

SCHEDULE 3.9

Gannett Fleming Depreciation Study

ENBRIDGE GAS NEW BRUNSWICK

FREDERICTON, NEW BRUNSWICK

2015 DEPRECIATION STUDY

CALCULATED ANNUAL DEPRECIATION
ACCRUALS RELATED TO GAS PLANT
AS OF DECEMBER 31, 2014

Prepared by:



ENBRIDGE GAS NEW BRUNSWICK
Fredericton, New Brunswick

2015 DEPRECIATION STUDY

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AS OF DECEMBER 31, 2014

GANNETT FLEMING CANADA ULC

Calgary, Alberta



December 21, 2015

Enbridge Gas New Brunswick
440 Wilsey Road Suite101,
Fredericton, NB
E3B 7G5

Attention: Mr. Paul Volpé
Regulatory Affairs Manager

Ladies and Gentlemen:

Pursuant to your request, we have conducted a review and assessment of the distribution assets of Enbridge Gas New Brunswick. Our report presents a description of the methods used in the estimation of service life and our recommendations for average service life estimates.

We gratefully acknowledge the assistance of the Enbridge Gas New Brunswick personnel in the completion of the review.

Respectfully submitted,

GANNETT FLEMING CANADA ULC

A handwritten signature in blue ink, appearing to be "L. Kennedy".

LARRY E. KENNEDY
Vice President

LEK/hac
Project #060432

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ENBRIDGE GAS NEW BRUNSWICK DEPRECIATION STUDY

EXECUTIVE SUMMARY

Pursuant to Enbridge Gas New Brunswick's ("EGNB" or "Company") request, Gannett Fleming Canada ULC ("Gannett Fleming") conducted a depreciation study related to distribution plant and general plant accounts as of December 31, 2014. The purpose of this study was to determine the annual depreciation accrual rates and amounts for book and ratemaking objectives.

The depreciation rates are based on the straight line method using the average service life ("ASL") procedure applied on a remaining life basis. The calculations were based on attained ages and estimated average service life characteristics for each depreciable group of assets. Inherent in the use of the remaining life basis, variances between the calculated accrued depreciation and the book accumulated depreciation as of December 31, 2014 are amortized over the remaining life of assets.

As EGNB is a utility that is still in an infancy phase, where its ability to grow its customer connections is vital to its long term viability, the company has not experienced a significant level of historic retirement activity. Therefore, the recommendations as contained in this report have relied heavily on the approved average service life parameters of peer natural gas peer utilities and the broad experience of Gannett Fleming. Additionally, given the very young age of assets in this company, the depreciation rate calculations have not included any provision for net negative salvage.

Gannett Fleming recommends the calculated annual depreciation accrual rates set forth herein apply specifically to distribution plant in service as of December 31, 2014 as summarized by Table 1 of the study by account detail. Supporting data and calculations are provided as well within the study.

Finally, this study results in a composite depreciation rate for depreciable property of 2.52%. The report study results are summarized at an aggregate functional group level as follows:

SUMMARY OF RECOMMENDED DEPRECIATION ACCRUAL PERCENTAGES

PLANT GROUP	ORIGINAL COST December 31, 2014	ANNUAL ACCRUAL %'s Recommended
(1)	(2)	(4)
DISTRIBUTION	218,686,614	2.35%
GENERAL	6,924,104	8.01%
TOTAL PLANT IN SERVICE	225,610,718	2.52%

PART I. INTRODUCTION

**ENBRIDGE GAS NEW BRUNSWICK
DEPRECIATION STUDY
PART I. INTRODUCTION**

SCOPE

This report sets forth the results of the depreciation study for Enbridge Gas New Brunswick, to determine the annual depreciation accrual rates and amounts for book purposes applicable to the original cost of distribution plant at December 31, 2014. The rates and amounts are based on the straight line remaining life method of depreciation with a separate amortization of the variance between the book depreciation reserve and the calculated accrued depreciation. This report also describes the concepts, methods and judgments which underlie the recommended annual depreciation accrual rates related to distribution plant in service as of December 31, 2014.

The service life estimates resulting from the study were based on: informed engineering judgment which incorporated analyses of historical plant retirement data as recorded through December 31, 2014; a review of Company practice and outlook as they relate to plant operation and retirement; and consideration of current practice in the gas industry, including knowledge of service lives used for other gas distribution 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. Development of Depreciation Parameters, presents descriptions of the methods used in the service life study. Part III. Calculation of Annual and Accrued Depreciation presents the methods and procedures used in the calculation of depreciation. Part IV. Results of Study, presents summaries by depreciable group of annual and accrued depreciation. Part V presents the results of the Retirement Rate Analysis and Service Life Statistics Analysis. Detailed tabulations of annual and accrued depreciation are presented in Part VI of this report. An overview of Iowa curves and the Retirement Rate Analysis are set forth in Appendix A of the report.

BASIS OF THE STUDY

Depreciation

For most accounts, the annual and accrued depreciation were calculated by the straight line method using the average service life procedure. For certain General Plant accounts, the annual and accrued depreciation are based on amortization accounting. Both types of calculations were based on original cost, attained ages, and estimates of service lives. Variances between the calculated accrued depreciation or amortization and the book accumulated depreciation are amortized over the composite remaining life of each account.

Continued monitoring and maintenance of the accumulated depreciation reserve at the account level is recommended. Gannett Fleming has used the remaining life basis which will correct the present accumulated depreciation balances to the calculated accrued depreciation, (“theoretical reserve”), over the composite remaining life of each account. This adjustment mechanism, whether determined separately as an amortization amount or incorporated in the calculation of remaining life accruals, is widely-accepted. An explanation of the monitoring of the accumulated depreciation reserve and the calculation of the true-up provision is presented beginning on page III-3 of the report.

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. Many gas utilities in North America have received approval to adopt amortization accounting for these accounts.

Service Life Estimates

The service life 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 gas utility industry, and comparisons of the service life estimates from our studies of other gas utilities. The use of survivor

curves to reflect the expected dispersion of retirement provides a consistent method of estimating depreciation for gas 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.

The depreciation rates should be reviewed periodically to reflect the changes that result from plant and reserve account activity. A depreciation reserve deficiency or surplus will develop if future capital expenditures vary significantly from those anticipated in this study.

PART II. DEVELOPMENT OF DEPRECIATIONS PARAMETERS

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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 natural gas 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 and accrued depreciation based on the straight line method requires the estimation of survivor curves and is described in the following sections of this report. The development of the proposed depreciation rates also requires the selection of group depreciation procedures, as discussed in Part III of this report.

ESTIMATION OF SURVIVOR CURVES

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 using the retirement rate method of analysis.

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 relative height of the modes. The left-moded curves are those in which the greatest frequency of retirement occurs to the left of, or prior to, average service life. The symmetrical-moded curves are those in which the greatest frequency of retirement occurs at average service life. The right-moded curves are those in which the greatest frequency occurs to the right of, or after, the average service life. The origin-moded curves are those in which the greatest frequency of retirement occurs at the origin, or immediately after age 0. The letter designation of each family of curves (L, S, R or O) represents the mode of the associated frequency curve with respect to the average service life. The numerical subscripts represent the relative heights of the modes of the frequency curves within each family.

