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Issue: Depreciation
Witness: Donald S. Roff
Type of Exhibit: Direct Testimony
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Case No.

Before the Public Service Commission
of the State of Missouri

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DIRECT TESTIMONY OF
DONALD S. ROFF
THE EMPIRE DISTRICT ELECTRIC COMPANY
BEFORE THE
MISSOURI PUBLIC SERVICE COMMISSION
CASE NO.

Q. PLEASE STATE YOUR NAME, TITLE, BUSINESS AFFILIATION AND ADDRESS.

A. My name is Donald S. Roff and I am a Director with the public accounting firm of Deloitte & Touche LLP ("Deloitte"). My business address is JP Morgan Chase Tower, 2200 Ross Avenue, Suite 1600, Dallas, Texas 75201-6778.

Q. WHAT ARE YOUR QUALIFICATIONS AND EXPERIENCE?

A. My qualifications and experience are described on Schedule DSR-1.

Q. HAVE YOU EVER TESTIFIED BEFORE THIS OR ANY OTHER REGULATORY BODY?

A. Yes. A listing of my regulatory appearances is contained on Schedule DSR-2.

1. **PURPOSE**

Q. WHAT IS THE PURPOSE OF YOUR TESTIMONY?

A. I have been asked by The Empire District Electric Company ("Empire" or "the Company") to present to The Missouri Public Service Commission ("Commission") the results of a depreciation study that I conducted as of December 31, 2003. I have also been asked to provide a discussion of the basics of depreciation principles and practices as applies to a regulated entity.

Q. HAVE YOU PREPARED ANY ADDITIONAL SCHEDULES?

A. Yes, Schedule DSR-3 is the formal report of my depreciation study. The depreciation study was conducted to fulfill the requirements of generally accepted accounting principles, as well as following the depreciation definitions of the Federal Energy Regulatory Commission ("FERC") Uniform System of Accounts ("USOA"). The report presents a summary of the results and recommendations, a description of the study approach and process, some fundamental depreciation definitions and a Schedule of recommended depreciation rates. Schedule DSR-4 presents a comparison of depreciation rates of other utilities and will be addressed later in my testimony.

Q. WERE THESE SCHEDULES PREPARED BY YOU, OR UNDER YOUR DIRECTION AND SUPERVISION?

A. Yes.

2. SUMMARY OF RESULTS

Q. WHAT ARE THE RESULTS OF YOUR DEPRECIATION STUDY?

A. As shown on Schedule 1 of Schedule DSR-3 and summarized by function, my study results in the following comparison of depreciation rates:

Function	Existing Rate (%)	Recommended Rate (%)
Steam Production	1.85	6.18
Hydraulic Production	1.62	3.27
Other Production	2.47	3.62
Transmission Plant	1.88	2.44
Distribution Plant	2.60	5.65
General Plant	6.90	4.48
Total Electric Plant	2.53	4.72

As shown on Schedule 1 of Schedule DSR-3, application of my recommended depreciation rates to the December 31, 2003, depreciable balances results in an increase in annual depreciation expense of about $25.6 million.

Q. WHAT FACTORS ARE DRIVING THIS INCREASE IN ANNUAL DEPRECIATION EXPENSE?

A. There are three primary elements which account for the substantial increase in annual depreciation expense indicated by my study. The first element, and most significant, is the effect on annual depreciation expense of the relatively low existing depreciation rates. The second element is the retirement dates used to calculate the depreciation rates for Production Plant coupled with new investment. The third element is the effect of negative net salvage. Each of these elements will be addressed separately in later sections of my testimony.

Q. WHAT ARE THE RESULTS OF YOUR DEPRECIATION STUDY FOR PRODUCTION PLANT?

A. For Steam Production Plant, there is an increase in the accrual rate from the existing depreciation rate of 1.85% to the recommended depreciation rate of 6.18%. The increase is primarily due to the use of retirement dates consistent with current Company plans, the effect of net salvage, and the effect of book reserve position. For Hydraulic Production Plant, the composite depreciation rate increased from 1.62% to 3.27%. For Other Production Plant, there is an increase in the depreciation rate from the existing rate of 2.47% to the recommended depreciation rate of 3.62%.

This is due primarily to estimated life spans and reserve position. The net dollar impact of the change in depreciation rate is an increase in annual depreciation expense of approximately $12.0 million.

Q. WHAT ARE THE RESULTS OF YOUR DEPRECIATION STUDY FOR TRANSMISSION PLANT?

A. For the Transmission Plant function, the depreciation rate increases from 1.88% to 2.44%. The composite average service life increases from 55.2 years to 56.5 years. Net salvage decreases from 0% to negative 37% and is the primary reason for the depreciation expense increase. The net dollar impact of the change in depreciation rate is an increase in annual depreciation expense of approximately $904 thousand.

Q. WHAT ARE THE RESULTS OF YOUR DEPRECIATION STUDY FOR DISTRIBUTION PLANT?

A. For the Distribution Plant function, the depreciation rate increases from 2.60% to 5.65%. The composite average service life increases from 39.9 years to 45.1 years. Net salvage decreases from 0% to negative 118%. A portion of the rate increase is attributable to the reserve position. The net dollar impact of the change in rate is an increase in annual depreciation expense of approximately $13.9 million.

Q. WHAT ARE THE RESULTS OF YOUR DEPRECIATION STUDY FOR GENERAL PLANT?

A. For the General Plant function, the depreciation rate decreases from 6.90% to 4.48%. The composite average service life increases from 18.2 years to 21.7 years. Net salvage changes from 0% to 4%. A portion of the rate decrease is attributable to the reserve position. The net dollar impact of the change in rate is a decrease in annual depreciation expense of approximately $1.2 million.

3. <u>**DEPRECIATION RATE COMPARISONS**</u>

Q. HAVE YOU MADE ANY COMPARISONS OF DEPRECIATION RATES WITH OTHER COMPANIES WHICH SUPPORT YOUR RESULTS?

A. Yes. While it is not my general practice to make comparisons with other companies due to the variety of factors which affect mortality characteristics and related depreciation rates, I have made a comparison of depreciation rates to demonstrate how low the existing composite depreciation rate of Empire appears to be.

Q. WHAT TYPES OF FACTORS AFFECT MORTALITY CHARACTERISTICS AND DEPRECIATION RATES?

A. These factors include, but are not limited to, capitalization policy, growth, location, construction standards, retirement reporting, pricing conventions, market circumstances, regulatory actions, field conditions, cause of retirement and accounting practices.

Q. WHAT ARE MORTALITY CHARACTERISTICS?

A. Mortality characteristics are the basic parameters necessary to calculate depreciation rates. They encompass average service life, retirement dispersion (the various ages at which assets within a group retire) defined by Iowa type curves or interim activity ratios, and net salvage allowance. Interim activity ratios encompass interim retirement ratios and interim addition ratios. Net salvage is the difference between salvage and cost of removal. If cost of removal exceeds salvage, negative net salvage occurs.

Q. WHAT DOES YOUR COMPARISON REVEAL?

A. I have included Schedule DSR-4 to illustrate the range of depreciation rates used by other Companies. My selection of Companies was based upon those utilities generally surrounding Joplin and Missouri, as well as utilities of reasonably the same size. This Schedule shows that only two Companies out of the sample of twenty-six (26) had a composite depreciation rate within 25 basis points of Empire's existing computed composite depreciation rate of 2.53%. I have conducted no extensive evaluation of the factors influencing any particular company composite depreciation rate. The two conclusions that I can reasonably reach are: 1.) a composite depreciation rate of at least 3.00% seems to be an adequate average composite depreciation rate for an electric utility and 2.) Empire's existing composite depreciation rate(s) is dramatically below this aggregate average. I will point out that my recommended composite depreciation rate is dramatically above this "minimum" rate.

4. DEPRECIATION CONCEPTS

Q. WHAT IS DEPRECIATION?

A. The most widely recognized accounting definition of depreciation is that of the American Institute of Certified Public Accountants, which states:

> Depreciation accounting is a system of accounting which aims to distribute the 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.[1]

Q. WHAT IS THE SIGNIFICANCE OF THIS DEFINITION?

A. This definition of depreciation accounting forms the accounting framework under which my depreciation study was conducted. Several aspects of this definition are particularly significant. Salvage (net salvage) is to be recognized. The allocation of costs is over the useful life of the assets. Useful life must be estimated. Grouping of assets is permissible. Depreciation accounting is not a valuation process. And the cost allocation must be both systematic and rational.

Q. PLEASE EXPLAIN THE IMPORTANCE OF THE TERMS "SYSTEMATIC AND RATIONAL".

A. Systematic implies the use of a formula. The formula used for calculating the recommended depreciation rates is shown on page 13 of Schedule DSR-3. Rational means that the pattern of depreciation, in this case, the

[1] Accounting Research Bulletin No. 43, Chapter 9, Paragraph 5 (June 1953).

depreciation rate itself, must match either the pattern of revenues produced by the asset, or match the consumption of the asset. Since revenues are determined through regulation (versus produced by the asset), and for this study, revenues are projected to continue to be determined through regulation, asset consumption is directly measured and reflected in the calculation of depreciation rates. This measurement of asset consumption is accomplished by conducting a depreciation study.

Q. ARE THERE OTHER DEFINITIONS OF DEPRECIATION?

A. Yes. The FERC USOA provides a series of definitions related to depreciation as shown on page 3 of Schedule DSR-3. These definitions of depreciation make reference to asset consumption, and therefore relate very well to the accounting framework for depreciation. These definitions form the regulatory framework under which my depreciation study was conducted. It is my understanding that the Commission has adopted the FERC USOA.[2]

Q. WHY IS THIS CITING SIGNIFICANT?

A. This reference is significant because of the importance of General Instruction Number 11 of the USOA:

"*Accounting to be on Accrual Basis*, A. The utility is required to keep its accounts on the accrual basis. This requires the inclusion in its accounts of all known transactions of appreciable amount which affect the accounts. If bills covering such transactions have not been received or

[2] 4 CSR 240-20.030.

rendered, the amounts shall be estimated and appropriate adjustments made when the bills are received. B. When payments are made in advance for items such as insurance, rent, taxes or interest the amount applicable to future periods shall be charged to account 165, Prepayments, and spread over the periods to which applicable by credits to account 165 and charges to the accounts appropriate for the expenditure."[3]

Thus the Company is required to maintain its books on an accrual basis. This requirement has particular significance to depreciation accounting and the inclusion of net salvage in the depreciation rate formula. Accrual accounting embodies the accounting principle of matching, which is the correlation between revenues and expenses. With respect to depreciation expense, we are concerned with the allocation of total cost over time.

Q. DO YOU HAVE ANY AUTHORITATIVE SOURCE THAT ADDRESSES THIS TOPIC?

A. Yes. The following quotation directly addresses this topic:

> Under presently accepted concepts, the amount of depreciation to be accrued over the life of an asset is its original cost less net salvage. Net salvage, as the name implies, is the difference between the gross salvage that will be obtained when the asset is disposed of and the cost of removing it. Positive net salvage occurs when gross salvage exceeds cost of removal, and negative net salvage occurs when cost of removal exceeds gross salvage. Thus the intent of the present concept is to allocate the net cost of an asset to annual accounting periods, making due allowance for the net salvage, positive or negative, that will be obtained when the asset is retired. This concept carries with it the thought that ownership of property entails the responsibility for its ultimate abandonment or removal. Hence if current users of the property benefit from its use, they should pay their pro rata share of the costs involved in the abandonment or removal of the property.

[3] 18 CFR Part 101.

> This treatment of salvage is in harmony with generally accepted accounting practices and tends to remove from the income statement fluctuations caused by erratic, although necessary, abandonment and uneconomical removal operations. It also has the advantage that current consumers pay a fair share, even though estimated, of costs associated with the property devoted to their service.[4]

This quotation addresses several key accounting and ratemaking issues. First and foremost, net salvage is an appropriate component of depreciation. Second, inclusion of net salvage into depreciation results in a fair and equitable allocation of cost. Third, from a ratemaking perspective, inclusion of net salvage in depreciation expense fulfills the regulatory precept of having customers pay their fair share of costs over the life of the property devoted to their service. By properly including net salvage, the potential for intergenerational cross subsidy is eliminated. As a matter of sound public policy, there is no reason to impose the costs of net salvage on future electric customers. This produces an economically inefficient allocation of resources across time to the detriment of all customers. So such treatment is both good accounting and good ratemaking. The USOA instructions clearly intended cost of removal and salvage to be components of depreciation as they must be charged to Account 108, Accumulated Provision for Depreciation.[5]

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[4] _Public Utility Depreciation Practices_, NARUC, 1968 Edition, page 24.

[5] 4 CSR 240-20.030, Paragraph 3(H). Charge original cost less net salvage to account 108., when implementing the provisions of Part 101 Electric Plant Instructions 10.F. and paragraph 15.060.10.F. The book cost less net salvage of depreciable electric plant retired shall be charged in its entirety to account108. Accumulated Provision for Depreciation of

5. <u>NET SALVAGE CONCEPTS</u>

Q. WHAT IS NET SALVAGE?

A. Net salvage is the difference between salvage and cost of removal. If cost of removal exceeds salvage, negative net salvage occurs.

Q. WHY IS NET SALVAGE SIGNIFICANT TO THIS PROCEEDING?

A. Net salvage is significant to this proceeding because, in my view, it has been improperly recognized in the past. Thus the existing depreciation rates are understated because of how net salvage has been treated by this Commission in prior proceedings.

Q. YOU HAVE INDICATED THAT YOU BELIEVE THE APPROACH TAKEN BY THIS COMMISSION HAS BEEN INCORRECT WITH HOW IT HAS RECOGNIZED NET SALVAGE FOR EMPIRE IN THE PAST. CAN YOU ELABORATE ON THIS VIEW?

A. Yes. We first must start with an understanding of regulatory accounting principles and the regulatory rules that must be followed by Empire with respect to depreciation. Empire is required to follow the USOA of the FERC. Empire is required to practice accrual accounting. Under the USOA, Empire is required, upon retirement of an asset to credit plant in service and debit accumulated depreciation. If salvage is received, Empire is required to credit accumulated depreciation. If cost of removal is incurred, Empire is required to debit accumulated depreciation. The clear intent of these requirements is to recognize

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Electric Plant in Service (Account 110, Accumulated Provision for Depreciation and Amortization of Electric Utility Plant, in the case of Nonmajor utilities).

net salvage (salvage less cost of removal) in annual depreciation expense. Depreciation, within the USOA, is defined as loss in service value, and service value is defined as the difference between original cost and net salvage value. Thus net salvage is supposed to be included as a component of depreciation. Second, the recent requirement for Empire by this Commission to treat net salvage on a cash basis is absolutely in violation of its own rules and requirements, first with respect to being inconsistent with accrual accounting and second with respect to not including a net salvage component with the depreciation rate. Third, such a treatment effectively defers the recovery of such costs from the generation of customers that benefited from the use of the retired assets to the last generation of customers that happen to being utilizing the asset at the time of its retirement. Deferral is improper and unfair. Common sense would reveal that any deferral is improper, and the unfairness rests with charging the wrong generation of customers. Staff's recommendation to recognize net salvage costs only on a cash basis is simply a cross subsidy of current customers who benefit from these assets at the expense of future customers who will need to pay these costs for retiring plant at a point in time when the plant is no longer used and useful. Fourth, Empire is continually retiring and removing plant. As such, the proper accrual for net salvage should be over the life of the asset, not at the end of the life of the asset. The effect of accrual accounting is to allocate a portion of the asset's total cost to each accounting period. As discussed above, the total cost includes net salvage in the depreciation base. The effect of cash accounting is not such an equitable cost allocation. Rather, Staff's methodology will lead to more volatile depreciation rates as salvage/removal related cash flows will spike whenever a major plant or asset is retired. Fifth, the use of a cash basis for net salvage is a practice of exception, whereas accrual accounting has widespread usage and authorization. I know of only three jurisdictions that have accepted a cash basis approach for net salvage compared with over 45 jurisdictions that utilize accrual accounting.

Q. **HOW DOES YOUR DEPRECIATION STUDY RECOGNIZE ASSET CONSUMPTION?**

A. Asset consumption in my depreciation study is recognized in two different ways, depending upon the type of asset. For mass property (Transmission, Distribution and General Plant), asset consumption (retirement dispersion) is defined by the use of Iowa type curves and related average service lives. For life span property (power plants), asset consumption is recognized through the use of interim addition and interim retirement ratios, which provide a form of retirement dispersion, by estimated capital replacement amounts over the life of the facility.

Q. **WHAT IS RETIREMENT DISPERSION?**

A. Retirement dispersion merely recognizes that groups of assets have individual assets of different lives, i.e., each asset retires at differing ages. Retirement dispersion is the scattering of retirements by age around the average service life for each group of assets.

