GAS UTILITIES DOCKET NO. 10567

STATEMENT OF INTENT OF CENTERPOINT ENERGY RESOURCES CORP., D/B/A CENTERPOINT ENERGY ENTEX AND CENTERPOINT ENERGY TEXAS GAS TO INCREASE RATES IN THE TEXAS GULF DIVISION	§ § § § § §	BEFORE THE RAILROAD COMMISSION OF TEXAS

DIRECT TESTIMONY OF

DAVID J. GARRETT

ON BEHALF OF

TEXAS COAST UTILITIES COALITION

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DIRECT TESTIMONY OF DAVID J. GARRETT

I. INTRODUCTION

Q. STATE YOUR NAME AND OCCUPATION.

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

Q. SUMMARIZE YOUR EDUCATIONAL BACKGROUND AND PROFESSIONAL EXPERIENCE.

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

A more complete description of my qualifications and regulatory experience is included in my curriculum vitae.[1]

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

A. I am testifying on behalf of the Texas Coast Utilities Coalition ("TCUC") regarding the depreciation study and proposed depreciation expense of CenterPoint Energy Resources Corp. d/b/a CenterPoint Energy Entex and CenterPoint Energy Texas Gas ("CenterPoint Texas" or the "Company"). I am responding to the Company's depreciation study sponsored by Mr. Dane A. Watson.

II. EXECUTIVE SUMMARY

Q. SUMMARIZE THE KEY POINTS OF YOUR TESTIMONY.

A. In the context of utility ratemaking, "depreciation" refers to a cost allocation system designed to measure the rate by which a utility may recover its capital investments in a systematic and rational manner. I employed a well-established depreciation system and used actuarial analysis to statistically analyze the Company's depreciable assets in order to develop reasonable depreciation rates in this case. The table below compares the proposed depreciation expense amounts by plant function.

Figure 1:
Depreciation Expense Comparison by Plant Function

Plant Function	Original Cost 12/31/2015	Company Expense	TCUC Expense	TCUC Adjustment
Intangible	$ 34,663,218	$ 6,552,576	$ 6,552,576	$ -
Distributrion	1,410,175,923	49,937,156	44,354,139	(5,583,017)
General	177,929,787	12,347,434	12,047,479	(299,955)
Total	$ 1,622,768,927	$ 68,837,166	$ 62,954,193	**$ (5,882,973)**

TCUC's total adjustment reduces the Company's proposed annual depreciation expense by $5.9 million.

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1 Exhibit DJG-1.

Q. SUMMARIZE THE PRIMARY FACTORS DRIVING TCUC'S ADJUSTMENT.

A. I am proposing adjustments to several distribution and general accounts. For each of these accounts, I propose a longer average remaining life, which results in lower depreciation rates and expense. These accounts will be discussed in more detail below.[2]

Q. 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 life of the utility's assets. If depreciation rates are overestimated (i.e., service lives are underestimated), it encourages economic inefficiency. Unlike competitive firms, regulated utility companies are not always incentivized by natural market forces to make the most economically efficient decisions.[3] If a utility is allowed to recover the cost of an asset before the end of its useful life, this could incentivize the utility to unnecessarily replace the asset in order to increase rate base, which results in economic waste. Thus, from a public policy perspective, it is preferable for regulators to ensure that assets are not depreciated before the end of their true useful lives. While underestimating the useful lives of depreciable assets could financially harm current ratepayers and encourage economic waste, unintentionally overestimating depreciable lives (i.e., underestimating depreciation rates) does not harm the Company. This is because if an asset's life is overestimated, there are a variety of measures that regulators can use to ensure the utility is not financially harmed. One such measure would be the use of a regulatory asset account. In that case, the Company's original cost investment in these assets would remain in the Company's rate base until they are recovered. Thus, the process of depreciation strives for a perfect match between actual and estimated useful life. When these estimates are not exact, however, it is better that useful lives are overestimated rather than underestimated.

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2 *See* Exhibit DJG-4.

3 An obvious example of this fact can be seen in the very low debt ratios of regulated utilities.

III. LEGAL STANDARDS

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

A. In *Lindheimer v. Illinois Bell Telephone Co.*, the U.S. Supreme Court stated that "depreciation is the loss, not restored by current maintenance, which is due to all the factors causing the ultimate retirement of the property. These factors embrace wear and tear, decay, inadequacy, and obsolescence."[4] The *Lindheimer* Court also recognized that the original cost of plant assets, rather than present value or some other measure, is the proper basis for calculating depreciation expense.[5] 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.[6]

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

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

A. Yes. While the *Lindheimer* case and other early literature recognized depreciation as a necessary expense, the language indicated that depreciation was primarily a mechanism

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

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

[6] *Id*. at 169.

to determine loss of value.[7] Adoption of this "value concept" would require annual appraisals of extensive utility plant, and is thus not practical in this context. Rather, the "cost allocation concept" recognizes that depreciation is a cost of providing service, and that in addition to receiving a "return on" invested capital through the allowed rate of return, a utility should also receive a "return of" its invested capital in the form of recovered depreciation expense. The cost allocation concept also satisfies several fundamental accounting principles, including verifiability, neutrality, and the matching principle.[8] The definition of "depreciation accounting" published by the American Institute of Certified Public Accountants ("AICPA") properly reflects the cost allocation concept:

> Depreciation accounting is a system of accounting that aims to distribute cost or other basic value of tangible capital assets, less salvage (if any), over the estimated useful life of the unit (which may be a group of assets) in a systematic and rational manner. It is a process of allocation, not of valuation.[9]

Thus, the concept of depreciation as "the allocation of cost has proven to be the most useful and most widely used concept."[10]

IV. ANALYTIC METHODS

Q. DISCUSS YOUR APPROACH TO ANALYZING THE COMPANY'S DEPRECIABLE PROPERTY IN THIS CASE.

A. I obtained and reviewed all of the data that was used to conduct the Company's depreciation study. The depreciation rates proposed by Mr. Watson were developed based on depreciable property recorded as of December 31, 2015. I used the same plant balances to develop my proposed depreciation rates, and applied those rates to the Company's updated plant balances to arrive at TCUC's final adjustment to depreciation

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

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

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

10 Wolf *supra* n. 7, at 73.

expense.[11] I used a reasonable depreciation system to develop my proposed depreciation rates.

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

A. The legal standards set forth above do not mandate a specific procedure for conducting depreciation analysis. These standards, however, direct that analysts use a system for estimating depreciation rates that will result in the "systematic and rational" allocation of capital recovery for the utility. Over the years, analysts have developed "depreciation systems" designed to analyze grouped property in accordance with this standard. A depreciation system may be defined by several primary parameters: 1) a <u>method</u> of allocation; 2) a <u>procedure</u> for applying the method of allocation; 3) a <u>technique</u> of applying the depreciation rate; and 4) a <u>model</u> for analyzing the characteristics of vintage property groups.[12] In this case, I used the straight line method, the average life procedure, the remaining life technique, and the equal life group model to analyze the Company's actuarial data; this system would be denoted as an "SL-AL-RL-ELG" 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 THERE OTHER REASONABLE DEPRECIATION SYSTEMS THAT ANALYSTS MAY USE?

A. Yes. There are multiple combinations of depreciation systems that analysts may use to develop deprecation rates. For example, many analysts use the broad group model instead of the equal life group model. In this case, however, I used the same depreciation

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[11] *See* Exhibit DJG-4 for a detailed comparison between rates and accrual amounts as of the study date; *see also* Exhibit DJG-3 for TCUC's detailed expense adjustment by account regarding the Company's revenue requirement.

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

system that Mr. Watson used. Although some of our assumptions and inputs differed, the analytical system we used is essentially the same.

Q. DESCRIBE THE COMPANY'S PLANT DATA AND HOW IT AFFECTED YOUR APPROACH AND ANALYSIS IN THIS CASE.

A. For the general plant accounts (390 – 398), the Company had "aged data" available. Aged data refers to a collection of property data for which the dates of placements, retirements, transfers, and other actions are known. In keeping aged data, when a utility retires an asset, it would not only record the year it was retired, but it would also track the year the asset was placed into service, or the "vintage" year. The Company, however, did not have aged data available for all of its accounts. When aged data is not available, the year-end balances of each account are known, but analysts must "simulate" an actuarial analysis by estimating the proportion that each vintage group contributed to year-end balances. For this reason, simulated data is not as reliable as aged data. In order to analyze accounts that do not contain aged data, analysts use the "simulated plant record" ("SPR") method. Because the analytical approach is not the same for actuarial and simulated data, I will separately discuss each approach and the corresponding accounts below.

V. ACTUARIAL ANALYSIS

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

A. The study of retirement patterns of industrial property is derived from the actuarial process used to study human mortality. Just as actuaries study historical human mortality data in order to predict how long a group of people will live, depreciation analysts study historical plant data in order to estimate the average lives of property groups. The most common actuarial method used by depreciation analysts is called the "retirement rate method." In the retirement rate method, original property data, including additions, retirements, transfers, and other transactions, are organized by vintage and transaction year.[13] The retirement rate method is ultimately used to develop an "observed life table," ("OLT") which shows the percentage of property surviving at each age interval. This pattern of property retirement is described as a "survivor curve." The survivor curve derived from the observed life table, however, must be fitted and smoothed with a complete curve in order to determine the ultimate average life of the group.[14] 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."[15] A more detailed explanation of how the Iowa curves are used in the actuarial analysis of depreciable property is set forth in Appendix C.

A. Service Life Estimates

Q. GENERALLY DESCRIBE YOUR APPROACH IN ESTIMATING THE SERVICE LIVES OF MASS PROPERTY.

A. I used all of the Company's aged property data to create an observed life table ("OLT") for each account. The data points on the OLT can be plotted to form a curve (the "OLT curve"). The OLT curve is not a theoretical curve, rather, it is actual observed data from the Company's records that indicate the rate of retirement for each property group. An OLT curve by itself, however, is rarely a smooth curve, and is often not a "complete" curve (i.e., it does not end at zero percent surviving). In order to calculate average life (the area under a curve), a complete survivor curve is needed. The Iowa curves are empirically-derived curves based on the extensive studies of the actual mortality patterns of many different types of industrial property. The curve-fitting process involves selecting the best Iowa curve to fit the OLT curve. This can be accomplished through a combination of visual and mathematical curve-fitting techniques, as well as professional judgment. The first step of my approach to curve-fitting involves visually inspecting the OLT curve for any irregularities. For example, if the "tail" end of the curve is erratic and

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

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

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

shows a sharp decline over a short period of time, it may indicate that this portion of the data is less reliable, as further discussed below. After inspecting the OLT curve, I use a mathematical curve-fitting technique which essentially involves measuring the distance between the OLT curve and the selected Iowa curve in order to get an objective, mathematical assessment of how well the curve fits. After selecting an Iowa curve, I observe the OLT curve along with the Iowa curve on the same graph to determine how well the curve fits. I may repeat this process several times for any given account to ensure that the most reasonable Iowa curve is selected.

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

A. Not necessarily. Mathematical fitting is an important part of the curve-fitting process because it promotes objective, unbiased results. While mathematical curve fitting is important, however, it may not always yield the optimum result; therefore, it should not necessarily be adopted without further analysis.

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."[16] In accordance with this standard, an analyst may decide to truncate the tail end of the OLT curve at a certain percent of initial exposures, such as one percent. Using this approach puts a greater emphasis on the most valuable portions of the curve. For my analysis in this case, I not only considered the entirety of the OLT curve, but also conducted further analyses that involved fitting Iowa curves to the most significant part of the OLT curve for certain accounts. In other words, to verify the accuracy of my curve selection, I narrowed the focus of my additional calculation to consider the top 99% of the "exposures" (i.e., dollars exposed to

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16 Wolf *supra* n. 7, at 46.

retirement) and to eliminate the tail end of the curve representing the bottom 1% of exposures. I will illustrate an example of this approach in the discussion below.

B. ACCOUNT 390 – STRUCTURES AND IMPROVEMENTS

Q. PLEASE PRESENT YOUR CONCLUSION REGARDING ACCOUNT 390 – STRUCTURES AND IMPROVEMENTS.

A. A. I propose an Iowa curve of R3-55 and a depreciation rate of 2.08%, compared to the Company's Iowa curve of R3-40 and a depreciation rate of 2.92%.[17] My adjustment results in a reduction of $190,419 in depreciation expense.[18]

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

A. The observed survivor curve for this account provides a good example of how the tail end of the observed survivor curve can be unreliable and statistically irrelevant. The observed survivor curve is derived from the OLT calculated from the Company's aged plant data. Thus, as set forth above, the OLT curve is not an estimate or a theoretical curve, rather, it represents actual data. The graph below shows the OLT curve (black triangles) for this account.

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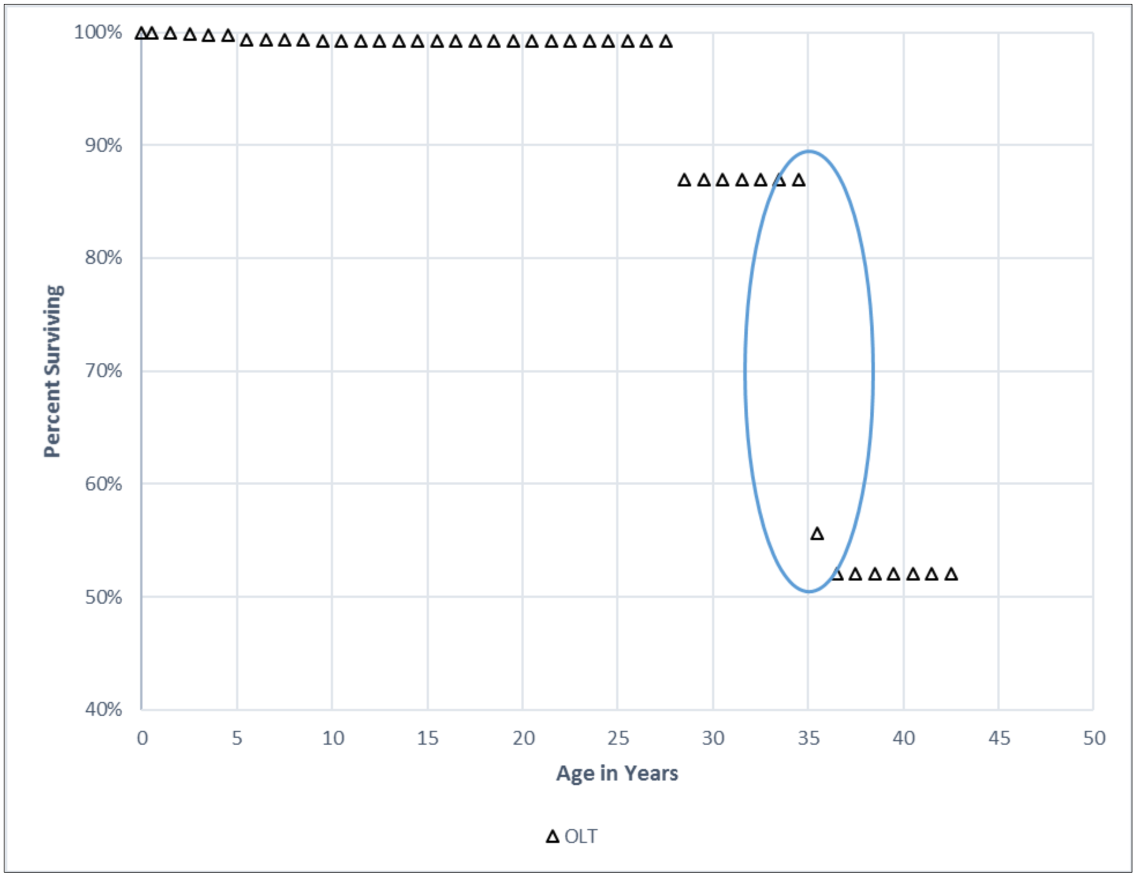
[17] Exhibit DJG-4.

[18] Exhibit DJG-3.

Figure 2:
Account 390 – Structures and Improvements



This graph shows the entire OLT curve obtained from the Company's plant data. Notice how there is a sudden drop in the OLT curve at age 35. Examination of the observed life table provides further explanation of this sudden change in the OLT curve. The figure below shows the pertinent portion of the observed life table for this account

Figure 3:
Account 390 – Portion of Observed Life Table

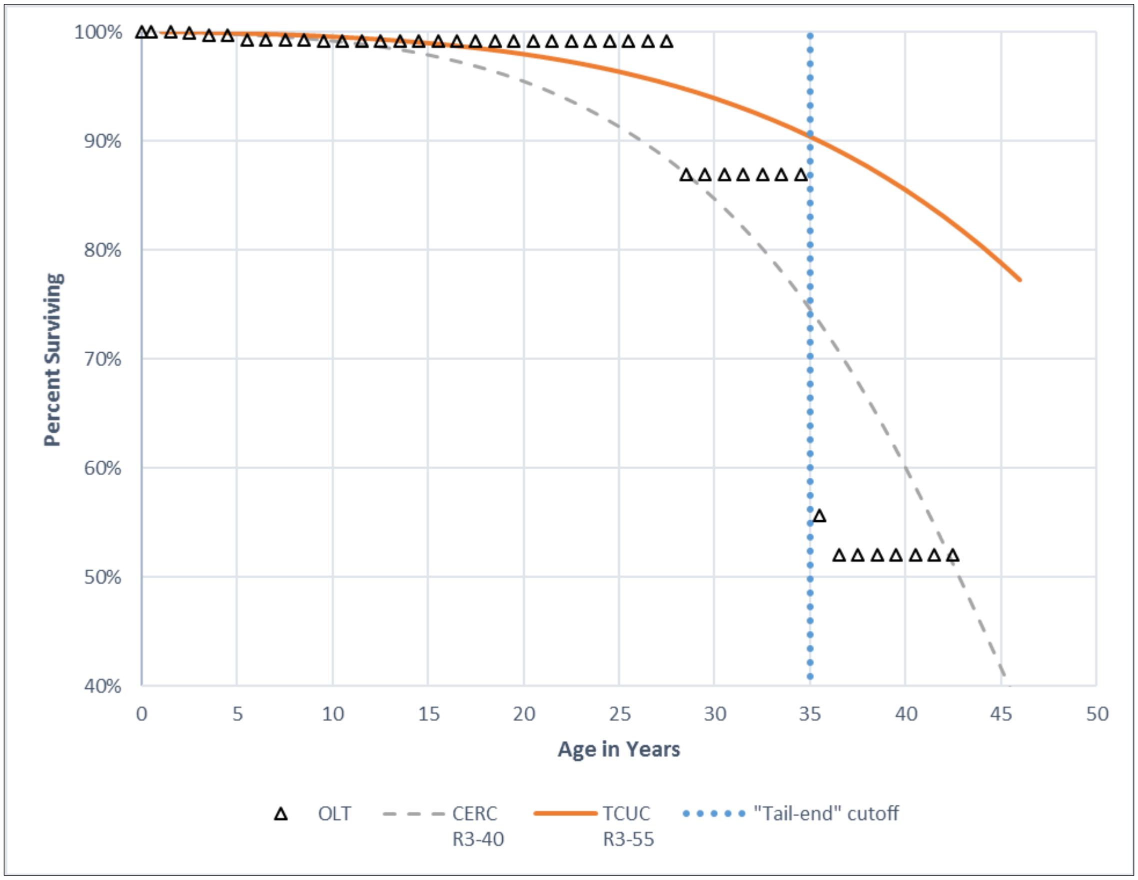
Age	Exposures	Retirements	Retirement Ratio	Percent Surviving
0	$ 28,898,108	$ -	0.000	100.00%
0.5	21,359,188	-	0.000	100.00%
1.5	16,557,960	17,056	0.001	100.00%
2.5	15,420,536	20,386	0.001	99.90%
3.5	888,380	-	0.000	99.76%
4.5	667,053	3,052	0.005	99.76%
5.5	576,693	-	0.000	99.31%
32.5	227,711	-	0.000	86.99%
33.5	227,711	-	0.000	86.99%
34.5	227,711	82,047	0.360	**86.99%**
35.5	145,664	9,500	0.065	**55.64%**
36.5	136,164	-	0.000	52.01%
37.5	136,164	-	0.000	52.01%
38.5	120,089	-	0.000	52.01%
39.5	33,654	-	0.000	52.01%
40.5	33,654	-	0.000	52.01%

This life table shows the dollars exposed to retirement (or "exposures") at the beginning of each age interval and the dollars retired during each age interval. The retirement ratio is calculated by dividing the retirements by the exposures. The percent surviving at each age interval is shown in the far right column. At age interval 34.5, we notice a substantial decrease in the percent surviving – from 86.99% to 55.64%. This interval corresponds with the gap in the OLT curve shown in the previous graph. In an account with beginning exposures of $28.9 million, a mere $82,047 of retirements cause a substantial 31% decrease in the OLT curve. We should not give the same analytical weight to the remaining data points in the OLT curve after this point. This illustration demonstrates that when the tail end of the OLT curve contains far fewer exposures than other portions of the OLT curve, it can be erratic and very problematic from a statistical standpoint.

Q. DID THE COMPANY'S SELECTED IOWA CURVE FOR THIS ACCOUNT APPEAR TO TRACK THE TAIL END OF THE OLT CURVE.

A. Yes. For this account the Company selected the Iowa R3-40 curve to represent its mortality characteristics. I selected the Iowa R3-55 curve for this account. These two curves are juxtaposed with the OLT curve in the graph below.[19]

Figure 4:
Account 390 – Structures and Improvements



The vertical dotted line at the 35-year age interval shows the erratic drop in the OLT curve discussed above. The data points of the OLT curve to the right of this line should be ignored from a statistical standpoint. The Company's R3-40 curve, however, declines sharply beginning at the age 15 interval and appears to give significance to the erratic tail end of this OLT curve.

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[19] *See also* Exhibit DJG-6.

Q. IS YOUR SELECTED IOWA CURVE A BETTER MATHEMATICAL FIT TO THE RELEVANT PORTION OF THE OLT CURVE?

A. Yes. Although it is visually clear that the Iowa R3-40 curve is a better fit to the relevant portion of the OLT curve, this fact can also be confirmed mathematically. Mathematical curve fitting essentially involves measuring the distance between the OLT curve and the selected Iowa curve. The best mathematically-fitted curve is the one that minimizes the distance between the OLT curve and the Iowa curve, thus providing the closest fit. The "distance" between the curves is calculated using the "sum-of-squared differences" ("SSD") technique. In Account 390, the total SSD, or "distance" between the Company's curve and the relevant portion of the OLT curve is 0.1318, while the total SSD between R3-55 and the OLT curve is only 0.0275. Thus, the R3-55 is a better mathematical fit. Applying the R3-55 curve to this account results in a remaining life of 45.2 years and a depreciation accrual rate of 2.08%.[20]

VI. SIMULATED PLANT RECORD ANALYSIS

Q. DESCRIBE THE SIMULATED PLANT RECORD METHOD.

A. As discussed above, when aged data is not available, we must "simulate" the actuarial data required for remaining life analysis. For the distribution accounts in this case, the Company did not provide aged data. Thus, Mr. Watson and I both used the simulated plant record ("SPR") model to analyze these accounts.[21] The SPR method involves analyzing the Company's unaged data by choosing an Iowa curve that best simulates that actual year-end account balances in the account.

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

A. There are two primary metrics used to measure the fit of the Iowa curve selected to describe an SPR account. The first is the "conformance index" ("CI"). The CI is the average observed plant balance for the tested years, divided by the square root of the average sum of squared differences (the "SSD" discussed above) between the simulated

[20] *See* Exhibit DJG-5 for depreciation calculation; *see also* Exhibit DJG-9 for detailed remaining life calculations.

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

and actual balances plant balances.[22] A higher CI indicates a better fit. Alex Bauhan, who developed the CI, also proposed a scale for measuring the value of the CI, as follows.

Figure 5:
Conformance Index Scale

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

Even Bauhan, however, described his own scale as "arbitrary."[23]

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

Figure 6:
Retirement Experience Index Scale

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

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

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

23 *Id*.

conformance index be "Good" or better."[24] I considered both of these scales in assessing my SPR analysis for each account, as further described below.

Q. DESCRIBE YOUR SPR ANALYSIS OF THE COMPANY'S DISTRIBUTION ACCOUNTS.

A. I made adjustments to four distribution accounts based on the SPR method. Each account is individually discussed below. The total dollar impact of these adjustment is $5.6 million.[25]

A. Account 376 – Distribution Mains – Plastic

Q. PLEASE PRESENT YOUR CONCLUSION REGARDING ACCOUNT 376 – DISTRIBUTION MAINS – PLASTIC.

A. I propose an Iowa curve of R2-65 and a depreciation rate of 2.59%, compared to the Company's Iowa curve of R2.5-63 and a depreciation rate of 2.67%.[26] My adjustment results in a reduction of $290,517 in depreciation expense.[27]

Q. DESCRIBE THE COMPANY'S ESTIMATE FOR THIS ACCOUNT.

A. The Company selected the R2.5-63 curve for this account, which results in a depreciation rate of 2.67%. Under the observation band of 1970 – 2015, the R2.5-63 curve has a good CI, but a very poor REI of only 19.

Q. DESCRIBE YOUR POSITION REGARDING THIS ACCOUNT.

A. As with all of the accounts discussed in this section, I analyzed this account under five-year band periods. Band analysis is useful for observing trends in retirement data, or for analyzing more recent periods of time, which may provide a better indication of future retirement patterns. For example, analysis of a series of five-year periods from 1976 – 2015 reveals that the mean highest-ranking average life is much higher than the average

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

[25] *See* Exhibit DJG-3.

[26] Exhibit DJG-4.

[27] Exhibit DJG-3.

life of 63 proposed by the Company. The most recent five-year period, 2011 – 2015, reveals that the L1.5 – 75 is the highest ranking Iowa curve, with a higher CI and a higher REI than the Company's selected curve. This trend in the data may indicate that the assets in this account will last longer than what is indicated by an analysis of the entire account band (starting at 1970).

Q. HAVE YOU ANALYZED ACTUARIAL DATA FOR ACCOUNT 376 FROM OTHER COMPANIES THAT INDICATE AVERAGE LIVES IN EXCESS OF 65 YEARS?

A. Yes. Although it is not necessarily instructive in most circumstances to compare the retirement patterns of asset accounts among different utilities, it may, at the very least, provide a basis upon which to gauge the reasonableness of a recommendation, especially when the utility being analyzed does not have reliable aged data. It is not unusual to see average life indications in excess of 65 years for Account 376.

Q. WHAT IS YOUR RECOMMENDATION REGARDING ACCOUNT 376?

A. I selected the R2-65 curve for this account. Given the recent trends in the data for this account, it appears that the average life is longer than 63 years, and perhaps longer than 65 years. However, a recommended average life of 65 years is reasonable and conservative. Applying the R2-65 curve to this account results in a remaining life of 42.8 years, a depreciation rate of 2.59%, and a dollar adjustment of $290,517.[28]

B. ACCOUNT 379 – MEASURING AND REGULATING EQUIPMENT – CITY GATE

Q. PLEASE PRESENT YOUR CONCLUSION REGARDING ACCOUNT 379 – MEASURING AND REGULATING EQUIPMENT – CITY GATE.

A. I propose an Iowa curve of R0.5-43 and a depreciation rate of 3.34%, compared to the Company's Iowa curve of R1-38 and a depreciation rate of 3.50%.[29] My adjustment results in a reduction of $37,580 in depreciation expense.[30]

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[28] *See* Exhibits DJG-3, 4, and 5.

[29] Exhibit DJG-4.

Q. DESCRIBE THE COMPANY'S ESTIMATE FOR THIS ACCOUNT.

A. Mr. Watson chose an R1-38 curve for this account, which results in a depreciation expense of $1 million.

Q. DESCRIBE YOUR POSITION REGARDING THIS ACCOUNT.

A. The curve I selected for this account, the R0.5-43 curve, is the highest ranking curve according to the SPR runs provided by Mr. Watson. The curve I selected also has a higher CI than the Company's curve and has an excellent REI of 89.45.

Q. WHAT IS YOUR RECOMMENDATION REGARDING ACCOUNT 379?

A. Selecting an R0.5-43 curve for this account results in a remaining life calculation of 23.6 and a depreciation rate of 3.34%.

C. ACCOUNT 380 – SERVICES – PLASTIC

Q. PLEASE PRESENT YOUR CONCLUSION REGARDING ACCOUNT 380 – SERVICES – PLASTIC.

A. I propose an Iowa curve of R2-56 and a depreciation rate of 2.84%, compared to the Company's Iowa curve of R2.5-46 and a depreciation rate of 4.03%.[31] My adjustment results in a reduction of $4,930,903 in depreciation expense.[32]

Q. DESCRIBE THE COMPANY'S ESTIMATE FOR THIS ACCOUNT.

A. For this account, Mr. Watson selected an R2.5-46 curve, which results in a depreciation expense of $16.7 million.[33]

Q. DO YOU AGREE WITH THE COMPANY'S POSITION ON THIS ACCOUNT?

A. No. An average life of only 46 years is notably short for Account 380. According to my SPR runs, there are several average life combinations with higher average lives than 46

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[30] Exhibit DJG-3.

[31] Exhibit DJG-4.

[32] Exhibit DJG-3.

[33] *See* Exhibit DJG-3 for expense adjustments.

years that are higher ranking, when considering the CI and REI together, including average lives of 58 years, 65 years, and 68 years. Furthermore, my experience with analysis of other gas companies with more reliable actuarial data for Account 380 has revealed average lives much higher than 46 years. While it is not always appropriate to rely on the average lives and curve shapes indicated by the retirement patters of another company's account, when the data is relatively unreliable, as it is here, it can be instructive to consider the experiences of other utilities. As acknowledged by Mr. Watson, "[s]ince the period of life analysis is short for this account (plastic services began to be installed in 1970), the REI results do not get into the good or excellent range."[34]

Q. HAVE OTHER GAS COMPANIES SPECIFICALLY ADOPTED AVERAGE SERVICE LIVES OF UP TO 58 YEARS FOR ACCOUNT 380?

A. Yes. In Oklahoma Natural Gas Company's ("ONG") 2015 rate case, the Oklahoma Commission approved a joint settlement among the parties. With regard to depreciation expense, there was only one account specifically mentioned in the settlement agreement: Account 380. According to the settlement agreement, the parties agreed to:

> Depreciation Expense adjustment in the amount of ($5,818,495). As part of this adjustment [ONG's] **<u>Asset Account 380.0 Service (Plastic) shall reflect a 58-year average life</u>**.[35]

In fact, ONG's actuarial data in that case indicated a longer average life than 58 years for this account, but the parties ultimately settled on 58 years.

Q. ARE YOU PROPOSING A 58-YEAR AVERAGE LIFE FOR ACCOUNT 380?

A. No. I am proposing a shorter average life in the interest of reasonableness. Specifically, I propose an R2-56 curve for this account. The R2 curve shape is the same shape proposed by Mr. Watson, but the 56-year average life represents a more accurate

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[34] *See* Exhibit DAW-2, p. 36.

[35] *See* Joint Stipulation and Settlement Agreement paragraph 3, filed November 13, 2015 in Cause No. PUD 201500213 before the Oklahoma Corporation Commission (emphasis added). This agreement was approved in Order No. 648236 filed in the same cause and entered January 6, 2016.

representation of this account. Since the Company's data is relatively unreliable regarding this account, it is instructive to look to the actuarial data of other utilities for this account, such as the ONG case discussed above, in order to assess the reasonableness of the proposed average life for this account. In this context, a 56-year average life is within the reasonable range of optional curve choices within the SPR runs. As indicated above, when the data for any particular account is lacking in reliability such that relatively more subjectivity must be included in the decision-making process, it is better from a regulatory and public policy perspective to lean toward longer depreciable lives rather than shorter lives. Doing so can provide current ratepayers with some financial relief in the face of a substantial rate increase while not imposing any financial harm to the Company.

Q. WHAT IS THE IMPACT OF YOUR RECOMMENDATION FOR ACCOUNT 380?

A. Selecting an R2-56 curve for this account results in a remaining life of 35.5 years, a depreciation rate of 2.84%, and an expense adjustment of $4.9 million.

D. ACCOUNT 382 – METER INSTALLATIONS – LARGE

Q. PLEASE PRESENT YOUR CONCLUSION REGARDING ACCOUNT 382 – METER INSTALLATIONS – LARGE.

A. I propose an Iowa curve of R0.5-43 and a depreciation rate of 2.89%, compared to the Company's Iowa curve of R1-38 and a depreciation rate of 4.05%.[36] My adjustment results in a reduction of $324,017 in depreciation expense.[37]

Q. DESCRIBE THE COMPANY'S POSITION ON THIS ACCOUNT.

A. The Company is proposing to use an R1-38 curve for this account, which results in a depreciation expense of $1.1 million.

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[36] Exhibit DJG-4.

[37] Exhibit DJG-3.

Q. DESCRIBE YOUR POSITION REGARDING THIS ACCOUNT.

A. The curve I selected for this account, the R0.5-43 curve, is the highest-ranking curve according to the SPR runs provided by Mr. Watson. The R0.5-43 curve has a higher CI than the Company's curve and has an excellent REI of 82.

Q. WHAT IS THE IMPACT OF YOUR RECOMMENDATION FOR THIS ACCOUNT?

A. Selecting an R0.5-43 curve for this account results in a remaining life of 24.5 years, a depreciation rate of 2.89%, and 35.5 years, and an expense adjustment of approximately $324,000.

VII. NET SALVAGE ANALYSIS

Q. DESCRIBE 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.

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

A. In this case, I examined the Company's historical net salvage data over different periods of time.

Q. ARE YOU RECOMMENDING ANY ADJUSTMENTS TO THE COMPANY'S PROPOSED NET SALVAGE RATES?

A. No. The Company's proposals with regard to net salvage appear to be reasonable in this case.

VIII. CONCLUSION AND RECOMMENDATION

Q. SUMMARIZE THE KEY POINTS OF YOUR TESTIMONY.

A. I employed a well-established depreciation system and used actuarial and simulated analysis to statistically analyze the Company's depreciable assets in order to develop reasonable depreciation rates in this case. I made adjustments to several actuarial and simulated asset accounts based on mathematical Iowa curve fitting, SPR analysis, and professional judgment.

Q. WHAT IS TCUC'S RECOMMENDATION TO THE COMMISSION WITH REGARD TO DEPRECIATION RATES AND EXPENSE?

A. TCUC recommends that the Commission adopt the proposed depreciation rates presented in Exhibit DJG-3. Applying these rates to the Company's pro forma plant balances results in an adjustment reducing the total Company-proposed annual depreciation expense by $5,882,973.[38]

Q. DOES THIS CONCLUDE YOUR TESTIMONY?

A. A. Yes, including any exhibits, appendices, and other items attached hereto. I reserve the right to supplement this testimony as needed with any additional information that has been requested from the Company but not yet provided.

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38 *See* Exhibit DJG-3.

GAS UTILITIES DOCKET NO. 10567

STATEMENT OF INTENT OF CENTERPOINT ENERGY RESOURCES CORP., D/B/A CENTERPOINT ENERGY ENTEX AND CENTERPOINT ENERGY TEXAS GAS TO INCREASE RATES IN THE TEXAS GULF DIVISION	§ § § § § §	**BEFORE THE RAILROAD COMMISSION OF TEXAS**

DIRECT TESTIMONY OF DAVID J. GARRETT

APPENDIX A: The Depreciation System

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.[39] 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.[40] The figure below illustrates the basic concept of a depreciation system and includes some of the available parameters.[41]

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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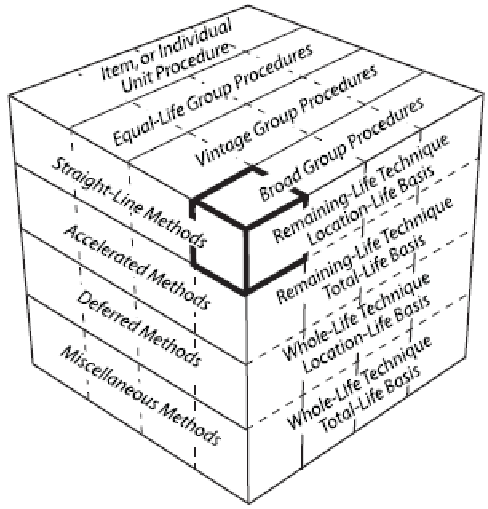
39 Wolf *supra* n. 7, at 69-70.

