC SSD
0.0	197,625,355	100.00%	100.00%	100.00%	0.0000	0.0000
0.5	195,148,454	99.85%	99.91%	99.99%	0.0000	0.0000
1.5	194,536,969	99.82%	99.72%	99.94%	0.0000	0.0000
2.5	185,423,708	99.77%	99.51%	99.85%	0.0000	0.0000
3.5	185,825,088	99.57%	99.30%	99.73%	0.0000	0.0000
4.5	179,827,792	98.42%	99.06%	99.57%	0.0000	0.0001
5.5	176,455,329	98.16%	98.82%	99.38%	0.0000	0.0001
6.5	168,971,513	98.11%	98.56%	99.16%	0.0000	0.0001
7.5	167,765,974	98.08%	98.28%	98.90%	0.0000	0.0001
8.5	159,482,180	97.96%	97.98%	98.61%	0.0000	0.0000
9.5	157,062,654	97.52%	97.67%	98.28%	0.0000	0.0001
10.5	150,344,770	95.75%	97.34%	97.93%	0.0003	0.0005
11.5	149,709,638	95.34%	96.99%	97.53%	0.0003	0.0005
12.5	134,712,353	95.12%	96.62%	97.11%	0.0002	0.0004
13.5	116,587,270	95.02%	96.23%	96.64%	0.0001	0.0003
14.5	106,908,533	94.87%	95.81%	96.15%	0.0001	0.0002
15.5	82,757,698	94.59%	95.37%	95.62%	0.0001	0.0001
16.5	68,630,702	94.34%	94.91%	95.06%	0.0000	0.0001
17.5	66,096,765	94.28%	94.43%	94.46%	0.0000	0.0000
18.5	52,836,517	93.56%	93.91%	93.83%	0.0000	0.0000
19.5	52,238,449	92.40%	93.37%	93.16%	0.0001	0.0001
20.5	51,172,669	91.99%	92.81%	92.46%	0.0001	0.0000
21.5	49,995,410	91.11%	92.21%	91.73%	0.0001	0.0000
22.5	48,738,254	90.59%	91.58%	90.97%	0.0001	0.0000
23.5	48,487,497	90.19%	90.92%	90.17%	0.0001	0.0000
24.5	46,718,134	89.92%	90.23%	89.35%	0.0000	0.0000
25.5	44,871,648	89.65%	89.50%	88.49%	0.0000	0.0001
26.5	43,103,565	89.20%	88.74%	87.60%	0.0000	0.0003
27.5	42,534,526	88.98%	87.94%	86.68%	0.0001	0.0005
28.5	38,452,845	87.50%	87.11%	85.74%	0.0000	0.0003
29.5	37,503,179	86.62%	86.23%	84.76%	0.0000	0.0003
30.5	33,486,128	86.30%	85.31%	83.75%	0.0001	0.0006
31.5	33,159,173	85.92%	84.35%	82.72%	0.0002	0.0010
32.5	32,218,448	84.08%	83.35%	81.66%	0.0001	0.0006
33.5	31,107,576	82.16%	82.31%	80.58%	0.0000	0.0003
34.5	30,351,069	81.33%	81.21%	79.47%	0.0000	0.0003
35.5	25,419,794	78.90%	80.08%	78.34%	0.0001	0.0000
36.5	23,800,597	74.95%	78.89%	77.18%	0.0016	0.0005
37.5	21,645,357	72.74%	77.65%	76.00%	0.0024	0.0011
38.5	20,084,499	71.04%	76.37%	74.80%	0.0028	0.0014
39.5	18,582,581	69.91%	75.03%	73.58%	0.0026	0.0013
40.5	17,490,475	68.80%	73.64%	72.34%	0.0023	0.0013
41.5	13,763,056	67.53%	72.20%	71.08%	0.0022	0.0013
42.5	13,308,603	66.79%	70.71%	69.80%	0.0015	0.0009
43.5	12,880,102	66.74%	69.17%	68.51%	0.0006	0.0003
44.5	10,235,864	65.62%	67.57%	67.20%	0.0004	0.0002
45.5	9,090,212	65.02%	65.92%	65.88%	0.0001	0.0001
46.5	8,616,233	63.76%	64.22%	64.54%	0.0000	0.0001

Account 353 Curve Fitting

[1]	[2]	[3]	[4]	[5]	[6]	[7]
Age (Years)	**Exposures (Dollars)**	**Observed Life Table (OLT)**	**Company R2-52**	**OUCC S0.5-57**	**Company SSD**	**OUCC SSD**
47.5	8,003,059	62.15%	62.47%	63.19%	0.0000	0.0001
48.5	6,396,063	60.73%	60.67%	61.84%	0.0000	0.0001
49.5	6,069,364	60.59%	58.82%	60.47%	0.0003	0.0000
50.5	5,671,283	58.32%	56.94%	59.09%	0.0002	0.0001
51.5	5,615,603	58.17%	55.00%	57.70%	0.0010	0.0000
52.5	5,414,341	57.98%	53.04%	56.31%	0.0024	0.0003
53.5	3,582,111	57.78%	51.03%	54.92%	0.0046	0.0008
54.5	3,251,997	54.23%	49.00%	53.51%	0.0027	0.0001
55.5	3,139,461	53.63%	46.94%	52.11%	0.0045	0.0002
56.5	2,754,615	49.24%	44.86%	50.70%	0.0019	0.0002
57.5	2,455,791	45.00%	42.77%	49.30%	0.0005	0.0018
58.5	2,452,779	44.95%	40.66%	47.89%	0.0018	0.0009
59.5	2,096,421	44.95%	38.56%	46.49%	0.0041	0.0002
60.5	1,767,249	42.18%	36.46%	45.09%	0.0033	0.0008
61.5	1,766,801	42.18%	34.37%	43.69%	0.0061	0.0002
62.5	1,451,088	42.18%	32.31%	42.30%	0.0097	0.0000
63.5	857,577	42.18%	30.26%	40.91%	0.0142	0.0002
64.5	511,409	42.18%	28.26%	39.54%	0.0194	0.0007
65.5	309,113	42.18%	26.29%	38.17%	0.0253	0.0016
66.5	225,514	42.18%	24.37%	36.81%	0.0317	0.0029
67.5			22.50%	35.46%		
Sum of Squared Differences for Entire OLT Curve				[8]	0.1527	0.0269
SSD for Truncated OLT Curve (Up to 1% of Beginning Exposures)				[9]	0.0430	0.0204

