MISSOURI-AMERICAN WATER COMPANY

ST. LOUIS, MISSOURI

DEPRECIATION STUDY

CALCULATED ANNUAL DEPRECIATION ACCRUALS
RELATED TO UTILITY PLANT
AT DECEMBER 31, 2005

MISSOURI-AMERICAN WATER COMPANY

St. Louis, Missouri

DEPRECIATION STUDY

CALCULATED ANNUAL DEPRECIATION ACCRUALS

RELATED TO UTILITY PLANT

AT DECEMBER 31, 2005

GANNETT FLEMING, INC. - VALUATION AND RATE DIVISION

Harrisburg, Pennsylvania

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December 8, 2006

Missouri American Water Company
727 Craig Road
Creve Coeur, MO 63141

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Attention James M. Jenkins, Chief Financial Officer

Ladies and Gentlemen:

Pursuant to your request, we have conducted a depreciation study related to the utility plant of Missouri-American Water Company, Inc. as of December 31, 2005. The attached report presents a description of the methods used in the estimation of depreciation, the summary of annual and accrued depreciation, the statistical support for the life and net salvage estimates and the detailed tabulations of annual and accrued depreciation.

Respectfully submitted,

GANNETT FLEMING, INC.

John J. Spanos

JOHN J. SPANOS
Vice President
Valuation and Rate Division

JJS:krm

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PART I. INTRODUCTION

MISSOURI-AMERICAN WATER COMPANY

DEPRECIATION STUDY

CALCULATED ANNUAL DEPRECIATION ACCRUALS
RELATED TO UTILITY PLANT
AT DECEMBER 31, 2005

PART I. INTRODUCTION

SCOPE

This report presents the results of the depreciation study prepared for the Missouri-American Water Company as applied to utility plant in service as of December 31, 2005. It relates to the concepts, methods, and basic judgments which underlie recommended annual depreciation accrual rates related to current utility plant in service.

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 2005; a review of Company practice and outlook as they relate to plant operation and retirement; and consideration of current practice in the water industry, including knowledge of service life and salvage estimates used for other water properties.

PLAN OF REPORT

Part I, Introduction, includes brief statements of the scope and basis of the study. Part II presents descriptions of the methods used in the service life and salvage studies and the methods and procedures used in the calculation of depreciation. Part III presents the results of the study, including summary tables, survivor curve charts and life tables resulting from the retirement rate method of analysis, tabular results of the historical net salvage analyses, and detailed tabulations of the calculated remaining lives and annual accruals.

BASIS OF STUDY

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 was based on amortization accounting. The calculated remaining lives and annual depreciation accrual rates were based on attained ages of plant in service and the estimated service life and salvage characteristics of each depreciable group.

Survivor Curve Estimates

The procedure for estimating survivor curves, which define service lives and remaining lives, consisted of compiling historical service life data for the plant accounts or other depreciable groups, analyzing the historical data base through the use of accepted techniques, and forecasting the survivor characteristics for each depreciable account or group. These forecasts were based on interpretations of the historical data analyses and the probable future. The combination of the historical data and the estimated future trend yields a complete pattern of life characteristics, i.e., a survivor curve, from which the average service life and remaining service life are derived.

The historical data analyzed for life estimation purposes were compiled through 2005 from the Company's plant accounting records. Such data included plant additions, retirements, transfers and other activity recorded by the Company for each of its plant accounts and subaccounts.

The estimates of net salvage incorporated a review of experienced costs of removal and salvage related to plant retirements, and considerations of trends exhibited by the

stated in dollars and as a percent of retirement for purposes of estimating average future levels of the components, as well as of net salvage.

An understanding of the function of the plant and information with respect to the reasons for past retirements and the expected causes of future retirements was obtained through field trips and discussions with operating and management personnel. The supplemental information obtained in this manner was considered in the interpretation and extrapolation of the statistical analyses.

Calculation of Depreciation

The depreciation accrual rates were calculated using the straight line method, the remaining life basis, and the average service life depreciation procedure. The life span technique was used for major structures. In this technique, an average date of final retirement was estimated for each plant location, and the estimated survivor curves applied to each vintage were truncated at ages coinciding with the dates of final retirement.

The change to amortization accounting for certain accounts is recommended 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 on page II-29 of the report.

PART II. METHODS USED IN THE ESTIMATION OF DEPRECIATION

PART II. METHODS USED IN THE ESTIMATION OF DEPRECIATION

DEPRECIATION

Depreciation, in public utility regulation, is the loss in service value not restored by current repairs or covered by insurance.

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 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.

The calculation of annual depreciation based on the straight line method requires the estimation of average life and salvage. These subjects are discussed in the sections which follow.

SERVICE LIFE AND NET SALVAGE ESTIMATION

Average Service Life

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. A discussion of the general concept of survivor curves is presented. Also, the Iowa type survivor curves are reviewed.

Survivor Curves

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 years 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 and is derived by obtaining the differences between the amount of property surviving at the beginning and at the end of each interval.

