TABLE P-1
SCHEDULE OF ANNUAL EXPENDITURES - 10% CONTINGENCY
UNIT 1 – CONSOLIDATED (INCLUDES SITE FACILITIES)
(thousands, 2019 dollars)

Year	Labor	Equipment & Materials	Energy	Burial	Other	Total
2040	340	0	0	0	0	340
2041	580	0	0	0	0	580
2042	580	0	0	0	0	580
2043	3,280	0	0	0	0	3,280
2044	5,199	0	0	0	0	5,199
2045	60,775	4,327	1,468	12	4,203	70,785
2046	79,717	16,056	3,748	14,253	21,681	135,454
2047	63,001	30,117	2,378	28,536	8,550	132,582
2048	64,265	27,775	2,356	24,215	7,536	126,147
2049	51,673	13,740	1,877	17,743	6,684	91,717
2050	51,801	14,125	1,877	17,743	6,684	92,230
2051	36,150	10,663	1,262	13,951	5,773	67,799
2052	8,585	2,177	0	3	2,206	12,971
2053	8,572	2,177	0	3	2,200	12,951
2054	20,710	2,814	311	10	1,945	25,790
2055	14,455	10,254	286	2	576	25,573
2056	12,088	10,344	251	0	376	23,059
2057	538	834	8	0	11	1,390
2058	154	462	0	0	0	616
2059	180	539	0	0	0	719
2060	180	539	0	0	0	719
2061	180	539	0	0	0	719
2062	180	539	0	0	0	719
2063	180	539	0	0	0	719
2064	180	539	0	0	0	719
2065	180	539	0	0	0	719
2066	154	462	0	0	0	616
2067	180	539	0	0	0	719
2068	180	539	0	0	0	719
2069	180	539	0	0	0	719
2070	180	539	0	0	0	719
2071	180	539	0	0	0	719
2072	180	539	0	0	0	719

TABLE P-1 (continued)
SCHEDULE OF ANNUAL EXPENDITURES - 10% CONTINGENCY
UNIT 1 – CONSOLIDATED (INCLUDES SITE FACILITIES)
(thousands, 2019 dollars)

Year	Labor	Equipment & Materials	Energy	Burial	Other	Total
2073	180	539	0	0	0	719
2074	154	462	0	0	0	616
2075	180	539	0	0	0	719
2076	180	539	0	0	0	719
2077	180	539	0	0	0	719
2078	180	539	0	0	0	719
2079	180	539	0	0	0	719
2080	180	539	0	0	0	719
2081	180	539	0	0	0	719
2082	154	462	0	0	0	616
2083	180	539	0	0	0	719
2084	180	539	0	0	0	719
2085	180	539	0	0	0	719
2086	180	539	0	0	0	719
2087	180	539	0	0	0	719
2088	180	539	0	0	0	719
2089	180	539	0	0	0	719
2090	154	462	0	0	0	616
2091	180	539	0	0	0	719
2092	180	539	0	0	0	719
2093	180	539	0	0	0	719
2094	180	539	0	0	0	719
2095	103	308	0	0	0	411
2096	308	924	0	0	0	1,232
2097	154	3,376	0	0	27,411	30,942
2098	1,844	2,587	0	1,277	1,716	7,425
2099	0	0	0	0	0	0
Total	491,239	172,165	15,822	117,748	97,552	894,526

Note: One third of the decommissioning cost of each of the Site Facilities (Stored Steam Generators and Storage Facility, Water Reclamation Facility, Water Reclamation Supply System Pipeline & Structures, Evaporation Ponds, Make-up Water Reservoir, Stored Reactor Closure Heads & Storage Facility, and ISFSI) has been allocated to each unit's cash flow.

TABLE P-2
SCHEDULE OF ANNUAL EXPENDITURES - 10% CONTINGENCY
UNIT 2 – CONSOLIDATED (INCLUDES SITE FACILITIES)
(thousands, 2019 dollars)

Year	Labor	Equipment & Materials	Energy	Burial	Other	Total
2040	0	0	0	0	0	0
2041	0	0	0	0	0	0
2042	0	0	0	0	0	0
2043	0	0	0	0	0	0
2044	0	0	0	0	0	0
2045	4,063	3,270	0	0	0	7,333
2046	78,246	5,335	1,788	4,606	6,427	96,403
2047	62,619	30,033	3,195	34,245	17,032	147,124
2048	67,460	29,892	2,382	33,093	7,838	140,665
2049	55,422	18,102	2,045	20,919	6,754	103,242
2050	49,499	12,618	1,875	14,701	6,207	84,901
2051	49,370	12,233	1,875	14,701	6,207	84,387
2052	30,975	8,993	1,065	11,142	5,042	57,217
2053	8,740	2,223	0	3	2,077	13,042
2054	20,747	2,829	311	10	1,766	25,663
2055	14,393	10,204	286	2	546	25,430
2056	12,023	10,286	251	0	375	22,936
2057	536	832	8	0	11	1,387
2058	154	462	0	0	0	616
2059	180	539	0	0	0	719
2060	180	539	0	0	0	719
2061	180	539	0	0	0	719
2062	180	539	0	0	0	719
2063	180	539	0	0	0	719
2064	180	539	0	0	0	719
2065	180	539	0	0	0	719
2066	154	462	0	0	0	616
2067	180	539	0	0	0	719
2068	180	539	0	0	0	719
2069	180	539	0	0	0	719
2070	180	539	0	0	0	719
2071	180	539	0	0	0	719
2072	180	539	0	0	0	719

TABLE P-2 (continued)
SCHEDULE OF ANNUAL EXPENDITURES - 10% CONTINGENCY
UNIT 2 – CONSOLIDATED (INCLUDES SITE FACILITIES)
(thousands, 2019 dollars)

Year	Labor	Equipment & Materials	Energy	Burial	Other	Total
2073	180	539	0	0	0	719
2074	154	462	0	0	0	616
2075	180	539	0	0	0	719
2076	180	539	0	0	0	719
2077	180	539	0	0	0	719
2078	180	539	0	0	0	719
2079	180	539	0	0	0	719
2080	180	539	0	0	0	719
2081	180	539	0	0	0	719
2082	154	462	0	0	0	616
2083	180	539	0	0	0	719
2084	180	539	0	0	0	719
2085	180	539	0	0	0	719
2086	180	539	0	0	0	719
2087	180	539	0	0	0	719
2088	180	539	0	0	0	719
2089	180	539	0	0	0	719
2090	154	462	0	0	0	616
2091	180	539	0	0	0	719
2092	180	539	0	0	0	719
2093	180	539	0	0	0	719
2094	180	539	0	0	0	719
2095	103	308	0	0	0	411
2096	308	924	0	0	0	1,232
2097	154	3,371	0	0	27,379	30,904
2098	1,844	2,587	0	1,277	1,716	7,425
2099	0	0	0	0	0	0
Total	463,024	173,607	15,081	134,700	89,377	875,788

Note: One third of the decommissioning cost of each of the Site Facilities (Stored Steam Generators and Storage Facility, Water Reclamation Facility, Water Reclamation Supply System Pipeline & Structures, Evaporation Ponds, Make-up Water Reservoir, Stored Reactor Closure Heads & Storage Facility, and ISFSI) has been allocated to each unit's cash flow.

TABLE P-3
SCHEDULE OF ANNUAL EXPENDITURES - 10% CONTINGENCY
UNIT 3 – CONSOLIDATED (INCLUDES SITE FACILITIES)
(thousands, 2019 dollars)

Year	Labor	Equipment & Materials	Energy	Burial	Other	Total
2040	0	0	0	0	0	0
2041	0	0	0	0	0	0
2042	0	0	0	0	0	0
2043	0	0	0	0	0	0
2044	0	0	0	0	0	0
2045	4,063	3,270	0	0	0	7,333
2046	1,169	3,381	0	3,997	984	9,530
2047	13,558	4,088	254	3,999	1,664	23,563
2048	92,949	14,061	3,341	11,458	16,056	137,865
2049	67,489	29,360	2,378	32,405	7,688	139,319
2050	67,174	28,598	2,342	31,301	7,589	137,003
2051	61,264	13,259	1,877	16,910	6,291	99,602
2052	61,421	13,290	1,882	16,957	6,308	99,859
2053	59,300	12,992	1,788	16,585	6,119	96,785
2054	40,120	6,124	690	5,191	2,660	54,784
2055	25,083	16,207	286	2	2,003	43,581
2056	22,691	17,274	251	0	2,095	42,311
2057	856	1,042	8	0	63	1,969
2058	154	462	0	0	0	616
2059	180	539	0	0	0	719
2060	180	539	0	0	0	719
2061	180	539	0	0	0	719
2062	180	539	0	0	0	719
2063	180	539	0	0	0	719
2064	180	539	0	0	0	719
2065	180	539	0	0	0	719
2066	154	462	0	0	0	616
2067	180	539	0	0	0	719
2068	180	539	0	0	0	719
2069	180	539	0	0	0	719
2070	180	539	0	0	0	719
2071	180	539	0	0	0	719
2072	180	539	0	0	0	719

TABLE P-3 (continued)
SCHEDULE OF ANNUAL EXPENDITURES - 10% CONTINGENCY
UNIT 3 - CONSOLIDATED (INCLUDES SITE FACILITIES)
(thousands, 2019 dollars)

Year	Labor	Equipment & Materials	Energy	Burial	Other	Total
2073	180	539	0	0	0	719
2074	154	462	0	0	0	616
2075	180	539	0	0	0	719
2076	180	539	0	0	0	719
2077	180	539	0	0	0	719
2078	180	539	0	0	0	719
2079	180	539	0	0	0	719
2080	180	539	0	0	0	719
2081	180	539	0	0	0	719
2082	154	462	0	0	0	616
2083	180	539	0	0	0	719
2084	180	539	0	0	0	719
2085	180	539	0	0	0	719
2086	180	539	0	0	0	719
2087	180	539	0	0	0	719
2088	180	539	0	0	0	719
2089	180	539	0	0	0	719
2090	154	462	0	0	0	616
2091	180	539	0	0	0	719
2092	180	539	0	0	0	719
2093	180	539	0	0	0	719
2094	180	539	0	0	0	719
2095	103	308	0	0	0	411
2096	308	924	0	0	0	1,232
2097	154	3,376	0	0	27,408	30,937
2098	1,844	2,587	0	1,277	1,716	7,425
2099	0	0	0	0	0	0
Total	526,068	189,705	15,097	140,083	88,643	959,596

Note: One third of the decommissioning cost of each of the Site Facilities (Stored Steam Generators and Storage Facility, Water Reclamation Facility, Water Reclamation Supply System Pipeline & Structures, Evaporation Ponds, Make-up Water Reservoir, Stored Reactor Closure Heads & Storage Facility, and ISFSI) has been allocated to each unit's cash flow.

DOCKET NO. _____

APPLICATION OF EL PASO ELECTRIC COMPANY TO CHANGE RATES	§ § §	PUBLIC UTILITY COMMISSION OF TEXAS

DIRECT TESTIMONY

OF

JOHN J. SPANOS

OF

GANNET FLEMING VALUATION AND RATE CONSULTANTS, LLC

FOR

EL PASO ELECTRIC COMPANY

JUNE 2021

EXECUTIVE SUMMARY

John J. Spanos, President of Gannett Fleming Valuation and Rate Consultants, LLC, supports depreciation rates for electric assets included in the Company's depreciation study in this rate case. Mr. Spanos summarizes the proposed depreciation rates for all assets, compares those rates to the Company's current rates, and explains some of the major factors that caused the change in depreciation rates. Those factors include incorporation of interim survivor curves which, Mr. Spanos explains, is consistent with the FERC Uniform System of Accounts, the NARUC Public Utility Depreciation Practices manual, and practice in every other jurisdiction of the country, although not with old Texas PUC precedent.

Mr. Spanos also testifies that he used the straight-line remaining life method of depreciation with the average service life procedure in performing his analysis. His testimony details the processes by which he determined service lives, net salvage percentages, and estimated annual depreciation accrual rates.

TABLE OF CONTENTS

EXHIBITS

I. Introduction and Purpose

Q. PLEASE STATE YOUR NAME AND ADDRESS.

A. My name is John J. Spanos. My business address is 207 Senate Avenue, Camp Hill, Pennsylvania.

Q. ARE YOU ASSOCIATED WITH ANY FIRM?

A. Yes. I am associated with the firm of Gannett Fleming Valuation and Rate Consultants, LLC ("Gannett Fleming").

Q. HOW LONG HAVE YOU BEEN ASSOCIATED WITH GANNETT FLEMING?

A. I have been associated with the firm since June 1986.

Q. WHAT IS YOUR POSITION WITH THE FIRM?

A. I am President.

Q. ON WHOSE BEHALF ARE YOU TESTIFYING IN THIS CASE?

A. I am testifying on behalf of El Paso Electric Company ("EPE" or the "Company").

Q. PLEASE STATE YOUR QUALIFICATIONS.

A. I have over 34 years of depreciation experience which includes giving expert testimony in more than 350 cases before 41 regulatory commissions, including the Public Utility Commission of Texas ("PUCT" or "Commission"). These cases have included depreciation studies in the electric, gas, water, wastewater, and pipeline industries. In addition to cases where I have submitted testimony, I have also supervised over 700 other depreciation or valuation assignments. Please refer to Exhibit JJS-1 for my qualifications statement, which includes further information with respect to my work history, case experience, and leadership in the Society of Depreciation Professionals.

Q. WHAT IS THE PURPOSE OF YOUR TESTIMONY IN THIS PROCEEDING?

A. The majority of EPE's depreciation rates were settled in its 2015 rate case, Docket No. 44941, however, some new assets had depreciation rates established in EPE's 2017 rate case, Docket No. 46831. I sponsor the depreciation study performed for EPE ("Depreciation Study") included in the Rate Filing Package. The Depreciation Study sets forth the calculated annual depreciation accrual rates by account as of December 31, 2019. The proposed rates appropriately reflect the rates at which EPE's assets should be depreciated over their useful lives and are based on the most commonly used methods and procedures for determining depreciation rates.

Q. WHAT SCHEDULES ARE YOU SPONSORING?

A. I co-sponsor the portion of Schedule D-5 that presents the depreciation rates developed for EPE ("Depreciation Calculations") for these assets as of December 31, 2019. The proposed rates are set forth in Exhibit JJS-2 and appropriately reflect the rates at which EPE assets in these calculations should be depreciated over their useful lives. I also co-sponsor Schedule D-8 that presents the average service life of EPE's assets as of December 31, 2019.

Q. WERE THE SCHEDULES AND EXHIBITS YOU ARE SPONSORING OR CO-SPONSORING PREPARED BY YOU OR UNDER YOUR DIRECT SUPERVISION?

A. Yes, they were.

Q. CAN YOU SUMMARIZE THE DEPRECIATION RATES BASED ON EXHIBIT JJS-2 AND COMPARE THE CURRENT RATES TO THE PROPOSED RATES?

A. Yes. The table below sets forth a comparison of the current utilized depreciation rates and resultant expense to the proposed depreciation rates and expense for EPE plant in service as of December 31, 2019.

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TABLE JJS-1

	Current		Proposed	
Function	Rates	Proforma Expense	Rates	Expense
Steam	2.20	$12,463,182	3.25	$18,397,949
Gas Turbine	2.22	11,483,481	2.92	15,143,974
Transmission	1.23	6,570,583	1.70	9,023,893
Distribution	1.69	22,735,432	2.21	29,846,554
General	2.61	4,475,358	3.84	6,601,194
Total	1.84	$57,728,035	2.52	$79,013,564

Q. CAN YOU EXPLAIN SOME OF THE FACTORS THAT CAUSED CHANGES IN EXHIBIT JJS-2 FROM THE DEPRECIATION RATES CURRENTLY UTILIZED?

A. Yes. The major components that caused rates to change by function are as follows:

- Steam Production Plant: The utilization of updated probable retirement dates for some generating facilities, the capital additions at some of the older facilities, interim survivor curves for each account, and the proper weighted net salvage component.
- Gas Turbine Plant: The utilization of the proper weighted net salvage component, interim survivor curves and the capital additions for most facilities.
- Transmission Plant: The utilization of more negative net salvage percentages for Account 353 and 356 and the inclusion of new depreciable assets in Account 350.
- Distribution Plant: The utilization of more negative net salvage percentages for Accounts 364, 367, and 368.
- General Plant: The primary factor is the shorter remaining life for structures in Account 390.

II. Depreciation Calculations

Q. PLEASE DEFINE THE CONCEPT OF DEPRECIATION.

A. Depreciation refers to 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 which are known to be current operations against which the Company 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 the requirements of public authorities.

Q. DID YOU PREPARE THE DEPRECIATION STUDY FILED BY EPE IN THIS PROCEEDING?

A. Yes. I prepared the depreciation study presented in rate filing package Schedule D-5 and a summary of the proposed depreciation rates in Exhibit JJS-2 that are submitted by EPE with its filing in this proceeding. The schedule and exhibit set forth the results of my depreciation study as of December 31, 2019.

Q. PLEASE DESCRIBE THE CONTENTS OF YOUR REPORT.

A. My report is presented in nine parts. Part I, Introduction, presents the scope and basis for the Depreciation Study. Part II, Estimation of Survivor Curves, includes descriptions of the methodology of estimating survivor curves. Parts III and IV set forth the analysis for determining life and net salvage estimation. Part V, Calculation of Annual and Accrued Depreciation, includes the concepts of depreciation and amortization using the remaining life. Part VI, Results of Study, presents a description of the results and a summary of the depreciation calculations. Parts VII, VIII, and IX include graphs and tables that relate to the service life and net salvage analyses and the detailed depreciation calculations.

The table on pages VI-4 through VI-8 presents the estimated survivor curve; the net salvage percent; the original cost as of December 31, 2019; the book depreciation reserve; and the calculated annual depreciation accrual and rate for each account or subaccount. The section beginning on page VII-2 presents the results of the retirement rate analyses prepared as the historical bases for the service life estimates. The section beginning on page VIII-2 presents the results of the salvage analysis. The section beginning on page IX-2 presents the depreciation calculations related to surviving original cost as of December 31, 2019.

Q. PLEASE EXPLAIN HOW YOU PERFORMED YOUR DEPRECIATION STUDY.

A. I used the straight-line remaining life method of depreciation, with the average service life procedure. The annual depreciation is based on a method of depreciation accounting that seeks to distribute the unrecovered cost of fixed capital assets over the estimated remaining useful life of each unit, or group of assets, in a systematic and rational manner.

For General Plant Accounts 391, 393, 394, 395, 397, and 398[1], I used the straight-line remaining life method of amortization. The account numbers identified throughout my testimony represent those in effect as of December 31, 2019. The annual amortization is based on amortization accounting that distributes the unrecovered cost of fixed capital assets over the remaining amortization period selected for each account and vintage.

Q. HOW DID YOU DETERMINE THE ANNUAL DEPRECIATION ACCRUAL RATES?

A. I did this in two phases. In the first phase, I estimated the service life and net salvage characteristics for each depreciable group, that is, each plant account or subaccount identified as having similar characteristics. In the second phase, I calculated the composite remaining lives and annual depreciation accrual rates based on the service life and net salvage estimates determined in the first phase.

Q. PLEASE DESCRIBE THE FIRST PHASE OF THE DEPRECIATION STUDY IN WHICH YOU ESTIMATED THE SERVICE LIFE AND NET SALVAGE CHARACTERISTICS FOR EACH DEPRECIABLE GROUP.

A. The service life and net salvage study consisted of compiling historical data from records related to EPE's plant; analyzing these data to obtain historical trends of survivor characteristics; obtaining supplementary information from management and operating personnel concerning practices and plans as they relate to plant operations; and interpreting the above data and the estimates used by other electric utilities to form judgments of average service life and net salvage characteristics.

Q. WHAT HISTORICAL DATA DID YOU ANALYZE FOR THE PURPOSE OF ESTIMATING SERVICE LIFE CHARACTERISTICS?

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1 391, Office Furniture and Equipment; 393, Stores Equipment; 394, Tools, Shop and Garage Equipment; 395, Laboratory Equipment; 397, Communication Equipment; 398, Miscellaneous Equipment.

A. I analyzed the Company's accounting entries that record plant transactions during the period 1993 through 2019. The transactions included additions, retirements, transfers, sales, and the related balances.

Q. WHAT METHOD DID YOU USE TO ANALYZE THESE SERVICE LIFE DATA?

A. I used the retirement rate method. This is the most appropriate method when retirement data covering a long period of time is available because this method determines the average rates of retirement actually experienced by the Company during the period of time covered by the Depreciation Study.

Q. PLEASE DESCRIBE HOW YOU USED THE RETIREMENT RATE METHOD TO ANALYZE EPE'S SERVICE LIFE DATA.

A. I applied the retirement rate analysis to each different group of property in the study. For each property group, I used the retirement rate data to form a life table that, when plotted, shows an original survivor curve for that property group. Each original survivor curve represents the average survivor pattern experienced by the several vintage groups during the experience band studied. The survivor patterns do not necessarily describe the life characteristics of the property group; therefore, interpretation of the original survivor curves is required in order to use them as valid considerations in estimating service life. The Iowa-type survivor curves were used to perform these interpretations.

Q. WHAT IS AN "IOWA-TYPE SURVIVOR CURVE" AND HOW DID YOU USE SUCH CURVES TO ESTIMATE THE SERVICE LIFE CHARACTERISTICS FOR EACH PROPERTY GROUP?

A. Iowa-type curves are a widely used group of survivor curves that contain the range of survivor characteristics usually experienced by utilities and other industrial companies. The Iowa curves were developed at the Iowa State College Engineering Experiment Station through an extensive process of observing and classifying the ages at which various types of property used by utilities and other industrial companies had been retired.

Iowa-type curves are used to smooth and extrapolate original survivor curves determined by the retirement rate method. The Iowa curves and truncated Iowa curves were used in this study to describe the forecasted rates of retirement based on the observed rates of retirement and the outlook for future retirements.

The estimated survivor curve designations for each depreciable property group indicate the average service life, the family within the Iowa system to which the property group belongs, and the relative height of the mode. For example, the Iowa 65-R2 indicates an average service life of sixty-five years; a right-moded, or R, type curve (the mode occurs after average life for right-moded curves); and a moderate height, 2, for the mode (possible modes for R type curves range from 1 to 5).

Q. WHAT APPROACH DID YOU USE TO ESTIMATE THE LIVES OF SIGNIFICANT FACILITIES SUCH AS PRODUCTION PLANTS?

A. I used the life span technique to estimate the lives of significant facilities for which concurrent retirement of the entire facility is anticipated. In this technique, the survivor characteristics of such facilities are described by the use of interim survivor curves and estimated probable retirement dates.