A discussion of the general concept of survivor curves and retirement rate method is presented in Appendix A of this report.

Survivor Curve Judgments

The survivor curve estimates were based on judgment which considered a number of factors. The primary factors were the professional judgment of Gannett Fleming, supported by the statistical analysis of data; current policies and outlook as determined during conversations with management personnel and on the knowledge Gannett Fleming developed through the completion of numerous gas utility studies.

The following discussion, dealing with a number of accounts which comprise the majority of the investment analyzed, presents an overview of the factors considered by Gannett Fleming in the determination of the average service life estimates. The survivor curve estimates for the remainder of the accounts not discussed in the following sections were based on similar considerations.

Account 475.00 – Mains, is the largest account studied and represents 54% of EGNB's depreciable plant. The retirements, additions and other plant transactions for the period 2001 through 2014 were analyzed by the retirement rate method. The

original and smooth survivor curve is plotted on page V-6. Typical service lives for distribution mains range from 55 to 80 years. EGNB's mains system is comprised of 82% plastic lines versus a small percentage (18%) steel lines.

To date, this account has experienced nearly \$1 million of retirement activity. Discussions with operating and engineering staff have not indicated any specific reasons to believe that the future retirement trends in this account will be significantly different than the historic indications. Furthermore, operations staff has indicated that it would be expected that the life of the EGNB distribution mains would be in the range of other industry peers and with the EGNB Transmission mains.

Gannett Fleming has recommended an Iowa 65-R3 survivor curve to better reflect the conservative range of the peer comparators given the relative age of the assets in his account.

Account 473.00 – Services, represents 26% of EGNB's depreciable plant. The retirements, additions and other plant transactions for the period 2002 through 2014 were analyzed by the retirement rate method. The original and smooth survivor curves are plotted on page V-4.

To date, this account has experienced under \$0.4 million of retirement activity. Discussions with operating and engineering staff indicated that it would be expected that the life of the EGNB distribution services would be in the range of other industry peers. Typical service lives for peer Canadian distribution services range from 48 to 62 years.

Based on Gannett Fleming's experience and the lives of peer gas utilities, Gannett Fleming recommends the Iowa 60-R2.5 to represent future retirement patterns.

Account 477.02 – Meters and Regulators, represents 10% of EGNB's depreciable plant. The retirements, additions and other plant transactions for the period 2002 through 2014 were analyzed by the retirement rate method. The original and smooth survivor curves are plotted on page V-10. Typical service lives for gas distribution meters range from 12 to 45 years. To date, this account has experienced nearly \$1.9 million of retirement activity.

In recent years, the gas distribution industry has been moving toward increased use of digital metering and Automated Meter Reading (AMR) technology. Additionally,

in early 2010, Measurement Canada has announced more stringent metering testing guidelines. The new testing guidelines place increasingly strict criteria on the test results as the age of the meters increase.

Interviews with the operational metering staff have indicated that the implementation of the new Measurement Canada requirements will result in residential meters being retired before they reach 20 years of age. In the experience of Gannett Fleming, this assumption is consistent with the metering experts across Canada, all of whom have indicated that residential meters will no longer be tested when they reach 15 to 20 years of age. Operations staff did indicate that the meters related to commercial and industrial customers are expected to last beyond 20 years, and would likely be refurbished when removed for testing.

Gannett Fleming recommends an Iowa 20-S0.5 curve to represent the retirement characteristics for this account. This account is experiencing significant change in the technology associated with the assets within this account. Therefore, given the future expectation that residential meters will be retired prior to reaching an age of 20 years, this account will be closely monitored over the next few years to determine if a further shortening of the average service life estimate becomes necessary.

Account 477.01 – Stations, represents approximately 7% of the depreciable plant studied. The retirements, additions and other plant transactions for the period 2002 through 2014 were analyzed by the retirement rate method. The original survivor curve as plotted on page V-8 indicates only a small level of historical retirements through age 12, relatively insignificant compared to the total exposures of \$123 million indicating a reliance on peer comparators and professional expertise. Gannett Fleming recommends a 35-S3 Iowa curve based on industry peers and the discussions with operating and engineering staff have not indicated any specific reason to believe it would deviate from the recommended Iowa curve.

The survivor curves estimates for the remaining accounts were based on similar considerations of historical analysis, management outlook and estimates of this company and other gas distribution companies.

PART III. CALCULATION OF ANNUAL AND ACCRUED DEPRECIATION

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CALCULATION OF ANNUAL AND ACCRUED DEPRECIATION

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 (ASL) and Equal Life Group (ELG).

In the average service life procedure, the rate of annual depreciation is based on the average service 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 the 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.

In the equal life group procedure, also known as the unit summation procedure, the property group is subdivided according to service life. That is, each equal life group includes that portion of the property which experiences the life of that specific group. The relative size of each equal life group is determined from the property's life dispersion curve. The calculated depreciation for the property group is the summation of the calculated depreciation based on the service life of each equal life unit.

In the determination of the depreciation rates in this study, the use of the average service life procedure has been used. While the equal life group procedure provides an enhanced matching of depreciation expense to the consumption of service value, the average service life procedure.

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 gas plant in service. The accounts and their amortization periods are as follows:

		AMORTIZATION PERIOD
<u>ACCOUNT</u>	<u>TITLE</u>	<u>YEARS</u>
483.00	Office Furniture and Equipment	20
486.00	Tools and Work Equipment	10
488.00	Communications Equipment	10
490.00	Computer Hardware	5
491.50	Computer Software	7
491.60	Intangible Software	5

For the purpose of calculating annual amortization amounts as of December 31, 2014, 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.

MONITORING OF BOOK ACCUMULATED DEPRECIATION

The calculated accrued depreciation or amortization represents that portion of the depreciable cost which will not be allocated to expense through future depreciation accruals, if current forecasts of service life characteristics materialize and are used as a basis for depreciation accounting. Thus, the calculated accrued depreciation provides a measure of the book accumulated depreciation. The use of this measure is recommended in the amortization of book accumulated depreciation variances to insure complete recovery of capital over the life of the property.

The recommended amortization of the variance between the book accumulated depreciation and the calculated accrued depreciation is based on an amortization period equal to the composite remaining life for each property group where the variance exceeds five percent of the calculated accrued depreciation.

The composite remaining life for use in the calculation of accumulated depreciation variances is derived by developing the composite sum of the individual equal life group remaining lives in accordance with the following equation:

$$\text{Composite Remaining Life} = \frac{\sum \left(\frac{\text{Book Cost}}{\text{Life}} \times \text{Remaining Life} \right)}{\sum \frac{\text{Book Cost}}{\text{Life}}}.$$

The book costs and lives of the several equal life groups, which are summed in the foregoing equation, are defined by the estimated future survivor curve. Inasmuch as book cost divided by life equals the whole life annual accrual, the foregoing equation reduces to the following form:

$$\text{Composite Remaining Life} = \frac{\sum \text{Whole Life Future Accruals}}{\sum \text{Whole Life Annual Accruals}}$$

or

$$\text{Composite Remaining Life} = \frac{\sum \text{Book Cost} - \text{Calc. Reserve}}{\sum \text{Whole Life Annual Accrual}}.$$

For the purposes of calculating remaining life accrual rates, the book depreciation reserve for each plant account is allocated among vintages in proportion to the calculated accrued depreciation for the account. 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 service life characteristics materialize and are used as a basis for depreciation accounting.