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,

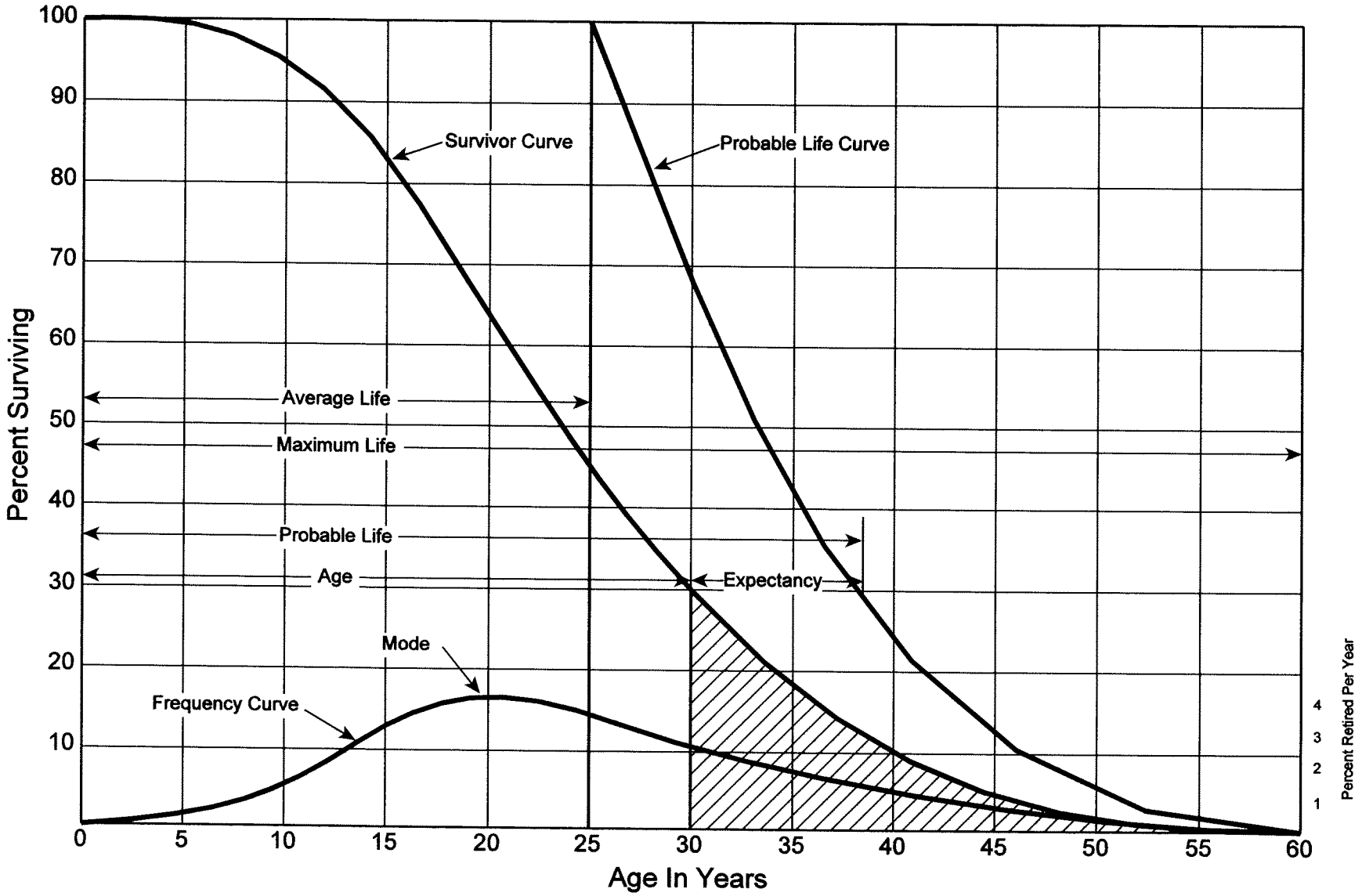

Figure 1. A Typical Survivor Curve and Derived Curves

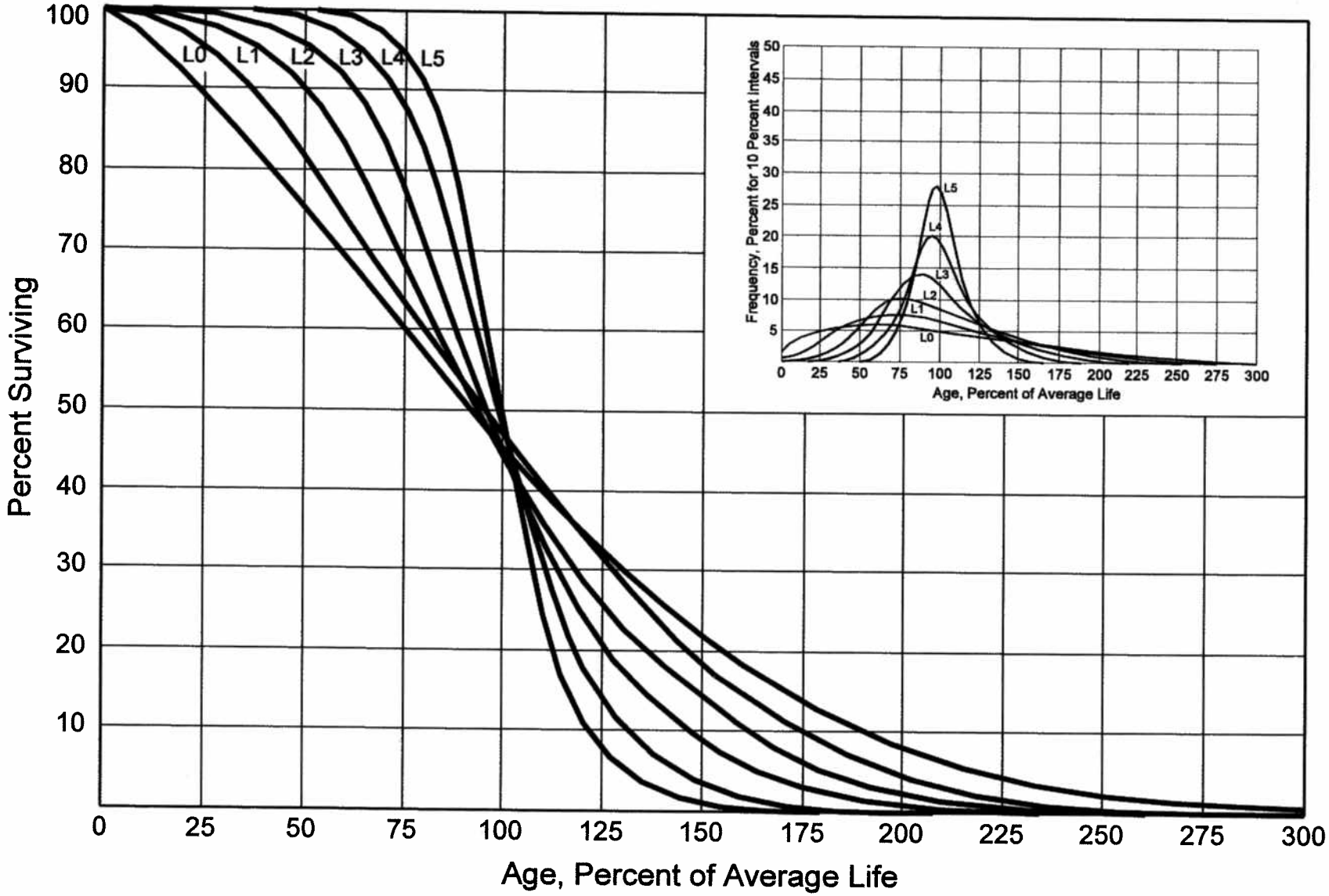

Figure 2. Left Modal or "L" Iowa Type Survivor Curves

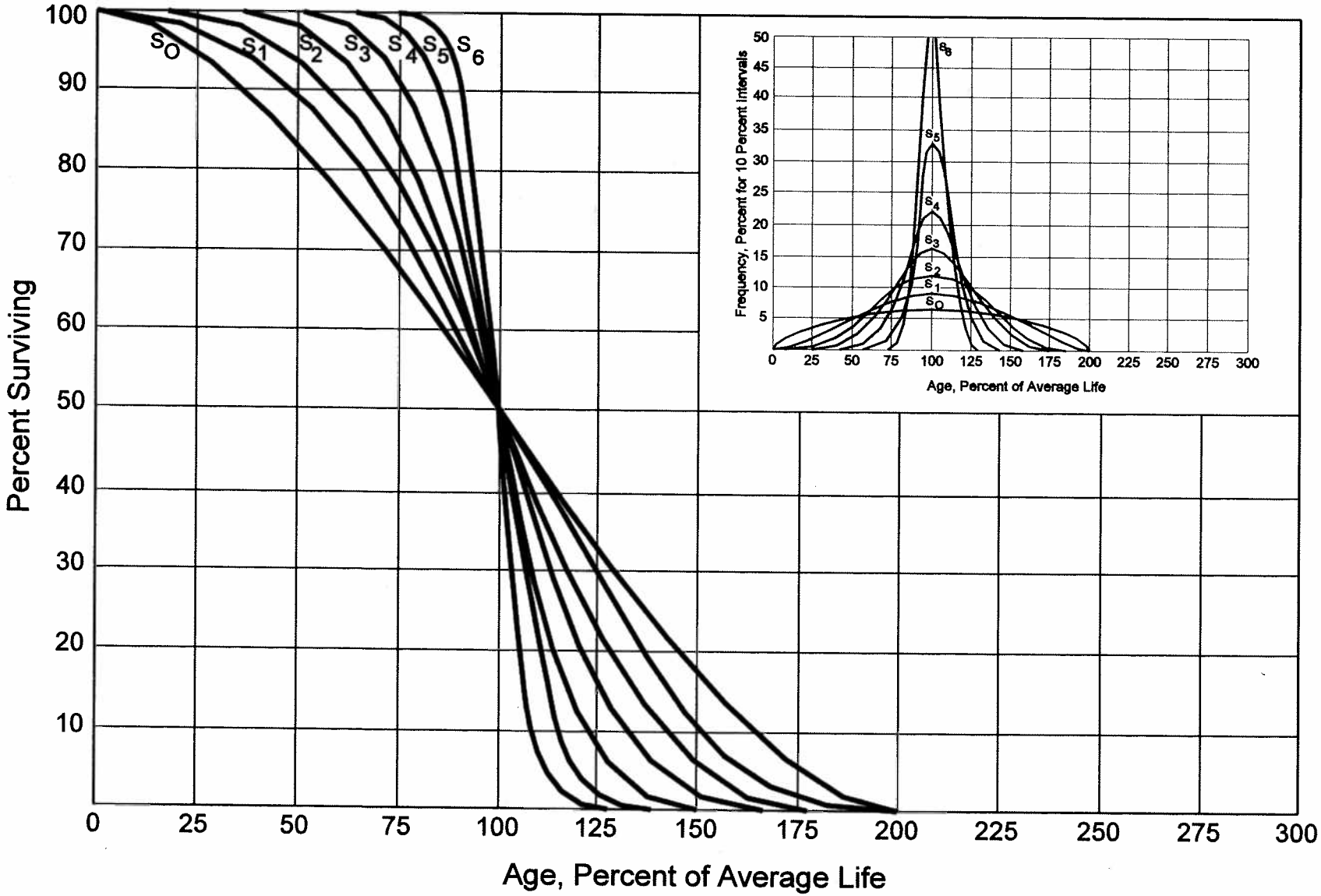

Figure 3. Symmetrical or "S" Iowa Type Survivor Curves

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, which constitute three of the four families, was published in 1935 in the form of the Experiment Station's Bulletin 125.[1] These type curves have also been presented in subsequent Experiment Station bulletins and in the text, "Engineering Valuation and Depreciation."[2] In 1957, Frank V. B. Couch, Jr., an Iowa State College graduate student, submitted a thesis[3] 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

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[1]Winfrey, Robley. Statistical Analyses of Industrial Property Retirements. Iowa State College, Engineering Experiment Station, Bulletin 125. 1935.