6. **DEPRECIATION STUDY CONCEPTS**

Q. PLEASE DESCRIBE HOW THESE ELEMENTS WERE DETERMINED AND UTILIZED IN YOUR DEPRECIATION STUDY.

A. A depreciation study consists of four distinct, yet related phases - data collection, analysis, evaluation and rate calculation. Data collection refers to the gathering of historical accounting information for use in the other phases. Company personnel were responsible for this effort. Analysis refers to the statistical processing of the data collected in the first phase. There are two separate analysis procedures, one for life, and one for salvage and cost of removal, and were conducted by Deloitte personnel. The evaluation phase incorporates the information developed in the data collection and analysis phases to determine the applicability of the historical relationships developed in these phases to the future, and was conducted jointly by Deloitte and Company personnel. The rate calculation phase merely utilizes the parameters developed in the other phases in the computation of the recommended depreciation rates, and was accomplished by Deloitte personnel.

7. **PRODUCTION PLANT LIFE ANALYSIS**

Q. PLEASE DISCUSS THE LIFE ANALYSIS PROCESS UTILIZED FOR PRODUCTION PLANT.

A. There were two separate life analyses performed for Production Plant – the first was based upon historical accounting activity, performed by Deloitte personnel, and the second was a forecast of projected investment activity, also performed by Deloitte personnel under my direction and supervision.

Q. PLEASE DESCRIBE THE HISTORICAL ANALYSIS PERFORMED FOR PRODUCTION PLANT.

A. The historical analysis performed for Production Plant consisted of the development of a worksheet of additions, retirements and plant balances for each plant site (e.g., Riverton) and primary account (e.g., Account 312 – Boiler Plant Equipment). Original additions were identified separate from interim additions and interim retirements were identified separate from terminal retirements.

Q. WHAT ARE ORIGINAL ADDITIONS, INTERIM ADDITIONS, INTERIM RETIREMENTS AND TERMINAL RETIREMENTS?

A. Original additions refer to the initial construction cost of a plant or unit. Interim additions refer to replacements of initial equipment or the addition of new equipment. Interim retirements refer to retirements of components throughout the life of a plant or unit. Terminal retirements refer to the final retirement of a plant or unit.

Q. WHY IS THIS DISTINCTION IMPORTANT?

A. One purpose of this analysis is to determine interim activity ratios (both interim addition and interim retirement ratios) for use in the second life analysis (i.e., forecast of projected investment activity) mentioned above. An interim retirement ratio was determined by dividing the sum of interim retirements by the sum of beginning plant or unit balances for each account. When expressed as a depreciation rate, this interim retirement ratio is the depreciation rate that would accrue the level of cost related to interim retirements over the life of the facility. An interim addition ratio was also determined by dividing the sum of the interim additions by the sum of the interim retirements. Thus this ratio is the number of dollars of new capital for each dollar of interim retirement. These ratios are important because they provide a measure of capital cost that must be included in the depreciable base of each asset category in order to develop an appropriate depreciation rate. Thus there is a relationship between the life used for depreciation purposes and the investment necessary to achieve that life.

Q. FOR PRODUCTION PLANT, WHAT LIFE ARE YOU REFERRING TO?

A. Utility companies Production Plant facilities are unique in that all assets tend to retire at one point in time, in this case the estimated retirement date. Company engineers provided an estimated retirement date for each Production unit. This retirement date effectively defines the period over which depreciation is to be accomplished. These estimated retirement dates assume normal maintenance and routine capital replacements, but do not include major investments that may be required for environmental regulations.

Q. HOW WERE THE RETIREMENT DATES AND INTERIM ACTIVITY RATIOS UTILIZED IN YOUR DEPRECIATION STUDY?

A. For each primary account, a forecast worksheet was prepared showing the existing investment and accumulated depreciation, and a projection of interim retirements, as well as the terminal retirement amount. These amounts were utilized in the development of a depreciation rate that provides for full recovery of these surviving and retiring amounts over the life of the facility. Interim and terminal net salvage amounts were also incorporated and will be discussed later in my testimony.

Q. WHY SHOULD INTERIM ADDITIONS AND RETIREMENTS BE INCLUDED IN THE CALCULATION OF DEPRECIATION RATES FOR PRODUCTION PLANT?

A. Interim retirements occur over the life of a production unit as capital items are replaced or retired. This is clearly evident from a review of historical retirement experience. Recognition of the effect of these interim retirements in the depreciation rate calculation is necessary to ensure that these interim retirements are fully depreciated by the time they occur. Similarly, interim additions occur over the life of a production unit as items are replaced or new items are installed. This activity is also clearly evident from a review of historical investment experience. While I believe that recognition of the effect of these interim additions in the depreciation rate calculation is highly preferable, such inclusion would create an even greater increase in annual depreciation expense. Therefore, in an effort to limit the annual depreciation expense change in this proceeding, I have not included interim additions in the depreciation rate calculation.

Q. WHAT INTERIM ACTIVITY RATIOS WERE DEVELOPED IN YOUR DEPRECIATION STUDY?

A. The interim addition ratios and interim retirement ratios developed in my depreciation study are shown in Columns 6 and 7, on page 14 of Schedule 2 of Schedule DSR-3.

Q. WERE THESE RATIOS USED IN DEVELOPING YOUR RECOMMENDED DEPRECIATION RATES?

A. Yes. The interim retirement ratios were utilized. I have not included interim additions in my calculations.

8. PRODUCTION PLANT NET SALVAGE

Q. PLEASE DISCUSS HOW NET SALVAGE WAS ADDRESSED IN YOUR STUDY OF PRODUCTION PLANT.

A. Net salvage occurs in two forms for Production Plant: interim net salvage and terminal net salvage. Interim net salvage refers to the salvage and removal costs associated with interim retirements. Terminal net salvage refers to the ultimate dismantlement of plant facilities, which includes both salvage and removal cost.

Q. HOW WERE THE INTERIM NET SALVAGE FACTORS DETERMINED?

A. Interim net salvage factors were determined by an analysis of historical retirement, salvage and cost of removal activity. The interim net salvage factor was calculated by subtracting cost of removal from salvage and dividing by retirements. An interim net salvage factor was determined for each primary asset account and is shown in Column 8 of Schedule 2 of Schedule DSR-3.

Q. HOW WERE TERMINAL NET SALVAGE FACTORS DETERMINED?

A. The Company has limited experience with the dismantlement of power plants. Reliance was placed on the dismantlement estimates of other utilities. Recognition was given to the type of facility and its relative capacity. We have a collection of the dismantlement estimates of other utilities. This collection contains the Company, plant/unit, capacity, study date, cost estimate and dismantlement cost per unit of capacity ($/kW). In general, the larger the facility, the lower the unit cost to dismantle. A figure of $50/kW was utilized in my study to estimate the dismantlement cost for Empire's Steam Production units. A figure of $13/kW was used for the Other Production units, with the exception of the State Line Combined Cycle Unit. A figure of $20/kW was utilized for it. As the terminal retirement dates approach, adjustments can be made, if necessary.

Q. HOW DID YOU UTILIZE THIS FIGURE TO DETERMINE THE TERMINAL NET SALVAGE FACTOR?

A. This unit cost per kilowatt was applied to the capacity of each of Empire's units to arrive at an estimate of the current cost to dismantle these units. This amount was divided by the plant balances to determine the terminal net salvage percentage, which is shown in Column 9 of Schedule 2 of Schedule DSR-3.

Q. DID YOU ESCALATE THE CURRENT DISMANTLEMENT COST?

A. No, although I believe that such escalation should be included in the depreciation rate calculation. This is true for two reasons. The first reason is to develop an estimate of the amount that will actually be spent at the time of dismantlement. The second reason is that the Company practices accrual accounting and this is the correct amount to be accrued over the life of the generating unit. Thus my preferred approach is consistent with accounting principles. There is only one reason why I did not include an escalated net salvage figure in my study recommendations, namely, to mitigate the depreciation expense increase developed in my study

9. <u>NON-PRODUCTION PLANT LIFE ANALYSIS</u>

Q. PLEASE DISCUSS THE LIFE ANALYSIS PROCESS UTILIZED FOR TRANSMISSION, DISTRIBUTION AND GENERAL PLANT.

A. Retirement experience was collected basically from inception through 2003 updating the historical data files used for the prior depreciation study. These data were arrayed into a format suitable for life analysis. Life tables were developed and Iowa type curves were fitted to the historical summaries.

Q. PLEASE DESCRIBE THE LIFE ANALYSIS PHASE OF YOUR DEPRECIATION STUDY FOR TRANSMISSION, DISTRIBUTION AND GENERAL PLANT.

A. Life analysis measures history and results in the determination of an estimate of average service life for each asset category. The actual analysis involves "converting" historical accounting data into mortality tables. In very simple terms, one is looking at the portion surviving at each age for every asset category.

Q. HOW IS THIS "CONVERSION" ACCOMPLISHED?

A. Because the age of retirement is known, as well as the age of the surviving balances, retirements of like ages are related to the asset amounts available to be retired at the same age. These retirement ratios are then related to the portion surviving at the beginning of each successive age, thus building what is known as the observed life table. When converted to a graphical format, this plot becomes the observed survivor curve.

Q. WHAT IS AN OBSERVED SURVIVOR CURVE?

A. An observed survivor curve is a plot, or graph of the recorded retirement and survivor history as a function of age. This observed curve is essentially a graphical representation of history.

Q. HOW IS THE OBSERVED CURVE USEFUL?

A. The observed curve is useful for two reasons. The area underneath the survivor curve is, by definition, equal to average service life. First, if one could find a matching empirical curve, such as the Iowa-type curves, an estimate of average service life can be made. Second, this estimate then becomes the starting point in the evaluation phase of a depreciation study.

Q. WHY DO YOU SAY THAT THIS OBSERVED CURVE IS ONLY THE STARTING POINT IN THE EVALUATION PROCESS?

A. The observed curve is only the starting point in the evaluation process because it only represents a pictorial view of history. In order to develop appropriate average service lives for depreciation rate calculation purposes, this history must be understood, and combined with expectations for the future.

Q. HOW IS THE SURVIVOR CURVE USED IN YOUR STUDY?

A. The observed survivor curve derived from the Company history is matched to generalized known curves, such as the Iowa-type curves to provide an estimate of average service life.

Q. WHAT ARE IOWA-TYPE CURVES?

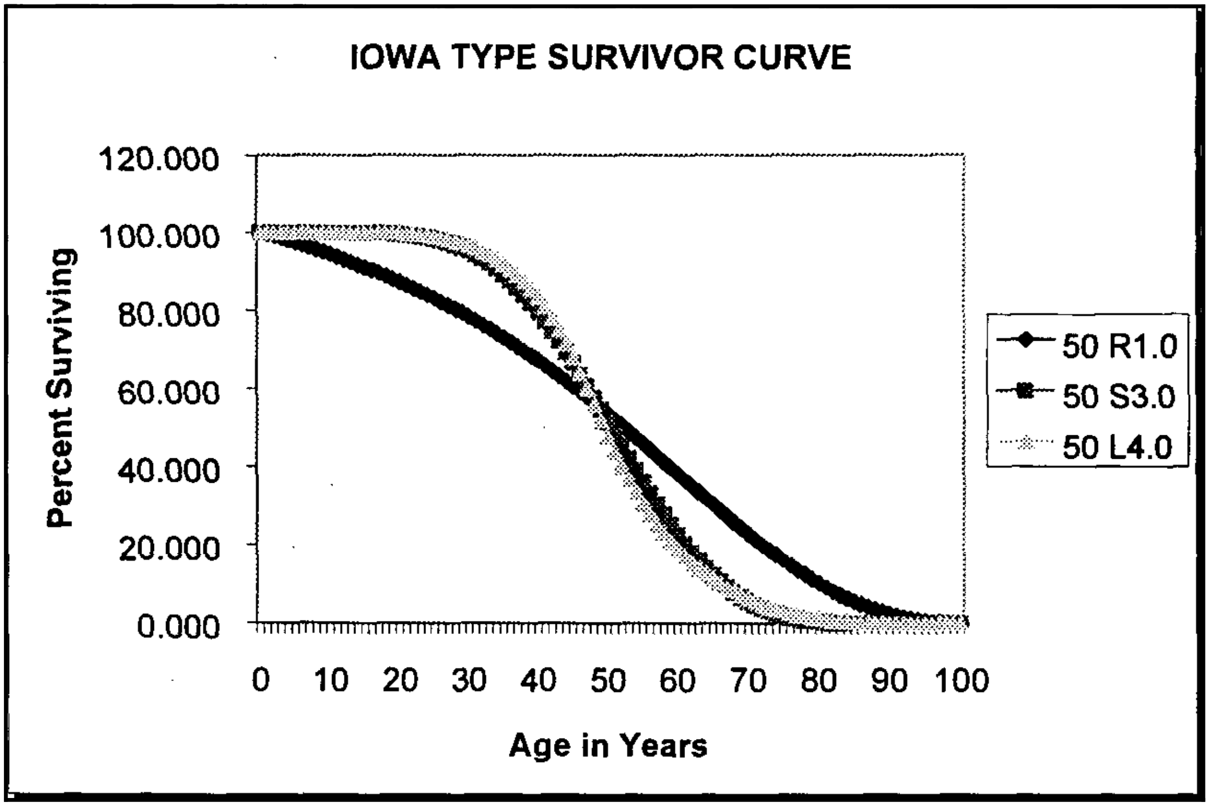
A. The Iowa-type curves were devised empirically over 60 years ago by the Engineering Research Institute at what is now Iowa State University to provide a set of standard definitions of retirement dispersion. Retirement dispersion merely recognizes that groups of assets have individual assets of different lives, i.e., each asset retires at differing ages. Retirement dispersion is the scattering of retirements by age around the average service life for each group of assets. Standard dispersion patterns are useful because they make calculations of the remaining life of existing property possible and allow life characteristics to be compared.

The Engineering Research Institute collected dated retirement information on many types of industrial and utility property and devised empirical curves that matched the range of patterns found. A total of 18 curves were defined. There were six left-skewed, seven symmetrical and five right-skewed curves, varying from wide to narrow dispersion patterns. The

Iowa-curve naming convention allows the analyst to relate easily to the patterns. The left-skewed curves are known as the "L series", the symmetrical as the "S series" and the right-skewed as the "R series." A number identifies the range of dispersion. A low number represents a wide pattern and a high number a narrow pattern. The combination of one letter and one number defines a unique dispersion pattern.

Q. HOW DO IOWA-TYPE CURVES PROVIDE AN ESTIMATE OF AVERAGE SERVICE LIFE?

A. Iowa-type curves and average service lives are inseparable. That is, the shape of the survivor curve defines the average service life. As mentioned above, the area underneath the survivor curve is equal to average service life. Thus the average service life cannot be described without also defining an Iowa-type curve, i.e., shape. An example is shown below:



Q. WHAT DOES THIS CHART ILLUSTRATE?

A. This chart illustrates that Iowa type survivor curves are composed of two elements, the curve shape and the average service life. Each of the above survivor curves (R1, S3 and L4) has the same average service life, in this case 50 years.

Q. HOW WERE THE IOWA CURVE SHAPES AND AVERAGE SERVICE LIFE SELECTIONS MADE?

A. Summaries of the individual asset category life analysis indications were prepared and discussed with Company personnel. Anomalies and trends were identified and engineering and operations input were requested where necessary. A single average service life and Iowa curve was selected for each asset category reflecting the combination of the historical results and the additional information obtained from the engineering, accounting and operations personnel. This process is a part of the evaluation phase of the depreciation study.

Q. WHAT IS THE EVALUATION PHASE OF A DEPRECIATION STUDY?

A. The evaluation phase of a depreciation study combines the results of historical analyses with information regarding the age of property retired, the age of property surviving, knowledge of the types of assets surviving and being retired, and Company experience and expectations, all coupled with the knowledge, experience and judgment of the depreciation analyst. The goal is to give recognition to these factors and their influence upon historical indications and the applicability of such historical indications to plant surviving into the future. Both Empire and Deloitte personnel participated in this process.

Q. WHAT TYPES OF INFORMATION ARE DISCERNED IN THIS PHASE OF THE DEPRECIATION STUDY?

A. Information discerned includes the specific types of equipment being retired and added, the relative age of property surviving and retiring and Company plans and expectations regarding the property being evaluated, as well as forces influencing the salvage obtainable and removal costs associated with retired assets.

Q. CAN YOU PROVIDE SPECIFIC EXAMPLES OF THE INFORMATION THAT WAS UTILIZED IN YOUR STUDY?

A. Yes. One example would be the impact of the transfer of the State Line facility in 2001. The recoding of this transaction had a significant impact on the salvage and cost of removal analysis for Other Production Plant

10. <u>NON-PRODUCTION PLANT NET SALVAGE</u>

Q. HOW WAS NET SALVAGE DETERMINED FOR TRANSMISSION, DISTRIBUTION AND GENERAL PLANT?

A. Historical retirement, salvage and cost of removal activity was collected and analyzed for the period 1989-2003 for each asset category. Both salvage and cost of removal were divided by retirements on an annual basis to develop salvage and cost of removal percentages. Shrinking and rolling band analyses were also conducted to illustrate any trends that might exist. A single net salvage percentage was developed for each asset category reflecting the history, trends and Company expectations.