The interim survivor curves describe the rate of retirement related to the replacement of elements of the facility, such as, for a building, the retirements of plumbing, heating, doors, windows, roofs, etc., that occur during the life of the facility. The probable retirement date provides the rate of final retirement for each year of installation for the facility by truncating the interim survivor curve for each installation year at its attained age at the date of probable retirement. The use of interim survivor curves truncated at the date of probable retirement provides a consistent method for estimating the lives of the several years of installation for a particular facility inasmuch as a single concurrent retirement for all years of installation will occur when it is retired.

Q. HAS GANNETT FLEMING USED THIS APPROACH IN OTHER PROCEEDINGS?

A. Yes, we have used the life span technique in performing depreciation studies presented to and accepted by many public utility commissions across the United States and Canada, including this Commission. This technique is currently being utilized by EPE in the same manner in this case as in the 2015 rate case and for the updated calculated rates in the 2017 rate case which were approved by this Commission.

Q. WHAT ARE THE BASES FOR THE PROBABLE RETIREMENT YEARS THAT YOU HAVE ESTIMATED FOR EACH FACILITY?

A. The probable retirement years are life spans for each facility that are based on informed judgment and incorporate consideration of the age, use, size, nature of construction, management outlook, and typical life spans experienced and used by other electric utilities for similar facilities. Most of the life spans result in probable retirement years that are many years in the future. As a result, the retirement of these facilities is not yet subject to specific management plans. Such plans would be premature. At the appropriate time, detailed studies of the economics of rehabilitation and continued use or retirement of the structure will be performed, and the results incorporated in the estimation of the facility's life span.

Q. WHAT IS LIFE SPAN PROPERTY?

A. Life span property is a term used to describe property for which all assets at a facility will be retired concurrently. Power plants and large buildings are textbook examples of life span property. When a power plant reaches the end of its useful life, all assets at the plant will be retired. The period of time from the original installation of the facility to the time it is retired from service is the life span of the facility.

Q. WILL ALL ASSETS AT A LIFE SPAN FACILITY BE IN SERVICE FOR THE ENTIRE LIFE SPAN OF THE FACILITY?

A. No. Many assets will be retired prior to the end of the facility. For power plants, assets such as pumps, piping, and boiler tubes must be replaced throughout the life of the facility in order for the plant to continue to operate and reach the end of its life span. Similarly, for buildings assets such as HVAC equipment and the roof will be replaced during the life of the building.

Q. BECAUSE MANY ASSETS WILL BE RETIRED PRIOR TO THE END OF THE LIFE SPAN OF THE FACILITY, SHOULD THE COSTS OF THESE ASSETS BE RECOVERED OVER THEIR SERVICE LIVES?

A. Yes. Depreciation principles require that the cost of an asset be allocated over its service life, as opposed to being recovered after the asset is retired. Interim retirements should therefore be depreciated over their service lives and should not be recovered after they are retired.

Q. DO AUTHORITATIVE DEPRECIATION TEXTS SUPPORT THAT INTERIM RETIREMENTS SHOULD BE INCLUDED IN DEPRECIATION?

A. Yes. The National Association of Regulatory Utility Commissioner's publication *Public Utility Depreciation Practices* (the "NARUC Manual") is a well-regarded, authoritative depreciation text. The NARUC Manual discusses the life span method and explains (emphasis added):

> Property studied using the life span method will usually have additions after the initial placement of the property and retirements prior to the final date of retirement of the property. Some interim additions may remain in service to the final retirement date, whereas others may be retired prior to this date. For example, a building may have a structural addition that will remain until the entire building is retired, whereas an addition such as a roof, plumbing, or internal partitions may be retired prior to the final building retirement. <u>Appropriate estimates must be made for such interim retirements</u>; however, interim additions are not considered in the depreciation base or rate until they occur.[2]

The NARUC Manual uses mandatory language stating that estimates for interim retirements must be included in depreciation.

Frank Wolf and Chester Fitch's publication *Depreciation Systems*, another highly regarded depreciation text, also explains that interim retirements are included in depreciation for life span property:

> The term *interim retirements* is used to describe those retirements that take place before the final retirement of all property. These retirements typically can be analyzed by standard methods to derive an interim survivor curve. The surviving property follows that curve until the end of the life span, when it drops to zero percent surviving. The resulting survivor curve for each vintage can be described as a truncated survivor curve. The average life of a vintage will be forecast by estimating the pattern of interim

2 National Association of Regulatory Utility Commissioners, *Public Utility Depreciation Practices* at 142 (1996).

survivors, estimating the date of final retirement, and calculating the area under the truncated survivor curve.[3]

Q. DOES THE UNIFORM SYSTEM OF ACCOUNTS REQUIRE THAT INTERIM RETIREMENTS BE INCLUDED IN DEPRECIATION?

A. Yes. The Uniform System of Accounts requires that the service value of an asset (original cost less net salvage) be allocated over the asset's service life. Since interim retirements will occur, the Uniform System of Accounts therefore requires that estimates of interim retirements be included in depreciation rates.

Specifically, Plant Instruction 22.A of the Uniform System of Accounts states (emphasis added):

> *Method.* Utilities must use a method of depreciation that allocates in a systematic and rational manner the service value of depreciable property <u>over the service life of the property.</u>

Service life is defined in Definition 36 of the Uniform System of Accounts:

> *Service life* means the time between the date electric plant is includible in electric plant in service, or electric plant leased to others, and the date of its retirement. If depreciation is accounted for on a production basis rather than on a time basis, then service life should be measured in terms of the appropriate unit of production.

The service life for interim retirements is the time between when the asset is placed in service and when it is retired. The Uniform System of Accounts therefore requires that these assets be depreciated over this period of time—that is, that these assets be depreciated over a time shorter than the full life span of the facility.

Q. IS THE COMMISSION'S PRECEDENT CONSISTENT WITH THESE REQUIREMENTS?

A. No. The Commission's precedent excludes interim retirements and therefore does not depreciate these assets over their service life. It instead requires that these assets be

3 Frank Wolf and Chester Fitch, *Depreciation Systems* at 283 (1994).

depreciated over a longer period of time, despite the fact that interim retirements can be estimated using widely accepted techniques. The Commission's precedent is therefore not consistent with the requirements of the Uniform System of Accounts.

Q. YOU HAVE EXPLAINED THAT INTERIM RETIREMENTS MUST BE INCLUDED IN ORDER TO BE CONSISTENT WITH AUTHORITATIVE DEPRECIATION TEXTS AS WELL AS THE UNIFORM SYSTEM OF ACCOUNTS. WHY HAVE EPE'S CURRENT DEPRECIATION RATES BEEN SETTLED WITHOUT INTERIM RATES OF RETIREMENT?

A. The depreciation rates agreed upon to settle the Company's last rate case were part of a larger settlement and should have no precedential effect. The only justification against the inclusion of interim retirements is prior Commission precedent regarding interim retirements based on ruling over 20 years ago. This precedent contradicts depreciation authorities, the Uniform System of Accounts, and the practices of every other jurisdiction in the country.

In a recent case, Docket No. 40443, the primary reason cited by the Administrative Law Judges ("ALJs") for excluding interim retirements was previous Commission precedent. The ALJs cite an order from 1990, in Docket Nos. 8425 and 8431, and state that "[t]he Commission has previously explained that interim retirements are not known and measurable and should be incorporated in the depreciation calculation when those retirements are actually made."[4]

Q. HAVE ANY OTHER RECENT DECISIONS ON THIS ISSUE BEEN BASED ON PRECEDENT?

A. Yes. In Docket No. 39896, the ALJs also cited Commission precedent to disallow the inclusion of interim retirements. However, the ALJs noted that while they did not wish to overturn precedent, they were persuaded that including interim retirements is actually the correct approach. The ALJs stated:

> Although the ALJs are persuaded by ETIs arguments that the use of interim retirements may be the more theoretically correct methodology to employ,

4 *Application of Southwestern Electric Power Company for Authority to Change Rates & Reconcile Fuel Costs*, Docket No. 40443, Proposal for Decision at 191 (May 20, 2013).

> Commission precedent clearly disfavors the use of interim retirements and the ALJs are reluctant to rule contrary to Commission precedent.[5]

The ALJs also explained:

> ETI is correct that neither Ms. Mathis nor Mr. Pous provide any reasoning behind the prior Commission precedent. Moreover, it is also true that the Commission precedent is relatively old at this point (dating back to the mid-1990s) and apparently has not been revisited in any recent cases. ETI argues that the Commission has in at least one other case used interim retirements (Docket No. 15195) but provides little more than that comment to support the concept. It is true that in concept, interim retirements are determined in much the same fashion as other elements of depreciation analysis. Primarily based on historical accounting data, the analyst identifies characteristics in the history of the data upon which to base a reasoned assessment of retirements going forward, which is similar to what occurs in determining asset lives or net salvage. Interim retirement determinations are supported by their own Iowa Curves, just as is the analysis of plant lives.[6]

Q. WHAT CAN YOU CONCLUDE BASED ON A REVIEW OF THESE DECISIONS?

A. The reasoning provided in both decisions makes clear that the reason interim retirements have not been allowed in recent cases is because of precedent from cases that occurred many years ago. Both of the more recent decisions cited above were not based on specific evidence that indicates that it would be inappropriate to include interim retirements, but instead were based solely on prior precedent. In fact, in Docket No. 39896 the ALJs appeared to agree that it would in fact be correct to include interim retirements.

Because the basis of disallowing interim retirements is solely a (fairly old) precedent, it is important to review the reasoning set forth in originally establishing this precedent. If indeed the Commission's reasoning from 25 years ago is outdated, no longer applies, and violates the Uniform System of Accounts and other depreciation authorities, then the precedent should not remain just for the sake of maintaining precedent. Instead, the proper methodologies for interim retirements should be adopted by the Commission.

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5 *Application of Entergy Texas Inc. for Authority to Change Rates, Reconcile Fuel Costs, & Obtain Deferred Treatment*, Docket No. 39896, Proposal for Decision at 125 (July 6, 2012).

6 *Id.* at 124.

Q. THE RECENT CASES CITE PRIOR PRECEDENT FROM 1990. WHAT WAS THE REASONING PROVIDED IN 1990 TO DISALLOW THE INCLUSION OF INTERIM RETIREMENTS?

A. As noted above, in Docket No. 40443 the ALJs cited the order from Docket Nos. 8425 and 8431 and stated that the Commission found that interim retirements were not "known and measurable." Specifically, in Docket Nos. 8425 and 8431 the Commission stated in Finding of Fact 212:

> The rate at which interim retirements will be made is not known and measurable. Incorporation of interim retirements into STP would best be done when those retirements are actually made.[7]

Q. IS THE COMMISSION'S ANALYSIS CORRECT THAT INTERIM RETIREMENTS ARE NOT KNOWN AND MEASURABLE?

A. No. If the Commission's reasoning were correct that interim retirements were not known and measurable, then by logical extension none of the estimates in a depreciation study could be considered known and measurable. Interim retirements, as well as interim net salvage, are estimated using the same process that is used to estimate the service life and net salvage for all other types of property. Service life and net salvage for assets such as poles and wires are determined in a depreciation study incorporating the statistical analysis of historical data as well as other factors such as industry experience, knowledge of the property studied, and management plans. Service life estimates based on this process have been consistently accepted by the Commission. Because estimates of interim retirements are determined in the same way, they therefore must also meet the same standard as the other service life and net salvage estimates in a depreciation study.

Q. THE COMMISSION ALSO STATED THAT THE INCORPORATION OF INTERIM RETIREMENTS "WOULD BEST BE DONE WHEN THOSE RETIREMENTS ARE ACTUALLY MADE." DO YOU AGREE?

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7 *Application of Houston Lighting & Power Co. for Authority to Change Rates*, Docket No. 8425, *Application of Houston Lighting & Power Co. for a Final Reconciliation of Fuel Costs through September 30, 1988*, Docket No. 8431, Finding of Factor No. 212 (June 20, 1990).

A. No. Every other jurisdiction, the Uniform System of Accounts, and authoritative depreciation texts would also disagree. Including interim retirements only after they occur results in the costs of these assets being recovered after they are no longer in service. This results in future customers paying for assets that do not provide them service and does not conform to the prescriptions of the Uniform System of Accounts.

Q. THE ORDER FROM DOCKET NOS. 8425 AND 8431 WAS ISSUED IN 1990. HAS EXPERIENCE OVER THE PAST 30 YEARS PROVIDED EVIDENCE THAT INTERIM RETIREMENTS DO OCCUR?

A. Yes. The nearly 30 years since the order from these dockets have provided extensive historical experience for power plants across the country. This experience has demonstrated that the replacements of components of a power plant (i.e., interim retirements and additions) are necessary in order for the plant to operate for its full life span. My firm has conducted hundreds of depreciation studies since 1990, and the experience of each of the utilities studied has been that interim retirements have and will occur. As noted previously, to my knowledge interim retirements are included in depreciation expense in every other jurisdiction in the country.

I have also toured numerous power plants in my career, as I typically perform site visits for each depreciation study I conduct. These site visits have also demonstrated that interim retirements do occur. For many older plants, a large portion of the assets in a facility are replaced before the terminal retirement of the facility.

Q. TO DEMONSTRATE THAT INTERIM RETIREMENTS HAVE OCCURRED AND SHOULD BE INCLUDED IN DEPRECIATION, CAN YOU PROVIDE AN EXAMPLE USING A POWER PLANT THAT HAS LIVED ITS FULL LIFE?

A. Yes. An example is the Venice Plant, which was owned and operated by Ameren Missouri (formerly Union Electric Company) and located in western Illinois across the river from St. Louis, Missouri. The units at the Venice Plant (also referred to as Venice II) were placed in service in the 1940s and early 1950s and retired from service in the early 2000s. The plant has since been demolished and the site remediated.

This plant therefore provides a representative example of a power plant that has lived its full life span, and therefore has experienced both interim and final retirements.

Q. DID VENICE EXPERIENCE INTERIM RETIREMENTS OVER ITS LIFE SPAN?

A. Yes. Venice experienced a large amount of interim retirements. Consider for example Account 312, Boiler Plant Equipment. Of the original assets placed in service (i.e., those installed from 1940 through 1951), approximately 25% were retired before the year 2000 as interim retirements. That is, for a plant with a life span in the 50- to 60-year range, about a quarter of the original plant in this account was replaced as interim retirements before the end of the plant's life.

Interim additions (additions that occurred after the original installation of the plant) also experienced interim retirements. Over the life of the plant, a total of about $40.6 million was retired from Account 312, both as interim and final retirements. Of this total, about $6.8 million, or about 17% of all retirements, were retired as interim retirements prior to 2000. Thus, interim retirements comprise a significant portion of the total retirements for a power plant.

Q. HOW WOULD THE COMMISSION'S PRECEDENT OF DISALLOWING THE RECOVERY OF THESE INTERIM RETIREMENTS IMPACT DEPRECIATION FOR THIS PLANT?

A. The Commission's precedent defers the recovery of assets retired as interim retirements to customers who receive no benefit from these assets. That is, were the Commission's precedent applied to the Venice plant, customers towards the end of the plant's life would be paying for the recovery of approximately $6.8 million in assets that were no longer in service. While a quarter of the original plant had been replaced, customers would still be paying for these assets (and in addition would be paying for the assets that replaced them). This results in intergenerational inequity, as customers in the later years pay for assets that only provided service to earlier generations of customers.

As noted previously, the Commission's precedent would also violate the prescriptions of the Uniform System of Accounts, as the costs for interim retirements would not be allocated over their service lives.

Q. CAN YOU ILLUSTRATE THE IMPACT OF INCLUDING INTERIM RETIREMENTS IN THE RECOVERY PATTERN FOR THIS PLANT?

A. Yes. Figure 1 below provides a graph of the depreciation rate for each year under two scenarios. In the first scenario, shown as a black line, interim retirements are included in depreciation rates. In the second scenario, shown as a dashed line, interim retirements are not included (i.e., this scenario represents the Commission's precedent). In both scenarios depreciation rates are updated every five years and the plant's actual retirement date is used to develop the life span for the plant.

Figure JJS-1: Comparison of Annual Depreciation Rates for Venice Plant Based on Inclusion and Exclusion of Interim Retirements, 1940-1999

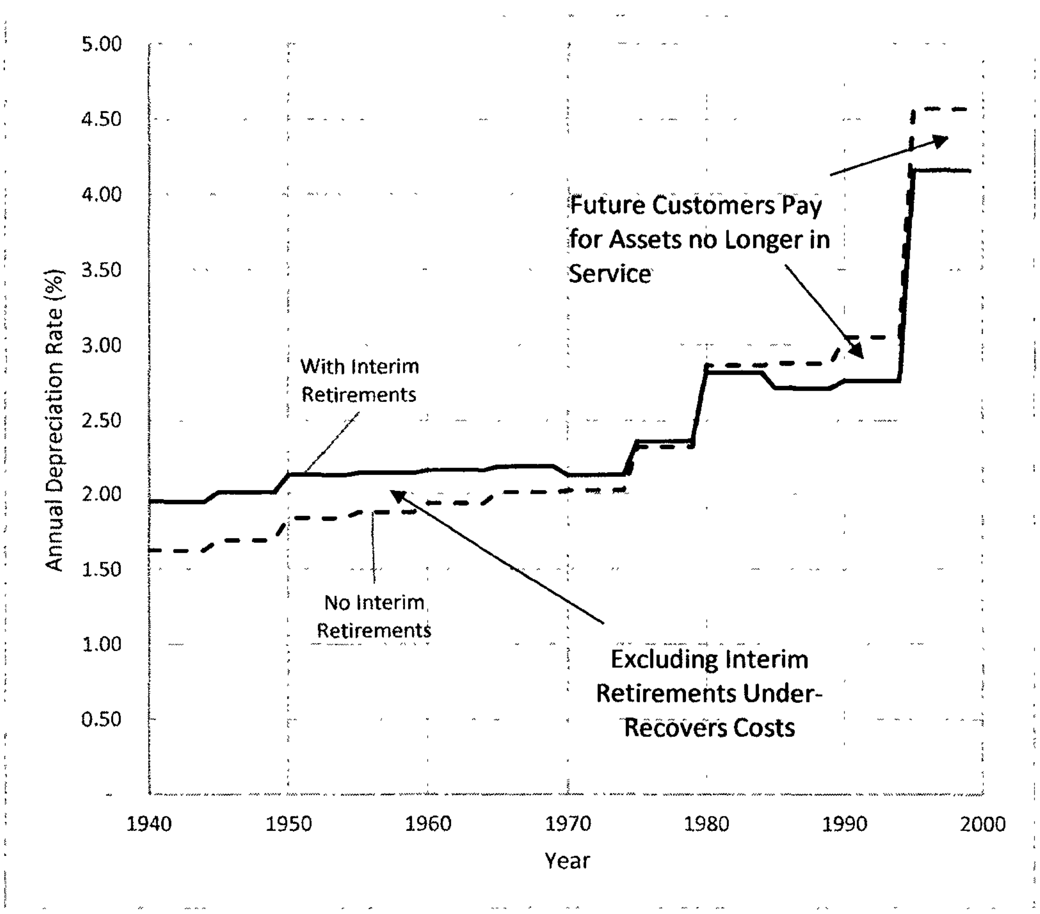

Figure 1 shows the annual depreciation rates for each scenario from 1940 until 1999, just before the final retirement of the facility. I should first note that the depreciation rate increases significantly in the mid-1990s. This occurs because assets added in the 1990s are recovered over a short period of time (as the terminal retirement in the early 2000s occurs only a few years after these assets are added to service)[8].

In general, the depreciation rate for life span property tends to increase with age. This occurs due to the fact that interim additions in each successive year must be recovered over the shorter period of time from installation until the terminal retirement of the facility.[9]

However, the Commission's precedent of excluding interim retirements results in a much sharper increase in depreciation rates, as can be seen by comparing the solid and dashed lines in Figure 1. This occurs because the exclusion of interim retirements does not recover the costs of the retired assets over their service lives. Instead, these costs are deferred until later in the life of the facility (after the interim retirements occur).

To further illustrate this point, in Figure 2 below I have shown only the depreciation rates for 1940 through 1994. I have also modified the y-axis values to better show the impact of excluding interim retirements. Figure 3 shows the same time period but shows the annual depreciation expense from 1951 through 1994 instead of the annual depreciation rates.

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8 I should also note that I have excluded the years 2000-2002 from this graph. The depreciation rate increases even more significantly in 2002, due to a remaining life of only two years for any interim additions that occur at this time.

9 The NARUC Manual explains this concept on page 142, stating "[a] general characteristic of property studied using the life span method is the gradual increase in the depreciation rate as the property ages."