[2]Marston, Anson, Robley Winfrey and Jean C. Hempstead. Engineering Valuation and Depreciation, 2nd Edition. New York, McGraw-Hill Book Company. 1953.

[3]Couch, Frank V. B., Jr. "Classification of Type O Retirement Characteristics of Industrial Property." Unpublished M.S. thesis (Engineering Valuation). Library, Iowa State College, Ames, Iowa. 1957.

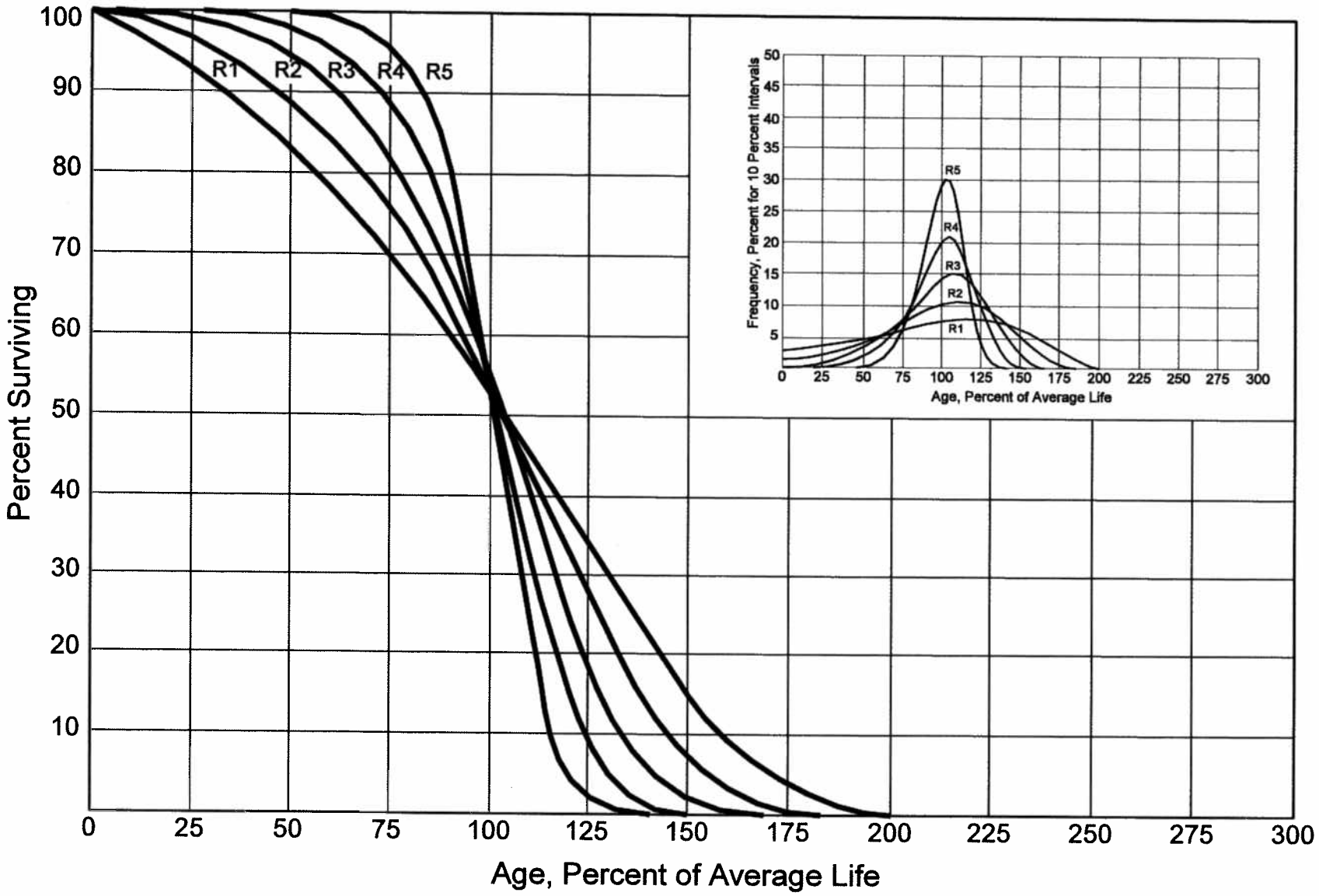

Figure 4. Right Modal or "R" Iowa Type Survivor Curves

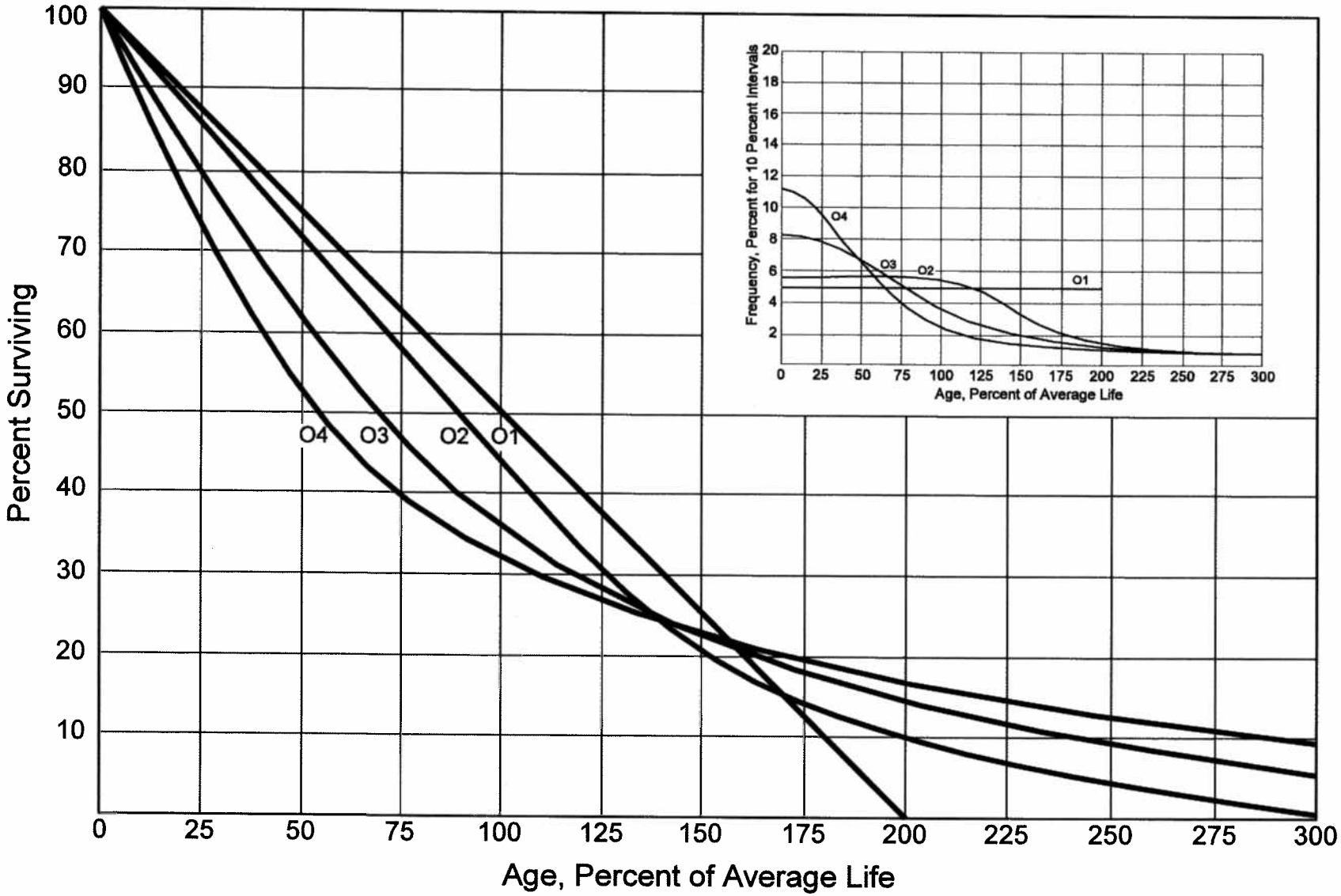

Figure 5. Origin Modal or "O" Iowa Type Survivor Curves

property groups for which aged accounting experience is available or for which aged accounting experience is developed by statistically aging unaged amounts 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,"[4] "Engineering Valuation and Depreciation,"[5] and "Depreciation Systems."[6]

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

Schedules of Annual Transactions in Plant Records. The property group used to illustrate the retirement rate method is observed for the experience band 1996-2005 during which there were placements during the years 1991-2005. In order to illustrate the summation of the aged data by age interval, the data were compiled in the manner

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[4]Winfrey, Robley, Supra Note 1.