[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 355 Curve Fitting

[1] Age (Years)	[2] Exposures (Dollars)	[3] Observed Life Table (OLT)	[4] Company S1.5-43	[5] OUCC S1.5-48	[6] Company SSD	[7] OUCC SSD
0.0	220,941,857	100.00%	100.00%	100.00%	0.0000	0.0000
0.5	195,299,033	100.00%	100.00%	100.00%	0.0000	0.0000
1.5	195,716,181	100.00%	100.00%	100.00%	0.0000	0.0000
2.5	189,242,424	100.00%	99.98%	99.99%	0.0000	0.0000
3.5	175,174,093	100.00%	99.95%	99.97%	0.0000	0.0000
4.5	165,592,872	99.97%	99.91%	99.93%	0.0000	0.0000
5.5	164,028,321	99.92%	99.84%	99.88%	0.0000	0.0000
6.5	160,370,417	99.92%	99.74%	99.81%	0.0000	0.0000
7.5	157,835,876	99.75%	99.60%	99.71%	0.0000	0.0000
8.5	147,244,214	99.64%	99.43%	99.59%	0.0000	0.0000
9.5	140,579,718	99.37%	99.22%	99.43%	0.0000	0.0000
10.5	110,377,038	99.20%	98.96%	99.24%	0.0000	0.0000
11.5	105,500,723	98.98%	98.65%	99.02%	0.0000	0.0000
12.5	78,042,228	98.55%	98.28%	98.75%	0.0000	0.0000
13.5	70,948,307	97.91%	97.85%	98.44%	0.0000	0.0000
14.5	67,709,527	97.52%	97.36%	98.08%	0.0000	0.0000
15.5	54,664,505	97.46%	96.79%	97.67%	0.0000	0.0000
16.5	37,603,000	94.10%	96.15%	97.21%	0.0004	0.0010
17.5	30,880,739	94.10%	95.44%	96.68%	0.0002	0.0007
18.5	29,186,187	93.43%	94.64%	96.10%	0.0001	0.0007
19.5	28,485,270	93.02%	93.76%	95.46%	0.0001	0.0006
20.5	27,901,090	92.83%	92.79%	94.75%	0.0000	0.0004
21.5	26,491,751	91.96%	91.73%	93.98%	0.0000	0.0004
22.5	25,267,703	91.53%	90.58%	93.13%	0.0001	0.0003
23.5	24,759,281	90.53%	89.35%	92.22%	0.0001	0.0003
24.5	19,884,456	89.21%	88.02%	91.23%	0.0001	0.0004
25.5	18,477,233	86.71%	86.60%	90.17%	0.0000	0.0012
26.5	17,069,025	85.31%	85.08%	89.04%	0.0000	0.0014
27.5	16,759,857	84.42%	83.48%	87.83%	0.0001	0.0012
28.5	15,893,743	82.80%	81.79%	86.55%	0.0001	0.0014
29.5	13,768,683	78.45%	80.02%	85.20%	0.0002	0.0046
30.5	12,743,950	76.46%	78.16%	83.77%	0.0003	0.0053
31.5	11,982,884	73.51%	76.22%	82.28%	0.0007	0.0077
32.5	11,370,750	71.44%	74.21%	80.71%	0.0008	0.0086
33.5	10,572,271	69.37%	72.13%	79.08%	0.0008	0.0094
34.5	10,175,699	68.22%	69.99%	77.38%	0.0003	0.0084
35.5	8,335,930	67.62%	67.78%	75.62%	0.0000	0.0064
36.5	7,764,280	65.37%	65.52%	73.81%	0.0000	0.0071
37.5	4,685,719	55.52%	63.22%	71.93%	0.0059	0.0269
38.5	4,141,158	52.22%	60.87%	70.01%	0.0075	0.0316
39.5	3,542,172	50.99%	58.49%	68.04%	0.0056	0.0291
40.5	3,497,118	50.34%	56.08%	66.02%	0.0033	0.0246
41.5	3,486,717	50.34%	53.66%	63.96%	0.0011	0.0186
42.5	2,277,331	50.34%	51.22%	61.87%	0.0001	0.0133
43.5	1,992,812	50.34%	48.78%	59.76%	0.0002	0.0089
44.5	1,187,009	50.34%	46.34%	57.61%	0.0016	0.0053
45.5	1,075,325	50.34%	43.92%	55.45%	0.0041	0.0026
46.5	85,539	50.34%	41.51%	53.28%	0.0078	0.0009

Account 355 Curve Fitting

[1] Age (Years)	[2] Exposures (Dollars)	[3] Observed Life Table (OLT)	[4] Company S1.5-43	[5] OUCC S1.5-48	[6] Company SSD	[7] OUCC SSD
47.5			39.13%	51.09%		
Sum of Squared Differences for Entire OLT Curve				[8]	0.0418	0.2291
SSD for Truncated OLT Curve (Up to 1% of Beginning Exposures)				[9]	0.0281	0.2115

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

Account 362 Curve Fitting

[1] Age (Years)	[2] Exposures (Dollars)	[3] Observed Life Table (OLT)	[4] Company S0.5-50	[5] OUCC L1-54	[6] Company SSD	[7] OUCC SSD
0.0	183,020,243	100.00%	100.00%	100.00%	0.0000	0.0000
0.5	163,875,059	99.91%	99.99%	99.95%	0.0000	0.0000
1.5	159,750,300	99.90%	99.93%	99.82%	0.0000	0.0000
2.5	141,132,808	99.89%	99.82%	99.67%	0.0000	0.0000
3.5	123,401,671	99.76%	99.66%	99.49%	0.0000	0.0000
4.5	116,140,402	99.52%	99.46%	99.28%	0.0000	0.0000
5.5	108,027,732	98.94%	99.21%	99.03%	0.0000	0.0000
6.5	102,189,550	98.56%	98.93%	98.74%	0.0000	0.0000
7.5	99,486,054	98.40%	98.60%	98.41%	0.0000	0.0000
8.5	95,689,162	97.76%	98.22%	98.03%	0.0000	0.0000
9.5	94,186,688	97.50%	97.80%	97.61%	0.0000	0.0000
10.5	84,358,187	97.30%	97.34%	97.14%	0.0000	0.0000
11.5	82,619,404	97.03%	96.83%	96.62%	0.0000	0.0000
12.5	81,297,992	96.78%	96.28%	96.04%	0.0000	0.0001
13.5	69,920,548	96.38%	95.68%	95.41%	0.0000	0.0001
14.5	60,900,435	95.95%	95.04%	94.72%	0.0001	0.0002
15.5	58,842,658	95.67%	94.35%	93.98%	0.0002	0.0003
16.5	51,574,622	94.01%	93.62%	93.18%	0.0000	0.0001
17.5	47,841,432	92.88%	92.85%	92.32%	0.0000	0.0000
18.5	46,112,411	89.50%	92.04%	91.41%	0.0006	0.0004
19.5	43,086,806	86.77%	91.18%	90.45%	0.0019	0.0014
20.5	39,827,959	86.39%	90.28%	89.43%	0.0015	0.0009
21.5	39,916,723	85.91%	89.34%	88.36%	0.0012	0.0006
22.5	40,545,189	85.21%	88.36%	87.24%	0.0010	0.0004
23.5	38,156,885	84.40%	87.34%	86.08%	0.0009	0.0003
24.5	36,722,526	83.82%	86.28%	84.88%	0.0006	0.0001
25.5	33,376,090	83.40%	85.18%	83.64%	0.0003	0.0000
26.5	32,181,702	82.72%	84.05%	82.36%	0.0002	0.0000
27.5	28,303,091	81.52%	82.88%	81.06%	0.0002	0.0000
28.5	25,950,816	79.56%	81.67%	79.73%	0.0004	0.0000
29.5	25,708,143	79.19%	80.44%	78.38%	0.0002	0.0001
30.5	24,265,682	76.73%	79.17%	77.02%	0.0006	0.0000
31.5	22,829,100	75.26%	77.86%	75.64%	0.0007	0.0000
32.5	22,611,855	74.76%	76.53%	74.26%	0.0003	0.0000
33.5	21,693,225	74.14%	75.17%	72.88%	0.0001	0.0002
34.5	21,512,901	73.54%	73.79%	71.51%	0.0000	0.0004
35.5	20,700,335	72.58%	72.38%	70.13%	0.0000	0.0006
36.5	19,507,507	71.99%	70.94%	68.75%	0.0001	0.0010
37.5	18,099,934	68.90%	69.48%	67.38%	0.0000	0.0002
38.5	15,957,553	62.81%	68.00%	66.01%	0.0027	0.0010
39.5	14,804,493	60.72%	66.50%	64.64%	0.0033	0.0015
40.5	13,615,722	55.84%	64.99%	63.28%	0.0084	0.0055
41.5	12,198,426	55.01%	63.45%	61.93%	0.0071	0.0048
42.5	10,783,112	54.71%	61.90%	60.58%	0.0052	0.0034
43.5	9,648,994	54.47%	60.34%	59.23%	0.0034	0.0023
44.5	8,417,326	54.18%	58.77%	57.89%	0.0021	0.0014
45.5	7,178,573	53.78%	57.19%	56.57%	0.0012	0.0008
46.5	6,969,775	53.37%	55.60%	55.24%	0.0005	0.0004