Figure JJS-2: Comparison of Annual Depreciation Rates for Venice Plant Based on Inclusion and Exclusion of Interim Retirements, 1940-1994

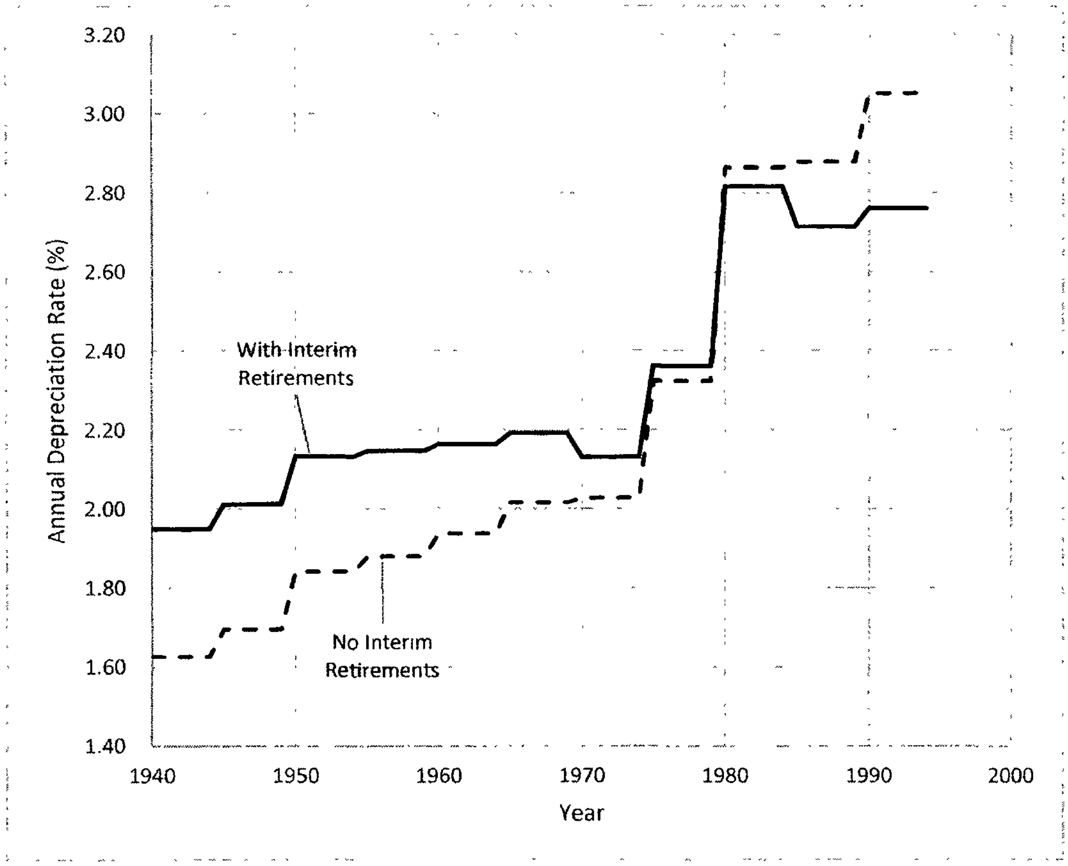

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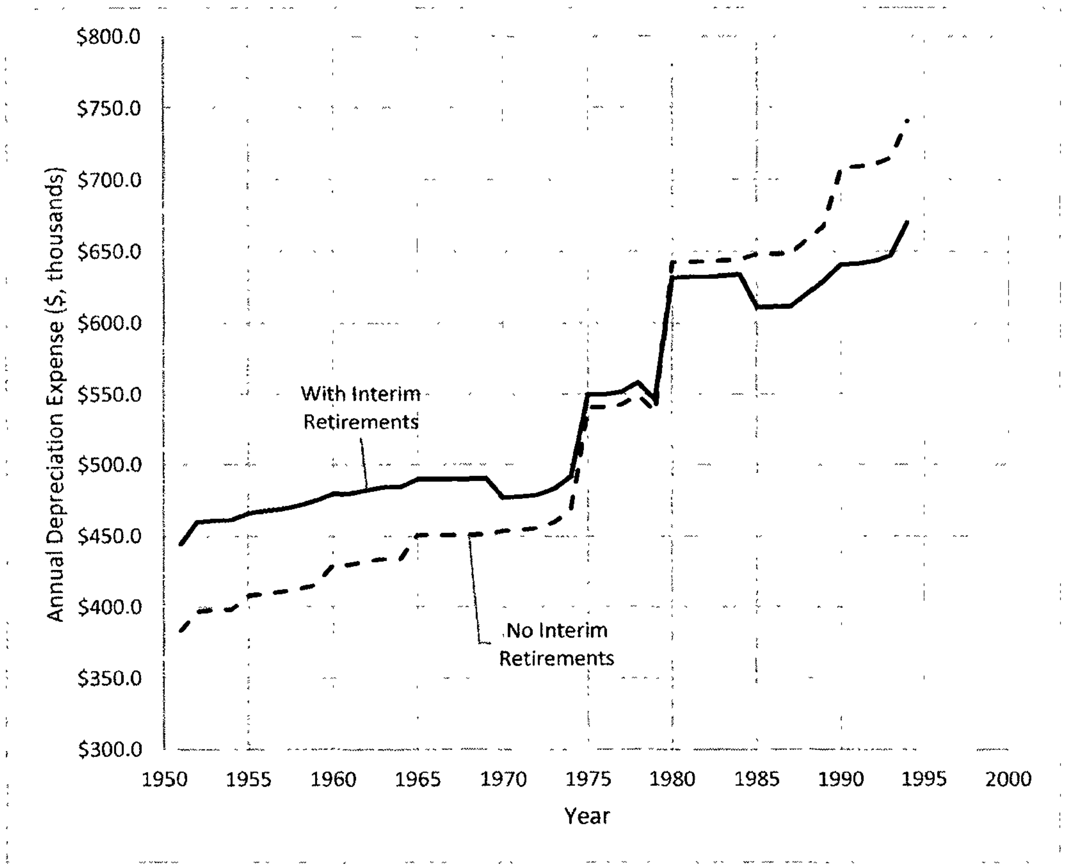
Figure JJS-3: Comparison of Annual Depreciation Expense for Venice Plant Based on Inclusion and Exclusion of Interim Retirements, 1950-1994



Figures 2 and 3 show that including interim retirements results in a much more equitable recovery pattern. While the depreciation rate and expense increase over time, both remain within a tighter range if interim retirements are included in depreciation. Excluding interim retirements instead results in a depreciation rate in later years that is almost double the depreciation rate in the earlier years. This occurs because earlier generations of customers do not pay their fair share, and later generations must pay for assets that are no longer in service.

Q. WHAT CAN YOU CONCLUDE REGARDING INTERIM RETIREMENTS?

A. Experience has shown that interim retirements can and will occur. Depreciation principles therefore require that estimates of interim retirements be incorporated into depreciation rates. While Commission precedent may disfavor including interim retirements, this precedent is outdated, is inconsistent with the Uniform System of Accounts, is out of step with all other jurisdictions, produces intergeneration inequity, and should therefore be reconsidered. In order to produce the proper depreciation rates for production plant (and general plant structures) that are consistent with the Uniform System of Accounts and authoritative depreciation texts, interim retirements must be included in depreciation rates.

Q. DID YOU PHYSICALLY OBSERVE EPE'S PLANT AND EQUIPMENT AS PART OF YOUR DEPRECIATION STUDY?

A. Yes. My most recent field review of the Company's property as part of this study was made in February 2020 to observe representative portions of plant. Field reviews are conducted to become familiar with company operations and to obtain an understanding of the function of the plant and information with respect to the reasons for past retirements and the expected future causes of retirements. This knowledge, as well as information from other discussions with management, was incorporated in the interpretation and extrapolation of the statistical analyses.

Q. WOULD YOU EXPLAIN THE CONCEPT OF "NET SALVAGE"?

A. Net salvage is a component of the service value of capital assets that is reflected in depreciation rates. The service value of an asset is its original cost less its net salvage. Net salvage is the salvage value received for the asset upon retirement less the cost to retire the asset. When the cost to retire exceeds the salvage value, the result is negative net salvage.

Inasmuch as depreciation expense is the loss in service value of an asset during a defined period, e.g. one year, it must include a ratable portion of both the original cost and the net salvage. That is, the net salvage related to an asset should be incorporated in the cost of service during the same period as its original cost so that customers receiving service from the asset pay rates that include a portion of both elements of the asset's service value: the original cost and the net salvage value.

For example, the full recovery of the service value of a $5,000 distribution pole includes not only the $5,000 of original cost, but also, on average, $1,600 to remove the pole at the end of its life and $100 in salvage value. In this example, the net salvage component is negative $1,500 (i.e., $100 - $1,600), and the net salvage percent is negative 30% (i.e., ($100 - $1,600)/$5,000).

Q. PLEASE DESCRIBE HOW YOU ESTIMATED NET SALVAGE PERCENTAGES?

A. I estimated the net salvage percentages by reviewing the Company's account specific historical salvage and cost of removal data for the period 1993 through 2019 as a percentage of the associated retired plant as well as considering industry experience in terms of net salvage estimates for other electric companies.

Q. HAVE YOU INCLUDED A DISMANTLEMENT COMPONENT INTO THE OVERALL RECOVERY OF GENERATING FACILITIES?

A. Yes. A dismantlement component has been included in the net salvage percentage for all the generation facilities. The dismantlement component for generating units has been approved in Texas for other facilities.

Q. CAN YOU EXPLAIN HOW THE DISMANTLEMENT COMPONENT IS INCLUDED IN THE DEPRECIATION RATES SET FORTH IN EXHIBIT JJS-2?

A. Yes. The dismantlement component is part of the overall net salvage for each location/unit within the steam and gas turbine accounts. Based on studies for comparable facilities of other utilities, it was determined that the dismantlement or decommissioning costs for steam or other production facilities is best calculated by dividing the dismantlement cost by the surviving plant at final retirement. These location-based amounts are added to the interim net salvage percentage of the assets anticipated to be retired on an interim basis to produce the weighted net salvage percentage for each location. The detailed calculation for each location is set forth on page VIII-3 of Exhibit JJS-2.

Q. PLEASE DESCRIBE THE SECOND PHASE OF THE PROCESS THAT YOU USED IN THE DEPRECIATION CALCULATIONS IN WHICH YOU CALCULATED COMPOSITE REMAINING LIVES AND ANNUAL DEPRECIATION ACCRUAL RATES.

A. After I estimated the service life and net salvage characteristics for each depreciable property group, I calculated the annual depreciation accrual rates for each group, using the straight-line remaining life method, and using remaining lives weighted consistent with the average service life procedure.

Q. WHAT IS THE STRAIGHT-LINE REMAINING LIFE METHOD OF DEPRECIATION?

A. The straight-line remaining life method of depreciation allocates the original cost of the property, less accumulated depreciation, less future net salvage, in equal amounts to each year of remaining service life.

Q. PLEASE DESCRIBE AMORTIZATION ACCOUNTING.

A. In amortization accounting, units of property are capitalized in the same manner as they are in depreciation accounting. Amortization accounting is used for accounts with a large number of units, but small asset values. Depreciation accounting is difficult for these assets because periodic inventories are required to properly reflect plant in service. Consequently, retirements are recorded when a vintage is fully amortized rather than as the units are removed from service. That is, there is no dispersion of retirements. All units are retired when the age of the vintage reaches the end of the amortization period. Each plant account or group of assets is assigned a fixed period which represents an anticipated life during which the asset will render full benefit. For example, in amortization accounting, assets that have a 15-year amortization period will be fully recovered after 15 years of service and taken off the Company's books, but not necessarily removed from service. In contrast, assets that are taken out of service before 15 years remain on the books until the amortization period for that vintage has expired.

Q. FOR WHICH PLANT ACCOUNTS IS AMORTIZATION ACCOUNTING BEING UTILIZED?

A. Amortization accounting is only appropriate for certain General Plant accounts. These accounts are 391, 393, 394, 395, 397, and 398. These accounts represent less than 2% of the Company's depreciable plant.

Q. PLEASE USE AN EXAMPLE TO ILLUSTRATE HOW THE ANNUAL DEPRECIATION ACCRUAL RATE FOR A PARTICULAR GROUP OF PROPERTY IS PRESENTED IN YOUR DEPRECIATION STUDY.

A. I will use Account 368, Line Transformers, as an example because it is one of the largest depreciable mass accounts and represents approximately nine percent of depreciable plant.

The retirement rate method was used to analyze the survivor characteristics of this property group. Aged plant accounting data was compiled from 1993 through 2019 and analyzed in periods that best represent the overall service life of this property. The life table for the 1993-2019 experience band is presented on pages VII-82 through VII-84 of the Depreciation Study. The life table displays the retirement and surviving ratios of the aged plant data exposed to retirement by age interval. For example, page VII-82 shows $87,071 retired at age 0.5 with $239,642,495 exposed to retirement. Consequently, the retirement ratio is 0.0004 and the surviving ratio is 0.9996. This life table, or original survivor curve, is plotted along with the estimated smooth survivor curve, the 52-R3, on page VII-81.

The net salvage percent is presented on pages VIII-44 and VIII-45. The percentage is based on the result of annual gross salvage minus the cost to remove plant assets as compared to the original cost of plant retired during the period 1993 through 2019. The 27-year period experienced $1,984,874 ($2,019,764 - $4,004,638) in net negative salvage for $15,290,806 plant retired. The result is negative net salvage of 13% ($1,984,874/$15,290,806) and the most recent five-year result is negative net salvage of 26%. Therefore, based on industry ranges, historical indications of these assets and Company expectations, I determined that negative 15% was the most appropriate estimate for this account.

My calculation of the annual depreciation related to the original cost at December 31, 2019, of electric plant is presented on pages IX-84 through IX-86. The calculation is based on the 52-R3 survivor curve, 15% negative net salvage, the attained age, and the allocated book reserve. The tabulation sets forth the installation year, the original cost, calculated accrued depreciation, allocated book reserve, future accruals, remaining life, and annual accrual. These totals are brought forward to the table on page VI-7.

Q. ARE YOU RECOMMENDING APPROVAL OF THE DEPRECIATION RATES IN YOUR EXHIBIT JJS-2?

A. Yes. EPE is requesting new depreciation rates for all assets as of December 31, 2019. My depreciation recommendations are set forth in Exhibit JJS-2. EPE witness Larry J. Hancock sets forth the depreciation expense based on these depreciation rates.

Q. DOES THIS CONCLUDE YOUR DIRECT TESTIMONY?

A. Yes.

JOHN J. SPANOS
DEPRECIATION EXPERIENCE

Q. Please state your name.

A. My name is John J. Spanos.

Q. What is your educational background?

A. I have Bachelor of Science degrees in Industrial Management and Mathematics from Carnegie-Mellon University and a Master of Business Administration from York College.

Q. Do you belong to any professional societies?

A. Yes. I am a member and past President of the Society of Depreciation Professionals and a member of the American Gas Association/Edison Electric Institute Industry Accounting Committee.

Q. Do you hold any special certification as a depreciation expert?

A. Yes. The Society of Depreciation Professionals has established national standards for depreciation professionals. The Society administers an examination to become certified in this field. I passed the certification exam in September 1997 and was recertified in August 2003, February 2008, January 2013 and February 2018.

Q. Please outline your experience in the field of depreciation.

A. In June 1986, I was employed by Gannett Fleming Valuation and Rate Consultants, Inc. as a Depreciation Analyst. During the period from June 1986 through December 1995, I helped prepare numerous depreciation and original cost studies for utility companies in various industries. I helped perform depreciation studies for the following telephone companies: United Telephone of Pennsylvania, United Telephone of New Jersey, and Anchorage Telephone Utility. I helped perform depreciation studies for the following companies in the railroad industry: Union Pacific Railroad, Burlington Northern Railroad, and Wisconsin Central Transportation Corporation.

I helped perform depreciation studies for the following organizations in the electric utility industry: Chugach Electric Association, The Cincinnati Gas and Electric Company (CG&E), The Union Light, Heat and Power Company (ULH&P), Northwest Territories Power Corporation, and the City of Calgary - Electric System.

I helped perform depreciation studies for the following pipeline companies: TransCanada Pipelines Limited, Trans Mountain Pipe Line Company Ltd., Interprovincial Pipe Line Inc., Nova Gas Transmission Limited and Lakehead Pipeline Company.

I helped perform depreciation studies for the following gas utility companies: Columbia Gas of Pennsylvania, Columbia Gas of Maryland, The Peoples Natural Gas Company, T. W. Phillips Gas & Oil Company, CG&E, ULH&P, Lawrenceburg Gas Company and Penn Fuel Gas, Inc.

I helped perform depreciation studies for the following water utility companies: Indiana-American Water Company, Consumers Pennsylvania Water Company and The York Water Company; and depreciation and original cost studies for Philadelphia Suburban Water Company and Pennsylvania-American Water Company.

In each of the above studies, I assembled and analyzed historical and simulated data, performed field reviews, developed preliminary estimates of service life and net salvage, calculated annual depreciation, and prepared reports for submission to state public utility commissions or federal regulatory agencies. I performed these studies under the general direction of William M. Stout, P.E.

In January 1996, I was assigned to the position of Supervisor of Depreciation Studies. In July 1999, I was promoted to the position of Manager, Depreciation and Valuation Studies. In December 2000, I was promoted to the position as Vice-President of Gannett Fleming Valuation and Rate Consultants, Inc., in April 2012, I was promoted to the position as Senior Vice President of the Valuation and Rate Division of Gannett Fleming Inc. (now doing business as Gannett Fleming Valuation and Rate Consultants, LLC) and in January of 2019, I was promoted to my present position of President of Gannett Fleming Valuation and Rate Consultants, LLC. In my current position I am responsible for conducting all depreciation, valuation and original cost studies, including the preparation of final exhibits and responses to data requests for submission to the appropriate regulatory bodies.

Since January 1996, I have conducted depreciation studies similar to those previously listed including assignments for Pennsylvania-American Water Company; Aqua Pennsylvania; Kentucky-American Water Company; Virginia-American Water Company; Indiana-American Water Company; Iowa-American Water Company; New Jersey-American Water Company; Hampton Water Works Company; Omaha Public Power District; Enbridge Pipe Line Company; Inc.; Columbia Gas of Virginia, Inc.; Virginia Natural Gas Company National Fuel Gas Distribution Corporation - New York and Pennsylvania Divisions; The City of Bethlehem - Bureau of Water; The City of Coatesville Authority; The City of Lancaster - Bureau of Water; Peoples Energy Corporation; The York Water Company; Public Service Company of Colorado; Enbridge Pipelines; Enbridge Gas Distribution, Inc.; Reliant Energy-HLP; Massachusetts-American Water Company; St. Louis County Water Company; Missouri-American Water Company; Chugach Electric Association; Alliant Energy; Oklahoma Gas & Electric Company; Nevada Power Company; Dominion Virginia Power; NUI-Virginia Gas Companies; Pacific Gas & Electric Company; PSI Energy; NUI - Elizabethtown Gas Company; Cinergy Corporation – CG&E; Cinergy Corporation – ULH&P; Columbia Gas of Kentucky; South Carolina Electric & Gas Company; Idaho Power Company; El Paso Electric Company; Aqua North Carolina; Aqua Ohio; Aqua Texas, Inc.; Aqua Illinois, Inc.; Ameren Missouri; Central Hudson Gas & Electric; Centennial Pipeline Company; CenterPoint Energy-Arkansas; CenterPoint Energy – Oklahoma; CenterPoint Energy – Entex; CenterPoint Energy - Louisiana; NSTAR – Boston Edison Company; Westar Energy, Inc.; United Water Pennsylvania; PPL Electric Utilities; PPL Gas Utilities; Wisconsin Power & Light Company; TransAlaska Pipeline; Avista Corporation; Northwest Natural Gas; Allegheny Energy Supply, Inc.; Public Service Company of North Carolina; South Jersey Gas Company; Duquesne Light Company; MidAmerican Energy Company; Laclede Gas; Duke Energy Company; E.ON U.S. Services Inc.; Elkton Gas Services; Anchorage Water and Wastewater Utility; Kansas City Power and Light; Duke Energy North Carolina; Duke Energy South Carolina; Monongahela Power Company; Potomac Edison Company; Duke Energy Ohio Gas; Duke Energy Kentucky; Duke Energy Indiana; Duke Energy Progress; Northern Indiana Public Service Company; Tennessee- American Water Company; Columbia Gas of Maryland; Maryland-American Water Company; Bonneville Power Administration; NSTAR Electric and Gas Company; EPCOR Distribution, Inc.; B. C. Gas Utility, Ltd; Entergy Arkansas; Entergy Texas; Entergy Mississippi; Entergy Louisiana; Entergy Gulf States Louisiana; the Borough of Hanover; Louisville Gas and Electric Company; Kentucky Utilities Company; Madison Gas and Electric; Central Maine Power; PEPCO; PacifiCorp; Minnesota Energy Resource Group; Jersey Central Power & Light Company; Cheyenne Light, Fuel and Power Company; United Water Arkansas;

Central Vermont Public Service Corporation; Green Mountain Power; Portland General Electric Company; Atlantic City Electric; Nicor Gas Company; Black Hills Power; Black Hills Colorado Gas; Black Hills Kansas Gas; Black Hills Service Company; Black Hills Utility Holdings; Public Service Company of Oklahoma; City of Dubois; Peoples Gas Light and Coke Company; North Shore Gas Company; Connecticut Light and Power; New York State Electric and Gas Corporation; Rochester Gas and Electric Corporation; Greater Missouri Operations; Tennessee Valley Authority; Omaha Public Power District; Indianapolis Power & Light Company; Vermont Gas Systems, Inc.; Metropolitan Edison; Pennsylvania Electric; West Penn Power; Pennsylvania Power; PHI Service Company - Delmarva Power and Light; Atmos Energy Corporation; Citizens Energy Group; PSE&G Company; Berkshire Gas Company; Alabama Gas Corporation; Mid-Atlantic Interstate Transmission, LLC; SUEZ Water; WEC Energy Group; Rocky Mountain Natural Gas, LLC; Illinois-American Water Company; Northern Illinois Gas Company; Public Service of New Hampshire and Newtown Artesian Water Company.

My additional duties include determining final life and salvage estimates, conducting field reviews, presenting recommended depreciation rates to management for its consideration and supporting such rates before regulatory bodies.

Q. Have you submitted testimony to any state utility commission on the subject of utility plant depreciation?

A. Yes. I have submitted testimony to the Pennsylvania Public Utility Commission; the Commonwealth of Kentucky Public Service Commission; the Public Utilities Commission of Ohio; the Nevada Public Utility Commission; the Public Utilities Board of New Jersey; the Missouri Public Service Commission; the Massachusetts Department of Telecommunications and Energy; the Alberta Energy & Utility Board; the Idaho Public Utility Commission; the Louisiana Public Service Commission; the State Corporation Commission of Kansas; the Oklahoma Corporate Commission; the Public Service Commission of South Carolina; Railroad Commission of Texas – Gas Services Division; the New York Public Service Commission; Illinois Commerce Commission; the Indiana Utility Regulatory Commission; the California Public Utilities Commission; the Federal Energy Regulatory Commission ("FERC"); the Arkansas Public Service Commission; the Public Utility Commission of Texas; Maryland Public Service Commission; Washington Utilities and Transportation Commission; The Tennessee Regulatory Commission; the Regulatory Commission of Alaska; Minnesota Public Utility Commission; Utah Public

Service Commission; District of Columbia Public Service Commission; the Mississippi Public Service Commission; Delaware Public Service Commission; Virginia State Corporation Commission; Colorado Public Utility Commission; Oregon Public Utility Commission; South Dakota Public Utilities Commission; Wisconsin Public Service Commission; Wyoming Public Service Commission; the Public Service Commission of West Virginia; Maine Public Utility Commission; Iowa Utility Board; Connecticut Public Utilities Regulatory Authority; New Mexico Public Regulation Commission; Commonwealth of Massachusetts Department of Public Utilities; Rhode Island Public Utilities Commission and the North Carolina Utilities Commission.

Q. Have you had any additional education relating to utility plant depreciation?

A. Yes. I have completed the following courses conducted by Depreciation Programs, Inc.: "Techniques of Life Analysis," "Techniques of Salvage and Depreciation Analysis," "Forecasting Life and Salvage," "Modeling and Life Analysis Using Simulation," and "Managing a Depreciation Study." I have also completed the "Introduction to Public Utility Accounting" program conducted by the American Gas Association.