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

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

Figure 7:
The Depreciation System Cube



1. <u>Allocation Methods</u>

The "method" refers to the pattern of depreciation in relation to the accounting periods. The method most commonly used in the regulatory context is the "straight-line method" – a type of age-life method in which the depreciable cost of plant is charged in equal amounts to each accounting period over the service life of plant.[42] 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.[43] The basic formula for the straight-line method is as follows:[44]

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42 NARUC *supra* n. 8, at 56.

43 *Id*.

44 *Id*.

Equation 1:
Straight-Line Accrual

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

Gross plant is a known amount from the utility's records, while both net salvage and service life must be estimated in order to calculate the annual accrual. The straight-line method differs from accelerated methods of recovery, such as the "sum-of-the-years-digits" method and the "declining balance" method. Accelerated methods are primarily used for tax purposes and are rarely used in the regulatory context for determining annual accruals.[45] In practice, the annual accrual is expressed as a rate which is applied to the original cost of plant in order to determine the annual accrual in dollars. The formula for determining the straight-line rate is as follows:[46]

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.[47] While single units may be analyzed for depreciation, a group plan of depreciation is particularly adaptable to utility property. Employing a grouping procedure allows for a composite application of depreciation rates to groups of similar property, rather than excessively conducting calculations for each unit. Whereas an individual unit of property has a single life, a group of property displays a dispersion of lives and the life

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45 *Id*. at 57.

46 *Id*. at 56.

47 Wolf *supra* n. 7, at 74-75.

characteristics of the group must be described statistically.[48] 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.[49]

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.[50] Thus, the average life procedure treats each unit as though its life is equal to the average life of the group. In contrast, the equal life procedure treats each unit in the group as though its life was known.[51] Under the equal life procedure the property is divided into subgroups that each has a common life.[52]

3. <u>Application Techniques</u>

The third factor of a depreciation system is the "technique" for applying the depreciation rate. There are two commonly used techniques: "whole life" and "remaining life." The whole life technique applies the depreciation rate on the estimated average service life of a group, while the remaining life technique seeks to recover undepreciated costs over the remaining life of the plant.[53]

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48 *Id*. at 74.

49 NARUC *supra* n. 8, at 61-62.

50 *See* Wolf *supr*a n. 7, at 74-75.

51 *Id*. at 75.

52 *Id*.

53 NARUC *supra* n. 8, at 63-64.

In choosing the application technique, consideration should be given to the proper level of the accumulated depreciation account. Depreciation accrual rates are calculated using estimates of service life and salvage. Periodically these estimates must be revised due to changing conditions, which cause the accumulated depreciation account to be higher or lower than necessary. Unless some corrective action is taken, the annual accruals will not equal the original cost of the plant at the time of final retirement.[54] 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.[55] 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.[56] 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:[57]

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

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

[56] NARUC *supra* n. 8, at 65 ("The desirability of using the remaining life technique is that any necessary adjustments of [accumulated depreciation] . . . are accrued automatically over the remaining life of the property. Once commenced, adjustments to the depreciation reserve, outside of those inherent in the remaining life rate would require regulatory approval.").

[57] *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.[58]

4. <u>Analysis Model</u>

The fourth parameter of a depreciation system, the "model," relates to the way of viewing the life and salvage characteristics of the vintage groups that have been combined to form a continuous property group for depreciation purposes.[59] A continuous property group is created when vintage groups are combined to form a common group. Over time, the characteristics of the property may change, but the continuous property group will continue. The two analysis models used among practitioners, the "broad group" and the "vintage group," are two ways of viewing the life and salvage characteristics of the vintage groups that have been combined to from a continuous property group.

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

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[58] Wolf *supra* n. 7, at 178.

[59] *See* Wolf *supra* n. 7, at 139 (I added the term "model" to distinguish this fourth depreciation system parameter from the other three parameters).

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

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APPENDIX B: Iowa Curves

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.[60] This explains why the word "mortality" is often used in the context of depreciation analysis. In fact, a group of property installed during the same accounting period is analogous to a group of humans born during the same calendar year. Each period the group will incur a certain fraction of deaths / retirements until there are no survivors. Describing this pattern of mortality is part of actuarial analysis, and is regularly used by insurance companies to determine life insurance premiums. The pattern of mortality may be described by several mathematical functions, particularly the survivor curve and frequency curve. Each curve may be derived from the other so that if one curve is known, the other may be obtained. A survivor curve is a graph of the percent of units remaining in service expressed as a function of age.[61] A frequency curve is a graph of the frequency of retirements as a function of age. Several types of survivor and frequency curves are illustrated in the figures below.

1. Development

The survivor curves used by analysts today were developed over several decades from extensive analysis of utility and industrial property. In 1931 Edwin Kurtz and Robley Winfrey used extensive data from a range of 65 industrial property groups to create survivor curves representing the life characteristics of each group of property.[62] They generalized the 65 curves into 13 survivor curve types and published their results in *Bulletin 103: Life Characteristics of*

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60 Wolf *supra* n. 7, at 276.

61 *Id*. at 23.

62 *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.[63] This resulted in 5 additional survivor curve types for a total of 18 curves. In 1935, Winfrey published *Bulletin 125: Statistical Analysis of Industrial Property Retirements*. According to Winfrey, "[t]he 18 type curves are expected to represent quite well all survivor curves commonly encountered in utility and industrial practices."[64] 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.[65] Rather than using the original formulas, analysts typically rely on the published tables containing the percentages surviving. This is because absent knowledge of the integration technique applied to each age interval, it is not possible to recreate the exact original published table values. In the 1970s, John Russo collected data from over 2,000 property accounts reflecting observations during the period 1965 – 1975 as part of his Ph.D. dissertation at Iowa State. Russo essentially repeated Winfrey's data collection, testing, and analysis methods used

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[63] *Id*.

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

[65] 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).

to develop the original Iowa curves, except that Russo studied industrial property in service several decades after Winfrey published the original Iowa curves. Russo drew three major conclusions from his research:[66]

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.[67]

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

[67] *Id*.

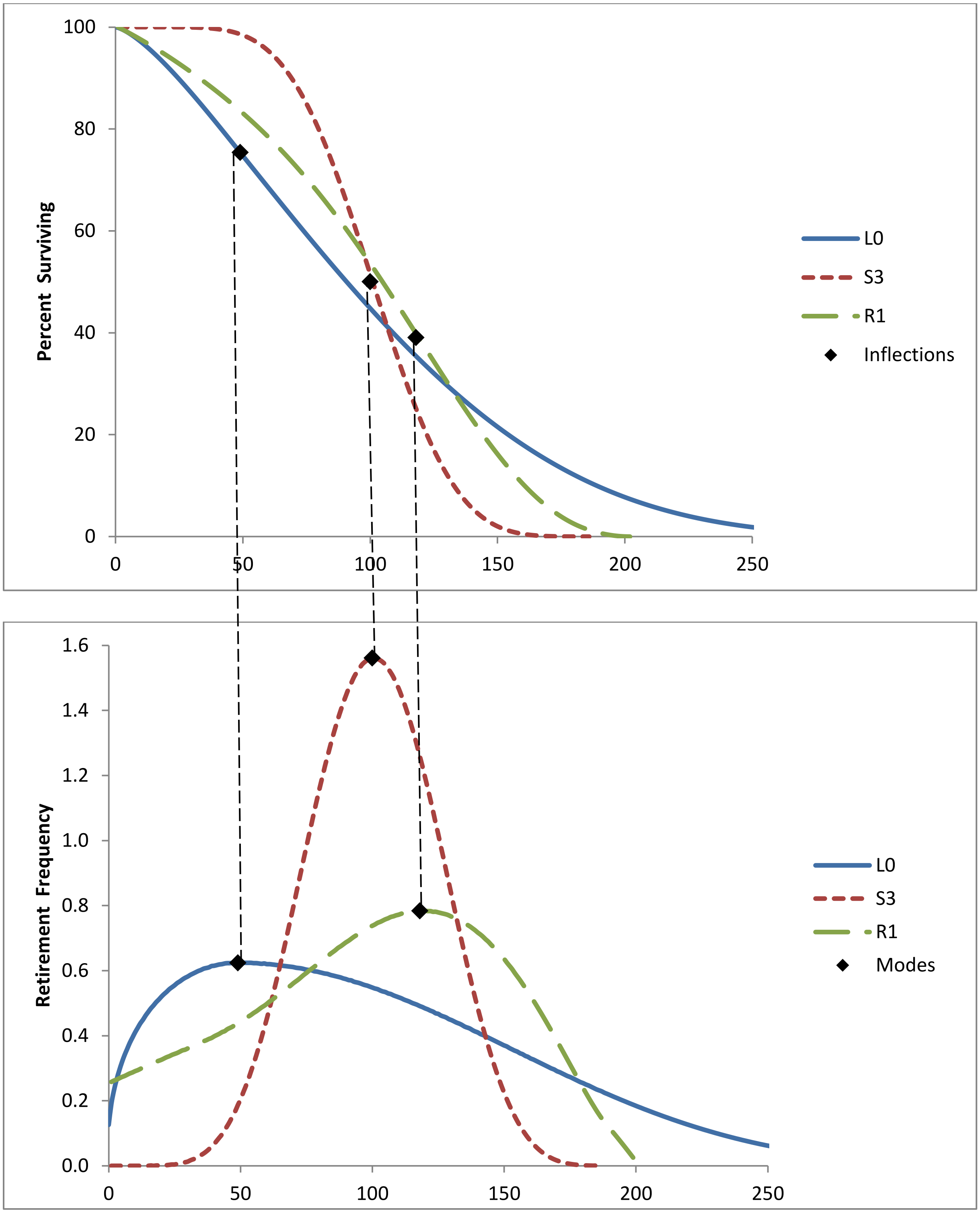
2. Classification

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).[68] 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.

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

Figure 8:
Modal Age Illustration



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

> Since the location of a particular survivor on a graph is affected by both its span in years and the shape of the curve, it is difficult to classify a group of curves unless one of these variables can be controlled. This is easily done by expressing the age in percent of average life."[69]

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

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

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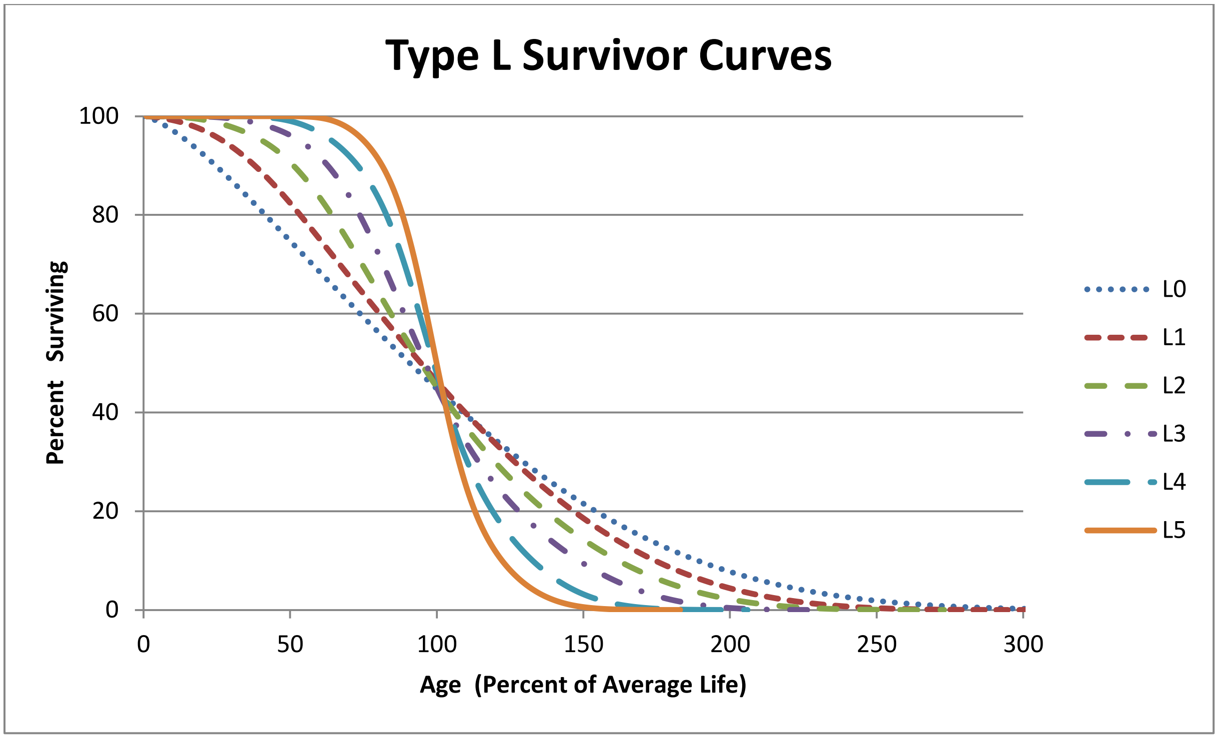
[69] Winfrey *supra* n. 75, at 60.

Figure 9:
Type L Survivor and Frequency Curves



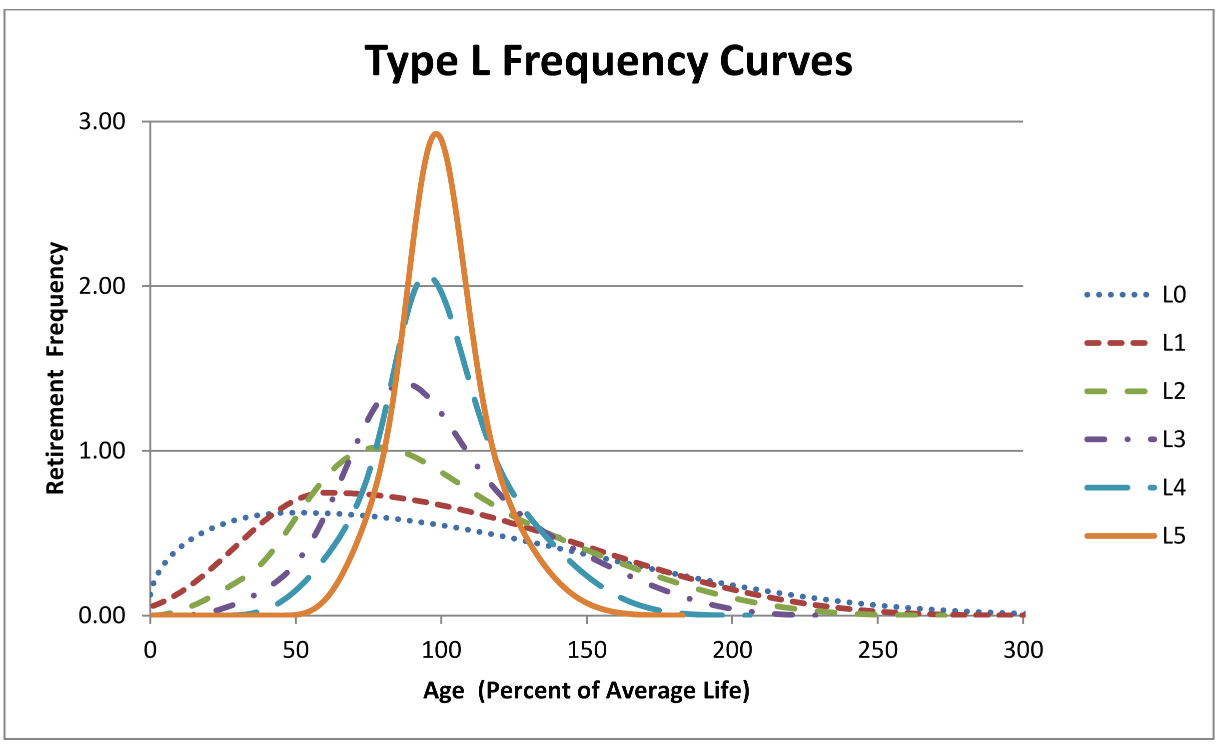
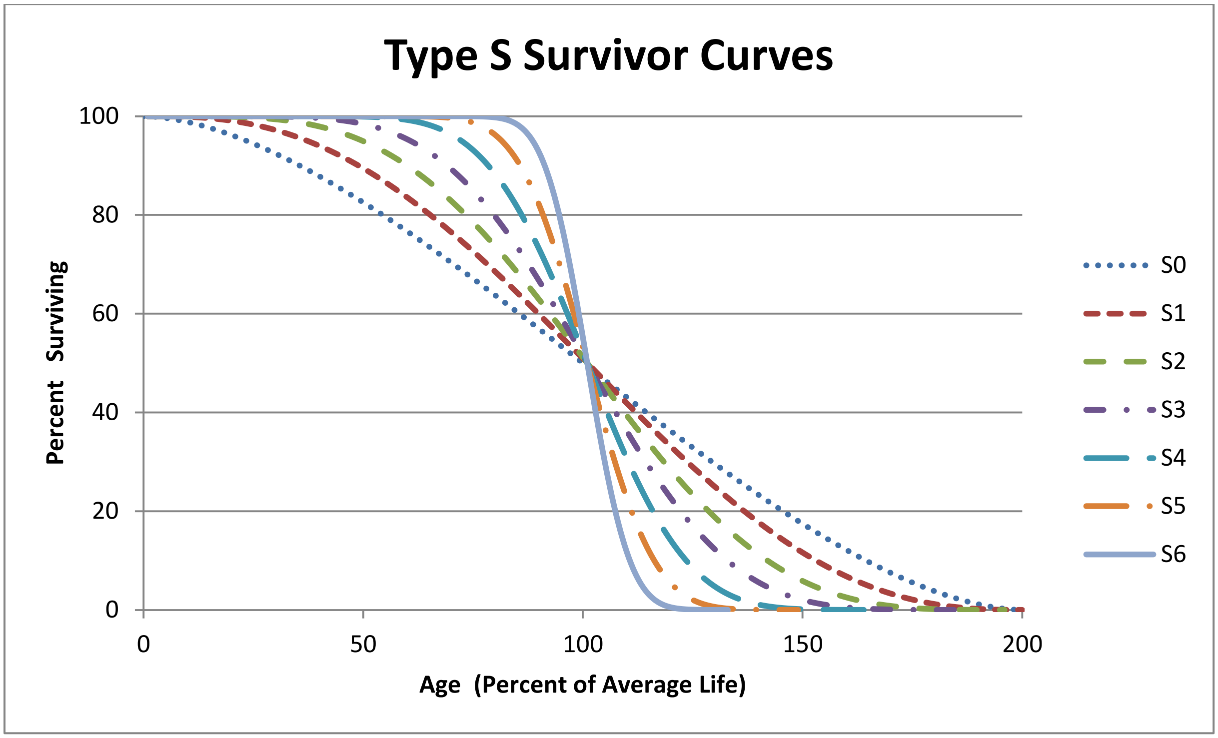


Figure 10:
Type S Survivor and Frequency Curves



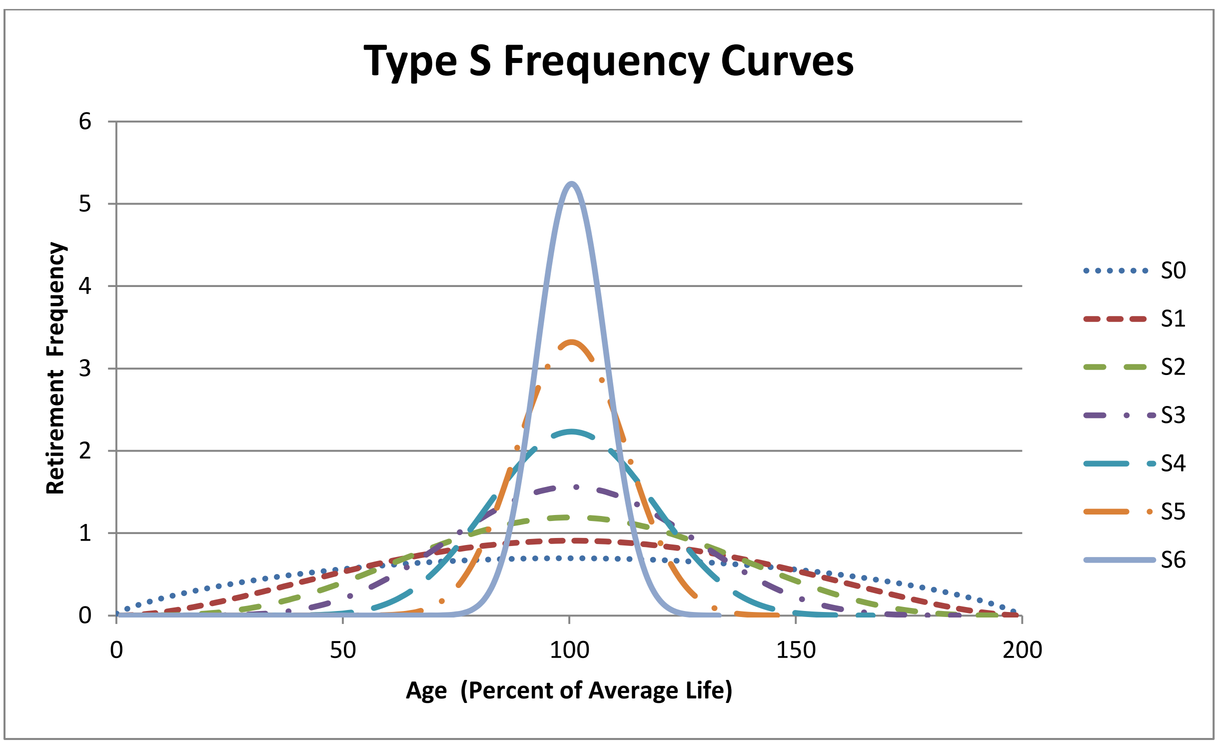
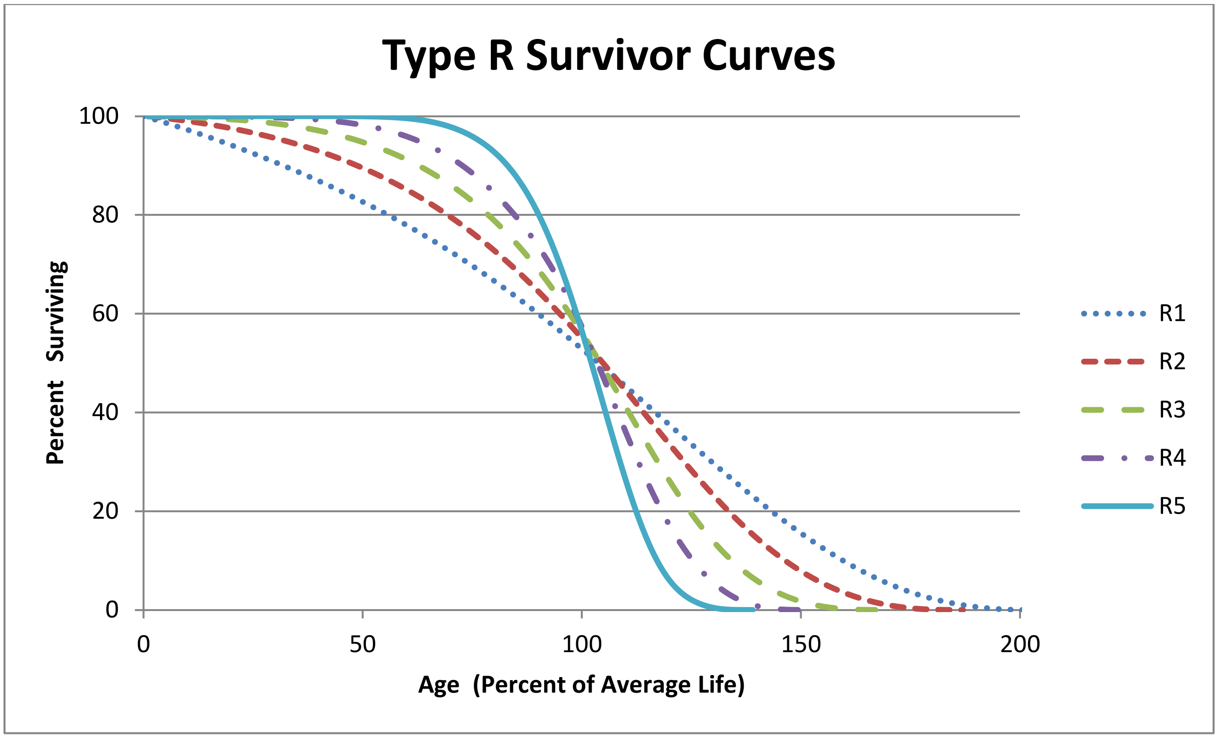
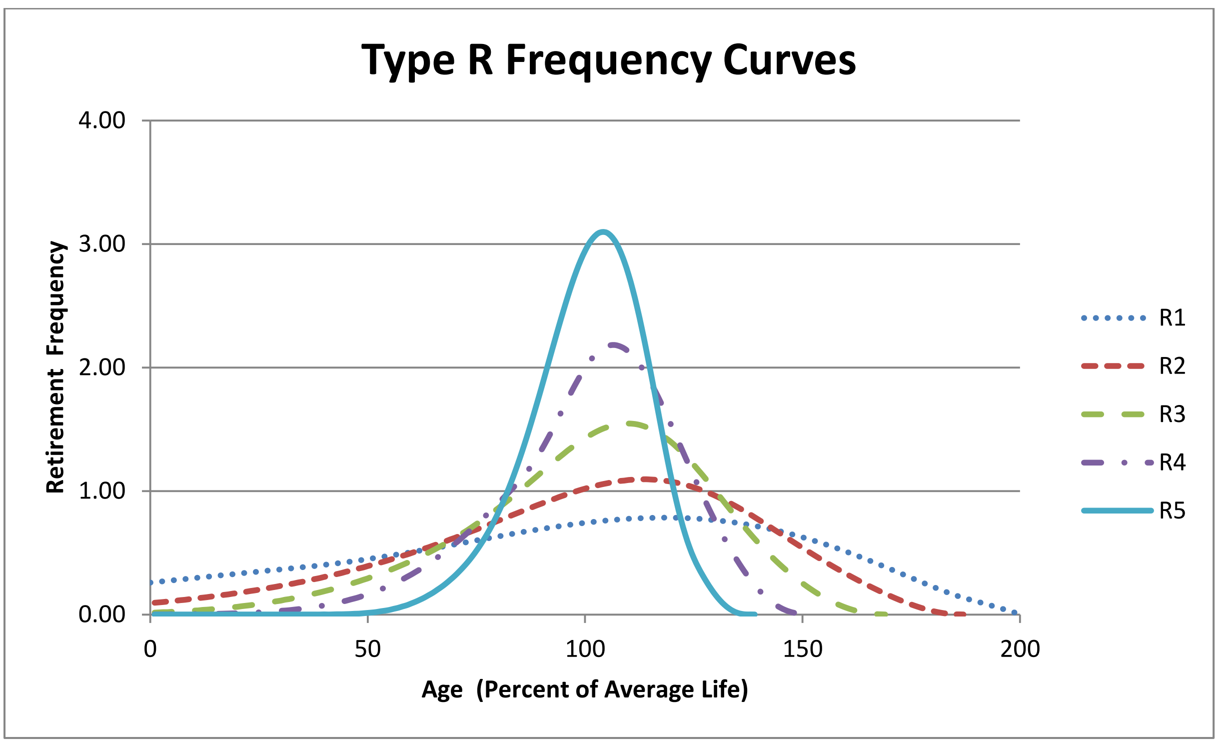


Figure 11:
Type R Survivor and Frequency Curves





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.[70]

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:[71]

Equation 4:
Average Life

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

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

70 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.

71 *See* NARUC *supra* n. 8, at 71.

Realized life is similar to average life, except that realized life is the average years of service experienced to date from the vintage's original installations.[72] 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.[73] Remaining life is sometimes referred to as "average remaining life" and "life expectancy." To calculate average remaining life at age x, the area under the estimated future potion of the survivor curve is divided by the percent surviving at age x (denoted S_X). Thus, the average remaining life formula is:

Equation 5:
Average Remaining Life

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

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

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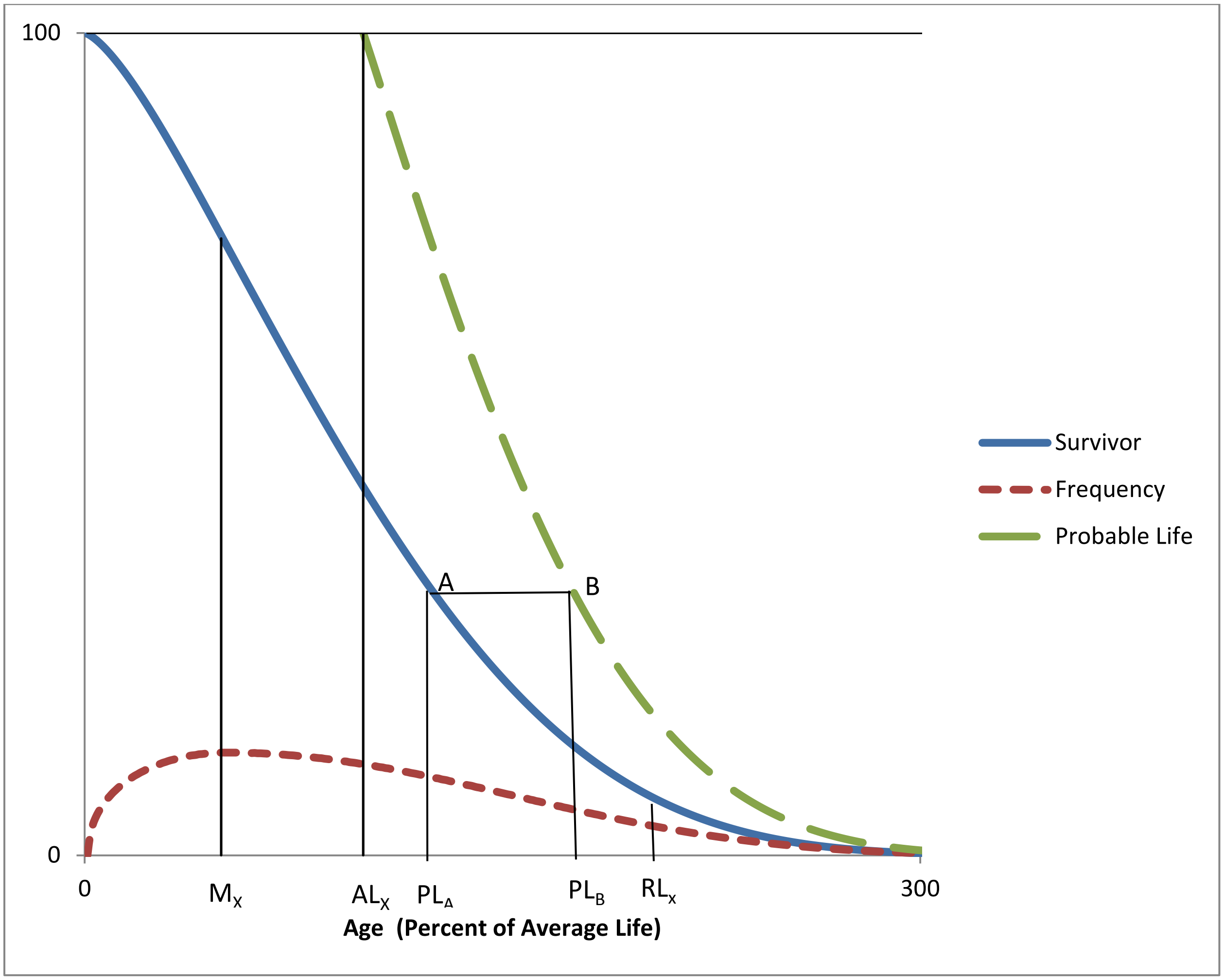
[72] *Id*. at 73.

[73] *Id*. at 74.

Figure 12:
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.[74] 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"

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

on the probable life curve, and back down to the age corresponding to point "B." It is no coincidence that the vertical line from AL_X connects at the top of the probable life curve. This is because at age zero, probable life equals average life.

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APPENDIX C: Actuarial Analysis

APPENDIX C:

ACTUARIAL ANALYSIS

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

The study of human mortality is analogous to estimating service lives of industrial property groups. While some humans die solely from chance, most deaths are related to age; that is, death rates generally increase as age increases. Similarly, physical plant is also subject to forces of retirement. These forces include physical, functional, and contingent factors, as shown in the table below.[75]

Figure 13:
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

[75] NARUC *supra* n. 8, at 14-15.

property record units; 2) the association of costs with such units; and 3) the dates of installation and removal of plant. Since actuarial analysis includes the examination of historical data to forecast future retirements, the historical data used in the analysis should not contain events that are anomalous or unlikely to recur.[76] Historical data is used in the retirement rate actuarial method, which is discussed further below.

The Retirement Rate Method

There are several systematic actuarial methods that use historical data in order to calculating observed survivor curves for property groups. Of these methods, the retirement rate method is superior, and is widely employed by depreciation analysts.[77] The retirement rate method is ultimately used to develop an observed survivor curve, which can be fitted with an Iowa curve discussed in Appendix B in order to forecast average life. The observed survivor curve is calculated by using an observed life table ("OLT"). The figures below illustrate how the OLT is developed. First, historical property data are organized in a matrix format, with placement years on the left forming rows, and experience years on the top forming columns. The placement year (a.k.a. "vintage year" or "installation year") is the year of placement of a group of property. The experience year (a.k.a. "activity year") refers to the accounting data for a particular calendar year. The two matrices below use aged data – that is, data for which the dates of placements, retirements, transfers, and other transactions are known. Without aged data, the retirement rate actuarial method may not be employed. The first matrix is the exposure matrix,

76 *Id*. at 112-13.

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

which shows the exposures at the beginning of each year.[78] An exposure is simply the depreciable property subject to retirement during a period. The second matrix is the retirement matrix, which shows the annual retirements during each year. Each matrix covers placement years 2003–2015, and experience years 2008-2015. In the exposure matrix, the number in the 2009 experience column and the 2003 placement row is $192,000. This means at the beginning of 2012, there was $192,000 still exposed to retirement from the vintage group placed in 2003. Likewise, in the retirement matrix, $19,000 of the dollars invested in 2003 was retired during 2012.

Figure 14:
Exposure Matrix

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

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

Figure 15:
Retirement Matrix

Placement Years	2008	2009	2010	2011	2012	2013	2014	2015	Total During Age Interval	Age Interval
	Experience Years Retirments During the Year (Dollars in 000's)									
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.[79] 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

[79] Wolf *supra* n. 7, at 22.

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

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

Figure 16:
Observed Life Table

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

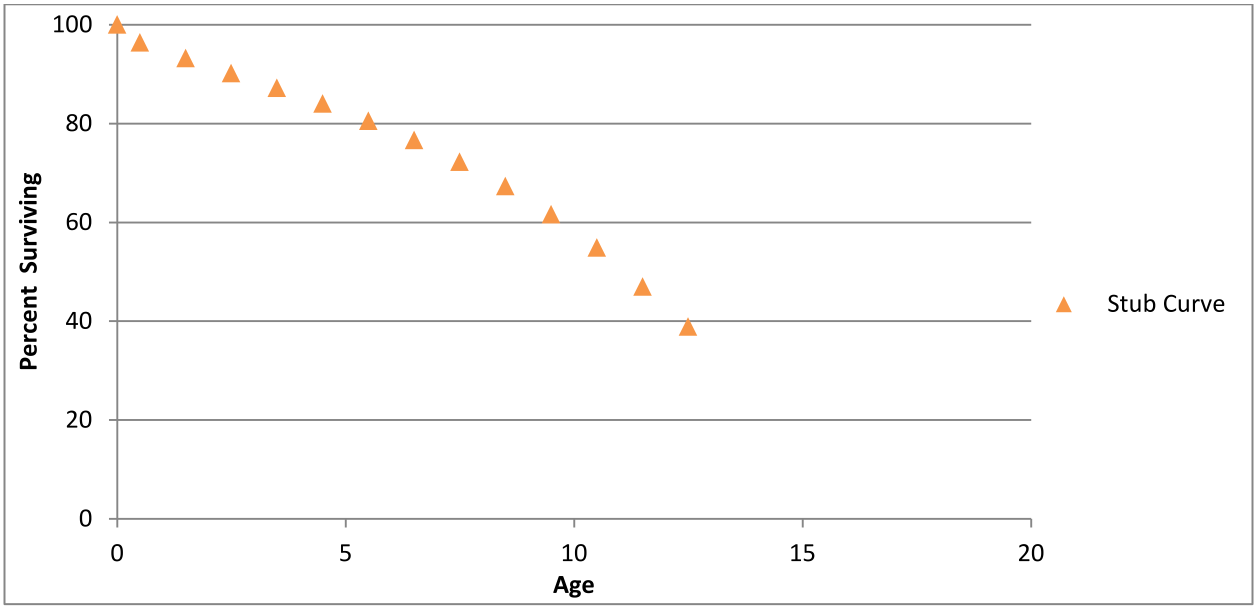
Column F on the right shows the percentages surviving at the beginning of each age interval. This column starts at 100% surviving. Each consecutive number below is calculated by multiplying the percent surviving from the previous age interval by the corresponding survivor ratio for that age interval. For example, the percent surviving at the start of age interval 1.5 is 93.21%, which was calculated by multiplying the percent surviving for age interval 0.5 (96.43%) by the survivor ratio for age interval 0.5 (0.967)[80].