[5]Marston, Anson, Robley Winfrey, and Jean C. Hempstead, Supra Note 2.

[6]Wolf, Frank K. and W. Chester Fitch. Depreciation Systems. Iowa State University Press. 1994

presented in Tables 1 and 2 on pages II-12 and II-13. In Table 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 1991 were retired in 1996. 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 Table 1 immediately above the stairstep line drawn on the table beginning with the 1996 retirements of 1991 installations and ending with the 2005 retirements of the 2000 installations. Thus, the total amount of 143 for age interval 4½-5½ equals the sum of:

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

In Table 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

TABLE 1. RETIREMENTS FOR EACH YEAR 1996 -2005
SUMMARIZED BY AGE INTERVAL

Experience Band 1996-2005

Placement Band 1991-2005

Year Placed (1)	Retirements, Thousands of Dollars During Year 1996 (2)	1997 (3)	1998 (4)	1999 (5)	2000 (6)	2001 (7)	2002 (8)	2003 (9)	2004 (10)	2005 (11)	Total During Age Interval (12)	Age Interval (13)
1991	10	11	12	13	14	16	23	24	25	26	26	13½-14½
1992	11	12	13	15	16	18	20	21	22	19	44	12½-13½
1993	11	12	13	14	16	17	19	21	22	18	64	11½-12½
1994	8	9	10	11	11	13	14	15	16	17	83	10½-11½
1995	9	10	11	12	13	14	16	17	19	20	93	9½-10½
1996	4	9	10	11	12	13	14	15	16	20	105	8½-9½
1997		5	11	12	13	14	15	16	18	20	113	7½-8½
1998			6	12	13	15	16	17	19	19	124	6½-7½
1999				6	13	15	16	17	19	19	131	5½-6½
2000					7	14	16	17	19	20	143	4½-5½
2001						8	18	20	22	23	146	3½-4½
2002							9	20	22	25	150	2½-3½
2003								11	23	25	151	1½-2½
2004									11	24	153	½-1½
2005	—	—	—	—	—	—	—	—	—	13	80	0-½
Total	53	68	86	106	128	157	196	231	273	308	1,606	

TABLE 2. OTHER TRANSACTIONS FOR EACH YEAR 1996-2005

Experience Band 1996-2005 SUMMARIZED BY AGE INTERVAL Placement Band 1991-2005

Year Placed (1)	Acquisitions, Transfers and Sales, Thousands of Dollars During Year										Total During Age Interval (12)	Age Interval (13)
	1996 (2)	1997 (3)	1998 (4)	1999 (5)	2000 (6)	2001 (7)	2002 (8)	2003 (9)	2004 (10)	2005 (11)		
1991	-	-	-	-	-	-	60[a]	-	-	-	-	13½-14½
1992	-	-	-	-	-	-	-	-	-	-	-	12½-13½
1993	-	-	-	-	-	-	-	-	-	-	-	11½-12½
1994	-	-	-	-	-	-	-	(5)[b]	-	-	60	10½-11½
1995	-	-	-	-	-	-	-	6[a]	-	-	-	9½-10½
1996		-	-	-	-	-	-	-	-	-	(5)	8½-9½
1997		-	-	-	-	-	-	-	-	-	6	7½-8½
1998			-	-	-	-	-	-	-	-	-	6½-7½
1999				-	-	-	-	(12)[b]	-	-	-	5½-6½
2000					-	-	-	-	22[a]	-	-	4½-5½
2001						-	-	(19)[b]	-	-	10	3½-4½
2002							-	-	-	-	-	2½-3½
2003								-	-	(102)[c]	(121)	1½-2½
2004									-	-	-	½-1½
2005	—	—	—	—	—	—	—	—	—	—	-	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.

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 Table 3 on page II-15.

The surviving plant at the beginning of each year from 1996 through 2005 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 Table 3 for each successive year following the beginning balance or addition are obtained by adding or subtracting the net entries shown on Tables 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 2001 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

For the entire experience band 1996-2005, the total exposures at the beginning of an age interval are obtained by summing diagonally in a manner similar to the summing

TABLE 3. PLANT EXPOSED TO RETIREMENT
JANUARY 1 OF EACH YEAR 1996-2005
SUMMARIZED BY AGE INTERVAL

Experience Band 1996-2005

Placement Band 1991-2005

Exposures, Thousands of Dollars

Year Placed (1)	Annual Survivors at the Beginning of the Year 1996 (2)	1997 (3)	1998 (4)	1999 (5)	2000 (6)	2001 (7)	2002 (8)	2003 (9)	2004 (10)	2005 (11)	Total at Beginning of Age Interval (12)	Age Interval (13)
1991	255	245	234	222	209	195	239	216	192	167	167	13½-14½
1992	279	268	256	243	228	212	194	174	153	131	323	12½-13½
1993	307	296	284	271	257	241	224	205	184	162	531	11½-12½
1994	338	330	321	311	300	289	276	262	242	226	823	10½-11½
1995	376	367	357	346	334	321	307	297	280	261	1,097	9½-10½
1996	420[a]	416	407	397	386	374	361	347	332	316	1,503	8½-9½
1997		460[a]	455	444	432	419	405	390	374	356	1,952	7½-8½
1998			510[a]	504	492	479	464	448	431	412	2,463	6½-7½
1999				580[a]	574	561	546	530	501	482	3,057	5½-6½
2000					660[a]	653	639	623	628	609	3,789	4½-5½
2001						750[a]	742	724	685	663	4,332	3½-4½
2002							850[a]	841	821	799	4,955	2½-3½
2003								960[a]	949	926	5,719	1½-2½
2004									1,080[a]	1,069	6,579	½-1½
2005										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.

of the retirements during an age interval (Table 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 Table 4 on page II-17, is developed from the totals shown on the schedules of retirements and exposures, Tables 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 Tables 1 and 3. The ratio of the total retirements to the total exposures, other than for each age interval, is meaningless.

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

Experience Band 1996-2005 Placement Band 1991-2005

(Exposure and Retirement Amounts are in Thousands of Dollars)

Age at Beginning of Interval (1)	Exposures at Beginning of Age Interval (2)	Retirements During Age Interval (3)	Retirement Ratio (4)	Survivor Ratio (5)	Percent Surviving at Beginning of Age Interval (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 Table 3, Column 12, Plant Exposed to Retirement.
Column 3 from Table 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, Table 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, assuming no contrary relevant factors external to the analysis of historical data.