In the average life group 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 for the surviving original cost of that vintage. The average remaining life is defined by the estimated future survivor curve.

The annual accrual rate for each account is equal to the sum of the remaining life annual accruals divided by the total original cost. The composite remaining life is calculated by dividing the sum of the future book accruals by the sum of the remaining life annual accruals.

PART IV. RESULTS OF STUDY

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QUALIFICATION OF RESULTS

The calculated annual and accrued depreciation 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 for the change of the composition of property in service. The annual accrual rates and the accrued depreciation were calculated in accordance with the straight line method, using the equal life group procedure based on estimates which reflect considerations of current historical evidence and expected future conditions.

DESCRIPTION OF DETAILED TABULATIONS

The service life estimates were based on judgment that incorporated statistical analysis of retirement data, discussions with management and consideration of estimates made for other gas distribution utilities. The results of the statistical analysis of service life are presented in the section beginning on page V-2 of this report.

For each depreciable group analyzed by the retirement rate method, a chart depicting the original and estimated survivor curves followed by a tabular presentation of the original life table(s) plotted on the chart. The survivor curves estimated for the depreciable groups are shown as dark smooth curves on the charts. Each smooth survivor curve is denoted by a numeral followed by the curve type designation. The numeral used is the average life derived from the entire curve from 100 percent to zero percent surviving. The titles of the chart indicate the group, the symbol used to plot the points of the original life table, and the experience and placement bands of the life tables which were plotted. The experience band indicates the range of years for which retirements were used to develop the stub survivor curve. The placements indicate, for the related experience band, the range of years of installations which appear in the experience.

The tables of the calculated annual depreciation applicable to depreciable assets as of December 31, 2014 are presented in account sequence starting on page VII-2 of

the supporting documents. The tables indicate the estimated average survivor curves used in the calculations. The tables set forth, for each installation year, the original cost, calculated accrued depreciation, and the calculated annual accrual.

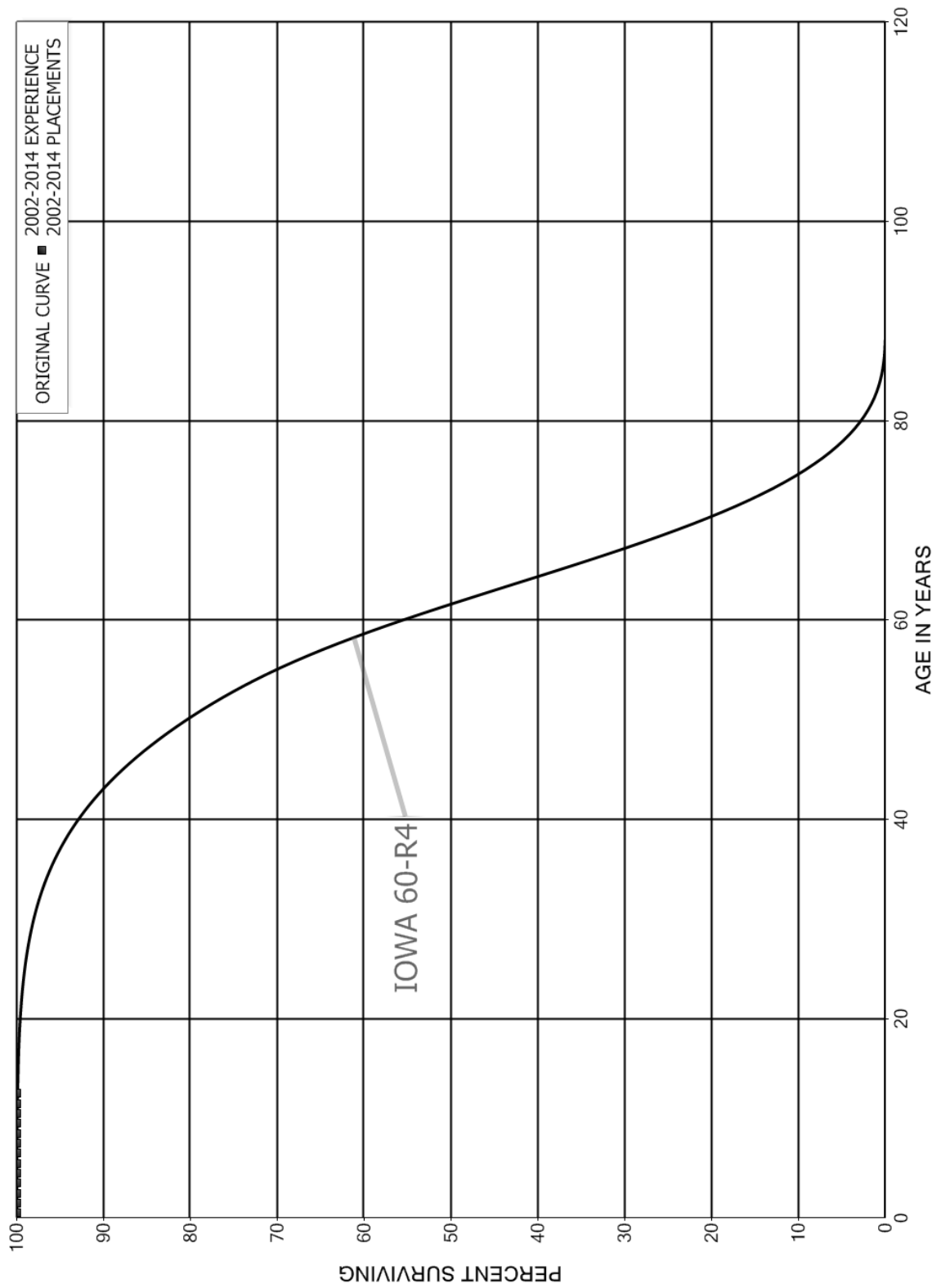
ENBRIDGE GAS NEW BRUNSWICK

TABLE 1. ESTIMATED SURVIVOR CURVE, ORIGINAL COST, BOOK DEPRECIATION RESERVE AND CALCULATED ANNUAL DEPRECIATION ACCRUALS RELATED TO UTILITY PLANT AS OF DECEMBER 31, 2014
DEPRECIATION RELATED TO RECOVERY OF ORIGINAL COST OF INVESTMENT