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

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

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

Figure 17:
Original "Stub" Survivor Curve



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

Banding

The forces of retirement and characteristics of industrial property are constantly changing. A depreciation analyst may examine the magnitude of these changes. Analysts often use a technique called "banding" to assist with this process. Banding refers to the merging of several years of data into a single data set for further analysis, and it is a common technique associated with the retirement rate method.[81] There are three primary benefits of using bands in depreciation analysis:

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

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

3. Identify trends. By looking at successive bands, the analyst may identify broad trends in the data that may be useful in projecting the future life characteristics of the property.[82]

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.

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

[82] *Id*.

Figure 18:
Placement Bands

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

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

Analysts often use placement bands for comparing the survivor characteristics of properties with different physical characteristics.[83] Placement bands allow analysts to isolate the effects of changes in technology and materials that occur in successive generations of plant. For example, if in 2005 an electric utility began placing transmission poles with a special chemical treatment that extended the service lives of the poles, an analyst could use placement bands to isolate and analyze the effect of that change in the property group's physical characteristics. While placement bands are very useful in depreciation analysis, they also possess an intrinsic

[83] Wolf *supra* n. 7, at 182.

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.[84]

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

Figure 19:
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 of course would result in a different

[84] NARUC *supra* n. 8, at 114.

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

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

[85] *Id*.

currently in service and would arguably not provide an accurate description of life characteristics for current plant in service. Because a complete curve is necessary to calculate the average life of the property group, however, curve fitting techniques using Iowa curves or other standardized curves may be employed in order to complete the stub curve.

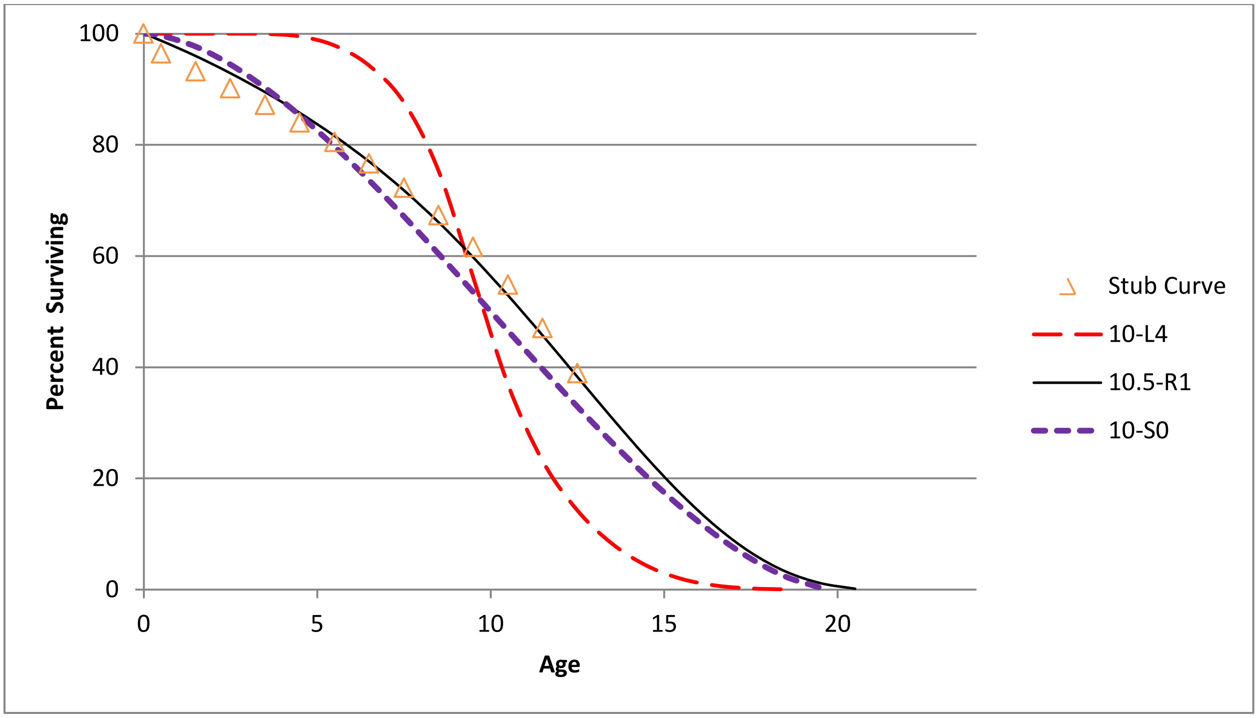
Curve Fitting

Depreciation analysts typically use the survivor curve rather than the frequency curve to fit the observed stub curves. The most commonly used generalized survivor curves used in the curve fitting process are the Iowa curves discussed above. As Wolf notes, if "the Iowa curves are adopted as a model, an underlying assumption is that the process describing the retirement pattern is one of the 22 [or more] processes described by the Iowa curves."[86]

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

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

Figure 20:
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.[87]

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."[88]

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

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

[88] *Id*. at 48.

Figure 21:
Mathematical Fitting

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

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DIRECT TESTIMONY OF DAVID J. GARRETT

APPENDIX D: Simulated Life Analysis

APPENDIX D:

SIMULATED LIFE ANALYSIS

Aged data is required to perform actuarial analysis. That is, the collection of property data must contain the dates of placements, retirements, transfers, and other actions. When a utility's property records do not contain aged data, however, analysts may use another analytical method to simulate the missing data. The contrast between aged and unaged data is illustrated in the matrices below.[89] The first matrix is similar to the matrices in Appendix C used to demonstrate actuarial analysis.

Figure 22:
Aged Data Matrix

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

89 See SDP Fundamentals 2014 pdf. 152.

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

Figure 23:
Unaged Data Matrix

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

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

The method that depreciation analysts use to examine unaged data is called the "simulated plant record" method ("SPR").[90] The SPR method is used to simulate the retirement pattern for each vintage and to indicate the Iowa curve that best represent the life characteristics of the property being analyzed.[91] In other words, the SPR model may be used to "fill in" the unaged data matrix with simulated vintage balances for each experience year. The SPR model assumes that all vintages' additions retire in accordance with the same retirement pattern.[92]

Unlike with actuarial analysis, which indicates the best fitting Iowa curve type based on the input data, the SPR model requires the analyst or computer program to first choose an Iowa curve and test the results. This process is repeated until the analyst finds the curve that best matches the observed data is found.[93] Although the SPR method may be conducted manually, analysts typically rely on computer programs to make the process more efficient.

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

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

[91] NARUC 106.

[92] NARUC 107.

[93] Wolf 222.

Figure 24:
SPR Calculation Using Iowa Curve 10-S3

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

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

Figure 25:
SPR Calculation Using Iowa Curve 12-S3

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

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

Figure 26:
SPR: Curve 12-S3: 2009, 2011, 2013

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

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

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

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

Figure 27:
SPR: Curve 10-S3: 2009, 2011, 2013

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

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

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

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

There are several indices used to measure the fit of the chosen curve. Alex Bauhan developed the conformance index ("CI") to rank the optimal curves.[94] The CI is the average

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

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

Equation 6:
Conformance Index

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

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

Figure 28:
Conformance Index Scale

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

Thus, the CI of 20 calculated above indicates that the 12-S3 curve is a poor fit. According to Bauhan, any CI value less than 50 would be considered unsatisfactory.[95]

[95] SDP pdf. 210.

A related measure to the CI is the "index of variation" ("IV").[96] The IV is equal to 1,000 divided by the CI, as shown in the Figures above. Although the IV does not use a definite scale like the CI, it follows that the highest ranking curves are those with the lowest IVs. When divided by ten, the IV approximates the average difference between simulated and actual balances expressed as a percent of the average actual balance.[97] The IV resulting from the 12-S3 curve is 85, while the IV from the 10-S3 is 50, as shown above.

Another important statistical measure is the "retirements experience index" ("REI"), which measures the maturity of the account.[98] According to Bauhan, the CI alone cannot truly measure the validity of the chosen curve because the CI provides no indication of the sufficiency of the retirement experience.[99] A small REI implies that the history of the account may be too short to determine a best fitting Iowa curve. In other words, there may be many potential Iowa curves that could be fitted to a stub curve that is too short. This concept is illustrated in the graph below. This graph shows a stub survivor curve (the diamond-shaped points on the graph). The first seven data points of the stub survivor curve represent a small REI score. If an analyst was looking at only the first seven data points, it appears that several Iowa curves would provide a good fit, including the 10-S1, 8-L3, and 8-R3 (and several others not shown on the graph). These curves, however, have significantly different life characteristics and average lives. Once the longer stub curve is taken into account, it is obvious that the 10-S1 curve provides the best fit.

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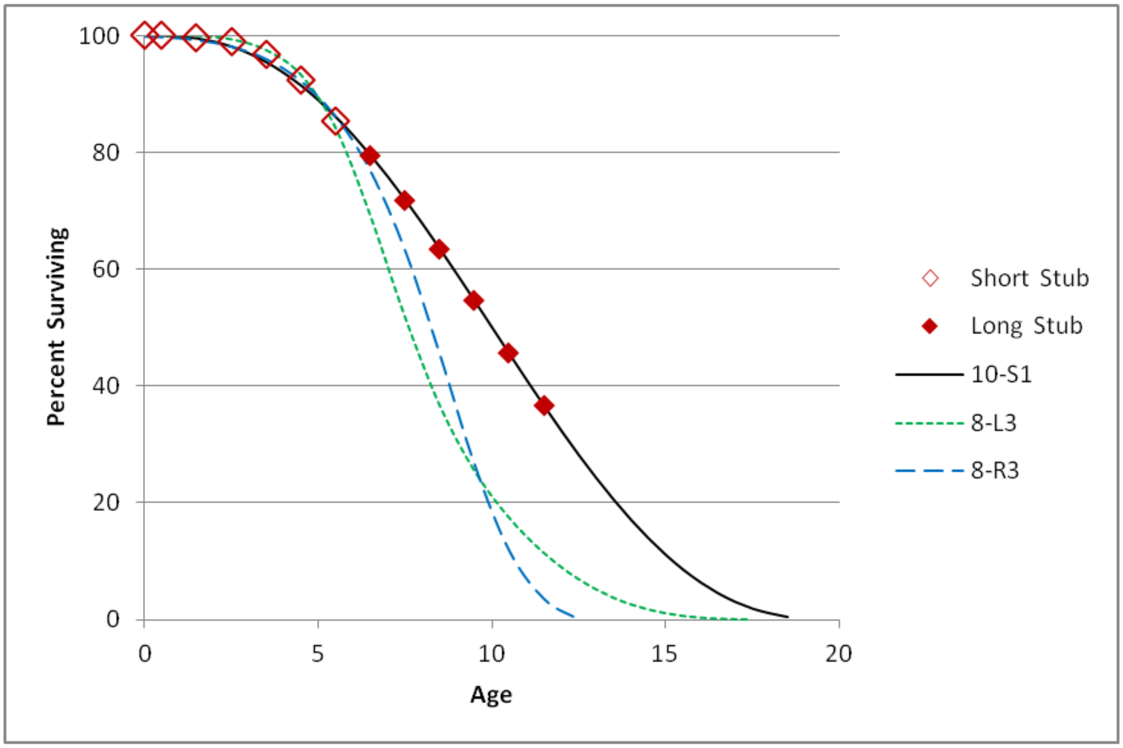
96 White, R.E. and H. A. Cowles, "A Test Procedure for the Simulated Plant Record Method of Life Analysis," Journal of the American Statistical Association, vol. 70 (1970): 1204-1212.

97 NARUC 111.

98 See SDP 210.

99 SDP 210.

Figure 29:
REI Illustration



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

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

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

Figure 30:
REI Scale

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

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

GAS UTILITIES DOCKET NO. 10567

STATEMENT OF INTENT OF CENTERPOINT ENERGY RESOURCES CORP., D/B/A CENTERPOINT ENERGY ENTEX AND CENTERPOINT ENERGY TEXAS GAS TO INCREASE RATES IN THE TEXAS GULF DIVISION	§ § § § § §	BEFORE THE RAILROAD COMMISSION OF TEXAS

DIRECT TESTIMONY OF DAVID J. GARRETT

EXHIBIT DJG-1: Curriculum Vitae

1900 NW Expy., Ste. 410
Oklahoma City, OK 73118

DAVID J. GARRETT

405.249.1050
dgarrett@resolveuc.com

EDUCATION

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

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

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

PROFESSIONAL DESIGNATIONS

Society of Depreciation Professionals
Certified Depreciation Professional (CDP)

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

The Mediation Institute
Certified Civil / Commercial & Employment Mediator

WORK EXPERIENCE

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

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

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

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

TEACHING EXPERIENCE

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

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

PUBLICATIONS

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

VOLUNTEER EXPERIENCE

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

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

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

PROFESSIONAL ASSOCIATIONS

Oklahoma Bar Association — 2007 – Present

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

Society of Utility Regulatory Financial Analysts — 2014 – Present

SELECTED CONTINUING PROFESSIONAL EDUCATION

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

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

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

Energy Management Institute — Houston, TX
"Fundamentals of Power Trading" — 2013
Instruction and practical examples on the power market complex, as well as comprehensive training on power trading.

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

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

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

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

EXPERIENCE IN REGULATORY PROCEEDINGS

1. **Idaho Power Company, 2016** (Idaho, IPC-E-16-23; IPC-E-16-24) – Filing testimony on depreciation rates and cost recovery of North Valmy plant.

2. **Southwestern Electric Power Company, 2016** (Texas, PUC 46449) – Filing testimony on depreciation rates.

3. **Empire District Electric Company, 2016** (Oklahoma, PUD 16-468) – Filing testimony on cost of capital and depreciation rates.

4. **CenterPoint Energy Resources, 2016** (Texas, GUD 10567) – Filing testimony on depreciation rates.

5. **Oklahoma Gas and Electric Company, 2016** (Arkansas, 16-052-U) – Filing testimony on cost of capital; filing testimony on depreciation rates.

6. **Peoples Gas System, 2016** (Florida, 160-159-GU) – Filed report on depreciation rates.

7. **Arizona Public Service Company, 2016** (Arizona, E-01345A-16-0036) – Testified on depreciation rates.

8. **Sierra Pacific Power Company, 2016** (Nevada, 16-06008) – Testified on depreciation rates.

9. **Oklahoma Gas and Electric Company, 2016** (Oklahoma, PUD 15-273) – Testified on cost of capital and depreciation rates.

10. **Public Service Company of Oklahoma, 2015** (Oklahoma, PUD 15-208) – Testified on cost of capital and depreciation rates.

11. **Oklahoma Natural Gas Company, 2015** (Oklahoma, PUD 15-213) – Testified on cost of capital and depreciation rates.

12. **Oak Hills Water System, Inc.** (Oklahoma, PUD 15-123) – Testified on cost of capital and depreciation rates.

13. **CenterPoint Energy Oklahoma Gas, 2014** (Oklahoma, PUD 14-227) – Testified on prudence of fuel-related costs and process in annual fuel audit and prudence review.

14. **Public Service Company of Oklahoma, 2014** (Oklahoma, PUD 14-233) – Testified on PSO's application for a certificate of authority to issue new debt securities.

15. **Empire District Electric Company, 2014** (Oklahoma, PUD 14-226) – Testified on prudence of fuel-related costs and process in annual fuel audit and prudence review.

16. **Fort Cobb Fuel Authority, 2014** (Oklahoma, PUD 14-219) – Testified on prudence of fuel-related costs and process in annual fuel audit and prudence review.

17. **Fort Cobb Fuel Authority, 2014** (Oklahoma, PUD 14-140) – Testified in FCFA's application for a rate increase on outside services, legislative advocacy, miscellaneous taxes, payroll expense and taxes, employee insurance expense, and insurance expense.

18. **Public Service Company of Oklahoma, 2013** (Oklahoma, PUD 13-217) – Lead auditor of PSO's application for a rate increase. Provided additional research support for cost of capital issue. Assisted in coordination of PUD staff analysts and issues.

19. **Public Service Company of Oklahoma, 2013** (Oklahoma, PUD 13-201) – Testified in PSO's application for authorization of a standby and supplemental service tariff.

20. **Fort Cobb Fuel Authority, 2013** (Oklahoma, PUD 13-134) – Testified on prudence of fuel-related costs and process in annual fuel audit and prudence review.

21. **Empire District Electric Company, 2013** (Oklahoma, PUD 13-131) – Testified on prudence of fuel-related costs and process in annual fuel audit and prudence review.

22. **CenterPoint Energy Oklahoma Gas, 2013** (Oklahoma, PUD 13-127) – Testified on prudence of fuel-related costs and process in annual fuel audit and prudence review.

23. **Oklahoma Gas & Electric Company, 2012** (Oklahoma, PUD 12-185) – Testified in OG&E's application for extension of a gas transportation contract.

24. **Empire District Electric Company, 2012** (Oklahoma, PUD 12-170) – Testified on prudence of fuel-related costs and process in annual fuel audit and prudence review.

25. **Oklahoma Gas & Electric Company, 2012** (Oklahoma, PUD 12-169) – Testified on prudence of fuel-related costs and process in annual fuel audit and prudence review.

GAS UTILITIES DOCKET NO. 10567

STATEMENT OF INTENT OF CENTERPOINT ENERGY RESOURCES CORP., D/B/A CENTERPOINT ENERGY ENTEX AND CENTERPOINT ENERGY TEXAS GAS TO INCREASE RATES IN THE TEXAS GULF DIVISION	**§ § § § § §**	**BEFORE THE RAILROAD COMMISSION OF TEXAS**

DIRECT TESTIMONY OF DAVID J. GARRETT

EXHIBIT DJG-2: Summary Expense Adjustment

Summary Expense Adjustment

Summary Expense Adjustment

Plant Function	Original Cost 12/31/2015	Company Expense	TCUC Expense	TCUC Adjustment
Intangible	$ 34,663,218	$ 6,552,576	$ 6,552,576	$ -
Distributrion	1,410,175,923	49,937,156	44,354,139	(5,583,017)
General	177,929,787	12,347,434	12,047,479	(299,955)
Total	$ 1,622,768,927	$ 68,837,166	$ 62,954,193	**$ (5,882,973)**

GAS UTILITIES DOCKET NO. 10567

STATEMENT OF INTENT OF CENTERPOINT ENERGY RESOURCES CORP., D/B/A CENTERPOINT ENERGY ENTEX AND CENTERPOINT ENERGY TEXAS GAS TO INCREASE RATES IN THE TEXAS GULF DIVISION	**§ § § § § §**	**BEFORE THE RAILROAD COMMISSION OF TEXAS**

DIRECT TESTIMONY OF DAVID J. GARRETT

EXHIBIT DJG-3: Detailed Expense Adjustment

Detailed Expense Adjustment

		[1]	[2]		[3]		[4]	
			Company Proposal		TCUC Proposal		TCUC Adjustment	
Account No.	Description	Plant Balance 9/30/2016	Rate	Annual Accrual	Rate	Annual Accrual	Rate	Annual Accrual
	Intangible Plant							
G30201 6010	Perpetual F & C	$ 5,331	0.00%	$ -	0.00%	$ -	0.00%	$ -
G30301 6030	P/L Interconn / Other	503,617	3.26%	16,404	3.26%	16,404	0.00%	-
G30301 6035	Misc. Intangible Plant	29,802,896	20.00%	5,960,579	20.00%	5,960,579	0.00%	-
G30301 6035	Misc. Intangible Plant - Corp	76,356	0.00%	-	0.00%	-	0.00%	-
G30301 6035	Misc. Intangible Plant - Corp	64,166	10.00%	6,417	10.00%	6,417	0.00%	-
G30301 6035	Misc. Intangible Plant - Corp	230,561	20.00%	46,112	20.00%	46,112	0.00%	-
G30301 6050	Software - Misc	274,443	20.00%	54,889	20.00%	54,889	0.00%	-
G30301 6050	Software - Misc - Corp	15,671	0.00%	-	0.00%	-	0.00%	-
G30301 6050	Software - Misc - Corp	991,575	20.00%	198,315	20.00%	198,315	0.00%	-
G30301 6060	Software - SAP	1,173,997	10.00%	117,400	10.00%	117,400	0.00%	-
G30301 6060	Software - SAP - Corp	1,524,604	10.00%	152,460	10.00%	152,460	0.00%	-
	Total Intangible Plant	34,663,218		6,552,576		6,552,576		-
	Distribution Plant							
G37401 6840	Land - General	4,442,166	0.00%	-	0.00%	-	0.00%	-
G37402 6880	Land Rights	1,159,656	1.37%	15,887	1.37%	15,887	0.00%	-
G37501 6900	Structures & Improvements	1,080,429	1.84%	19,880	1.84%	19,880	0.00%	-
G37601 6940	Distribution Mains - Non Cast Iron	3,282,178	0.00%	-	0.00%	-	0.00%	-
G37601 6951	Distribution Mains - Steel	302,943,322	3.95%	11,966,261	3.95%	11,966,261	0.00%	-
G37601 6952	Distribution Mains - Plastic	350,733,117	2.67%	9,364,574	2.59%	9,074,057	-0.08%	(290,517)
G37801 6980	Meas. & Reg. Sta. Eq-General	8,342,913	3.66%	305,351	3.66%	305,351	0.00%	-
G37801 7000	Meas & Reg, Sta, Odorizers	2,919,515	6.53%	190,644	6.53%	190,644	0.00%	-
G37901 7010	Meas. & Reg. - City Gate	23,559,799	3.50%	824,593	3.34%	787,013	-0.16%	(37,580)
G38001 7022	Services - Steel	30,312,117	4.74%	1,436,794	4.74%	1,436,794	0.00%	-
G38001 7023	Services - Plastic	415,324,118	4.03%	16,737,562	2.84%	11,806,659	-1.19%	(4,930,903)
G38101 7050	Meters	86,086,167	3.39%	2,918,321	3.39%	2,918,321	0.00%	-
G38201 7080	Meter Installations Small	98,274,929	3.33%	3,272,555	3.33%	3,272,555	0.00%	-
G38201 7090	Meter Installations Large	27,880,833	4.05%	1,129,174	2.89%	805,157	-1.16%	(324,017)
G38301 7120	House Regulators Small	35,134,607	3.45%	1,212,144	3.45%	1,212,144	0.00%	-
G38301 7130	House Regulators Large	20,652	3.86%	797	3.86%	797	0.00%	-
G38501 7150	Ind. Meas. & Reg. Sta. Equip	16,057,360	2.94%	472,086	2.94%	472,086	0.00%	-
G38701 7160	Other Equipment - CNG Equip	2,614,394	2.69%	70,327	2.69%	70,327	0.00%	-
G38701 7160	Other Equipment - CNG Equip - Corp	7,651	2.69%	206	2.69%	206	0.00%	-
	Total Distribution Plant	1,410,175,923		49,937,156		44,354,139		(5,583,017)
	General Plant							

Detailed Expense Adjustment

		[1]	[2]		[3]		[4]	
			Company Proposal		TCUC Proposal		TCUC Adjustment	
Account No.	Description	Plant Balance 9/30/2016	Rate	Annual Accrual	Rate	Annual Accrual	Rate	Annual Accrual
G39001 7180	Land	293,741	0.00%	-	0.00%	-	0.00%	-
G39001 7200	Structures & Improvements	22,683,847	2.92%	662,368	2.08%	471,949	-0.84%	(190,419)
G39002 7225	Leasehold Improvements	57,668	6.67%	3,846	6.67%	3,846	0.00%	-
G39002 7225	Leasehold Improvements - Corp	127,051	6.67%	8,474	6.67%	8,474	0.00%	-
G39101 7230	Furniture & Equipment	15,012	5.00%	751	5.00%	751	0.00%	-
G39101 7230	Furniture & Equipment - Corp	212,612	5.00%	10,631	5.00%	10,631	0.00%	-
G39101 7232	Office Equipment - General	2,090,802	5.00%	104,540	5.00%	104,540	0.00%	-
G39101 7232	Office Equipment - General - Corp	912,734	5.00%	45,637	5.00%	45,637	0.00%	-
G39102 7260	Computer Equipment - Misc	12,750,981	14.29%	1,822,115	14.29%	1,822,115	0.00%	-
G39102 7260	Computer Equipment - Misc - Gas Support	223,356	14.29%	31,918	14.29%	31,918	0.00%	-
G39102 7260	Computer Equipment - Misc - Corp	1,589,790	14.29%	227,181	14.29%	227,181	0.00%	-
G39401 7362	Tools	4,440,358	14.29%	634,527	14.29%	634,527	0.00%	-
G39401 7364	Shop Equipment	-	8.33%	-	8.33%	-	0.00%	-
G39401 7366	Garage Equipment	-	8.33%	-	8.33%	-	0.00%	-
G39501	Labortatory Equipment	84,188	6.67%	5,615	6.67%	5,615	0.00%	-
G39701	Communication Equipment	5,430,674	5.00%	271,534	5.00%	271,534	0.00%	-
G39702	Communication Equipment - Corp	30,447	5.00%	1,522	5.00%	1,522	0.00%	-
G39703	Communication Equipment-ERTS	98,522,404	5.00%	4,926,120	5.00%	4,926,120	0.00%	-
G39801	Miscellaneous Equipment	647,333	6.67%	43,177	6.67%	43,177	0.00%	-
G39801	Miscellaneous Equipment - Gas Support	2,565	6.67%	171	6.67%	171	0.00%	-
G39801	Miscellaneous Equipment - Corp	116,886	6.67%	7,796	6.67%	7,796	0.00%	-
	Total General Plant	150,232,448		8,807,923		8,617,504		(190,419)
	Transportation and Power Operated Equipment							
G39201 7300	Autos	1,186,951	13.06%	155,016	12.61%	149,706	-0.45%	(5,310)
G39201 7300	Autos - Gas Support	87,178	13.06%	11,385	12.61%	10,995	-0.45%	(390)
G39201 7300	Autos - Corp	67,824	13.06%	8,858	12.61%	8,554	-0.45%	(304)
G39201 7320	Trucks	21,744,848	13.06%	2,839,877	12.61%	2,742,595	-0.45%	(97,282)
G39201 7320	Trucks - Gas Support	16,513	13.06%	2,157	12.61%	2,083	-0.45%	(74)
G39201 7320	Trucks - Corp	114,148	13.06%	14,908	12.61%	14,397	-0.45%	(511)
G39201 7340	Trailers	1,033,549	13.06%	134,981	12.61%	130,358	-0.45%	(4,623)
G39201 7340	Trailers - Corp	233,067	13.06%	30,439	12.61%	29,396	-0.45%	(1,043)
G39601 7380	Power Operated Equipment	3,205,474	10.64%	341,062	10.64%	341,062	0.00%	-
G39601 7380	Power Operated Equipment - Corp	7,786	10.64%	828	10.64%	828	0.00%	-
	Total Transportation and Power Operated Equipment	27,697,339		3,539,511		3,429,974		(109,537)

Detailed Expense Adjustment

		[1]	[2]		[3]		[4]	
			Company Proposal		TCUC Proposal		TCUC Adjustment	
Account No.	Description	Plant Balance 9/30/2016	Rate	Annual Accrual	Rate	Annual Accrual	Rate	Annual Accrual
	TOTAL TEXAS GULF DIVISION	$ 1,622,768,927		$ 68,837,166		$ 62,954,193		$ (5,882,973)

[1] Company Workpaper 2a - Plant in Service
[2] Company Workpaper 4b-12
[3] From Rate Development exhibit; some unadjusted amounts hard coded to match Company numbers due to rounding
[4] = [3] - [2]

GAS UTILITIES DOCKET NO. 10567

STATEMENT OF INTENT OF CENTERPOINT ENERGY RESOURCES CORP., D/B/A CENTERPOINT ENERGY ENTEX AND CENTERPOINT ENERGY TEXAS GAS TO INCREASE RATES IN THE TEXAS GULF DIVISION	§ § § § § §	**BEFORE THE RAILROAD COMMISSION OF TEXAS**

DIRECT TESTIMONY OF DAVID J. GARRETT

EXHIBIT DJG-4: Detailed Rate Comparison

Detailed Rate Comparison

		[1]	[2]				[3]				[4]	
			Company Proposal				TCUC Proposal				Difference	
Account		Original	Iowa Curve			Annual	Iowa Curve			Annual		Annual
No.	Description	Cost	Type	AL	Rate	Accrual	Type	AL	Rate	Accrual	Rate	Accrual
	Distribution Plant											
G37402 6880	Land Rights	1,653,176	R5	75	1.37%	22,729	R5	75	1.37%	22,729	0.00%	-
G37501 6900	Structures & Improvements	1,262,809	R1	65	1.84%	23,260	R1	65	1.84%	23,260	0.00%	-
G37601 6951	Distribution Mains - Steel	374,295,481	S2.5	47	3.95%	14,802,515	S2.5	47	3.95%	14,802,515	0.00%	-
G37601 6952	Distribution Mains - Plastic	519,824,553	R2.5	63	2.67%	13,889,182	R2	65	2.59%	13,448,737	-0.08%	(440,445)
G37801 6980	Meas. & Reg. Sta. Eq-General	11,608,136	R1	38	3.66%	424,815	R1	38	3.66%	424,815	0.00%	-
G37801 7000	Meas & Reg, Sta, Odorizers	4,148,225	R1	25	6.53%	270,852	R1	25	6.53%	270,852	0.00%	-
G37901 7010	Meas. & Reg. - City Gate	30,353,126	R1	38	3.50%	1,063,143	R0.5	43	3.34%	1,013,943	-0.16%	(49,200)
G38001 7022	Services - Steel	39,660,957	S4	39	4.74%	1,880,399	S4	39	4.74%	1,880,399	0.00%	-
G38001 7023	Services - Plastic	520,969,210	R2.5	46	4.03%	21,020,737	R2	56	2.84%	14,809,893	-1.19%	(6,210,844)
G38101 7050	Meters	102,731,865	R4	30	3.39%	3,478,275	R4	30	3.39%	3,478,275	0.00%	-
G38201 7080	Meter Installations Small	117,291,319	R4	30	3.33%	3,909,609	R4	30	3.33%	3,909,609	0.00%	-
G38201 7090	Meter Installations Large	32,484,867	R1	38	4.05%	1,317,221	R0.5	43	2.89%	938,115	-1.17%	(379,106)
G38301 7120	House Regulators Small	42,246,219	R4	30	3.45%	1,459,061	R4	30	3.45%	1,459,061	0.00%	-
G38301 7130	House Regulators Large	153,741	R2	30	3.86%	5,932	R2	30	3.86%	5,932	0.00%	-
G38501 7150	Ind. Meas. & Reg. Sta. Equip	15,264,732	R2	45	2.94%	448,697	R2	45	2.94%	448,697	0.00%	-
G38701 7160	Other Equipment	4,561,330	R1	35	2.69%	122,906	R1	35	2.69%	122,906	0.00%	-
	Total Distribution Plant	1,818,509,745			3.53%	64,139,334			3.14%	57,059,565	-0.39%	(7,079,768)
	General Plant											
G39001 7200	Structures & Improvements	29,323,423	R3	40	2.92%	855,298	R3	55	2.08%	610,089	-0.84%	(245,209)
G39201	Transportation Equipment	34,960,015	L2.5	8	13.06%	4,565,095	S1.5	8	12.61%	4,409,374	-0.45%	(155,721)
G39601	Power Operated Equipment	6,462,669	L2.5	10	10.64%	687,598	L2.5	10	10.64%	687,598	0.00%	-
G39002 7225 (15)	Improv. to Leased Premises 15 Yr	468,524	AM	15	6.67%	31,235	AM	15	6.67%	31,235	0.00%	-
G39002 7225 (5)	Improv. to Leased Premises 5 Yr	125,146	AM	5	20.00%	25,029	AM	5	20.00%	25,029	0.00%	-
G39101 7230	Office Furniture & Equipment	4,020,314	AM	20	5.00%	201,016	AM	20	5.00%	201,016	0.00%	-
G39102	Computer Equipment	17,875,628	AM	7	14.29%	2,553,661	AM	7	14.29%	2,553,661	0.00%	-
G39401 7362	Tools	6,341,102	AM	7	14.29%	905,872	AM	7	14.29%	905,872	0.00%	-
G39401 7364	Shop Equipment	-	AM	12	8.33%	-	AM	12	8.33%	-	0.00%	-
G39401 7366	Garage Equipment	-	AM	12	8.33%	-	AM	12	8.33%	-		
G39501	Labortatory Equipment	91,830	AM	15	6.67%	6,122	AM	15	6.67%	6,122		
G39701	Communication Equipment	5,618,886	AM	20	5.00%	280,944	AM	20	5.00%	280,944		
G39703	Communication Equipment-ERTS	116,148,053	AM	20	5.00%	5,807,403	AM	20	5.00%	5,807,403	0.00%	-
G39801	Miscellaneous Equipment	1,029,897	AM	15	6.67%	68,660	AM	15	6.67%	68,660	0.00%	-
	Amortization of Reserve Difference					1,788,045				1,788,045		
	Total General Plant	222,465,487			7.99%	17,775,979			7.01%	17,375,668	-0.98%	(400,311)

Detailed Rate Comparison

		[1]	[2]				[3]				[4]	
			Company Proposal				TCUC Proposal				Difference	
			Iowa Curve				Iowa Curve					
Account No.	Description	Original Cost	Type	AL	Rate	Annual Accrual	Type	AL	Rate	Annual Accrual	Rate	Annual Accrual
	TOTAL PLANT STUDIED	**2,040,975,232**			**4.01%**	**81,915,313**			**3.56%**	**74,435,234**	**-0.45%**	**(7,480,079)**

[1] From Company depreciation study; plant balances as of the study date
[2] Company Depreciation Study
[3] Rates and Accruals from Rate Development exhibit. (Some unadjusted accounts hard coded to zero to account for rounding differences)
[4] = [3] - [2]

GAS UTILITIES DOCKET NO. 10567

STATEMENT OF INTENT OF CENTERPOINT ENERGY RESOURCES CORP., D/B/A CENTERPOINT ENERGY ENTEX AND CENTERPOINT ENERGY TEXAS GAS TO INCREASE RATES IN THE TEXAS GULF DIVISION	**§ § § § § §**	**BEFORE THE RAILROAD COMMISSION OF TEXAS**

DIRECT TESTIMONY OF DAVID J. GARRETT

EXHIBIT DJG-5: Depreciation Rate Development

Depreciation Rate Development
(SL-AL-RL-ELG System)