Account 362 Curve Fitting

[1] Age (Years)	[2] Exposures (Dollars)	[3] Observed Life Table (OLT)	[4] Company S0.5-50	[5] OUCC L1-54	[6] Company SSD	[7] OUCC SSD
47.5	6,293,671	52.95%	54.01%	53.93%	0.0001	0.0001
48.5	5,674,426	52.71%	52.41%	52.63%	0.0000	0.0000
49.5	5,295,290	51.92%	50.80%	51.33%	0.0001	0.0000
50.5	4,793,345	50.90%	49.20%	50.05%	0.0003	0.0001
51.5	4,500,900	50.47%	47.60%	48.78%	0.0008	0.0003
52.5	4,056,830	50.18%	46.00%	47.52%	0.0017	0.0007
53.5	3,664,447	48.92%	44.40%	46.27%	0.0020	0.0007
54.5	3,339,351	48.73%	42.81%	45.03%	0.0035	0.0014
55.5	2,829,158	47.35%	41.23%	43.81%	0.0037	0.0013
56.5	2,547,706	46.33%	39.66%	42.60%	0.0044	0.0014
57.5	2,252,153	45.45%	38.10%	41.41%	0.0054	0.0016
58.5	2,045,221	44.70%	36.55%	40.22%	0.0066	0.0020
59.5	2,027,980	44.32%	35.02%	39.06%	0.0087	0.0028
60.5	1,865,847	43.93%	33.50%	37.91%	0.0109	0.0036
61.5	1,295,935	34.60%	32.00%	36.77%	0.0007	0.0005
62.5	675,169	27.66%	30.52%	35.65%	0.0008	0.0064
63.5	342,231	27.66%	29.06%	34.55%	0.0002	0.0047
64.5			27.63%	33.46%		

Sum of Squared Differences for Entire OLT Curve	[8]	0.0953	0.0560
SSD for Truncated OLT Curve (Up to 1% of Beginning Exposures)	[9]	0.0936	0.0444

[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 R3-55**	**OUCC S1.5-65**	**Company SSD**	**OUCC SSD**
0.0	126,571,828	100.00%	100.00%	100.00%	0.0000	0.0000
0.5	112,002,659	100.00%	99.99%	100.00%	0.0000	0.0000
1.5	105,895,670	100.00%	99.95%	100.00%	0.0000	0.0000
2.5	96,517,222	100.00%	99.92%	99.99%	0.0000	0.0000
3.5	87,323,749	100.00%	99.88%	99.99%	0.0000	0.0000
4.5	77,405,571	100.00%	99.83%	99.97%	0.0000	0.0000
5.5	68,012,324	100.00%	99.77%	99.95%	0.0000	0.0000
6.5	64,286,184	100.00%	99.71%	99.92%	0.0000	0.0000
7.5	61,997,695	100.00%	99.64%	99.88%	0.0000	0.0000
8.5	59,000,447	100.00%	99.55%	99.83%	0.0000	0.0000
9.5	57,804,377	100.00%	99.46%	99.76%	0.0000	0.0000
10.5	55,663,831	99.94%	99.36%	99.68%	0.0000	0.0000
11.5	53,679,955	99.93%	99.24%	99.59%	0.0000	0.0000
12.5	51,578,518	99.84%	99.11%	99.48%	0.0001	0.0000
13.5	49,390,328	99.78%	98.96%	99.35%	0.0001	0.0000
14.5	46,902,436	99.63%	98.80%	99.20%	0.0001	0.0000
15.5	45,012,378	99.34%	98.62%	99.03%	0.0001	0.0000
16.5	42,693,122	99.21%	98.41%	98.84%	0.0001	0.0000
17.5	38,686,608	98.50%	98.19%	98.62%	0.0000	0.0000
18.5	35,525,755	98.25%	97.95%	98.38%	0.0000	0.0000
19.5	33,562,645	98.18%	97.68%	98.12%	0.0000	0.0000
20.5	32,029,249	97.62%	97.39%	97.82%	0.0000	0.0000
21.5	30,320,043	97.42%	97.07%	97.50%	0.0000	0.0000
22.5	27,969,371	97.41%	96.72%	97.15%	0.0000	0.0000
23.5	25,354,155	97.17%	96.34%	96.76%	0.0001	0.0000
24.5	23,131,851	96.61%	95.92%	96.35%	0.0000	0.0000
25.5	20,934,823	96.21%	95.47%	95.90%	0.0001	0.0000
26.5	19,620,800	96.11%	94.99%	95.41%	0.0001	0.0000
27.5	18,045,513	94.96%	94.47%	94.89%	0.0000	0.0000
28.5	16,509,598	94.43%	93.90%	94.34%	0.0000	0.0000
29.5	15,092,491	93.48%	93.29%	93.74%	0.0000	0.0000
30.5	13,963,282	92.37%	92.64%	93.11%	0.0000	0.0001
31.5	13,291,905	92.08%	91.94%	92.44%	0.0000	0.0000
32.5	12,204,143	91.52%	91.19%	91.73%	0.0000	0.0000
33.5	11,127,623	90.67%	90.39%	90.98%	0.0000	0.0000
34.5	10,216,149	90.18%	89.53%	90.20%	0.0000	0.0000
35.5	9,124,223	89.21%	88.62%	89.37%	0.0000	0.0000
36.5	8,107,187	88.67%	87.64%	88.50%	0.0001	0.0000
37.5	7,154,150	87.97%	86.60%	87.59%	0.0002	0.0000
38.5	6,222,893	85.86%	85.49%	86.64%	0.0000	0.0001
39.5	5,598,216	84.41%	84.31%	85.65%	0.0000	0.0002
40.5	5,263,565	79.36%	83.06%	84.62%	0.0014	0.0028
41.5	4,695,046	79.05%	81.72%	83.56%	0.0007	0.0020
42.5	4,090,099	78.83%	80.31%	82.45%	0.0002	0.0013
43.5	3,378,692	78.65%	78.81%	81.31%	0.0000	0.0007
44.5	2,609,778	75.81%	77.22%	80.13%	0.0002	0.0019
45.5	1,026,499	48.75%	75.54%	78.91%	0.0718	0.0910
46.5	227,281	23.96%	73.76%	77.66%	0.2480	0.2884

Account 367 Curve Fitting

[1]	[2]	[3]	[4]	[5]	[6]	[7]
Age (Years)	**Exposures (Dollars)**	**Observed Life Table (OLT)**	**Company R3-55**	**OUCC S1.5-65**	**Company SSD**	**OUCC SSD**
47.5			71.89%	76.38%		
Sum of Squared Differences for Entire OLT Curve				[8]	0.3236	0.3886
SSD for Truncated OLT Curve (Up to 1% of Beginning Exposures)				[9]	0.0013	0.0005