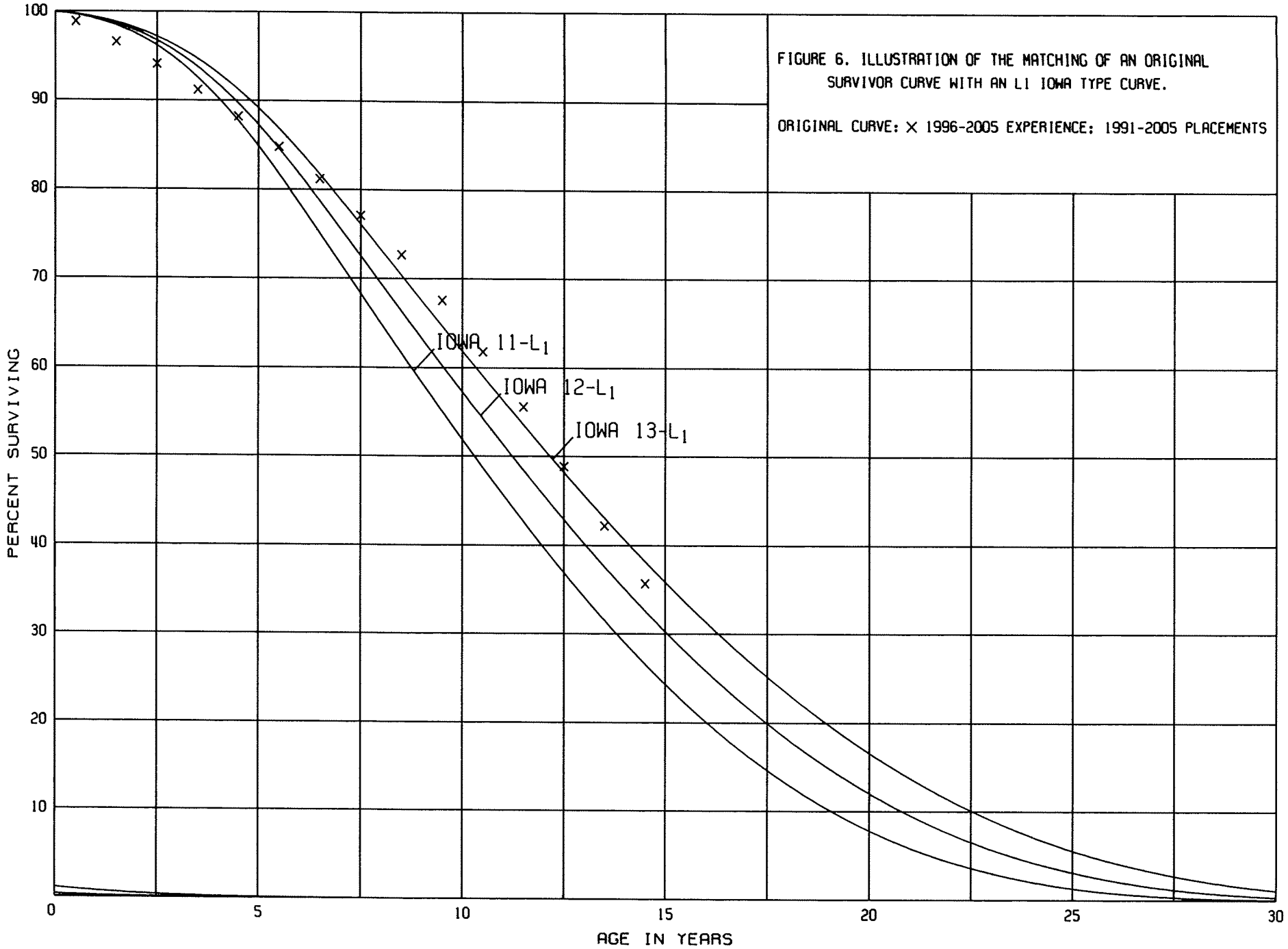
FIGURE 6. ILLUSTRATION OF THE MATCHING OF AN ORIGINAL SURVIVOR CURVE WITH AN L1 IOWA TYPE CURVE.
ORIGINAL CURVE: × 1996-2005 EXPERIENCE: 1991-2005 PLACEMENTS
IOWA 11-L1
IOWA 12-L1
IOWA 13-L1
PERCENT SURVIVING
AGE IN YEARS
100
90
80
70
60
50
40
30
20
10
0
5
10
15
20
25
30

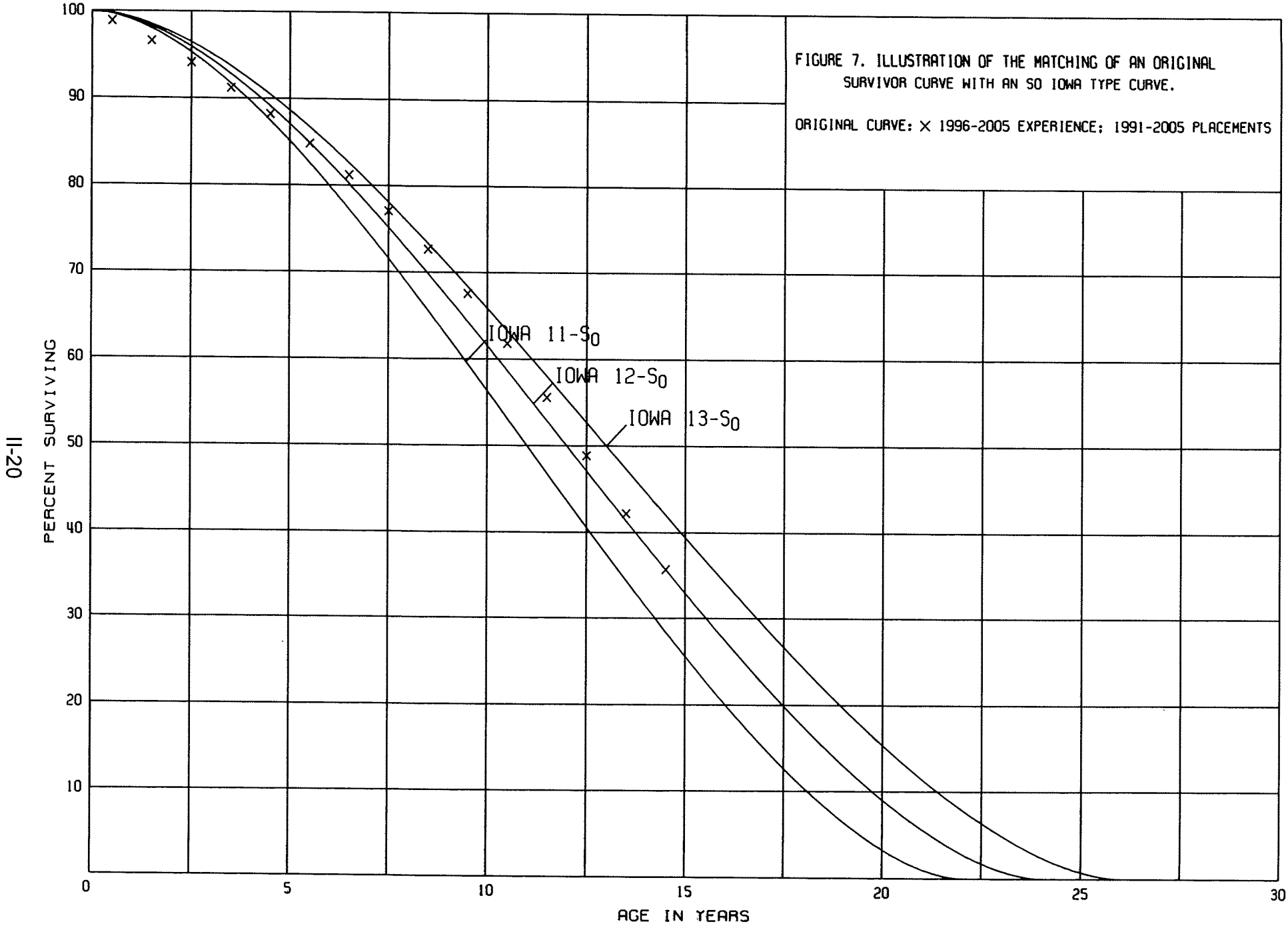
FIGURE 7. ILLUSTRATION OF THE MATCHING OF AN ORIGINAL SURVIVOR CURVE WITH AN SO IOWA TYPE CURVE.
ORIGINAL CURVE: × 1996-2005 EXPERIENCE; 1991-2005 PLACEMENTS
IOWA 11-S0
IOWA 12-S0
IOWA 13-S0
PERCENT SURVIVING
AGE IN YEARS
100
90
80
70
60
50
40
30
20
10
0
5
10
15
20
25
30