		[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]	[12]	[13]
									Service Life		Net Salvage		Total	
Account No.	Description	Original Cost	Iowa Curve Type - AL	Net Salvage	Depreciable Base	Book Reserve	Future Accruals	Remaining Life	Accrual	Rate	Accrual	Rate	Accrual	Rate
	Distribution Plant													
G37402 6880	Land Rights	1,653,176	R5 - 75	0.0%	1,653,176	483,772	1,169,404	51.5	22,729	1.37%	-	0.00%	22,729	**1.37%**
G37501 6900	Structures & Improvements	1,262,809	R1 - 65	-10.0%	1,389,090	533,691	855,399	36.8	19,824	1.57%	3,433	0.27%	23,257	**1.84%**
G37601 6951	Distribution Mains - Steel	374,295,481	S2.5 - 47	-65.0%	617,587,544	225,215,296	392,372,247	26.5	5,623,545	1.50%	9,177,369	2.45%	14,800,915	**3.95%**
G37601 6952	Distribution Mains - Plastic	519,824,553	R2 - 65	-40.0%	727,754,374	151,744,958	576,009,416	42.8	8,593,967	1.65%	4,854,771	0.93%	13,448,737	**2.59%**
G37801 6980	Meas. & Reg. Sta. Eq-General	11,608,136	R1 - 38	-15.0%	13,349,356	4,330,184	9,019,173	21.2	342,815	2.95%	82,017	0.71%	424,831	**3.66%**
G37801 7000	Meas & Reg, Sta, Odorizers	4,148,225	R1 - 25	-10.0%	4,563,048	664,223	3,898,825	14.4	242,113	5.84%	28,827	0.69%	270,940	**6.53%**
G37901 7010	Meas. & Reg. - City Gate	30,353,126	R0.5 - 43	-15.0%	34,906,095	10,987,180	23,918,915	23.6	820,939	2.70%	193,004	0.64%	1,013,943	**3.34%**
G38001 7022	Services - Steel	39,660,957	S4 - 39	-60.0%	63,457,531	39,718,889	23,738,642	12.6	-4,591	-0.01%	1,885,624	4.75%	1,881,033	**4.74%**
G38001 7023	Services - Plastic	520,969,210	R2 - 56	-45.0%	755,405,355	229,061,761	526,343,593	35.5	8,213,490	1.58%	6,596,402	1.27%	14,809,893	**2.84%**
G38101 7050	Meters	102,731,865	R4 - 30	0.0%	102,731,865	38,864,892	63,866,973	18.4	3,478,593	3.39%	-	0.00%	3,478,593	**3.39%**
G38201 7080	Meter Installations Small	117,291,319	R4 - 30	-5.0%	123,155,885	50,935,702	72,220,183	18.5	3,592,616	3.06%	317,518	0.27%	3,910,134	**3.33%**
G38201 7090	Meter Installations Large	32,484,867	R0.5 - 43	-25.0%	40,606,084	17,641,028	22,965,055	24.5	606,366	1.87%	331,749	1.02%	938,115	**2.89%**
G38301 7120	House Regulators Small	42,246,219	R4 - 30	0.0%	42,246,219	15,402,538	26,843,681	18.4	1,458,896	3.45%	-	0.00%	1,458,896	**3.45%**
G38301 7130	House Regulators Large	153,741	R2 - 30	-5.0%	161,428	68,394	93,034	15.7	5,443	3.54%	490	0.32%	5,933	**3.86%**
G38501 7150	Ind. Meas. & Reg. Sta. Equip	15,264,732	R2 - 45	0.0%	15,264,732	1,673,235	13,591,497	30.3	448,712	2.94%	-	0.00%	448,712	**2.94%**
G38701 7160	Other Equipment	4,561,330	R1 - 35	0.0%	4,561,330	2,463,381	2,097,949	17.1	122,903	2.69%	-	0.00%	122,903	**2.69%**
	Total Distribution Plant	1,818,509,746			2,548,793,111	789,789,126	1,759,003,985	30.8	33,588,360	1.85%	23,471,206	1.29%	57,059,565	**3.14%**
	General Plant													
G39001 7200	Structures & Improvements	29,323,423	R3 - 55	0.0%	29,323,423	1,771,789	27,551,634	45.2	610,089	2.08%	-	0.00%	610,089	**2.08%**
G39201	Transportation Equipment	34,960,015	S1.5 - 8	17.0%	29,016,812	10,321,065	18,695,748	4.2	5,811,073	16.62%	(1,401,699)	-4.01%	4,409,374	**12.61%**
G39601	Power Operated Equipment	6,462,669	L3 - 10	18.0%	5,299,389	1,768,832	3,530,557	5.1	914,978	14.16%	(226,760)	-3.51%	688,218	**10.65%**
G39002 7225 (15)	Improv. to Leased Premises 15 Yr	468,524	AM - 15	0.0%	468,524	264,830	203,694	15.0	13,580	2.90%	17,655	3.77%	31,235	**6.67%**
G39002 7225 (5)	Improv. to Leased Premises 5 Yr	125,146	AM - 5	0.0%	125,146	67,744	57,402	5.0	11,480	9.17%	13,549	10.83%	25,029	**20.00%**
G39101 7230	Office Furniture & Equipment	4,020,314	AM - 20	0.0%	4,020,314	2,001,547	2,018,767	20.0	100,938	2.51%	100,077	2.49%	201,016	**5.00%**
G39102	Computer Equipment	17,875,628	AM - 7	0.0%	17,875,628	3,941,904	13,933,723	7.0	1,990,532	11.14%	563,129	3.15%	2,553,661	**14.29%**
G39401 7362	Tools	6,341,102	AM - 7	0.0%	6,341,102	2,229,181	4,111,921	7.0	587,417	9.26%	318,454	5.02%	905,872	**14.29%**
G39401 7364	Shop Equipment	-	AM - 12	0.0%	-	-	-	12.0	0				-	**8.33%**
G39401 7366	Garage Equipment	-	AM - 12	0.0%	-	-	-	12.0	0				-	**8.33%**
G39501	Labortatory Equipment	91,830	AM - 15	0.0%	91,830	43,196	48,635	15.0	3,242	3.53%	2,880	3.14%	6,122	**6.67%**
G39701	Communication Equipment	5,618,886	AM - 20	0.0%	5,618,886	3,033,166	2,585,719	20.0	129,286	2.30%	151,658	2.70%	280,944	**5.00%**
G39703	Communication Equipment-ERTS	116,148,053	AM - 20	0.0%	116,148,053	14,493,537	101,654,516	20.0	5,082,726	4.38%	724,677	0.62%	5,807,403	**5.00%**
G39801	Miscellaneous Equipment	1,029,897	AM - 15	0.0%	1,029,897	394,348	635,549	15.0	42,370	4.11%	26,290	2.55%	68,660	**6.67%**
	Total General Plant	222,465,488			215,359,005	40,331,139	175,027,865	11.2	15,297,712	6.88%	289,911	0.13%	15,587,623	**7.01%**
	TOTAL PLANT STUDIED	**2,040,975,234**			**2,764,152,116**	**830,120,266**	**1,934,031,850**	**26.6**	**48,886,072**	**2.40%**	**23,761,117**	**1.16%**	**72,647,188**	**3.56%**

[1] From Company depreciation study; plant balances as of the study date
[2] Selected Iowa curve type and average life through mathematical and visual curve fitting-techniques and professional judgement.
[3] For life span accounts, weighted net salvage considering interim and terminal retirements. For mass accounts, estimated net salvage through historical analysis.
[4] = [1]*(1-[3])
[5] From the Company's property records; any negative book reserve balances were replaced with the Company's redistibuted reserve calculations
[6] = [4] - [5]
[7] Average remaining life based on Iowas Curve in Column [2]
[8] = ([1] - [5]) / [7]
[9] = [8] / [1]
[10] = [12] - [8]
[11] = [13] - [9]
[12] = [6] / [7]. Some unadjusted accruals may be hard coded to match the Company's proposed accrual.
[13] = [12] / [1]. Some unadjusted rates may be hard coded to match the Company's proposed rate.

GAS UTILITIES DOCKET NO. 10567

STATEMENT OF INTENT OF CENTERPOINT ENERGY RESOURCES CORP., D/B/A CENTERPOINT ENERGY ENTEX AND CENTERPOINT ENERGY TEXAS GAS TO INCREASE RATES IN THE TEXAS GULF DIVISION	§ § § § § §	**BEFORE THE RAILROAD COMMISSION OF TEXAS**

DIRECT TESTIMONY OF DAVID J. GARRETT

EXHIBIT DJG-6: Account 390 (Structures & Improvements) Detailed Curve Comparison

Account 390 Detailed Curve Comparison

[1] Age (Years)	[2] Exposures (Dollars)	[3] Observed Life Table (OLT)	[4] CERC R3-40	[5] TCUC R3-55	[6] CERC SSD	[7] TCUC SSD
0.0	28,898,108	100.00%	100.00%	100.00%	0.0000	0.0000
0.5	21,359,188	100.00%	99.98%	99.99%	0.0000	0.0000
1.5	16,557,960	100.00%	99.93%	99.95%	0.0000	0.0000
2.5	15,420,536	99.90%	99.88%	99.92%	0.0000	0.0000
3.5	888,380	99.76%	99.81%	99.88%	0.0000	0.0000
4.5	667,053	99.76%	99.73%	99.83%	0.0000	0.0000
5.5	576,693	99.31%	99.63%	99.77%	0.0000	0.0000
6.5	500,816	99.31%	99.51%	99.71%	0.0000	0.0000
7.5	640,923	99.31%	99.38%	99.64%	0.0000	0.0000
8.5	355,824	99.31%	99.21%	99.55%	0.0000	0.0000
9.5	355,556	99.23%	99.03%	99.46%	0.0000	0.0000
10.5	355,556	99.23%	98.81%	99.36%	0.0000	0.0000
11.5	311,876	99.23%	98.55%	99.24%	0.0000	0.0000
12.5	329,215	99.23%	98.26%	99.11%	0.0001	0.0000
13.5	329,215	99.23%	97.93%	98.96%	0.0002	0.0000
14.5	329,215	99.23%	97.56%	98.80%	0.0003	0.0000
15.5	329,215	99.23%	97.13%	98.61%	0.0004	0.0000
16.5	212,107	99.23%	96.65%	98.41%	0.0007	0.0001
17.5	209,157	99.23%	96.11%	98.19%	0.0010	0.0001
18.5	178,287	99.23%	95.50%	97.95%	0.0014	0.0002
19.5	169,340	99.23%	94.83%	97.68%	0.0019	0.0002
20.5	22,816	99.23%	94.08%	97.39%	0.0027	0.0003
21.5	22,816	99.23%	93.25%	97.07%	0.0036	0.0005
22.5	22,816	99.23%	92.34%	96.72%	0.0047	0.0006
23.5	22,816	99.23%	91.34%	96.33%	0.0062	0.0008
24.5	18,038	99.23%	90.23%	95.92%	0.0081	0.0011
25.5	16,774	99.23%	89.02%	95.47%	0.0104	0.0014
26.5	103,246	99.23%	87.70%	94.99%	0.0133	0.0018
27.5	117,783	99.23%	86.26%	94.47%	0.0168	0.0023
28.5	103,246	86.99%	84.69%	93.90%	0.0005	0.0048
29.5	136,899	86.99%	82.97%	93.29%	0.0016	0.0040
30.5	136,899	86.99%	81.11%	92.64%	0.0035	0.0032
31.5	218,910	86.99%	79.10%	91.94%	0.0062	0.0025
32.5	227,711	86.99%	76.91%	91.19%	0.0102	0.0018
33.5	227,711	86.99%	74.55%	90.39%	0.0155	0.0012
34.5	227,711	86.99%	72.01%	89.53%	0.0225	0.0006
35.5	145,664	55.64%	69.28%	88.62%	0.0186	0.1087
36.5	136,164	52.01%	66.36%	87.64%	0.0206	0.1269
37.5	136,164	52.01%	63.25%	86.60%	0.0126	0.1196
38.5	120,089	52.01%	59.97%	85.49%	0.0063	0.1121
39.5	33,654	52.01%	56.52%	84.31%	0.0020	0.1043
40.5	33,654	52.01%	52.92%	83.06%	0.0001	0.0964
41.5	33,654	52.01%	49.21%	81.72%	0.0008	0.0883
42.5	0	52.01%	45.40%	80.31%	0.0044	0.0801
43.5	0	52.01%	41.55%	78.81%	0.0109	0.0718
44.5	0	52.01%	37.69%	77.22%	0.0205	0.0636
Sum of Squared Differences for Relevant OLT				[8]	0.1318	0.0275

Account 390 Detailed Curve Comparison

[1]	[2]	[3]	[4]	[5]	[6]	[7]
Age (Years)	**Exposures (Dollars)**	**Observed Life Table (OLT)**	**CERC R3-40**	**TCUC R3-55**	**CERC SSD**	**TCUC SSD**

[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.
[9] = Sum of squared differences excluding less than 1% of beginning exposures.
*Below the bold horizontal line represents less than 1% of beginning exposures.

GAS UTILITIES DOCKET NO. 10567

STATEMENT OF INTENT OF CENTERPOINT ENERGY RESOURCES CORP., D/B/A CENTERPOINT ENERGY ENTEX AND CENTERPOINT ENERGY TEXAS GAS TO INCREASE RATES IN THE TEXAS GULF DIVISION	**§ § § § § §**	**BEFORE THE RAILROAD COMMISSION OF TEXAS**

DIRECT TESTIMONY OF DAVID J. GARRETT

EXHIBIT DJG-7: Simulated Plant Record Analysis and Graphical Balance Fit Summaries

CERC

Electric Division

376.02 Distribution Mains - Plastic

Simulated Plant Record Analysis Calculated As Of 12/31/2015

Simulated Balances Method

No. Of Test Points -	46
Interval Between Test Points -	1
First Test Point -	1970
Last Test Point -	2015

Curve Type	Average Service Life		Sum Of Squares Difference	Conformance Index	Index Of Variation	Ret Exp Index
R2.5	63.00	Yrs.	9.9410E+12	323.65	3.09	19.19
R2	79.84	Yrs.	1.0358E+13	317.08	3.15	13.89
L0.5	126.31	Yrs.	1.0940E+13	308.52	3.24	13.06
L1	91.78	Yrs.	1.1005E+13	307.60	3.25	17.98
S0	100.19	Yrs.	1.1428E+13	301.86	3.31	14.94
L0	164.75	Yrs.	1.1460E+13	301.44	3.32	11.68
S0.5	80.53	Yrs.	1.2117E+13	293.15	3.41	18.03
R1.5	113.97	Yrs.	1.2229E+13	291.81	3.43	10.21
S.5	171.91	Yrs.	1.2591E+13	287.58	3.48	9.68
L1.5	75.16	Yrs.	1.2964E+13	283.42	3.53	21.83
R1	153.94	Yrs.	1.3118E+13	281.75	3.55	9.15
R3	50.56	Yrs.	1.7434E+13	244.40	4.09	32.14
R0.5	201.00	Yrs.	1.7532E+13	.00	.00	9.02
S1	64.06	Yrs.	1.8534E+13	237.04	4.22	25.01
L2	60.69	Yrs.	2.2740E+13	213.99	4.67	31.46
S1.5	56.41	Yrs.	2.3176E+13	211.97	4.72	30.42
S2	49.66	Yrs.	3.8932E+13	163.55	6.11	40.11
L3	48.16	Yrs.	4.9055E+13	145.70	6.86	49.13
R4	41.69	Yrs.	5.7851E+13	134.17	7.45	64.21
S3	43.16	Yrs.	7.2541E+13	119.81	8.35	58.42
L4	41.59	Yrs.	8.8976E+13	108.18	9.24	69.94
S4	39.19	Yrs.	1.3011E+14	89.46	11.18	81.83
R5	37.88	Yrs.	1.4916E+14	83.55	11.97	95.16
L5	38.56	Yrs.	1.5051E+14	83.18	12.02	87.20
O1	201.00	Yrs.	1.5100E+14	.00	.00	11.32
SC	201.00	Yrs.	1.5100E+14	.00	.00	11.32
S5	37.34	Yrs.	1.8693E+14	74.64	13.40	96.82
S6	36.44	Yrs.	2.2611E+14	67.86	14.74	99.96
SQ	36.00	Yrs.	2.6252E+14	62.98	15.88	100.00
O2	201.00	Yrs.	3.0361E+14	.00	.00	12.72
O3	201.00	Yrs.	1.5852E+15	.00	.00	18.38
O4	201.00	Yrs.	4.5169E+15	.00	.00	24.98

CERC

Electric Division

376.02 Distribution Mains - Plastic

Simulated Plant Record Analysis Calculated As Of 12/31/2015

Simulated Balances Method

No. Of Test Points -	5
Interval Between Test Points -	1
First Test Point -	2011
Last Test Point -	2015

Curve Type	Average Service Life	Sum Of Squares Difference	Conformance Index	Index Of Variation	Ret Exp Index
L1.5	75.28 Yrs.	5.2093E+10	4324.56	.23	21.76
S1	64.59 Yrs.	7.5647E+10	3588.70	.28	24.56
R2.5	62.56 Yrs.	1.0234E+11	3085.33	.32	19.52
S0.5	80.25 Yrs.	1.1053E+11	2968.89	.34	18.14
L1	91.28 Yrs.	1.1116E+11	2960.51	.34	18.17
R3	51.00 Yrs.	1.6254E+11	2448.21	.41	31.25
S1.5	57.06 Yrs.	2.0439E+11	2183.24	.46	29.55
S0	99.00 Yrs.	2.1966E+11	2106.00	.47	15.23
L2	61.44 Yrs.	2.5651E+11	1948.87	.51	30.53
R2	78.09 Yrs.	2.9777E+11	1808.82	.55	14.50
L0.5	123.53 Yrs.	3.3245E+11	1711.87	.58	13.53
L0	160.18 Yrs.	4.2182E+11	1519.74	.66	12.13
R1.5	109.03 Yrs.	5.4980E+11	1331.16	.75	10.86
S.5	163.88 Yrs.	5.9467E+11	1279.96	.78	10.26
R1	145.78 Yrs.	6.4790E+11	1226.25	.82	9.75
R0.5	200.25 Yrs.	7.1746E+11	.00	.00	9.06
S2	50.50 Yrs.	7.8461E+11	1114.31	.90	38.35
L3	48.97 Yrs.	1.7000E+12	757.02	1.32	47.02
R4	42.38 Yrs.	2.5839E+12	614.04	1.63	60.39
S3	43.97 Yrs.	2.9217E+12	577.45	1.73	55.42
L4	42.34 Yrs.	4.7780E+12	451.55	2.21	67.10
S4	39.91 Yrs.	8.7926E+12	332.87	3.00	78.51
L5	39.22 Yrs.	1.1673E+13	288.90	3.46	85.17
R5	38.50 Yrs.	1.2212E+13	282.45	3.54	92.95
S5	37.94 Yrs.	1.7492E+13	236.00	4.24	95.42
S6	36.97 Yrs.	2.4442E+13	199.65	5.01	99.91
SQ	36.00 Yrs.	4.0177E+13	155.72	6.42	100.00
SC	201.00 Yrs.	5.3366E+13	.00	.00	11.32
O1	201.00 Yrs.	5.3366E+13	.00	.00	11.32
O2	201.00 Yrs.	1.2815E+14	.00	.00	12.72
O3	201.00 Yrs.	8.0790E+14	.00	.00	18.38
O4	201.00 Yrs.	2.4180E+15	.00	.00	24.98

CERC
Electric Division
376.02 Distribution Mains - Plastic

Simulated Plant Record Analysis Calculated As Of 12/31/2015

Simulated Balances Method

No. Of Test Points -	5
Interval Between Test Points -	1
First Test Point -	2006
Last Test Point -	2010

Curve Type	Average Service Life	Sum Of Squares Difference	Conformance Index	Index Of Variation	Ret Exp Index
R3	50.22 Yrs.	1.0520E+10	7040.31	.14	32.86
S1.5	55.97 Yrs.	1.0828E+10	6939.44	.14	31.02
L2	60.09 Yrs.	1.3338E+10	6252.43	.16	32.21
S1	64.09 Yrs.	2.1604E+10	4912.83	.20	24.98
L1.5	75.88 Yrs.	9.1050E+10	2393.07	.42	21.38
S0.5	81.97 Yrs.	1.5468E+11	1836.00	.54	17.42
S2	48.66 Yrs.	1.6809E+11	1761.24	.57	42.31
L1	93.56 Yrs.	1.7988E+11	1702.58	.59	17.32
R2.5	64.31 Yrs.	2.1038E+11	1574.32	.64	18.22
S0	102.91 Yrs.	2.4512E+11	1458.49	.69	14.31
L0.5	131.13 Yrs.	3.5611E+11	1210.05	.83	12.32
R2	82.97 Yrs.	3.8026E+11	1171.00	.85	12.91
L0	171.98 Yrs.	4.0451E+11	1135.35	.88	11.03
L3	46.72 Yrs.	4.4375E+11	1084.00	.92	52.93
R1.5	120.69 Yrs.	5.4558E+11	977.61	1.02	9.44
S.5	182.41 Yrs.	5.5887E+11	965.92	1.04	9.01
R1	164.19 Yrs.	6.0056E+11	931.79	1.07	8.49
R4	40.19 Yrs.	7.2000E+11	851.00	1.18	72.59
S3	41.59 Yrs.	1.0958E+12	689.83	1.45	64.37
L4	39.78 Yrs.	1.7900E+12	539.72	1.85	76.23
S4	37.09 Yrs.	3.9536E+12	363.16	2.75	90.15
R0.5	201.00 Yrs.	5.0034E+12	.00	.00	9.02
L5	36.31 Yrs.	5.3052E+12	313.51	3.19	92.73
R5	35.66 Yrs.	5.3136E+12	313.26	3.19	99.26
S5	34.94 Yrs.	7.8693E+12	257.41	3.88	99.55
SQ	33.00 Yrs.	8.6120E+12	246.06	4.06	100.00
S6	33.91 Yrs.	1.0463E+13	223.24	4.48	100.00
O1	201.00 Yrs.	5.0911E+13	.00	.00	11.32
SC	201.00 Yrs.	5.0911E+13	.00	.00	11.32
O2	201.00 Yrs.	9.6746E+13	.00	.00	12.72
O3	201.00 Yrs.	4.5720E+14	.00	.00	18.38
O4	201.00 Yrs.	1.2554E+15	.00	.00	24.98

CERC

Electric Division

376.02 Distribution Mains - Plastic

Simulated Plant Record Analysis Calculated As Of 12/31/2015

Simulated Balances Method

No. Of Test Points -	5
Interval Between Test Points -	1
First Test Point -	2001
Last Test Point -	2005

Curve Type	Average Service Life		Sum Of Squares Difference	Conformance Index	Index Of Variation	Ret Exp Index
L0.5	139.56	Yrs.	1.0493E+11	1646.35	.61	11.17
L0	184.79	Yrs.	1.0528E+11	1643.63	.61	10.01
S0	106.91	Yrs.	1.0693E+11	1630.93	.61	13.44
R2	89.03	Yrs.	1.0809E+11	1622.13	.62	11.32
R2.5	66.63	Yrs.	1.1094E+11	1601.15	.62	16.70
R1.5	134.72	Yrs.	1.1452E+11	1575.90	.63	8.15
L1	96.06	Yrs.	1.1682E+11	1560.34	.64	16.46
R1	185.94	Yrs.	1.1760E+11	1555.12	.64	7.35
S0.5	83.66	Yrs.	1.1848E+11	1549.34	.65	16.76
S.5	201.00	Yrs.	1.3538E+11	.00	.00	8.01
L1.5	76.47	Yrs.	1.3789E+11	1436.20	.70	21.01
S1	63.31	Yrs.	1.9839E+11	1197.34	.84	25.66
R3	49.44	Yrs.	1.9937E+11	1194.40	.84	34.60
L2	58.56	Yrs.	2.5459E+11	1056.95	.95	34.23
S1.5	54.56	Yrs.	2.7103E+11	1024.40	.98	33.02
S2	46.47	Yrs.	5.5748E+11	714.27	1.40	47.52
L3	44.16	Yrs.	7.2810E+11	625.00	1.60	59.77
R4	37.75	Yrs.	9.1565E+11	557.33	1.79	85.14
S3	38.81	Yrs.	1.3534E+12	458.42	2.18	75.15
L4	36.88	Yrs.	1.7594E+12	402.06	2.49	84.58
S4	34.00	Yrs.	3.0934E+12	303.22	3.30	97.54
R5	32.56	Yrs.	3.7521E+12	275.32	3.63	100.00
L5	33.19	Yrs.	3.9117E+12	269.65	3.71	97.56
S5	31.78	Yrs.	5.1444E+12	235.13	4.25	100.00
R0.5	201.00	Yrs.	6.7019E+12	.00	.00	9.02
S6	30.75	Yrs.	6.9045E+12	202.96	4.93	100.00
SQ	30.00	Yrs.	8.7294E+12	180.50	5.54	100.00
O1	201.00	Yrs.	3.3648E+13	.00	.00	11.32
SC	201.00	Yrs.	3.3648E+13	.00	.00	11.32
O2	201.00	Yrs.	5.6757E+13	.00	.00	12.72
O3	201.00	Yrs.	2.2358E+14	.00	.00	18.38
O4	201.00	Yrs.	5.7572E+14	.00	.00	24.98

CERC

Electric Division

376.02 Distribution Mains - Plastic

Simulated Plant Record Analysis Calculated As Of 12/31/2015

Simulated Balances Method

No. Of Test Points -	5
Interval Between Test Points -	1
First Test Point -	1996
Last Test Point -	2000

Curve Type	Average Service Life	Sum Of Squares Difference	Conformance Index	Index Of Variation	Ret Exp Index
R1	165.69 Yrs.	3.6031E+10	1811.01	.55	8.40
S.5	181.88 Yrs.	4.0941E+10	1698.96	.59	9.04
R1.5	119.97 Yrs.	4.1366E+10	1690.20	.59	9.52
R2	79.13 Yrs.	6.4287E+10	1355.81	.74	14.13
L0	164.83 Yrs.	6.7421E+10	1323.92	.76	11.68
L0.5	124.28 Yrs.	7.5400E+10	1251.91	.80	13.40
R2.5	59.00 Yrs.	1.0500E+11	1060.89	.94	22.68
S0	95.19 Yrs.	1.1305E+11	1022.39	.98	16.23
L1	85.06 Yrs.	1.3204E+11	946.04	1.06	20.79
S0.5	74.25 Yrs.	1.5200E+11	881.74	1.13	21.02
L1.5	67.59 Yrs.	1.8969E+11	789.30	1.27	27.44
R3	43.53 Yrs.	2.8750E+11	641.12	1.56	51.95
S1	55.88 Yrs.	3.1172E+11	615.71	1.62	33.49
L2	51.59 Yrs.	3.8107E+11	556.88	1.80	44.79
S1.5	48.00 Yrs.	4.0928E+11	537.34	1.86	44.55
S2	40.63 Yrs.	7.4370E+11	398.62	2.51	64.04
L3	38.59 Yrs.	8.8783E+11	364.83	2.74	73.82
R0.5	201.00 Yrs.	8.9280E+11	.00	.00	9.02
R4	32.91 Yrs.	1.0448E+12	336.31	2.97	99.03
S3	33.75 Yrs.	1.4516E+12	285.33	3.50	92.03
L4	32.06 Yrs.	1.7932E+12	256.71	3.90	94.68
S4	29.50 Yrs.	2.7002E+12	209.20	4.78	99.96
R5	28.28 Yrs.	3.1863E+12	192.58	5.19	100.00
L5	28.78 Yrs.	3.3043E+12	189.11	5.29	99.86
S5	27.56 Yrs.	4.1094E+12	169.58	5.90	100.00
S6	26.72 Yrs.	5.6622E+12	144.47	6.92	100.00
O1	201.00 Yrs.	8.4493E+12	.00	.00	11.32
SC	201.00 Yrs.	8.4493E+12	.00	.00	11.32
SQ	26.00 Yrs.	9.1439E+12	113.68	8.80	100.00
O2	201.00 Yrs.	1.5671E+13	.00	.00	12.72
O3	201.00 Yrs.	7.1878E+13	.00	.00	18.38
O4	201.00 Yrs.	1.9596E+14	.00	.00	24.98

CERC

Electric Division

376.02 Distribution Mains - Plastic

Simulated Plant Record Analysis Calculated As Of 12/31/2015

Simulated Balances Method

No. Of Test Points -	5
Interval Between Test Points -	1
First Test Point -	1991
Last Test Point -	1995

Curve Type	Average Service Life	Sum Of Squares Difference	Conformance Index	Index Of Variation	Ret Exp Index
R1	146.94 Yrs.	6.2156E+10	922.55	1.08	9.66
R1.5	106.03 Yrs.	6.8612E+10	878.08	1.14	11.30
S.5	160.81 Yrs.	6.8675E+10	877.67	1.14	10.50
R0.5	201.00 Yrs.	7.1904E+10	.00	.00	9.02
R2	69.28 Yrs.	9.4089E+10	749.83	1.33	18.40
L0	144.32 Yrs.	1.0230E+11	719.10	1.39	13.94
L0.5	108.59 Yrs.	1.0967E+11	694.53	1.44	16.56
R2.5	51.22 Yrs.	1.3400E+11	628.31	1.59	33.03
S0	82.56 Yrs.	1.5259E+11	588.80	1.70	20.39
L1	73.56 Yrs.	1.6402E+11	567.92	1.76	26.98
S0.5	64.09 Yrs.	1.8942E+11	528.47	1.89	27.62
L1.5	58.13 Yrs.	2.1986E+11	490.52	2.04	36.97
R3	37.25 Yrs.	2.9421E+11	424.03	2.36	78.09
S1	47.75 Yrs.	3.3655E+11	396.47	2.52	45.73
L2	44.03 Yrs.	3.8663E+11	369.90	2.70	58.55
S1.5	40.91 Yrs.	4.0941E+11	359.46	2.78	61.64
S2	34.41 Yrs.	6.5755E+11	283.64	3.53	83.88
L3	32.69 Yrs.	7.5506E+11	264.69	3.78	86.53
R4	27.84 Yrs.	8.3310E+11	251.99	3.97	100.00
S3	28.47 Yrs.	1.0977E+12	219.53	4.56	99.54
L4	27.06 Yrs.	1.3066E+12	201.21	4.97	99.49
O1	201.00 Yrs.	1.6774E+12	.00	.00	11.32
SC	201.00 Yrs.	1.6774E+12	.00	.00	11.32
S4	24.91 Yrs.	1.8214E+12	170.42	5.87	100.00
R5	23.91 Yrs.	2.1162E+12	158.11	6.32	100.00
L5	24.34 Yrs.	2.1852E+12	155.59	6.43	100.00
S5	23.34 Yrs.	2.7229E+12	139.38	7.17	100.00
O2	201.00 Yrs.	3.6006E+12	.00	.00	12.72
S6	22.72 Yrs.	3.8796E+12	116.77	8.56	100.00
SQ	22.00 Yrs.	6.7814E+12	88.32	11.32	100.00
O3	201.00 Yrs.	2.0395E+13	.00	.00	18.38
O4	201.00 Yrs.	5.9739E+13	.00	.00	24.98

CERC

Electric Division

376.02 Distribution Mains - Plastic

Simulated Plant Record Analysis Calculated As Of 12/31/2015

Simulated Balances Method

No. Of Test Points -	5
Interval Between Test Points -	1
First Test Point -	1986
Last Test Point -	1990

Curve Type	Average Service Life		Sum Of Squares Difference	Conformance Index	Index Of Variation	Ret Exp Index
O1	193.00	Yrs.	1.1986E+11	440.36	2.27	11.79
SC	193.00	Yrs.	1.1986E+11	440.36	2.27	11.79
R0.5	148.28	Yrs.	1.2205E+11	436.38	2.29	12.45
R1	105.44	Yrs.	1.2867E+11	425.01	2.35	14.40
R1.5	76.50	Yrs.	1.3797E+11	410.43	2.44	18.45
S.5	115.91	Yrs.	1.3834E+11	409.88	2.44	15.70
O2	201.00	Yrs.	1.6377E+11	.00	.00	12.72
R2	50.72	Yrs.	1.7242E+11	367.15	2.72	36.04
L0	105.45	Yrs.	1.8676E+11	352.78	2.83	20.99
L0.5	79.66	Yrs.	1.9541E+11	344.88	2.90	26.58
R2.5	38.03	Yrs.	2.2115E+11	324.18	3.08	70.92
S0	61.09	Yrs.	2.4868E+11	305.72	3.27	32.55
L1	54.78	Yrs.	2.5357E+11	302.75	3.30	42.57
S0.5	47.81	Yrs.	2.8721E+11	284.47	3.52	46.13
L1.5	43.66	Yrs.	3.1193E+11	272.97	3.66	58.20
R3	28.31	Yrs.	3.8609E+11	245.35	4.08	99.90
S1	36.13	Yrs.	4.2322E+11	234.34	4.27	72.61
L2	33.56	Yrs.	4.7767E+11	220.58	4.53	79.69
S1.5	31.16	Yrs.	4.8601E+11	218.68	4.57	89.72
S2	26.53	Yrs.	6.7098E+11	186.12	5.37	99.43
L3	25.38	Yrs.	7.6887E+11	173.86	5.75	97.98
R4	21.75	Yrs.	8.2386E+11	167.96	5.95	100.00
S3	22.31	Yrs.	9.8577E+11	153.55	6.51	100.00
L4	21.31	Yrs.	1.1489E+12	142.23	7.03	100.00
S4	19.78	Yrs.	1.5091E+12	124.10	8.06	100.00
R5	19.06	Yrs.	1.7280E+12	115.98	8.62	100.00
L5	19.41	Yrs.	1.7603E+12	114.91	8.70	100.00
S5	18.72	Yrs.	2.1862E+12	103.11	9.70	100.00
O3	201.00	Yrs.	2.6188E+12	.00	.00	18.38
S6	18.31	Yrs.	2.9443E+12	88.85	11.26	100.00
SQ	18.00	Yrs.	3.9236E+12	76.96	12.99	100.00
O4	201.00	Yrs.	1.0768E+13	.00	.00	24.98

CERC

Electric Division

376.02 Distribution Mains - Plastic

Simulated Plant Record Analysis Calculated As Of 12/31/2015

Simulated Balances Method

No. Of Test Points -	5
Interval Between Test Points -	1
First Test Point -	1981
Last Test Point -	1985

Curve Type	Average Service Life	Sum Of Squares Difference	Conformance Index	Index Of Variation	Ret Exp Index
O3	176.84 Yrs.	2.4525E+11	175.97	5.68	20.80
SC	106.91 Yrs.	2.4566E+11	175.82	5.69	21.28
O1	106.91 Yrs.	2.4566E+11	175.82	5.69	21.28
O2	120.03 Yrs.	2.4573E+11	175.80	5.69	21.30
R0.5	82.63 Yrs.	2.4847E+11	174.83	5.72	23.60
R1	59.66 Yrs.	2.5654E+11	172.05	5.81	31.05
S.5	66.53 Yrs.	2.6532E+11	169.18	5.91	31.39
R1.5	44.16 Yrs.	2.6820E+11	168.27	5.94	49.26
L0	63.38 Yrs.	3.0261E+11	158.42	6.31	38.74
R2	30.81 Yrs.	3.0771E+11	157.10	6.37	91.38
L0.5	48.53 Yrs.	3.1541E+11	155.17	6.44	50.90
S0	38.31 Yrs.	3.5174E+11	146.94	6.81	62.93
R2.5	24.19 Yrs.	3.6011E+11	145.22	6.89	100.00
L1	35.09 Yrs.	3.7416E+11	142.47	7.02	72.22
S0.5	30.72 Yrs.	3.8771E+11	139.95	7.15	84.68
L1.5	28.66 Yrs.	4.2051E+11	134.39	7.44	87.30
O4	201.00 Yrs.	4.4420E+11	.00	.00	24.98
S1	24.25 Yrs.	4.8753E+11	124.81	8.01	99.72
R3	19.19 Yrs.	5.0031E+11	123.20	8.12	100.00
S1.5	21.31 Yrs.	5.4461E+11	118.09	8.47	100.00
L2	22.97 Yrs.	5.5222E+11	117.27	8.53	97.76
S2	18.66 Yrs.	6.7802E+11	105.83	9.45	100.00
L3	18.13 Yrs.	7.7949E+11	98.70	10.13	100.00
R4	15.66 Yrs.	8.3580E+11	95.32	10.49	100.00
S3	16.16 Yrs.	9.2272E+11	90.72	11.02	100.00
L4	15.59 Yrs.	1.0494E+12	85.07	11.76	100.00
S4	14.66 Yrs.	1.3236E+12	75.75	13.20	100.00
R5	14.22 Yrs.	1.4652E+12	71.99	13.89	100.00
L5	14.47 Yrs.	1.4849E+12	71.52	13.98	100.00
S5	14.03 Yrs.	1.7613E+12	65.66	15.23	100.00
S6	13.78 Yrs.	2.1318E+12	59.68	16.75	100.00
SQ	16.00 Yrs.	4.0725E+12	43.18	23.16	100.00