[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 369 Curve Fitting

[1] Age (Years)	[2] Exposures (Dollars)	[3] Observed Life Table (OLT)	[4] Company R3-60	[5] OUCC R2.5-65	[6] Company SSD	[7] OUCC SSD
0.0	89,863,613	100.00%	100.00%	100.00%	0.0000	0.0000
0.5	87,325,493	100.00%	99.99%	99.96%	0.0000	0.0000
1.5	84,003,800	100.00%	99.96%	99.87%	0.0000	0.0000
2.5	81,225,379	100.00%	99.93%	99.77%	0.0000	0.0000
3.5	78,444,366	100.00%	99.89%	99.67%	0.0000	0.0000
4.5	76,667,019	100.00%	99.85%	99.57%	0.0000	0.0000
5.5	74,335,503	100.00%	99.80%	99.45%	0.0000	0.0000
6.5	71,782,165	100.00%	99.74%	99.33%	0.0000	0.0000
7.5	68,906,350	99.85%	99.68%	99.20%	0.0000	0.0000
8.5	66,287,489	99.82%	99.61%	99.07%	0.0000	0.0001
9.5	63,727,001	99.75%	99.53%	98.92%	0.0000	0.0001
10.5	61,345,091	99.59%	99.45%	98.77%	0.0000	0.0001
11.5	59,626,438	99.55%	99.35%	98.60%	0.0000	0.0001
12.5	58,000,287	99.43%	99.24%	98.43%	0.0000	0.0001
13.5	53,762,330	99.19%	99.12%	98.24%	0.0000	0.0001
14.5	50,924,827	99.04%	98.99%	98.05%	0.0000	0.0001
15.5	47,217,398	98.83%	98.85%	97.84%	0.0000	0.0001
16.5	43,343,868	98.37%	98.68%	97.62%	0.0000	0.0001
17.5	40,479,974	97.88%	98.51%	97.38%	0.0000	0.0000
18.5	37,663,848	97.33%	98.32%	97.13%	0.0001	0.0000
19.5	34,971,323	97.01%	98.10%	96.87%	0.0001	0.0000
20.5	32,837,339	96.06%	97.87%	96.59%	0.0003	0.0000
21.5	30,635,402	95.76%	97.62%	96.30%	0.0003	0.0000
22.5	27,503,403	94.56%	97.35%	95.99%	0.0008	0.0002
23.5	24,607,377	94.12%	97.05%	95.66%	0.0009	0.0002
24.5	22,653,082	94.05%	96.73%	95.32%	0.0007	0.0002
25.5	20,845,859	93.99%	96.38%	94.95%	0.0006	0.0001
26.5	19,102,577	93.93%	96.01%	94.57%	0.0004	0.0000
27.5	17,244,456	93.90%	95.61%	94.16%	0.0003	0.0000
28.5	15,825,784	93.85%	95.17%	93.74%	0.0002	0.0000
29.5	14,639,423	93.84%	94.71%	93.29%	0.0001	0.0000
30.5	13,553,486	93.77%	94.21%	92.81%	0.0000	0.0001
31.5	12,586,777	93.65%	93.68%	92.32%	0.0000	0.0002
32.5	11,558,354	93.36%	93.11%	91.80%	0.0000	0.0002
33.5	10,358,628	92.20%	92.50%	91.25%	0.0000	0.0001
34.5	9,189,124	91.75%	91.85%	90.67%	0.0000	0.0001
35.5	7,994,061	91.25%	91.16%	90.07%	0.0000	0.0001
36.5	6,725,689	90.97%	90.43%	89.44%	0.0000	0.0002
37.5	5,395,304	87.97%	89.64%	88.77%	0.0003	0.0001
38.5	4,281,562	87.44%	88.81%	88.08%	0.0002	0.0000
39.5	3,465,364	86.52%	87.93%	87.35%	0.0002	0.0001
40.5	2,899,016	84.35%	87.00%	86.59%	0.0007	0.0005
41.5	2,321,013	84.35%	86.01%	85.80%	0.0003	0.0002
42.5	1,658,096	84.35%	84.96%	84.97%	0.0000	0.0000
43.5	1,033,107	84.35%	83.85%	84.10%	0.0000	0.0000
44.5	418,570	84.35%	82.68%	83.20%	0.0003	0.0001
45.5	69,378	84.35%	81.44%	82.25%	0.0008	0.0004
46.5			80.13%	81.26%		

Account 369 Curve Fitting

[1]	[2]	[3]	[4]	[5]	[6]	[7]
Age (Years)	**Exposures (Dollars)**	**Observed Life Table (OLT)**	**Company R3-60**	**OUCC R2.5-65**	**Company SSD**	**OUCC SSD**
Sum of Squared Differences for Entire OLT Curve				[8]	0.0078	0.0043
SSD for Truncated OLT Curve (Up to 1% of Beginning Exposures)				[9]	0.0067	0.0038

[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.

CEI South
Electric Division
353.00 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: 57 *Survivor Curve:* S0.5

Year (1)	Original Cost (2)	Avg. Service Life (3)	Avg. Annual Accrual (4)	Avg. Remaining Life (5)	Future Annual Accruals (6)
1955	225,513.98	57.00	3,956.39	16.25	64,272.30
1956	83,598.62	57.00	1,466.64	16.63	24,394.00
1957	202,296.34	57.00	3,549.06	17.02	60,412.89
1958	346,168.29	57.00	6,073.13	17.42	105,765.96
1959	593,510.70	57.00	10,412.47	17.81	185,468.21
1960	315,712.84	57.00	5,538.82	18.21	100,877.41
1961	448.01	57.00	7.86	18.62	146.32
1962	199,984.76	57.00	3,508.51	19.02	66,746.52
1963	356,358.33	57.00	6,251.90	19.44	121,510.63
1965	61,850.89	57.00	1,085.10	20.27	21,996.24
1966	127,687.08	57.00	2,240.13	20.69	46,359.34
1967	76,467.57	57.00	1,341.54	21.12	28,337.61
1968	110,080.37	57.00	1,931.24	21.56	41,629.38
1969	1,813,588.68	57.00	31,817.36	21.99	699,764.97
1970	327,244.30	57.00	5,741.13	22.44	128,803.77
1972	215,466.56	57.00	3,780.12	23.33	88,204.12
1973	302,802.79	57.00	5,312.33	23.79	126,384.99
1974	1,434,665.78	57.00	25,169.59	24.25	610,445.13
1975	354,247.76	57.00	6,214.88	24.72	153,638.38
1976	298,223.09	57.00	5,231.99	25.19	131,813.30
1977	1,051,705.36	57.00	18,450.98	25.67	473,692.23
1978	2,412,231.63	57.00	42,319.88	26.16	1,107,007.80
1979	418,381.65	57.00	7,340.03	26.65	195,605.75
1980	325,369.85	57.00	5,708.25	27.15	154,952.94
1981	3,403,254.69	57.00	59,706.26	27.65	1,650,840.14
1982	797,182.50	57.00	13,985.67	28.16	393,832.81
1983	1,182,333.19	57.00	20,742.70	28.68	594,833.12

CEI South
Electric Division
353.00 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: 57 **Survivor Curve:** S0.5