Q. Does this conclude your qualification statement?

A. Yes.

LIST OF CASES IN WHICH JOHN J. SPANOS SUBMITTED TESTIMONY

No.	Year	Jurisdiction	Docket No.	Client Utility	Subject
01.	1998	PA PUC	R-00984375	City of Bethlehem – Bureau of Water	Original Cost and Depreciation
02.	1998	PA PUC	R-00984567	City of Lancaster	Original Cost and Depreciation
03.	1999	PA PUC	R-00994605	The York Water Company	Depreciation
04.	2000	D.T.&E.	DTE 00-105	Massachusetts-American Water Company	Depreciation
05.	2001	PA PUC	R-00016114	City of Lancaster	Original Cost and Depreciation
06.	2001	PA PUC	R-00017236	The York Water Company	Depreciation
07.	2001	PA PUC	R-00016339	Pennsylvania-American Water Company	Depreciation
08.	2001	OH PUC	01-1228-GA-AIR	Cinergy Corp – Cincinnati Gas & Elect Company	Depreciation
09.	2001	KY PSC	2001-092	Cinergy Corp – Union Light, Heat & Power Co.	Depreciation
10.	2002	PA PUC	R-00016750	Philadelphia Suburban Water Company	Depreciation
11.	2002	KY PSC	2002-00145	Columbia Gas of Kentucky	Depreciation
12.	2002	NJ BPU	GF02040245	NUI Corporation/Elizabethtown Gas Company	Depreciation
13.	2002	ID PUC	IPC-E-03-7	Idaho Power Company	Depreciation
14.	2003	PA PUC	R-0027975	The York Water Company	Depreciation
15.	2003	IN URC	R-0027975	Cinergy Corp – PSI Energy, Inc.	Depreciation
16.	2003	PA PUC	R-00038304	Pennsylvania-American Water Company	Depreciation
17.	2003	MO PSC	WR-2003-0500	Missouri-American Water Company	Depreciation
18.	2003	FERC	ER03-1274-000	NSTAR-Boston Edison Company	Depreciation
19.	2003	NJ BPU	BPU 03080683	South Jersey Gas Company	Depreciation
20.	2003	NV PUC	03-10001	Nevada Power Company	Depreciation
21.	2003	LA PSC	U-27676	CenterPoint Energy – Arkla	Depreciation
22.	2003	PA PUC	R-00038805	Pennsylvania Suburban Water Company	Depreciation
23.	2004	AB En/Util Bd	1306821	EPCOR Distribution, Inc.	Depreciation
24.	2004	PA PUC	R-00038168	National Fuel Gas Distribution Corp (PA)	Depreciation
25.	2004	PA PUC	R-00049255	PPL Electric Utilities	Depreciation
26.	2004	PA PUC	R-00049165	The York Water Company	Depreciation
27.	2004	OK Corp Cm	PUC 200400187	CenterPoint Energy – Arkla	Depreciation
28.	2004	OH PUC	04-680-El-AIR	Cinergy Corp. – Cincinnati Gas and Electric Company	Depreciation
29.	2004	RR Com of TX	GUD#	CenterPoint Energy – Entex Gas Services Div.	Depreciation
30.	2004	NY PUC	04-G-1047	National Fuel Gas Distribution Gas (NY)	Depreciation

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No.	Year	Jurisdiction	Docket No.	Client Utility	Subject
31.	2004	AR PSC	04-121-U	CenterPoint Energy – Arkla	Depreciation
32.	2005	IL CC	05-ICC-06	North Shore Gas Company	Depreciation
33.	2005	IL CC	05-ICC-06	Peoples Gas Light and Coke Company	Depreciation
34.	2005	KY PSC	2005-00042	Union Light Heat & Power	Depreciation
35.	2005	IL CC	05-0308	MidAmerican Energy Company	Depreciation
36.	2005	MO PSC	GF-2005	Laclede Gas Company	Depreciation
37.	2005	KS CC	05-WSEE-981-RTS	Westar Energy	Depreciation
38.	2005	RR Com of TX	GUD #	CenterPoint Energy – Entex Gas Services Div.	Depreciation
39.	2005	US District Court	Cause No. 1:99-CV-1693-LJM/VSS	Cinergy Corporation	Accounting
40.	2005	OK CC	PUD 200500151	Oklahoma Gas and Electric Company	Depreciation
41.	2005	MA Dept Tele-	DTE 05-85	NSTAR	Depreciation
42.	2005	NY PUC	05-E-934/05-G-0935	Central Hudson Gas & Electric Company	Depreciation
43.	2005	AK Reg Com	U-04-102	Chugach Electric Association	Depreciation
44.	2005	CA PUC	A05-12-002	Pacific Gas & Electric	Depreciation
45.	2006	PA PUC	R-00051030	Aqua Pennsylvania, Inc.	Depreciation
46.	2006	PA PUC	R-00051178	T.W. Phillips Gas and Oil Company	Depreciation
47.	2006	NC Util Cm.	G-5, Sub522	Pub. Service Company of North Carolina	Depreciation
48.	2006	PA PUC	R-00051167	City of Lancaster	Depreciation
49.	2006	PA PUC	R00061346	Duquesne Light Company	Depreciation
50.	2006	PA PUC	R-00061322	The York Water Company	Depreciation
51.	2006	PA PUC	R-00051298	PPL GAS Utilities	Depreciation
52.	2006	PUC of TX	32093	CenterPoint Energy – Houston Electric	Depreciation
53.	2006	KY PSC	2006-00172	Duke Energy Kentucky	Depreciation
54.	2006	SC PSC		SCANA	Accounting
55.	2006	AK Reg Com	U-06-6	Municipal Light and Power	Depreciation
56.	2006	DE PSC	06-284	Delmarva Power and Light	Depreciation
57.	2006	IN URC	IURC43081	Indiana American Water Company	Depreciation
58.	2006	AK Reg Com	U-06-134	Chugach Electric Association	Depreciation
59.	2006	MO PSC	WR-2007-0216	Missouri American Water Company	Depreciation

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No.	Year	Jurisdiction	Docket No.	Client Utility	Subject
60.	2006	FERC	IS05-82-002, et al	TransAlaska Pipeline	Depreciation
61.	2006	PA PUC	R-00061493	National Fuel Gas Distribution Corp. (PA)	Depreciation
62.	2007	NC Util Com.	E-7 SUB 828	Duke Energy Carolinas, LLC	Depreciation
63.	2007	OH PSC	08-709-EL-AIR	Duke Energy Ohio Gas	Depreciation
64.	2007	PA PUC	R-00072155	PPL Electric Utilities Corporation	Depreciation
65.	2007	KY PSC	2007-00143	Kentucky American Water Company	Depreciation
66.	2007	PA PUC	R-00072229	Pennsylvania American Water Company	Depreciation
67.	2007	KY PSC	2007-0008	NiSource – Columbia Gas of Kentucky	Depreciation
68.	2007	NY PSC	07-G-0141	National Fuel Gas Distribution Corp (NY)	Depreciation
69.	2008	AK PSC	U-08-004	Anchorage Water & Wastewater Utility	Depreciation
70.	2008	TN Reg Auth	08-00039	Tennessee-American Water Company	Depreciation
71.	2008	DE PSC	08-96	Artesian Water Company	Depreciation
72.	2008	PA PUC	R-2008-2023067	The York Water Company	Depreciation
73.	2008	KS CC	08-WSEE1-RTS	Westar Energy	Depreciation
74.	2008	IN URC	43526	Northern Indiana Public Service Company	Depreciation
75.	2008	IN URC	43501	Duke Energy Indiana	Depreciation
76.	2008	MD PSC	9159	NiSource – Columbia Gas of Maryland	Depreciation
77.	2008	KY PSC	2008-000251	Kentucky Utilities	Depreciation
78.	2008	KY PSC	2008-000252	Louisville Gas & Electric	Depreciation
79.	2008	PA PUC	2008-20322689	Pennsylvania American Water Co. - Wastewater	Depreciation
80.	2008	NY PSC	08-E887/08-00888	Central Hudson	Depreciation
81.	2008	WV TC	VE-080416/VG-8080417	Avista Corporation	Depreciation
82.	2008	IL CC	ICC-09-166	Peoples Gas, Light and Coke Company	Depreciation
83.	2009	IL CC	ICC-09-167	North Shore Gas Company	Depreciation
84.	2009	DC PSC	1076	Potomac Electric Power Company	Depreciation
85.	2009	KY PSC	2009-00141	NiSource – Columbia Gas of Kentucky	Depreciation
86.	2009	FERC	ER08-1056-002	Entergy Services	Depreciation
87.	2009	PA PUC	R-2009-2097323	Pennsylvania American Water Company	Depreciation
88.	2009	NC Util Cm	E-7, Sub 090	Duke Energy Carolinas, LLC	Depreciation
89.	2009	KY PSC	2009-00202	Duke Energy Kentucky	Depreciation
90.	2009	VA St. CC	PUE-2009-00059	Aqua Virginia, Inc.	Depreciation
91.	2009	PA PUC	2009-2132019	Aqua Pennsylvania, Inc.	Depreciation

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No.	Year	Jurisdiction	Docket No.	Client Utility	Subject
92.	2009	MS PSC	Docket No. 2011-UA-183	Entergy Mississippi	Depreciation
93.	2009	AK PSC	09-08-U	Entergy Arkansas	Depreciation
94.	2009	TX PUC	37744	Entergy Texas	Depreciation
95.	2009	TX PUC	37690	El Paso Electric Company	Depreciation
96.	2009	PA PUC	R-2009-2106908	The Borough of Hanover	Depreciation
97.	2009	KS CC	10-KCPE-415-RTS	Kansas City Power & Light	Depreciation
98.	2009	PA PUC	R-2009-	United Water Pennsylvania	Depreciation
99.	2009	OH PUC		Aqua Ohio Water Company	Depreciation
100.	2009	WI PSC	3270-DU-103	Madison Gas & Electric Company	Depreciation
101.	2009	MO PSC	WR-2010	Missouri American Water Company	Depreciation
102.	2009	AK Reg Cm	U-09-097	Chugach Electric Association	Depreciation
103.	2010	IN URC	43969	Northern Indiana Public Service Company	Depreciation
104.	2010	WI PSC	6690-DU-104	Wisconsin Public Service Corp.	Depreciation
105.	2010	PA PUC	R-2010-2161694	PPL Electric Utilities Corp.	Depreciation
106.	2010	KY PSC	2010-00036	Kentucky American Water Company	Depreciation
107.	2010	PA PUC	R-2009-2149262	Columbia Gas of Pennsylvania	Depreciation
108.	2010	MO PSC	GR-2010-0171	Laclede Gas Company	Depreciation
109.	2010	SC PSC	2009-489-E	South Carolina Electric & Gas Company	Depreciation
110.	2010	NJ BD OF PU	ER09080664	Atlantic City Electric	Depreciation
111.	2010	VA St. CC	PUE-2010-00001	Virginia American Water Company	Depreciation
112.	2010	PA PUC	R-2010-2157140	The York Water Company	Depreciation
113.	2010	MO PSC	ER-2010-0356	Greater Missouri Operations Company	Depreciation
114.	2010	MO PSC	ER-2010-0355	Kansas City Power and Light	Depreciation
115.	2010	PA PUC	R-2010-2167797	T.W. Phillips Gas and Oil Company	Depreciation
116.	2010	PSC SC	2009-489-E	SCANA – Electric	Depreciation
117.	2010	PA PUC	R-2010-22010702	Peoples Natural Gas, LLC	Depreciation
118.	2010	AK PSC	10-067-U	Oklahoma Gas and Electric Company	Depreciation
119.	2010	IN URC	Cause No. 43894	Northern Indiana Public Serv. Company - NIFL	Depreciation
120.	2010	IN URC	Cause No. 43894	Northern Indiana Public Serv. Co. - Kokomo	Depreciation
121.	2010	PA PUC	R-2010-2166212	Pennsylvania American Water Co. - WW	Depreciation
122.	2010	NC Util Cn.	W-218,SUB310	Aqua North Carolina, Inc.	Depreciation
123.	2011	OH PUC	11-4161-WS-AIR	Ohio American Water Company	Depreciation
124.	2011	MS PSC	EC-123-0082-00	Entergy Mississippi	Depreciation

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No.	Year	Jurisdiction	Docket No.	Client Utility	Subject
125.	2011	CO PUC	11AL-387E	Black Hills Colorado	Depreciation
126.	2011	PA PUC	R-2010-2215623	Columbia Gas of Pennsylvania	Depreciation
127.	2011	PA PUC	R-2010-2179103	City of Lancaster – Bureau of Water	Depreciation
128.	2011	IN URC	43114 IGCC 4S	Duke Energy Indiana	Depreciation
129.	2011	FERC	IS11-146-000	Enbridge Pipelines (Southern Lights)	Depreciation
130.	2011	IL CC	11-0217	MidAmerican Energy Corporation	Depreciation
131.	2011	OK CC	201100087	Oklahoma Gas & Electric Company	Depreciation
132.	2011	PA PUC	2011-2232243	Pennsylvania American Water Company	Depreciation
133.	2011	FERC	RP11-___-000	Carolina Gas Transmission	Depreciation
134.	2012	WA UTC	UE-120436/UG-120437	Avista Corporation	Depreciation
135.	2012	AK Reg Cm	U-12-009	Chugach Electric Association	Depreciation
136.	2012	MA PUC	DPU 12-25	Columbia Gas of Massachusetts	Depreciation
137.	2012	TX PUC	40094	El Paso Electric Company	Depreciation
138.	2012	ID PUC	IPC-E-12	Idaho Power Company	Depreciation
139.	2012	PA PUC	R-2012-2290597	PPL Electric Utilities	Depreciation
140.	2012	PA PUC	R-2012-2311725	Borough of Hanover – Bureau of Water	Depreciation
141.	2012	KY PSC	2012-00222	Louisville Gas and Electric Company	Depreciation
142.	2012	KY PSC	2012-00221	Kentucky Utilities Company	Depreciation
143.	2012	PA PUC	R-2012-2285985	Peoples Natural Gas Company	Depreciation
144.	2012	DC PSC	Case 1087	Potomac Electric Power Company	Depreciation
145.	2012	OH PSC	12-1682-EL-AIR	Duke Energy Ohio (Electric)	Depreciation
146.	2012	OH PSC	12-1685-GA-AIR	Duke Energy Ohio (Gas)	Depreciation
147.	2012	PA PUC	R-2012-2310366	City of Lancaster – Sewer Fund	Depreciation
148.	2012	PA PUC	R-2012-2321748	Columbia Gas of Pennsylvania	Depreciation
149.	2012	FERC	ER-12-2681-000	ITC Holdings	Depreciation
150.	2012	MO PSC	ER-2012-0174	Kansas City Power and Light	Depreciation
151.	2012	MO PSC	ER-2012-0175	KCPL Greater Missouri Operations Company	Depreciation
152.	2012	MO PSC	GO-2012-0363	Laclede Gas Company	Depreciation
153.	2012	MN PUC	G007,001/D-12-533	Integrys – MN Energy Resource Group	Depreciation
154.	2012	TX PUC	SOAH 582-14-1051/ TECQ 2013-2007-UCR	Aqua Texas	Depreciation
155.	2012	PA PUC	2012-2336379	York Water Company	Depreciation

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LIST OF CASES IN WHICH JOHN J. SPANOS SUBMITTED TESTIMONY

No.	Year	Jurisdiction	Docket No.	Client Utility	Subject
156.	2013	NJ BPU	ER12121071	PHI Service Company– Atlantic City Electric	Depreciation
157.	2013	KY PSC	2013-00167	Columbia Gas of Kentucky	Depreciation
158.	2013	VA St CC	2013-00020	Virginia Electric and Power Company	Depreciation
159.	2013	IA Util Bd	2013-0004	MidAmerican Energy Corporation	Depreciation
160.	2013	PA PUC	2013-2355276	Pennsylvania American Water Company	Depreciation
161.	2013	NY PSC	13-E-0030, 13-G-0031, 13-S-0032	Consolidated Edison of New York	Depreciation
162.	2013	PA PUC	2013-2355886	Peoples TWP LLC	Depreciation
163.	2013	TN Reg Auth	12-0504	Tennessee American Water	Depreciation
164.	2013	ME PUC	2013-168	Central Maine Power Company	Depreciation
165.	2013	DC PSC	Case 1103	PHI Service Company – PEPCO	Depreciation
166.	2013	WY PSC	2003-ER-13	Cheyenne Light, Fuel and Power Company	Depreciation
167.	2013	FERC	ER13-2428-0000	Kentucky Utilities	Depreciation
168.	2013	FERC	ER13- -0000	MidAmerican Energy Company	Depreciation
169.	2013	FERC	ER13-2410-0000	PPL Utilities	Depreciation
170.	2013	PA PUC	R-2013-2372129	Duquesne Light Company	Depreciation
171.	2013	NJ BPU	ER12111052	Jersey Central Power and Light Company	Depreciation
172.	2013	PA PUC	R-2013-2390244	Bethlehem, City of – Bureau of Water	Depreciation
173.	2013	OK CC	UM 1679	Oklahoma, Public Service Company of	Depreciation
174.	2013	IL CC	13-0500	Nicor Gas Company	Depreciation
175.	2013	WY PSC	20000-427-EA-13	PacifiCorp	Depreciation
176.	2013	UT PSC	13-035-02	PacifiCorp	Depreciation
177.	2013	OR PUC	UM 1647	PacifiCorp	Depreciation
178.	2013	PA PUC	2013-2350509	Dubois, City of	Depreciation
179.	2014	IL CC	14-0224	North Shore Gas Company	Depreciation
180.	2014	FERC	ER14- -0000	Duquesne Light Company	Depreciation
181.	2014	SD PUC	EL14-026	Black Hills Power Company	Depreciation
182.	2014	WY PSC	20002-91-ER-14	Black Hills Power Company	Depreciation
183.	2014	PA PUC	2014-2428304	Borough of Hanover – Municipal Water Works	Depreciation
184.	2014	PA PUC	2014-2406274	Columbia Gas of Pennsylvania	Depreciation
185.	2014	IL CC	14-0225	Peoples Gas Light and Coke Company	Depreciation
186.	2014	MO PSC	ER-2014-0258	Ameren Missouri	Depreciation
187.	2014	KS CC	14-BHCG-502-RTS	Black Hills Service Company	Depreciation

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LIST OF CASES IN WHICH JOHN J. SPANOS SUBMITTED TESTIMONY

No.	Year	Jurisdiction	Docket No.	Client Utility	Subject
188.	2014	KS CC	14-BHCG-502-RTS	Black Hills Utility Holdings	Depreciation
189.	2014	KS CC	14-BHCG-502-RTS	Black Hills Kansas Gas	Depreciation
190.	2014	PA PUC	2014-2418872	Lancaster, City of – Bureau of Water	Depreciation
191.	2014	WV PSC	14-0701-E-D	First Energy – MonPower/PotomacEdison	Depreciation
192	2014	VA St CC	PUC-2014-00045	Aqua Virginia	Depreciation
193.	2014	VA St CC	PUE-2013	Virginia American Water Company	Depreciation
194.	2014	OK CC	PUD201400229	Oklahoma Gas and Electric Company	Depreciation
195.	2014	OR PUC	UM1679	Portland General Electric	Depreciation
196.	2014	IN URC	Cause No. 44576	Indianapolis Power & Light	Depreciation
197.	2014	MA DPU	DPU. 14-150	NSTAR Gas	Depreciation
198.	2014	CT PURA	14-05-06	Connecticut Light and Power	Depreciation
199.	2014	MO PSC	ER-2014-0370	Kansas City Power & Light	Depreciation
200.	2014	KY PSC	2014-00371	Kentucky Utilities Company	Depreciation
201.	2014	KY PSC	2014-00372	Louisville Gas and Electric Company	Depreciation
202.	2015	PA PUC	R-2015-2462723	United Water Pennsylvania Inc.	Depreciation
203.	2015	PA PUC	R-2015-2468056	NiSource - Columbia Gas of Pennsylvania	Depreciation
204.	2015	NY PSC	15-E-0283/15-G-0284	New York State Electric and Gas Corporation	Depreciation
205.	2015	NY PSC	15-E-0285/15-G-0286	Rochester Gas and Electric Corporation	Depreciation
206.	2015	MO PSC	WR-2015-0301/SR-2015-0302	Missouri American Water Company	Depreciation
207.	2015	OK CC	PUD 201500208	Oklahoma, Public Service Company of	Depreciation
208.	2015	WV PSC	15-0676-W-42T	West Virginia American Water Company	Depreciation
209.	2015	PA PUC	2015-2469275	PPL Electric Utilities	Depreciation
210.	2015	IN URC	Cause No. 44688	Northern Indiana Public Service Company	Depreciation
211.	2015	OH PSC	14-1929-EL-RDR	First Energy-Ohio Edison/Cleveland Electric/ Toledo Edison	Depreciation
212.	2015	NM PRC	15-00127-UT	El Paso Electric	Depreciation
213.	2015	TX PUC	PUC-44941; SOAH 473-15-	El Paso Electric	Depreciation
214.	2015	WI PSC	3270-DU-104	Madison Gas and Electric Company	Depreciation
215.	2015	OK CC	PUD 201500273	Oklahoma Gas and Electric	Depreciation
216.	2015	KY PSC	Doc. No. 2015-00418	Kentucky American Water Company	Depreciation
217.	2015	NC UC	Doc. No. G-5, Sub 565	Public Service Company of North Carolina	Depreciation
218.	2016	WA UTC	Docket UE-17	Puget Sound Energy	Depreciation
219.	2016	NY PSC	Case No. 16-W-0130	SUEZ Water New York, Inc.	Depreciation