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Electric Division

376.02 Distribution Mains - Plastic

Simulated Plant Record Analysis Calculated As Of 12/31/2015

Simulated Balances Method

No. Of Test Points -	5
Interval Between Test Points -	1
First Test Point -	1976
Last Test Point -	1980

Curve Type	Average Service Life	Sum Of Squares Difference	Conformance Index	Index Of Variation	Ret Exp Index
O4	88.56 Yrs.	2.7072E+11	60.43	16.55	49.22
O3	63.47 Yrs.	2.7092E+11	60.41	16.55	51.52
O1	38.50 Yrs.	2.7136E+11	60.36	16.57	59.09
SC	38.50 Yrs.	2.7136E+11	60.36	16.57	59.09
O2	43.25 Yrs.	2.7138E+11	60.35	16.57	58.92
R0.5	30.38 Yrs.	2.7360E+11	60.11	16.64	79.61
R1	23.00 Yrs.	2.7942E+11	59.48	16.81	99.95
S.5	26.41 Yrs.	2.8171E+11	59.24	16.88	89.78
R1.5	18.09 Yrs.	2.9055E+11	58.33	17.14	100.00
L0	27.52 Yrs.	2.9091E+11	58.29	17.15	83.70
L0.5	22.06 Yrs.	3.0417E+11	57.01	17.54	95.02
S0	18.28 Yrs.	3.1249E+11	56.24	17.78	100.00
R2	14.31 Yrs.	3.2170E+11	55.43	18.04	100.00
S0.5	15.47 Yrs.	3.3665E+11	54.19	18.45	100.00
L1	17.59 Yrs.	3.3931E+11	53.98	18.53	99.82
R2.5	12.31 Yrs.	3.6353E+11	52.15	19.18	100.00
L1.5	15.06 Yrs.	3.6901E+11	51.76	19.32	100.00
S1	13.22 Yrs.	3.8603E+11	50.60	19.76	100.00
S1.5	12.03 Yrs.	4.3174E+11	47.85	20.90	100.00
L2	13.00 Yrs.	4.4458E+11	47.15	21.21	100.00
R3	10.84 Yrs.	4.5138E+11	46.80	21.37	100.00
S2	11.03 Yrs.	5.1338E+11	43.88	22.79	100.00
L3	10.94 Yrs.	5.9730E+11	40.68	24.58	100.00
R4	9.66 Yrs.	6.6980E+11	38.42	26.03	100.00
S3	9.97 Yrs.	6.8470E+11	38.00	26.32	100.00
L4	9.78 Yrs.	7.8329E+11	35.52	28.15	100.00
S4	9.34 Yrs.	9.3476E+11	32.52	30.75	100.00
L5	9.25 Yrs.	1.0304E+12	30.97	32.29	100.00
R5	9.13 Yrs.	1.0326E+12	30.94	32.32	100.00
S5	9.06 Yrs.	1.1633E+12	29.15	34.30	100.00
S6	8.94 Yrs.	1.3370E+12	27.19	36.78	100.00
SQ	16.00 Yrs.	2.5090E+12	19.85	50.38	100.00

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Electric Division

376.02 Distribution Mains - Plastic

Simulated Plant Record Analysis Calculated As Of 12/31/2015

Simulated Balances Method

No. Of Test Points -	5
Interval Between Test Points -	1
First Test Point -	1971
Last Test Point -	1975

Curve Type	Average Service Life		Sum Of Squares Difference	Conformance Index	Index Of Variation	Ret Exp Index
S0.5	28.25	Yrs.	2.0930E+08	544.17	1.84	91.20
S0	38.66	Yrs.	2.0983E+08	543.49	1.84	62.21
L1.5	25.22	Yrs.	2.1880E+08	532.23	1.88	93.45
R3	15.09	Yrs.	2.1965E+08	531.20	1.88	100.00
L0	79.75	Yrs.	2.2742E+08	522.05	1.92	29.66
S1	17.88	Yrs.	2.2771E+08	521.71	1.92	100.00
L0.5	59.38	Yrs.	2.2811E+08	521.26	1.92	39.80
L1	35.91	Yrs.	2.2853E+08	520.78	1.92	70.64
L2	16.13	Yrs.	2.3067E+08	518.35	1.93	100.00
S1.5	14.72	Yrs.	2.3926E+08	508.97	1.96	100.00
R2.5	27.88	Yrs.	2.4035E+08	507.81	1.97	98.89
R2	43.06	Yrs.	2.4858E+08	499.33	2.00	51.91
S.5	111.69	Yrs.	2.5368E+08	494.29	2.02	16.44
R1.5	74.66	Yrs.	2.5528E+08	492.73	2.03	19.19
R1	107.47	Yrs.	2.5708E+08	491.01	2.04	14.06
R0.5	156.25	Yrs.	2.5832E+08	489.83	2.04	11.77
SC	201.00	Yrs.	2.5974E+08	.00	.00	11.32
O1	201.00	Yrs.	2.5974E+08	.00	.00	11.32
O2	201.00	Yrs.	3.0217E+08	.00	.00	12.72
L3	10.53	Yrs.	3.1776E+08	441.65	2.26	100.00
S2	11.25	Yrs.	3.2000E+08	440.09	2.27	100.00
R4	8.84	Yrs.	3.2154E+08	439.04	2.28	100.00
S3	8.59	Yrs.	4.6945E+08	363.35	2.75	100.00
L4	8.03	Yrs.	5.2026E+08	345.15	2.90	100.00
R5	6.66	Yrs.	6.9249E+08	299.17	3.34	100.00
S4	7.03	Yrs.	6.9303E+08	299.05	3.34	100.00
O3	201.00	Yrs.	1.2191E+09	.00	.00	18.38
L5	16.00	Yrs.	2.2442E+09	166.19	6.02	100.00
S6	16.00	Yrs.	2.2442E+09	166.19	6.02	100.00
SQ	16.00	Yrs.	2.2442E+09	166.19	6.02	100.00
S5	16.00	Yrs.	2.2442E+09	166.19	6.02	100.00
O4	201.00	Yrs.	3.9832E+09	.00	.00	24.98

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Electric Division

376.02 Distribution Mains - Plastic

Simulated Plant Record Analysis Calculated As Of 12/31/2015

Simulated Balances Method

No. Of Test Points -	1
Interval Between Test Points -	1
First Test Point -	1970
Last Test Point -	1970

Curve Type	Average Service Life	Sum Of Squares Difference	Conformance Index	Index Of Variation	Ret Exp Index
R5	16.00 Yrs.	4.9000E-01	301382.74	.00	100.00
S2	50.00 Yrs.	4.9000E-01	301382.74	.00	39.39
S3	16.00 Yrs.	4.9000E-01	301382.74	.00	100.00
L5	16.00 Yrs.	4.9000E-01	301382.74	.00	100.00
L3	16.00 Yrs.	4.9000E-01	301382.74	.00	100.00
S4	16.00 Yrs.	4.9000E-01	301382.74	.00	100.00
S5	16.00 Yrs.	4.9000E-01	301382.74	.00	100.00
S6	16.00 Yrs.	4.9000E-01	301382.74	.00	100.00
SQ	16.00 Yrs.	4.9000E-01	301382.74	.00	100.00
L4	16.00 Yrs.	4.9000E-01	301382.74	.00	100.00
L2	201.00 Yrs.	5.8150E-01	.00	.00	1.11
S1.5	201.00 Yrs.	5.9108E-01	.00	.00	.83
S1	201.00 Yrs.	6.9119E-01	.00	.00	1.45
R4	201.00 Yrs.	1.2878E+00	.00	.00	.11
S0.5	201.00 Yrs.	3.9169E+01	.00	.00	3.08
R3	201.00 Yrs.	7.7853E+01	.00	.00	.88
S0	201.00 Yrs.	1.3626E+02	.00	.00	4.70
L1.5	201.00 Yrs.	2.5427E+02	.00	.00	2.45
R2.5	201.00 Yrs.	8.7930E+02	.00	.00	2.00
L1	201.00 Yrs.	9.6865E+02	.00	.00	3.79
L0.5	201.00 Yrs.	2.4016E+03	.00	.00	6.36
R2	201.00 Yrs.	2.5475E+03	.00	.00	3.11
L0	206.00 Yrs.	4.2614E+03	.00	.00	8.64
R1.5	201.00 Yrs.	8.7070E+03	.00	.00	4.92
R1	201.00 Yrs.	1.8534E+04	.00	.00	6.73
S.5	201.00 Yrs.	1.8875E+04	.00	.00	8.01
R0.5	201.00 Yrs.	3.9849E+04	.00	.00	9.02
O1	201.00 Yrs.	6.9223E+04	.00	.00	11.32
SC	201.00 Yrs.	6.9223E+04	.00	.00	11.32
O2	201.00 Yrs.	8.7093E+04	.00	.00	12.72
O3	201.00 Yrs.	1.8986E+05	.00	.00	18.38
O4	201.00 Yrs.	3.7087E+05	.00	.00	24.98

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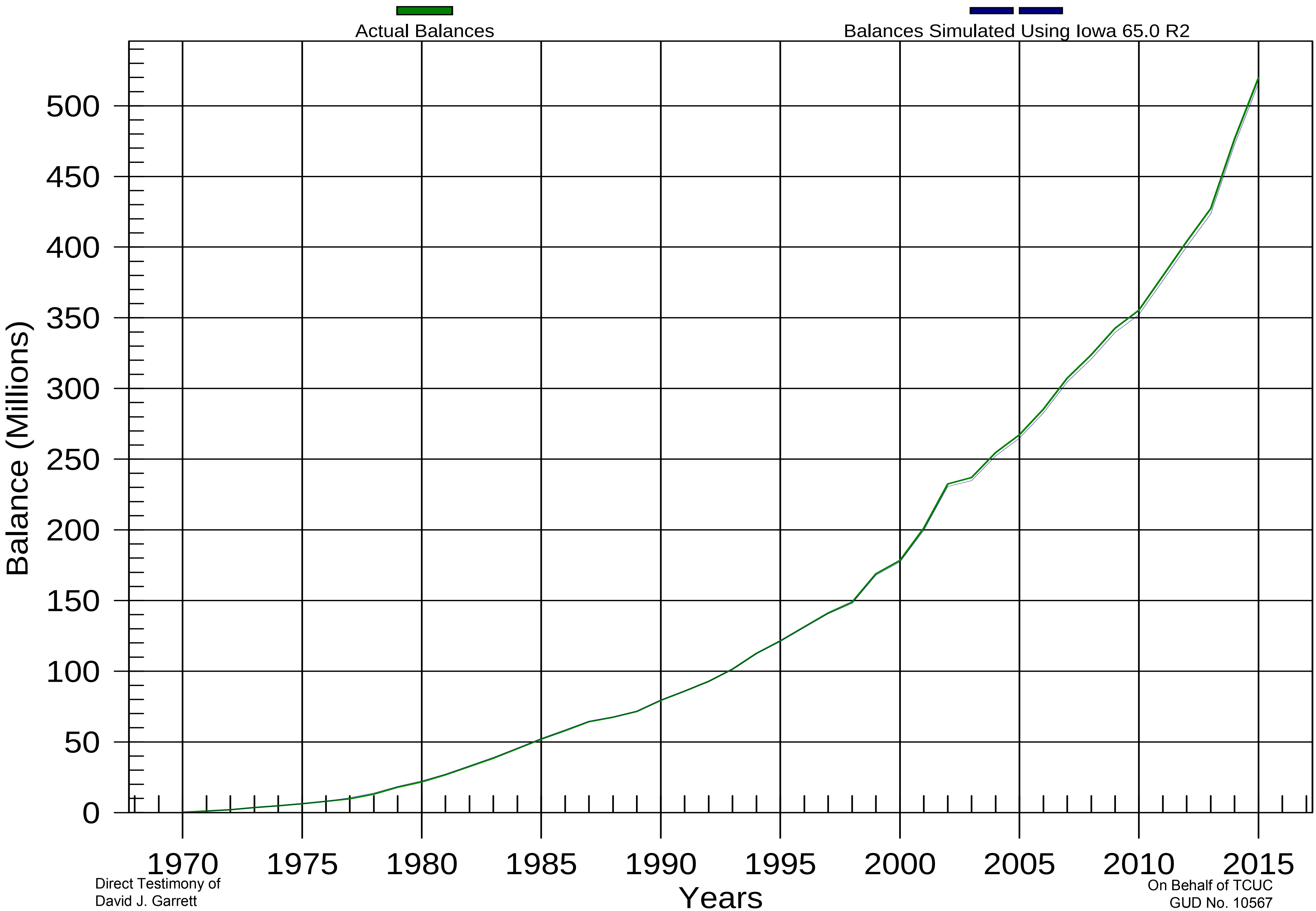
Electric Division

376.02 Distribution Mains - Plastic

Actual And Simulated Balances 1970-2015



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Electric Division
379.00 Meas. & Reg. - City Gate

Summary of Simulated Curve Fitting Results

5 Year Band

Experience Band	Curve Dispersion	Ave. Serv. Life	Least Sum Of Square	Conformance Index	Index of Variation	Ret. Exp. Index
1944 - 2015	O1	49	5.559800E+12	24.75	40.4	72.91
2011 - 2015	O4	98.1	1.390600E+11	151.8	6.59	60.73
2006 - 2010	R2.5	32.6	2.281200E+10	292.4	3.42	100
2001 - 2005	O4	139.4	4.513100E+10	169.6	5.9	49.16
1996 - 2000	O4	107.3	1.388400E+11	72.1	13.87	57.9
1991 - 1995	O4	85.1	8.032000E+09	244.7	4.09	65.02
1986 - 1990	SQ	16	5.836700E+09	216.2	4.63	100
1981 - 1985	S6	15.4	6.228900E+09	118	8.48	100
1976 - 1980	R4	14.8	4.842500E+08	229.4	4.36	100
1971 - 1975	S1	23.3	1.965600E+10	17.89	55.89	100
1966 - 1970	L4	116	9.486800E-20	5E+15	0	4.28
1961 - 1965	L4	94	4.446900E-21	8E+15	0	13.38
1956 - 1960	L4	72	1.905800E-21	5E+15	0	52.71

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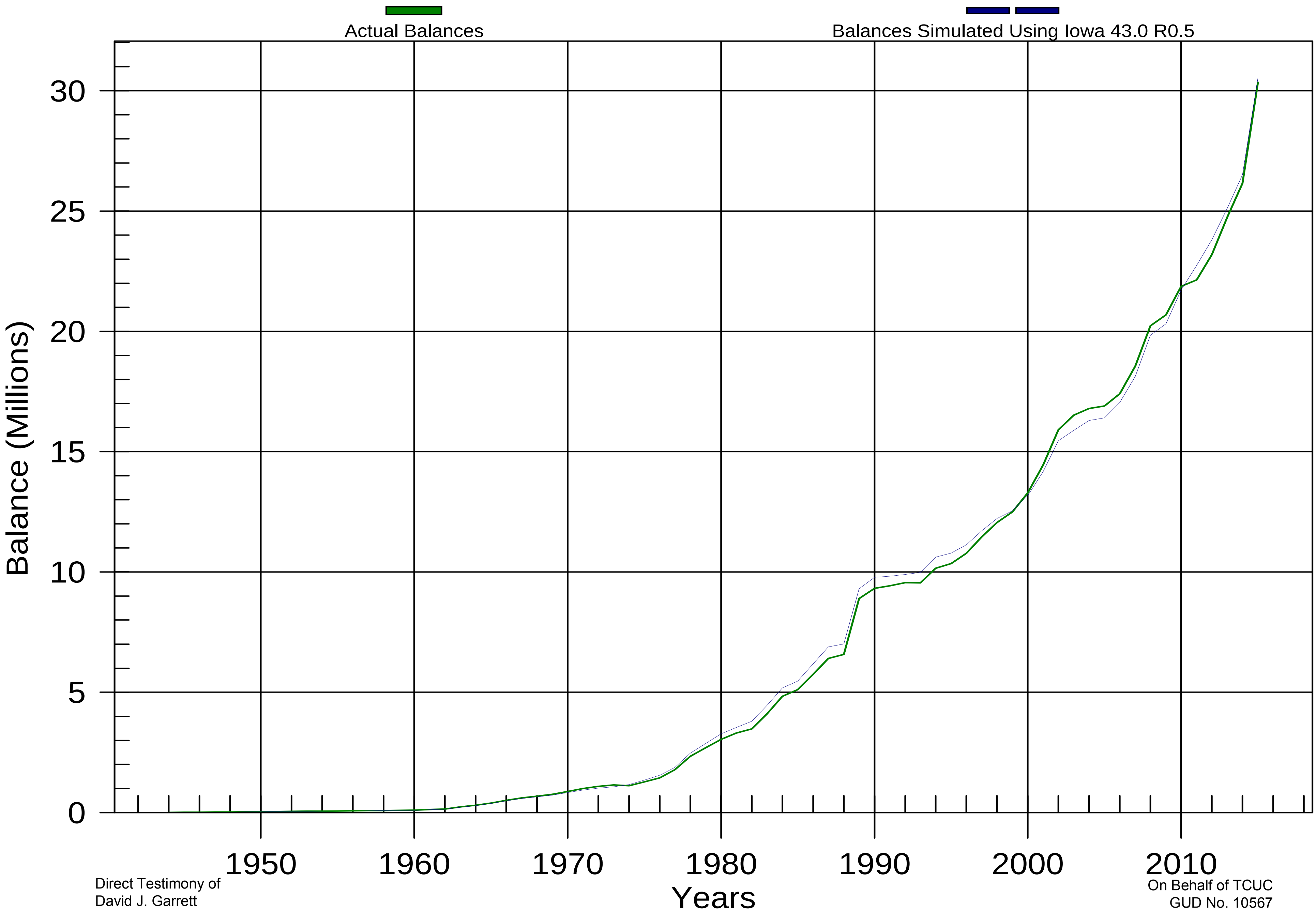
Electric Division
379.00 Meas. & Reg. - City Gate
Actual And Simulated Balances 1944-2015



Direct Testimony of
David J. Garrett

On Behalf of TCUC
GUD No. 10567

CERC

Electric Division

380.02 Services - Plastic

Simulated Plant Record Analysis Calculated As Of 12/31/2015

Simulated Balances Method

No. Of Test Points -	46
Interval Between Test Points -	1
First Test Point -	1970
Last Test Point -	2015

Curve Type	Average Service Life		Sum Of Squares Difference	Conformance Index	Index Of Variation	Ret Exp Index
R1.5	66.47	Yrs.	2.9839E+13	215.15	4.65	23.28
S.5	97.09	Yrs.	3.0535E+13	212.69	4.70	19.58
L0	102.02	Yrs.	3.1203E+13	210.40	4.75	21.89
R1	84.28	Yrs.	3.1635E+13	208.96	4.79	19.15
R0.5	111.13	Yrs.	3.5247E+13	197.96	5.05	16.98
L0.5	81.69	Yrs.	3.5732E+13	196.61	5.09	25.61
O2	158.19	Yrs.	3.7223E+13	192.64	5.19	16.16
SC	140.84	Yrs.	3.7259E+13	192.54	5.19	16.15
O1	140.84	Yrs.	3.7259E+13	192.54	5.19	16.15
R2	52.75	Yrs.	4.3133E+13	178.95	5.59	33.01
S0	68.03	Yrs.	4.4727E+13	175.73	5.69	27.61
L1	65.41	Yrs.	6.5512E+13	145.20	6.89	32.71
S0.5	57.69	Yrs.	6.6741E+13	143.86	6.95	33.40
R2.5	45.56	Yrs.	8.2282E+13	129.56	7.72	45.45
L1.5	56.13	Yrs.	9.9638E+13	117.74	8.49	39.40
S1	49.44	Yrs.	1.3391E+14	101.56	9.85	42.80
O3	201.00	Yrs.	1.7191E+14	.00	.00	18.38
S1.5	44.97	Yrs.	1.9319E+14	84.56	11.83	51.24
R3	40.34	Yrs.	2.0257E+14	82.58	12.11	64.66
L2	48.53	Yrs.	2.0314E+14	82.46	12.13	50.11
S2	41.22	Yrs.	3.1818E+14	65.89	15.18	62.21
L3	40.81	Yrs.	4.2906E+14	56.74	17.62	68.43
R4	36.00	Yrs.	5.4274E+14	50.45	19.82	92.14
S3	37.28	Yrs.	5.7392E+14	49.06	20.38	80.88
L4	36.47	Yrs.	7.1082E+14	44.08	22.69	85.61
S4	34.81	Yrs.	9.4992E+14	38.13	26.22	96.19
L5	34.47	Yrs.	1.0754E+15	35.84	27.90	95.95
R5	33.91	Yrs.	1.0855E+15	35.67	28.03	99.98
S5	33.66	Yrs.	1.2831E+15	32.81	30.48	99.90
S6	33.09	Yrs.	1.4999E+15	30.35	32.95	100.00
SQ	33.00	Yrs.	1.6580E+15	28.86	34.65	100.00
O4	201.00	Yrs.	2.0769E+15	.00	.00	24.98

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Electric Division

380.02 Services - Plastic

Simulated Plant Record Analysis Calculated As Of 12/31/2015

Simulated Balances Method

No. Of Test Points -	5
Interval Between Test Points -	1
First Test Point -	2011
Last Test Point -	2015

Curve Type	Average Service Life	Sum Of Squares Difference	Conformance Index	Index Of Variation	Ret Exp Index
R1.5	67.34 Yrs.	8.4694E+11	1124.04	.89	22.76
L0	103.70 Yrs.	8.8973E+11	1096.68	.91	21.44
L0.5	83.53 Yrs.	9.2090E+11	1077.96	.93	24.77
S.5	97.75 Yrs.	9.8057E+11	1044.64	.96	19.41
R1	84.59 Yrs.	1.0260E+12	1021.27	.98	19.06
S0	69.88 Yrs.	1.0742E+12	998.06	1.00	26.49
R2	54.09 Yrs.	1.2034E+12	942.97	1.06	31.21
R0.5	110.56 Yrs.	1.2251E+12	934.59	1.07	17.08
O2	156.81 Yrs.	1.3258E+12	898.40	1.11	16.30
O1	139.59 Yrs.	1.3272E+12	897.92	1.11	16.30
SC	139.59 Yrs.	1.3272E+12	897.92	1.11	16.30
S0.5	59.53 Yrs.	1.6859E+12	796.69	1.26	31.58
L1	67.50 Yrs.	1.6971E+12	794.06	1.26	31.11
R2.5	46.94 Yrs.	2.8002E+12	618.18	1.62	41.92
L1.5	58.06 Yrs.	2.9110E+12	606.30	1.65	37.04
S1	51.28 Yrs.	3.7820E+12	531.92	1.88	39.84
S1.5	46.66 Yrs.	6.2782E+12	412.85	2.42	47.40
L2	50.41 Yrs.	6.8993E+12	393.83	2.54	46.81
R3	41.69 Yrs.	8.3071E+12	358.91	2.79	59.06
S2	42.81 Yrs.	1.1520E+13	304.77	3.28	57.44
L3	42.34 Yrs.	1.8723E+13	239.06	4.18	64.52
S3	38.66 Yrs.	2.6036E+13	202.73	4.93	75.76
R4	37.19 Yrs.	2.8172E+13	194.89	5.13	87.58
L4	37.69 Yrs.	3.8437E+13	166.85	5.99	82.45
S4	35.94 Yrs.	5.6469E+13	137.66	7.26	93.64
O3	201.00 Yrs.	6.6168E+13	.00	.00	18.38
L5	35.50 Yrs.	7.1321E+13	122.49	8.16	94.28
R5	34.88 Yrs.	7.4224E+13	120.07	8.33	99.76
S5	34.59 Yrs.	9.7681E+13	104.67	9.55	99.70
S6	33.88 Yrs.	1.3758E+14	88.19	11.34	100.00
SQ	33.00 Yrs.	1.9771E+14	73.57	13.59	100.00
O4	201.00 Yrs.	1.0820E+15	.00	.00	24.98

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Simulated Plant Record Analysis Calculated As Of 12/31/2015

Simulated Balances Method

No. Of Test Points -	5
Interval Between Test Points -	1
First Test Point -	2006
Last Test Point -	2010

Curve Type	Average Service Life	Sum Of Squares Difference	Conformance Index	Index Of Variation	Ret Exp Index
SC	133.78 Yrs.	9.4999E+11	833.48	1.20	17.01
O1	133.78 Yrs.	9.4999E+11	833.48	1.20	17.01
O2	150.28 Yrs.	9.5114E+11	832.98	1.20	17.01
R0.5	105.66 Yrs.	1.0338E+12	798.98	1.25	17.95
R1	80.28 Yrs.	1.2698E+12	720.92	1.39	20.43
S.5	92.56 Yrs.	1.3832E+12	690.74	1.45	20.78
R1.5	63.38 Yrs.	1.7589E+12	612.54	1.63	25.27
L0	97.48 Yrs.	1.8727E+12	593.64	1.68	23.18
L0.5	78.03 Yrs.	2.5069E+12	513.09	1.95	27.39
S0	65.03 Yrs.	3.0280E+12	466.85	2.14	29.59
R2	50.22 Yrs.	3.3949E+12	440.90	2.27	36.85
S0.5	55.03 Yrs.	4.3837E+12	388.00	2.58	36.30
L1	62.41 Yrs.	4.4586E+12	384.73	2.60	35.18
R2.5	43.19 Yrs.	6.0043E+12	331.53	3.02	52.40
L1.5	53.41 Yrs.	6.3247E+12	323.03	3.10	42.97
S1	47.06 Yrs.	7.5039E+12	296.56	3.37	46.99
S1.5	42.63 Yrs.	1.0603E+13	249.49	4.01	57.05
L2	45.97 Yrs.	1.1484E+13	239.73	4.17	54.84
R3	38.00 Yrs.	1.2438E+13	230.35	4.34	74.86
O3	201.00 Yrs.	1.6454E+13	.00	.00	18.38
S2	38.94 Yrs.	1.6615E+13	199.30	5.02	69.39
L3	38.31 Yrs.	2.3877E+13	166.25	6.01	74.48
S3	34.91 Yrs.	3.1496E+13	144.75	6.91	88.81
R4	33.56 Yrs.	3.1928E+13	143.77	6.96	98.21
L4	33.91 Yrs.	4.0869E+13	127.07	7.87	91.35
S4	32.22 Yrs.	5.8934E+13	105.82	9.45	99.27
L5	31.75 Yrs.	6.7981E+13	98.53	10.15	98.79
R5	31.22 Yrs.	6.9997E+13	97.10	10.30	100.00
S5	30.88 Yrs.	8.7888E+13	86.65	11.54	100.00
S6	30.16 Yrs.	1.0442E+14	79.50	12.58	100.00
SQ	30.00 Yrs.	1.1911E+14	74.44	13.43	100.00
O4	201.00 Yrs.	4.5470E+14	.00	.00	24.98

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380.02 Services - Plastic

Simulated Plant Record Analysis Calculated As Of 12/31/2015

Simulated Balances Method

No. Of Test Points -	5
Interval Between Test Points -	1
First Test Point -	2001
Last Test Point -	2005

Curve Type	Average Service Life		Sum Of Squares Difference	Conformance Index	Index Of Variation	Ret Exp Index
R4	31.03	Yrs.	4.5637E+12	285.58	3.50	99.97
S3	32.25	Yrs.	4.7014E+12	281.36	3.55	95.38
L3	35.75	Yrs.	4.7934E+12	278.65	3.59	80.22
L4	31.13	Yrs.	5.0553E+12	271.33	3.69	96.06
S2	36.78	Yrs.	5.5008E+12	260.12	3.84	76.37
L2	44.16	Yrs.	6.8421E+12	233.23	4.29	58.30
R3	36.44	Yrs.	7.0041E+12	230.52	4.34	81.50
S4	29.28	Yrs.	7.0518E+12	229.74	4.35	99.97
S1.5	41.09	Yrs.	7.0886E+12	229.14	4.36	61.13
L5	28.78	Yrs.	8.1011E+12	214.34	4.67	99.86
R5	28.28	Yrs.	8.2733E+12	212.10	4.71	100.00
S1	46.13	Yrs.	8.3313E+12	211.36	4.73	48.77
L1.5	52.84	Yrs.	9.2654E+12	200.42	4.99	43.74
R2.5	42.97	Yrs.	1.0023E+13	192.70	5.19	53.10
S5	27.81	Yrs.	1.0225E+13	190.78	5.24	100.00
L1	62.97	Yrs.	1.0467E+13	188.56	5.30	34.70
S0.5	55.63	Yrs.	1.0574E+13	187.61	5.33	35.63
S6	27.06	Yrs.	1.1051E+13	183.52	5.45	100.00
S0	67.34	Yrs.	1.1870E+13	177.07	5.65	28.05
R2	51.81	Yrs.	1.2045E+13	175.78	5.69	34.36
L0.5	82.03	Yrs.	1.2657E+13	171.48	5.83	25.45
L0	104.83	Yrs.	1.3468E+13	166.23	6.02	21.15
R1.5	68.88	Yrs.	1.4023E+13	162.91	6.14	21.92
S.5	102.63	Yrs.	1.4486E+13	160.29	6.24	18.27
R1	89.94	Yrs.	1.4788E+13	158.64	6.30	17.60
R0.5	121.06	Yrs.	1.5292E+13	156.01	6.41	15.48
O2	173.94	Yrs.	1.5485E+13	155.03	6.45	14.70
SC	154.88	Yrs.	1.5489E+13	155.01	6.45	14.69
O1	154.88	Yrs.	1.5489E+13	155.01	6.45	14.69
SQ	27.00	Yrs.	1.7806E+13	144.57	6.92	100.00
O3	201.00	Yrs.	5.5449E+13	.00	.00	18.38
O4	201.00	Yrs.	3.3425E+14	.00	.00	24.98

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Simulated Plant Record Analysis Calculated As Of 12/31/2015

Simulated Balances Method

No. Of Test Points -	5
Interval Between Test Points -	1
First Test Point -	1996
Last Test Point -	2000

Curve Type	Average Service Life	Sum Of Squares Difference	Conformance Index	Index Of Variation	Ret Exp Index
O1	165.03 Yrs.	2.5457E+11	876.16	1.14	13.79
SC	165.03 Yrs.	2.5457E+11	876.16	1.14	13.79
O2	185.28 Yrs.	2.5489E+11	875.60	1.14	13.80
R0.5	128.19 Yrs.	2.6919E+11	852.03	1.17	14.55
R1	93.84 Yrs.	3.1224E+11	791.11	1.26	16.67
S.5	106.00 Yrs.	3.5131E+11	745.83	1.34	17.55
R1.5	70.53 Yrs.	3.8477E+11	712.66	1.40	21.06
L0	105.18 Yrs.	5.2433E+11	610.50	1.64	21.06
L0.5	81.22 Yrs.	6.3772E+11	553.57	1.81	25.83
R2	51.06 Yrs.	6.6928E+11	540.36	1.85	35.50
S0	65.59 Yrs.	8.5292E+11	478.66	2.09	29.21
R2.5	41.13 Yrs.	1.1381E+12	414.38	2.41	59.33
L1	60.28 Yrs.	1.1652E+12	409.53	2.44	37.07
S0.5	53.25 Yrs.	1.1856E+12	405.99	2.46	38.45
L1.5	49.88 Yrs.	1.5857E+12	351.05	2.85	48.05
S1	42.97 Yrs.	2.1906E+12	298.68	3.35	55.34
R3	33.69 Yrs.	2.6170E+12	273.26	3.66	91.45
L2	40.66 Yrs.	2.9322E+12	258.16	3.87	65.23
S1.5	37.88 Yrs.	2.9379E+12	257.91	3.88	70.33
S2	33.38 Yrs.	4.8459E+12	200.82	4.98	86.94
L3	32.22 Yrs.	5.9992E+12	180.48	5.54	87.45
R4	27.84 Yrs.	7.4886E+12	161.54	6.19	100.00
S3	28.78 Yrs.	8.6929E+12	149.94	6.67	99.40
L4	27.69 Yrs.	1.0522E+13	136.28	7.34	99.22
S4	25.88 Yrs.	1.3946E+13	118.38	8.45	100.00
L5	25.41 Yrs.	1.5541E+13	112.14	8.92	100.00
R5	24.97 Yrs.	1.5848E+13	111.04	9.01	100.00
S5	24.50 Yrs.	1.7229E+13	106.50	9.39	100.00
S6	23.88 Yrs.	1.8824E+13	101.89	9.81	100.00
O3	201.00 Yrs.	2.4121E+13	.00	.00	18.38
SQ	23.00 Yrs.	2.5074E+13	88.28	11.33	100.00
O4	201.00 Yrs.	1.4833E+14	.00	.00	24.98

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Simulated Plant Record Analysis Calculated As Of 12/31/2015

Simulated Balances Method

No. Of Test Points -	5
Interval Between Test Points -	1
First Test Point -	1991
Last Test Point -	1995

Curve Type	Average Service Life	Sum Of Squares Difference	Conformance Index	Index Of Variation	Ret Exp Index
O1	164.84 Yrs.	2.5907E+10	1911.21	.52	13.80
SC	164.84 Yrs.	2.5907E+10	1911.21	.52	13.80
O2	185.06 Yrs.	2.5995E+10	1907.96	.52	13.81
R0.5	127.44 Yrs.	2.9268E+10	1798.12	.56	14.64
R1	92.13 Yrs.	4.0181E+10	1534.62	.65	17.06
S.5	103.03 Yrs.	5.3718E+10	1327.25	.75	18.18
R1.5	68.22 Yrs.	5.8935E+10	1267.15	.79	22.27
L0	99.32 Yrs.	1.2836E+11	858.60	1.16	22.64
R2	47.66 Yrs.	1.4580E+11	805.64	1.24	41.45
L0.5	75.84 Yrs.	1.6228E+11	763.62	1.31	28.54
S0	60.22 Yrs.	2.7405E+11	587.62	1.70	33.26
R2.5	37.38 Yrs.	3.0502E+11	556.99	1.80	73.45
L1	54.59 Yrs.	3.6489E+11	509.25	1.96	42.78
S0.5	48.16 Yrs.	4.0880E+11	481.12	2.08	45.58
L1.5	44.56 Yrs.	5.5478E+11	413.00	2.42	56.63
S1	37.91 Yrs.	8.9089E+11	325.91	3.07	67.75
R3	29.63 Yrs.	9.0944E+11	322.57	3.10	99.24
L2	35.59 Yrs.	1.1373E+12	288.45	3.47	75.54
S1.5	33.09 Yrs.	1.1805E+12	283.12	3.53	84.48
S2	28.75 Yrs.	2.0046E+12	217.27	4.60	97.28
L3	27.72 Yrs.	2.4105E+12	198.14	5.05	95.18
R4	23.88 Yrs.	2.8700E+12	181.58	5.51	100.00
S3	24.56 Yrs.	3.3910E+12	167.05	5.99	100.00
L4	23.63 Yrs.	4.1637E+12	150.76	6.63	99.99
S4	22.03 Yrs.	5.1590E+12	135.43	7.38	100.00
L5	21.66 Yrs.	5.8711E+12	126.96	7.88	100.00
R5	21.31 Yrs.	6.0743E+12	124.81	8.01	100.00
S5	20.94 Yrs.	6.7658E+12	118.26	8.46	100.00
O3	201.00 Yrs.	7.9281E+12	.00	.00	18.38
S6	20.44 Yrs.	8.1350E+12	107.85	9.27	100.00
SQ	20.00 Yrs.	9.6017E+12	99.27	10.07	100.00
O4	201.00 Yrs.	4.9347E+13	.00	.00	24.98

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Simulated Plant Record Analysis Calculated As Of 12/31/2015

Simulated Balances Method

No. Of Test Points -	5
Interval Between Test Points -	1
First Test Point -	1986
Last Test Point -	1990