Year (1)	Original Cost (2)	Avg. Service Life (3)	Avg. Annual Accrual (4)	Avg. Remaining Life (5)	Future Annual Accruals (6)
1984	1,060,602.77	57.00	18,607.08	29.20	543,314.88
1985	1,453,449.29	57.00	25,499.13	29.73	758,107.72
1986	346,520.52	57.00	6,079.31	30.27	184,016.24
1987	4,008,603.28	57.00	70,326.41	30.82	2,167,118.12
1988	441,387.26	57.00	7,743.64	31.37	242,895.72
1989	377,047.62	57.00	6,614.87	31.93	211,206.33
1990	201,803.68	57.00	3,540.42	32.50	115,059.50
1991	177,827.71	57.00	3,119.79	33.08	103,192.67
1992	3,878,463.08	57.00	68,043.25	33.66	2,290,436.24
1993	487,870.22	57.00	8,559.13	34.26	293,212.52
1994	3,373,331.36	57.00	59,181.29	34.86	2,063,171.20
1995	475,555.21	57.00	8,343.08	35.48	295,975.23
1996	71,869.18	57.00	1,260.86	36.10	45,515.22
1997	839,032.87	57.00	14,719.88	36.73	540,658.14
1998	2,252,560.22	57.00	39,518.62	37.37	1,476,926.79
1999	502,265.74	57.00	8,811.68	38.03	335,073.76
2000	420,214.66	57.00	7,372.19	38.69	285,226.07
2001	1,967,358.80	57.00	34,515.09	39.36	1,358,584.86
2002	854,630.84	57.00	14,993.53	40.05	600,457.77
2003	288,215.24	57.00	5,056.41	40.74	206,021.07
2004	13,221,101.03	57.00	231,949.28	41.45	9,614,885.12
2005	2,486,397.85	57.00	43,621.04	42.17	1,839,527.31
2006	14,137,360.26	57.00	248,024.01	42.90	10,641,025.97
2007	24,110,494.25	57.00	422,991.37	43.65	18,462,667.44
2008	9,629,779.11	57.00	168,943.59	44.40	7,501,917.90
2009	18,267,212.77	57.00	320,477.60	45.17	14,476,896.90
2010	15,861,697.70	57.00	278,275.56	45.96	12,788,632.20

CEI South
Electric Division
353.00 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:* 57** ***Survivor Curve:* S0.5**

Year (1)	Original Cost (2)	Avg. Service Life (3)	Avg. Annual Accrual (4)	Avg. Remaining Life (5)	Future Annual Accruals (6)
2011	1,104,724.44	57.00	19,381.14	46.75	906,141.11
2012	2,664,544.47	57.00	46,746.42	47.56	2,223,459.48
2013	2,015,341.35	57.00	35,356.89	48.39	1,710,805.26
2014	8,723,899.22	57.00	153,050.95	49.23	7,534,158.45
2015	2,732,394.35	57.00	47,936.77	50.08	2,400,700.38
2016	9,084,220.20	57.00	159,372.38	50.95	8,119,922.16
2017	3,350,648.64	57.00	58,783.34	51.83	3,046,816.59
2018	5,144,477.09	57.00	90,254.04	52.73	4,759,284.10
2019	1,797,554.22	57.00	31,536.06	53.65	1,691,875.73
2020	10,401,779.42	57.00	182,487.46	54.58	9,960,622.86
2021	1,202,882.89	57.00	21,103.22	55.53	1,171,893.31
2022	7,336,754.69	57.00	128,715.07	56.50	7,272,940.38
Total	193,788,249.11	57.00	3,399,795.82	43.42	147,618,078.92

Composite Average Remaining Life ...* 43.42 *Years

CEI South
Electric Division
355.00 Poles 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: 48 **Survivor Curve:** S1.5

Year (1)	Original Cost (2)	Avg. Service Life (3)	Avg. Annual Accrual (4)	Avg. Remaining Life (5)	Future Annual Accruals (6)
1975	85,539.24	48.00	1,782.07	13.99	24,930.87
1976	989,785.80	48.00	20,620.54	14.40	296,852.12
1977	111,684.29	48.00	2,326.76	14.81	34,462.77
1978	805,803.14	48.00	16,787.57	15.24	255,790.28
1979	284,518.06	48.00	5,927.46	15.67	92,897.76
1980	1,209,386.07	48.00	25,195.55	16.12	406,114.66
1981	10,401.69	48.00	216.70	16.58	3,592.16
1983	501,428.46	48.00	10,446.43	17.53	183,073.87
1984	265,618.13	48.00	5,533.71	18.02	99,701.41
1985	1,908,729.35	48.00	39,765.20	18.52	736,512.29
1986	294,125.35	48.00	6,127.61	19.04	116,661.70
1987	1,751,709.77	48.00	36,493.96	19.57	714,148.18
1988	220,687.07	48.00	4,597.65	20.11	92,470.88
1989	468,258.20	48.00	9,755.38	20.67	201,645.31
1990	275,364.41	48.00	5,736.76	21.24	121,859.29
1991	270,115.31	48.00	5,627.40	21.83	122,834.94
1992	675,260.51	48.00	14,067.93	22.43	315,529.28
1993	1,288,615.10	48.00	26,846.15	23.05	618,735.31
1994	545,684.36	48.00	11,368.43	23.68	269,196.34
1995	130,562.50	48.00	2,720.05	24.33	66,170.23
1996	1,109,738.76	48.00	23,119.56	24.99	577,763.69
1997	849,399.37	48.00	17,695.82	25.67	454,248.30
1998	4,515,979.23	48.00	94,082.91	26.37	2,480,556.74
1999	232,003.81	48.00	4,833.41	27.08	130,878.72
2000	1,099,354.81	48.00	22,903.23	27.81	636,863.21
2001	1,149,195.44	48.00	23,941.57	28.55	683,581.17
2002	525,905.68	48.00	10,956.37	29.31	321,174.82

CEI South
Electric Division
355.00 Poles 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: **48** *Survivor Curve:* **S1.5**

Year (1)	Original Cost (2)	Avg. Service Life (3)	Avg. Annual Accrual (4)	Avg. Remaining Life (5)	Future Annual Accruals (6)
2003	572,306.51	48.00	11,923.05	30.09	358,793.55
2004	1,475,602.17	48.00	30,741.72	30.89	949,527.57
2005	6,719,886.98	48.00	139,997.66	31.70	4,438,037.42
2006	15,175,784.64	48.00	316,162.22	32.53	10,284,163.30
2007	13,007,758.69	48.00	270,995.01	33.37	9,043,407.94
2008	2,953,424.77	48.00	61,529.69	34.23	2,106,127.12
2009	6,587,815.61	48.00	137,246.18	35.10	4,817,704.16
2010	27,001,486.37	48.00	562,531.04	35.99	20,245,632.49
2011	4,633,764.95	48.00	96,536.78	36.89	3,561,405.43
2012	29,951,525.64	48.00	623,990.20	37.81	23,590,796.74
2013	6,275,472.17	48.00	130,739.02	38.73	5,063,987.02
2014	10,409,700.42	48.00	216,868.79	39.67	8,603,739.64
2015	2,265,889.55	48.00	47,206.04	40.62	1,917,629.76
2016	5,079,343.69	48.00	105,819.67	41.58	4,400,266.82
2017	3,613,901.86	48.00	75,289.63	42.55	3,203,812.42
2018	10,415,878.97	48.00	216,997.51	43.53	9,446,063.10
2019	15,778,963.85	48.00	328,728.46	44.52	14,633,494.95
2020	7,504,396.55	48.00	156,341.62	45.51	7,114,501.05
2021	1,513,232.54	48.00	31,525.68	46.50	1,465,991.52
2022	26,715,151.85	48.00	556,565.74	47.50	26,436,912.15
Total	219,226,141.69	48.00	4,567,211.90	37.60	171,740,240.44