ACCOUNT	ACCOUNT DESCRIPTION (1)	SURVIVOR CURVE (2)	NET SALVAGE (%) (3)	ORIGINAL COST AS OF DECEMBER 31, 2014 (4)	BOOK DEPRECIATION RESERVE (5)	FUTURE ACCRUALS (6)	CALCULATED ANNUAL ACCRUAL AMOUNT (7)	ANNUAL ACCRUAL RATE (8)=(7)/(4)	COMPOSITE REMAINING LIFE (9)=(6)/(7)
	DISTRIBUTION PLANT								
471.00	RIGHT OF WAY	60-R4	-	189,283	-	189,283	4,037	2.13	46.9
473.00	SERVICES	60-R2.5	-	59,059,977	14,529,107	44,530,870	1,026,209	1.74	43.4
475.00	MAINS	65-R3	-	122,131,827	24,225,132	97,906,695	2,003,097	1.64	48.9
477.01	STATIONS	35-S3	-	15,415,662	5,187,017	10,228,645	434,620	2.82	23.5
477.02	METERS AND REGULATORS	20-S0.5	-	21,889,865	3,887,415	18,002,451	1,669,732	7.63	10.8
	TOTAL DISTRIBUTION PLANT			218,686,614	47,828,670	170,857,944	5,137,695	2.35	
	GENERAL PLANT								
483.00	OFFICE FURNITURE AND EQUIPMENT	20-SQ	-	463,808	206,073	257,735	29,736	6.41	8.7
484.00	TRANSPORTATION EQUIPMENT	8-S3	15	1,396,579	879,787	307,305	88,308	6.32	3.5
486.00	TOOLS AND WORK EQUIPMENT	10-SQ	-	1,696,779	485,394	1,211,385	246,570	14.53	4.9
488.00	COMMUNICATIONS EQUIPMENT	10-SQ	-	81,156	81,156	-	-	-	-
490.00	COMPUTER HARDWARE	5-SQ	-	940,391	777,962	162,429	83,432	8.87	1.9
491.50	COMPUTER SOFTWARE	7-SQ	-	409,944	370,635	39,310	10,678	2.60	3.7
491.60	INTANGIBLE SOFTWARE	5-SQ	-	1,935,446	1,743,921	191,525	95,948	4.96	2.0
	TOTAL GENERAL PLANT			6,924,104	4,544,928	2,169,689	554,672	8.01	
	TOTAL DEPRECIABLE PLANT			225,610,718	52,373,598	173,027,633	5,692,367	2.52	
	PLANT NOT STUDIED								
470.00	LAND			374,967	5,769,850				
475.90	DEVELOPMENT OPERATION AND MAINTENANCE		-	114,901,733	20,542,289				
482.00	LEASEHOLD IMPROVEMENTS		-	933,146	612,115				
	TOTAL PLANT NOT STUDIED			116,209,846	26,924,254				
	TOTAL PLANT			341,820,564	79,297,852	173,027,633	5,692,367		

PART V. SERVICE LIFE STATISTICS

ENBRIDGE GAS NEW BRUNSWICK
ACCOUNT 471.00 - RIGHT OF WAY
ORIGINAL AND SMOOTH SURVIVOR CURVES



ENBRIDGE GAS NEW BRUNSWICK

ACCOUNT 471.00 - RIGHT OF WAY

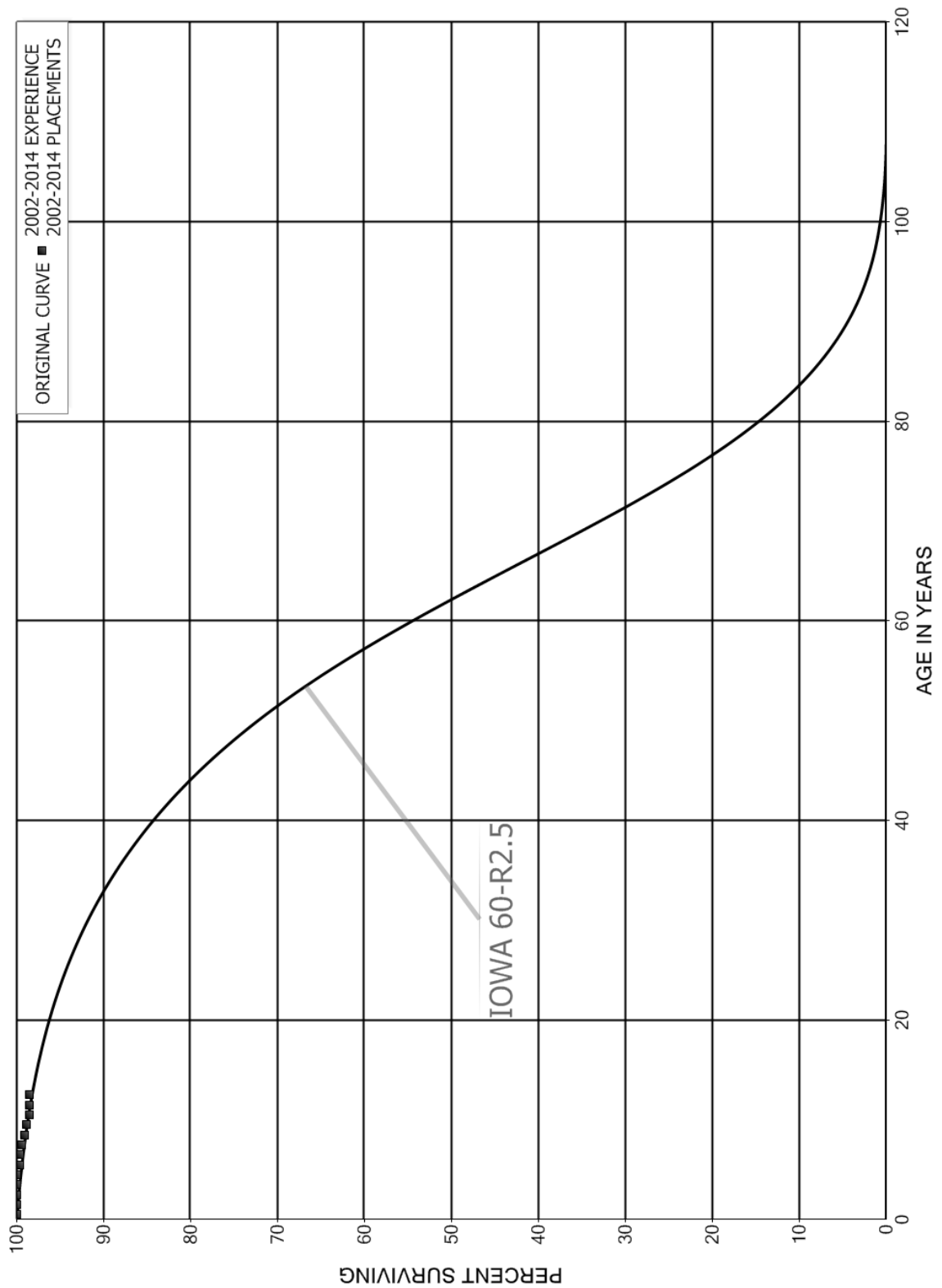
ORIGINAL LIFE TABLE

PLACEMENT BAND 2002-2014

EXPERIENCE BAND 2002-2014

AGE AT BEGIN OF INTERVAL	EXPOSURES AT BEGINNING OF AGE INTERVAL	RETIREMENTS DURING AGE INTERVAL	RETMT RATIO	SURV RATIO	PCT SURV BEGIN OF INTERVAL
0.0	189,283		0.0000	1.0000	100.00
0.5	156,208		0.0000	1.0000	100.00
1.5	156,208		0.0000	1.0000	100.00
2.5	156,208		0.0000	1.0000	100.00
3.5	156,208		0.0000	1.0000	100.00
4.5	155,866		0.0000	1.0000	100.00
5.5	121,066		0.0000	1.0000	100.00
6.5	121,066		0.0000	1.0000	100.00
7.5	108,826		0.0000	1.0000	100.00
8.5	107,394		0.0000	1.0000	100.00
9.5	99,295		0.0000	1.0000	100.00
10.5	89,295		0.0000	1.0000	100.00
11.5	70,652		0.0000	1.0000	100.00
12.5					100.00