Curve Type	Average Service Life	Sum Of Squares Difference	Conformance Index	Index Of Variation	Ret Exp Index
O1	136.75 Yrs.	1.5046E+11	535.68	1.87	16.64
SC	136.75 Yrs.	1.5046E+11	535.68	1.87	16.64
O2	153.53 Yrs.	1.5063E+11	535.37	1.87	16.65
R0.5	105.53 Yrs.	1.5633E+11	525.51	1.90	17.97
R1	75.97 Yrs.	1.7383E+11	498.36	2.01	22.01
S.5	84.56 Yrs.	1.9591E+11	469.45	2.13	23.26
R1.5	55.97 Yrs.	1.9933E+11	465.40	2.15	31.56
R2	38.69 Yrs.	2.9289E+11	383.93	2.60	64.91
L0	80.18 Yrs.	3.0229E+11	377.92	2.65	29.47
L0.5	61.19 Yrs.	3.3016E+11	361.62	2.77	38.28
R2.5	30.13 Yrs.	4.2685E+11	318.03	3.14	95.99
S0	48.13 Yrs.	4.4842E+11	310.29	3.22	46.21
L1	43.72 Yrs.	4.8368E+11	298.77	3.35	57.04
O3	201.00 Yrs.	5.0474E+11	.00	.00	18.38
S0.5	38.38 Yrs.	5.4812E+11	280.65	3.56	64.65
L1.5	35.53 Yrs.	6.2761E+11	262.28	3.81	73.52
R3	23.69 Yrs.	8.4198E+11	226.44	4.42	100.00
S1	30.03 Yrs.	8.6462E+11	223.46	4.48	89.72
S1.5	26.25 Yrs.	1.0192E+12	205.81	4.86	98.66
L2	28.31 Yrs.	1.0211E+12	205.63	4.86	89.96
S2	22.84 Yrs.	1.4071E+12	175.17	5.71	100.00
L3	22.13 Yrs.	1.6625E+12	161.15	6.21	99.81
R4	19.16 Yrs.	1.8715E+12	151.89	6.58	100.00
S3	19.69 Yrs.	2.0228E+12	146.09	6.84	100.00
L4	19.00 Yrs.	2.4059E+12	133.96	7.46	100.00
S4	17.81 Yrs.	2.9500E+12	120.98	8.27	100.00
L5	17.53 Yrs.	3.3382E+12	113.72	8.79	100.00
R5	17.28 Yrs.	3.4456E+12	111.94	8.93	100.00
S5	17.00 Yrs.	3.9263E+12	104.86	9.54	100.00
S6	16.63 Yrs.	4.6382E+12	96.48	10.36	100.00
SQ	16.00 Yrs.	5.7812E+12	86.42	11.57	100.00
O4	201.00 Yrs.	7.4824E+12	.00	.00	24.98

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Simulated Plant Record Analysis Calculated As Of 12/31/2015

Simulated Balances Method

No. Of Test Points -	5
Interval Between Test Points -	1
First Test Point -	1981
Last Test Point -	1985

Curve Type	Average Service Life	Sum Of Squares Difference	Conformance Index	Index Of Variation	Ret Exp Index
O3	158.41 Yrs.	1.7277E+11	265.85	3.76	23.12
O1	95.75 Yrs.	1.7311E+11	265.59	3.77	23.76
SC	95.75 Yrs.	1.7311E+11	265.59	3.77	23.76
O2	107.50 Yrs.	1.7316E+11	265.55	3.77	23.79
R0.5	74.03 Yrs.	1.7537E+11	263.87	3.79	26.77
R1	53.50 Yrs.	1.8186E+11	259.12	3.86	36.60
S.5	59.69 Yrs.	1.8839E+11	254.59	3.93	35.91
R1.5	39.66 Yrs.	1.9168E+11	252.40	3.96	60.08
L0	56.90 Yrs.	2.1618E+11	237.67	4.21	43.68
R2	27.81 Yrs.	2.2593E+11	232.48	4.30	97.92
L0.5	43.69 Yrs.	2.2808E+11	231.38	4.32	57.26
O4	201.00 Yrs.	2.3374E+11	.00	.00	24.98
S0	34.53 Yrs.	2.5488E+11	218.88	4.57	71.52
R2.5	22.00 Yrs.	2.7427E+11	211.00	4.74	100.00
L1	31.81 Yrs.	2.7843E+11	209.42	4.78	78.81
S0.5	27.81 Yrs.	2.8665E+11	206.39	4.85	92.28
L1.5	26.06 Yrs.	3.1938E+11	195.53	5.11	92.06
S1	22.13 Yrs.	3.7061E+11	181.52	5.51	100.00
R3	17.66 Yrs.	4.0653E+11	173.31	5.77	100.00
S1.5	19.53 Yrs.	4.2860E+11	168.79	5.92	100.00
L2	21.06 Yrs.	4.3806E+11	166.96	5.99	99.20
S2	17.25 Yrs.	5.5559E+11	148.25	6.75	100.00
L3	16.81 Yrs.	6.6075E+11	135.94	7.36	100.00
R4	14.63 Yrs.	7.5803E+11	126.92	7.88	100.00
S3	15.06 Yrs.	8.0658E+11	123.04	8.13	100.00
L4	14.59 Yrs.	9.5212E+11	113.25	8.83	100.00
S4	13.78 Yrs.	1.1880E+12	101.38	9.86	100.00
L5	13.59 Yrs.	1.3387E+12	95.51	10.47	100.00
R5	13.38 Yrs.	1.3606E+12	94.73	10.56	100.00
S5	13.19 Yrs.	1.5464E+12	88.86	11.25	100.00
S6	12.91 Yrs.	1.8119E+12	82.09	12.18	100.00
SQ	16.00 Yrs.	6.2280E+12	44.28	22.58	100.00

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Simulated Plant Record Analysis Calculated As Of 12/31/2015

Simulated Balances Method

No. Of Test Points -	5
Interval Between Test Points -	1
First Test Point -	1976
Last Test Point -	1980

Curve Type	Average Service Life	Sum Of Squares Difference	Conformance Index	Index Of Variation	Ret Exp Index
O4	100.72 Yrs.	1.3479E+11	88.83	11.26	44.90
O3	72.16 Yrs.	1.3485E+11	88.81	11.26	46.68
O1	43.72 Yrs.	1.3499E+11	88.76	11.27	52.04
SC	43.72 Yrs.	1.3499E+11	88.76	11.27	52.04
O2	49.09 Yrs.	1.3500E+11	88.76	11.27	52.05
R0.5	34.25 Yrs.	1.3573E+11	88.52	11.30	69.43
R1	25.59 Yrs.	1.3779E+11	87.85	11.38	97.18
S.5	29.25 Yrs.	1.3877E+11	87.54	11.42	81.68
R1.5	19.81 Yrs.	1.4190E+11	86.57	11.55	100.00
L0	29.95 Yrs.	1.4287E+11	86.28	11.59	79.18
L0.5	23.66 Yrs.	1.4876E+11	84.55	11.83	92.60
S0	19.44 Yrs.	1.5389E+11	83.13	12.03	100.00
R2	15.19 Yrs.	1.5554E+11	82.69	12.09	100.00
S0.5	16.25 Yrs.	1.6644E+11	79.94	12.51	100.00
L1	18.47 Yrs.	1.6737E+11	79.71	12.55	99.56
R2.5	12.81 Yrs.	1.7602E+11	77.73	12.87	100.00
L1.5	15.66 Yrs.	1.8276E+11	76.28	13.11	100.00
S1	13.66 Yrs.	1.9572E+11	73.71	13.57	100.00
S1.5	12.31 Yrs.	2.1955E+11	69.60	14.37	100.00
L2	13.28 Yrs.	2.2259E+11	69.12	14.47	100.00
R3	11.09 Yrs.	2.2537E+11	68.69	14.56	100.00
S2	11.19 Yrs.	2.6535E+11	63.31	15.80	100.00
L3	11.00 Yrs.	3.0435E+11	59.11	16.92	100.00
R4	9.72 Yrs.	3.5211E+11	54.96	18.20	100.00
S3	10.00 Yrs.	3.5228E+11	54.94	18.20	100.00
L4	9.78 Yrs.	4.0748E+11	51.09	19.57	100.00
S4	9.28 Yrs.	4.7492E+11	47.32	21.13	100.00
L5	9.19 Yrs.	5.2554E+11	44.98	22.23	100.00
R5	9.09 Yrs.	5.4227E+11	44.29	22.58	100.00
S5	8.97 Yrs.	5.9340E+11	42.33	23.62	100.00
S6	8.81 Yrs.	6.8592E+11	39.38	25.40	100.00
SQ	16.00 Yrs.	1.8503E+12	23.97	41.71	100.00

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Electric Division

380.02 Services - Plastic

Simulated Plant Record Analysis Calculated As Of 12/31/2015

Simulated Balances Method

No. Of Test Points -	5
Interval Between Test Points -	1
First Test Point -	1971
Last Test Point -	1975

Curve Type	Average Service Life	Sum Of Squares Difference	Conformance Index	Index Of Variation	Ret Exp Index
R5	18.00 Yrs.	8.6736E-19	803040.00	.00	100.00
S6	16.00 Yrs.	8.6736E-19	803040.00	.00	100.00
S5	16.00 Yrs.	8.6736E-19	803040.00	.00	100.00
L3	79.00 Yrs.	8.6736E-19	803040.00	.00	7.38
L4	24.00 Yrs.	8.6736E-19	803040.00	.00	99.98
L5	16.00 Yrs.	8.6736E-19	803040.00	.00	100.00
SQ	16.00 Yrs.	8.6736E-19	803040.00	.00	100.00
S4	21.00 Yrs.	2.2973E-03	092426.25	.00	100.00
S3	62.00 Yrs.	1.5188E-02	985554.85	.00	14.45
S2	201.00 Yrs.	7.4420E-02	.00	.00	.21
S1.5	201.00 Yrs.	9.4491E+02	.00	.00	.83
L2	201.00 Yrs.	1.0984E+03	.00	.00	1.11
S1	201.00 Yrs.	3.6991E+03	.00	.00	1.45
R4	201.00 Yrs.	5.0731E+03	.00	.00	.11
S0.5	201.00 Yrs.	1.6467E+06	.00	.00	3.08
R3	201.00 Yrs.	1.6744E+06	.00	.00	.88
L1.5	201.00 Yrs.	6.0745E+06	.00	.00	2.45
S0	201.00 Yrs.	6.2736E+06	.00	.00	4.70
R2.5	201.00 Yrs.	2.0596E+07	.00	.00	2.00
L1	201.00 Yrs.	2.3971E+07	.00	.00	3.79
R2	201.00 Yrs.	6.0555E+07	.00	.00	3.11
L0.5	201.00 Yrs.	7.0975E+07	.00	.00	6.36
L0	206.00 Yrs.	1.3436E+08	.00	.00	8.64
R1.5	201.00 Yrs.	2.0746E+08	.00	.00	4.92
R1	201.00 Yrs.	4.4203E+08	.00	.00	6.73
S.5	201.00 Yrs.	4.6291E+08	.00	.00	8.01
R0.5	201.00 Yrs.	9.4728E+08	.00	.00	9.02
O1	201.00 Yrs.	1.6428E+09	.00	.00	11.32
SC	201.00 Yrs.	1.6428E+09	.00	.00	11.32
O2	201.00 Yrs.	2.0685E+09	.00	.00	12.72
O3	201.00 Yrs.	4.5113E+09	.00	.00	18.38
O4	201.00 Yrs.	8.8111E+09	.00	.00	24.98

CERC

Electric Division

380.02 Services - Plastic

Simulated Plant Record Analysis Calculated As Of 12/31/2015

Simulated Balances Method

No. Of Test Points -	1
Interval Between Test Points -	1
First Test Point -	1970
Last Test Point -	1970

Curve Type	Average Service Life	Sum Of Squares Difference	Conformance Index	Index Of Variation	Ret Exp Index
R5	16.00 Yrs.	0.0000E+00	.00	.00	100.00
S2	50.00 Yrs.	0.0000E+00	.00	.00	39.39
S3	16.00 Yrs.	0.0000E+00	.00	.00	100.00
S4	16.00 Yrs.	0.0000E+00	.00	.00	100.00
S6	16.00 Yrs.	0.0000E+00	.00	.00	100.00
L3	16.00 Yrs.	0.0000E+00	.00	.00	100.00
S5	16.00 Yrs.	0.0000E+00	.00	.00	100.00
L4	16.00 Yrs.	0.0000E+00	.00	.00	100.00
SQ	16.00 Yrs.	0.0000E+00	.00	.00	100.00
L5	16.00 Yrs.	0.0000E+00	.00	.00	100.00
L2	201.00 Yrs.	1.4216E-02	.00	.00	1.11
S1.5	201.00 Yrs.	1.7201E-02	.00	.00	.83
S1	201.00 Yrs.	6.2691E-02	.00	.00	1.45
R4	201.00 Yrs.	6.8665E-01	.00	.00	.11
S0.5	201.00 Yrs.	1.1222E+02	.00	.00	3.08
R3	201.00 Yrs.	2.3969E+02	.00	.00	.88
S0	201.00 Yrs.	4.3735E+02	.00	.00	4.70
L1.5	201.00 Yrs.	8.4426E+02	.00	.00	2.45
R2.5	201.00 Yrs.	3.0448E+03	.00	.00	2.00
L1	201.00 Yrs.	3.3618E+03	.00	.00	3.79
L0.5	201.00 Yrs.	8.4756E+03	.00	.00	6.36
R2	201.00 Yrs.	8.9982E+03	.00	.00	3.11
L0	206.00 Yrs.	1.5148E+04	.00	.00	8.64
R1.5	201.00 Yrs.	3.1153E+04	.00	.00	4.92
R1	201.00 Yrs.	6.6629E+04	.00	.00	6.73
S.5	201.00 Yrs.	6.7862E+04	.00	.00	8.01
R0.5	201.00 Yrs.	1.4373E+05	.00	.00	9.02
SC	201.00 Yrs.	2.5009E+05	.00	.00	11.32
O1	201.00 Yrs.	2.5009E+05	.00	.00	11.32
O2	201.00 Yrs.	3.1484E+05	.00	.00	12.72
O3	201.00 Yrs.	6.8740E+05	.00	.00	18.38
O4	201.00 Yrs.	1.3440E+06	.00	.00	24.98

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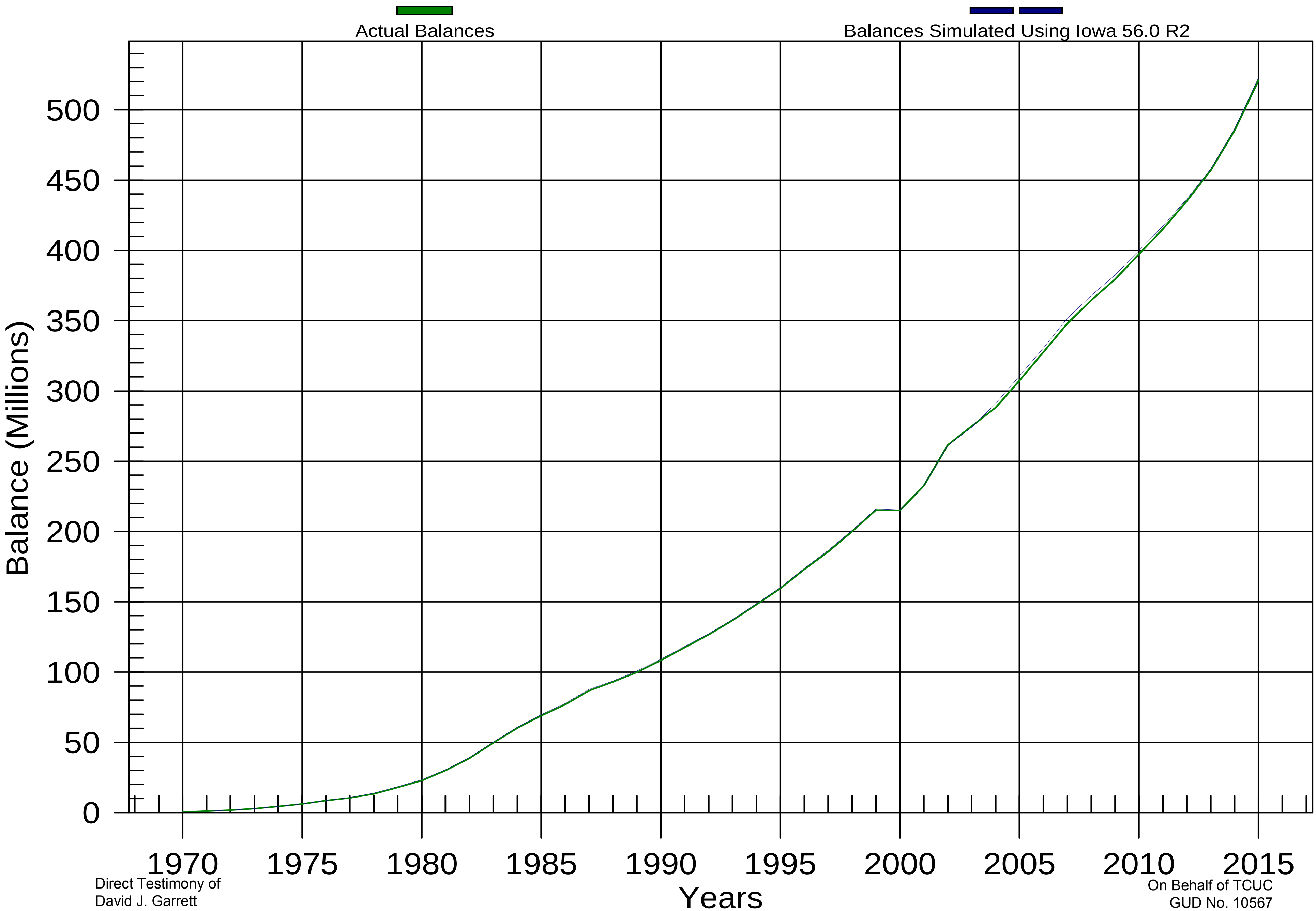
Electric Division
380.02 Services - Plastic
Actual And Simulated Balances 1970-2015



Direct Testimony of
David J. Garrett

On Behalf of TCUC
GUD No. 10567

CERC
Electric Division
382.02 Meter Installations Large

Simulated Plant Record Analysis Calculated As Of 12/31/2015

Simulated Balances Method

No. Of Test Points -	67
Interval Between Test Points -	1
First Test Point -	1949
Last Test Point -	2015

Curve Type	Average Service Life	Sum Of Squares Difference	Conformance Index	Index Of Variation	Ret Exp Index
O4	107.00 Yrs.	5.1450E+13	11.56	86.53	55.60
O3	78.00 Yrs.	5.2417E+13	11.45	87.34	58.18
O1	49.16 Yrs.	5.4794E+13	11.20	89.30	67.64
SC	49.16 Yrs.	5.4794E+13	11.20	89.30	67.64
O2	55.22 Yrs.	5.4809E+13	11.20	89.31	66.84
R0.5	43.03 Yrs.	6.1208E+13	10.60	94.38	82.24
S.5	42.56 Yrs.	6.6662E+13	10.15	98.50	82.03
L0	47.45 Yrs.	6.8154E+13	10.04	99.59	74.61
R1	38.41 Yrs.	7.2298E+13	9.75	102.57	95.80
L0.5	42.84 Yrs.	7.7507E+13	9.42	106.21	82.14
S0	37.97 Yrs.	8.3749E+13	9.06	110.40	94.49
R1.5	35.72 Yrs.	8.5800E+13	8.95	111.74	99.45
L1	39.16 Yrs.	8.9901E+13	8.74	114.38	88.95
S0.5	35.75 Yrs.	9.5639E+13	8.48	117.98	98.77
L1.5	36.63 Yrs.	1.0154E+14	8.23	121.56	93.71
R2	33.59 Yrs.	1.0300E+14	8.17	122.43	100.00
S1	33.88 Yrs.	1.1019E+14	7.90	126.63	99.99
L2	34.53 Yrs.	1.1591E+14	7.70	129.88	97.07
R2.5	32.25 Yrs.	1.1855E+14	7.61	131.35	100.00
S1.5	32.69 Yrs.	1.2159E+14	7.52	133.02	100.00
S2	31.63 Yrs.	1.3446E+14	7.15	139.89	100.00
R3	31.09 Yrs.	1.3584E+14	7.11	140.60	100.00
L3	31.78 Yrs.	1.3820E+14	7.05	141.82	99.88
S3	30.31 Yrs.	1.5277E+14	6.71	149.10	100.00
L4	30.06 Yrs.	1.5825E+14	6.59	151.76	100.00
R4	29.84 Yrs.	1.5860E+14	6.58	151.93	100.00
S4	29.34 Yrs.	1.6846E+14	6.39	156.58	100.00
L5	29.22 Yrs.	1.7165E+14	6.33	158.05	100.00
R5	29.03 Yrs.	1.7514E+14	6.26	159.65	100.00
S5	28.88 Yrs.	1.7816E+14	6.21	161.02	100.00
S6	28.69 Yrs.	1.8395E+14	6.11	163.61	100.00
SQ	29.00 Yrs.	1.8950E+14	6.02	166.07	100.00

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Electric Division

382.02 Meter Installations Large

Simulated Plant Record Analysis Calculated As Of 12/31/2015

Simulated Balances Method

No. Of Test Points -	5
Interval Between Test Points -	1
First Test Point -	2011
Last Test Point -	2015

Curve Type	Average Service Life		Sum Of Squares Difference	Conformance Index	Index Of Variation	Ret Exp Index
O4	135.56	Yrs.	2.1194E+11	158.29	6.32	47.66
O3	98.25	Yrs.	2.1916E+11	155.66	6.42	49.33
SC	61.06	Yrs.	2.3708E+11	149.66	6.68	54.45
O1	61.06	Yrs.	2.3708E+11	149.66	6.68	54.45
O2	68.63	Yrs.	2.3726E+11	149.60	6.68	54.39
R0.5	52.13	Yrs.	2.9231E+11	134.78	7.42	66.10
S.5	51.38	Yrs.	3.4631E+11	123.83	8.08	67.37
L0	57.76	Yrs.	3.6417E+11	120.75	8.28	63.16
R1	45.31	Yrs.	4.0395E+11	114.65	8.72	82.35
L0.5	51.31	Yrs.	4.6023E+11	107.41	9.31	71.13
S0	44.94	Yrs.	5.2553E+11	100.52	9.95	81.41
R1.5	41.34	Yrs.	5.6221E+11	97.19	10.29	93.89
L1	46.34	Yrs.	5.9573E+11	94.41	10.59	79.02
S0.5	41.69	Yrs.	6.6609E+11	89.29	11.20	90.52
L1.5	42.84	Yrs.	7.3760E+11	84.85	11.79	86.02
R2	38.44	Yrs.	7.8399E+11	82.30	12.15	99.54
S1	39.16	Yrs.	8.4852E+11	79.11	12.64	96.90
L2	40.06	Yrs.	9.2410E+11	75.80	13.19	91.56
R2.5	36.69	Yrs.	1.0018E+12	72.80	13.74	99.99
S1.5	37.50	Yrs.	1.0126E+12	72.42	13.81	99.16
S2	36.13	Yrs.	1.2037E+12	66.42	15.06	99.95
L3	36.47	Yrs.	1.2291E+12	65.73	15.21	98.36
R3	35.28	Yrs.	1.2445E+12	65.32	15.31	100.00
S3	34.47	Yrs.	1.4735E+12	60.03	16.66	100.00
L4	34.22	Yrs.	1.5503E+12	58.53	17.09	99.99
R4	33.81	Yrs.	1.5695E+12	58.17	17.19	100.00
S4	33.34	Yrs.	1.6742E+12	56.32	17.76	100.00
L5	33.22	Yrs.	1.7152E+12	55.64	17.97	100.00
R5	32.94	Yrs.	1.8334E+12	53.82	18.58	100.00
S5	32.81	Yrs.	1.8441E+12	53.66	18.64	100.00
S6	32.56	Yrs.	1.8709E+12	53.28	18.77	100.00
SQ	33.00	Yrs.	1.9178E+12	52.62	19.00	100.00

CERC

Electric Division

382.02 Meter Installations Large

Simulated Plant Record Analysis Calculated As Of 12/31/2015

Simulated Balances Method

No. Of Test Points -	5
Interval Between Test Points -	1
First Test Point -	2006
Last Test Point -	2010

Curve Type	Average Service Life	Sum Of Squares Difference	Conformance Index	Index Of Variation	Ret Exp Index
O4	115.41 Yrs.	2.5697E+11	121.13	8.26	53.09
O3	83.75 Yrs.	2.6494E+11	119.30	8.38	55.45
SC	52.19 Yrs.	2.8507E+11	115.01	8.70	63.71
O1	52.19 Yrs.	2.8507E+11	115.01	8.70	63.71
O2	58.66 Yrs.	2.8521E+11	114.98	8.70	63.26
R0.5	44.81 Yrs.	3.4435E+11	104.64	9.56	78.81
S.5	44.28 Yrs.	3.9438E+11	97.78	10.23	78.87
L0	49.75 Yrs.	4.0306E+11	96.72	10.34	71.87
R1	39.28 Yrs.	4.5756E+11	90.78	11.02	94.41
L0.5	44.38 Yrs.	4.9862E+11	86.96	11.50	80.10
S0	39.00 Yrs.	5.6539E+11	81.66	12.25	92.67
R1.5	36.06 Yrs.	6.0937E+11	78.66	12.71	99.30
L1	40.22 Yrs.	6.3316E+11	77.17	12.96	87.54
S0.5	36.31 Yrs.	7.0046E+11	73.37	13.63	98.24
L1.5	37.31 Yrs.	7.5758E+11	70.55	14.17	92.95
R2	33.66 Yrs.	8.1033E+11	68.21	14.66	100.00
S1	34.22 Yrs.	8.7204E+11	65.76	15.21	99.97
L2	35.00 Yrs.	9.0895E+11	64.41	15.53	96.70
R2.5	32.22 Yrs.	9.9280E+11	61.63	16.23	100.00
S1.5	32.84 Yrs.	1.0051E+12	61.25	16.33	100.00
SQ	29.00 Yrs.	1.0186E+12	60.84	16.44	100.00
S2	31.69 Yrs.	1.1526E+12	57.20	17.48	100.00
L3	32.03 Yrs.	1.1610E+12	56.99	17.55	99.85
R3	31.03 Yrs.	1.1872E+12	56.36	17.74	100.00
S3	30.34 Yrs.	1.3407E+12	53.03	18.86	100.00
L4	30.16 Yrs.	1.4059E+12	51.79	19.31	100.00
R4	29.81 Yrs.	1.4266E+12	51.41	19.45	100.00
S4	29.44 Yrs.	1.5106E+12	49.96	20.02	100.00
L5	29.34 Yrs.	1.5581E+12	49.19	20.33	100.00
R5	29.09 Yrs.	1.6652E+12	47.58	21.02	100.00
S5	29.00 Yrs.	1.6846E+12	47.31	21.14	100.00
S6	28.75 Yrs.	1.7321E+12	46.66	21.43	100.00

CERC

Electric Division

382.02 Meter Installations Large

Simulated Plant Record Analysis Calculated As Of 12/31/2015

Simulated Balances Method

No. Of Test Points -	5
Interval Between Test Points -	1
First Test Point -	2001
Last Test Point -	2005

Curve Type	Average Service Life	Sum Of Squares Difference	Conformance Index	Index Of Variation	Ret Exp Index
O4	89.94 Yrs.	7.8143E+11	58.20	17.18	61.18
O3	65.47 Yrs.	7.9691E+11	57.63	17.35	64.79
O2	46.25 Yrs.	8.3806E+11	56.20	17.79	76.96
SC	41.13 Yrs.	8.3806E+11	56.20	17.79	80.85
O1	41.13 Yrs.	8.3806E+11	56.20	17.79	80.85
R0.5	35.88 Yrs.	9.4214E+11	53.00	18.87	95.73
S.5	35.59 Yrs.	1.0015E+12	51.41	19.45	95.77
L0	39.83 Yrs.	1.0058E+12	51.30	19.49	84.21
R1	32.00 Yrs.	1.1119E+12	48.79	20.50	100.00
L0.5	35.94 Yrs.	1.1198E+12	48.62	20.57	91.03
S0	31.81 Yrs.	1.2238E+12	46.50	21.50	100.00
L1	32.88 Yrs.	1.2605E+12	45.82	21.82	96.12
R1.5	29.78 Yrs.	1.3046E+12	45.04	22.20	100.00
S0.5	29.94 Yrs.	1.3746E+12	43.88	22.79	100.00
L1.5	30.78 Yrs.	1.3979E+12	43.51	22.98	98.49
R2	28.06 Yrs.	1.5214E+12	41.71	23.98	100.00
L2	29.09 Yrs.	1.5433E+12	41.41	24.15	99.68
S1	28.41 Yrs.	1.5437E+12	41.41	24.15	100.00
S1.5	27.47 Yrs.	1.6698E+12	39.81	25.12	100.00
R2.5	27.06 Yrs.	1.6889E+12	39.59	25.26	100.00
S2	26.63 Yrs.	1.7949E+12	38.40	26.04	100.00
L3	26.91 Yrs.	1.7991E+12	38.36	26.07	100.00
R3	26.19 Yrs.	1.8513E+12	37.81	26.45	100.00
SQ	24.00 Yrs.	1.9416E+12	36.92	27.08	100.00
S3	25.66 Yrs.	1.9660E+12	36.69	27.25	100.00
L4	25.53 Yrs.	2.0392E+12	36.03	27.76	100.00
R4	25.28 Yrs.	2.0653E+12	35.80	27.93	100.00
S4	25.00 Yrs.	2.1603E+12	35.00	28.57	100.00
L5	24.91 Yrs.	2.2318E+12	34.44	29.04	100.00
R5	24.75 Yrs.	2.3639E+12	33.46	29.89	100.00
S5	24.66 Yrs.	2.3660E+12	33.45	29.90	100.00
S6	24.44 Yrs.	2.4853E+12	32.63	30.64	100.00

CERC
Electric Division
382.02 Meter Installations Large

Simulated Plant Record Analysis Calculated As Of 12/31/2015

Simulated Balances Method

No. Of Test Points -	5
Interval Between Test Points -	1
First Test Point -	1996
Last Test Point -	2000

Curve Type	Average Service Life		Sum Of Squares Difference	Conformance Index	Index Of Variation	Ret Exp Index
O4	64.94	Yrs.	3.2689E+11	70.34	14.22	70.46
O3	47.59	Yrs.	3.3875E+11	69.10	14.47	75.66
O2	34.16	Yrs.	3.7394E+11	65.77	15.20	89.29
SC	30.41	Yrs.	3.7510E+11	65.67	15.23	100.00
O1	30.41	Yrs.	3.7510E+11	65.67	15.23	100.00
L0	30.18	Yrs.	4.3843E+11	60.74	16.46	95.42
R0.5	27.22	Yrs.	4.4656E+11	60.18	16.62	100.00
S.5	27.16	Yrs.	4.5896E+11	59.37	16.84	100.00
L0.5	27.72	Yrs.	4.9188E+11	57.35	17.44	98.39
R1	24.91	Yrs.	5.4601E+11	54.43	18.37	100.00
L1	25.75	Yrs.	5.4970E+11	54.25	18.43	99.81
S0	24.84	Yrs.	5.6014E+11	53.74	18.61	100.00
L1.5	24.44	Yrs.	6.2138E+11	51.02	19.60	99.97
S0.5	23.72	Yrs.	6.3336E+11	50.54	19.79	100.00
R1.5	23.59	Yrs.	6.4150E+11	50.21	19.91	100.00
L2	23.34	Yrs.	6.9514E+11	48.24	20.73	100.00
S1	22.78	Yrs.	7.0732E+11	47.82	20.91	100.00
R2	22.56	Yrs.	7.3417E+11	46.94	21.30	100.00
S1.5	22.19	Yrs.	7.6943E+11	45.85	21.81	100.00
R2.5	21.91	Yrs.	7.9732E+11	45.04	22.20	100.00
S2	21.66	Yrs.	8.2840E+11	44.19	22.63	100.00
L3	21.88	Yrs.	8.3505E+11	44.01	22.72	100.00
R3	21.34	Yrs.	8.5903E+11	43.39	23.05	100.00
S3	21.00	Yrs.	9.2490E+11	41.82	23.91	100.00
L4	20.91	Yrs.	9.8630E+11	40.50	24.69	100.00
R4	20.72	Yrs.	9.9471E+11	40.33	24.80	100.00
S4	20.53	Yrs.	1.0524E+12	39.21	25.51	100.00
L5	20.47	Yrs.	1.1212E+12	37.98	26.33	100.00
S5	20.28	Yrs.	1.2214E+12	36.39	27.48	100.00
R5	20.34	Yrs.	1.2263E+12	36.32	27.53	100.00
S6	20.13	Yrs.	1.4082E+12	33.89	29.51	100.00
SQ	20.00	Yrs.	2.1302E+12	27.56	36.29	100.00

CERC

Electric Division

382.02 Meter Installations Large

Simulated Plant Record Analysis Calculated As Of 12/31/2015

Simulated Balances Method

No. Of Test Points -	5
Interval Between Test Points -	1
First Test Point -	1991
Last Test Point -	1995

Curve Type	Average Service Life	Sum Of Squares Difference	Conformance Index	Index Of Variation	Ret Exp Index
O4	52.28 Yrs.	7.2984E+10	103.76	9.64	75.71
O3	38.44 Yrs.	7.8468E+10	100.07	9.99	81.84
O2	27.84 Yrs.	9.5722E+10	90.60	11.04	94.55
SC	24.78 Yrs.	9.6785E+10	90.11	11.10	100.00
O1	24.78 Yrs.	9.6785E+10	90.11	11.10	100.00
L0	24.95 Yrs.	1.1753E+11	81.77	12.23	98.98
R0.5	22.47 Yrs.	1.3064E+11	77.56	12.89	100.00
S.5	22.47 Yrs.	1.3328E+11	76.79	13.02	100.00
L0.5	23.09 Yrs.	1.4599E+11	73.37	13.63	99.79
R1	20.78 Yrs.	1.7825E+11	66.40	15.06	100.00
S0	20.84 Yrs.	1.7869E+11	66.31	15.08	100.00
L1	21.63 Yrs.	1.7953E+11	66.16	15.11	100.00
L1.5	20.59 Yrs.	2.1610E+11	60.30	16.58	100.00
S0.5	20.00 Yrs.	2.1886E+11	59.92	16.69	100.00
R1.5	19.84 Yrs.	2.2378E+11	59.26	16.88	100.00
L2	19.72 Yrs.	2.5656E+11	55.34	18.07	100.00
S1	19.28 Yrs.	2.6158E+11	54.81	18.25	100.00
R2	19.06 Yrs.	2.6836E+11	54.11	18.48	100.00
R2.5	18.56 Yrs.	2.9302E+11	51.79	19.31	100.00
S1.5	18.81 Yrs.	2.9428E+11	51.67	19.35	100.00
R3	18.13 Yrs.	3.1656E+11	49.82	20.07	100.00
S2	18.41 Yrs.	3.2681E+11	49.04	20.39	100.00
L3	18.56 Yrs.	3.3713E+11	48.28	20.71	100.00
R4	17.63 Yrs.	3.5351E+11	47.15	21.21	100.00
S3	17.88 Yrs.	3.6528E+11	46.38	21.56	100.00
S4	17.47 Yrs.	4.2666E+11	42.92	23.30	100.00
L4	17.78 Yrs.	4.3244E+11	42.63	23.46	100.00
R5	17.28 Yrs.	4.9061E+11	40.02	24.99	100.00
L5	17.41 Yrs.	5.2640E+11	38.64	25.88	100.00
S5	17.22 Yrs.	5.7154E+11	37.08	26.97	100.00
S6	17.16 Yrs.	8.4096E+11	30.57	32.71	100.00
SQ	17.00 Yrs.	1.7350E+12	21.28	46.99	100.00

CERC

Electric Division

382.02 Meter Installations Large

Simulated Plant Record Analysis Calculated As Of 12/31/2015

Simulated Balances Method

No. Of Test Points -	5
Interval Between Test Points -	1
First Test Point -	1986
Last Test Point -	1990