Q. WHAT ARE SHRINKING AND ROLLING BAND ANALYSES?

A. These are two techniques to help discern trends in the historical data. A shrinking band begins with the full experience period and successively eliminates the oldest year's activity, thus illustrating trends as one moves through time. Rolling bands are useful because salvage, cost of removal and retirements are not always recorded in the same accounting period. Rolling band analysis combines activity for fixed periods, in the case of this study, three years. Three years was selected because virtually all salvage and cost of removal activity occurs within three years of the recording of the retirement. These three-year combined activities are then "rolled" forward one year at a time, and similarly aid in identifying trends as with the shrinking bands. Examples of rolling bands would be 1992-1994, 1993-1995, 1994-1996, etc.

Q. WERE THERE ANY TRENDS EVIDENT FROM THE DATA CONTAINED IN THE SALVAGE AND COST OF REMOVAL ANALYSYES?

A. In general, salvage is declining and cost of removal is increasing.

Q. WHY IS THIS THE CASE?

A. I believe that there are two reasons for this occurrence. First, both salvage and cost of removal are a function of the age of property retired. Younger property is more valuable as it can be reused. In general, we have seen longer lives for most of the mass assets contained in the Transmission and Distribution Plant functions. Older property retirements have less salvage value and cost more to remove relative to their original cost due to cost escalation over time. The second reason is there are just more environmental requirements that impact the level of cost of removal. This creates an additional cost not reflected in the existing depreciation rates.

11. THEORETICAL RESERVE CONCEPTS

Q. PLEASE EXPLAIN WHAT YOU MEAN WHEN YOU SAY THAT THE CHANGE IN ANNUAL DEPRECIATION EXPENSE IS DUE TO THE IMPACT OF RESERVE POSITION.

A. My study developed recommended depreciation rates utilizing the remaining life technique. A remaining life depreciation rate is actually a whole life depreciation rate plus an adjustment for the difference between a theoretical reserve and the actual book reserve. This is shown in the second formula shown on page 5 of Schedule DSR-3. When the theoretical reserve exceeds the book reserve, past depreciation accruals have been inadequate compared with those annual depreciation accruals projected by the new study mortality characteristics. For example, in the case of Distribution Plant, the theoretical reserve is approximately $106 million higher than the accumulated depreciation balance on the books at December 31, 2003. This suggests that past depreciation accruals have been inappropriate, and the use of revised mortality characteristics would produce a different level of annual depreciation expense. It is important to utilize the remaining life technique so that any "over" or "under" accruals are appropriately charged to the customer to maintain intergenerational equity. Past depreciation has been exactly what has been authorized by this Commission, although I would disagree with the methodology that has been approved.

12. <u>CONCLUSIONS</u>

Q. PLEASE SUMMARIZE YOUR TESTIMONY.

A. I recommend that Empire adopt the depreciation rates shown in Column 8 of Schedule 1 of Schedule DSR-3, and that this Commission approve their use. I base this recommendation on the fact that I have conducted a comprehensive depreciation study, giving appropriate recognition to historical experience, recent trends, Empire expectations, accounting principles, regulatory requirements and professional judgment. I have appropriately recognized net salvage, consistent with traditional depreciation accounting and the rules of this Commission. This study and underlying workpapers support my recommendations. My study results in a fair and reasonable level of depreciation expense, which will provide Empire with adequate capital recovery until such time as a new depreciation study indicates a need for change.

Q. DOES THIS COMPLETE YOUR TESTIMONY?

A. Yes.

Academic Background

Donald S. Roff graduated from Rensselaer Polytechnic Institute with a Bachelor of Science degree in Management Engineering in 1972.

Mr. Roff has also received specialized training in the area of depreciation from Western Michigan University's Institute of Technological Studies. This training involved three forty-hour seminars on depreciation entitled "Fundamentals of Depreciation", "Fundamentals of Service Life Forecasting" and "Making a Depreciation Study" and included such topics as accounting for depreciation, estimating service life, and estimating salvage and cost of removal.

Employment and Professional Experience

Following graduation, Mr. Roff was employed for eleven and one-half years by Gilbert Associates, Inc., as an engineer in the Management Consulting Division. In this capacity, he held positions of increasing responsibility related to the conduct and preparation of various capital recovery and valuation assignments.

In 1984, Mr. Roff was employed by Ernst & Whinney and was involved in several depreciation rate studies and utility consulting assignments.

In 1985, Mr. Roff joined Deloitte Haskins & Sells (DH&S), which, in 1989, merged with Touche Ross & Co. to form Deloitte & Touche. In 1995, Mr. Roff was appointed as a Director with Deloitte & Touche.

During his tenure with Gilbert Associates, Inc., Ernst & Whinney, DH&S and Deloitte & Touche, Mr. Roff has participated in or directed depreciation studies for electric, gas, water and steam heat utilities, pipelines, railroad and telecommunication companies in over 30 states, several Canadian provinces and Puerto Rico. This work requires an in-depth knowledge of depreciation accounting and regulatory principles, mortality analysis techniques and financial practices. At these firms, Mr. Roff has had varying degrees of responsibility for valuation studies, development of depreciation accrual rates, consultation on the unitization of property records, and other studies concerned with the inspection and appraisals of utility property, preparation of rate case testimony and support exhibits, data responses and rebuttal testimony, in addition to appearing as an expert witness.

Industry and Technical Affiliations

Mr. Roff is a registered Professional Engineer in Pennsylvania (by examination).

Mr. Roff is a member of the Society of Depreciation Professionals and a Certified Depreciation Professional, and a Technical Associate of the American Gas Association (A.G.A.) Depreciation Committee. He currently serves as the lead instructor for the A.G.A.'s Principles of Depreciation Course.

DONALD S. ROFF

TESTIMONY EXPERIENCE

CASE NO.	DATE	COMPANY	JURISDICTION	SUBJECT
Docket No. 93-3005	July 1993	Southwest Gas Corporation	Nevada	Gas Depreciation Rates
Docket No. 93-3025	July 1993	Southwest Gas Corporation	Nevada	Gas Depreciation Rates
Docket No. 12820	June 1994	Central Power and Light Company	Texas	Electric Depreciation Rates
Case No. U-10380	Dec 1994	Consumers Power Company	Michigan	Gas Depreciation Rates and Accounting
Cause No. 39938	April 1995	Indianapolis Power & Light Company	Indiana	Electric Depreciation Rates
Case No. U-10754	July 1995	Consumers Power Company	Michigan	Electric Depreciation Rates and Accounting
Docket No. 13369	Aug 1995	West Texas Utilities Company	Texas	Electric Depreciation Rates
Docket No. 95-02116	Sept 1995	Chattanooga Gas Company	Tennessee	Gas Depreciation Rates
Docket No. 95-715-G	Oct 1995	Piedmont Natural Gas Company	South Carolina	Gas Depreciation Rates
Docket No. 14965	Dec 1995	Central Power and Light Company	Texas	Electric Depreciation Rates
Cause No. 40395 (I)	Feb 1996	Wabash Valley Power Association, Inc.	Indiana	Electric Depreciation Rates
GUD NO. 8664	Oct 1996	Lone Star Pipeline Company	Texas	Gas Depreciation Rates
Docket No. 96-360-U	Nov 1996	Entergy Arkansas Inc.	Arkansas	Electric Depreciation Rates
Docket No. 16705	Nov 1996	Entergy Gulf States Inc.	Texas	Electric Depreciation Rates/Competitive Issue
Docket No. ER-97-394	Mar 1997	Missouri Public Service	Missouri	Electric Depreciation Rates/Competitive Issue
Docket No. U-22092	Mar 1997	Entergy Gulf States Inc.	Louisiana	Electric Depreciation Rates/Competitive Issue
Docket No. 97-00982	May 1997	Chattanooga Gas Company	Tennessee	Gas Depreciation Rates
Cause No. 40395 (II)	June 1997	Wabash Valley Power Association, Inc.	Indiana	Electric Depreciation Rates
Case No. U-11509	Sept 1997	Consumers Energy Company	Michigan	Gas Depreciation Rates and Accounting
Docket No. ER98-11	Sept 1997	Long Island Lighting Company	FERC	Electric Depreciation Rates
Docket No. 8390-U	Dec 1997	Atlanta Gas Light Company	Georgia	Gas Depreciation Rates and Accounting
Cause No. 41118	Mar 1998	Wabash Valley Power Association, Inc.	Indiana	Electric Depreciation Rates
Case No. U-11722	Oct 1998	Detroit Edison Company	Michigan	Electric Depreciation Rates
Docket No. 98-2035-03	Nov 1998	PacifiCorp	Utah	Electric Depreciation Rates
Docket No. 99-4006	April 1999	Nevada Power Company	Nevada	Electric Depreciation Rates
GUD Docket No. 9030	March 2000	Atmos Energy Corporation	Texas	Gas Depreciation Rates and Accounting
GUD Docket No. 9145	April 2000	TXU Gas Distribution	Texas	Gas Depreciation Rates
City of Tyler	Dec 2000	Reliant Energy Entex	Texas	Gas Depreciation Rates and Accounting
Docket No. U-24993	March 2001	Entergy Gulf States Inc.	Louisiana	Electric Depreciation Rates and Accounting
Docket Nos. GR01050328/GR0105029	May 2001	Public Service Electric & Gas	New Jersey	Gas Depreciation Rates and Accounting
Case No. U-12999	July 2001	Consumers Energy Company	Michigan	Gas Depreciation Rates and Accounting
Docket No. 01-10002	Oct 2001	Nevada Power Company	Nevada	Electric Depreciation Rates
Docket No. 14618-U	Nov 2001	Savannah Electric and Power Company	Georgia	Electric Depreciation Rates
Docket No. 01-11031	Dec 2001	Sierra Pacific Power Company	Nevada	Electric Depreciation Rates
Docket No. 010949-EL	Jan 2002	Gulf Power Company	Florida	Electric Depreciation Rates
Docket No. 14311-U	Jan 2002	Atlanta Gas Light Company	Georgia	Gas Depreciation Rates and Accounting
Docket No. UD-00-2	March 2002	Entergy New Orleans, Inc.	New Orleans	Electric Depreciation Accounting
Cause No. PUD200200166	May 2002	Reliant Energy Entex	Oklahoma	Gas Depreciation Rates and Accounting
Docket No. 01-243-U	June 2002	Reliant Energy Entex	Arkansas	Gas Depreciation Rates and Accounting
Docket No. 02-035-12	Oct 2002	PacifiCorp	Utah	Electric Depreciation Rates
Docket No. 20000-ER-2-192	Oct 2002	PacifiCorp	Wyoming	Electric Depreciation Rates
Docket No. UE-021271	Oct 2002	PacifiCorp	Washington	Electric Depreciation Rates
Docket No. UM-1064	Oct 2002	PacifiCorp	Oregon	Electric Depreciation Rates
Docket No. PAC-E-02-5	Oct 2002	PacifiCorp	Idaho	Electric Depreciation Rates
Docket No. 02-0391	Oct 2002	Hawaiian Electric Company, Inc.	Hawaii	Electric Depreciation Rates and Accounting
Docket No. 03-ATMG-1036-RTS	June 2003	Atmos Energy Corporation	Kansas	Gas Depreciation Rates and Accounting
Docket No. 02-0391	Aug 2003	Hawaiian Electric Company, Inc.	Hawaii	Electric Depreciation Rates and Accounting
Cause No. 42458	Sept 2003	Wabash Valley Power Association, Inc.	Indiana	Electric Depreciation Rates and Accounting
Docket No. 03-ATMG-1036-RTS	Nov 2003	Atmos Energy Corporation	Kansas	Gas Depreciation Rates and Accounting
Case No. 12999	Dec 2003	Consumers Energy Company	Michigan	Gas Depreciation Rates and Accounting
Case No. 12999	Feb 2004	Consumers Energy Company	Michigan	Gas Depreciation Rates and Accounting

The Empire District Electric Company

Book Depreciation Study
as of December 31, 2003

April 2004

Mr. Darryl Coit, Controller, Assistant Secretary and Assistant Treasurer
The Empire District Electric Company
602 Joplin Street
Joplin, Missouri 64802

Dear Mr. Coit:

In accordance with your request, we have conducted a book depreciation study of The Empire District Electric Company (Empire or the Company) property. The study recognized addition and retirement experience through December 31, 2003, and the comparisons presented are based on depreciable plant balances as of that date. The purpose of the study was to determine if the existing approved depreciation rates remain appropriate for the property and, if not, to recommend changes. Changes were found to be needed and are recommended.

A comparison of the recommended depreciation rates with the existing rates is shown below:

Function	Depreciation Rates	
	Existing	Recommended
	%	%
Steam Production Plant	1.85	6.18
Hydraulic Production Plant	1.62	3.27
Other Production Plant	2.47	3.62
Transmission Plant	1.88	2.44
Distribution Plant	2.60	5.65
General Plant	6.90	4.48
Composite total	2.53	4.72

The above summary is taken from Schedule 1, which compares the annual depreciation provisions for the existing and recommended rates. Based on the December 31, 2003 depreciable plant balances, the recommended depreciation rates would result in an annual increase in depreciation provision of $25,624,491, as shown in Column 8 of Schedule 1.

Schedules 2 and 3 show the mortality characteristics used to calculate the existing and recommended depreciation rates. Note that on Schedule 2, the mortality characteristics under the existing and recommended rates are different. Mortality characteristics under the recommended rates are used to calculate the depreciation expense applicable to a unit until the unit's projected retirement date. Under the existing mortality characteristics, depreciation expense is based on the retirement dispersion and the salvage activity in each account.

The recommended depreciation rates for Steam, Hydraulic and Other Production Plant are calculated in a manner different from that used for the existing rates. This difference is explained in more detail under the section of this report entitled "Calculation of Depreciation Rates." The existing depreciation rates are calculated on a whole-life basis using the Average Life Group (ALG) calculation procedure. The recommended depreciation rates for Transmission, Distribution and General Plant are calculated on a remaining-life basis using the Average Life Group (ALG) calculation procedure. The basis for the changes to the depreciation rates are discussed in Appendix A.

The depreciation rate increases for Steam, Hydraulic and Other Production Plant are attributable to the use of more reasonable retirement dates. The depreciation rate increase for Distribution Plant is due to increased cost of removal allowances (decreased net salvage). The depreciation rate increases for Transmission Plant and General Plant are primarily due to the level of new investment and the theoretical depreciation reserve. Overall, there were both increases and decreases in average service lives for Transmission, Distribution and General Plant accounts. Changes in net salvage also influenced the overall increase.

The following sections of this report describe the methods of analysis used and the bases for the conclusions reached. To assist the reader, we have also included, in Appendix B, a glossary of terms frequently used in depreciation accounting. We appreciate this opportunity to serve The Empire District Electric Company and would be pleased to meet with you to discuss further the matters presented in this report, if you desire.

Yours truly,

Deloitte & Touche LLP

PURPOSE OF DEPRECIATION ACCOUNTING

Book depreciation accounting is the procedure for recognizing in financial statements the fact that physical assets are consumed in the process of providing a service or a product. Generally accepted accounting principles require the recording of depreciation provisions to be systematic and rational. To accomplish this, depreciation expense should, to the extent possible, match either the consumption of the facilities or the revenues generated by the facilities. Such matching ensures that financial statements accurately reflect the results of operations and changes in financial position. The matching principle is often referred to as the "cause and effect" principle; thus, both the cause and the effect are required to be recognized for financial accounting purposes.

Since utility revenues are determined through regulation, asset consumption is not necessarily automatically reflected in revenues. Therefore, the consumption of utility assets must be measured directly by conducting a book depreciation study to determine their mortality characteristics. The term "mortality characteristics" encompasses generating unit retirement dates, average service lives, pattern (or variation) of retirements around average life defined by interim addition and retirement factors and by Iowa-type dispersion patterns, and net salvage factors (salvage less cost of removal).

The matching principle is also an essential element of basic regulatory philosophy that has become known as "intergenerational customer equity." Intergenerational equity means the costs are borne by the generation of customers that caused them to be incurred, not by some earlier or later generation. This matching is required to ensure that charges to customers reflect the actual costs of providing service.

DEPRECIATION DEFINITIONS

The electric utility Uniform System of Accounts of the Federal Energy Regulatory Commission (FERC) followed by the Company states that:

> *Depreciation*, as applied to depreciable utility plant, means the loss in service value not restored by current maintenance, incurred in connection with the consumption or prospective retirement of utility plant in the course of service from causes that are known to be in current operation and against which the utility is not protected by insurance. Among the causes to be given consideration are wear and tear, decay, action of the elements, inadequacy, obsolescence, changes in the art, changes in demand and requirements of public authorities.
>
> *Service value* means the difference between original cost and net salvage value of utility plant.
>
> *Net salvage* value means the salvage value of property retired less the cost of removal.
>
> *Salvage* value means the amount received for the property retired less any expenses incurred in connection with the sale or in preparing the property for sale or, if retained, the amount at which the material recoverable is chargeable to materials and supplies, or other appropriate account.
>
> *Cost of removal* means the cost of demolishing, dismantling, tearing down or otherwise removing utility plant, including the cost of transportation and handling incidental thereto.