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LIST OF CASES IN WHICH JOHN J. SPANOS SUBMITTED TESTIMONY

No.	Year	Jurisdiction	Docket No.	Client Utility	Subject
220.	2016	MO PSC	ER-2016-0156	KCPL – Greater Missouri	Depreciation
221.	2016	WI PSC		Wisconsin Public Service Corporation	Depreciation
222.	2016	KY PSC	Case No. 2016-00026	Kentucky Utilities Company	Depreciation
223.	2016	KY PSC	Case No. 2016-00027	Louisville Gas and Electric Company	Depreciation
224.	2016	OH PUC	Case No. 16-0907-WW-AIR	Aqua Ohio	Depreciation
225.	2016	MD PSC	Case 9417	NiSource - Columbia Gas of Maryland	Depreciation
226.	2016	KY PSC	2016-00162	Columbia Gas of Kentucky	Depreciation
227.	2016	DE PSC	16-0649	Delmarva Power and Light Company – Electric	Depreciation
228.	2016	DE PSC	16-0650	Delmarva Power and Light Company – Gas	Depreciation
229.	2016	NY PSC	Case 16-G-0257	National Fuel Gas Distribution Corp – NY Div	Depreciation
230.	2016	PA PUC	R-2016-2537349	Metropolitan Edison Company	Depreciation
231.	2016	PA PUC	R-2016-2537352	Pennsylvania Electric Company	Depreciation
232.	2016	PA PUC	R-2016-2537355	Pennsylvania Power Company	Depreciation
233.	2016	PA PUC	R-2016-2537359	West Penn Power Company	Depreciation
234.	2016	PA PUC	R-2016-2529660	NiSource - Columbia Gas of PA	Depreciation
235.	2016	KY PSC	Case No. 2016-00063	Kentucky Utilities / Louisville Gas & Electric Co	Depreciation
236.	2016	MO PSC	ER-2016-0285	KCPL Missouri	Depreciation
237.	2016	AR PSC	16-052-U	Oklahoma Gas & Electric Co	Depreciation
238.	2016	PSCW	6680-DU-104	Wisconsin Power and Light	Depreciation
239.	2016	ID PUC	IPC-E-16-23	Idaho Power Company	Depreciation
240.	2016	OR PUC	UM1801	Idaho Power Company	Depreciation
241.	2016	ILL CC	16-	MidAmerican Energy Company	Depreciation
242.	2016	KY PSC	Case No. 2016-00370	Kentucky Utilities Company	Depreciation
243.	2016	KY PSC	Case No. 2016-00371	Louisville Gas and Electric Company	Depreciation
244.	2016	IN URC	Cause No. 45029	Indianapolis Power & Light	Depreciation
245.	2016	AL RC	U-16-081	Chugach Electric Association	Depreciation
246.	2017	MA DPU	D.P.U. 17-05	NSTAR Electric Company and Western Massachusetts Electric Company	Depreciation
247.	2017	TX PUC	PUC-26831, SOAH 973-17-	El Paso Electric Company	Depreciation
248.	2017	WA UTC	UE-17033 and UG-170034	Puget Sound Energy	Depreciation
249.	2017	OH PUC	Case No. 17-0032-EL-AIR	Duke Energy Ohio	Depreciation
250.	2017	VA SCC	Case No. PUE-2016-00413	Virginia Natural Gas, Inc.	Depreciation
251.	2017	OK CC	Case No. PUD201700151	Public Service Company of Oklahoma	Depreciation

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No.	Year	Jurisdiction	Docket No.	Client Utility	Subject
252.	2017	MD PSC	Case No. 9447	Columbia Gas of Maryland	Depreciation
253.	2017	NC UC	Docket No. E-2, Sub 1142	Duke Energy Progress	Depreciation
254.	2017	VA SCC	Case No. PUR-2017-00090	Dominion Virginia Electric and Power Company	Depreciation
255.	2017	FERC	ER17-1162	MidAmerican Energy Company	Depreciation
256.	2017	PA PUC	R-2017-2595853	Pennsylvania American Water Company	Depreciation
257.	2017	OR PUC	UM1809	Portland General Electric	Depreciation
258.	2017	FERC	ER17-217-000	Jersey Central Power & Light	Depreciation
259.	2017	FERC	ER17-211-000	Mid-Atlantic Interstate Transmission, LLC	Depreciation
260.	2017	MN PUC	Docket No. G007/D-17-442	Minnesota Energy Resources Corporation	Depreciation
261.	2017	IL CC	Docket No. 17-0124	Northern Illinois Gas Company	Depreciation
262.	2017	OR PUC	UM1808	Northwest Natural Gas Company	Depreciation
263.	2017	NY PSC	Case No. 17-W-0528	SUEZ Water Owego-Nichols	Depreciation
264.	2017	MO PSC	GR-2017-0215	Laclede Gas Company	Depreciation
265.	2017	MO PSC	GR-2017-0216	Missouri Gas Energy	Depreciation
266.	2017	ILL CC	Docket No. 17-0337	Illinois-American Water Company	Depreciation
267.	2017	FERC	Docket No. ER18-22-000	PPL Electric Utilities Corporation	Depreciation
268.	2017	IN URC	Cause No. 44988	Northern Indiana Public Service Company	Depreciation
269.	2017	NJ BPU	BPU Docket No. WR17090985	New Jersey American Water Company, Inc.	Depreciation
270.	2017	RI PUC	Docket No. 4800	SUEZ Water Rhode Island	Depreciation
271.	2017	OK CC	Cause No. PUD 201700496	Oklahoma Gas and Electric Company	Depreciation
272.	2017	NJ BPU	ER18010029 & GR18010030	Public Service Electric and Gas Company	Depreciation
273.	2017	NC Util Com.	Docket No. E-7, SUB 1146	Duke Energy Carolinas, LLC	Depreciation
274.	2017	KY PSC	Case No. 2017-00321	Duke Energy Kentucky, Inc.	Depreciation
275.	2017	MA DPU	D.P.U. 18-40	Berkshire Gas Company	Depreciation
276.	2018	IN IURC	Cause No. 44992	Indiana-American Water Company, Inc.	Depreciation
277.	2018	IN IURC	Cause No. 45029	Indianapolis Power and Light	Depreciation
278.	2018	NC Util Com.	Docket No. W-218, Sub 497	Aqua North Carolina, Inc.	Depreciation
279.	2018	PA PUC	Docket No. R-2018-2647577	NiSource - Columbia Gas of Pennsylvania, Inc.	Depreciation
280.	2018	OR PUC	Docket UM 1933	Avista Corporation	Depreciation
281.	2018	WA UTC	Docket No. UE-108167	Avista Corporation	Depreciation
282.	2018	ID PUC	AVU-E-18-03, AVU-G-18-02	Avista Corporation	Depreciation
283.	2018	IN URC	Cause No. 45039	Citizens Energy Group	Depreciation
284.	2018	FERC	Docket No. ER18-	Duke Energy Progress	Depreciation

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No.	Year	Jurisdiction	Docket No.	Client Utility	Subject
285.	2018	PA PUC	Docket No. R-2018-3000124	Duquesne Light Company	Depreciation
286.	2018	MD PSC	Case No. 948	NiSource - Columbia Gas of Maryland	Depreciation
287.	2018	MA DPU	D.P.U. 18-45	NiSource - Columbia Gas of Massachusetts	Depreciation
288.	2018	OH PUC	Case No. 18-0299-GA-ALT	Vectren Energy Delivery of Ohio	Depreciation
289.	2018	PA PUC	Docket No. R-2018-3000834	SUEZ Water Pennsylvania Inc.	Depreciation
290.	2018	MD PSC	Case No. 9847	Maryland-American Water Company	Depreciation
291.	2018	PA PUC	Docket No. R-2018-3000019	The York Water Company	Depreciation
292.	2018	FERC	ER-18-2231-000	Duke Energy Carolinas, LLC	Depreciation
293.	2018	KY PSC	Case No. 2018-00261	Duke Energy Kentucky, Inc.	Depreciation
294.	2018	NJ BPU	BPU Docket No. WR18050593	SUEZ Water New Jersey	Depreciation
295.	2018	WA UTC	Docket No. UE-180778	PacifiCorp	Depreciation
296.	2018	UT PSC	Docket No. 18-035-36	PacifiCorp	Depreciation
297.	2018	OR PUC	Docket No. UM-1968	PacifiCorp	Depreciation
298.	2018	ID PUC	Case No. PAC-E-18-08	PacifiCorp	Depreciation
299.	2018	WY PSC	20000-539-EA-18	PacifiCorp	Depreciation
300.	2018	PA PUC	Docket No. R-2018-3003068	Aqua Pennsylvania, Inc.	Depreciation
301.	2018	IL CC	Docket No. 18-1467	Aqua Illinois, Inc.	Depreciation
302.	2018	KY PSC	Case No. 2018-00294	Louisville Gas & Electric Company	Depreciation
303.	2018	KY PSC	Case No. 2018-00295	Kentucky Utilities Company	Depreciation
304.	2018	IN URC	Cause No. 45159	Northern Indiana Public Service Company	Depreciation
305.	2018	VA SCC	Case No. PUR-2019-00175	Virginia American Water Company	Depreciation
306.	2019	PA PUC	Docket No. R-2018-3006818	Peoples Natural Gas Company, LLC	Depreciation
307.	2019	OK CC	Cause No. PUD201800140	Oklahoma Gas and Electric Company	Depreciation
308.	2019	MD PSC	Case No. 9490	FirstEnergy – Potomac Edison	Depreciation
309.	2019	SC PSC	Docket No. 2018-318-E	Duke Energy Progress	Depreciation
310.	2019	SC PSC	Docket No. 2018-319-E	Duke Energy Carolinas	Depreciation
311.	2019	DE PSC	DE 19-057	Public Service of New Hampshire	Depreciation
312.33	2019	NY PSC	Case No. 19-W-0168 & 19-W-	SUEZ Water New York	Depreciation
313.	2019	PA PUC	Docket No. R-2019-3006904	Newtown Artesian Water Company	Depreciation
314.	2019	MO PSC	ER-2019-0335	Ameren Missouri	Depreciation
315.	2019	MO PSC	EC-2019-0200	KCP&L Greater Missouri Operations Company	Depreciation
316.	2019	MN DOC	G011/D-19-377	Minnesota Energy Resource Corp.	Depreciation
317.	2019	NY PSC	Case 19-E-0378 & 19-G-0379	New York State Electric and Gas Corporation	Depreciation
318.	2019	NY PSC	Case 19-E-0380 & 19-G-0381	Rochester Gas and Electric Corporation	Depreciation

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No.	Year	Jurisdiction	Docket No.	Client Utility	Subject
319.	2019	WA UTC	Docket UE-190529 / UG-190530	Puget Sound Energy	Depreciation
320.	2019	PA PUC	Docket No. R-2019-3010955	City of Lancaster	Depreciation
321.00	2019	IURC	Cause No. 45253	Duke Energy Indiana	Depreciation
322.	2019	KY PSC	Case No. 2019-00271	Duke Energy Kentucky, Inc.	Depreciation
323.	2019	OH PUC	Case No. 18-1720-GA-AIR	Northeast Ohio Natural Gas Corp	Depreciation
324.	2019	NC Util. Com.	Docket No. E-2, Sub 1219	Duke Energy Carolinas	Depreciation
325.	2019	FERC	Docket No. ER20-277-000	Jersey Central Power & Light Company	Depreciation
326.	2019	MA DPU	D.P.U. 19-120	NSTAR Gas Company	Depreciation
327.	2019	SC PSC	Docket No. 2019-290-WS	Blue Granite Water Company	Depreciation
328.	2019	NC Util. Com.	Docket No. E-2, Sub 1219	Duke Energy Progress	Depreciation
329.	2019	MD PSC	Case No. 9609	NiSource Columbia Gas of Maryland, Inc.	Depreciation
330.	2020	NJ BPU	Docket No. ER20020146	Jersey Central Power & Light Company	Depreciation
331.	2020	PA PUC	Docket No. R-2020-3018835	NiSource - Columbia Gas of Pennsylvania, Inc.	Depreciation
332.	2020	PA PUC	Docket No. R-2020-3019369	Pennsylvania-American Water Company	Depreciation
333.	2020	PA PUC	Docket No. R-2020-3019371	Pennsylvania-American Water Company	Depreciation
334.	2020	MO PSC	GO-2018-0309, GO-2018-0310	Spire Missouri, Inc.	Depreciation
335.	2020	NM PRC	Case No. 20-00104-UT	El Paso Electric Company	Depreciation
336.	2020	MD PSC	Case No. 9644	Columbia Gas of Maryland, Inc.	Depreciation
337.	2020	MO PSC	GO-2018-0309, GO-2018-0310	Spire Missouri, Inc.	Depreciation
338.	2020	VA St CC	Case No. PUR-2020-00095	Virginia Natural Gas Company	Depreciation
339.	2020	SC PSC	Docket No. 2020-125-E	Dominion Energy South Carolina, Inc.	Depreciation
340.	2020	WV PSC	Case No. 20-0745-G-D	Hope Gas, Inc. d/b/a Dominion Energy West Virginia	Depreciation
341.	2020	VA St CC	Case No. PUR-2020-00106	Aqua Virginia, Inc.	Depreciation
342.	2020	PA PUC	Docket No. R-2020-3020256	City of Bethlehem – Bureau of Water	Depreciation
343.	2020	NE PSC	Docket No. NG-109	Black Hills Nebraska	Depreciation
344.	2020	NY PSC	Case No. 20-E-0428 & 20-G-0429	Central Hudson Gas & Electric Corporation	Depreciation
345.	2020	FERC	ER20-598	Duke Energy Indiana	Depreciation
346.	2020	FERC	ER20-855	Northern Indiana Public Service Company	Depreciation
347.	2020	OR PSC	UE 374	Pacificorp	Depreciation
348.3	2020	MD PSC	Case No. 9490 Phase II	Potomac Edison – Maryland	Depreciation
349.	2020	IN URC	Case No. 45447	Southern Indiana Gas and Electric Company	Depreciation
350.	2020	IN URC	IURC Cause No. 45468	Indiana Gas Company, Inc. d/b/a Vectren Energy	Depreciation
351.	2020	KY PSC	Case No. 2020-00349	Kentucky Utilities Company	Depreciation
352.	2020	KY PSC	Case No. 2020-00350	Louisville Gas and Electric Company	Depreciation
353.	2020	FERC	Docket No. ER21- 000	South FirstEnergy Operating Companies	Depreciation

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No.	Year	Jurisdiction	Docket No.	Client Utility	Subject
354.	2020	OH PUC	Case Nos 20-1651-EL-AIR, 20-1652-EL-AAM & 20-1653-EL-ATA	Dayton Power and Light Company	Depreciation
355.	2020	OR PSC	UE 388	Northwest Natural Gas Company	Depreciation
356.	2021	KY PSC	Case No. 2021-00103	East Kentucky Power Cooperative	Depreciation
357.	2021	MPUC	Docket No. 2021-00024	Bangor Natural Gas	Depreciation
358.	2021	PA PUC	Docket No. R-2021-3024296	Columbia Gas of Pennsylvania, Inc.	Depreciation
359.	2021	NC Util. Com.	Doc. No. G-5, Sub 632	Public Service of North Carolina	Depreciation
360.	2021	MO PSC	ER-2021-0240	Ameren Missouri	Depreciation

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The Electric Company

El Paso Electric

2019 DEPRECIATION STUDY

CALCULATED ANNUAL DEPRECIATION
ACCRUALS RELATED TO ELECTRIC PLANT
AS OF DECEMBER 31, 2019

Prepared by:

Gannett Fleming

Excellence Delivered ***As Promised***

EL PASO ELECTRIC COMPANY

EL PASO, TEXAS

2019 DEPRECIATION STUDY

CALCULATED ANNUAL DEPRECIATION
ACCRUALS RELATED TO ELECTRIC PLANT
AS OF DECEMBER 31, 2019

GANNETT FLEMING VALUATION AND RATE CONSULTANTS, LLC

Camp Hill, Pennsylvania

Gannett Fleming

Excellence Delivered ***As Promised***

April 12, 2021

El Paso Electric Company
100 N. Stanton Street
El Paso, TX 79901-1463

Attention Richard A. Ostberg
Chief Financial Officer

Ladies and Gentlemen:

Pursuant to your request, we have conducted a depreciation study related to the electric plant of El Paso Electric Company as of December 31, 2019. The attached report presents a description of the methods used in the estimation of depreciation, the summary of annual depreciation accrual rates, the statistical support for the life and net salvage estimates and the detailed tabulations of annual depreciation.

We gratefully acknowledge the assistance of El Paso Electric personnel in the conduct of this study.

Respectfully submitted,

GANNETT FLEMING VALUATION
AND RATE CONSULTANTS, LLC

John J. Spanos

JOHN J. SPANOS
President

JJS:mle

066756.400

Gannett Fleming Valuation and Rate Consultants, LLC
207 Senate Avenue • Camp Hill, PA 17011-2316
t 717.763 7211 • f 717 763 4590

www gfvrc com

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EL PASO ELECTRIC COMPANY

DEPRECIATION STUDY

EXECUTIVE SUMMARY

Pursuant to El Paso Electric Company's ("El Paso" or "Company") request, Gannett Fleming Valuation and Rate Consultants, LLC ("Gannett Fleming") conducted a depreciation study related to the electric plant as of December 31, 2019. The purpose of this study was to determine the annual depreciation accrual rates and amounts for book and ratemaking purposes.

The depreciation rates are based on the straight line method using the average service life ("ASL") procedure and were applied on a remaining life basis. The calculations were based on attained ages and estimated average service life, and net salvage characteristics for each depreciable group of assets.

El Paso's accounting policy has not changed since the last depreciation study was prepared. However, there has been significant change in expected life spans of generating facilities, recording retirements of assets as well as the associated cost of removal and gross salvage. These changes have caused the proposed depreciation rates in the depreciation study to change from those currently-approved from the last depreciation study as of December 31, 2014.

Gannett Fleming recommends the calculated annual depreciation accrual rates set forth herein apply specifically to electric plant in service as of December 31, 2019 as summarized by Table 1 of the study. Supporting analysis and calculations are provided within the study.

The study results set forth an annual depreciation expense of $79.0 million when applied to depreciable plant balances as of December 31, 2019. The results are summarized at the functional level as follows:

SUMMARY OF ORIGINAL COST, ACCRUAL RATES AND AMOUNTS

FUNCTION	ORIGINAL COST AS OF DECEMBER 31, 2019	PROPOSED RATE	PROPOSED EXPENSE
Steam Production Plant	$565,455,714.90	3.25	$18,397,949
Gas Turbine Plant	518,021,061.74	2.92	15,143,974
Transmission Plant	532,343,333.89	1.70	9,023,893
Distribution Plant	1,347,787,849.28	2.21	29,846,554
General Plant	171,715,518.71	3.84	6,601,194
Total	**$3,135,323,478.52**	**2.52**	**$79,013,564**

PART I. INTRODUCTION

EL PASO ELECTRIC COMPANY
DEPRECIATION STUDY

PART I. INTRODUCTION

SCOPE

This report sets forth the results of the depreciation study for El Paso Electric Company ("El Paso"), to determine the annual depreciation accrual rates and amounts for book purposes applicable to the original cost of electric plant as of December 31, 2019. The rates and amounts are based on the straight line remaining life method of depreciation. This report also describes the concepts, methods and judgments which underlie the recommended annual depreciation accrual rates related to electric plant in service as of December 31, 2019.

The service life and net salvage estimates resulting from the study were based on informed judgment which incorporated analyses of historical plant retirement data as recorded through 2019, a review of Company practice and outlook as they relate to plant operation and retirement, and consideration of current practice in the electric industry, including knowledge of service lives and net salvage estimates used for other electric companies.

PLAN OF REPORT

Part I, Introduction, contains statements with respect to the plan of the report, and the basis of the study. Part II, Estimation of Survivor Curves, presents descriptions of the considerations and the methods used in the service life and net salvage studies. Part III, Service Life Considerations, presents the factors and judgment utilized in the average service life analysis. Part IV, Net Salvage Considerations, presents the judgment utilized for the net salvage study. Part V, Calculation of Annual and Accrued Depreciation, describes the procedures used in the calculation of group depreciation.

Part VI, Results of Study, presents summaries by depreciable group of annual depreciation accrual rates and amounts, as well as composite remaining lives. Part VII, Service Life Statistics presents the statistical analysis of service life estimates, Part VIII, Net Salvage Statistics sets forth the statistical indications of net salvage percents, and Part IX, Detailed Depreciation Calculations presents the detailed tabulations of annual depreciation.

BASIS OF THE STUDY

Depreciation

Depreciation, in public utility regulation, is 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 which are known to be in current operation and against which the utility is not protected by insurance. Among causes to be given consideration are wear and tear, deterioration, action of the elements, inadequacy, obsolescence, changes in the art, changes in demand, and the requirements of public authorities.

Depreciation, as used in accounting, is a method of distributing fixed capital costs, less net salvage, over a period of time by allocating annual amounts to expense. Each annual amount of such depreciation expense is part of that year's total cost of providing electric utility service. Normally, the period of time over which the fixed capital cost is allocated to the cost of service is equal to the period of time over which an item renders service, that is, the item's service life. The most prevalent method of allocation is to distribute an equal amount of cost to each year of service life. This method is known as the straight line method of depreciation.

For most accounts, the annual depreciation was calculated by the straight line method using the average service life procedure and the remaining life basis. For certain General Plant accounts, the annual depreciation is based on amortization accounting. Both types of calculations were based on original cost, attained ages, and estimates of service lives and net salvage.

The straight line method, average service life procedure is a commonly used depreciation calculation procedure that has been widely accepted in jurisdictions throughout North America. Gannett Fleming recommends its continued use. Amortization accounting is used for certain General Plant accounts because of the disproportionate plant accounting effort required when compared to the minimal original cost of the large number of items in these accounts. An explanation of the calculation of annual and accrued amortization is presented beginning on page V-4 of the report.

Service Life and Net Salvage Estimates

The service life and net salvage estimates used in the depreciation and amortization calculations were based on informed judgment which incorporated a review of management's plans, policies and outlook, a general knowledge of the electric utility industry, and comparisons of the service life and net salvage estimates from our studies of other electric utilities. The use of survivor curves to reflect the expected dispersion of retirement provides a consistent method of estimating depreciation for electric plant. Iowa type survivor curves were used to depict the estimated survivor curves for the plant accounts not subject to amortization accounting.

The procedure for estimating service lives consisted of compiling historical data for the plant accounts or depreciable groups, analyzing this history through the use of widely accepted techniques, and forecasting the survivor characteristics for each depreciable group on the basis of interpretations of the historical data analyses and the probable future. The combination of the historical experience and the estimated future yielded estimated survivor curves from which the average service lives were derived.

PART II. ESTIMATION OF SURVIVOR CURVES

PART II. ESTIMATION OF SURVIVOR CURVES

The calculation of annual depreciation based on the straight line method requires the estimation of survivor curves and the selection of group depreciation procedures. The estimation of survivor curves is discussed below and the development of net salvage is discussed in later sections of this report.

SURVIVOR CURVES

The use of an average service life for a property group implies that the various units in the group have different lives. Thus, the average life may be obtained by determining the separate lives of each of the units, or by constructing a survivor curve by plotting the number of units which survive at successive ages.