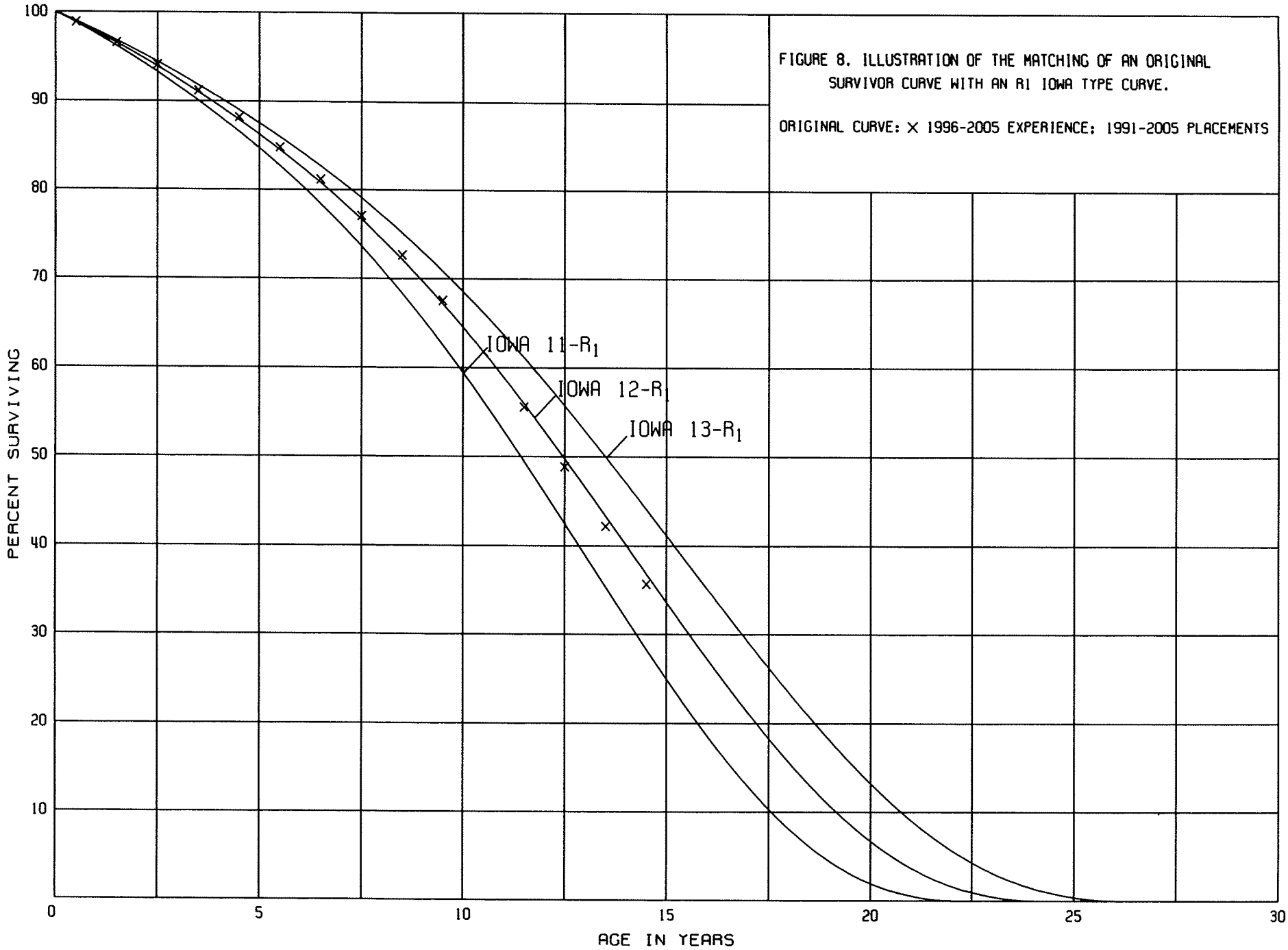

FIGURE 8. ILLUSTRATION OF THE MATCHING OF AN ORIGINAL SURVIVOR CURVE WITH AN R1 IOWA TYPE CURVE.

ORIGINAL CURVE: × 1996-2005 EXPERIENCE: 1991-2005 PLACEMENTS

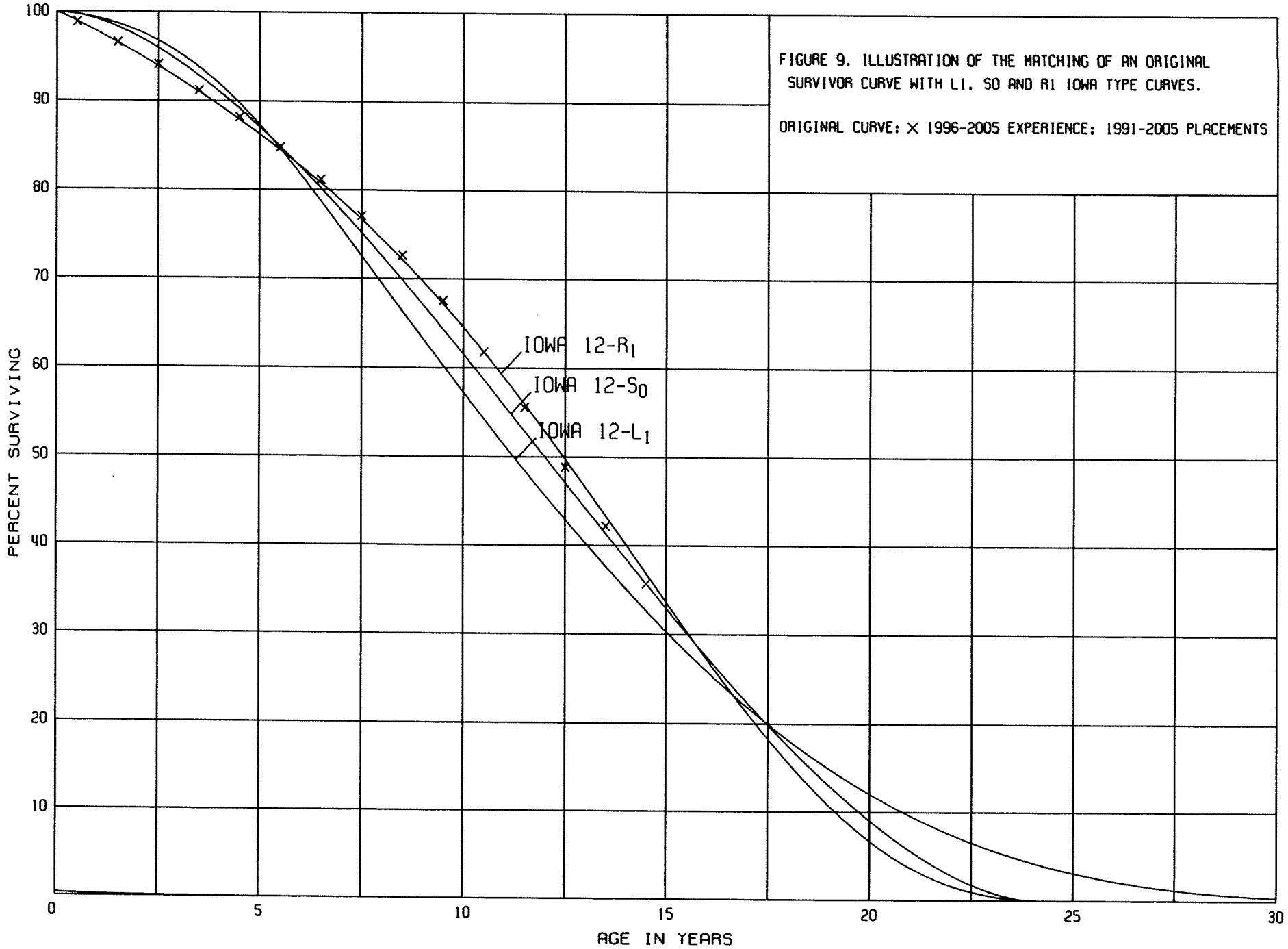

FIGURE 9. ILLUSTRATION OF THE MATCHING OF AN ORIGINAL SURVIVOR CURVE WITH L1, S0 AND R1 IOWA TYPE CURVES.

ORIGINAL CURVE: X 1996-2005 EXPERIENCE; 1991-2005 PLACEMENTS

Service Life Considerations

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

For most of the mass plant accounts and subaccounts, the statistical analyses resulted in good to excellent indications of significant survivor patterns. These accounts represent 77 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.

Account No.	Account Description
304.61	Structures and Improvements - Office Building
311	Electric Pumping Equipment
320	Water Treatment Equipment
331	Mains - Transmission and Distribution
333	Services
335	Fire Hydrants
339.50	Miscellaneous Transmission & Distribution - Other
341.10	Light Trucks
341.20	Heavy Trucks
341.30	Auto
345	Power Operated Equipment

Accounts 331, Mains - Transmission and Distribution, is used to illustrate the manner in which the study was conducted for the accounts in the preceding list. Aged plant accounting data have been compiled for the years through 2005. These data have been coded according to account or property group, type of transaction, year in which the transaction took place, and year in which the utility plant was placed in service. The

retirements, other plant transactions and plant additions were analyzed by the retirement rate method.

The survivor curve estimate for this account is the 90-R2 and is based on the statistical indication for the period 1939 through 2005. The 90-R2 is an excellent fit of the significant portion of the original survivor curve as set forth on page III-100, is consistent with management outlook for a continuation of the historical experience and is within the typical service life range of 75 to 100 years for water mains.

The life span estimates for structures and equipment in Accounts 304.20, 304.30, 305.00 and 306.00 which represent 8 percent of depreciable plant were based on the type construction, attained age, observed features and conditions at the time of the field visit, and the plans of management.

Amortization accounting is proposed for certain General Plant accounts that represent numerous units of property, but a small portion of the depreciable plant in service. These accounts represent 4 percent of total utility plant. A discussion of the basis for the amortization periods is presented in the section "Calculation of Annual and Accrued Amortization".