It is the salvage that will actually be received and the cost of removal that will actually be incurred, both measured at the price level at the time of receipt or incurrence, which is required to be recognized by the Company through capital recovery. Implementation of these depreciation accounting definitions results in recovery of invested capital after expenditure, credit for salvage before receipt and recovery of cost of removal before expenditure. Thus, the accrual method of accounting is utilized.

These definitions are consistent with the purpose of depreciation, and the study reported here was conducted in a manner consistent with all the definitions.

THE BOOK DEPRECIATION STUDY

Implementation of a policy toward book depreciation that recognizes the purpose of depreciation accounting requires the determination of the mortality characteristics that are applicable to surviving property. The purpose of the study reported here was to accurately measure those mortality characteristics and to use the characteristics to calculate appropriate depreciation rates.

The major effort of the study was the determination of the appropriate mortality characteristics. The remainder of this report describes how those characteristics were determined, describes how the mortality characteristics were used to calculate the recommended depreciation rates and shows how the mortality characteristics are presented in the rate calculation results.

Step One of the study was a Life Analysis consisting of a study of historical retirement experience and an evaluation of the applicability of that experience to surviving property. For Production Plant, this step also entailed the determination of the generating unit retirement dates used in the rate calculation.

Step Two was a Salvage and Cost of Removal Analysis consisting of a study of salvage value and cost of removal experience and an evaluation of the applicability of that experience to surviving property.

Step Three consisted of the selection of (1) average service lives for property other than Production Plant, (2) retirement dispersion factors identified by interim addition and retirement ratios for Production Plant and by Iowa-type curves for the other property, and (3) net salvage factors applicable to surviving property.

Step Four was the calculation of the recommended depreciation rate applicable to each depreciable property group, recognizing the results of the work in Steps One through Three.

LIFE ANALYSIS

The Life Analysis for the property concerns the determination of retirement dates and average service lives, and retirement dispersion characteristics identified either by interim ratios or by standard Iowa-type curves. Retirement dates and interim ratios were used for Production Plant. Average service lives and Iowa-type curves were used for the other property. The Life Analysis for Production Plant consisted of both a historical analysis and a forecast, and for other property consisted of a historical analysis.

Production Plant

For Production Plant, the service life span of each generating unit was estimated based on unit retirement dates provided by Company planning personnel. The dates in this study are used solely to establish a reasonable depreciation accounting period over which to allocate costs as required by depreciation accounting principles. The depreciation accounting periods are needed for use in a reasoned, systematic and rational process for estimating appropriate depreciation rates. The units may continue to operate beyond the dates shown, depending on their condition and the economics of continuing to operate. Interim retirement ratios were used to recognize retirement dispersion for Production Plant property groups. These estimated retirement dates assume routine maintenance and normal capital replacements.

The expected normal future Production Plant interim retirements were determined from an analysis of the Company's past interim retirements. The analysis was conducted by production site and by account, and covered the entire history of each unit, thus making evident the influence of the age of the unit on the magnitude of interim retirement amounts. The interim retirement analysis consisted of relating the sum of the past interim retirements to the sum of the depreciable balances. When expressed as a percentage, the interim retirement ratio is the depreciation rate that would have recovered an amount equal to the total interim retirements.

Other Property Groups

An analysis of historical retirement activity, suitably tempered by informed judgment as to the future applicability of such activity to surviving property, formed the basis for determination of average service lives and retirement dispersion patterns for property other than Production Plant. For most accounts, retirement experience was collected basically from inception through 2003 and was analyzed using the actuarial method of Life Analysis. This method could be used because aged data are available.

The actuarial method determines actual survivor curves (observed life tables) for selected periods of actual retirement experience. In order to recognize trends in life characteristics and to ensure that the valuable information in the curves is available to the analyst, observed life tables were calculated and plotted by computer, using several different periods of retirement experience. The average service lives and retirement dispersion patterns indicated by these actual survivor curves were identified by visually fitting Iowa-type dispersion curves to the actual curves. Retirement dispersion refers to the pattern of retirements as a function of age over the life of each property group. For each non-Production asset category, an Iowa-type curve combined with an estimated average service life was selected. This selection was based upon an analysis of historical investment activity, associated mortality trends and the types of assets surviving and retiring. The workpapers prepared as an integral part of the depreciation study contain the rationale for each selection. Appendix A also contains a brief discussion of the dispersion, average service life and net salvage selections.

Trends in historical mortality experience are helpful in understanding history. In order to determine trends, the periods (year bands) of retirement experience analyzed were the past five years, the past 10 years, the past 15 years, the past 20 years, the past 30 years and the full band of retirement experience (69 years). The observed life tables and the Iowa curves fitted to each of these year bands were plotted. This visual approach ensures that the data contained in the observed life tables are available to the analyst and that the analyst does not allow computer calculations to be the sole determinant of study results.

For accounts having little retirement experience or having retirement experience that is not an adequate measure of the expected mortality characteristics of surviving property, evaluation of the significance of history played a major role in selecting the mortality characteristics shown on Schedules 2 and 3. Examples of these evaluations are discussed later.

SALVAGE AND COST OF REMOVAL ANALYSIS

In general, salvage and cost of removal experience from 1989 through 2003 was the basis for determining the net salvage factors shown on Schedules 2 and 3 for most of the property groups. The analyses were done in a manner that allows the determination of salvage and cost of removal incurred for each depreciable property group and allows selection of separate salvage and terminal cost of removal factors for most groups. Net salvage is positive when salvage exceeds cost of removal and is negative when cost of removal exceeds salvage.

The analysis consisted of calculating salvage and cost of removal factors by relating the recorded salvage and cost of removal for each property group to the retirements that caused the salvage and cost of removal to occur. Factors were calculated on an annual basis. Additionally, rolling bands and shrinking bands of retirement experience were calculated.

The Company has minimal terminal salvage and terminal cost of removal experience for Production Plant due to no plant sites being dismantled and disposed of. Cost estimates made by other utilities for dismantling generating units were considered. Interim net salvage factors were based on historical experience.

EVALUATION OF ACTUAL EXPERIENCE

The analyses conducted in this study utilize historical retirement experience. Since the depreciation rates are to be applied to surviving property, the historical mortality experience indicated by Life Analysis and Salvage and Cost of Removal Analysis must be evaluated to ensure that the mortality characteristics used to calculate the rates are applicable to surviving property. The evaluation is required to ensure the validity of the recommended depreciation rates.

The evaluation process requires knowledge of the type of property surviving; the type of property retired; the reasons for changing life, dispersion, and salvage and cost of removal; and the effect of present and future Company plans on property life. The evaluation included discussions with Company accounting, engineering and operating personnel; determination of the type of property carried in each account; and special analyses of retirements to identify the type of property retired and reasons for retirement.

The Salvage and Cost of Removal Analysis for Production Plant was found not to provide a reasonable indication of terminal net salvage, as no plant sites have been retired and removed. As indicated by company personnel, cost to remove equipment upon retirement of units and specific sites are expected to be incurred. The Production Plant Salvage and Cost of Removal Analysis provided some indication of interim net salvage, and the indications from history were used. The terminal net salvage selections consider power plant removal cost estimates and the experience of other utilities for similar generating units. These data have been gathered from other utilities over the years.

The Life Analysis of Transmission, Distribution and General Plant showed a general upward trend in average service life. This analysis is particularly sensitive to the level of retirement activity. Discussions with operations personnel support a life increase for some categories of investment, and this has been reflected in study recommendations. An example of increased average service life would be Account 364, Poles, Towers and Fixtures.

The Cost of Removal and Salvage Analysis of Transmission, Distribution and General Plant showed more cost of removal and less salvage than prior study indications. Cost of removal and salvage factors are sensitive to the age of property. The older an asset is, generally the less valuable it is. Similarly, given a constant removal effort, cost of removal is greater due to longer periods for inflation to affect the labor cost component of the labor-intensive activity. The selections are representative of actual Company experience.

ACCOMPLISHMENT OF ACCOUNTING AND REGULATORY PRINCIPLES

The depreciation rate calculation procedure used for all categories of Production Plant results in depreciation provisions that will adequately accomplish the basic accounting principle that the timing of expenses should match that of revenues, and the basic depreciation accounting principle that the costs of all additions and retirements be fully recovered at the time of retirement.

Depreciation is a group concept, and depreciation rates are based on the recognition that a group has an average service life. The ALG procedure of depreciation rate calculation was selected for Transmission, Distribution and General Plant, which is the same procedure used in calculating the existing rates. The ALG procedure ensures that the recovery of the property is over the average life of the group.

The remaining life rate calculation technique was selected to ensure compliance with accounting principles and regulatory rules. The difference between the book and the calculated theoretical reserves will be amortized over the remaining life to ensure complete recovery.

The desirability of using the remaining life technique is that any necessary adjustments of depreciation reserves, because of changes to the estimates of life and net salvage, are accrued automatically over the remaining life of the property. Schedule 6 provides a comparison of the calculated theoretical reserve and the book reserve.

The recommended rate for each depreciable Production Plant property group will cause the book reserve to become zero at the time of the last generating unit retirement and removal.

CALCULATION OF DEPRECIATION RATES

A straight-line remaining life rate for each depreciable property group was calculated using the following formula:

$$\text{Rate} = \frac{\text{Plant Balance—Net Salvage—Book Reserve}}{\text{Average Remaining Life}}$$

$$\text{Rate} = \text{Whole Life Rate—}\frac{\text{Book Reserve—Theoretical Reserve}}{\text{Average Remaining Life}}$$

For example, with a net salvage figure of negative 20%, a book reserve ratio of 40% and a remaining life of 20 years, a depreciation rate of 4.00% is calculated (100%—(20%)—40%)/20 = 4.00%, where the plant balance is 100%.

The whole life rate used in the second formula was calculated using the following formula:

$$\text{Rate} = \frac{\text{Plant Balance—Net Salvage}}{\text{Average Service Life}}$$

Formula numerator elements in percent of depreciable plant balance (100%) and the denominator element in years produce a rate in percent with the same negative 20% net salvage and an average life of 30 years, a rate of 4.00% is calculated (100%—(20%))/30 = 4.00%. The second remaining life rate formula clearly illustrates that a remaining life rate is merely an adjustment to a whole life rate in order to amortize the calculated reserve difference over the remaining life.

The depreciable balances and book reserves are from the Company's accounting records. The net salvage factors were determined by the study. The remaining lives for Production Plant were determined from generating unit remaining life spans, and for the other property groups, the average remaining lives were determined from the average service life and dispersion pattern determined by the study and the age distribution of each surviving property group. The age distributions were determined from Company property records.

For Production Plant, the calculated depreciation rate will cause the book reserve for each property group to become zero at the time of the retirement and removal of the last generating unit. Future interim retirements indicated by the estimated interim retirement ratios, net salvage for interim retirements and net salvage for terminal retirements were reflected in the rate calculations.

Schedule 4 is an example of the process used to calculate the recommended rates for Production Plant, showing how the rate of 7.222% for Account 312 shown in Column 6 of Schedule 1 was calculated. The annual interim retirements and interim net salvage are calculated on Schedule 4. The terminal net salvage amount is applied and its applicable rate is calculated on Schedule 4. As shown in Column 10, the rate of 7.222% causes the reserve to become zero at the time of the last retirement in 2008. Column 2 shows that interim retirements are assumed to cease three years prior to retirement. The interim retirement ratio shown in Column 7 of Schedule 2 was utilized in Schedule 4 to calculate the interim retirements shown in Column 2 of Schedule 4. The interim net salvage amount is calculated by multiplying the annual interim net salvage rate by the annual retirements.

The average remaining life is calculated from the vintage balances for each account, and the average remaining life for each vintage is defined by the average service life and retirement dispersion pattern. The calculated theoretical reserve ratio without net salvage for each group is calculated using the following formula:

$$\text{Theoretical Reserve Ratio} = 1 - \frac{\text{Remaining Life}}{\text{Average Service Life}}$$

The ratio for each vintage is determined from the ratios for the groups making up that vintage. The theoretical reserve amount for each vintage is calculated from the surviving balance and vintage ratio and then summarized for the account and adjusted for the effect of net salvage. The summarized theoretical reserve amount is then used to calculate the average remaining life, for use in calculating the depreciation rates.

RESULTS

As shown on Schedule 1, the rates for the Steam, Hydraulic and Other Production Plant increased, as well as rates for the Transmission and Distribution Plant functional groups, while the rate for General decreased. The following discussions summarize the more detailed explanation of study results in Appendix A.

Steam, Hydraulic and Other Production Plant

Schedule 5 shows the projected retirement date for each unit used for calculating the depreciation rates. The dates in this study are used solely to establish a reasonable depreciation accounting period over which to allocate costs as required by depreciation accounting principles. The depreciation accounting periods are needed for use in a reasoned, systematic and rational process for estimating appropriate depreciation rates. At this point in time, there is no commitment on the part of Empire to retire units on the dates indicated. The units may be retired prior to, or may continue to operate beyond the dates shown, depending on their condition and the economics of continuing to operate.

Schedule 2 shows the recommended interim retirement ratios, interim net salvage and terminal net salvage for the production accounts. The interim ratios are based on Company experience. The terminal net salvage recognizes power plant removal cost estimates of other utilities.

Transmission Plant

The composite rate increased from 1.88% to 2.44%. Average service lives are generally increasing, and net salvage is primarily decreasing. The most significant changes in annual accrual amounts were for Account 355, Poles and Fixtures, where the average service life increased from 54 years to 60 years and net salvage changed from zero to negative 135%; and for Account 356, Overhead Conductors and Devices, where the average service life decreased from 70 years to 65 years and net salvage changed from zero to negative 40%.

Distribution Plant

The composite rate increased from 2.60% to 5.65%. Average service lives are generally increasing, and net salvage is primarily decreasing. The most significant changes in annual accrual amounts were for Accounts 364, Poles, Towers and Fixtures; 365, Overhead Conductors and Devices; and 369, Services. The average service life for Account 364 increased from 41.1 years to 46 years, and net salvage changed from zero to negative 210%. The average service life for Account 365 increased from 47.7 years to 53 years, and net salvage changed from zero to negative 250%. The average service life for Account 369 increased from 33 years to 40 years, and net salvage changed from zero to negative 225%.

General Plant

The composite rate for depreciable property decreased from 6.90% to 4.48%. Average service lives are generally increasing, and net salvage increased. The most significant change in annual accrual amount is for Account 392, Transportation Equipment. The average service life for Account 392 increased from 10.5 years to 12 years, and net salvage changed from positive 10% to positive 15%.

RECOMMENDATIONS

Our recommendations for your future action in regard to book depreciation are as follows:

1. The recommended depreciation rates shown in Column 6 of Schedule 1 are applicable to existing property and are recommended for adoption.
2. Because of the variation in service lives and net salvage experience with time, another complete depreciation study should be made during 2008 based upon retirement experience through December 31, 2007.
3. We suggest the Company consider a vintage amortization accounting process for certain categories of General Plant.