The survivor curve graphically depicts the amount of property existing at each age throughout the life of an original group. From the survivor curve, the average life of the group, the remaining life expectancy, the probable life, and the frequency curve can be calculated. In Figure 1, a typical smooth survivor curve and the derived curves are illustrated. The average life is obtained by calculating the area under the survivor curve, from age zero to the maximum age, and dividing this area by the ordinate at age zero. The remaining life expectancy at any age can be calculated by obtaining the area under the curve, from the observation age to the maximum age, and dividing this area by the percent surviving at the observation age. For example, in Figure 1, the remaining life at age 30 is equal to the crosshatched area under the survivor curve divided by 29.5 percent surviving at age 30. The probable life at any age is developed by adding the age and remaining life. If the probable life of the property is calculated for each year of age, the probable life curve shown in the chart can be developed. The frequency curve presents the number of units retired in each age interval. It is derived by obtaining the differences between the amount of property surviving at the beginning and at the end of each interval.

This study has incorporated the use of Iowa curves developed from a retirement rate analysis of historical retirement data. A discussion of the concepts of survivor curves and of the development of survivor curves using the retirement rate method is presented below.

Iowa Type Curves

The range of survivor characteristics usually experienced by utility and industrial properties is encompassed by a system of generalized survivor curves known as the Iowa type curves. There are four families in the Iowa system, labeled in accordance with the location of the modes of the retirements in relationship to the average life and the relative height of the modes. The left moded curves, presented in Figure 2, are those in which the greatest frequency of retirement occurs to the left of, or prior to, average service life. The symmetrical moded curves, presented in Figure 3, are those in which the greatest frequency of retirement occurs at average service life. The right moded curves, presented in Figure 4, are those in which the greatest frequency occurs to the right of, or after, average service life. The origin moded curves, presented in Figure 5, are those in which the greatest frequency of retirement occurs at the origin, or immediately after age zero. The letter designation of each family of curves (L, S, R or O) represents the location of the mode of the associated frequency curve with respect to the average service life. The numbers represent the relative heights of the modes of the frequency curves within each family.

The Iowa curves were developed at the Iowa State College Engineering Experiment Station through an extensive process of observation and classification of the ages at which industrial property had been retired. A report of the study which resulted in the classification of property survivor characteristics into 18 type curves,

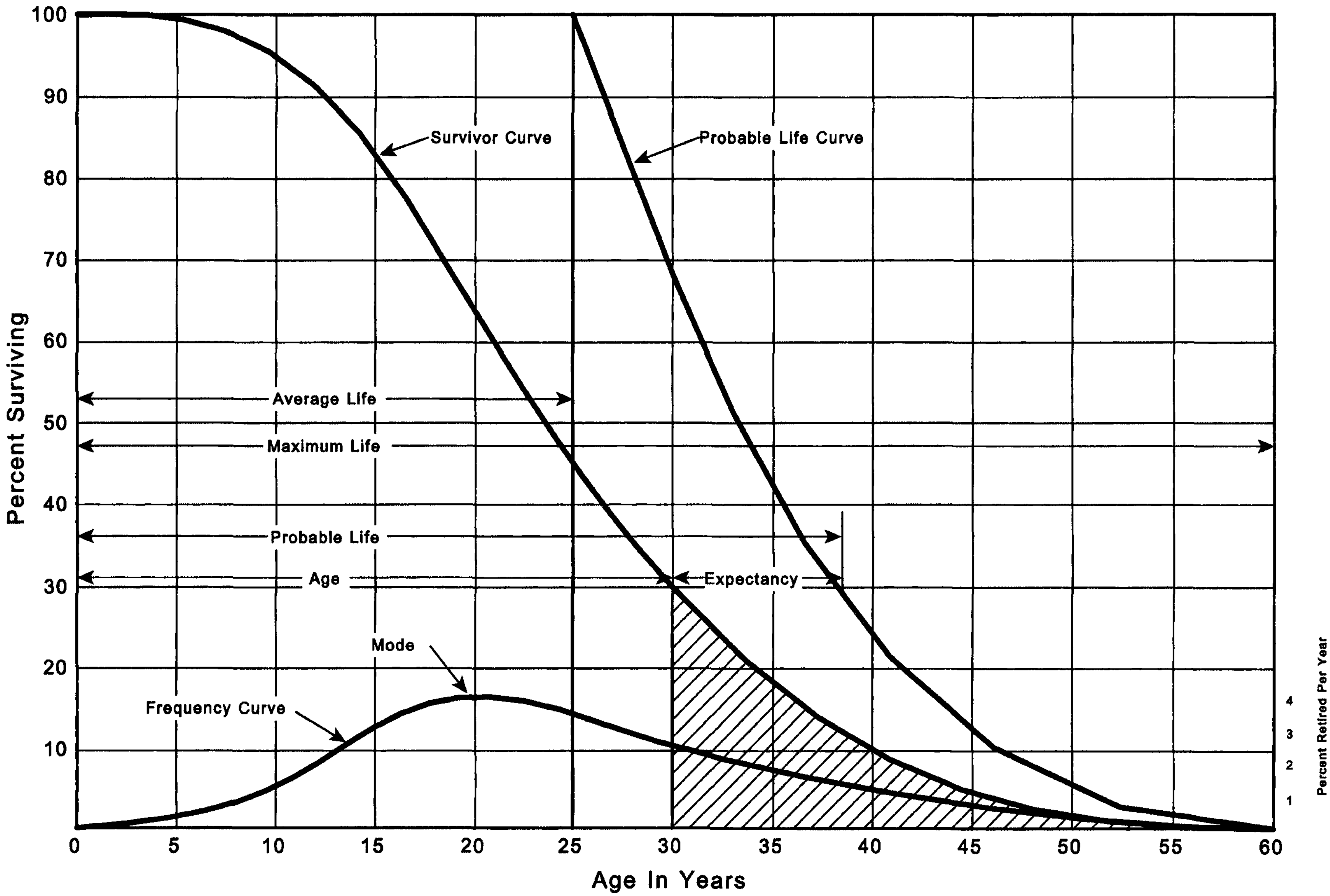


Figure 1. A Typical Survivor Curve and Derived Curves

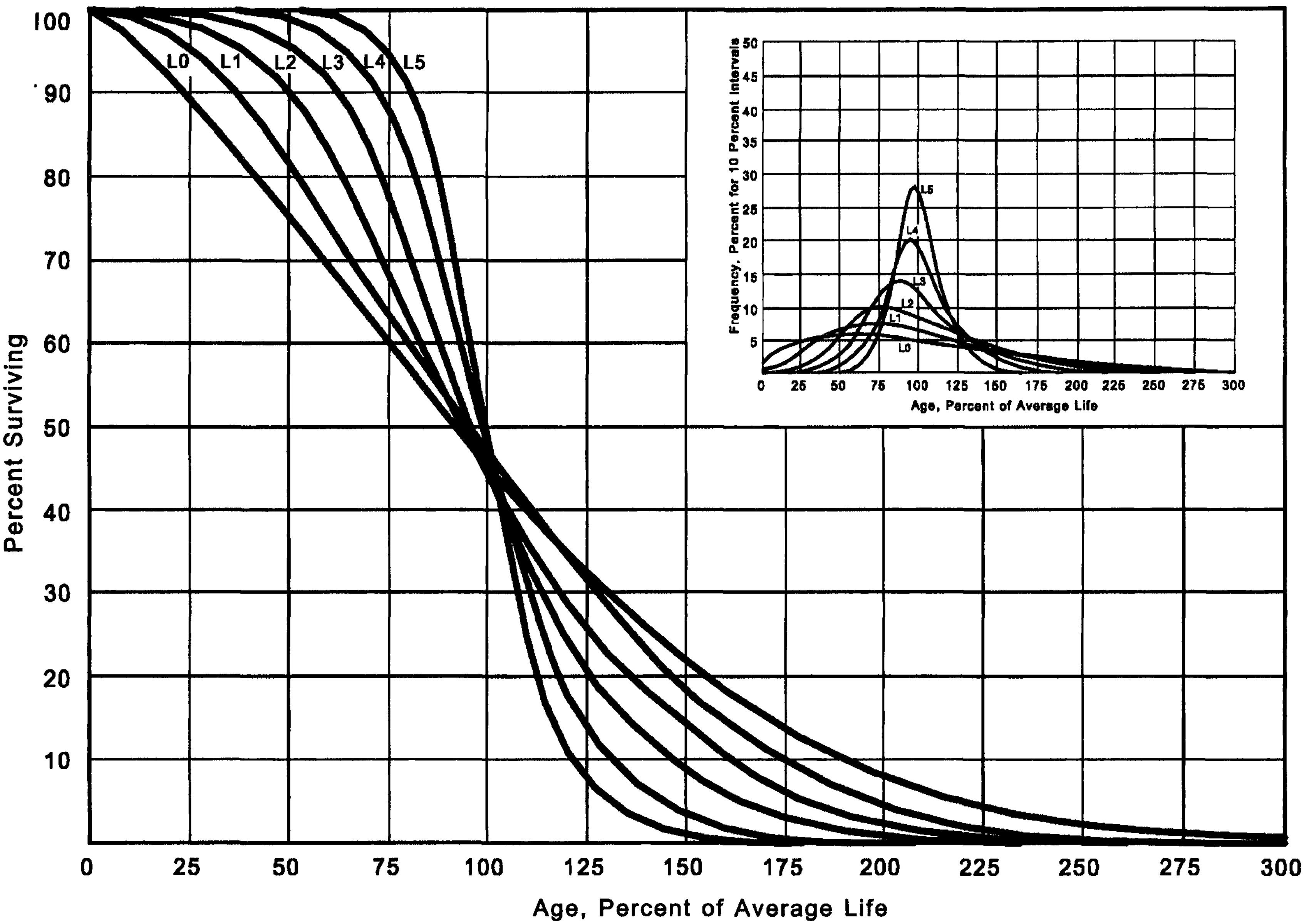


Figure 2. Left Modal or "L" Iowa Type Survivor Curves

Gannett Fleming

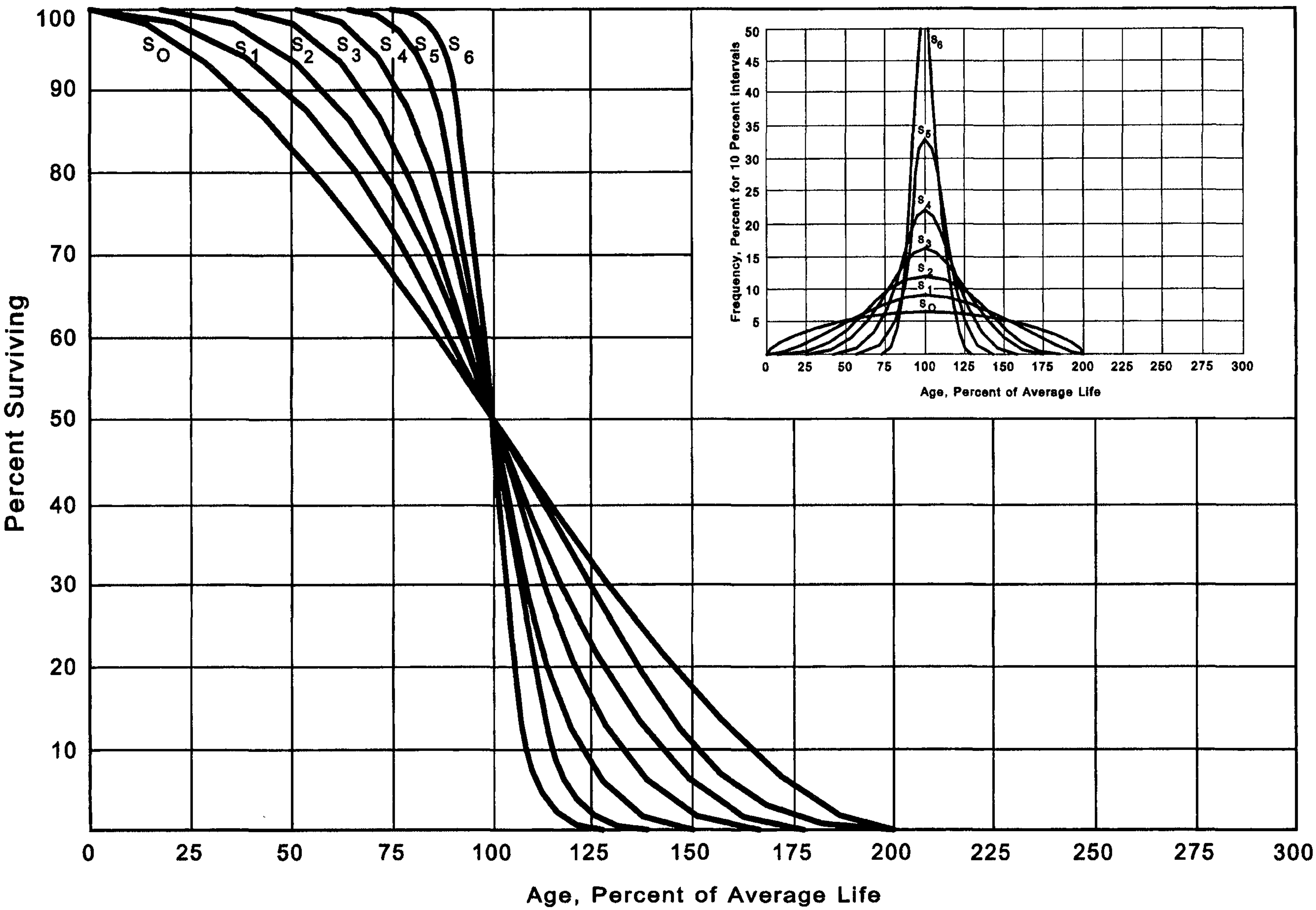


Figure 3. Symmetrical or "S" Iowa Type Survivor Curves

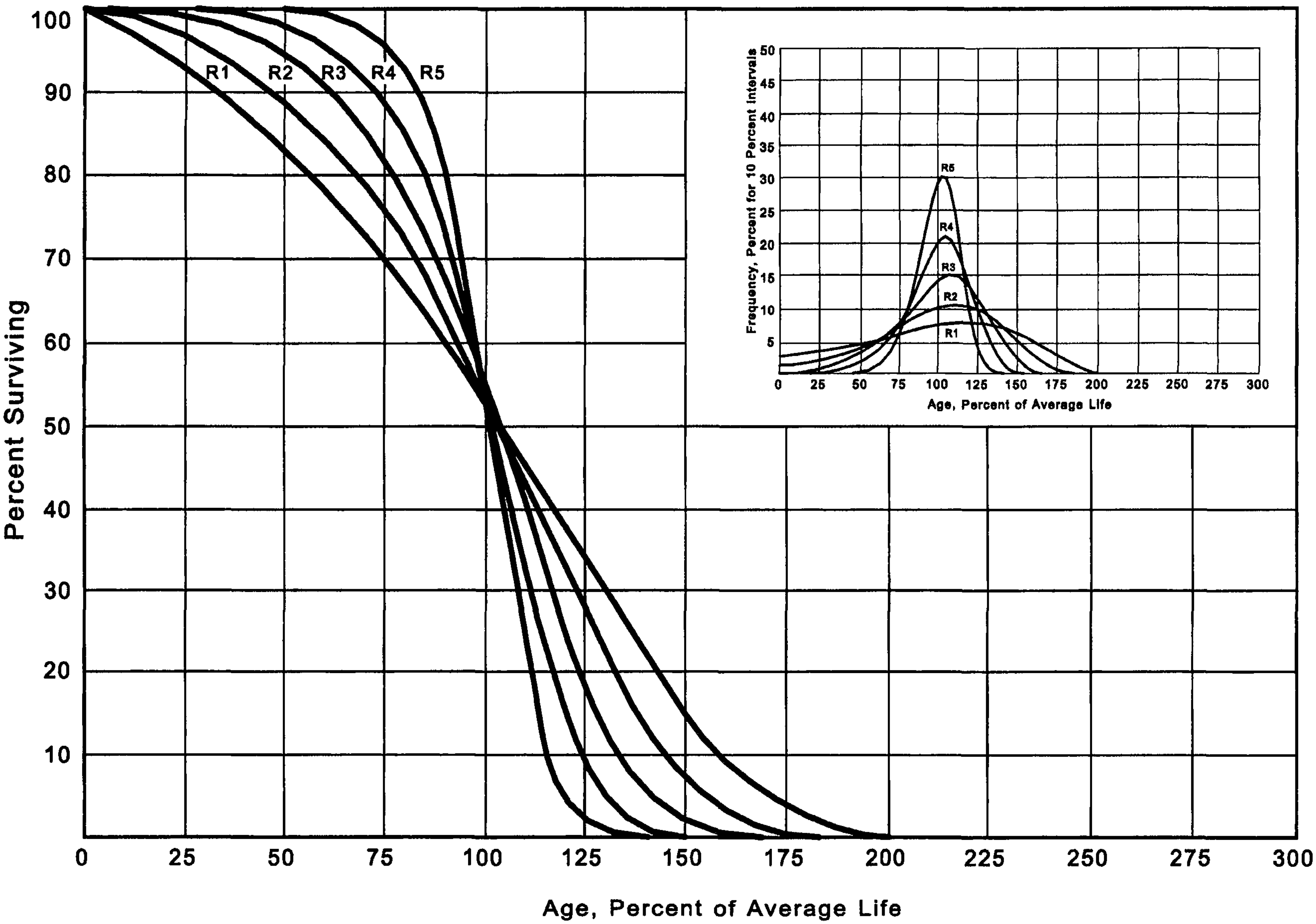


Figure 4. Right Modal or "R" Iowa Type Survivor Curves

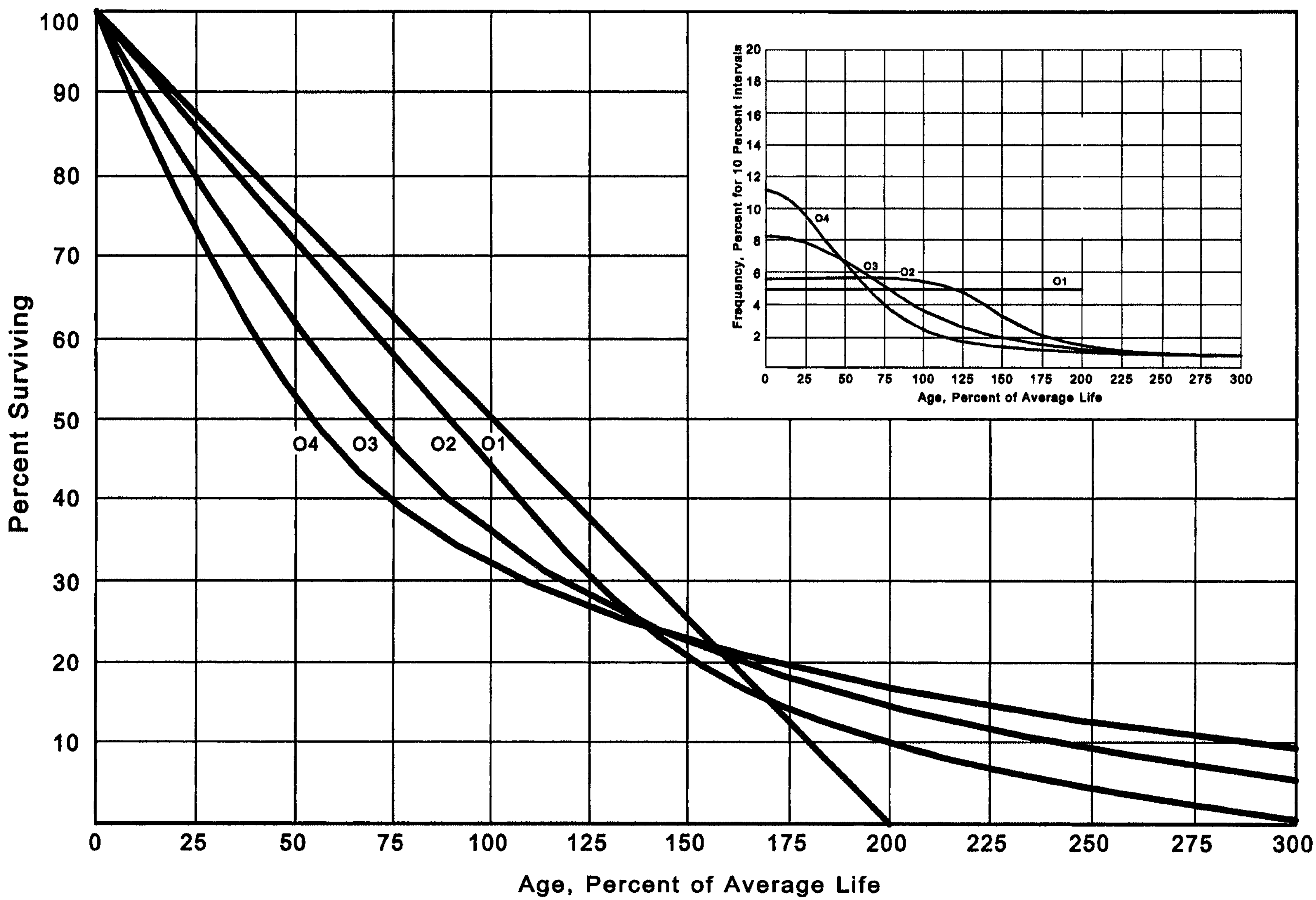


Figure 5. Origin Modal or "O" Iowa Type Survivor Curves

which constitute three of the four families, was published in 1935 in the form of the Experiment Station's Bulletin 125. These curve types have also been presented in subsequent Experiment Station bulletins and in the text, "Engineering Valuation and Depreciation."[1] In 1957, Frank V. B. Couch, Jr., an Iowa State College graduate student submitted a thesis presenting his development of the fourth family consisting of the four O type survivor curves.