ENBRIDGE GAS NEW BRUNSWICK
ACCOUNT 473.00 - SERVICES
ORIGINAL AND SMOOTH SURVIVOR CURVES



ENBRIDGE GAS NEW BRUNSWICK

ACCOUNT 473.00 - SERVICES

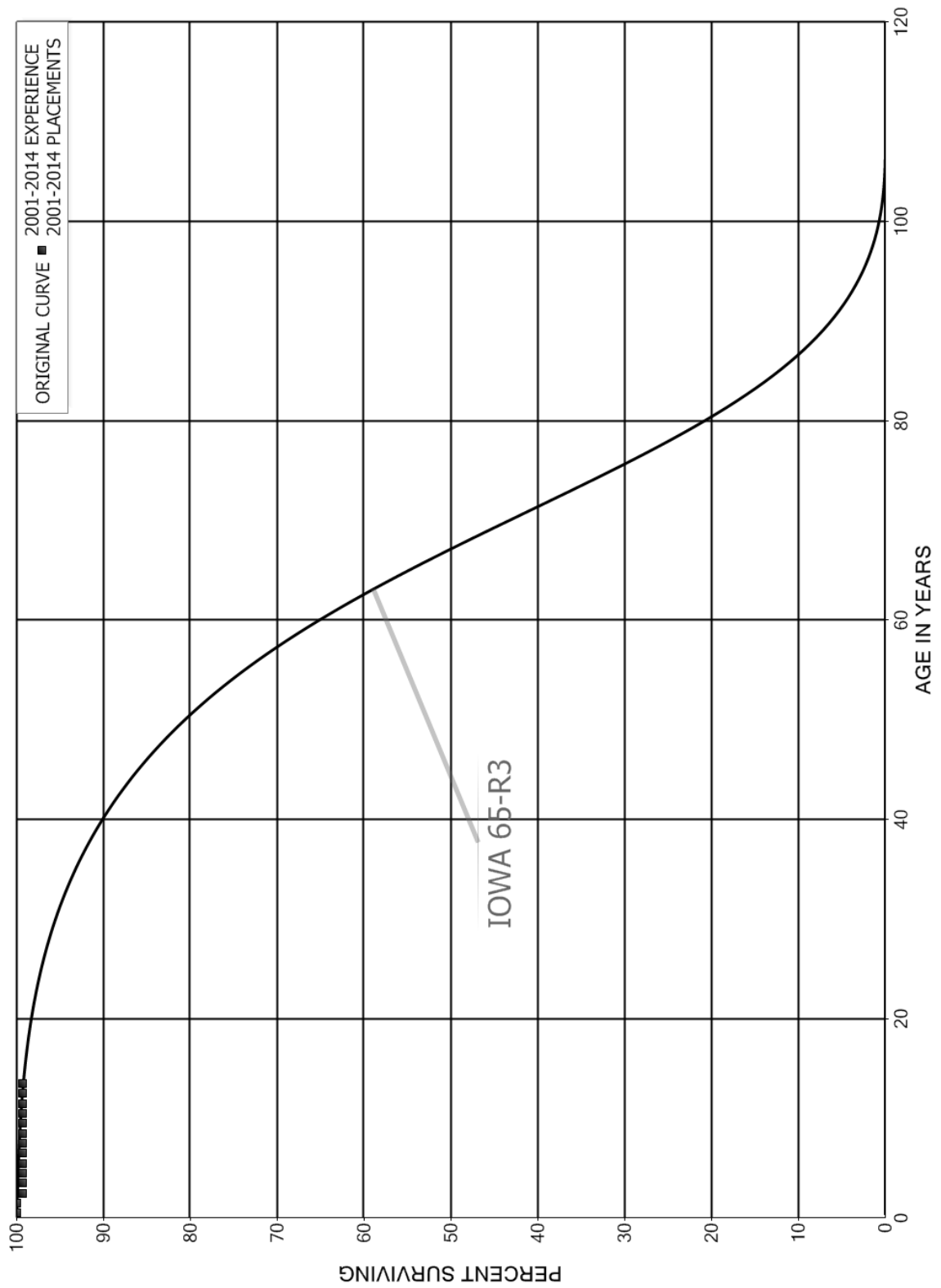
ORIGINAL LIFE TABLE

PLACEMENT BAND 2002-2014

EXPERIENCE BAND 2002-2014

AGE AT BEGIN OF INTERVAL	EXPOSURES AT BEGINNING OF AGE INTERVAL	RETIREMENTS DURING AGE INTERVAL	RETMT RATIO	SURV RATIO	PCT SURV BEGIN OF INTERVAL
0.0	9,410,873		0.0000	1.0000	100.00
0.5	56,481,471		0.0000	1.0000	100.00
1.5	53,488,436	2,590	0.0000	1.0000	100.00
2.5	47,886,643	377	0.0000	1.0000	100.00
3.5	44,086,272	38,046	0.0009	0.9991	99.99
4.5	39,788,485	101,479	0.0026	0.9974	99.91
5.5	35,484,631	15,581	0.0004	0.9996	99.65
6.5	30,632,277	60,744	0.0020	0.9980	99.61
7.5	24,539,240	89,432	0.0036	0.9964	99.41
8.5	20,179,291	38,350	0.0019	0.9981	99.05
9.5	12,968,069	52,111	0.0040	0.9960	98.86
10.5	9,312,856		0.0000	1.0000	98.46
11.5	4,687,348		0.0000	1.0000	98.46
12.5					98.46