Curve Type	Average Service Life	Sum Of Squares Difference	Conformance Index	Index Of Variation	Ret Exp Index
R5	15.66 Yrs.	7.5760E+09	231.71	4.32	100.00
R1.5	18.19 Yrs.	9.1602E+09	210.72	4.75	100.00
L1	19.94 Yrs.	9.3894E+09	208.14	4.80	100.00
L1.5	18.84 Yrs.	9.4155E+09	207.85	4.81	100.00
S0.5	18.31 Yrs.	9.5746E+09	206.11	4.85	100.00
L5	15.69 Yrs.	9.7267E+09	204.50	4.89	100.00
S0	19.22 Yrs.	9.8091E+09	203.63	4.91	100.00
R1	19.25 Yrs.	1.0356E+10	198.19	5.05	100.00
S5	15.53 Yrs.	1.0553E+10	196.32	5.09	100.00
L2	17.97 Yrs.	1.1500E+10	188.07	5.32	100.00
L0.5	21.50 Yrs.	1.1739E+10	186.15	5.37	99.93
S1	17.56 Yrs.	1.1896E+10	184.91	5.41	100.00
R2	17.38 Yrs.	1.2063E+10	183.63	5.45	100.00
R4	16.00 Yrs.	1.2527E+10	180.20	5.55	100.00
S4	15.78 Yrs.	1.3582E+10	173.05	5.78	100.00
L4	16.03 Yrs.	1.3787E+10	171.76	5.82	100.00
S1.5	17.09 Yrs.	1.4751E+10	166.06	6.02	100.00
S.5	21.06 Yrs.	1.4760E+10	166.01	6.02	100.00
R2.5	16.91 Yrs.	1.4802E+10	165.77	6.03	100.00
L0	23.46 Yrs.	1.5928E+10	159.81	6.26	99.49
R0.5	21.09 Yrs.	1.6358E+10	157.69	6.34	100.00
L3	16.78 Yrs.	1.6884E+10	155.21	6.44	100.00
R3	16.47 Yrs.	1.7016E+10	154.61	6.47	100.00
S2	16.66 Yrs.	1.8182E+10	149.57	6.69	100.00
S6	15.41 Yrs.	1.9115E+10	145.87	6.86	100.00
S3	16.16 Yrs.	1.9793E+10	143.36	6.98	100.00
SC	23.66 Yrs.	2.4280E+10	129.43	7.73	100.00
O1	23.66 Yrs.	2.4280E+10	129.43	7.73	100.00
O2	26.59 Yrs.	2.4396E+10	129.12	7.74	95.58
O3	37.16 Yrs.	2.9478E+10	117.47	8.51	82.74
O4	50.78 Yrs.	3.1502E+10	113.63	8.80	76.36
SQ	15.00 Yrs.	7.1318E+10	75.52	13.24	100.00

CERC
Electric Division
382.02 Meter Installations Large

Simulated Plant Record Analysis Calculated As Of 12/31/2015

Simulated Balances Method

No. Of Test Points -	5
Interval Between Test Points -	1
First Test Point -	1981
Last Test Point -	1985

Curve Type	Average Service Life	Sum Of Squares Difference	Conformance Index	Index Of Variation	Ret Exp Index
O4	54.47 Yrs.	8.9997E+09	146.79	6.81	74.77
O3	39.59 Yrs.	9.5143E+09	142.77	7.00	81.03
O2	27.88 Yrs.	1.0907E+10	133.34	7.50	94.53
SC	24.81 Yrs.	1.0914E+10	133.30	7.50	100.00
O1	24.81 Yrs.	1.0914E+10	133.30	7.50	100.00
R0.5	21.47 Yrs.	1.5008E+10	113.68	8.80	100.00
L0	23.73 Yrs.	1.7526E+10	105.19	9.51	99.41
S.5	21.22 Yrs.	1.7619E+10	104.91	9.53	100.00
L0.5	21.31 Yrs.	2.3070E+10	91.68	10.91	99.94
R1	18.97 Yrs.	2.3212E+10	91.40	10.94	100.00
S0	18.78 Yrs.	2.8635E+10	82.29	12.15	100.00
L1	19.41 Yrs.	3.0583E+10	79.63	12.56	100.00
R1.5	17.53 Yrs.	3.5275E+10	74.15	13.49	100.00
S0.5	17.63 Yrs.	3.8161E+10	71.29	14.03	100.00
L1.5	18.13 Yrs.	3.9034E+10	70.49	14.19	100.00
L2	17.09 Yrs.	4.7141E+10	64.14	15.59	100.00
S1	16.66 Yrs.	5.0123E+10	62.20	16.08	100.00
R2	16.47 Yrs.	5.2490E+10	60.78	16.45	100.00
S1.5	16.09 Yrs.	6.1383E+10	56.21	17.79	100.00
L3	15.81 Yrs.	6.7532E+10	53.59	18.66	100.00
R2.5	15.84 Yrs.	7.2966E+10	51.55	19.40	100.00
S2	15.59 Yrs.	7.3228E+10	51.46	19.43	100.00
S3	15.06 Yrs.	9.4686E+10	45.26	22.10	100.00
R3	15.34 Yrs.	9.5726E+10	45.01	22.22	100.00
L4	15.03 Yrs.	1.0116E+11	43.78	22.84	100.00
S4	14.75 Yrs.	1.2724E+11	39.04	25.61	100.00
R4	14.88 Yrs.	1.3163E+11	38.38	26.05	100.00
L5	14.75 Yrs.	1.3220E+11	38.30	26.11	100.00
R5	14.66 Yrs.	1.5992E+11	34.82	28.72	100.00
S5	14.63 Yrs.	1.6309E+11	34.48	29.00	100.00
S6	14.59 Yrs.	1.8488E+11	32.39	30.88	100.00
SQ	15.00 Yrs.	2.5813E+11	27.41	36.48	100.00

CERC

Electric Division

382.02 Meter Installations Large

Simulated Plant Record Analysis Calculated As Of 12/31/2015

Simulated Balances Method

No. Of Test Points -	5
Interval Between Test Points -	1
First Test Point -	1976
Last Test Point -	1980

Curve Type	Average Service Life	Sum Of Squares Difference	Conformance Index	Index Of Variation	Ret Exp Index
O4	38.22 Yrs.	7.3695E+10	30.01	33.33	82.30
O3	27.94 Yrs.	7.5152E+10	29.71	33.66	89.61
O2	19.88 Yrs.	7.9023E+10	28.98	34.51	100.00
O1	17.72 Yrs.	7.9162E+10	28.95	34.54	100.00
SC	17.72 Yrs.	7.9162E+10	28.95	34.54	100.00
L0	17.33 Yrs.	8.4489E+10	28.02	35.68	100.00
R0.5	15.63 Yrs.	8.7923E+10	27.47	36.40	100.00
S.5	15.53 Yrs.	8.8811E+10	27.33	36.59	100.00
L0.5	15.78 Yrs.	9.2183E+10	26.83	37.27	100.00
L1	14.56 Yrs.	9.9384E+10	25.84	38.70	100.00
S0	14.03 Yrs.	1.0020E+11	25.73	38.86	100.00
R1	14.09 Yrs.	1.0210E+11	25.49	39.23	100.00
S0.5	13.31 Yrs.	1.1377E+11	24.15	41.41	100.00
L1.5	13.75 Yrs.	1.1637E+11	23.88	41.88	100.00
R1.5	13.22 Yrs.	1.2076E+11	23.44	42.66	100.00
S1	12.72 Yrs.	1.2873E+11	22.70	44.05	100.00
L2	13.06 Yrs.	1.3432E+11	22.23	44.99	100.00
R2	12.53 Yrs.	1.4348E+11	21.50	46.50	100.00
S1.5	12.34 Yrs.	1.4946E+11	21.07	47.46	100.00
R2.5	12.13 Yrs.	1.7173E+11	19.66	50.87	100.00
S2	12.00 Yrs.	1.7196E+11	19.64	50.91	100.00
L3	12.19 Yrs.	1.8282E+11	19.05	52.49	100.00
R3	11.81 Yrs.	2.0307E+11	18.08	55.32	100.00
S3	11.66 Yrs.	2.2558E+11	17.15	58.31	100.00
L4	11.63 Yrs.	2.5044E+11	16.28	61.44	100.00
R4	11.50 Yrs.	2.6864E+11	15.72	63.63	100.00
S4	11.41 Yrs.	2.9752E+11	14.93	66.96	100.00
L5	11.38 Yrs.	3.1557E+11	14.50	68.96	100.00
R5	11.28 Yrs.	3.4512E+11	13.87	72.12	100.00
S5	11.25 Yrs.	3.5856E+11	13.60	73.51	100.00
S6	11.16 Yrs.	3.9785E+11	12.91	77.43	100.00
SQ	11.00 Yrs.	4.2660E+11	12.47	80.18	100.00

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Electric Division
382.02 Meter Installations Large

Simulated Plant Record Analysis Calculated As Of 12/31/2015

Simulated Balances Method

No. Of Test Points -	5
Interval Between Test Points -	1
First Test Point -	1971
Last Test Point -	1975

Curve Type	Average Service Life	Sum Of Squares Difference	Conformance Index	Index Of Variation	Ret Exp Index
S6	8.41 Yrs.	1.4986E+11	11.50	86.99	100.00
SQ	8.00 Yrs.	1.6114E+11	11.09	90.20	100.00
S5	8.50 Yrs.	1.6287E+11	11.03	90.69	100.00
R5	8.53 Yrs.	1.7142E+11	10.75	93.04	100.00
L5	8.66 Yrs.	1.7260E+11	10.71	93.36	100.00
S4	8.69 Yrs.	1.8186E+11	10.44	95.83	100.00
L4	8.97 Yrs.	1.9398E+11	10.10	98.97	100.00
R4	8.78 Yrs.	2.0372E+11	9.86	101.43	100.00
S3	9.06 Yrs.	2.0716E+11	9.78	102.28	100.00
L3	9.69 Yrs.	2.1933E+11	9.50	105.24	100.00
S2	9.63 Yrs.	2.3279E+11	9.22	108.42	100.00
R3	9.25 Yrs.	2.3579E+11	9.16	109.12	100.00
S1.5	10.03 Yrs.	2.4984E+11	8.90	112.32	100.00
L2	10.81 Yrs.	2.4996E+11	8.90	112.35	100.00
R2.5	9.69 Yrs.	2.5813E+11	8.76	114.17	100.00
S1	10.59 Yrs.	2.6487E+11	8.65	115.65	100.00
L1.5	11.63 Yrs.	2.7065E+11	8.55	116.90	100.00
R2	10.25 Yrs.	2.7844E+11	8.43	118.58	100.00
S0.5	11.38 Yrs.	2.8396E+11	8.35	119.74	100.00
L1	12.75 Yrs.	2.8652E+11	8.31	120.28	100.00
S0	12.41 Yrs.	2.9949E+11	8.13	122.98	100.00
R1.5	11.19 Yrs.	3.0198E+11	8.10	123.49	100.00
L0.5	14.19 Yrs.	3.0490E+11	8.06	124.08	100.00
L0	16.16 Yrs.	3.1924E+11	7.88	126.97	100.00
R1	12.53 Yrs.	3.1993E+11	7.87	127.10	100.00
S.5	14.34 Yrs.	3.2344E+11	7.82	127.80	100.00
R0.5	14.66 Yrs.	3.3373E+11	7.70	129.81	100.00
O1	17.38 Yrs.	3.4143E+11	7.62	131.30	100.00
SC	17.38 Yrs.	3.4143E+11	7.62	131.30	100.00
O2	19.53 Yrs.	3.4147E+11	7.62	131.31	100.00
O3	28.06 Yrs.	3.4415E+11	7.59	131.83	89.51
O4	38.81 Yrs.	3.4532E+11	7.57	132.05	81.99

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Electric Division

382.02 Meter Installations Large

Simulated Plant Record Analysis Calculated As Of 12/31/2015

Simulated Balances Method

No. Of Test Points -	5
Interval Between Test Points -	1
First Test Point -	1966
Last Test Point -	1970

Curve Type	Average Service Life		Sum Of Squares Difference	Conformance Index	Index Of Variation	Ret Exp Index
SQ	22.00	Yrs.	1.3553E-20	'847000.00	.00	100.00
R5	68.00	Yrs.	1.3553E-20	'847000.00	.00	39.98
L4	94.00	Yrs.	1.3553E-20	'847000.00	.00	9.09
S4	94.00	Yrs.	1.3553E-20	'847000.00	.00	4.60
S6	36.00	Yrs.	1.3553E-20	'847000.00	.00	100.00
S5	49.00	Yrs.	1.1479E-07	298912.08	.00	99.92
L5	49.00	Yrs.	1.1479E-07	298912.08	.00	97.18
S3	201.00	Yrs.	4.9575E-05	.00	.00	.13
L3	201.00	Yrs.	3.3291E-03	.00	.00	.83
S2	201.00	Yrs.	3.1990E+00	.00	.00	1.06
R4	201.00	Yrs.	1.4378E+03	.00	.00	.38
S1.5	201.00	Yrs.	2.5307E+03	.00	.00	2.50
L2	201.00	Yrs.	3.9242E+03	.00	.00	3.09
S1	201.00	Yrs.	9.7395E+03	.00	.00	3.94
R3	201.00	Yrs.	4.2014E+05	.00	.00	1.97
S0.5	201.00	Yrs.	8.6035E+05	.00	.00	6.41
L1.5	201.00	Yrs.	1.6415E+06	.00	.00	5.55
S0	201.00	Yrs.	3.0840E+06	.00	.00	8.88
R2.5	201.00	Yrs.	4.8379E+06	.00	.00	3.70
L1	201.00	Yrs.	6.2486E+06	.00	.00	8.00
R2	201.00	Yrs.	1.4067E+07	.00	.00	5.43
L0.5	201.00	Yrs.	2.1093E+07	.00	.00	11.43
L0	206.00	Yrs.	4.1883E+07	.00	.00	14.39
R1.5	201.00	Yrs.	4.7208E+07	.00	.00	7.93
R1	201.00	Yrs.	9.9817E+07	.00	.00	10.44
S.5	201.00	Yrs.	1.0856E+08	.00	.00	12.71
R0.5	201.00	Yrs.	2.1132E+08	.00	.00	13.49
SC	201.00	Yrs.	3.6416E+08	.00	.00	16.54
O1	201.00	Yrs.	3.6416E+08	.00	.00	16.54
O2	201.00	Yrs.	4.5868E+08	.00	.00	18.59
O3	201.00	Yrs.	9.9814E+08	.00	.00	26.43
O4	201.00	Yrs.	1.9451E+09	.00	.00	35.01

CERC
Electric Division
382.02 Meter Installations Large

Simulated Plant Record Analysis Calculated As Of 12/31/2015

Simulated Balances Method

No. Of Test Points -	5
Interval Between Test Points -	1
First Test Point -	1961
Last Test Point -	1965

Curve Type	Average Service Life	Sum Of Squares Difference	Conformance Index	Index Of Variation	Ret Exp Index
SQ	17.00 Yrs.	4.8704E-21	5871960.00	.00	100.00
L5	40.00 Yrs.	4.8704E-21	5871960.00	.00	99.97
L4	72.00 Yrs.	4.8704E-21	5871960.00	.00	38.53
S6	28.00 Yrs.	4.8704E-21	5871960.00	.00	100.00
S4	72.00 Yrs.	4.8704E-21	5871960.00	.00	33.43
S5	37.00 Yrs.	1.1479E-07	4711144.13	.00	100.00
R5	49.00 Yrs.	1.1479E-07	4711144.13	.00	100.00
L3	201.00 Yrs.	1.0020E-06	.00	.00	.83
S3	201.00 Yrs.	3.5547E-06	.00	.00	.13
S2	201.00 Yrs.	1.2458E-01	.00	.00	1.06
R4	201.00 Yrs.	4.2472E+01	.00	.00	.38
S1.5	201.00 Yrs.	1.3525E+02	.00	.00	2.50
L2	201.00 Yrs.	2.1433E+02	.00	.00	3.09
S1	201.00 Yrs.	5.2395E+02	.00	.00	3.94
R3	201.00 Yrs.	1.1651E+04	.00	.00	1.97
S0.5	201.00 Yrs.	3.3780E+04	.00	.00	6.41
L1.5	201.00 Yrs.	4.7466E+04	.00	.00	5.55
S0	201.00 Yrs.	1.1879E+05	.00	.00	8.88
R2.5	201.00 Yrs.	1.2885E+05	.00	.00	3.70
L1	201.00 Yrs.	1.7731E+05	.00	.00	8.00
R2	201.00 Yrs.	3.7202E+05	.00	.00	5.43
L0.5	201.00 Yrs.	6.4523E+05	.00	.00	11.43
R1.5	201.00 Yrs.	1.2318E+06	.00	.00	7.93
L0	206.00 Yrs.	1.3154E+06	.00	.00	14.39
R1	201.00 Yrs.	2.5914E+06	.00	.00	10.44
S.5	201.00 Yrs.	2.8900E+06	.00	.00	12.71
R0.5	201.00 Yrs.	5.4412E+06	.00	.00	13.49
SC	201.00 Yrs.	9.3359E+06	.00	.00	16.54
O1	201.00 Yrs.	9.3359E+06	.00	.00	16.54
O2	201.00 Yrs.	1.1762E+07	.00	.00	18.59
O3	201.00 Yrs.	2.5557E+07	.00	.00	26.43
O4	201.00 Yrs.	4.9729E+07	.00	.00	35.01

CERC

Electric Division

382.02 Meter Installations Large

Simulated Plant Record Analysis Calculated As Of 12/31/2015

Simulated Balances Method

No. Of Test Points -	5
Interval Between Test Points -	1
First Test Point -	1956
Last Test Point -	1960

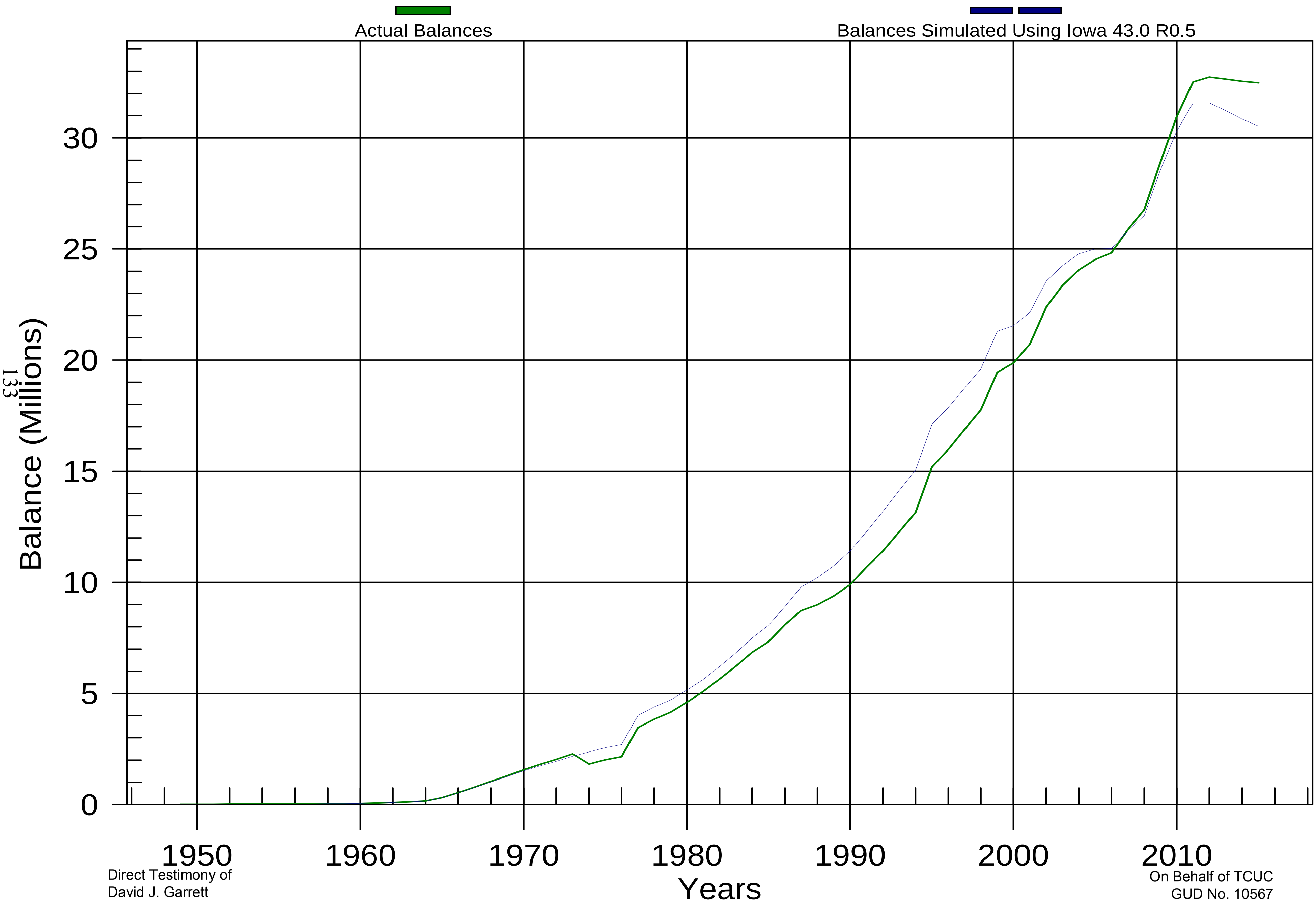
Curve Type	Average Service Life		Sum Of Squares Difference	Conformance Index	Index Of Variation	Ret Exp Index
S3	192.00	Yrs.	9.2644E-23	4352090.00	.00	.17
SQ	16.00	Yrs.	9.2644E-23	4352090.00	.00	100.00
S6	20.00	Yrs.	9.2644E-23	4352090.00	.00	100.00
R5	36.00	Yrs.	9.2644E-23	4352090.00	.00	100.00
L3	165.00	Yrs.	9.2644E-23	4352090.00	.00	1.82
L4	50.00	Yrs.	9.2644E-23	4352090.00	.00	90.73
L5	28.00	Yrs.	9.2644E-23	4352090.00	.00	100.00
S5	25.00	Yrs.	1.1479E-07	6807422.82	.00	100.00
S4	46.00	Yrs.	1.1479E-07	6807422.82	.00	99.63
S2	201.00	Yrs.	2.0309E-03	.00	.00	1.06
R4	201.00	Yrs.	3.5291E+00	.00	.00	.38
S1.5	201.00	Yrs.	6.7305E+00	.00	.00	2.50
L2	201.00	Yrs.	9.8976E+00	.00	.00	3.09
S1	201.00	Yrs.	2.6406E+01	.00	.00	3.94
R3	201.00	Yrs.	1.0144E+03	.00	.00	1.97
S0.5	201.00	Yrs.	2.6797E+03	.00	.00	6.41
L1.5	201.00	Yrs.	4.0098E+03	.00	.00	5.55
S0	201.00	Yrs.	9.6844E+03	.00	.00	8.88
R2.5	201.00	Yrs.	1.1474E+04	.00	.00	3.70
L1	201.00	Yrs.	1.5263E+04	.00	.00	8.00
R2	201.00	Yrs.	3.3260E+04	.00	.00	5.43
L0.5	201.00	Yrs.	5.6369E+04	.00	.00	11.43
R1.5	201.00	Yrs.	1.1086E+05	.00	.00	7.93
L0	206.00	Yrs.	1.1544E+05	.00	.00	14.39
R1	201.00	Yrs.	2.3382E+05	.00	.00	10.44
S.5	201.00	Yrs.	2.5931E+05	.00	.00	12.71
R0.5	201.00	Yrs.	4.9272E+05	.00	.00	13.49
O1	201.00	Yrs.	8.4701E+05	.00	.00	16.54
SC	201.00	Yrs.	8.4701E+05	.00	.00	16.54
O2	201.00	Yrs.	1.0670E+06	.00	.00	18.59
O3	201.00	Yrs.	2.3202E+06	.00	.00	26.43
O4	201.00	Yrs.	4.5184E+06	.00	.00	35.01

CERC

Electric Division

382.02 Meter Installations Large

Actual And Simulated Balances 1949-2015



GAS UTILITIES DOCKET NO. 10567

STATEMENT OF INTENT OF CENTERPOINT ENERGY RESOURCES CORP., D/B/A CENTERPOINT ENERGY ENTEX AND CENTERPOINT ENERGY TEXAS GAS TO INCREASE RATES IN THE TEXAS GULF DIVISION	§ § § § § §	BEFORE THE RAILROAD COMMISSION OF TEXAS

DIRECT TESTIMONY OF DAVID J. GARRETT

EXHIBIT DJG-8: Actuarial Observed Life Tables and Iowa Curve Fitting

CERC
Electric Division
390.00 Structures & Improvements - General

Observed Life Table
Retirement Expr. 2003 TO 2015
Placement Years 1970 TO 2015

Age Interval	$ Surviving At Beginning of Age Interval	$ Retired During The Age Interval	Retirement Ratio	% Surviving At Beginning of Age Interval
0.0 - 0.5	$28,898,108.34	$0.00	0.00000	100.00
0.5 - 1.5	$21,359,187.63	$0.00	0.00000	100.00
1.5 - 2.5	$16,557,960.36	$17,055.85	0.00103	100.00
2.5 - 3.5	$15,420,536.28	$20,386.27	0.00132	99.90
3.5 - 4.5	$888,379.71	$0.00	0.00000	99.76
4.5 - 5.5	$667,053.18	$3,052.38	0.00458	99.76
5.5 - 6.5	$576,692.74	$0.00	0.00000	99.31
6.5 - 7.5	$500,816.18	$0.00	0.00000	99.31
7.5 - 8.5	$640,923.26	$0.00	0.00000	99.31
8.5 - 9.5	$355,824.35	$267.94	0.00075	99.31
9.5 - 10.5	$355,556.41	$0.00	0.00000	99.23
10.5 - 11.5	$355,556.41	$0.00	0.00000	99.23
11.5 - 12.5	$311,875.94	$0.00	0.00000	99.23
12.5 - 13.5	$329,214.68	$0.00	0.00000	99.23
13.5 - 14.5	$329,214.68	$0.00	0.00000	99.23
14.5 - 15.5	$329,214.68	$0.00	0.00000	99.23
15.5 - 16.5	$329,214.68	$0.00	0.00000	99.23
16.5 - 17.5	$212,107.15	$0.00	0.00000	99.23
17.5 - 18.5	$209,157.15	$0.00	0.00000	99.23
18.5 - 19.5	$178,287.32	$0.00	0.00000	99.23
19.5 - 20.5	$169,340.42	$0.00	0.00000	99.23
20.5 - 21.5	$22,816.47	$0.00	0.00000	99.23
21.5 - 22.5	$22,816.47	$0.00	0.00000	99.23
22.5 - 23.5	$22,816.47	$0.00	0.00000	99.23
23.5 - 24.5	$22,816.47	$0.00	0.00000	99.23
24.5 - 25.5	$18,037.59	$0.00	0.00000	99.23
25.5 - 26.5	$16,773.83	$0.00	0.00000	99.23
26.5 - 27.5	$103,245.59	$0.00	0.00000	99.23
27.5 - 28.5	$117,783.31	$14,537.72	0.12343	99.23
28.5 - 29.5	$103,245.59	$0.00	0.00000	86.99
29.5 - 30.5	$136,899.26	$0.00	0.00000	86.99
30.5 - 31.5	$136,899.26	$0.00	0.00000	86.99
31.5 - 32.5	$218,909.80	$0.00	0.00000	86.99
32.5 - 33.5	$227,710.95	$0.00	0.00000	86.99
33.5 - 34.5	$227,710.95	$0.00	0.00000	86.99
34.5 - 35.5	$227,710.95	$82,047.21	0.36031	86.99
35.5 - 36.5	$145,663.74	$9,500.00	0.06522	55.64

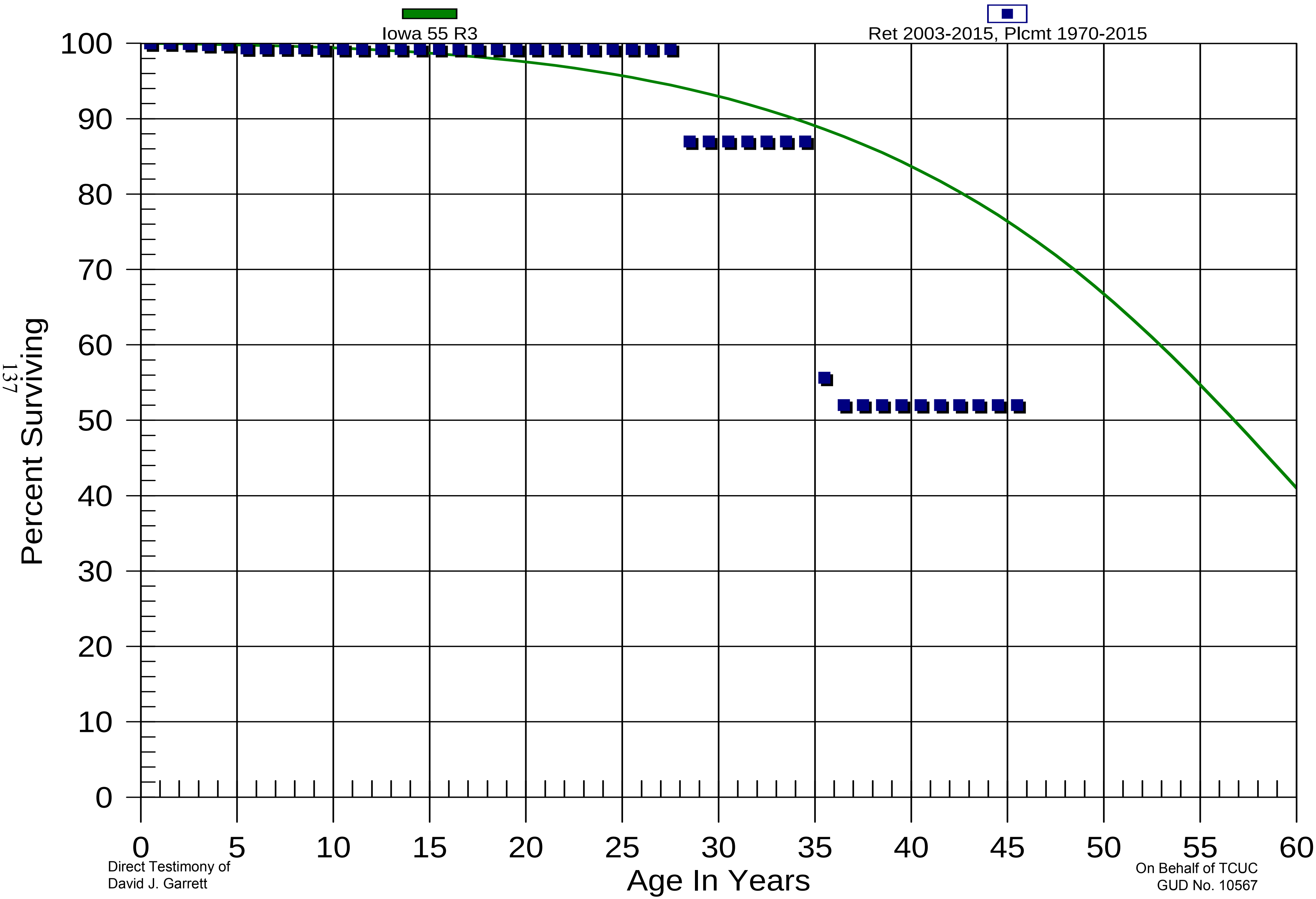
CERC
Electric Division
390.00 Structures & Improvements - General

Observed Life Table
Retirement Expr. 2003 TO 2015
Placement Years 1970 TO 2015

Age Interval	*$ Surviving At Beginning of Age Interval*	*$ Retired During The Age Interval*	*Retirement Ratio*	*% Surviving At Beginning of Age Interval*
36.5 - 37.5	$136,163.74	$0.00	0.00000	52.01
37.5 - 38.5	$136,163.74	$0.00	0.00000	52.01
38.5 - 39.5	$120,088.76	$0.00	0.00000	52.01
39.5 - 40.5	$33,653.67	$0.00	0.00000	52.01
40.5 - 41.5	$33,653.67	$0.00	0.00000	52.01
41.5 - 42.5	$33,653.67	$0.00	0.00000	52.01
42.5 - 43.5	$0.00	$0.00	0.00000	52.01
43.5 - 44.5	$0.00	$0.00	0.00000	52.01
44.5 - 45.5	$0.00	$0.00	0.00000	52.01

CERC

Electric Division
390.00 Structures & Improvements - General
Original And Smooth Survivor Curves



Direct Testimony of
David J. Garrett

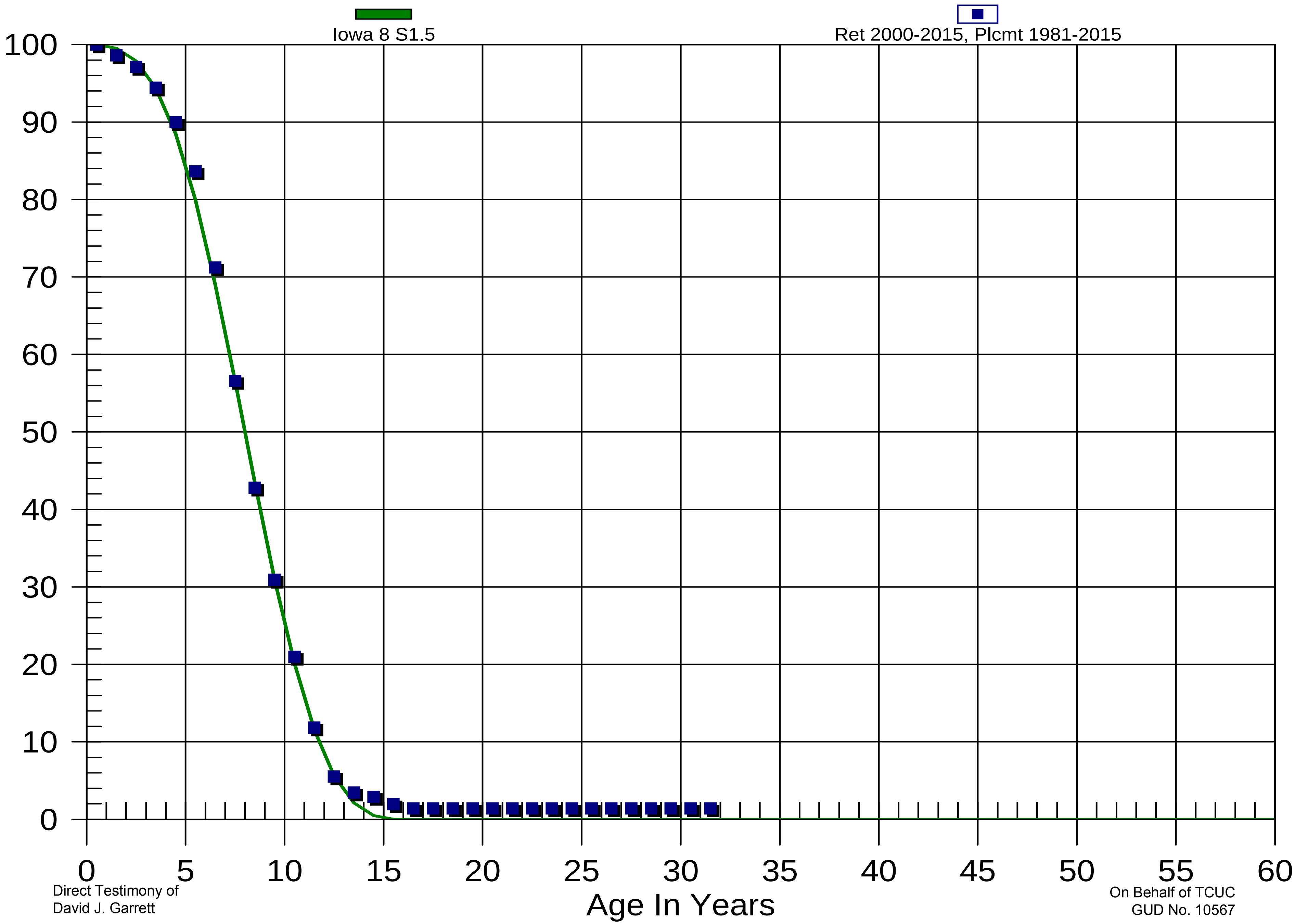
On Behalf of TCUC
GUD No. 10567

CERC
Electric Division
392.00 Transportation Equipment
Observed Life Table
Retirement Expr. 2000 TO 2015
Placement Years 1981 TO 2015