4. For new asset categories that arise in the future for which no depreciation rate is currently approved, we recommend that the functional composite depreciation rates be used until future depreciation studies are conducted. The functional composite rates are as follows and are also noted in Schedule 1:

Steam Production Plant	6.18%
Hydraulic Production Plant	3.27%
Other Production Plant	3.62%
Transmission Plant	2.44%
Distribution Plant	5.65%
General Plant	4.48%

THE EMPIRE DISTRICT ELECTRIC COMPANY
Depreciation Study as of December 31, 2003
Comparison of Depreciation Rates and Annual Amounts

SCHEDULE 1

[1] Account Number	[2] Description	[3] 12/31/03 Balance $	[4] Existing Rate %	[5] Annual Amount $	[6] Study Rate %	[7] Annual Amount $	[8] Increase/ Decrease $
	STEAM PRODUCTION PLANT						
	RIVERTON						
311.0	Structures and Improvements	8,467,460	1.05	88,908	14.37	1,216,774	1,127,866
312.0	Boiler Plant Equipment	21,399,386	1.85	395,889	7.22	1,545,036	1,149,147
314.0	Turbogenerator Units	6,514,048	1.59	103,573	4.57	297,692	194,119
315.0	Accessory Electric Equipment	1,299,877	1.79	23,268	0.79	10,269	(12,999)
316.0	Miscellaneous Power Plant Equipment	1,075,367	1.96	21,077	10.52	113,129	92,051
	Total Riverton	38,756,138	1.63	632,715	8.21	3,182,899	2,550,184
	ASBURY						
311.0	Structures and Improvements	9,184,624	1.05	96,439	6.91	634,658	538,219
312.0	Boiler Plant Equipment	67,003,898	1.85	1,239,572	7.71	5,166,001	3,926,428
312.7	Unit Train	5,580,296	6.67	372,206	1.34	74,776	(297,430)
314.0	Turbogenerator Units	21,039,942	1.59	334,535	6.36	1,338,140	1,003,605
315.0	Accessory Electric Equipment	6,348,259	1.79	113,634	7.74	491,355	377,721
316.0	Miscellaneous Power Plant Equipment	1,596,097	1.96	31,284	5.37	85,710	54,427
	Total Asbury	110,753,116	1.98	2,187,669	7.03	7,790,640	5,602,971
	IATAN						
311.0	Structures and Improvements	3,987,532	1.05	41,869	3.30	131,589	89,719
312.0	Boiler Plant Equipment	31,031,913	1.85	574,090	2.21	685,805	111,715
314.0	Turbogenerator Units	8,252,526	1.59	131,215	3.14	259,129	127,914
315.0	Accessory Electric Equipment	3,689,765	1.79	66,047	2.88	106,265	40,218
316.0	Miscellaneous Power Plant Equipment	862,575	1.96	16,906	4.16	35,883	18,977
	Total Iatan	47,824,311	1.74	830,128	2.55	1,218,672	388,544
	Total Steam Production	197,333,565	1.85	3,650,512	6.18	12,192,211	8,541,699
	HYDRAULIC PRODUCTION PLANT						
	OZARK BEACH						
331.0	Structures and Improvements	556,389	1.64	9,125	4.06	22,589	13,465
332.0	Reservoirs, Dams and Waterways	1,435,117	1.67	23,966	0.99	14,208	(9,759)
333.0	Waterwheels, Turbines and Generators	1,067,352	1.47	15,690	4.06	43,334	27,644
334.0	Accessory Electric Equipment	926,850	1.43	13,254	5.27	48,845	35,591
335.0	Miscellaneous Power Plant Equipment	325,076	2.44	7,932	3.67	11,930	3,998
	Total Hydraulic Production	4,310,784	1.62	69,967	3.27	140,907	70,940
	OTHER PRODUCTION PLANT						
	RIVERTON CT						
341.0	Structures and Improvements	193,357	1.82	3,519	4.97	9,610	6,091
342.0	Fuel Holders, Producers and Access.	87,123	3.85	3,354	4.78	4,164	810
343.0	Prime Movers	10,147,180	1.92	194,826	6.15	624,052	429,226
344.0	Generators	926,850	1.82	16,869	4.87	45,138	28,269
345.0	Accessory Electric Equipment	315,835	3.57	11,275	5.29	16,708	5,432
346.0	Miscellaneous Power Plant Equipment	83,907	4.00	3,356	3.65	3,063	(294)
	Total Riverton CT	11,754,252	1.98	233,199	5.98	702,734	469,534
	ENERGY CENTER CT						
341.0	Structures and Improvements	1,883,127	1.82	34,273	2.33	43,877	9,604
342.0	Fuel Holders, Producers and Access.	1,209,362	3.85	46,560	(1.77)	(21,406)	(67,966)
343.0	Prime Movers	25,638,096	1.92	492,251	4.69	1,202,427	710,175
344.0	Generators	4,160,383	1.82	75,719	2.57	106,922	31,203
345.0	Accessory Electric Equipment	339,416	3.57	12,117	(0.46)	(1,561)	(13,678)
346.0	Miscellaneous Power Plant Equipment	1,252,500	4.00	50,100	2.67	33,442	(16,658)
	Total Energy Center CT	34,482,884	2.06	711,021	3.95	1,363,700	652,679
	ENERGY CENTER JET ENGINES						
341.0	Structures and Improvements	1,117,747	1.82	20,343	3.45	38,562	18,219
344.0	Generators	40,238,906	1.82	732,348	3.43	1,380,194	647,846
345.0	Accessory Electric Equipment	2,235,495	3.57	79,807	3.40	76,007	(3,800)
346.0	Miscellaneous Power Plant Equipment	12,295,221	4.00	491,809	3.40	418,038	(73,771)
	Total Energy Center Jet Engines	55,887,369	2.37	1,324,307	3.42	1,912,801	588,494

THE EMPIRE DISTRICT ELECTRIC COMPANY **SCHEDULE 1**

Depreciation Study as of December 31, 2003

Comparison of Depreciation Rates and Annual Amounts

[1] Account Number	[2] Description	[3] 12/31/03 Balance $	[4] Existing Rate %	[5] Annual Amount $	[6] Study Rate %	[7] Annual Amount $	[8] Increase/ Decrease $
	STATE LINE CT						
341.0	Structures and Improvements	4,130,748	1.82	75,180	3.23	133,423	58,244
342.0	Fuel Holders, Producers and Access.	3,380,804	3.85	130,161	3.24	109,538	(20,623)
343.0	Prime Movers	42,664,185	1.92	819,152	3.39	1,446,316	627,164
344.0	Generators	11,268,284	1.82	205,083	3.18	358,331	153,249
345.0	Accessory Electric Equipment	3,710,093	3.57	132,450	3.54	131,337	(1,113)
346.0	Miscellaneous Power Plant Equipment	123,436	4.00	4,937	(0.80)	(987)	(5,925)
	Total State Line CT	65,277,550	2.09	1,366,963	3.34	2,177,958	810,995
	STATE LINE CC						
341.0	Structures and Improvements	7,159,115	2.86	204,751	3.54	253,433	48,682
342.0	Fuel Holders, Producers and Access.	7,824,293	2.86	223,775	3.49	273,068	49,293
343.0	Prime Movers	84,008,591	2.86	2,402,646	3.56	2,990,706	588,060
344.0	Generators	23,336,374	2.86	667,420	3.49	814,439	147,019
345.0	Accessory Electric Equipment	7,785,292	2.86	222,659	3.50	272,485	49,826
346.0	Miscellaneous Power Plant Equipment	51,796	2.86	1,481	3.61	1,870	388
	Total State Line CC	130,165,461	2.86	3,722,732	3.54	4,606,001	883,269
	Total Other Production	297,567,516	2.47	7,358,223	3.62	10,763,194	3,404,971
	TOTAL PRODUCTION PLANT	499,211,865	2.22	11,078,702	4.63	23,096,312	12,017,610
	TRANSMISSION PLANT						
352.0	Structures and Improvements	2,335,614	1.37	31,998	1.95	45,544	13,547
353.0	Station Equipment	81,203,748	2.19	1,778,362	2.04	1,656,556	(121,806)
354.0	Towers and Fixtures	777,079	1.30	10,102	1.35	10,491	389
355.0	Poles and Fixtures	26,516,184	1.85	490,549	4.21	1,116,331	625,782
356.0	Overhead Conductors and Devices	50,765,895	1.43	725,952	2.19	1,111,773	385,821
	Total Transmission	161,598,520	1.88	3,036,964	2.44	3,940,696	903,732
	DISTRIBUTION PLANT						
361.0	Structures and Improvements	9,001,252	1.98	178,225	2.10	189,026	10,802
362.0	Station Equipment	58,177,159	2.44	1,419,523	1.53	890,111	(529,412)
364.0	Poles, Towers and Fixtures	89,549,037	2.43	2,176,042	8.15	7,298,247	5,122,205
365.0	Overhead Conductors and Devices	102,680,118	2.10	2,156,282	7.86	8,070,657	5,914,375
366.0	Underground Conduit	15,763,255	2.97	468,169	4.01	632,107	163,938
367.0	Underground Conductors and Devices	33,337,405	3.61	1,203,480	3.46	1,153,474	(50,006)
368.0	Line Transformers	66,324,487	2.51	1,664,745	2.76	1,830,556	165,811
369.0	Services	45,193,254	3.03	1,369,356	9.95	4,496,729	3,127,373
370.0	Meters	15,118,298	2.58	390,052	1.88	284,224	(105,828)
371.0	I.O.C.P.	12,250,216	5.15	630,886	5.50	673,762	42,876
373.0	Street Lighting and Signal Systems	10,089,943	2.36	238,123	3.09	311,779	73,657
	Total Distribution	457,484,424	2.60	11,894,882	5.65	25,830,671	13,935,789
	GENERAL PLANT						
390.0	Structures and Improvements	9,228,596	4.27	394,061	2.24	206,721	(187,340)
391.1	Office Furniture and Equipment	3,443,866	4.81	165,650	3.85	132,589	(33,061)
391.2	Computer Equipment	7,606,233	14.29	1,086,931	12.08	918,833	(168,098)
	Subtotal 391.0	11,050,099	11.34	1,252,581	9.52	1,051,422	(201,159)
392.0	Transportation Equipment	6,284,687	9.52	598,302	0.26	16,340	(581,962)
393.0	Stores Equipment	343,778	3.95	13,579	1.77	6,085	(7,494)
394.0	Tools, Shop and Garage Equipment	2,871,995	2.50	71,800	3.99	114,593	42,793
395.0	Laboratory Equipment	886,388	2.66	23,578	1.63	14,448	(9,130)
396.0	Power Operated Equipment	9,359,418	6.67	624,273	5.46	511,024	(113,249)
397.0	Communication Equipment	10,761,984	4.95	532,718	3.31	356,222	(176,497)
398.0	Miscellaneous Equipment	229,184	3.75	8,594	4.36	9,992	1,398
	Total General	51,016,129	6.90	3,519,487	4.48	2,286,846	(1,232,640)
	Total Depreciable Plant	1,169,310,938	2.53	29,530,034	4.72	55,154,525	25,624,491
	Intangible Plant	7,622,196					
	Land	12,373,021					
	Total Electric Plant in Service	1,189,306,155					

THE EMPIRE DISTRICT ELECTRIC COMPANY **SCHEDULE 2**

Depreciation Study as of December 31, 2003

Comparison of Mortality Characteristics

[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]
		EXISTING			STUDY			
Account Number	Description	ASL yrs.	Iowa Curve	Net Salvage %	Interim Addition Ratio	Interim Retirement Ratio %	Interim Net Salvage %	Terminal Net Salvage %
	STEAM PRODUCTION PLANT							
	RIVERTON							
311.0	Structures and Improvements	95.0	-	0	0.0	0.2500	(20.00)	(10.12)
312.0	Boiler Plant Equipment	54.0	-	0	0.0	0.6000	(25.00)	(10.12)
314.0	Turbogenerator Units	63.0	-	0	0.0	0.4500	(30.00)	(10.12)
315.0	Accessory Electric Equipment	56.0	-	0	0.0	0.3000	(15.00)	(10.12)
316.0	Miscellaneous Power Plant Equipment	51.0	-	0	0.0	0.5000	10.00	(10.12)
	ASBURY							
311.0	Structures and Improvements	95.0	-	0	0.0	0.2500	(20.00)	(10.12)
312.0	Boiler Plant Equipment	54.0	-	0	0.0	0.6000	(25.00)	(10.12)
312.7	Unit Train	15.0	-	0	0.0	0.6000	0.00	0.00
314.0	Turbogenerator Units	63.0	-	0	0.0	0.4500	(30.00)	(10.12)
315.0	Accessory Electric Equipment	56.0	-	0	0.0	0.3000	(15.00)	(10.12)
316.0	Miscellaneous Power Plant Equipment	51.0	-	0	0.0	0.5000	10.00	(10.12)
	IATAN							
311.0	Structures and Improvements	95.0	-	0	0.0	0.2500	(20.00)	(10.12)
312.0	Boiler Plant Equipment	54.0	-	0	0.0	0.6000	(25.00)	(10.12)
314.0	Turbogenerator Units	63.0	-	0	0.0	0.4500	(30.00)	(10.12)
315.0	Accessory Electric Equipment	56.0	-	0	0.0	0.3000	(15.00)	(10.12)
316.0	Miscellaneous Power Plant Equipment	51.0	-	0	0.0	0.5000	10.00	(10.12)
	HYDRAULIC PRODUCTION PLANT							
	OZARK BEACH							
331.0	Structures and Improvements	61.0	-	0	0.0	0.0075	(10.00)	(8.33)
332.0	Reservoirs, Dams and Waterways	60.0	-	0	0.0	0.0070	0.00	(8.33)
333.0	Waterwheels, Turbines and Generators	68.0	-	0	0.0	0.0060	0.00	(8.33)
334.0	Accessory Electric Equipment	70.0	-	0	0.0	0.0075	(10.00)	(8.33)
335.0	Miscellaneous Power Plant Equipment	41.0	-	0	0.0	0.0100	0.00	(8.33)
	OTHER PRODUCTION PLANT							
	RIVERTON CT							
341.0	Structures and Improvements	55.0	-	0	0.0	0.0500	0.00	(3.92)
342.0	Fuel Holders, Producers and Access.	26.0	-	0	0.0	0.0100	0.00	(3.92)
343.0	Prime Movers	52.0	-	0	0.0	0.1500	(5.00)	(3.92)
344.0	Generators	55.0	-	0	0.0	0.0100	0.00	(3.92)
345.0	Accessory Electric Equipment	28.0	-	0	0.0	0.0400	0.00	(3.92)
346.0	Miscellaneous Power Plant Equipment	25.0	-	0	0.0	0.0700	10.00	(3.92)
	ENERGY CENTER CT							
341.0	Structures and Improvements	55.0	-	0	0.0	0.0500	0.00	(3.92)
342.0	Fuel Holders, Producers and Access.	26.0	-	0	0.0	0.0100	0.00	(3.92)
343.0	Prime Movers	52.0	-	0	0.0	0.1500	(5.00)	(3.92)
344.0	Generators	55.0	-	0	0.0	0.0100	0.00	(3.92)
345.0	Accessory Electric Equipment	28.0	-	0	0.0	0.0400	0.00	(3.92)
346.0	Miscellaneous Power Plant Equipment	25.0	-	0	0.0	0.0700	10.00	(3.92)

THE EMPIRE DISTRICT ELECTRIC COMPANY **SCHEDULE 2**

Depreciation Study as of December 31, 2003

Comparison of Mortality Characteristics

[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]
		EXISTING			STUDY			
Account Number	Description	ASL yrs.	Iowa Curve	Net Salvage %	Interim Addition Ratio	Interim Retirement Ratio %	Interim Net Salvage %	Terminal Net Salvage %
	ENERGY CENTER JET ENGINES							
341.0	Structures and Improvements	55.0	-	0	0.0	0.0500	0.00	(3.92)
344.0	Generators	55.0	-	0	0.0	0.0100	0.00	(3.92)
345.0	Accessory Electric Equipment	28.0	-	0	0.0	0.0400	0.00	(3.92)
346.0	Miscellaneous Power Plant Equipment	25.0	-	0	0.0	0.0700	10.00	(3.92)
	STATE LINE CT							
341.0	Structures and Improvements	55.0	-	0	0.0	0.0500	0.00	(3.92)
342.0	Fuel Holders, Producers and Access.	26.0	-	0	0.0	0.0100	0.00	(3.92)
343.0	Prime Movers	52.0	-	0	0.0	0.1500	(5.00)	(3.92)
344.0	Generators	55.0	-	0	0.0	0.0100	0.00	(3.92)
345.0	Accessory Electric Equipment	28.0	-	0	0.0	0.0400	0.00	(3.92)
346.0	Miscellaneous Power Plant Equipment	25.0	-	0	0.0	0.0700	10.00	(3.92)
	STATE LINE CC							
341.0	Structures and Improvements	35.0	-	0	0.0	0.0500	0.00	(3.92)
342.0	Fuel Holders, Producers and Access.	35.0	-	0	0.0	0.0100	0.00	(3.92)
343.0	Prime Movers	35.0	-	0	0.0	0.1500	(5.00)	(3.92)
344.0	Generators	35.0	-	0	0.0	0.0100	0.00	(3.92)
345.0	Accessory Electric Equipment	35.0	-	0	0.0	0.0400	0.00	(3.92)
346.0	Miscellaneous Power Plant Equipment	35.0	-	0	0.0	0.0700	10.00	(3.92)

SCHEDULE 3

THE EMPIRE DISTRICT ELECTRIC COMPANY
Depreciation Study as of December 31, 2003
Comparison of Mortality Characteristics

[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]
		EXISTING			STUDY				
Account Number	Description	ASL yrs.	Iowa Curve	Net Salvage %	ASL yrs.	Iowa Curve	Salvage %	Cost of Removal %	Net Salvage %
	TRANSMISSION PLANT								
352.0	Structures and Improvements	73.0	R2	0	55.0	R1.5	0	15	(15)
353.0	Station Equipment	45.7	R2	0	50.0	R2.5	0	10	(10)
354.0	Towers and Fixtures	77.0	S3.5	0	65.0	R5	0	25	(25)
355.0	Poles and Fixtures	54.0	R2	0	60.0	R4	65	200	(135)
356.0	Overhead Conductors and Devices	70.0	R3.5	0	65.0	S1.5	60	100	(40)
	DISTRIBUTION PLANT								
361.0	Structures and Improvements	50.5	S1.5	0	60.0	R3	0	25	(25)
362.0	Station Equipment	40.9	R1.5	0	45.0	R2.5	40	25	15
364.0	Poles, Towers and Fixtures	41.1	R4	0	46.0	L5	55	265	(210)
365.0	Overhead Conductors and Devices	47.7	R3	0	53.0	R3	50	300	(250)
366.0	Underground Conduit	33.7	S3	0	37.0	R3	10	55	(45)
367.0	Underground Conductors and Devices	27.7	S6	0	32.0	S1	5	20	(15)
368.0	Line Transformers	39.9	R2	0	45.0	S1	3	28	(25)
369.0	Services	33.0	S3	0	40.0	S4	20	245	(225)
370.0	Meters	38.7	S1.5	0	44.0	S0	0	0	0
371.0	I.O.C.P.	19.4	S1	0	25.0	L1.5	10	55	(45)
373.0	Street Lighting and Signal Systems	42.4	R1	0	48.0	R2	25	75	(50)
	GENERAL PLANT								
390.0	Structures and Improvements	23.4	L0	0	40.0	R1.5	0	10	(10)
391.1	Office Furniture and Equipment	20.8	S0.5	0	20.0	L0	0	0	0
391.2	Computer Equipment	7.0	SQ	0	10.0	L2	0	0	0
392.0	Transportation Equipment	10.5	L1.5	0	12.0	L2	15	0	15
393.0	Stores Equipment	25.3	R2	0	30.0	R2.5	5	0	5
394.0	Tools, Shop and Garage Equipment	40.0	S1	0	20.0	R5	10	0	10
395.0	Laboratory Equipment	37.6	S1	0	38.0	R2.5	0	0	0
396.0	Power Operated Equipment	15.0	S4	0	15.0	L3	5	0	5
397.0	Communication Equipment	20.2	S5	0	25.0	R2	0	0	0
398.0	Miscellaneous Equipment	26.7	R1	0	22.0	L1.5	0	0	0