ENBRIDGE GAS NEW BRUNSWICK
ACCOUNT 475.00 - MAINS
ORIGINAL AND SMOOTH SURVIVOR CURVES



ENBRIDGE GAS NEW BRUNSWICK

ACCOUNT 475.00 - MAINS

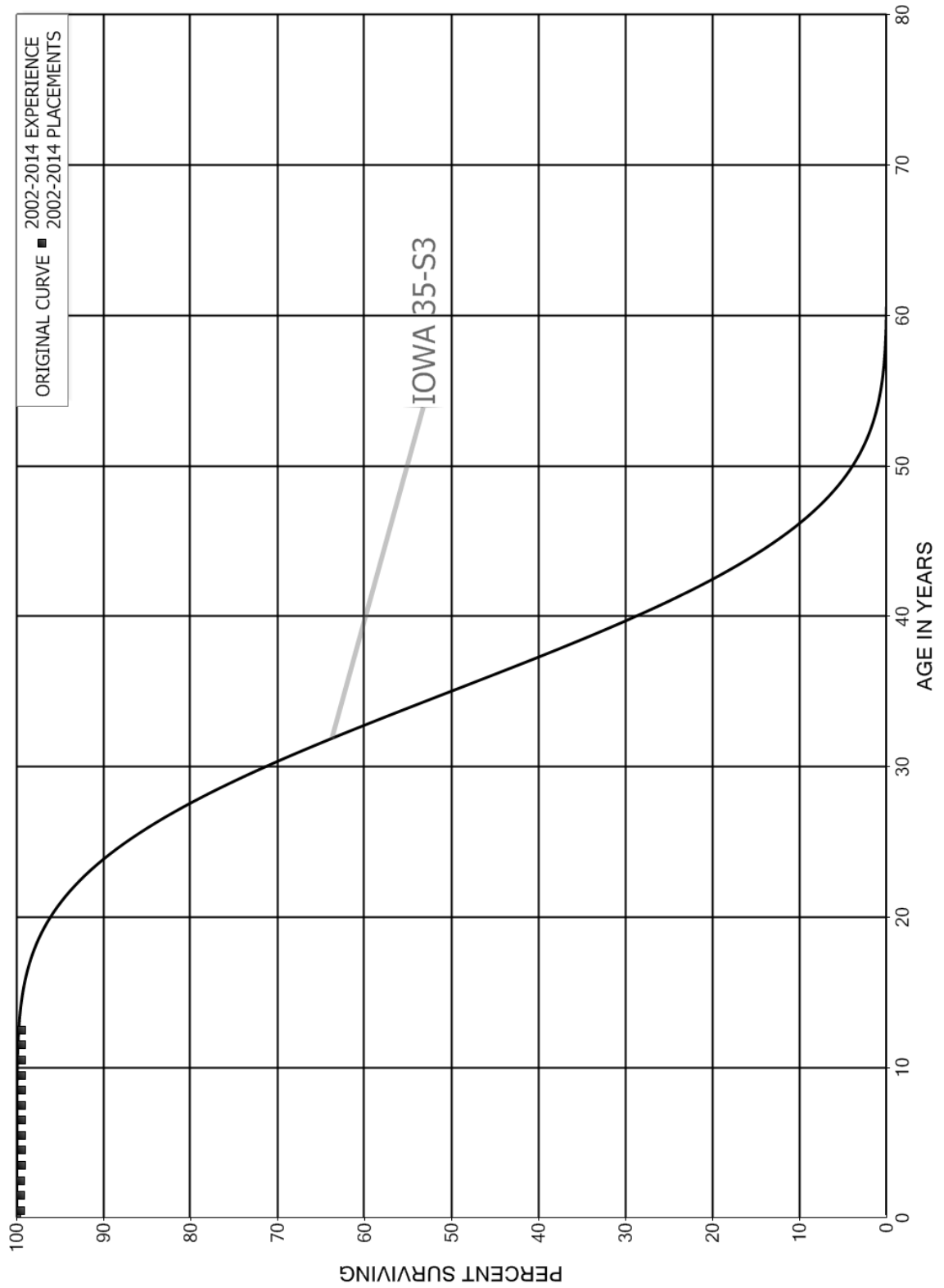
ORIGINAL LIFE TABLE

PLACEMENT BAND 2001-2014

EXPERIENCE BAND 2001-2014

AGE AT BEGIN OF INTERVAL	EXPOSURES AT BEGINNING OF AGE INTERVAL	RETIREMENTS DURING AGE INTERVAL	RETMT RATIO	SURV RATIO	PCT SURV BEGIN OF INTERVAL
0.0	42,263,097		0.0000	1.0000	100.00
0.5	141,164,357		0.0000	1.0000	100.00
1.5	138,590,469	955,989	0.0069	0.9931	100.00
2.5	128,383,262		0.0000	1.0000	99.31
3.5	122,693,353		0.0000	1.0000	99.31
4.5	116,225,175		0.0000	1.0000	99.31
5.5	86,884,548		0.0000	1.0000	99.31
6.5	71,512,902		0.0000	1.0000	99.31
7.5	63,307,661		0.0000	1.0000	99.31
8.5	61,211,876		0.0000	1.0000	99.31
9.5	47,198,253		0.0000	1.0000	99.31
10.5	33,357,136		0.0000	1.0000	99.31
11.5	20,646,659		0.0000	1.0000	99.31
12.5	9,406,942		0.0000	1.0000	99.31
13.5					99.31