Composite Average Remaining Life ... **37.60 Years**

CEI South
Electric Division
362.00 Distribution 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: 54 *Survivor Curve:* L1

Year (1)	Original Cost (2)	Avg. Service Life (3)	Avg. Annual Accrual (4)	Avg. Remaining Life (5)	Future Annual Accruals (6)
1958	342,230.57	54.00	6,337.20	22.13	140,271.79
1959	332,938.00	54.00	6,165.13	22.42	138,245.54
1960	360,788.37	54.00	6,680.84	22.71	151,746.83
1961	173,510.04	54.00	3,212.95	23.01	73,918.24
1962	144,044.71	54.00	2,667.33	23.30	62,153.40
1964	169,788.18	54.00	3,144.03	23.90	75,144.87
1965	247,065.96	54.00	4,575.01	24.20	110,736.16
1966	220,717.05	54.00	4,087.10	24.51	100,183.05
1967	415,883.28	54.00	7,701.06	24.82	191,149.02
1968	310,616.05	54.00	5,751.79	25.13	144,560.82
1969	290,367.23	54.00	5,376.83	25.45	136,831.08
1970	418,138.75	54.00	7,742.82	25.77	199,504.42
1971	252,189.86	54.00	4,669.89	26.09	121,825.94
1972	397,815.54	54.00	7,366.49	26.41	194,568.43
1973	294,230.58	54.00	5,448.37	26.74	145,688.14
1974	590,357.12	54.00	10,931.85	27.07	295,926.36
1975	622,095.78	54.00	11,519.57	27.40	315,679.04
1976	153,710.37	54.00	2,846.31	27.74	78,958.46
1977	1,175,782.50	54.00	21,772.38	28.08	611,388.29
1978	1,181,245.26	54.00	21,873.53	28.42	621,745.78
1979	1,087,351.06	54.00	20,134.86	28.77	579,322.24
1980	1,347,707.25	54.00	24,955.97	29.12	726,779.64
1981	1,214,152.58	54.00	22,482.89	29.48	662,714.63
1983	620,854.23	54.00	11,496.58	30.20	347,140.11
1984	542,916.22	54.00	10,053.37	30.56	307,230.47
1985	570,408.87	54.00	10,562.46	30.93	326,681.53
1986	1,025,434.98	54.00	18,988.34	31.30	594,355.43

CEI South
Electric Division
362.00 Distribution 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: 54 *Survivor Curve:* L1

Year (1)	Original Cost (2)	Avg. Service Life (3)	Avg. Annual Accrual (4)	Avg. Remaining Life (5)	Future Annual Accruals (6)
1987	530,343.50	54.00	9,820.56	31.68	311,087.75
1988	4,980.14	54.00	92.22	32.06	2,956.29
1989	732,389.93	54.00	13,561.92	32.44	439,965.79
1990	63,847.04	54.00	1,182.28	32.83	38,813.34
1991	974,491.96	54.00	18,045.01	33.22	599,485.34
1992	643,230.10	54.00	11,910.92	33.62	400,444.86
1993	119,776.86	54.00	2,217.95	34.03	75,466.78
1994	1,673,563.57	54.00	30,989.96	34.44	1,067,334.59
1995	3,411,619.57	54.00	63,174.16	34.87	2,202,792.34
1996	920,974.20	54.00	17,054.00	35.31	602,155.80
1997	3,900,204.08	54.00	72,221.45	35.76	2,582,876.26
1998	1,146,037.37	54.00	21,221.58	36.23	768,929.66
1999	2,970,899.64	54.00	55,013.19	36.72	2,019,964.24
2000	468,866.39	54.00	8,682.16	37.22	323,176.72
2001	568,960.34	54.00	10,535.64	37.75	397,689.83
2002	3,801,760.10	54.00	70,398.53	38.29	2,695,611.37
2003	2,076,689.22	54.00	38,454.78	38.85	1,494,146.12
2004	57,312.13	54.00	1,061.27	39.44	41,855.74
2005	3,530,034.24	54.00	65,366.88	40.05	2,617,637.50
2006	6,775,865.72	54.00	125,471.08	40.67	5,102,884.75
2007	2,451,123.17	54.00	45,388.31	41.32	1,875,462.00
2008	9,276,257.09	54.00	171,771.71	41.99	7,213,204.63
2009	11,464,259.56	54.00	212,287.72	42.69	9,062,049.55
2010	1,655,826.17	54.00	30,661.51	43.40	1,330,835.89
2011	2,154,100.23	54.00	39,888.23	44.14	1,760,759.84
2012	11,197,965.82	54.00	207,356.66	44.90	9,310,718.41
2013	2,003,115.46	54.00	37,092.39	45.68	1,694,371.27

CEI South
Electric Division
362.00 Distribution 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: 54 **Survivor Curve:** L1

Year (1)	Original Cost (2)	Avg. Service Life (3)	Avg. Annual Accrual (4)	Avg. Remaining Life (5)	Future Annual Accruals (6)
2014	3,393,717.28	54.00	62,842.65	46.48	2,921,042.63
2015	3,359,547.00	54.00	62,209.91	47.30	2,942,754.20
2016	4,947,541.74	54.00	91,615.37	48.14	4,410,758.79
2017	7,714,037.34	54.00	142,843.54	49.00	6,999,770.29
2018	8,278,323.39	54.00	153,292.62	49.88	7,646,072.07
2019	18,883,058.67	54.00	349,664.23	50.77	17,752,766.02
2020	19,780,463.52	54.00	366,281.79	51.68	18,928,050.66
2021	5,647,473.43	54.00	104,576.25	52.60	5,500,485.09
2022	20,306,860.07	54.00	376,029.26	53.53	20,129,598.78
Total	181,387,856.43	54.00	3,358,822.61	44.87	150,718,424.88

Composite Average Remaining Life ... 44.87 Years

CEI South
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: 65 *Survivor Curve:* S1.5

Year (1)	Original Cost (2)	Avg. Service Life (3)	Avg. Annual Accrual (4)	Avg. Remaining Life (5)	Future Annual Accruals (6)
1975	227,281.33	65.00	3,496.64	26.81	93,738.26
1976	277,181.72	65.00	4,264.33	27.35	116,647.57
1977	651,602.58	65.00	10,024.66	27.91	279,829.62
1978	646,900.05	65.00	9,952.31	28.48	283,476.11
1979	702,111.02	65.00	10,801.71	29.06	313,917.32
1980	592,019.89	65.00	9,108.00	29.65	270,077.94
1981	547,549.20	65.00	8,423.83	30.25	254,844.00
1983	519,541.92	65.00	7,992.95	31.49	251,683.89
1984	759,437.78	65.00	11,683.66	32.12	375,333.99
1985	888,872.71	65.00	13,674.97	32.77	448,122.44
1986	962,603.12	65.00	14,809.28	33.43	495,069.02
1987	981,131.22	65.00	15,094.33	34.10	514,683.20
1988	852,278.42	65.00	13,111.98	34.78	456,060.69
1989	962,458.09	65.00	14,807.05	35.47	525,263.06
1990	1,007,469.68	65.00	15,499.53	36.18	560,812.13
1991	627,033.68	65.00	9,646.67	36.90	355,980.78
1992	950,554.68	65.00	14,623.92	37.63	550,322.37
1993	1,249,896.90	65.00	19,229.18	38.38	737,935.11
1994	1,436,153.45	65.00	22,094.67	39.13	864,559.33
1995	1,341,265.41	65.00	20,634.85	39.90	823,302.08
1996	1,292,035.84	65.00	19,877.48	40.68	808,551.70
1997	2,099,312.25	65.00	32,297.11	41.47	1,339,366.54
1998	2,077,462.75	65.00	31,960.97	42.27	1,351,063.43
1999	2,546,721.48	65.00	39,180.33	43.09	1,688,273.94
2000	2,346,736.31	65.00	36,103.64	43.92	1,585,508.86
2001	1,644,710.21	65.00	25,303.24	44.76	1,132,487.35
2002	1,342,671.68	65.00	20,656.49	45.61	942,043.18