Generally, the estimates for the remaining accounts which comprise 11 percent of the total depreciable plant in service were based on judgments which considered the nature of the plant and equipment, the previous estimate for this company and a general knowledge of service lives for similar equipment in other utility companies.

Salvage Analysis

The estimates of net salvage were based in part on historical data compiled for the years 1974 through 2005. 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 are expressed as a percent of the original cost of plant retired.

Net Salvage Considerations

The estimates of salvage were based primarily on judgment which considered a number of factors. The primary factors were the analyses of historical data; a knowledge of management's plans and operating policies; and net salvage estimates from previous studies of this company and other water companies. The accounts for which the historical analyses were representative of expectations for future net salvage levels represent 93 percent of the depreciable plant balance and are presented below:

304.2 & 304.30	Structures and Improvements
304.4, 304.6, 304.7 & 304.8	Structures and Improvements - General
306	Lake, River and Other Intakes
307	Wells and Springs
309	Supply Mains
311	Electric Pumping Equipment
320	Water Treatment Equipment
330	Distribution Reservoirs and Standpipes
331	Mains - Transmission and Distribution
334	Meters and Meter Installations
335	Fire Hydrants
341.1, 341.2 & 341.3	Transportation Equipment - Vehicles
345	Power Operated Equipment

Account 335, Fire Hydrants, is used to illustrate the manner in which the study was conducted for the accounts in the preceding list. Depreciation reserve accounting data were compiled for the years 1974 through 2005. These data include the retirements, cost of removal and gross salvage.

The net salvage estimate for this account is negative 25 percent and is based on the trends in cost of removal and salvage percents as shown in the tabulation on pages III-184 and III-185. Cost of removal as a percent of the original cost retired has fluctuated during the experience and most recently decreased as a percentage of plant retired. The

overall and most recent five-year bands averaged 27 and 11 percent removal cost, respectively. Gross salvage has been sporadic, averaging 9 percent for the 32-year period, but trending to 1 percent in recent years. The negative 25 percent net salvage estimate is based primarily on the overall cost of removal and gross salvage percent.

The net salvage estimate for Account 333, Services, represents a significant modification of the statistical indications based on previous studies for this and other water companies. This account represents 2 percent of depreciable plant.

For this account, the experienced removal cost during seven of the last nine years is several times the typical level for similar assets in other utilities. These amounts were discounted in developing the net salvage estimates and future entries will be reviewed in order to determine the significance of recorded cost of removal in the future.

Amortization accounting is proposed for certain General Plant accounts which represent 4 percent of depreciable property. Future gross salvage and removal cost for these accounts will be recorded as revenue and expense, respectively. Inasmuch as there will be no depreciation reserve entries related to salvage, the estimate of net salvage for accounts subject to amortization is zero percent.

Generally, the net salvage estimates for the remaining accounts, which comprise 1 percent of the total depreciable plant in service, were based on judgments which considered the nature of the plant and equipment, reviews of available historical data, and a general knowledge of net salvage percents for similar equipment in other water companies.

CALCULATION OF ANNUAL AND ACCRUED DEPRECIATION

After the survivor curve and salvage are estimated, the annual depreciation accrual rate can be calculated. In the average service life procedure, the annual accrual rate is computed by the following equation:

$$\textit{Annual Accrual Rate, Percent} = \frac{(100\% \quad \textit{Net Salvage, Percent})}{\textit{Average Service Life}}.$$

The calculated accrued depreciation for each depreciable property group represents that portion of the depreciable cost of the group which will not be allocated to expense through future depreciation accruals, if current forecasts of life characteristics are used as a basis for straight line depreciation accounting.

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 the estimated survivor curve. The accrued depreciation ratios are calculated as follows:

$$\textit{Ratio} = \left(1 - \frac{\textit{Average Remaining Life Expectancy}}{\textit{Average Service Life}}\right)(1 - \textit{Net Salvage, Percent}).$$

The application of these procedures is described for a single unit of property and a group of property units. Salvage is omitted from the description for ease of application.

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:

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

The accrued depreciation is:

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

Group Depreciation Procedures

When more than a single item of property is under consideration, a group procedure for depreciation is appropriate because normally all of 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.

Remaining Life Annual Accruals. For the purpose of calculating remaining life accruals as of December 31, 2005, 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, 2005, 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 certain General Plant accounts that represent numerous units of property, but a very small portion of depreciable utility plant in service. The accounts and their amortization periods are as follows:

Account		Amortization Period, Years
340.10	Office Furniture	20
340.20	Computer Hardware	6
340.30	Computer Software	5
340.50	Office Equipment	15

Account		Amortization Period, Years
342.00	Stores Equipment	25
343.00	Tools, Shop & Garage Equipment	20
344.00	Laboratory Equipment	15
346.10	Communication Equip. - Non-Telephone	15
346.20	Communication Equip. - Telephone	10
347.00	Miscellaneous Equipment	15
348.00	Other Tangible Property	20

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 original cost by the period of amortization for the account.

III-1

PART III. RESULTS OF STUDY

PART III. RESULTS OF STUDY

QUALIFICATION OF RESULTS

The calculated annual depreciation accrual rates are the principal results of the study. Continued surveillance and periodic revisions are normally required to maintain continued use of appropriate annual depreciation accrual rates. An assumption that accrual rates can remain unchanged over a long period of time implies a disregard for the inherent variability in service lives and salvage and for the change of the composition of property in service. The annual accrual rates were calculated in accordance with the straight line remaining life method of depreciation using the average service life procedure based on estimates which reflect considerations of current historical evidence and expected future conditions.

The annual depreciation accrual rates are applicable specifically to the water plant in service as of December 31, 2005. For most plant accounts, the application of such rates to future balances that reflect additions subsequent to December 31, 2005, is reasonable for a period of three to five years.

DESCRIPTION OF STATISTICAL SUPPORT

The service life and salvage estimates were based on judgment which incorporated statistical analyses of retirement data, discussions with management and consideration of estimates made for other water utility companies. The results of the statistical analyses of service life are presented in the section titled "Service Life Statistics".

The estimated survivor curves for each account are presented in graphical form. The charts depict the estimated smooth survivor curve and original survivor curve(s), when

applicable, related to each specific group. For groups where the original survivor curve was plotted, the calculation of the original life table is also presented.

The analyses of salvage data are presented in the section titled, "Net Salvage Statistics". The tabulations present annual cost of removal and salvage data, three-year moving averages and the most recent five-year average. Data are shown in dollars and as percentages of original costs retired.

DESCRIPTION OF DEPRECIATION TABULATIONS

A summary of the results of the study, as applied to the original cost of utility plant at December 31, 2005, is presented on pages III-4 and III-5 of this report. The schedule sets forth the original cost, the book depreciation reserve, future accruals, the calculated annual depreciation rate and amount, and the composite remaining life related to utility plant.

The tables of the calculated annual depreciation accruals are presented in account sequence in the section titled "Depreciation Calculations." The tables indicate the estimated survivor curve and salvage percent for the account and set forth for each installation year the original cost, the calculated accrued depreciation, the allocated book reserve, future accruals, the remaining life and the calculated annual accrual amount.

MISSOURI-AMERICAN WATER COMPANY

TABLE 1. ESTIMATED SURVIVOR CURVE, NET SALVAGE, ORIGINAL COST, BOOK RESERVE, AND CALCULATED ANNUAL DEPRECIATION ACCRUALS RELATED TO UTILITY PLANT AT DECEMBER 31, 2005