THE EMPIRE DISTRICT ELECTRIC COMPANY

SCHEDULE 4

Depreciation Rate Calculation
Account 312, Steam - Boiler Plant Equipment
Riverton Plant
No Interim Additions
Current Terminal Net Salvage

Interim Net Salvage	-25.00%
Terminal Net Salvage =	-10.12%
Average Future Net Salvage =	-10.30%
Average Age Survivors =	40.288
Average Remaining Life =	4.952
Average Service Life =	45.240
Book Reserve Ratio =	74.53%
Theoretical Reserve =	21,019,431
Interim Retirement Ratio =	0.6000%
Interim Addition Ratio =	-
Depreciation Rate =	7.222%

[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]
Year	Interim Retirements $	Interim Net Salvage $	Terminal Retirements $	Terminal Net Salvage $	Interim Additions $	Ending Balance $	Average Balance $	Deprec. Amount $	Ending Reserve $
2003						21,399,386			15,949,657
2004	128,396	(32,099)			-	21,270,990	21,335,188	1,540,850	17,330,011
2005	127,626	(31,906)			-	21,143,364	21,207,177	1,531,605	18,702,084
2006		-			-	21,143,364	21,143,364	1,526,996	20,229,080
2007		-			-	21,143,364	21,143,364	1,526,996	21,756,076
2008		-	21,143,364	(2,139,708)	-	-	21,143,364	1,526,996	-
Totals	256,022	(64,006)	21,143,364	(2,139,708)	-		105,972,456		

THE EMPIRE DISTRICT ELECTRIC COMPANY **SCHEDULE 5**

Depreciation Study as of December 31, 2003
Projected Retirement Years

[1]	[2]	[3]	[4]	[5]
Description	Fuel Type	Capacity kW	Installation Year	Projected Retirement Year
STEAM PRODUCTION PLANT				
Riverton Unit 7	Coal	38,100	1950	2008
Riverton Unit 8	Coal	53,200	1954	2008
Asbury Unit 1	Coal	191,000	1970	2014
Asbury Unit 2	-	20,000	1986	2014
Iatan Unit 1	Coal	80,000	1980	2014
HYDRAULIC PRODUCTION PLANT				
Ozark Beach Unit 1	Water	4,000	1931	2022
Ozark Beach Unit 2	Water	4,000	1931	2022
Ozark Beach Unit 3	Water	4,000	1931	2022
Ozark Beach Unit 4	Water	4,000	1931	2022
OTHER PRODUCTION PLANT				
Riverton Unit 9	Gas/Oil	14,500	1964	2008
Riverton Unit 10	Gas/Oil	16,500	1988	2014
Riverton Unit 11	Gas/Oil	16,500	1988	2014
Energy Center Unit 1	Gas/Oil	90,000	1978	2012
Energy Center Unit 2	Gas/Oil	90,000	1981	2015
Energy Center Jet Engine 1	Gas/Oil	50,000	2003	2033
Energy Center Jet Engine 2	Gas/Oil	50,000	2003	2033
State Line Unit 1	Gas/Oil	90,000	1995	2029
State Line Unit 2 - Combined Cycle	Gas	300,000	2001	2031

THE EMPIRE DISTRICT ELECTRIC COMPANY **SCHEDULE 6**

Depreciation Study as of December 31, 2003

Comparison of Book and Theoretical Reserves

[1] Account Number	[2] Description	[3] 12/31/03 Balance $	[4] Book Reserve $	[5] Theoretical Reserve $	[6] Reserve Difference (Col 4 - Col 5) $
	STEAM PRODUCTION PLANT				
	RIVERTON				
311.0	Structures and Improvements	8,467,460	3,270,378	8,216,191	(4,945,813)
312.0	Boiler Plant Equipment	21,399,386	15,949,657	21,019,431	(5,069,774)
314.0	Turbogenerator Units	6,514,048	5,707,235	6,591,123	(883,888)
315.0	Accessory Electric Equipment	1,299,877	1,380,852	1,321,038	59,814
316.0	Miscellaneous Power Plant Equipment	1,075,367	620,727	1,011,650	(390,923)
	Total Riverton	38,756,138	26,928,849	38,159,433	(11,230,584)
	ASBURY				
311.0	Structures and Improvements	9,184,624	3,238,566	7,656,019	(4,417,453)
312.0	Boiler Plant Equipment	67,003,898	19,160,896	43,931,052	(24,770,156)
312.7	Unit Train	5,580,296	4,375,059	2,347,720	2,027,339
314.0	Turbogenerator Units	21,039,942	8,923,170	16,618,848	(7,695,678)
315.0	Accessory Electric Equipment	6,348,259	1,678,166	4,036,789	(2,358,623)
316.0	Miscellaneous Power Plant Equipment	1,596,097	825,465	1,150,162	(324,697)
	Total Asbury	110,753,116	38,201,322	75,740,590	(37,539,268)
	IATAN				
311.0	Structures and Improvements	3,987,532	2,212,979	2,832,611	(619,632)
312.0	Boiler Plant Equipment	31,031,913	23,427,557	19,684,460	3,743,097
314.0	Turbogenerator Units	8,252,526	4,948,704	5,743,803	(795,099)
315.0	Accessory Electric Equipment	3,689,765	2,309,337	2,503,641	(194,304)
316.0	Miscellaneous Power Plant Equipment	862,575	352,247	666,094	(313,847)
	Total Iatan	47,824,311	33,250,824	31,430,609	1,820,215
	Total Steam Production	197,333,565	98,380,995	145,330,632	(46,949,637)
	HYDRAULIC PRODUCTION PLANT				
	OZARK BEACH				
331.0	Structures and Improvements	556,389	211,345	356,434	(145,089)
332.0	Reservoirs, Dams and Waterways	1,435,117	1,289,756	1,226,700	63,056
333.0	Waterwheels, Turbines and Generators	1,067,352	369,679	608,725	(239,046)
334.0	Accessory Electric Equipment	926,850	152,811	406,104	(253,293)
335.0	Miscellaneous Power Plant Equipment	325,076	131,315	165,428	(34,113)
	Total Hydraulic Production	4,310,784	2,154,906	2,763,391	(608,485)
	OTHER PRODUCTION PLANT				
	RIVERTON CT				
341.0	Structures and Improvements	193,357	114,544	157,462	(42,918)
342.0	Fuel Holders, Producers and Access.	87,123	53,036	57,705	(4,669)
343.0	Prime Movers	10,147,180	4,967,746	7,806,843	(2,839,097)
344.0	Generators	926,850	557,349	757,030	(199,681)
345.0	Accessory Electric Equipment	315,835	178,096	209,184	(31,088)
346.0	Miscellaneous Power Plant Equipment	83,907	59,654	57,907	1,747
	Total Riverton CT	11,754,252	5,930,425	9,046,131	(3,115,706)
	ENERGY CENTER CT				
341.0	Structures and Improvements	1,883,127	1,475,001	1,559,153	(84,152)
342.0	Fuel Holders, Producers and Access.	1,209,362	1,491,898	935,677	556,221
343.0	Prime Movers	25,638,096	13,535,384	19,074,008	(5,538,624)
344.0	Generators	4,160,383	3,145,777	3,435,535	(289,758)
345.0	Accessory Electric Equipment	339,416	369,766	248,469	121,297
346.0	Miscellaneous Power Plant Equipment	1,252,500	934,658	819,278	115,380
	Total Energy Center CT	34,482,884	20,952,484	26,072,120	(5,119,636)
	ENERGY CENTER JET ENGINES				
341.0	Structures and Improvements	1,117,747	13,521	25,360	(11,839)
344.0	Generators	40,238,906	486,761	908,052	(421,291)
345.0	Accessory Electric Equipment	2,235,495	53,044	50,652	2,392
346.0	Miscellaneous Power Plant Equipment	12,295,221	326,885	279,212	47,673
	Total Energy Center Jet Engines	55,887,369	880,211	1,263,276	(383,065)

THE EMPIRE DISTRICT ELECTRIC COMPANY **SCHEDULE 6**

Depreciation Study as of December 31, 2003

Comparison of Book and Theoretical Reserves

[1] Account Number	[2] Description	[3] 12/31/03 Balance $	[4] Book Reserve $	[5] Theoretical Reserve $	[6] Reserve Difference (Col 4 - Col 5) $
	STATE LINE CT				
341.0	Structures and Improvements	4,130,748	847,015	1,303,059	(456,044)
342.0	Fuel Holders, Producers and Access.	3,380,804	665,022	577,560	87,462
343.0	Prime Movers	42,664,185	7,942,202	12,339,058	(4,396,856)
344.0	Generators	11,268,284	2,409,216	1,715,668	693,548
345.0	Accessory Electric Equipment	3,710,093	457,459	454,022	3,437
346.0	Miscellaneous Power Plant Equipment	123,436	153,380	69,965	83,415
	Total State Line CT	65,277,550	12,474,294	16,459,332	(3,985,038)
	STATE LINE CC				
341.0	Structures and Improvements	7,159,115	386,033	472,091	(86,058)
342.0	Fuel Holders, Producers and Access.	7,824,293	493,729	594,528	(100,799)
343.0	Prime Movers	84,008,591	5,262,082	6,458,082	(1,196,000)
344.0	Generators	23,336,374	1,470,726	2,150,465	(679,739)
345.0	Accessory Electric Equipment	7,785,292	490,634	593,178	(102,544)
346.0	Miscellaneous Power Plant Equipment	51,796	1,910	2,385	(475)
	Total State Line CC	130,165,461	8,105,114	10,270,729	(2,165,615)
	Total Other Production	297,567,516	48,342,528	63,111,588	(14,769,060)
	Total Production Plant	499,211,865	148,878,429	211,205,611	(62,327,182)
	TRANSMISSION PLANT				
352.0	Structures and Improvements	2,335,614	835,183	700,424	134,759
353.0	Station Equipment	81,203,748	23,689,135	18,783,930	4,905,205
354.0	Towers and Fixtures	777,079	692,786	574,088	118,698
355.0	Poles and Fixtures	26,516,184	10,461,171	14,104,018	(3,642,847)
356.0	Overhead Conductors and Devices	50,765,895	13,260,955	14,075,445	(814,490)
	Total Transmission	161,598,520	48,939,230	48,237,905	701,325
	DISTRIBUTION PLANT				
361.0	Structures and Improvements	9,001,252	2,728,334	2,803,042	(74,708)
362.0	Station Equipment	58,177,159	19,414,017	12,260,120	7,153,897
364.0	Poles, Towers and Fixtures	89,549,037	39,711,597	80,963,840	(41,252,243)
365.0	Overhead Conductors and Devices	102,680,118	32,191,247	84,436,960	(52,245,713)
366.0	Underground Conduit	15,763,255	4,887,416	5,283,275	(395,859)
367.0	Underground Conductors and Devices	33,337,405	10,723,748	9,654,387	1,069,361
368.0	Line Transformers	66,324,487	21,644,294	21,251,944	392,350
369.0	Services	45,193,254	19,571,576	42,957,148	(23,385,572)
370.0	Meters	15,118,298	5,726,966	3,778,351	1,948,615
371.0	I.O.C.P.	12,250,216	5,671,345	5,009,113	662,232
373.0	Street Lighting and Signal Systems	10,089,943	3,949,088	3,813,576	135,512
	Total Distribution	457,484,424	166,219,628	272,211,756	(105,992,128)
	GENERAL PLANT				
390.0	Structures and Improvements	9,228,596	4,454,944	3,171,851	1,283,093
391.1	Office Furniture and Equipment	3,443,866	1,311,125	672,905	638,220
391.2	Computer Equipment	7,606,233	436,398	1,669,196	(1,232,798)
	Subtotal 391.0	11,050,099	1,747,523	2,342,101	(594,578)
392.0	Transportation Equipment	6,284,687	5,233,374	2,358,612	2,874,762
393.0	Stores Equipment	343,778	220,850	137,496	83,354
394.0	Tools, Shop and Garage Equipment	2,871,995	1,419,727	1,269,821	149,906
395.0	Laboratory Equipment	886,388	544,611	334,980	209,631
396.0	Power Operated Equipment	9,359,418	4,732,795	4,066,138	666,657
397.0	Communication Equipment	10,761,984	5,247,800	4,099,776	1,148,024
398.0	Miscellaneous Equipment	229,184	72,016	65,156	6,860
	Total General Plant	51,016,129	23,673,640	17,845,931	5,827,709
	Total Depreciable Plant	1,169,310,938	387,710,927	549,501,203	(161,790,276)
		7,622,196			
		12,373,021			
	Total Electric Plant In Service	1,189,306,155			

APPENDIX A

THE EMPIRE DISTRICT ELECTRIC COMPANY

Bases for Changes to Rates

STEAM PRODUCTION PLANT

For Steam Production Plant, the composite depreciation rate increases from 1.85% to 6.18%. The major change to the mortality characteristics that causes this increase is recognition of more realistic retirement dates in the rate calculation.

Retirement dispersion for these asset categories is recognized through the use of interim retirement ratios. Interim retirements are any retirements made prior to the final retirement of a generating unit. A generating unit experiences capital additions and retirements over its life as items are replaced and items not originally required are added. This addition and retirement activity is required to maintain the reliability of the unit, thereby ensuring that the originally planned operating life occurs. Thus, there is a link between the interim additions and retirements and the remaining life span.

The interim retirement ratios used are shown on Schedule 2. The projected retirement dates are shown on Schedule 5.

The interim retirement ratio is applied to the beginning-year balance to calculate the estimated retirements for each year.

Terminal net salvage costs were projected at the date of final retirement. These amounts were derived by current net salvage cost estimates in dollars per kW. A figure of $50/kW was utilized, which amount represents industry averages for site-specific decommissioning. For the total Steam Production function, the composite terminal net salvage is approximately negative 10.12% related to December 31, 2003 balances.

Interim net salvage factors were derived from a review of history. These factors relate to interim retirements. The recommended factors are shown in Column 8 of Schedule 2.

HYDRAULIC PRODUCTION PLANT

For Hydraulic Production Plant, the composite depreciation rate increases from 1.62% to 3.27%. The major change that causes this increase is the recognition of more realistic retirement dates and the reserve position incorporated into the rate calculation.

The interim activity ratios used are shown on Schedule 2. Projected retirement dates are as shown on Schedule 5.

Terminal net salvage is estimated in the same manner as Steam Production Plant. A figure of $20/kW was utilized, which is based upon engineering judgment. For the total Hydraulic Production function, the composite terminal net salvage is approximately negative 8.33% related to December 31, 2003 balances.

OTHER PRODUCTION PLANT

The existing 2.47% composite depreciation rate increases to 3.62%. The interim activity ratios used are shown on Schedule 2. The projected retirement dates for each unit are shown on Schedule 5.

Terminal net salvage is estimated in the same manner as Steam Production Plant. A figure of $13/kW was utilized, except for the combined cycle units, where $20/kW was used. These figures represent industry averages for site specific decommissioning. For the total Other Production function, the composite terminal net salvage is approximately negative 3.92% related to December 31, 2003 balances.

TRANSMISSION PLANT

The composite rate increased from 1.88% to 2.44%. Average service lives are generally increasing, and net salvage is primarily decreasing. The most significant changes in annual accrual amounts were for Account 355, Poles and Fixtures, where the average service life increased from 54 years to 60 years and net salvage changed from zero to negative 135%; and for Account 356, Overhead Conductors and Devices, where the average service life decreased from 70 years to 65 years and net salvage changed from zero to negative 40%.

Account 352—Structures and Improvements

This account has an existing average service life (ASL) of 73 years. However, the prior-study ASL is 50 years, and the current-study recommendation is 55 years. The curve is changed from an R2 to an R1.5. These selections are based on the 20-year band analysis. The existing net salvage is zero. We recommend a negative 15% net salvage factor. The depreciation rate changes from 1.37% to 1.95%.