CEI South
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: 65 *Survivor Curve:* S1.5

Year (1)	Original Cost (2)	Avg. Service Life (3)	Avg. Annual Accrual (4)	Avg. Remaining Life (5)	Future Annual Accruals (6)
2003	1,936,601.85	65.00	29,793.88	46.47	1,384,495.19
2004	3,060,627.02	65.00	47,086.57	47.34	2,229,204.82
2005	3,701,795.95	65.00	56,950.71	48.23	2,746,472.05
2006	2,262,879.98	65.00	34,813.54	49.12	1,710,049.72
2007	1,753,268.04	65.00	26,973.36	50.02	1,349,297.52
2008	2,411,168.17	65.00	37,094.90	50.94	1,889,544.04
2009	2,160,327.01	65.00	33,235.80	51.86	1,723,616.08
2010	2,051,630.01	65.00	31,563.54	52.79	1,666,346.44
2011	1,998,939.19	65.00	30,752.91	53.73	1,652,445.83
2012	2,607,429.43	65.00	40,114.30	54.68	2,193,564.43
2013	1,994,074.01	65.00	30,678.06	55.64	1,706,871.70
2014	3,447,247.92	65.00	53,034.59	56.60	3,001,908.42
2015	3,163,489.18	65.00	48,669.07	57.57	2,801,975.99
2016	4,501,139.70	65.00	69,248.31	58.55	4,054,442.42
2017	9,768,247.55	65.00	150,280.75	59.53	8,946,431.17
2018	10,693,177.73	65.00	164,510.44	60.52	9,955,820.08
2019	9,968,472.84	65.00	153,361.13	61.51	9,433,110.59
2020	10,153,448.46	65.00	156,206.91	62.50	9,763,463.97
2021	6,781,988.69	65.00	104,338.30	63.50	6,625,578.94
2022	15,244,168.89	65.00	234,525.70	64.50	15,126,899.64
Total	129,193,114.99	65.00	1,987,586.57	54.03	107,380,492.93

Composite Average Remaining Life ... 54.03 Years

CEI South
Electric Division
369.00 Services

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: 65 *Survivor Curve:* R2.5

Year (1)	Original Cost (2)	Avg. Service Life (3)	Avg. Annual Accrual (4)	Avg. Remaining Life (5)	Future Annual Accruals (6)
1976	69,378.08	65.00	1,067.35	26.15	27,915.48
1977	349,191.55	65.00	5,372.17	26.84	144,167.83
1978	614,537.80	65.00	9,454.42	27.53	260,241.54
1979	624,988.21	65.00	9,615.19	28.22	271,370.10
1980	662,917.17	65.00	10,198.71	28.93	295,055.15
1981	578,002.69	65.00	8,892.34	29.64	263,610.55
1982	479,535.43	65.00	7,377.46	30.37	224,047.21
1983	771,140.26	65.00	11,863.68	31.10	368,953.84
1984	1,081,039.34	65.00	16,631.35	31.84	529,544.16
1985	1,108,875.06	65.00	17,059.59	32.59	555,903.68
1986	1,243,460.35	65.00	19,130.13	33.34	637,841.57
1987	1,145,473.59	65.00	17,622.65	34.10	600,987.73
1988	1,118,403.54	65.00	17,206.19	34.87	600,055.74
1989	1,056,747.62	65.00	16,257.63	35.65	579,581.97
1990	988,860.67	65.00	15,213.22	36.44	554,303.12
1991	950,048.13	65.00	14,616.11	37.23	544,119.36
1992	1,075,239.07	65.00	16,542.12	38.02	629,010.68
1993	1,183,364.63	65.00	18,205.59	38.83	706,929.25
1994	1,411,092.65	65.00	21,709.09	39.64	860,571.06
1995	1,850,115.75	65.00	28,463.28	40.46	1,151,621.47
1996	1,731,427.03	65.00	26,637.30	41.28	1,099,678.95
1997	1,792,536.33	65.00	27,577.45	42.12	1,161,425.92
1998	1,936,653.89	65.00	29,794.64	42.95	1,279,707.20
1999	2,766,759.25	65.00	42,565.47	43.79	1,864,148.37
2000	2,747,357.21	65.00	42,266.98	44.64	1,886,905.26
2001	2,100,859.30	65.00	32,320.87	45.50	1,470,541.74
2002	1,790,780.42	65.00	27,550.43	46.36	1,277,161.94

CEI South
Electric Division
369.00 Services

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: 65 **Survivor Curve:** R2.5

Year (1)	Original Cost (2)	Avg. Service Life (3)	Avg. Annual Accrual (4)	Avg. Remaining Life (5)	Future Annual Accruals (6)
2003	2,568,227.46	65.00	39,511.14	47.22	1,865,877.35
2004	2,591,193.24	65.00	39,864.46	48.10	1,917,302.66
2005	2,644,786.05	65.00	40,688.96	48.97	1,992,592.59
2006	3,655,657.22	65.00	56,240.81	49.85	2,803,781.57
2007	3,597,628.30	65.00	55,348.05	50.74	2,808,297.17
2008	2,755,154.05	65.00	42,386.93	51.63	2,188,456.52
2009	4,098,167.13	65.00	63,048.64	52.53	3,311,661.79
2010	1,554,896.74	65.00	23,921.46	53.43	1,278,034.80
2011	1,696,805.23	65.00	26,104.66	54.33	1,418,270.14
2012	2,279,167.00	65.00	35,064.06	55.24	1,936,922.27
2013	2,512,061.29	65.00	38,647.05	56.15	2,170,093.41
2014	2,598,706.91	65.00	39,980.05	57.07	2,281,621.57
2015	2,773,070.29	65.00	42,662.56	57.99	2,473,948.42
2016	2,549,710.46	65.00	39,226.26	58.91	2,310,959.83
2017	3,571,516.62	65.00	54,946.34	59.84	3,288,069.03
2018	3,277,346.87	65.00	50,420.65	60.77	3,064,172.81
2019	3,581,013.02	65.00	55,092.43	61.71	3,399,572.75
2020	3,578,420.89	65.00	55,052.56	62.64	3,448,697.12
2021	4,021,692.34	65.00	61,872.11	63.58	3,934,100.40
2022	3,138,120.86	65.00	48,278.72	64.53	3,115,292.10
Total	92,272,126.99	65.00	1,419,569.30	49.91	70,853,125.19