Age Interval	$ Surviving At Beginning of Age Interval	$ Retired During The Age Interval	Retirement Ratio	% Surviving At Beginning of Age Interval
0.0 - 0.5	$59,567,680.52	$0.00	0.00000	100.00
0.5 - 1.5	$55,692,084.57	$781,038.35	0.01402	100.00
1.5 - 2.5	$52,993,600.73	$805,003.81	0.01519	98.60
2.5 - 3.5	$50,109,690.32	$1,386,803.65	0.02768	97.10
3.5 - 4.5	$44,156,449.87	$2,081,948.46	0.04715	94.41
4.5 - 5.5	$37,907,082.18	$2,674,238.93	0.07055	89.96
5.5 - 6.5	$32,102,650.82	$4,757,822.94	0.14821	83.61
6.5 - 7.5	$25,129,310.85	$5,172,581.67	0.20584	71.22
7.5 - 8.5	$17,435,741.58	$4,243,804.85	0.24340	56.56
8.5 - 9.5	$12,003,159.54	$3,330,919.81	0.27750	42.80
9.5 - 10.5	$7,837,072.16	$2,520,012.74	0.32155	30.92
10.5 - 11.5	$4,266,284.87	$1,861,449.59	0.43632	20.98
11.5 - 12.5	$1,990,723.03	$1,060,013.71	0.53248	11.82
12.5 - 13.5	$869,420.74	$329,235.76	0.37868	5.53
13.5 - 14.5	$540,184.98	$86,429.33	0.16000	3.43
14.5 - 15.5	$256,472.39	$83,956.90	0.32735	2.89
15.5 - 16.5	$120,163.38	$33,513.57	0.27890	1.94
16.5 - 17.5	$19,700.49	$0.00	0.00000	1.40
17.5 - 18.5	$19,700.49	$0.00	0.00000	1.40
18.5 - 19.5	$14,678.65	$0.00	0.00000	1.40
19.5 - 20.5	$14,678.65	$0.00	0.00000	1.40
20.5 - 21.5	$12,248.17	$0.00	0.00000	1.40
21.5 - 22.5	$4,652.37	$0.00	0.00000	1.40
22.5 - 23.5	$3,687.79	$0.00	0.00000	1.40
23.5 - 24.5	$3,687.79	$0.00	0.00000	1.40
24.5 - 25.5	$3,687.79	$0.00	0.00000	1.40
25.5 - 26.5	$3,687.79	$0.00	0.00000	1.40
26.5 - 27.5	$3,687.79	$0.00	0.00000	1.40
27.5 - 28.5	$3,687.79	$0.00	0.00000	1.40
28.5 - 29.5	$32.15	$0.00	0.00000	1.40
29.5 - 30.5	$32.15	$0.00	0.00000	1.40
30.5 - 31.5	$32.15	$0.00	0.00000	1.40

CERC

Electric Division
392.00 Transportation Equipment
Original And Smooth Survivor Curves



GAS UTILITIES DOCKET NO. 10567

STATEMENT OF INTENT OF CENTERPOINT ENERGY RESOURCES CORP., D/B/A CENTERPOINT ENERGY ENTEX AND CENTERPOINT ENERGY TEXAS GAS TO INCREASE RATES IN THE TEXAS GULF DIVISION	**§ § § § § §**	**BEFORE THE RAILROAD COMMISSION OF TEXAS**

DIRECT TESTIMONY OF DAVID J. GARRETT

EXHIBIT DJG-9: Simulated and Actuarial Remaining Life Development

CERC
Electric Division
376.02 Distribution Mains - Plastic

Original Cost Of Utility Plant In Service
And Development Of Composite Remaining Life as of December 31, 2015
Based Upon A Composite of BG/ELG Procedure Plus Rem. Life Technique
Using December 31, 2015 Plant In Service And 1/2 of Future Year Additions

ELG Vintages - 1900 And Subsequent

Average Service Life: 65 Survivor Curve: R2

Year (1)	Original Cost (2)	Avg. Service Life (3)	Avg. Annual Accrual (4)	Avg. Remaining Life (5)	Future Annual Accruals (6)
1970	168,384.78	71.15	2,366.69	25.65	60,700.30
1971	706,055.31	70.66	9,991.69	26.16	261,425.08
1972	795,641.74	70.19	11,336.32	26.69	302,511.88
1973	1,220,215.61	69.71	17,504.12	27.21	476,290.51
1974	1,008,563.22	69.24	14,566.35	27.74	404,059.84
1975	1,265,656.71	68.77	18,403.66	28.27	520,308.46
1976	1,439,575.62	68.31	21,074.64	28.81	607,127.38
1977	2,202,713.84	67.85	32,465.37	29.35	952,797.00
1978	2,923,512.99	67.39	43,381.33	29.89	1,296,713.21
1979	4,170,372.91	66.94	62,303.15	30.44	1,896,307.86
1980	3,430,148.94	66.49	51,592.53	30.99	1,598,614.29
1981	4,357,661.85	66.04	65,988.88	31.54	2,081,045.40
1982	5,363,819.88	65.59	81,778.51	32.09	2,624,239.67
1983	5,364,691.75	65.14	82,350.38	32.64	2,688,304.41
1984	6,105,918.15	64.70	94,370.30	33.20	3,133,253.67
1985	6,163,022.69	64.26	95,907.32	33.76	3,237,849.54
1986	5,663,705.38	63.82	88,745.41	34.32	3,045,715.83
1987	5,936,801.03	63.38	93,669.76	34.88	3,267,212.89
1988	2,916,998.66	62.94	46,345.05	35.44	1,642,509.72
1989	3,935,560.14	62.50	62,967.07	36.00	2,266,932.76
1990	7,489,805.56	62.06	120,681.79	36.56	4,412,419.92
1991	6,168,735.96	61.62	100,105.40	37.12	3,716,153.54
1992	6,616,805.74	61.18	108,151.25	37.68	4,075,251.30

CERC
Electric Division
376.02 Distribution Mains - Plastic

Original Cost Of Utility Plant In Service
And Development Of Composite Remaining Life as of December 31, 2015
Based Upon A Composite of BG/ELG Procedure Plus Rem. Life Technique
Using December 31, 2015 Plant In Service And 1/2 of Future Year Additions

ELG Vintages - **1900** *And Subsequent*

Average Service Life: 65 *Survivor Curve:* R2

Year (1)	Original Cost (2)	Avg. Service Life (3)	Avg. Annual Accrual (4)	Avg. Remaining Life (5)	Future Annual Accruals (6)
1993	8,281,521.74	60.74	136,348.02	38.24	5,213,691.21
1994	10,813,756.89	60.29	179,354.24	38.79	6,957,640.78
1995	8,509,750.15	59.84	142,197.47	39.34	5,594,702.01
1996	9,881,388.85	59.39	166,374.02	39.89	6,637,095.47
1997	9,587,241.52	58.94	162,671.07	40.44	6,577,826.66
1998	7,632,653.86	58.47	130,528.94	40.97	5,348,397.44
1999	19,762,900.96	58.01	340,700.87	41.51	14,141,336.60
2000	9,489,391.49	57.53	164,944.65	42.03	6,932,749.41
2001	22,475,737.71	57.05	393,996.76	42.55	16,762,784.70
2002	30,888,862.92	56.55	546,228.85	43.05	23,514,773.39
2003	4,627,043.57	56.04	82,567.23	43.54	3,594,953.15
2004	17,982,295.70	55.51	323,921.26	44.01	14,257,201.24
2005	13,041,078.27	54.97	237,241.35	44.47	10,550,044.08
2006	18,536,960.25	54.40	340,742.13	44.90	15,299,910.04
2007	22,469,352.53	53.80	417,610.59	45.30	18,919,662.51
2008	17,280,995.68	53.17	325,005.71	45.67	14,843,452.83
2009	19,652,496.86	52.49	374,396.46	45.99	17,218,919.90
2010	13,535,279.31	51.75	261,551.59	46.25	12,096,745.58
2011	25,295,733.64	50.92	496,729.91	46.42	23,060,449.05
2012	25,056,312.37	49.98	501,357.31	46.48	23,301,561.79
2013	24,414,193.32	48.84	499,914.47	46.34	23,164,407.15
2014	50,365,132.87	47.34	1,063,809.15	45.84	48,769,419.15
2015	44,830,104.26	44.96	997,221.11	44.46	44,331,493.70

CERC
Electric Division
376.02 Distribution Mains - Plastic

Original Cost Of Utility Plant In Service
And Development Of Composite Remaining Life as of December 31, 2015
Based Upon A Composite of BG/ELG Procedure Plus Rem. Life Technique
Using December 31, 2015 Plant In Service And 1/2 of Future Year Additions

ELG Vintages - 1900 *And Subsequent*

Average Service Life: 65 *Survivor Curve:* R2

Year (1)	Original Cost (2)	Avg. Service Life (3)	Avg. Annual Accrual (4)	Avg. Remaining Life (5)	Future Annual Accruals (6)
Total BG	0.00	0.00	0.00	0.00	0.00
Total ELG	519,824,553.18	54.08	9,611,460.13	42.83	411,656,962.29
Total ALL	519,824,553.18	54.08	9,611,460.13	42.83	411,656,962.29
Less F.Y.	0.00				
12/31/2015	519,824,553.18				

CERC
Electric Division
379.00 Meas. & Reg. - City Gate

Original Cost Of Utility Plant In Service
And Development Of Composite Remaining Life as of December 31, 2015
Based Upon A Composite of BG/ELG Procedure Plus Rem. Life Technique
Using December 31, 2015 Plant In Service And 1/2 of Future Year Additions

ELG Vintages - 1900 And Subsequent

Average Service Life: 43 Survivor Curve: R0.5

Year (1)	Original Cost (2)	Avg. Service Life (3)	Avg. Annual Accrual (4)	Avg. Remaining Life (5)	Future Annual Accruals (6)
1944	557.85	78.11	7.14	6.61	47.20
1945	628.01	77.48	8.11	6.98	56.59
1946	703.78	76.85	9.16	7.35	67.31
1947	785.34	76.21	10.30	7.71	79.48
1948	872.94	75.57	11.55	8.07	93.25
1949	966.93	74.93	12.90	8.43	108.78
1950	1,067.47	74.28	14.37	8.78	126.22
1951	1,174.82	73.64	15.95	9.14	145.76
1952	1,289.32	72.99	17.67	9.49	167.58
1953	1,411.15	72.34	19.51	9.84	191.88
1954	1,540.55	71.68	21.49	10.18	218.87
1955	1,677.86	71.03	23.62	10.53	248.79
1956	1,823.27	70.38	25.91	10.88	281.86
1957	1,977.02	69.73	28.35	11.23	318.35
1958	2,139.44	69.08	30.97	11.58	358.54
1959	2,310.73	68.43	33.77	11.93	402.71
1960	2,491.16	67.77	36.76	12.27	451.16
1961	7,917.37	67.12	117.95	12.62	1,489.07
1962	8,506.54	66.48	127.96	12.98	1,660.42
1963	30,888.11	65.83	469.23	13.33	6,253.71
1964	27,927.40	65.18	428.46	13.68	5,861.72
1965	36,832.84	64.54	570.74	14.04	8,010.50
1966	46,673.72	63.89	730.52	14.39	10,512.88

CERC
Electric Division
379.00 Meas. & Reg. - City Gate

Original Cost Of Utility Plant In Service
And Development Of Composite Remaining Life as of December 31, 2015
Based Upon A Composite of BG/ELG Procedure Plus Rem. Life Technique
Using December 31, 2015 Plant In Service And 1/2 of Future Year Additions

ELG Vintages - 1900 And Subsequent

Average Service Life: 43 Survivor Curve: R0.5

Year (1)	*Original Cost* (2)	*Avg. Service Life* (3)	*Avg. Annual Accrual* (4)	*Avg. Remaining Life* (5)	*Future Annual Accruals* (6)
1967	43,878.68	63.25	693.76	14.75	10,231.39
1968	31,815.10	62.61	508.18	15.11	7,676.52
1969	36,985.10	61.97	596.87	15.47	9,230.71
1970	52,554.61	61.33	856.97	15.83	13,562.27
1971	59,389.04	60.69	978.60	16.19	15,841.14
1972	45,457.09	60.05	756.98	16.55	12,528.27
1973	31,449.35	59.41	529.33	16.91	8,953.00
1974	57,693.40	58.78	981.54	17.28	16,959.60
1975	105,697.40	58.14	1,817.86	17.64	32,074.18
1976	119,534.96	57.51	2,078.51	18.01	37,433.64
1977	202,548.48	56.88	3,561.22	18.38	65,441.42
1978	359,644.17	56.24	6,394.52	18.74	119,849.58
1979	257,338.19	55.61	4,627.65	19.11	88,428.91
1980	265,645.07	54.97	4,832.13	19.47	94,104.60
1981	186,046.34	54.34	3,423.74	19.84	67,927.22
1982	191,805.13	53.70	3,571.51	20.20	72,159.47
1983	456,259.22	53.07	8,597.80	20.57	176,830.65
1984	516,283.81	52.43	9,847.51	20.93	206,087.31
1985	231,109.29	51.79	4,462.75	21.29	94,995.38
1986	540,719.24	51.14	10,572.92	21.64	228,818.02
1987	542,480.82	50.49	10,743.47	21.99	236,292.03
1988	138,026.80	49.84	2,769.30	22.34	61,871.17
1989	1,729,887.36	49.18	35,171.13	22.68	797,852.54

CERC
Electric Division
379.00 Meas. & Reg. - City Gate

Original Cost Of Utility Plant In Service
And Development Of Composite Remaining Life as of December 31, 2015
Based Upon A Composite of BG/ELG Procedure Plus Rem. Life Technique
Using December 31, 2015 Plant In Service And 1/2 of Future Year Additions

ELG Vintages - 1900 And Subsequent

Average Service Life: 43 Survivor Curve: R0.5

Year (1)	Original Cost (2)	Avg. Service Life (3)	Avg. Annual Accrual (4)	Avg. Remaining Life (5)	Future Annual Accruals (6)
1990	422,870.00	48.52	8,714.97	23.02	200,638.27
1991	111,294.20	47.85	2,325.76	23.35	54,313.16
1992	134,158.10	47.18	2,843.77	23.68	67,329.42
1993	149,826.26	46.49	3,222.72	23.99	77,315.16
1994	584,640.31	45.80	12,766.39	24.30	310,162.96
1995	227,584.46	45.09	5,047.47	24.59	124,111.32
1996	380,271.83	44.37	8,570.51	24.87	213,146.86
1997	584,374.16	43.64	13,391.92	25.14	336,623.66
1998	534,961.31	42.89	12,473.79	25.39	316,670.01
1999	382,736.19	42.12	9,086.97	25.62	232,801.26
2000	665,808.83	41.33	16,109.17	25.83	416,116.62
2001	997,425.80	40.52	24,615.81	26.02	640,496.62
2002	1,263,844.93	39.68	31,849.06	26.18	833,882.62
2003	538,447.09	38.82	13,872.10	26.32	365,045.89
2004	534,723.24	37.91	14,103.52	26.41	372,532.74
2005	274,163.98	36.97	7,414.92	26.47	196,307.31
2006	769,729.68	35.99	21,387.12	26.49	566,552.06
2007	1,189,510.68	34.95	34,030.93	26.45	900,247.74
2008	1,808,111.85	33.86	53,407.52	26.36	1,407,555.48
2009	671,326.91	32.68	20,542.46	26.18	537,800.94
2010	1,584,243.72	31.41	50,438.57	25.91	1,306,831.56
2011	1,237,614.21	30.01	41,234.32	25.51	1,052,059.79
2012	1,311,188.11	28.45	46,091.93	24.95	1,149,866.35

CERC
Electric Division
379.00 Meas. & Reg. - City Gate

Original Cost Of Utility Plant In Service
And Development Of Composite Remaining Life as of December 31, 2015
Based Upon A Composite of BG/ELG Procedure Plus Rem. Life Technique
Using December 31, 2015 Plant In Service And 1/2 of Future Year Additions

ELG Vintages - **1900** *And Subsequent*

Average Service Life: **43** *Survivor Curve:* **R0.5**

Year (1)	Original Cost (2)	Avg. Service Life (3)	Avg. Annual Accrual (4)	Avg. Remaining Life (5)	Future Annual Accruals (6)
2013	1,580,365.65	26.62	59,357.63	24.12	1,431,971.57
2014	1,680,975.47	24.36	68,994.13	22.86	1,577,484.27
2015	4,348,517.27	21.08	206,239.92	20.58	4,245,397.31
Total BG	0.00	0.00	0.00	0.00	0.00
Total ELG	30,353,126.51	33.38	909,280.02	23.59	21,445,562.60
Total ALL	30,353,126.51	33.38	909,280.02	23.59	21,445,562.60
Less F.Y.	0.00				
12/31/2015	30,353,126.51				

CERC
Electric Division
380.02 Services - Plastic

Original Cost Of Utility Plant In Service
And Development Of Composite Remaining Life as of December 31, 2015
Based Upon A Composite of BG/ELG Procedure Plus Rem. Life Technique
Using December 31, 2015 Plant In Service And 1/2 of Future Year Additions

ELG Vintages - **1900** *And Subsequent*

Average Service Life: *56* *Survivor Curve:* *R2*

Year (1)	Original Cost (2)	Avg. Service Life (3)	Avg. Annual Accrual (4)	Avg. Remaining Life (5)	Future Annual Accruals (6)
1970	359,722.83	64.51	5,576.50	19.01	105,991.92
1971	492,377.43	63.99	7,695.01	19.49	149,949.52
1972	677,159.98	63.47	10,668.56	19.97	213,077.79
1973	958,403.35	62.96	15,221.35	20.46	311,496.05
1974	1,367,015.41	62.46	21,885.40	20.96	458,771.19
1975	1,717,753.97	61.97	27,720.65	21.47	595,067.80
1976	2,171,837.93	61.48	35,328.01	21.98	776,381.35
1977	1,946,061.82	60.99	31,907.24	22.49	717,633.06
1978	2,789,456.29	60.51	46,098.37	23.01	1,060,767.49
1979	4,163,351.01	60.04	69,347.79	23.54	1,632,156.71
1980	4,442,941.69	59.57	74,589.03	24.07	1,795,031.15
1981	6,377,001.52	59.10	107,902.64	24.60	2,654,360.37
1982	8,007,754.30	58.64	136,564.06	25.14	3,432,858.28
1983	9,811,808.54	58.18	168,649.37	25.68	4,330,703.85
1984	9,569,331.38	57.72	165,777.30	26.22	4,347,346.34
1985	8,058,368.63	57.27	140,701.71	26.77	3,766,966.51
1986	7,304,506.32	56.82	128,546.17	27.32	3,512,394.43
1987	9,108,273.74	56.38	161,558.54	27.88	4,503,855.24
1988	5,651,082.65	55.93	101,032.43	28.43	2,872,690.84
1989	6,410,136.41	55.49	115,515.94	28.99	3,348,964.12
1990	7,847,119.75	55.05	142,543.18	29.55	4,212,268.61
1991	8,299,860.14	54.61	151,981.46	30.11	4,576,314.43
1992	8,420,486.51	54.17	155,441.36	30.67	4,767,614.50

CERC
Electric Division
380.02 Services - Plastic

Original Cost Of Utility Plant In Service
And Development Of Composite Remaining Life as of December 31, 2015
Based Upon A Composite of BG/ELG Procedure Plus Rem. Life Technique
Using December 31, 2015 Plant In Service And 1/2 of Future Year Additions

ELG Vintages - 1900 And Subsequent

Average Service Life: 56 Survivor Curve: R2

Year (1)	Original Cost (2)	Avg. Service Life (3)	Avg. Annual Accrual (4)	Avg. Remaining Life (5)	Future Annual Accruals (6)
1993	9,381,579.95	53.73	174,598.55	31.23	5,453,112.48
1994	10,474,673.98	53.29	196,548.78	31.79	6,248,875.15
1995	10,640,990.10	52.85	201,333.98	32.35	6,513,643.55
1996	12,733,313.02	52.41	242,956.63	32.91	7,995,658.73
1997	11,831,324.83	51.96	227,680.77	33.46	7,619,230.60
1998	13,387,700.57	51.52	259,872.98	34.02	8,839,923.47
1999	14,169,777.80	51.06	277,490.25	34.56	9,591,188.68
2001	17,244,255.12	50.14	343,916.87	35.64	12,257,460.44
2002	28,351,605.92	49.67	570,831.12	36.17	20,645,385.81
2003	13,196,351.52	49.18	268,306.51	36.68	9,842,520.19
2004	17,490,114.67	48.69	359,229.39	37.19	13,358,976.64
2005	20,056,335.25	48.18	416,314.68	37.68	15,685,031.11
2006	20,688,049.75	47.64	434,219.39	38.14	16,562,965.59
2007	21,917,895.09	47.09	465,458.13	38.59	17,961,500.98
2008	17,172,655.95	46.50	369,277.24	39.00	14,403,076.64
2009	15,826,108.94	45.88	344,960.37	39.38	13,583,866.56
2010	18,618,149.60	45.20	411,910.68	39.70	16,352,640.88
2011	18,907,356.42	44.45	425,382.40	39.95	16,993,135.60
2012	20,809,125.98	43.59	477,366.54	40.09	19,138,343.08
2013	23,161,142.62	42.57	544,096.30	40.07	21,800,901.88
2014	30,470,733.98	41.24	738,933.75	39.74	29,362,333.35
2015	38,488,156.95	39.12	983,907.96	38.62	37,996,202.97

CERC
Electric Division
380.02 Services - Plastic

Original Cost Of Utility Plant In Service
And Development Of Composite Remaining Life as of December 31, 2015
Based Upon A Composite of BG/ELG Procedure Plus Rem. Life Technique
Using December 31, 2015 Plant In Service And 1/2 of Future Year Additions

ELG Vintages - 1900 And Subsequent

Average Service Life: 56 Survivor Curve: R2

Year (1)	Original Cost (2)	Avg. Service Life (3)	Avg. Annual Accrual (4)	Avg. Remaining Life (5)	Future Annual Accruals (6)
Total BG	0.00	0.00	0.00	0.00	0.00
Total ELG	520,969,209.61	48.43	10,756,845.34	35.54	382,348,635.94
Total ALL	520,969,209.61	48.43	10,756,845.34	35.54	382,348,635.94
Less F.Y.	0.00				
12/31/2015	520,969,209.61				

CERC
Electric Division
382.02 Meter Installations Large

Original Cost Of Utility Plant In Service
And Development Of Composite Remaining Life as of December 31, 2015
Based Upon A Composite of BG/ELG Procedure Plus Rem. Life Technique
Using December 31, 2015 Plant In Service And 1/2 of Future Year Additions

ELG Vintages - 1900 And Subsequent

Average Service Life: 43 Survivor Curve: R0.5

Year (1)	Original Cost (2)	Avg. Service Life (3)	Avg. Annual Accrual (4)	Avg. Remaining Life (5)	Future Annual Accruals (6)
1949	537.49	74.93	7.17	8.43	60.47
1950	593.38	74.28	7.99	8.78	70.16
1951	653.05	73.64	8.87	9.14	81.02
1952	716.70	72.99	9.82	9.49	93.15
1953	784.42	72.34	10.84	9.84	106.66
1954	856.35	71.68	11.95	10.18	121.66
1955	932.68	71.03	13.13	10.53	138.29
1956	1,013.51	70.38	14.40	10.88	156.68
1957	1,098.98	69.73	15.76	11.23	176.97
1958	1,189.26	69.08	17.22	11.58	199.31
1959	1,284.48	68.43	18.77	11.93	223.86
1960	1,661.97	67.77	24.52	12.27	300.99
1961	9,363.04	67.12	139.49	12.62	1,760.96
1962	10,541.26	66.48	158.57	12.98	2,057.58
1963	11,493.88	65.83	174.61	13.33	2,327.09
1964	12,514.18	65.18	191.99	13.68	2,626.62
1965	67,584.47	64.54	1,047.25	14.04	14,698.45
1966	100,266.48	63.89	1,569.34	14.39	22,584.22
1967	115,944.25	63.25	1,833.18	14.75	27,035.26
1968	123,940.97	62.61	1,979.70	15.11	29,905.16
1969	124,911.32	61.97	2,015.83	15.47	31,175.26
1970	137,971.72	61.33	2,249.82	15.83	35,605.06
1971	126,327.63	60.69	2,081.61	16.19	33,696.01

CERC
Electric Division
382.02 Meter Installations Large

Original Cost Of Utility Plant In Service
And Development Of Composite Remaining Life as of December 31, 2015
Based Upon A Composite of BG/ELG Procedure Plus Rem. Life Technique
Using December 31, 2015 Plant In Service And 1/2 of Future Year Additions

ELG Vintages - 1900 And Subsequent

Average Service Life: 43 Survivor Curve: R0.5

Year (1)	Original Cost (2)	Avg. Service Life (3)	Avg. Annual Accrual (4)	Avg. Remaining Life (5)	Future Annual Accruals (6)
1972	122,483.37	60.05	2,039.68	16.55	33,757.22
1973	138,708.19	59.41	2,334.61	16.91	39,487.44
1974	119,931.19	58.78	2,040.39	17.28	35,255.07
1975	125,610.24	58.14	2,160.33	17.64	38,116.78
1976	104,899.09	57.51	1,824.02	18.01	32,850.27
1977	828,336.17	56.88	14,563.87	18.38	267,627.25
1978	264,441.70	56.24	4,701.81	18.74	88,123.84
1979	234,810.98	55.61	4,222.55	19.11	80,687.90
1980	326,831.80	54.97	5,945.12	19.47	115,779.97
1981	362,089.94	54.34	6,663.41	19.84	132,202.35
1982	442,496.03	53.70	8,239.51	20.20	166,472.50
1983	479,077.42	53.07	9,027.79	20.57	185,674.21
1984	532,183.37	52.43	10,150.77	20.93	212,434.01
1985	473,725.39	51.79	9,147.70	21.29	194,720.53
1986	690,905.11	51.14	13,509.57	21.64	292,372.69
1987	736,469.57	50.49	14,585.28	21.99	320,789.01
1988	406,958.52	49.84	8,165.00	22.34	182,421.09
1989	511,153.43	49.18	10,392.49	22.68	235,752.38
1990	613,261.82	48.52	12,638.77	23.02	290,973.09
1991	802,845.61	47.85	16,777.37	23.35	391,800.12
1992	860,835.50	47.18	18,247.29	23.68	432,024.25
1993	913,878.30	46.49	19,657.23	23.99	471,590.54
1994	897,275.05	45.80	19,593.18	24.30	476,021.72

CERC
Electric Division
382.02 Meter Installations Large

Original Cost Of Utility Plant In Service
And Development Of Composite Remaining Life as of December 31, 2015
Based Upon A Composite of BG/ELG Procedure Plus Rem. Life Technique
Using December 31, 2015 Plant In Service And 1/2 of Future Year Additions

ELG Vintages - **1900** *And Subsequent*

Average Service Life: ***43*** *Survivor Curve:* ***R0.5***

Year (1)	Original Cost (2)	Avg. Service Life (3)	Avg. Annual Accrual (4)	Avg. Remaining Life (5)	Future Annual Accruals (6)
1995	1,908,582.52	45.09	42,329.40	24.59	1,040,829.81
1996	830,193.65	44.37	18,710.78	24.87	465,333.36
1997	937,114.48	43.64	21,475.56	25.14	539,816.65
1998	964,352.96	42.89	22,485.99	25.39	570,848.13
1999	1,729,537.35	42.12	41,062.87	25.62	1,052,000.02
2000	452,911.51	41.33	10,958.15	25.83	283,060.24
2001	788,724.06	40.52	19,465.19	26.02	506,478.87
2002	1,560,084.60	39.68	39,314.34	26.18	1,029,341.03
2003	924,222.11	38.82	23,810.88	26.32	626,586.13
2004	781,555.94	37.91	20,613.82	26.41	544,496.96
2005	510,033.22	36.97	13,794.14	26.47	365,194.76
2006	316,578.73	35.99	8,796.21	26.49	233,014.70
2007	1,099,043.58	34.95	31,442.74	26.45	831,780.26
2008	1,019,275.63	33.86	30,107.09	26.36	793,472.48
2009	2,394,045.74	32.68	73,257.28	26.18	1,917,873.45
2010	2,125,869.64	31.41	67,682.66	25.91	1,753,614.99
2011	1,676,126.55	30.01	55,844.49	25.51	1,424,826.35
2012	411,245.65	28.45	14,456.44	24.95	360,648.13
2013	65,030.04	26.62	2,442.49	24.12	58,923.81
2014	40,767.76	24.36	1,673.28	22.86	38,257.85
2015	108,182.26	21.08	5,130.83	20.58	105,616.85

CERC
Electric Division
382.02 Meter Installations Large

Original Cost Of Utility Plant In Service
And Development Of Composite Remaining Life as of December 31, 2015
Based Upon A Composite of BG/ELG Procedure Plus Rem. Life Technique
Using December 31, 2015 Plant In Service And 1/2 of Future Year Additions

ELG Vintages - **1900** *And Subsequent*

Average Service Life: **43** *Survivor Curve:* **R0.5**

Year (1)	Original Cost (2)	Avg. Service Life (3)	Avg. Annual Accrual (4)	Avg. Remaining Life (5)	Future Annual Accruals (6)
Total BG	0.00	0.00	0.00	0.00	0.00
Total ELG	32,484,867.24	40.86	795,084.18	24.48	19,464,149.96
Total ALL	32,484,867.24	40.86	795,084.18	24.48	19,464,149.96
Less F.Y.	0.00				
12/31/2015	32,484,867.24				

CERC
Electric Division
390.00 Structures & Improvements - General

Original Cost Of Utility Plant In Service
And Development Of Composite Remaining Life as of December 31, 2015
Based Upon A Composite of BG/ELG Procedure Plus Rem. Life Technique
Using December 31, 2015 Plant In Service And 1/2 of Future Year Additions

ELG Vintages - **1900** *And Subsequent*

Average Service Life: **55** *Survivor Curve:* **R3**

Year (1)	Original Cost (2)	Avg. Service Life (3)	Avg. Annual Accrual (4)	Avg. Remaining Life (5)	Future Annual Accruals (6)
1973	33,653.67	59.30	567.54	16.80	9,533.32
1976	86,435.09	58.07	1,488.38	18.57	27,644.26
1977	16,074.98	57.68	278.67	19.18	5,346.16
1983	698.85	55.53	12.58	23.03	289.86
1990	17,338.74	53.36	324.92	27.86	9,053.30
1991	4,778.88	53.08	90.03	28.58	2,573.14
1995	146,523.95	52.02	2,816.93	31.52	88,776.92
1996	9,645.75	51.77	186.34	32.27	6,012.19
1997	30,869.83	51.52	599.17	33.02	19,785.14
1998	2,950.00	51.28	57.53	33.78	1,943.31
1999	117,107.53	51.05	2,294.05	34.55	79,255.65
2004	48,459.35	49.95	970.09	38.45	37,303.34
2007	285,098.91	49.33	5,779.12	40.83	235,976.35
2008	6,416.87	49.13	130.62	41.63	5,437.20
2009	85,522.31	48.91	1,748.41	42.41	74,157.67
2010	118,177.89	48.70	2,426.80	43.20	104,830.48
2011	224,276.53	48.47	4,627.23	43.97	203,453.98
2012	14,628,877.83	48.22	303,365.10	44.72	13,567,099.99
2013	1,120,368.23	47.94	23,369.90	45.44	1,061,943.49
2014	4,801,227.27	47.59	100,887.20	46.09	4,649,896.47
2015	7,538,920.71	47.05	160,238.99	46.55	7,458,801.22

CERC
Electric Division
390.00 Structures & Improvements - General

Original Cost Of Utility Plant In Service
And Development Of Composite Remaining Life as of December 31, 2015
Based Upon A Composite of BG/ELG Procedure Plus Rem. Life Technique
Using December 31, 2015 Plant In Service And 1/2 of Future Year Additions

ELG Vintages - **1900** *And Subsequent*

Average Service Life: 55 *Survivor Curve:* R3

Year (1)	Original Cost (2)	Avg. Service Life (3)	Avg. Annual Accrual (4)	Avg. Remaining Life (5)	Future Annual Accruals (6)
Total BG	0.00	0.00	0.00	0.00	0.00
Total ELG	29,323,423.17	47.89	612,259.59	45.16	27,649,113.42
Total ALL	29,323,423.17	47.89	612,259.59	45.16	27,649,113.42
Less F.Y.	0.00				
12/31/2015	29,323,423.17				

CERC
Electric Division
392.00 Transportation Equipment

Original Cost Of Utility Plant In Service
And Development Of Composite Remaining Life as of December 31, 2015
Based Upon A Composite of BG/ELG Procedure Plus Rem. Life Technique
Using December 31, 2015 Plant In Service And 1/2 of Future Year Additions

ELG Vintages - 1900 And Subsequent

Average Service Life: 8 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)
1981	0.16	0.00	0.00	0.00	0.00
1984	31.99	0.00	0.00	0.00	0.00
1987	3,655.64	0.00	0.00	0.00	0.00
1993	964.58	0.00	0.00	0.00	0.00
1994	7,595.80	0.00	0.00	0.00	0.00
1995	2,430.48	0.00	0.00	0.00	0.00
1997	5,022.00	0.00	0.00	0.00	0.00
1999	66,949.32	0.00	0.00	0.00	0.00
2000	52,384.10	16.00	3,274.01	0.50	1,637.00
2001	197,283.26	15.08	13,080.95	0.58	7,609.51
2003	64,944.22	13.64	4,760.09	1.14	5,443.13
2004	437,679.88	12.90	33,919.91	1.40	47,600.89
2005	1,068,072.80	12.16	87,805.73	1.66	146,112.65
2006	910,491.68	11.43	79,624.84	1.93	154,055.71
2007	1,306,772.95	10.72	121,864.57	2.22	270,924.12
2008	2,783,714.52	10.04	277,356.47	2.54	703,540.96
2009	2,542,270.93	9.38	270,944.33	2.88	781,132.81
2010	3,577,855.32	8.77	407,900.84	3.27	1,334,400.71
2011	4,643,156.74	8.21	565,401.77	3.71	2,098,848.78
2012	5,520,720.75	7.72	715,399.84	4.22	3,016,821.30
2013	3,339,093.78	7.30	457,515.27	4.80	2,195,305.60
2014	3,074,980.82	6.97	441,288.31	5.47	2,413,048.35
2015	5,377,709.87	6.74	798,169.76	6.24	4,978,624.99

CERC
Electric Division
392.00 Transportation Equipment

Original Cost Of Utility Plant In Service
And Development Of Composite Remaining Life as of December 31, 2015
Based Upon A Composite of BG/ELG Procedure Plus Rem. Life Technique
Using December 31, 2015 Plant In Service And 1/2 of Future Year Additions

ELG Vintages - **1900** *And Subsequent*

Average Service Life: ***8*** *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)
Total BG	0.00	0.00	0.00	0.00	0.00
Total ELG	34,983,781.59	8.18	4,278,306.69	4.24	18,155,106.51
Total ALL	34,983,781.59	8.18	4,278,306.69	4.24	18,155,106.51
Less F.Y.	0.00				
12/31/2015	34,983,781.59				

GAS UTILITIES DOCKET NO. 10567

STATEMENT OF INTENT OF CENTERPOINT ENERGY RESOURCES CORP., D/B/A CENTERPOINT ENERGY ENTEX AND CENTERPOINT ENERGY TEXAS GAS TO INCREASE RATES IN THE TEXAS GULF DIVISION	**§ § § § § §**	**BEFORE THE RAILROAD COMMISSION OF TEXAS**

DIRECT TESTIMONY OF DAVID J. GARRETT

Workpapers (Provided on CD)