	DEPRECIABLE GROUP	SURVIVOR CURVE		NET SALVAGE	ORIGINAL COST AT DECEMBER 31, 2005	BOOK RESERVE	FUTURE ACCRUALS	ANNUAL ACCRUAL AMOUNT	COMPOSITE REMAINING LIFE	ANNUAL ACCRUAL RATE PERCENT
	(1)	(2)		(3)	(4)	(5)	(6)	(7)	(8)	(9)=(7)/(4)
	DEPRECIABLE PLANT									
	STRUCTURES & IMPROVEMENTS									
304.10	SOURCE OF SUPPLY	55-R4		(35)	9,721,746.32	2,820,674	10,303,685	254,715	40.5	2.62
304.20	POWER AND PUMPING	75-R2.5	*	(30)	14,988,805.60	3,968,095	15,517,359	749,306	20.7	5.00
304.30	WATER TREATMENT	80-R3	*	(30)	73,589,429.82	23,830,651	71,835,606	1,882,361	38.2	2.56
304.40	TRANSMISSION AND DISTRIBUTION	45-R3		(20)	7,244,346.60	2,970,909	5,722,306	176,904	32.3	2.44
304.53	LEASEHOLD IMPROVEMENTS	20-SQ		0	339,727.80	204,161	135,567	15,949	8.5	4.69
304.61	OFFICE BUILDINGS	50-R1		(20)	1,159,540.81	201,133	1,190,317	31,855	37.4	2.75
304.70	SHOP AND GARAGE	50-R3		(20)	368,203.80	29,803	412,037	31,685	13.0	8.61
304.80	MISCELLANEOUS	50-R2		(20)	3,953,230.48	1,087,918	3,655,958	84,282	43.4	2.13
	TOTAL STRUCTURES & IMPROVEMENTS				**111,365,031.23**	**35,113,344**	**108,772,835**	**3,227,057**	**33.7**	**2.90**
305.00	COLLECTING AND IMPOUNDING RESERVIORS	80-R2.5	*	0	111,065.96	81,867	29,199	2,257	12.9	2.03
306.00	LAKE, RIVER AND OTHER INTAKES	65-R1.5	*	(15)	447,398.17	(604,013)	1,118,519	85,693	13.1	19.15
307.00	WELLS AND SPRINGS	60-R1.5		0	5,932,322.45	810,213	5,122,109	110,761	46.2	1.87
308.00	INFILTRATION GALLERIES AND TUNNELS	60-R2.5		0	1,803.84		1,804	31	58.2	1.72
309.00	SUPPLY MAINS	75-R2.5		(20)	16,784,337.37	4,191,425	15,949,775	245,910	64.9	1.47
310.10	POWER GENERATION EQUIPMENT	50-R2.5		0	323,229.99	59,650	263,580	6,956	37.9	2.15
310.20	BOILER PLANT EQUIPMENT	50-R3		0	347.69		348	37	9.4	10.64
311.00	ELECTRIC PUMPING EQUIPMENT	40-R1.5		(10)	43,198,806.66	17,799,499	29,719,187	1,005,267	29.6	2.33
320.00	WATER TREATMENT EQUIPMENT	45-R1.5		(25)	77,395,165.11	28,503,931	68,240,032	1,857,821	36.7	2.40
330.00	DISTRIBUTION RESERVOIRS & STANDPIPES	60-R3		(35)	23,704,253.98	8,081,500	23,919,245	607,705	39.4	2.56
331.00	MAINS - TRANSMISSION AND DISTRIBUTION	90-R2		(35)	607,111,067.78	137,857,396	681,742,548	8,955,684	76.1	1.48
332.00	MAINS - FIRE	90-R2		(35)	485,107.66	68,565	586,332	7,276	80.6	1.50
333.00	SERVICES	65-R2.5		(100)	21,219,663.90	4,724,555	37,714,773	726,728	51.9	3.42
334.00	METERS AND METER INSTALLATIONS	35-R2.5		3	49,184,063.16	15,981,347	31,727,194	1,342,106	23.6	2.73
335.00	FIRE HYDRANTS	65-R1.5		(25)	46,278,352.77	14,850,351	42,997,594	829,206	51.9	1.79
339.10	MISCELLANEOUS INTANGIBLE PLANT - OTHER	25-SQ		0	2,294.00	306,586	(304,292)	0	-	-
339.20	MISCELLANEIOUS SOURCE OF SUPPLY - OTHER	25-SQ		0	1,729.62		1,730	74	23.4	4.28
339.40	MISCELLANEOUS WATER TREATMENT - OTHER	30-SQ		0	1,481,666.20	79,970	1,401,697	53,111	26.4	3.58
339.50	MISCELLANEOUS TRANS. & DISTR. - OTHER	50-R3		0	18,610.15	7,494	11,117	671	16.6	3.61
339.60	MISCELLANEOUS INTANGIBLE PLANT - SOFTWARE	30-SQ		0	284,734.98	341,659	(56,924)	0	-	-
	TOTAL ACCOUNT 339				**1,789,034.95**	**735,709**	**1,053,328**	**53,856**	**19.6**	**3.01**
340.10	OFFICE FURNITURE	20-SQ		0	11,622,276.46	2,390,596	9,231,680	607,962	15.2	5.23
340.20	COMPUTER HARDWARE	6-SQ		0	4,694,073.56	377,695	4,316,381	2,368,726	1.8	50.46
340.30	COMPUTER SOFTWARE	5-SQ		0	8,906,110.38	2,173,175	6,732,935	2,905,028	2.3	32.62
340.50	OTHER EQUIPMENT	15-SQ		0	428,561.21	104,748	323,812	34,693	9.3	8.10
	TOTAL ACCOUNT 340				**25,651,021.61**	**5,046,214**	**20,604,808**	**5,916,409**	**3.5**	**23.07**

MISSOURI-AMERICAN WATER COMPANY

TABLE 1. ESTIMATED SURVIVOR CURVE, NET SALVAGE, ORIGINAL COST, BOOK RESERVE, AND CALCULATED ANNUAL DEPRECIATION ACCRUALS RELATED TO UTILITY PLANT AT DECEMBER 31, 2005

	DEPRECIABLE GROUP	SURVIVOR CURVE	NET SALVAGE	ORIGINAL COST AT DECEMBER 31, 2005	BOOK RESERVE	FUTURE ACCRUALS	ANNUAL ACCRUAL AMOUNT	COMPOSITE REMAINING LIFE	ANNUAL ACCRUAL RATE PERCENT
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)=(7)/(4)
	TRANSPORTATION EQUIPMENT								
341.10	LIGHT TRUCKS	8-L1.5	25	937,975.20	1,435,526	(732,043)	0	-	-
341.20	HEAVY TRUCKS	9-L2	25	4,947,093.52	3,219,493	490,826	107,161	4.6	2.17
341.30	AUTOS	5-L2.5	25	521,124.03	660,198	(269,356)	0	-	-
341.40	OTHER	15-S4	0	64,599.06	316,553	(251,954)	0	-	-
	TOTAL ACCOUNT 341			**6,470,791.81**	**5,631,770**	**(762,527)**	**107,161**		**1.66**
342.00	STORES EQUIPMENT	25-SQ	0	327,793.79	(262,638)	590,433	41,846	14.1	12.77
343.00	TOOLS, SHOP AND GARAGE EQUIPMENT	20-SQ	0	6,184,681.47	3,120,035	3,064,647	248,190	12.3	4.01
344.00	LABORATORY EQUIPMENT	15-SQ	0	1,975,567.59	871,321	1,104,249	264,844	4.2	13.41
345.00	POWER OPERATED EQUIPMENT	11-L1	25	1,277,894.05	828,838	129,583	17,761	7.3	1.39
346.10	COMMUNICATION EQUIPMENT - NON-TELEPHONE	15-SQ	0	1,261,394.04	606,690	654,700	85,062	7.7	6.74
346.20	COMMUNICATION EQUIPMENT - TELEPHONE	10-SQ	0	147,852.02	95,027	52,824	6,902	7.7	4.67
347.00	MISCELLANEOUS EQUIPMENT	15-SQ	0	1,289,294.57	181,126	1,108,170	105,302	10.5	8.17
348.00	OTHER TANGIBLE PROPERTY	20-SQ	0	927,074.65	202,100	724,974	535,920	1.4	57.81
	TOTAL DEPRECIABLE PLANT			1,050,844,418.27	284,575,822	1,076,230,263	26,393,748		**2.51**
	NONDEPRECIABLE PLANT								
301.00	ORGANIZATION			173,458.00	(25,007)				
302.00	FRANCHISES AND CONSENTS			39,500.89					
303.20	LAND AND LAND RIGHTS - SOURCE OF SUPPLY			1,681,713.63					
303.30	LAND AND LAND RIGHTS - PUMPING			367,015.70					
303.40	LAND AND LAND RIGHTS - WATER TREATMENT			1,579,103.84					
303.50	LAND AND LAND RIGHTS - TRANSMISSION & DISTRIBUTION			4,664,569.83	(741,642)				
303.60	LAND AND LAND RIGHTS - ADMINISTRATIVE			20,432.09					
	TOTAL NONDEPRECIABLE PLANT			8,525,793.98	(766,649)				
	TOTAL UTILITY PLANT			1,059,370,212.25	283,809,173	1,076,230,263	26,393,748		

* LIFE SPAN PROCEDURE IS USED. SURVIVOR CURVE SHOWN IS INTERIM CURVE.