Composite Average Remaining Life ... 49.91 Years

STATE OF INDIANA

INDIANA UTILITY REGULATORY COMMISSION

VERIFIED PETITION OF SOUTHERN INDIANA GAS AND ELECTRIC COMPANY D/B/A CENTERPOINT ENERGY INDIANA SOUTH ("CEI SOUTH") FOR (1) AUTHORITY TO MODIFY ITS RATES AND CHARGES FOR ELECTRIC UTILITY SERVICE THROUGH A PHASE-IN OF RATES, (2) APPROVAL OF NEW SCHEDULES OF RATES AND CHARGES, AND NEW AND REVISED RIDERS, INCLUDING BUT NOT LIMITED TO A NEW TAX ADJUSTMENT RIDER AND A NEW GREEN POWER RIDER (3) APPROVAL OF A CRITICAL PEAK PRICING ("CPP") PILOT PROGRAM, (4) APPROVAL OF REVISED DEPRECIATION RATES APPLICABLE TO ELECTRIC AND COMMON PLANT IN SERVICE, (5) APPROVAL OF NECESSARY AND APPROPRIATE ACCOUNTING RELIEF, INCLUDING AUTHORITY TO CAPITALIZE AS RATE BASE ALL CLOUD COMPUTING COSTS AND DEFER TO A REGULATORY ASSET AMOUNTS NOT ALREADY INCLUDED IN BASE RATES THAT ARE INCURRED FOR THIRD-PARTY CLOUD COMPUTING ARRANGEMENTS, AND (6) APPROVAL OF AN ALTERNATIVE REGULATORY PLAN GRANTING CEI SOUTH A WAIVER FROM 170 IAC 4-1-16(f) TO ALLOW FOR REMOTE DISCONNECTION FOR NON-PAYMENT.	**CAUSE NO. 45990**

CENTERPOINT ENERGY INDIANA SOUTH'S RESPONSE TO OFFICE OF UTILITY CONSUMER COUNSELOR'S ELEVENTH SET OF DATA REQUESTS

Southern Indiana Gas & Electric Company d/b/a CenterPoint Energy Indiana South ("CEI South") pursuant to 170 IAC 1-1.1-16 and the discovery provisions of Rules 26 through 37 of the Indiana Rules of Trial Procedure, by its counsel, hereby submits the following Objections and Responses to the Office of Utility Consumer Counselor's ("OUCC") Eleventh Set of Data Requests dated January 17, 2024 ("Requests").

General Objections

All of the following General Objections are incorporated by reference in the response to each of the Requests:

1. The responses provided to the Requests have been prepared pursuant to a reasonable and diligent investigation and search conducted in connection with the Requests in those areas where

information is expected to be found. To the extent the Requests purport to require more than a reasonable and diligent investigation and search, CEI South objects on grounds that they include an undue burden or unreasonable expense.

2. CEI South objects to the Requests to the extent they seek documents or information which are not relevant to the subject matter of this proceeding and which are not reasonably calculated to lead to the discovery of admissible evidence.

3. CEI South objects to the Requests to the extent they seek responses and information from individuals and entities who are not parties to this proceeding and to the extent they request the production of information and documents not presently in CEI South's possession, custody or control. CEI South further objects to the Requests to the extent they are (i) vague and ambiguous as to the individuals and entities to whom the Request refer, or (ii) overbroad and not reasonably calculated to lead to the discovery of relevant or admissible evidence.

4. CEI South objects to the Requests to the extent they seek an analysis, calculation, or compilation which has not already been performed and which CEI South objects to performing.

5. CEI South objects to the Requests to the extent they are vague and ambiguous and provide no basis from which CEI South can determine what information is sought.

6. CEI South objects to the Requests to the extent they seek information outside the scope of this proceeding, and as such, the Requests seek information not reasonably calculated to lead to the discovery of relevant or admissible evidence.

7. CEI South objects to the extent the Requests purport to require production of (a) information in a particular format; (b) multiple copies of the same document; (c) additional copies of the same document merely because alterations, notes, comments, or other material appear thereon when such other material is not material or relevant; and (d) copies of the same information in multiple formats on the grounds that it is irrelevant, overbroad, unreasonably burdensome and not required by the Commission rules and inconsistent with practice in Commission proceedings.

8. CEI South objects to the Requests to the extent they solicit copies of voluminous documents.

9. CEI South objects to the Requests to the extent the discovery sought is unreasonably cumulative or duplicative; or is obtainable from some other source that is more convenient, less burdensome, or less expensive.

10. CEI South objects to the Requests to the extent the burden or expense of the proposed discovery outweighs its likely benefit, taking into account the needs of the case, the amount in controversy, the parties' resources, the importance of the issues at stake in litigation, and the importance of the proposed discovery in resolving the issues.

11. CEI South objects to the Request on the grounds that it is overbroad, unreasonably burdensome and seeks information that is largely irrelevant to the subject matter of this proceeding.

12. CEI South objects to the Requests to the extent they seek information that is confidential, proprietary, competitively sensitive and/or trade secret.

13. The responses constitute the corporate responses of CEI South and contain information gathered from a variety of sources. CEI South objects to the Requests to the extent they request identification of and personal information about all persons who participated in responding to each data request on the grounds that it is overbroad, unreasonably burdensome and irrelevant given the nature and scope of the requests and the many people who may be consulted about them. CEI South further objects to the Requests to the extent they purport to require identification of a witness who can answer questions regarding the substance of or origination of information supplied in each response on the ground that CEI South has no obligation to call witnesses to testify as to information provided in discovery.

14. CEI South objects to the Requests to the extent they seek information that is subject to the attorney-client, work product, settlement negotiation or other applicable privileges. CEI South further objects to the Requests to the extent they purport to require the creation of a privilege log on the grounds that given the extremely expedited and informal nature of discovery in this proceeding, contemporaneous privilege logs are inappropriate. CEI South objects to the Requests on the grounds they are unreasonably burdensome, overbroad, inconsistent with discovery practices in Commission proceedings and inconsistent with the informal discovery process applicable to this proceeding.

15. CEI South assumes no obligation to supplement these responses except to the extent required by Ind. Tr. R. 26(E) (1) and (2) and objects to the extent the instructions and/or Requests purport to impose any greater obligation. CEI South denies that Ind. Tr. R. 26(E)(3) applies to the Requests.

Subject to and without waiver of the general and specific objections set forth herein, CEI South responds to the Requests in the manner set forth below.

Data Requests – Set 11

Q 11.1 Referencing the direct testimony of Mr. Spanos, please provide a copy of the most recent industry surveys associated with depreciation statistics from other companies around the United States.

Response: There are no industry surveys with depreciation statistics. However, the industry statistics maintained by Gannett Fleming that were considered during the conduct of the depreciation study are attached to this response.

Attachment:

- 45990_Attachment OUCC DR11 11.01- Electric Industry Statistics.xlsx

Dated: January 29, 2024

As to objections only,

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AFFIRMATION

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

____

David J. Garrett
Resolve Utility Consulting, Inc.
Indiana Office of Utility Consumer Counselor

Cause No. 45990
CenterPoint Energy Indiana South

March 12, 2024
Date

CERTIFICATE OF SERVICE

The undersigned counsel for the OUCC certifies that on March 12, 2024 a copy of this ***Testimony of Public Exhibit No. 11, Witness David J. Garrett*** was electronically served, via e-mail, upon all parties of record in this proceeding.

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