Account 353—Station Equipment

This account has an existing ASL of 45.7 years, which we recommend increasing to 50 years. The curve is changed from an R2 to a slightly steeper R2.5 pattern. Reliance was placed on the fuller experience band indications. Both salvage and cost of removal have declined. Our selection reflects zero salvage and 10% cost of removal for a negative 10% net salvage factor, which is a decrease from the existing zero. The depreciation rate decreases from 2.19% to 2.04%.

Account 354—Towers and Fixtures

This account has an ASL of 77 years. The prior-study selection was 50 years, which we believe is too low based upon the analysis. We suggest moving the ASL to 65 years with an R5 curve. The existing net salvage is zero. We recommend a net salvage factor of negative 25%. The depreciation rate increases from 1.30% to 1.35%.

Account 355—Poles and Fixtures

The existing ASL is 54 years, which we suggest increasing to 60 years based upon the indications across the bands analyzed. The curve is changed from an R2 to an R4. The existing net salvage is zero, which we recommend changing to negative 135%. This recommendation is based upon the 5-year band and represents 1/2 of the cost of removal experience. The depreciation rate increases from 1.85% to 4.21%.

Account 356—Overhead Conductors and Devices

The existing ASL of 70 years is high when compared to the prior-study ASL of 50 years and the current-study indications. We recommend decreasing the ASL to 65 years with reliance on the full experience band. The existing curve of R3.5 is changed to an S1.5. The existing net salvage factor is zero, which we recommend changing to negative 40%. The result is an increase in depreciation rate from 1.43% to 2.19%.

DISTRIBUTION PLANT

The composite rate increased from 2.60% to 5.65%. Average service lives are generally increasing, and net salvage is primarily decreasing. The most significant changes in annual accrual amounts were for Accounts 364, Poles, Towers and Fixtures; 365, Overhead Conductors and Devices; and 369, Services. The average service life for Account 364 increased from 41.1 years to 46 years, and net salvage changed from zero to negative 210%. The average service life for Account 365 increased from 47.7 years to 53 years, and net salvage changed from zero to negative 250%. The average service life for Account 369 increased from 33 years to 40 years, and net salvage changed from zero to negative 225%.

Account 361—Structures and Improvements

The asset mix is approximately 50% structures and 50% improvements. An ASL of 60 years is recommended, which is an increase of about 10 years from the existing 50.5 years. The recommended R3 dispersion pattern is a steeper one than the existing S1.5 but is more appropriate and expected with an increase in life. The net salvage factor changes from zero to negative 25%, which reflects a selection based on 1/2 of the full history indications. The resulting depreciation rate increases from 1.98% to 2.10%.

Account 362—Station Equipment

The ASL is increased from the existing 40.9 years to 45 years, which reflects the indications in the 15- to 30-year band analysis. The curve also changes from an R1.5 to an R2.5. The existing net salvage factor is zero and is changed to positive 15%. The resulting depreciation rate decreases from 2.44% to 1.53%, due to the increase in ASL and the reserve position.

Account 364—Poles, Towers and Fixtures

The existing ASL is 41.1 years. Current-study indications suggest life is increasing, which is reflected in our recommendation of 46 years and is based upon the 20-year band analysis. The dispersion pattern shifts slightly from an R4 to an L5. Net salvage is changed from the existing zero to negative 210%, which is based upon the 5-year band analysis. The resulting depreciation rate increases from 2.43% to 8.15%.

Account 365—Overhead Conductors and Devices

The existing ASL is 47.7 years, which we recommend increasing to 53 years and which is reflected in the 30-year band analysis. The curve remains unchanged from an R3 pattern. The net salvage factor is changed from zero to negative 250%, which is based on more recent experience. The resulting depreciation rate is an increase from 2.10% to 7.86%.

Account 366—Underground Conduit

The existing ASL is 33.7 years, which we recommend increasing to 37 years and which is reflected in the fuller-band analysis. The curve is changed from an S3 to an R3 pattern. The net salvage factor is changed from zero to negative 45%, which is based on more recent experience. The resulting depreciation rate is an increase from 2.97% to 4.01%.

Account 367—Underground Conductors and Devices

The existing ASL is 27.7 years, which we recommend increasing to 32 years and which is reflected in the fuller bands analyzed. The curve is changed from an S6 to an S1 pattern. The net salvage factor is changed from zero to negative 15%, which is based on more recent experience. The resulting depreciation rate is a decrease from 3.61% to 3.46% and is due to the increase in ASL and the reserve position.

Account 368—Line Transformers

The existing ASL is 39.9 years, which we recommend increasing to 45 years. This is consistent with the indications but limited to a 5-year increase. This recommendation reflects the 20-year band analysis. The curve is changed from an R2 to an S1 pattern. The net salvage factor is changed from zero to negative 25%, which is based on more recent activity. The resulting depreciation rate is an increase from 2.51% to 2.76%.

Account 369—Services

The existing ASL is 33 years, which we recommend increasing to 40 years based upon the bands analyzed. The curve is changed from an S3 to an S4 pattern. The net salvage factor is changed from zero to negative 225%. The selection is based upon the 5-year band and is one-half of the indicated cost of removal factor. The resulting depreciation rate is an increase from 3.03% to 9.95%.

Account 370—Meters

The existing ASL is 38.7 years, which we recommend increasing to 44 years based upon the bands analyzed. The curve is changed from an S1.5 to an S0 pattern. The net salvage factor remains unchanged at zero. The resulting depreciation rate is a decrease from 2.58% to 1.88%.

Account 371—Installed on Customer Premises

The existing ASL is 19.4 years, which we recommend increasing to 25 years based on the indications across the bands analyzed. The curve is changed from an S1 to an L1.5 pattern. The net salvage factor is changed from zero to negative 45%, which is based upon more recent activity. The resulting depreciation rate is an increase from 5.15% to 5.50%.

Account 373—Street Lighting and Signal Systems

The existing ASL is 42.4 years, which we recommend increasing to 48 years. The curve is changed from an R1 to a slightly steeper R2 pattern. The net salvage factor is changed from zero to negative 50%, which is based upon the 5-year band. The resulting depreciation rate is an increase from 2.36% to 3.09%.

<u>GENERAL PLANT</u>

The composite rate for depreciable property decreased from 6.90% to 4.48%. Average service lives are generally increasing, and net salvage increased. The most significant change in annual accrual amount is for Account 392, Transportation Equipment. The average service life for Account 392 increased from 10.5 years to 12 years, and net salvage changed from positive 10% to positive 15%.

<u>Account 390—Structures and Improvements</u>

The existing ASL is 23.4 years with an L0 curve. We recommend increasing the life to 40 years, as well as changing the curve to an R1.5. Our net salvage recommendation is negative 10%. The depreciation rate decreases from 4.27% to 2.24%.

<u>Account 391.1—Office Furniture and Equipment</u>

The existing and prior-study ASL is 20 years, which we have retained. The dispersion pattern is an L0, which is reflected across the full and most recent bands analyzed. We also recommend retaining zero net salvage. The depreciation rate changes from 4.81% to 3.85%, which is due to the reserve position.

<u>Account 391.2—Computer Equipment</u>

The ASL indications from prior, existing and current study show an increase. Our recommendation is to increase the existing ASL of 7 years to 10 years. We recommend changing the dispersion pattern from an SQ to an L2. Net salvage remains at zero. The depreciation rate decreases from 14.29% to 12.08%, which is due to the increase in ASL.

<u>Account 392—Transportation Equipment</u>

The existing ASL is 10.5 years. Our recommendation is 12 years and an L2 curve, which is a change from the existing L1.5. The existing net salvage factor of positive 10% is being increased to positive 15% due to the indications of the most recent 3-year activity and the full history indications. The resulting depreciation rate decreases from 9.52% to 0.26%.

<u>Account 393—Stores Equipment</u>

The existing 25.3-year ASL is increased to 30 years based upon the bands analyzed. The curve changes to a slightly steeper pattern, moving from an R2 to an R2.5. The existing net salvage factor is zero, which we are changing to positive 5%. The resulting depreciation rate decreases from 3.95% to 1.77%.

<u>Account 394—Tools, Shop and Garage Equipment</u>

Prior-study and existing ASLs are at 40 years. Our recommendation would be to decrease the ASL to 20 years based upon the type and mix of assets. The curve is changed from an S1 to an R5. Net salvage is increased from zero to positive 10%, which is based upon the indications in all bands analyzed. The depreciation rate changes from 2.50% to 3.99%, due mainly to the change in life.

Account 395—Laboratory Equipment

The prior-study, existing and current-study recommendation is to retain the 38-year ASL. The dispersion pattern changes from an S1 to an R2.5. The net salvage factor of zero is retained. The depreciation rate decreases from 2.66% to 1.63%.

Account 396—Power-Operated Equipment

The results from the prior, existing and current study remain the same at 15 years for ASL. The curve changes from an S4 to an L3 based upon the 5+10-year fit. Net salvage remains at positive 5%. The resulting depreciation rate is a decrease from 6.67% to 5.46%, which is due to the reserve position.

Account 397—Communication Equipment

The current study recommends increasing the ASL from the existing 20.2 years to 25 years, which is based upon the fits for all bands. The curve is also changed from an S5 to an R2. Net salvage remains unchanged at zero. The resulting depreciation rate is a decrease from 4.95% to 3.31%.

Account 398—Miscellaneous Equipment

The existing and prior-study ASLs are 27 years. The current study indicates that the ASL is declining, and we recommend moving toward those indications with a decrease of 5 years to 22 years. The dispersion pattern changes very slightly from an R1 to an L1.5. Net salvage remains unchanged at zero. The resulting depreciation rate is an increase from 3.75% to 4.36%, which is due to the reserve position.

APPENDIX B

This appendix consists of a glossary of terms frequently used in depreciation accounting. This glossary is from the book, *Public Utility Depreciation Practices*, August 1996. This was compiled and edited by the Staff Subcommittee on Depreciation of The NARUC Finance and Technology Committee of the National Association of Regulatory Utility Commissioners.

GLOSSARY

Accelerated Capital Recovery System (ACRS)
The 1982 Economic Recovery Tax Act (ERTA) established this accelerated depreciation method liberalizing previous tax laws (Class Life System and Asset Depreciation Range) for capital assets placed in service after December 31, 1980, and before January 1, 1987. This method allows for shorter lives and accelerated methods for calculating tax depreciation expense.

Accelerated Depreciation
A generic term for depreciation methods that allow larger depreciation accruals in the early years of an asset's life and diminishing accruals in later years compared to straight-line methods. The various accelerated depreciation methods accomplish the same goal, i.e., to recover the investment over the life of the plant, but the timing of the depreciation accruals is varied depending on the method selected. Accelerated depreciation is currently used for tax depreciation but not for regulated book depreciation.

Accounting Period
The period of time for which the accounting data is regularly reported.

Accrual
<ins>See</ins> **Depreciation Accruals.**

Accrual Accounting
An accounting procedure that attempts to match revenue and expense for a particular accounting period, regardless of when the actual cash flow takes place.

Accrual Weighting
The process of determining an average service life (ASL) by means of weighting factors calculated by dividing component net or gross investment amounts by the corresponding life of each component. Gross book investment is used to weight average service lives, and net investment is used to weight the remaining lives. The weighting factors are the annual depreciation accruals (neglecting net salvage) for the components. The composite life is the sum of the net or gross investments divided by the sum of the accruals. <ins>See</ins> **Reciprocal Weighting, Direct Weighting.**

Accrued Depreciation
<ins>See</ins> **Depreciation Accruals.**

Accumulated Depreciation Account
The account that reflects the portion of the cost of existing plant that has been expensed. Also referred to as the "accumulated provision for depreciation" account.

Acquisition Cost
The price paid for material, supplies and plant. The acquisition cost will be the same as original cost or book cost for materials, supplies and plant purchased new. However, if operating plant is purchased, the acquisition cost may differ from the original cost of the plant.

Activity Year
Usually refers to the accounting data for a particular calendar year or other designated accounting period. For example, the 1995 activity year retirement would refer to the total retirements occurring (from all existing vintages) during 1995.

Actuarial Analysis
The translation of mortality data into statistics or charts displaying the relationships among age, retirements, realized life, unrealized life, life expectancy and indicated average life. It can also refer to the body of age-dependent statistical procedures used to study mortality data.

Additions
See **Gross Additions.**

Age
The length of time, in years, the survivors of a vintage have been in service. This may be stated as (1) age at a particular location or (2) age since originally placed in service without regard to location. The first would be "location life" age and the second would be "cradle-to-grave" age. Because it is assumed that plant is added evenly throughout the year (or on the average, all at midyear), age as of the end of a calendar year will normally be 0.5, 1.5, 2.5, . . . rather than 1.0, 2.0, 3.0, ... See **Age Interval.**

Aged Data
A collection of property data for which the dates of placements, retirements, transfers and other actions are known.

Age Distribution of Plant
The surviving investment, in units or dollars, by year of placement (vintage year).

Age Interval
Age interval is measured from the beginning of one period of observation (usually a year) to the beginning of the next consecutive period. See **Half-Year Convention.**

Amortization
The process of allocating a fixed amount, such as the total cost of an asset, to an expense account over future accounting periods.

Annuity Rate
See **Sinking Fund.**

Asset
Tangible or intangible property that has economic value. Although loosely thought of as anything that has value to its owner, in accounting, it must be measurable and must possess future utility. In other words, it must possess utility beyond the current accounting period, such as cash, a building, a generating unit or telephone central office equipment.

Average Life
The average expected life of all units of a group when new. It is determined as the arithmetic average of the lives of the units. It is equal to the area under the survivor curve divided by the original placements. <u>See</u> **Average Service Life, Vintage Average Life-Vintage Group Procedure, Vintage Average Life-Equal Life Group Procedure.**

Average Net Salvage
The composite of the past and future net salvage. <u>See</u> **Net Salvage.**

Average Realized Life
<u>See</u> **Realized Life.**

Average Remaining Life
The future expected service in years of the survivors at a given age. For single units or single age groups of property, the age of the survivors plus the remaining life equals the probable life. Using this relationship, the probable life curve is drawn so that for any age along the survivor curve, the horizontal distance to the probable life curve represents the remaining life. At any given age, the average remaining life is the unrealized life divided by the proportion surviving at that age.

Average Retirement Unit Cost
The average (annual or cumulative) installed cost of a unit of plant that is normally placed in large quantities for which development of an actual unit cost is not practical.

Average Service Life (ASL)
Average service life is the same as average life when a single group is involved. When two or more groups, such as vintages, categories or plant accounts are involved, the average service life is the reciprocal or harmonic average of the lives of the groups.

Average Year of Final Retirement (AYFR)
The direct weighted average of the individual estimated final retirement years for existing units in a major structure category. It is generally used in conjunction with an interim retirement life table to develop vintage group remaining lives. <u>See</u> **Life Span, Major Structure.**

Average Year of Placement (AYP)
The direct weighted average of the individual placement years for existing units in a major structure category. Weighting is generally based on investment. AYP may be used to develop an AYFR, by adding an estimated life span. <u>See</u> **Life Span, Major Structure.**

Band
A period of three or more years for which the average life and the retirement pattern (dispersion) can be determined through actuarial analysis of mortality experience.

Betterment
An addition to the plant that provides new or increased services, more efficient operation, increased safety or reliability and increased capacity.

Book Cost
The amount at which property is recorded on the books. <u>See</u> **Original Cost, Net Book Cost, Acquisition Cost.**

Book Depreciation
Depreciation accruals calculated on a "straight-line" basis for regulatory purposes. These depreciation charges are designed to spread the cost of plant uniformly over its estimated service life.

Book Reserve
See **Accumulated Depreciation Account.**

Broad Group Procedure
Under this procedure, all units of plant within a particular depreciation category, usually a plant account or subaccount, are considered to be one group. The broad group procedure requires, at a minimum, records of annual additions and balances. Records of retirements by vintage are desirable.

Capital Recovery
Recovery of the cost of assets from revenues generated by use of the asset over a number of accounting periods.

Class of Plant
A group of assets having common physical or mortality characteristics as prescribed by a system of accounts, commonly referred to as a plant account.

Composite Depreciation Rate
The weighted average of two or more component rates. Accruals resulting from the application of a composite depreciation rate should always equal the accruals calculated by applying the component rates to their related investments.

Computed Mortality
A model that computes retirement data, rather than using actual data, by year of placement, based on a curve shape considered reasonable for the plant.

Conformance Index (CI)
A measure of closeness of fit between calculated and actual balances in the Simulated Plant-Record Model. The best fits are those with the highest CIs. The CI equals 1,000 divided by the index of variation (IV). See **Simulated Plant-Record Model (SPR).**

Continuing Property Record (CPR)
A perpetual collection of essential records showing the detailed original costs, quantities and locations of plant in service. These records vary in detail depending upon the kind of plant. CPRs are required by most systems of accounts. Generally, a CPR should contain 1) an inventory of property record units that can be readily checked for proof of physical existence, 2) the association of costs with such property record units to ensure accurate accounting for retirements and 3) the dates of installation and removal of plant to provide data for use in connection with depreciation studies.