Retirement Rate Method of Analysis

The retirement rate method is an actuarial method of deriving survivor curves using the average rates at which property of each age group is retired. The method relates to property groups for which aged accounting experience is available and is the method used to develop the original stub survivor curves in this study. The method (also known as the annual rate method) is illustrated through the use of an example in the following text, and is also explained in several publications, including "Statistical Analyses of Industrial Property Retirements,"[2] "Engineering Valuation and Depreciation,"[3] and "Depreciation Systems."[4]

The average rate of retirement used in the calculation of the percent surviving for the survivor curve (life table) requires two sets of data: first, the property retired during a period of observation, identified by the property's age at retirement; and second, the property exposed to retirement at the beginning of the age intervals during the same period. The period of observation is referred to as the experience band, and the band of years which represent the installation dates of the property exposed to retirement during the experience band is referred to as the placement band. An example of the calculations used in the development of a life table follows. The example includes

[1]Marston, Anson, Robley Winfrey and Jean C. Hempstead. Engineering Valuation and Depreciation, 2nd Edition. New York, McGraw-Hill Book Company. 1953.
[2]Winfrey, Robley, Statistical Analyses of Industrial Property Retirements. Iowa State College, Engineering Experiment Station, Bulletin 125. 1935.
[3]Marston, Anson, Robley Winfrey, and Jean C. Hempstead, Supra Note 1.
[4]Wolf, Frank K. and W. Chester Fitch. Depreciation Systems. Iowa State University Press. 1994.

schedules of annual aged property transactions, a schedule of plant exposed to retirement, a life table and illustrations of smoothing the stub survivor curve.

<u>Schedules of Annual Transactions in Plant Records</u>

The property group used to illustrate the retirement rate method is observed for the experience band 2010-2019 during which there were placements during the years 2005-2019. In order to illustrate the summation of the aged data by age interval, the data were compiled in the manner presented in Schedules 1 and 2 on pages II-11 and II-12. In Schedule 1, the year of installation (year placed) and the year of retirement are shown. The age interval during which a retirement occurred is determined from this information. In the example which follows, $10,000 of the dollars invested in 2005 were retired in 2010. The $10,000 retirement occurred during the age interval between 4½ and 5½ years on the basis that approximately one-half of the amount of property was installed prior to and subsequent to July 1 of each year. That is, on the average, property installed during a year is placed in service at the midpoint of the year for the purpose of the analysis. All retirements also are stated as occurring at the midpoint of a one-year age interval of time, except the first age interval which encompasses only one-half year.

The total retirements occurring in each age interval in a band are determined by summing the amounts for each transaction year-installation year combination for that age interval. For example, the total of $143,000 retired for age interval 4½-5½ is the sum of the retirements entered on Schedule 1 immediately above the stair step line drawn on the table beginning with the 2010 retirements of 2005 installations and ending with the 2019 retirements of the 2014 installations. Thus, the total amount of 143 for age interval 4½-5½ equals the sum of:

$$10 + 12 + 13 + 11 + 13 + 13 + 15 + 17 + 19 + 20.$$

SCHEDULE 1. RETIREMENTS FOR EACH YEAR 2010-2019
SUMMARIZED BY AGE INTERVAL

Experience Band 2010-2019

Placement Band 2005-2019

Year Placed (1)	Retirements, Thousands of Dollars During Year 2010 (2)	2011 (3)	2012 (4)	2013 (5)	2014 (6)	2015 (7)	2016 (8)	2017 (9)	2018 (10)	2019 (11)	Total During Age Interval (12)	Age Interval (13)
2005	10	11	12	13	14	16	23	24	25	26	26	13½-14½
2006	11	12	13	15	16	18	20	21	22	19	44	12½-13½
2007	11	12	13	14	16	17	19	21	22	18	64	11½-12½
2008	8	9	10	11	11	13	14	15	16	17	83	10½-11½
2009	9	10	11	12	13	14	16	17	19	20	93	9½-10½
2010	4	9	10	11	12	13	14	15	16	20	105	8½-9½
2011		5	11	12	13	14	15	16	18	20	113	7½-8½
2012			6	12	13	15	16	17	19	19	124	6½-7½
2013				6	13	15	16	17	19	19	131	5½-6½
2014					7	14	16	17	19	20	143	4½-5½
2015						8	18	20	22	23	146	3½-4½
2016							9	20	22	25	150	2½-3½
2017								11	23	25	151	1½-2½
2018									11	24	153	½-1½
2019										13	80	0-½
Total	53	68	86	106	128	157	196	231	273	308	1,606	

SCHEDULE 2. OTHER TRANSACTIONS FOR EACH YEAR 2010-2019
SUMMARIZED BY AGE INTERVAL

Experience Band 2010-2019 | Placement Band 2005-2019

Year Placed	Acquisitions, Transfers and Sales, Thousands of Dollars During Year 2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	Total During Age Interval	Age Interval
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
2005	-	-	-	-	-	-	60[a]	-	-	-	-	13½-14½
2006	-	-	-	-	-	-	-	-	-	-	-	12½-13½
2007	-	-	-	-	-	-	-	-	-	-	-	11½-12½
2008	-	-	-	-	-	-	-	(5)[b]	-	-	60	10½-11½
2009	-	-	-	-	-	-	-	6[a]	-	-	-	9½-10½
2010	-	-	-	-	-	-	-	-	-	-	(5)	8½-9½
2011		-	-	-	-	-	-	-	-	-	6	7½-8½
2012			-	-	-	-	-	-	-	-	-	6½-7½
2013				-	-	-	-	(12)[b]	-	-	-	5½-6½
2014					-	-	-	-	22[a]	-	-	4½-5½
2015						-	-	(19)[b]	-	-	10	3½-4½
2016							-	-	-	-	-	2½-3½
2017								-	-	(102)[c]	(121)	1½-2½
2018									-	-	-	½-1½
2019											-	0-½
Total	-	-	-	-	-	-	60	(30)	22	(102)	(50)	

[a] Transfer Affecting Exposures at Beginning of Year
[b] Transfer Affecting Exposures at End of Year
[c] Sale with Continued Use
Parentheses Denote Credit Amount.

In Schedule 2, other transactions which affect the group are recorded in a similar manner. The entries illustrated include transfers and sales. The entries which are credits to the plant account are shown in parentheses. The items recorded on this schedule are not totaled with the retirements, but are used in developing the exposures at the beginning of each age interval.

Schedule of Plant Exposed to Retirement

The development of the amount of plant exposed to retirement at the beginning of each age interval is illustrated in Schedule 3 on page II-14. The surviving plant at the beginning of each year from 2010 through 2019 is recorded by year in the portion of the table headed "Annual Survivors at the Beginning of the Year." The last amount entered in each column is the amount of new plant added to the group during the year. The amounts entered in Schedule 3 for each successive year following the beginning balance or addition are obtained by adding or subtracting the net entries shown on Schedules 1 and 2. For the purpose of determining the plant exposed to retirement, transfers-in are considered as being exposed to retirement in this group at the beginning of the year in which they occurred, and the sales and transfers-out are considered to be removed from the plant exposed to retirement at the beginning of the following year. Thus, the amounts of plant shown at the beginning of each year are the amounts of plant from each placement year considered to be exposed to retirement at the beginning of each successive transaction year. For example, the exposures for the installation year 2015 are calculated in the following manner:

Exposures at age 0	= amount of addition	= $750,000
Exposures at age ½	= $750,000 - $ 8,000	= $742,000
Exposures at age 1½	= $742,000 - $18,000	= $724,000
Exposures at age 2½	= $724,000 - $20,000 - $19,000	= $685,000
Exposures at age 3½	= $685,000 - $22,000	= $663,000

SCHEDULE 3. PLANT EXPOSED TO RETIREMENT
JANUARY 1 OF EACH YEAR 2010-2019
SUMMARIZED BY AGE INTERVAL

Experience Band 2010-2019

Placement Band 2005-2019

Year Placed	Exposures, Thousands of Dollars: Annual Survivors at the Beginning of the Year 2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	Total at Beginning of Age Interval	Age Interval
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
2005	255	245	234	222	209	195	239	216	192	167	167	13½-14½
2006	279	268	256	243	228	212	194	174	153	131	323	12½-13½
2007	307	296	284	271	257	241	224	205	184	162	531	11½-12½
2008	338	330	321	311	300	289	276	262	242	226	823	10½-11½
2009	376	367	357	346	334	321	307	297	280	261	1,097	9½-10½
2010	420[a]	416	407	397	386	374	361	347	332	316	1,503	8½-9½
2011		460[a]	455	444	432	419	405	390	374	356	1,952	7½-8½
2012			510[a]	504	492	479	464	448	431	412	2,463	6½-7½
2013				580[a]	574	561	546	530	501	482	3,057	5½-6½
2014					660[a]	653	639	623	628	609	3,789	4½-5½
2015						750[a]	742	724	685	663	4,332	3½-4½
2016							850[a]	841	821	799	4,955	2½-3½
2017								960[a]	949	926	5,719	1½-2½
2018									1,080[a]	1,069	6,579	½-1½
2019										1,220[a]	7,490	0-½
Total	1,975	2,382	2,824	3,318	3,872	4,494	5,247	6,017	6,852	7,799	44,780	

[a]Additions during the year

For the entire experience band 2010-2019, the total exposures at the beginning of an age interval are obtained by summing diagonally in a manner similar to the summing of the retirements during an age interval (Schedule 1). For example, the figure of 3,789, shown as the total exposures at the beginning of age interval 4½-5½, is obtained by summing:

255 + 268 + 284 + 311 + 334 + 374 + 405 + 448 + 501 + 609.

Original Life Table

The original life table, illustrated in Schedule 4 on page II-16, is developed from the totals shown on the schedules of retirements and exposures, Schedules 1 and 3, respectively. The exposures at the beginning of the age interval are obtained from the corresponding age interval of the exposure schedule, and the retirements during the age interval are obtained from the corresponding age interval of the retirement schedule. The retirement ratio is the result of dividing the retirements during the age interval by the exposures at the beginning of the age interval. The percent surviving at the beginning of each age interval is derived from survivor ratios, each of which equals one minus the retirement ratio. The percent surviving is developed by starting with 100% at age zero and successively multiplying the percent surviving at the beginning of each interval by the survivor ratio, i.e., one minus the retirement ratio for that age interval. The calculations necessary to determine the percent surviving at age 5½ are as follows:

Percent surviving at age 4½	=	88.15			
Exposures at age 4½	=	3,789,000			
Retirements from age 4½ to 5½	=	143,000			
Retirement Ratio	=	143,000 ÷	3,789,000	=	0.0377
Survivor Ratio	=	1.000 -	0.0377	=	0.9623
Percent surviving at age 5½	=	(88.15) x	(0.9623)	=	84.83

The totals of the exposures and retirements (columns 2 and 3) are shown for the purpose of checking with the respective totals in Schedules 1 and 3. The ratio of the total retirements to the total exposures, other than for each age interval, is meaningless.

SCHEDULE 4. ORIGINAL LIFE TABLE
CALCULATED BY THE RETIREMENT RATE METHOD

Experience Band 2010-2019 Placement Band 2005-2019

(Exposure and Retirement Amounts are in Thousands of Dollars)

Age at Beginning of Interval	Exposures at Beginning of Age Interval	Retirements During Age Interval	Retirement Ratio	Survivor Ratio	Percent Surviving at Beginning of Age Interval
(1)	(2)	(3)	(4)	(5)	(6)
0.0	7,490	80	0.0107	0.9893	100.00
0.5	6,579	153	0.0233	0.9767	98.93
1.5	5,719	151	0.0264	0.9736	96.62
2.5	4,955	150	0.0303	0.9697	94.07
3.5	4,332	146	0.0337	0.9663	91.22
4.5	3,789	143	0.0377	0.9623	88.15
5.5	3,057	131	0.0429	0.9571	84.83
6.5	2,463	124	0.0503	0.9497	81.19
7.5	1,952	113	0.0579	0.9421	77.11
8.5	1,503	105	0.0699	0.9301	72.65
9.5	1,097	93	0.0848	0.9152	67.57
10.5	823	83	0.1009	0.8991	61.84
11.5	531	64	0.1205	0.8795	55.60
12.5	323	44	0.1362	0.8638	48.90
13.5	167	26	0.1557	0.8443	42.24
					35.66
Total	44,780	1,606			

Column 2 from Schedule 3, Column 12, Plant Exposed to Retirement.
Column 3 from Schedule 1, Column 12, Retirements for Each Year.
Column 4 = Column 3 Divided by Column 2.
Column 5 = 1.0000 Minus Column 4.
Column 6 = Column 5 Multiplied by Column 6 as of the Preceding Age Interval.

The original survivor curve is plotted from the original life table (column 6, Schedule 4). When the curve terminates at a percent surviving greater than zero, it is called a stub survivor curve. Survivor curves developed from retirement rate studies generally are stub curves.

Smoothing the Original Survivor Curve

The smoothing of the original survivor curve eliminates any irregularities and serves as the basis for the preliminary extrapolation to zero percent surviving of the original stub curve. Even if the original survivor curve is complete from 100% to zero percent, it is desirable to eliminate any irregularities, as there is still an extrapolation for the vintages which have not yet lived to the age at which the curve reaches zero percent. In this study, the smoothing of the original curve with established type curves was used to eliminate irregularities in the original curve.

The Iowa type curves are used in this study to smooth those original stub curves which are expressed as percents surviving at ages in years. Each original survivor curve was compared to the Iowa curves using visual and mathematical matching in order to determine the better fitting smooth curves. In Figures 6, 7, and 8, the original curve developed in Table 4 is compared with the L, S, and R Iowa type curves which most nearly fit the original survivor curve. In Figure 6, the L1 curve with an average life between 12 and 13 years appears to be the best fit. In Figure 7, the S0 type curve with a 12-year average life appears to be the best fit and appears to be better than the L1 fitting. In Figure 8, the R1 type curve with a 12-year average life appears to be the best fit and appears to be better than either the L1 or the S0.

In Figure 9, the three fittings, 12-L1, 12-S0 and 12-R1 are drawn for comparison purposes. It is probable that the 12-R1 Iowa curve would be selected as the most representative of the plotted survivor characteristics of the group.

FIGURE 6. ILLUSTRATION OF THE MATCHING OF AN ORIGINAL SURVIVOR CURVE WITH AN L1 IOWA TYPE CURVE
ORIGINAL AND SMOOTH SURVIVOR CURVES

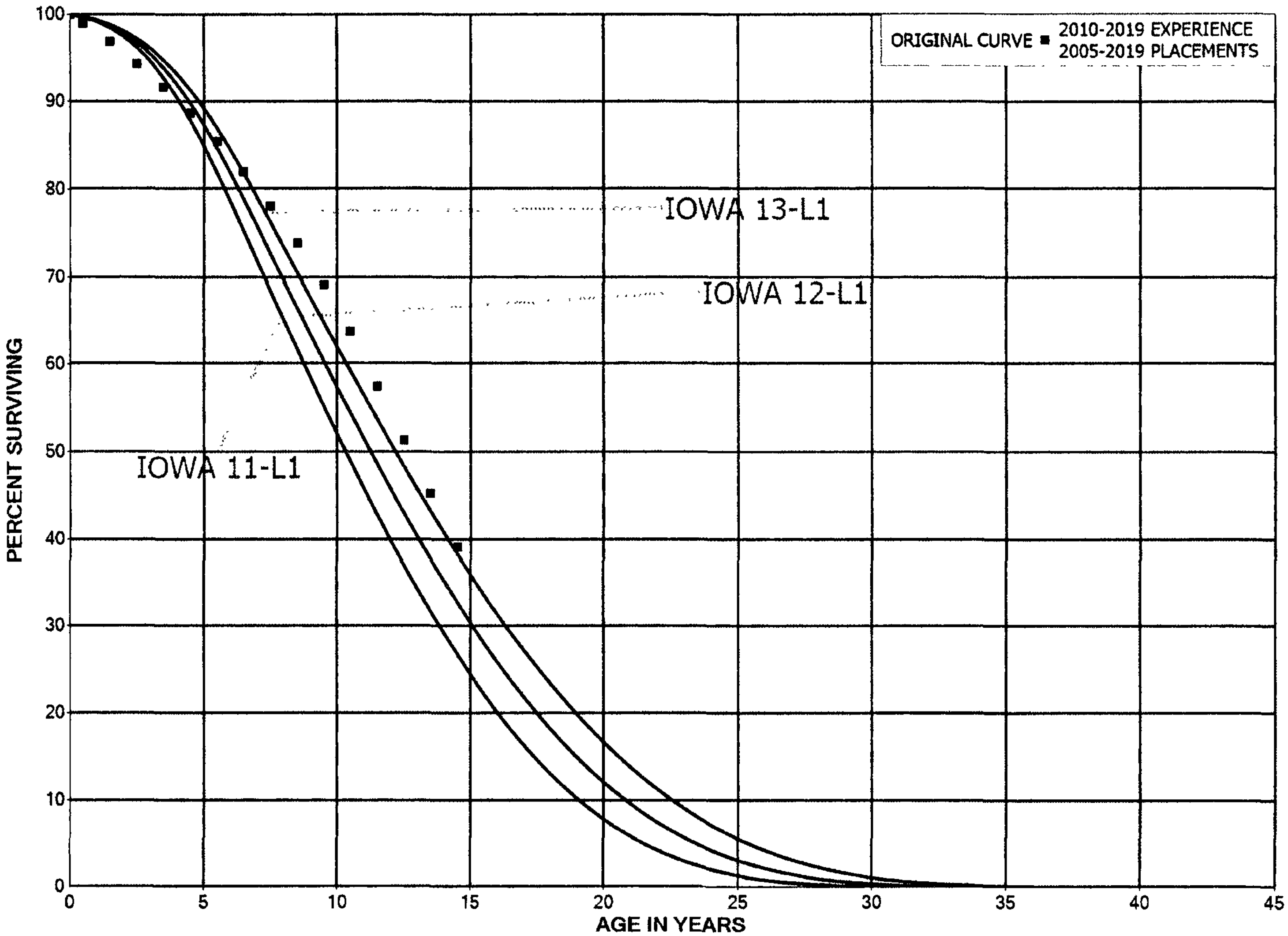


FIGURE 7. ILLUSTRATION OF THE MATCHING OF AN ORIGINAL SURVIVOR CURVE WITH AN S0 IOWA TYPE CURVE
ORIGINAL AND SMOOTH SURVIVOR CURVES

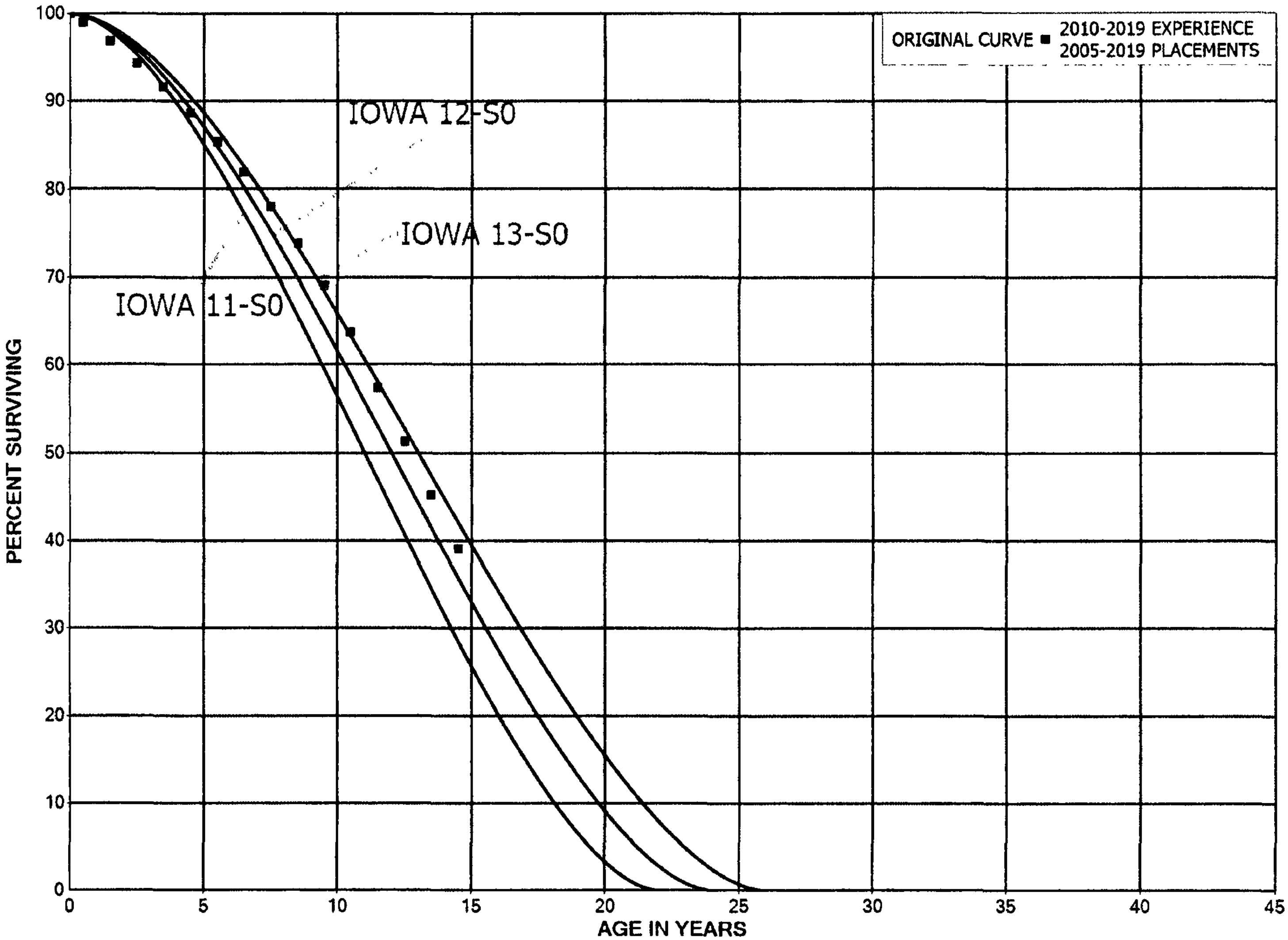


FIGURE 8. ILLUSTRATION OF THE MATCHING OF AN ORIGINAL SURVIVOR CURVE WITH AN R1 IOWA TYPE CURVE
ORIGINAL AND SMOOTH SURVIVOR CURVES