ENBRIDGE GAS NEW BRUNSWICK
ACCOUNT 477.01 - STATIONS
ORIGINAL AND SMOOTH SURVIVOR CURVES



ENBRIDGE GAS NEW BRUNSWICK

ACCOUNT 477.01 - STATIONS

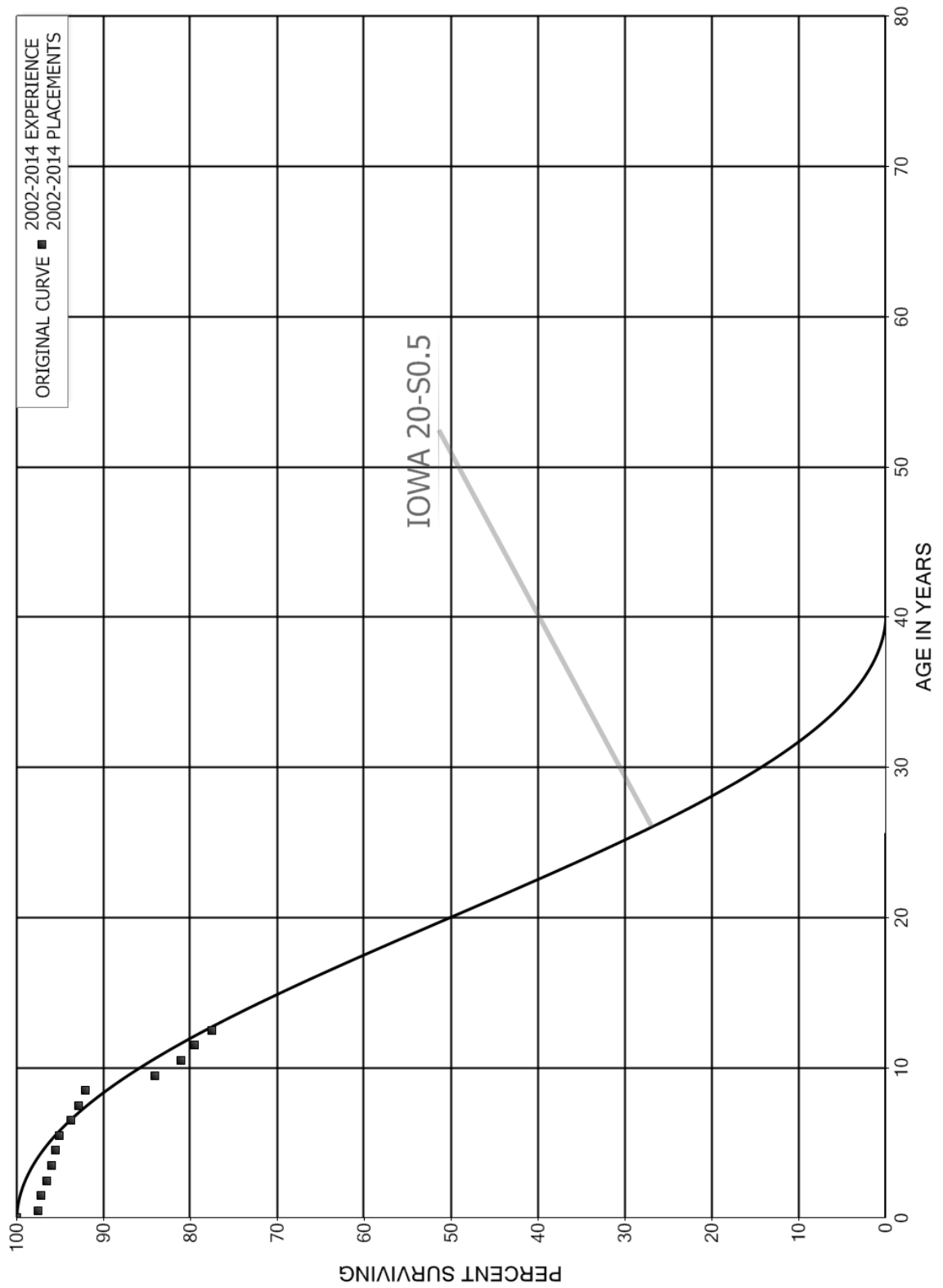
ORIGINAL LIFE TABLE

PLACEMENT BAND 2002-2014

EXPERIENCE BAND 2002-2014

AGE AT BEGIN OF INTERVAL	EXPOSURES AT BEGINNING OF AGE INTERVAL	RETIREMENTS DURING AGE INTERVAL	RETMT RATIO	SURV RATIO	PCT SURV BEGIN OF INTERVAL
0.0	2,566,707	13,638	0.0053	0.9947	100.00
0.5	15,214,218		0.0000	1.0000	99.47
1.5	15,032,298		0.0000	1.0000	99.47
2.5	14,355,322	3,982	0.0003	0.9997	99.47
3.5	14,125,458		0.0000	1.0000	99.44
4.5	13,305,824		0.0000	1.0000	99.44
5.5	12,373,786		0.0000	1.0000	99.44
6.5	9,069,801		0.0000	1.0000	99.44
7.5	8,683,454		0.0000	1.0000	99.44
8.5	7,847,922		0.0000	1.0000	99.44
9.5	5,580,105		0.0000	1.0000	99.44
10.5	2,583,902	136	0.0001	0.9999	99.44
11.5	1,778,345		0.0000	1.0000	99.44
12.5					99.44