Converted Life Table
A life table with the same basic shape as the Graduated Life Table from which it was developed but having whatever average life was specified by the analyst.

Cost of Removal
The costs incurred in connection with the retirement from service and the disposition of depreciable plant. Cost of removal may be incurred for plant that is retired in place. See **Net Salvage**.

Cradle-to-Grave
An accounting method that treats a unit of plant as being in service from the time it is first purchased until it is finally junked or disposed of. Periods in shop for refurbishing, and in stock awaiting reinstallation are included in the service life. See, in contrast, **Location Life.**

Depletion
The loss of service value incurred in connection with the exhaustion of a natural resource in the course of service.

Depreciable Base
The cost of plant in service that is allocable to expense during the service life of the property through the depreciation process.

Depreciable Plant
Plant in service for which it is proper to allocate the original cost to annual expense through the depreciation process. Items such as land and plant under construction are not considered depreciable.

Depreciation
As applied to the depreciable plant of utilities, the term depreciation means the loss in service value not restored by current maintenance, incurred in connection with the consumption or prospective retirement of utility plant in the course of service from causes that are known to be in current operation, against which the company is not protected by insurance, and the effect of which can be forecast with reasonable accuracy. Among the causes to be considered are wear and tear, decay, action of the elements, inadequacy, obsolescence, changes in the art, changes in demand and the requirement of public authorities.

Depreciation Accounting
The process of charging the book cost of depreciable property, adjusted for net salvage, to operations over its useful life. See **Depreciable Base, Service Value.**

Depreciation Accruals
The amount of depreciation expense during each period of an asset's life. The amount is developed by applying a depreciation rate to the appropriate depreciation base. Depreciation accruals are charged to depreciation expense accounts or clearing accounts and credited to the accumulated depreciation account.

Depreciation Base
The cost of depreciable plant to which the depreciation rate is applied to compute the amount of depreciation expense. Under a cost basis method, the depreciation base is the original cost of the depreciable plant.

Depreciation Expense
The periodic charge to expense to allocate the cost of depreciable plant over the expected service life of the plant. See **Depreciation Accruals, Accumulated Depreciation Account.**

Depreciation Rate
The rate applied to the depreciation base to determine the amount of depreciation expense for an accounting period.

Depreciation Reserve
See **Accumulated Depreciation Account.**

Direct Weighting
The process of computing the weighted average of a set of numbers by multiplying each by its corresponding weight, and then dividing the sum of the products by the sum of the weights.

Economic Depreciation
The change in economic value of an asset from one time period to the next.

Economic Life
The total revenue producing life of an asset.

Exposure
Depreciable property subject to retirement during a period.

Extraordinary Retirement
Unanticipated nonrecurring retirement of plant not recognized in setting depreciation rates, with a loss in service value not covered by insurance. Usually, the charging of the retirement against the reserve will unduly deplete the reserve. Early retirements brought about by technological and social changes should properly be considered in depreciation accruals and should not be considered extraordinary.

Final Retirement
The retirement of a major structure unit in its entirety, or a very large part of it, as opposed to interim retirements.

Future Life Expectancy
See **Average Remaining Life.**

Forecast Method
See **Life Span.**

Generation Arrangement
An exhibit that displays the age, plant surviving, proportion surviving, realized life and the calculation of the remaining life and average life of each vintage. This exhibit is used to combine the past realized life with the expected future life and produces the composite average service life and average remaining life for each category.

Gompertz-Makeham Formula
Formula used to calculate a least squares mathematical algorithm (root-mean-square) to fit an observed life table.

Graduation
A method of smoothing and extending an observed life table to zero percent surviving. See **Gompertz-Makeham Formula, Iowa Curves.**

Gross Additions
Plant additions made during an accounting period. These additions do not include adjustments, transfers and reclassifications applicable to plant placed in a previous year.

Gross Salvage
The amount recorded for the property retired due to the sale, reimbursement or reuse of the property.

Group Depreciation
In depreciation accounting, a procedure under which depreciation charges are accrued on the basis of the original cost of all property included in each depreciable group.

h Curves
A system of mathematically-developed, generalized survivor curves based on the truncated normal distribution (curve). The h curves are used by the New York Department of Public Service and most New York utilities.

Half-Year Convention
For calculation purposes, the units installed during an age interval are assumed to have been installed simultaneously at the middle of the interval and thus to have an age dating from the middle of the interval during which they were placed in service. See **Age Interval.**

Harmonic Weighting
See **Reciprocal Weighting.**

Historical Cost
See **Book Cost.**

Index of Variation (IV)
The conformance index divided by 1,000. See **Conformance Index (CI).**

Indirect Weighting
See **Reciprocal Weighting.**

Installations
See **Gross Additions.**

Installed Cost
The cost of labor, material, engineering and overhead associated with transporting and delivering, attaching, testing and preparing a piece of equipment for the purpose for which it is acquired. These outlays are capitalized as part of the cost of the asset. This is also referred to as in-place cost.

Interim Additions
As used in life span analysis, additions made subsequent to the year in which the unit was placed in service. Interim additions are not considered in the depreciation computation until they occur.

Interim Retirements
As used in life span analysis, retirements of component parts of a major structure prior to the complete removal of the retirement unit from service. See **Final Retirement, Retirement Unit.**

Interim Retirement Ratio
The ratio of the interim dollars retired from a group during a period divided by the total dollars in service at the beginning of the period.

Interim Salvage
Salvage received from the disposition of plant as a result of interim retirements.

Iowa Curves
Several families of curve shapes derived empirically from analysis of the mortality data for many different types of industrial property.

Life
A general term, used broadly to refer to the period of time during which depreciable plant is in service. See **Average Life, Average Remaining Life, Average Service Life (ASL), Economic Life, Life Characteristics, Life Cycle, Life Indication, Location Life, Probable Life, Realized Life, Service Life, Unrealized Life.**

Life Characteristics
A general term to refer to the average life and shape of a survivor curve.

Life Cycle
The state of an asset at every point in time from its inception to termination with the asset passing through identifiable and predictable stages.

Life Indication
A life indicated by analysis of historical property records.

Life Span
The number of years between the year of installation of a major structure unit and its year of final retirement.

Life Table
A tabulation showing the proportion of the original additions surviving at successive ages after placement. See **Survivor Curve.**

Location Life
The period of time during which depreciable plant is in service at one location. See, in contrast, **Cradle-to-Grave Accounting.**

Major Structure
A large, identifiable unit of plant or any assembly of plant, most of which will continue in service until final retirement. See **Interim Retirements, Final Retirement, Average Year of Final Retirement.**

Mass Property Group or Account
An account consisting of large numbers of similar units, the life of any one of which is not, in general, dependent upon the life of any of the other units. For such classes of plant, the retirement of a group of units occurs gradually until the last unit is retired. The retirements and additions to the account occur more or less continually and systematically.

Mortality Data
See **Aged Data.**

Mortality Rate
See **Retirement Ratio (Rate).**

Net Book Cost
The recorded cost of an asset or group of assets minus the accumulated depreciation of those assets.

Net Salvage
The gross salvage for the property retired less its cost of removal.

Observed Life Table
A series of percents surviving, by age, reflecting the actual experience recorded in a band of mortality data.

Original Cost
The cost of property when first placed in service. See **Book Cost.**

Placement Year
See **Vintage Year.**

Probable Life
The total expected service life for survivors at a given age. It is the sum of the age of the survivors and their remaining life.

Projection Life
The average life expectancy of new additions to plant. See **Projection Life Table.**

Projection Life Table
A series of percents surviving, by age, selected to reflect the appropriate retirement pattern and used to develop the remaining life at any age. The projection life table is described by specifying a curve shape (e.g., Gompertz-Makeham or Iowa curve) and the projection life.

Property Group
A collection of units having similar mortality characteristics for depreciation study purposes.

Property Units
See **Units of Property.**

Proportion Surviving
The ratio of units or dollars surviving in a vintage at a given point in time to the gross additions to the vintage. This should not be confused with the Survival Ratio, which is the complement of the Retirement Ratio. See **Survival Ratio.**

Realized Life
A vintage's average realized life is the average years of service experienced to date from the vintage's original installation.

Reciprocal Weighting
The process of computing the weighted average of a set of numbers by dividing each by its corresponding weights, and then dividing the sum of the weights by the sum of the quotients. See **Accrual Weighting, Direct Weighting.**

Remaining Life
See **Average Remaining Life.**

Remaining Life Span
See **Life Span.**

Remaining Life Technique
A technique used to determine the annual depreciation accruals required to recover the undepreciated service value over its remaining life. The annual depreciation accruals amount is the original cost less accumulated depreciation and future net salvage divided by the remaining service life.

Reserve
See **Accumulated Depreciation Account.**

Reserve Imbalance
Difference between the accumulated depreciation account and the theoretical reserve at a point in time. See **Theoretical Depreciation Reserve.**

Reserve Ratio
The accumulated depreciation divided by its associated plant balance, expressed as a percentage.

Reserve Requirement
See **Theoretical Depreciation Reserve.**

Retirement
The sale, abandonment, destruction or withdrawal of assets from service.

Retirement Dispersion
The distribution of retirements by age. See **Retirement Frequency Curve.**

Retirement Experience Index (REI)
The REI associated with a retirement dispersion pattern is the percentage of installations from the oldest vintage that would have retired by the end of the most recent year in the chosen band of years if the installations retired according to the specified survivor curve. The higher the REI, the more assurance that a unique retirement pattern was used in the SPR simulation.

Retirement Frequency Curve
The retirement frequency curve shows the distribution of the percentage (or number) retired at each age.

Retirement Ratio (Rate)
The ratio of the number of units (or dollars) retired from a group during a period divided by the units (or dollars) in service at the beginning of the period.

Retirement Unit
The largest unit of plant for which addition and retirement records are maintained as defined by the relevant accounting system. See **Average Retirement Unit Cost.**

Reuse Salvage
The material (as opposed to labor) portion of a retirement, reported as salvage and placed in materials and supplies in anticipation of putting it back into service.

Salvage
See **Gross Salvage, Net Salvage.**

Service Life
See **Life.**

Service Value
The original cost of an asset less its estimated net salvage. See **Depreciable Base.**

Simulated Plant-Record Model (SPR)
A trial-and-error model used to estimate the average service life of a depreciable group. The SPR model simulates retirements and the resultant plant balances for combinations of standardized survivor curves and average service lives and compares the results to the historical data until a good match is found.

Sinking Fund Method
Under this method, the depreciation accrual is composed of two parts: an annuity and interest on the accumulated depreciation. As compared with the straight-line method, the sinking fund method produces lower early accruals and higher accruals in the latter part of the service life.

Statistical Aging
See **Computed Mortality.**

Straight-Line Method
A depreciation method by which the service value of plant is charged to depreciation expense (or a clearing account) and credited to the accumulated depreciation account through equal annual charges over its service life. See **Depreciation Rate.**

Survivor Curve
A plot representing the percent surviving at each age.

Survival Ratio
The ratio of the number of units (or dollars) surviving in a group at the end of a period to the number of units (or dollars) in the group at the beginning of that period. The ratio is equal to one minus the retirement ratio. See **Proportion Surviving.**

T-cut
A truncation of the observed life table values that is generally used in a mathematical fitting of a curve to the observed values.

Theoretical Depreciation Reserve
The calculated balance that would be in the accumulated depreciation account at a point in time using current depreciation parameters, such as average service and net salvage. Also known as "reserve requirement" or "calculated accumulated depreciation (CAD)." See **Accumulated Depreciation Account.**

Turnover Methods
Methods of estimating service life based on the time it takes the plant to "turn over," that is, the time it takes for the actual retirements to exhaust a previous plant balance. See **Computed Mortality.**

Total Life
A term sometimes used to represent the sum of the age and the remaining life. Not to be confused with average service life.

Type Curves
Generalized survivor curve families, for example, Iowa, h and Bell curves.

Unit Depreciation Procedure
The depreciation procedure in which each plant unit (retirement unit) is accounted for individually in the depreciation process, as compared to the "group" depreciation procedure.

Unit of Production Method
A straight-line depreciation method that allocates the depreciable base to expense on a "use" or production basis using, for example, miles, megawatt-hours or cubic feet, as opposed to the allocation of the depreciable base over the average service life in years.

Units of Property
The terms in which quantities of plant are expressed, for example, dollars, poles, sheath-feet, lines.

Unrealized Life
That portion of the average life of a vintage group expected to be realized subsequent to the study date. Realized life plus unrealized life equals the vintage group average life.

Vintage Group
Plant placed in service during the same year. See **Vintage Year.**

Vintage Average Life-Vintage Group Procedure
The average life of a vintage is calculated by dividing the total unit-years or dollar-years lived during the total life of the vintage by the original number of units or dollars in the vintage.

Vintage Group Procedure
Under this procedure, each vintage within the depreciation category is considered to be a separate group. This requires that each vintage group be analyzed separately to determine its average life, and then the average lives of all vintages are composited to produce the average service life for the plant class.

Vintage Year
Year of placement of a group of property. See **Vintage Group.**

Weighting
See **Accrual Weighting, Direct Weighting, Reciprocal Weighting.**

Whole Life Technique
The whole life technique bases the depreciation rate on the estimated average service life of the plant. See **Average Service Life.** See, in contrast, **Remaining Life Technique.**

COMPARISON OF DEPRECIATION AMOUNTS AND RATES
SOURCE FERC FORM 1, 2002
PAGES 110 AND 114

[1] UTILITY	[2] 12/31/2001 BALANCE $	[3] 12/31/2002 BALANCE $	[4] AVERAGE BALANCE $	[5] ANNUAL AMOUNT $	[6] DEPREC. RATE %
EMPIRE DISTRICT	**1,069,175,974**	**1,108,384,516**	**1,088,780,245**	**24,764,316**	**2.27**
KANSAS G & E	3,738,912,169	3,771,693,990	3,755,303,080	64,485,439	1.72
ILLINOIS POWER	2,826,758,945	2,900,259,440	2,863,509,193	66,515,070	2.32
NIAGARA MOHAWK POWER	6,609,177,309	8,000,474,605	7,304,825,957	190,808,323	2.61
PUBLIC SERVICE COLORADO	7,152,766,788	7,325,017,027	7,238,891,908	189,327,033	2.62
CINCINNATI G & E	5,793,079,260	6,073,225,551	5,933,152,406	163,234,717	2.75
UNION ELECTRIC	9,279,855,829	9,762,262,735	9,521,059,282	271,339,945	2.85
NEW YORK STATE E & G	3,359,262,122	3,354,672,716	3,356,967,419	96,709,102	2.88
PSI ENERGY	4,909,007,459	5,135,410,332	5,022,208,896	146,506,230	2.92
PUGET SOUND ENERGY	5,955,481,829	6,142,161,302	6,048,821,566	177,294,073	2.93
PENNSYLVANIA ELECTRIC	1,845,172,146	1,844,983,717	1,845,077,932	55,453,176	3.01
PUBLIC SERVICE OKLAHOMA	2,638,198,690	2,671,060,128	2,654,629,409	80,208,010	3.02
KANSAS CITY P & L	4,332,463,597	4,428,432,911	4,380,448,254	132,599,638	3.03
AQUILA, INC.	3,580,042,757	3,649,185,694	3,614,614,226	109,591,517	3.03
OKLAHOMA G & E	3,945,598,164	4,083,929,604	4,014,763,884	122,235,184	3.04
SIERRA PACIFIC POWER	2,326,712,189	2,385,894,608	2,356,303,399	71,940,550	3.05
LOUISVILLE G & E	3,165,823,064	3,319,858,912	3,242,840,988	101,054,754	3.12
ENTERGY ARKANSAS, INC.	5,434,898,422	5,674,830,721	5,554,864,572	175,238,529	3.15
DAYTON P & L	3,524,184,638	3,604,567,361	3,564,376,000	113,533,017	3.19
UNITED ILLUMINATING	868,249,767	695,619,266	781,934,517	25,223,618	3.23
SOUTHWESTERN ELECTRIC POWER	3,339,591,256	3,419,576,021	3,379,583,639	109,210,693	3.23
CENTRAL ILLINOIS P S	1,504,112,252	1,553,060,714	1,528,586,483	50,376,791	3.30
INTERSTATE P & L	3,891,477,506	4,022,333,943	3,956,905,725	133,151,501	3.37
CENTRAL ILLINOIS LIGHT	1,800,574,143	1,836,162,016	1,818,368,080	63,125,184	3.47
METROPOLITAN EDISON	1,582,318,803	1,592,612,775	1,587,465,789	56,003,806	3.53
PORTLAND GENERAL ELECTRIC	3,498,986,622	3,625,250,480	3,562,118,551	154,777,246	4.35
ROCHESTER G & E	2,268,336,828	2,355,962,189	2,312,149,509	102,758,007	4.44
TOTALS	99,171,042,554	103,228,498,758	101,199,770,656	3,022,701,153	2.99
UNWEIGHTED AVERAGE					3.08
STANDARD DEVIATION					0.53