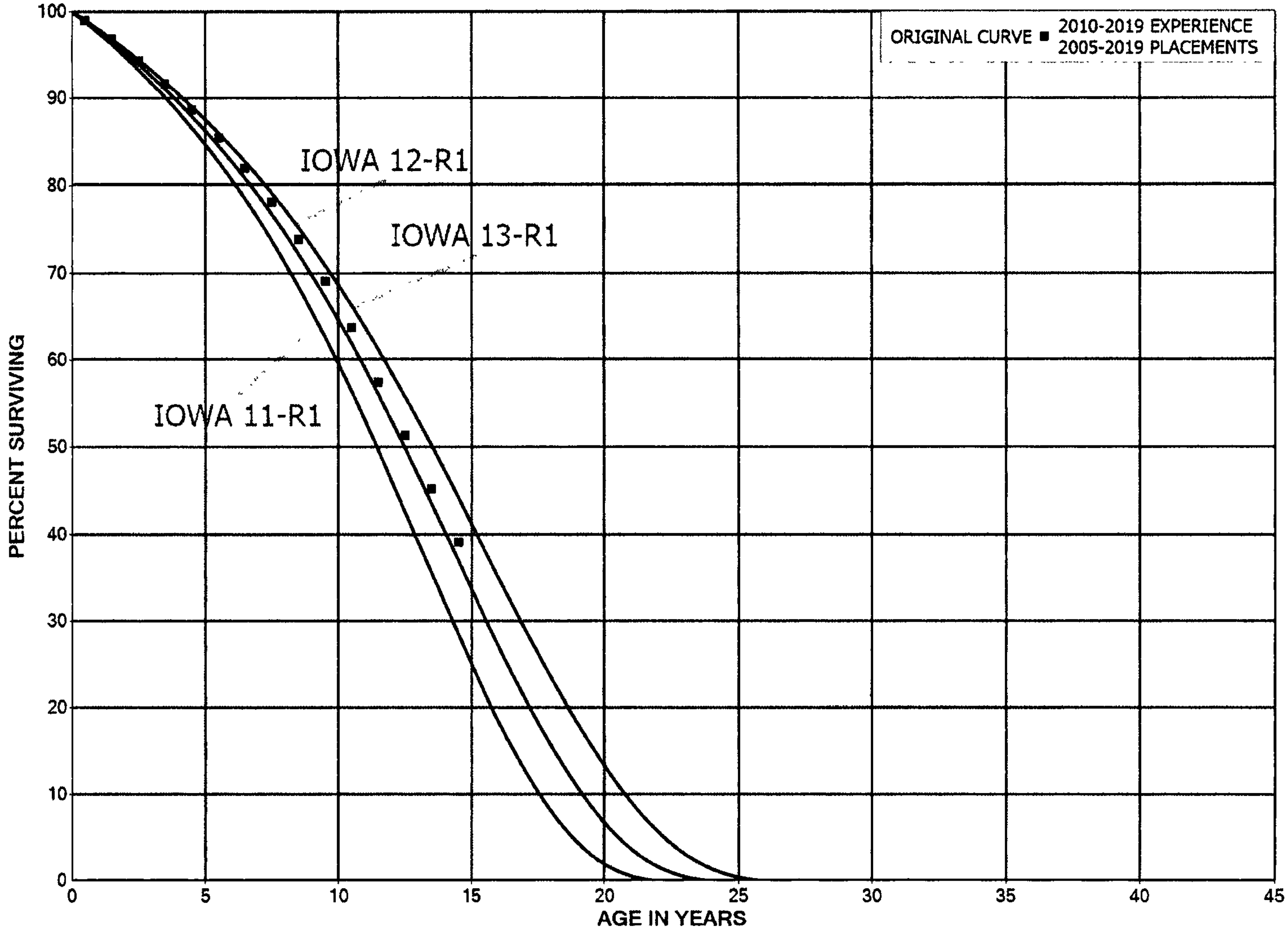
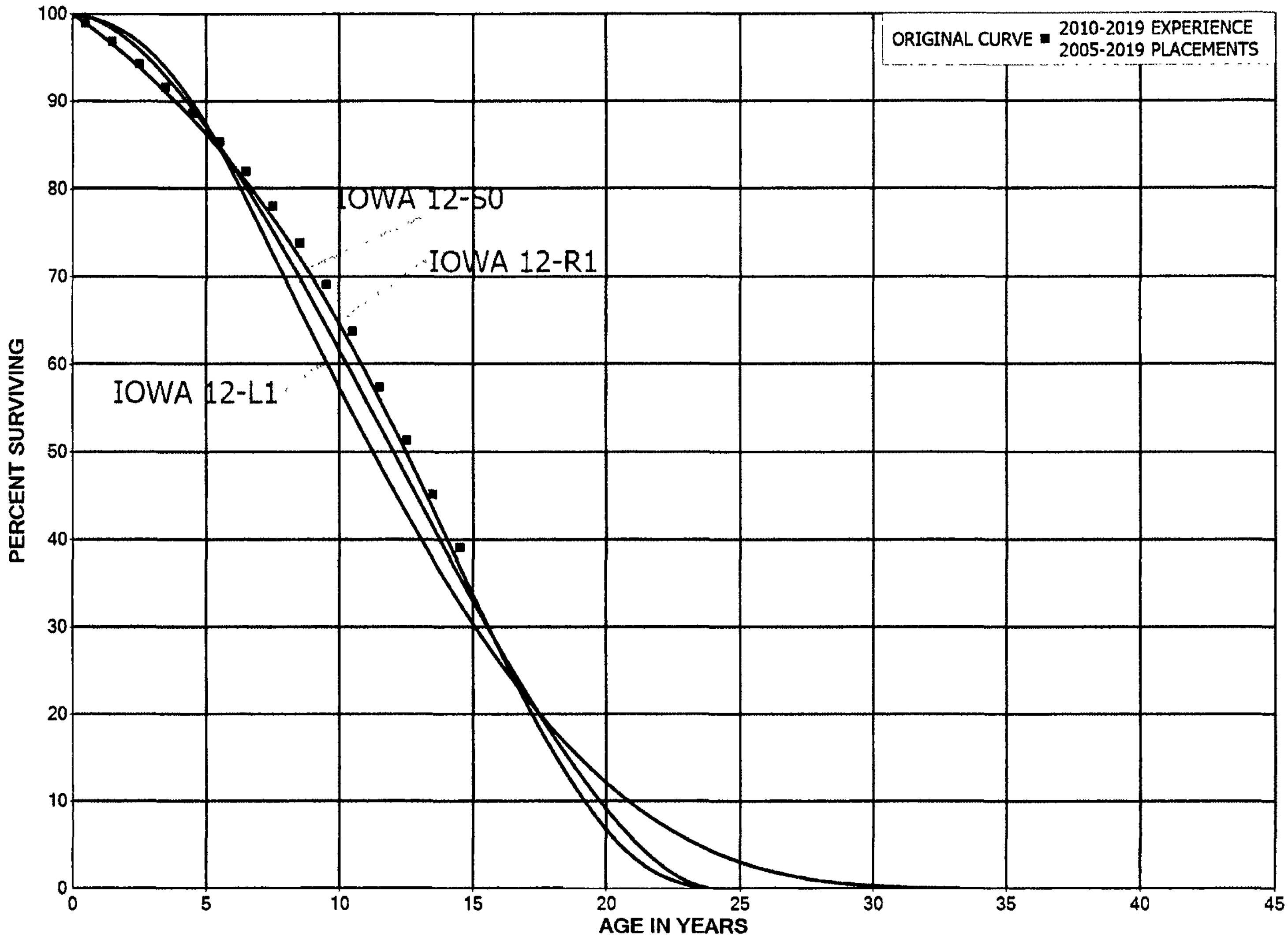


FIGURE 9. ILLUSTRATION OF THE MATCHING OF AN ORIGINAL SURVIVOR CURVE WITH AN L1, S0 AND R1 IOWA TYPE CURVE
ORIGINAL AND SMOOTH SURVIVOR CURVES



PART III. SERVICE LIFE CONSIDERATIONS

PART III. SERVICE LIFE CONSIDERATIONS

FIELD TRIPS

In order to be familiar with the operation of the Company and observe representative portions of the plant, a field trip was conducted for the study. A general understanding of the function of the plant and information with respect to the reasons for past retirements and the expected future causes of retirements are obtained during field trips. This knowledge and information were incorporated in the interpretation and extrapolation of the statistical analyses.

The following is a list of the locations visited during the most recent field trips.

February 24, 2020
East Side Distribution Operations Center
Montana Power Substation
Montana Power Generating Facility
Caliente Substation
Pelicano Substation
Newman Generating Station
Rio Grande Generating Station

August 18, 2014
Newman Generating Station
Rio Grande Generating Station
Stanton Tower

August 19, 2014
Wrangler Substation
Wrangler Solar Facility
Diamond Head Substation
East Side Distribution Operations Center
Montana Power Generating Facility
Montana Power Substation

February 9, 2009
Vanderbilt Service Center
Vista Substation
Wrangler Substation
Hawkins Service Center
Copper Training Center
Copper Combustion Station

Roland Lucky Building
Stanton Building

February 10, 2009
Rio Grande Generating Station
Systems Operating Center
Newman Generation Station

February 19, 2003
Newman Generating Station
Systems Operating Center
Rio Grande Generating Station
501 Engineering Building
Centre Building

February 20, 2003
Sante Fe Building
Ascarate Substation
Copper Combustion Station
Copper Substation
Copper Training Facility
Hawkins Warehouse
Montwood Substation
Caliente Substation

SERVICE LIFE ANALYSIS

The service life estimates were based on informed judgment which considered a number of factors. The primary factors were the statistical analyses of data; current Company policies and outlook as determined during conversations with management; and the survivor curve estimates from previous studies of this company and other electric companies.

For many of the plant accounts for which survivor curves were estimated, the statistical analyses using the retirement rate method resulted in good to excellent indications of the survivor patterns experienced. These accounts represent 63 percent of depreciable plant. Generally, the information external to the statistics led to no significant departure from the indicated survivor curves for the accounts listed below.

The statistical support for the service life estimates is presented in the section beginning on page VII-2.

Account No.	Account Description
STEAM PLANT	
312	Boiler Plant Equipment
316	Miscellaneous Power Plant Equipment
TRANSMISSION PLANT	
352	Structures and Improvements
353	Station Equipment
355	Wood and Steel Poles
DISTRIBUTION PLANT	
362	Station Equipment
364	Poles, Towers and Fixtures
365	Overhead Conductors and Devices
366	Underground Conduit
367	Underground Conductors and Devices
368	Line Transformers
370	Meters
371	Installations on Customers' Premises
GENERAL PLANT	
390	Structures and Improvements – Minor Structures
396	Power Operated Equipment

Account 312, Boiler Plant Equipment, is used to illustrate the manner in which the study was conducted for the generating plant. Aged plant accounting data have been compiled for the years 1993 through 2019. These data have been coded in the course of the Company's normal record keeping according to account or property group, type of transaction, year in which the transaction took place, and year in which the electric plant was placed in service. The retirements, other plant transactions, and plant additions were analyzed by the retirement rate method.

The survivor curve estimate is based on the statistical indications for the period 1993 through 2019. The Iowa 70-R4 is a reasonable fit of the original interim survivor curve. The 70-year service life for interim retirements is reasonable for assets in this account. The 70-year life is shorter than the 80-year life previously used by the Company.

Account 364, Poles, Towers and Fixtures, is used to illustrate the manner in which the study was conducted for the mass accounts. Aged retirement and other plant accounting data were compiled through the year 2019. These data were coded in the course of the Company's normal recordkeeping according to plant account or property group, type of transaction, year in which the transaction took place, and year in which the electric plant was placed in service. The data were analyzed by the retirement rate method of life analysis. The survivor curve chart for the account is presented on page VII-67 and the life table for the experience band plotted on the chart follows it.

The historical service life indication for Account 364, Poles, Towers and Fixtures is the 45-R3 based on the experience band, 1993-2019. The prior survivor curve estimate for Account 364, Poles, Towers and Fixtures was also the 45-R3. Typical service lives for poles of other electric companies range from 40 to 55 years. The Iowa 45-R3 survivor curve reflects the outlook of management, is within the range of service life estimates used by other electric companies and is a reasonable interpretation of the significant portion of the stub survivor curves through age 62.

For Account 365, Overhead Conductors and Devices, the estimate of survivor characteristics is based on the 1993-2019 experience band. Most retirements have been due to inadequacy or voltage conversions. Typical service lives for overhead conductors range from 40 to 55 years. The Iowa 48-R2.5 survivor curve is within the range of other estimates, is a reasonable interpretation of the significant portions of the survivor curves through age 70 and reflects the outlook of management.

Life Span Estimates

The life span technique was used for the Company's Generation accounts. The life span procedure is appropriate for these accounts since all of the assets within the plant will be retired concurrently. Probable retirement dates were estimated for each power plant. Life spans for each Generating Station were estimated based on discussions with management regarding future outlook, age and condition of the plant and life spans typically experienced and estimated for similar plants. The life span and probable retirement dates used for each generating unit are as follows:

Depreciable Group	Major Year in Service	Probable Retirement Year	Life Span
Steam Production Plant			
Rio Grande #6	1957	2021	64
Rio Grande #7	1958	2022	64
Rio Grande #8	1973	2033	60
Newman #1	1959	2022	63
Newman #2	1962	2022	60
Newman #3	1966	2026	60
Newman #4	1975	2026	51
Newman #5	2009	2061	52
Newman Zero Liquid Discharge	2011	2061	50
Other Production Plant			
Copper	1980	2030	50
Rio Grande #9	2013	2057	44
Montana Power #1	2015	2060	45
Montana Power #2	2015	2060	45
Montana Power #3	2016	2061	45
Montana Power #4	2016	2061	45
Solar Facilities	2009	2034	25

Power plants typically are retired when there are other units that can generate electricity at a lower cost. Typical life spans for base load, steam power plants have been 50 to 65 years in the past. For example, Units 6, 7 and 8 at Rio Grande were completed in 1957, 1958 and 1973, respectively. The estimated probable retirement dates for Rio Grande are 2021, 2022 and 2033. Thus, the life spans estimated for the Rio Grande steam units are 64 years for Unit 6, 64 years for Unit 7 and 60 years for Unit 8, which are within the typical range. The estimated retirement dates should not be interpreted as commitments to retire these plants on these dates, but rather, as reasonable estimates subject to modification in the future as circumstances dictate. However, environmental regulations will impact decisions for closures which will lead to shorter life spans for facilities built in recent years.

For all Production accounts, an interim survivor curve was estimated for each account, since interim retirements, i.e., retirements prior to the final retirement, are experienced in such accounts.

Similar studies were performed for the remaining plant accounts. Each of the judgments represented a consideration of statistical analyses of aged plant activity, management's outlook for the future, and the typical range of lives used by other electric companies.

The selected amortization periods for other General Plant accounts are described in the section "Calculated Annual and Accrued Amortization."

PART IV. NET SALVAGE CONSIDERATIONS

PART IV. NET SALVAGE CONSIDERATIONS

NET SALVAGE ANALYSIS

The estimates of net salvage by account were based in part on historical data compiled for the years 1993 through 2019. Cost of removal and salvage were expressed as percents of the original cost of plant retired, both on annual and three-year moving average bases. The most recent five-year average also was calculated for consideration. The net salvage estimates by account are expressed as a percent of the original cost of plant retired.

Net Salvage Considerations

The estimates of future net salvage are expressed as percentages of surviving plant in service, i.e., all future retirements. In cases in which removal costs are expected to exceed salvage receipts, a negative net salvage percentage is estimated. The net salvage estimates were based on judgment which incorporated analyses of historical cost of removal and salvage data, expectations with respect to future removal requirements and markets for retired equipment and materials.

The analyses of historical cost of removal and salvage data are presented in the section titled "Net Salvage Statistics" for the plant accounts for which the net salvage estimate relied partially on those analyses.

Statistical analyses of historical data for the period 1993 through 2019 contributed significantly toward the net salvage estimates for 14 plant accounts, representing 49 percent of the depreciable plant, as follows:

STEAM PRODUCTION PLANT

312.00	Boiler Plant Equipment
314.00	Turbogenerator Units
315.00	Accessory Electric Equipment
316.00	Miscellaneous Power Plant Equipment

TRANSMISSION PLANT		
	353.00	Station Equipment
	355.00	Wood and Steel Poles
	356.00	Overhead Conductors and Devices
DISTRIBUTION PLANT		
	365.00	Overhead Conductors and Devices
	367.00	Underground Conductors and Devices
	368.00	Line Transformers
	370.00	Meters
	371.00	Installations on Customers' Premises
	373.00	Street Lighting and Signal Systems
GENERAL PLANT		
	396.00	Power Operated Equipment

Account 367, Underground Conductors and Devices, will be used to illustrate the manner in which the study was conducted for most mass plant accounts. Net salvage data were compiled for the years 1993 through 2019. These data include the retirements, cost of removal and gross salvage.

Discussions with management indicated that retired underground conductors are either reused or sold for scrap. The previous estimate of net salvage for underground conductors was negative 15 percent. The range of typical net salvage estimates used by other electric companies for underground conductors is negative 10 percent to negative 25 percent.

The net salvage estimate for this account is negative 20 percent and is based on the current practices in place for recording cost of removal and gross salvage. Cost of removal as a percent of the original cost retired averaged around 35 percent through the 1990s, then went to 0 percent starting in 2002 when practices changed. In 2013, a new practice for recording cost of removal was started and will continue into the future. Gross salvage was generally between 5 and 30 percent during the 1990s, then also went to 0 percent in 2002. Then new practices were implemented in 2013 which will continue into the foreseeable future, therefore, the most recent period is the best indicator of the future. The overall net salvage percent is negative 21 percent. The most recent five year average for net salvage indicates negative 39 percent. Given the overall statistical indications, most recent five-year average and the estimates of others, a negative 20 percent net salvage was utilized.

The overall net salvage estimates for the Company's production facilities, for which the life span method is used, is based on estimates of both final net salvage and interim net salvage. Final net salvage is the net salvage experienced at the end of a production plant's life span. Interim net salvage is the net salvage experienced for interim retirements that occur prior to the final retirement of the plant. The final net salvage estimates in the study were based on decommissioning analyses incorporating a $/KW estimate that was consistent with similar facilities determined by a variety of engineering specialists. The interim net salvage estimates were based in part on analysis of historical interim retirement and net salvage data. Based on informed judgment that incorporated these interim net salvage analyses for each plant account, an interim net salvage estimate of negative 5 percent was used for all steam plant accounts, and a negative 5 percent estimate was used for other production plant accounts.

The interim survivor curve estimates for each account and production facility were used to calculate the percentage of plant expected to be retired as interim retirements and final retirements. These are shown on Table 1 in the Net Salvage Statistics section on page VIII-2. These percentages were used to determine the weighted net salvage estimate for each account and production facility based on the interim and final net salvage estimates. These calculations, as well as the estimated final net salvage amounts and interim net salvage percents, are shown on Table 2 of the Net Salvage Statistics section on page VIII-3.

The net salvage estimates for most of the remaining accounts were estimated using the above-described judgment process incorporating historical indications and reviewing the typical range of estimates used by other electric companies. The results of the net salvage analysis for each plant account are presented in account sequence beginning in the section titled "Net Salvage Statistics", page VIII-2.

Generally, the net salvage estimates for the general plant accounts were zero percent, consistent with amortization accounting.

PART V. CALCULATION OF ANNUAL AND ACCRUED DEPRECIATION

PART V. CALCULATION OF ANNUAL AND ACCRUED DEPRECIATION

GROUP DEPRECIATION PROCEDURES

A group procedure for depreciation is appropriate when considering more than a single item of property. Normally the items within a group do not have identical service lives, but have lives that are dispersed over a range of time. There are two primary group procedures, namely, average service life and equal life group. In the average service life procedure, the rate of annual depreciation is based on the average life or average remaining life of the group, and this rate is applied to the surviving balances of the group's cost. A characteristic of this procedure is that the cost of plant retired prior to average life is not fully recouped at the time of retirement, whereas the cost of plant retired subsequent to average life is more than fully recouped. Over the entire life cycle, the portion of cost not recouped prior to average life is balanced by the cost recouped subsequent to average life.

Single Unit of Property

The calculation of straight line depreciation for a single unit of property is straightforward. For example, if a $1,000 unit of property attains an age of four years and has a life expectancy of six years, the annual accrual over the total life is:

$$\frac{\$1{,}000}{(4 + 6)} = \$100 \text{ per year.}$$

The accrued depreciation is:

$$\$1{,}000\left(1 - \frac{6}{10}\right) = \$400.$$

Remaining Life Annual Accruals

For the purpose of calculating remaining life accruals as of December 31, 2019, the depreciation reserve for each plant account is allocated among vintages in proportion to the calculated accrued depreciation for the account. Explanations of remaining life accruals and calculated accrued depreciation follow. The detailed calculations as of December 31, 2019, are set forth in the Results of Study section of the report.

Average Service Life Procedure

In the average service life procedure, the remaining life annual accrual for each vintage is determined by dividing future book accruals (original cost less book reserve) by the average remaining life of the vintage. The average remaining life is a directly weighted average derived from the estimated future survivor curve in accordance with the average service life procedure.

The calculated accrued depreciation for each depreciable property group represents that portion of the depreciable cost of the group which would not be allocated to expense through future depreciation accruals if current forecasts of life characteristics are used as the basis for such accruals. The accrued depreciation calculation consists of applying an appropriate ratio to the surviving original cost of each vintage of each account based upon the attained age and service life. The straight line accrued depreciation ratios are calculated as follows for the average service life procedure:

$$Ratio = 1 - \frac{Average\ Remaining\ Life}{Average\ Service\ Life}.$$

CALCULATION OF ANNUAL AND ACCRUED AMORTIZATION

Amortization is the gradual extinguishment of an amount in an account by distributing such amount over a fixed period, over the life of the asset or liability to which it applies, or over the period during which it is anticipated the benefit will be realized. Normally, the distribution of the amount is in equal amounts to each year of the amortization period.

The calculation of annual and accrued amortization requires the selection of an amortization period. The amortization periods used in this report were based on judgment which incorporated a consideration of the period during which the assets will render most of their service, the amortization period and service lives used by other utilities, and the service life estimates previously used for the asset under depreciation accounting.

Amortization accounting is proposed for a number of accounts that represent numerous units of property, but a very small portion of depreciable electric plant in service. The accounts and their amortization periods are as follows:

ACCT	TITLE	AMORTIZATION PERIOD, YEARS
391,	Office Furniture and Equipment	20
393,	Stores Equipment	25
394,	Tools, Shop and Garage Equipment	25
395,	Laboratory Equipment	15
397,	Communication Equipment	15
398,	Miscellaneous Equipment	15

For the purpose of calculating annual amortization amounts as of December 31, 2019, the book depreciation reserve for each plant account or subaccount is assigned or allocated to vintages. The book reserve assigned to vintages with an age greater than the amortization period is equal to the vintage's original cost. The remaining book reserve is allocated among vintages with an age less than the amortization period in proportion to the calculated accrued amortization. The calculated accrued amortization is equal to the original cost multiplied by the ratio of the vintage's age to its amortization period. The annual amortization amount is determined by dividing the future amortizations (original cost less allocated book reserve) by the remaining period of amortization for the vintage.