ENBRIDGE GAS NEW BRUNSWICK
ACCOUNT 477.02 - METERS AND REGULATORS
ORIGINAL AND SMOOTH SURVIVOR CURVES



ENBRIDGE GAS NEW BRUNSWICK

ACCOUNT 477.02 - METERS AND REGULATORS

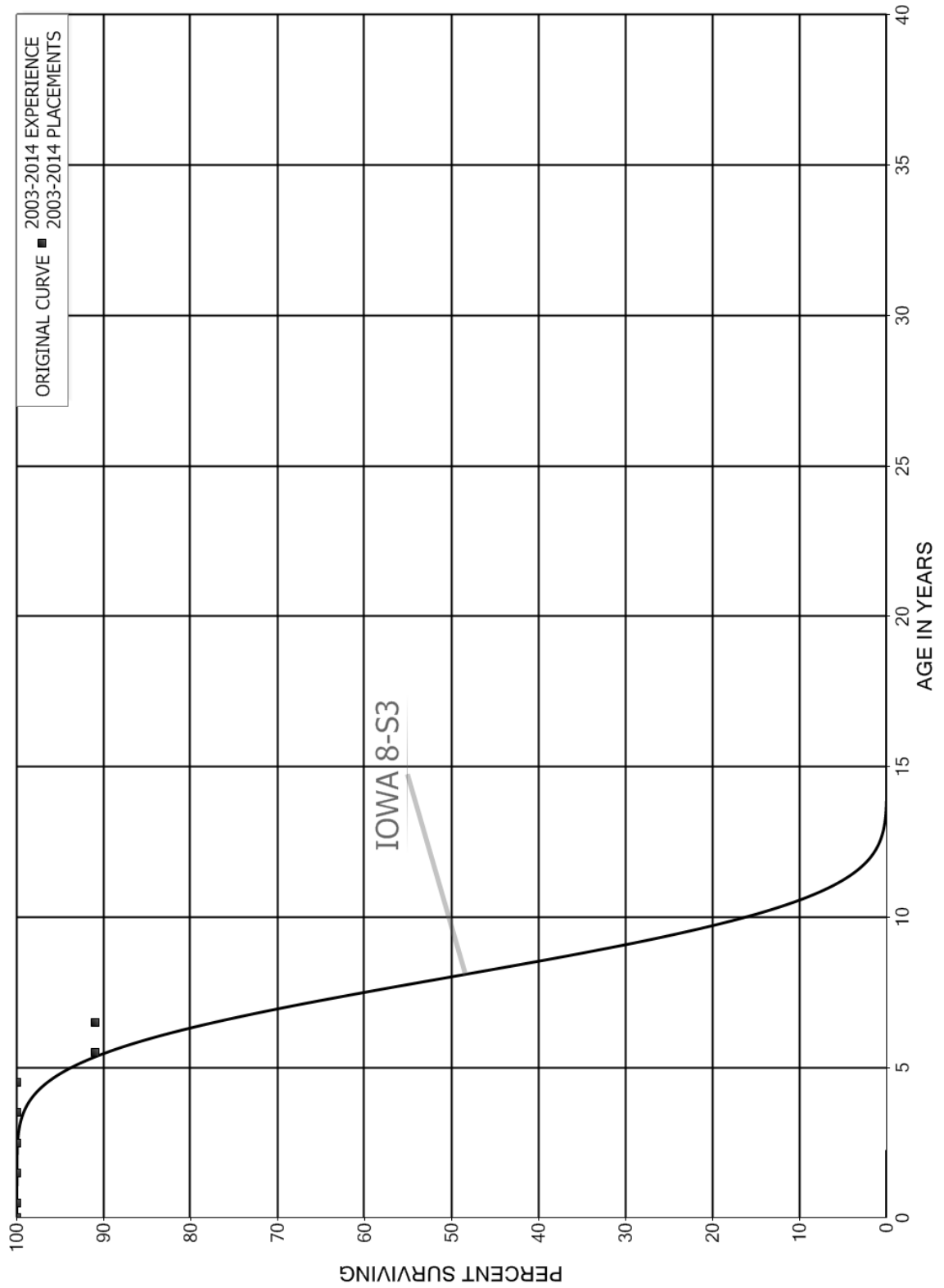
ORIGINAL LIFE TABLE

PLACEMENT BAND 2002-2014

EXPERIENCE BAND 2002-2014

AGE AT BEGIN OF INTERVAL	EXPOSURES AT BEGINNING OF AGE INTERVAL	RETIREMENTS DURING AGE INTERVAL	RETMT RATIO	SURV RATIO	PCT SURV BEGIN OF INTERVAL
0.0	2,240,109	55,543	0.0248	0.9752	100.00
0.5	22,051,895	82,783	0.0038	0.9962	97.52
1.5	20,387,228	133,609	0.0066	0.9934	97.15
2.5	18,133,956	100,722	0.0056	0.9944	96.52
3.5	15,540,119	72,717	0.0047	0.9953	95.98
4.5	13,918,226	73,540	0.0053	0.9947	95.53
5.5	12,785,676	175,460	0.0137	0.9863	95.03
6.5	11,660,597	110,405	0.0095	0.9905	93.72
7.5	10,201,676	87,107	0.0085	0.9915	92.84
8.5	8,238,496	714,535	0.0867	0.9133	92.04
9.5	6,333,034	226,879	0.0358	0.9642	84.06
10.5	3,244,907	62,855	0.0194	0.9806	81.05
11.5	2,005,774	49,913	0.0249	0.9751	79.48
12.5					77.50

ENBRIDGE GAS NEW BRUNSWICK
ACCOUNT 484.00 - TRANSPORTATION EQUIPMENT
ORIGINAL AND SMOOTH SURVIVOR CURVES



ENBRIDGE GAS NEW BRUNSWICK

ACCOUNT 484.00 - TRANSPORTATION EQUIPMENT

ORIGINAL LIFE TABLE

PLACEMENT BAND 2003-2014

EXPERIENCE BAND 2003-2014

AGE AT BEGIN OF INTERVAL	EXPOSURES AT BEGINNING OF AGE INTERVAL	RETIREMENTS DURING AGE INTERVAL	RETMT RATIO	SURV RATIO	PCT SURV BEGIN OF INTERVAL
0.0	1,477,541		0.0000	1.0000	100.00
0.5	1,474,582		0.0000	1.0000	100.00
1.5	1,288,701		0.0000	1.0000	100.00
2.5	994,990		0.0000	1.0000	100.00
3.5	878,682		0.0000	1.0000	100.00
4.5	796,314	72,052	0.0905	0.9095	100.00
5.5	332,286		0.0000	1.0000	90.95
6.5	8,910		0.0000	1.0000	90.95
7.5	8,910	8,910	1.0000		90.95
8.5					

PART VI. DETAILED DEPRECIATIONS CALCULATIONS

ENBRIDGE GAS NEW BRUNSWICK

ACCOUNT 471.00 - RIGHT OF WAY

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2014

YEAR (1)	ORIGINAL COST (2)	CALCULATED ACCRUED (3)	ALLOC. BOOK RESERVE (4)	FUTURE BOOK ACCRUALS (5)	REM. LIFE (6)	ANNUAL ACCRUAL (7)
SURVIVOR CURVE.. IOWA 60-R4						
NET SALVAGE PERCENT.. 0						
2002	70,651.89	16,787		70,652	43.32	1,631
2003	18,642.83	4,101		18,643	44.32	421
2004	10,000.00	2,024		10,000	45.32	221
2005	8,099.15	1,497		8,099	46.32	175
2006	1,432.16	241		1,432	46.99	30
2007	12,240.00	1,841		12,240	48.00	255
2009	34,800.00	4,002		34,800	50.00	696
2010	342.00	33		342	50.99	7
2014	33,075.00	880		33,075	54.99	601
	189,283.03	31,406		189,283		4,037
COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PERCENT .. 46.9 2.13						

ENBRIDGE GAS NEW BRUNSWICK

ACCOUNT 473.00 - SERVICES

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2014

YEAR (1)	ORIGINAL COST (2)	CALCULATED ACCRUED (3)	ALLOC. BOOK RESERVE (4)	FUTURE BOOK ACCRUALS (5)	REM. LIFE (6)	ANNUAL ACCRUAL (7)
SURVIVOR CURVE.. IOWA 60-R2.5						
NET SALVAGE PERCENT.. 0						
2002	4,687,348.37	1,183,087	1,915,635	2,771,713	39.98	69,327
2003	4,625,507.77	1,086,994	1,760,043	2,865,465	40.69	70,422
2004	3,603,102.02	783,314	1,268,329	2,334,773	41.41	56,382
2005	7,172,871.62	1,438,878	2,329,807	4,843,065	41.85	115,724
2006	4,270,517.33	778,942	1,261,250	3,009,267	42.58	70,673
2007	6,032,293.32	994,725	1,610,642	4,421,651	43.05	102,710
2008	4,836,772.13	707,136	1,144,983	3,691,789	43.78	84,326
2009	4,202,375.40	537,904	870,965	3,331,410	44.26	75,269
2010	4,259,741.16	466,016	754,566	3,505,175	44.75	78,328
2011	3,799,993.95	345,419	559,297	3,240,697	45.00	72,015
2012	5,599,202.45	399,783	647,322	4,951,880	45.52	108,785
2013	2,993,035.02	155,638	252,007	2,741,028	45.58	60,137
2014	2,977,216.62	95,271	154,261	2,822,956	45.45	62,111
	59,059,977.16	8,973,107	14,529,107	44,530,870		1,026,209
COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PERCENT .. 43.4 1.74						

ENBRIDGE GAS NEW BRUNSWICK

ACCOUNT 475.00 - MAINS

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2014

YEAR (1)	ORIGINAL COST (2)	CALCULATED ACCRUED (3)	ALLOC. BOOK RESERVE (4)	FUTURE BOOK ACCRUALS (5)	REM. LIFE (6)	ANNUAL ACCRUAL (7)
SURVIVOR CURVE.. IOWA 65-R3						
NET SALVAGE PERCENT.. 0						
2001	9,406,941.80	2,304,701	2,901,219	6,505,723	44.67	145,640
2002	11,239,717.58	2,579,515	3,247,163	7,992,555	45.32	176,358
2003	12,710,476.28	2,700,976	3,400,061	9,310,415	46.32	201,002
2004	13,841,116.84	2,721,164	3,425,474	10,415,643	46.98	221,704
2005	14,013,623.85	2,530,860	3,185,915	10,827,709	47.64	227,282
2006	2,095,784.67	342,451	431,086	1,664,699	48.64	34,225
2007	8,205,240.73	1,206,170	1,518,359	6,686,882	49.31	135,609
2008	15,371,646.52	1,995,240	2,511,662	12,859,985	50.30	255,666
2009	9,273,047.06	1,048,782	1,320,235	7,952,812	50.97	156,029
2010	6,468,177.81	622,239	783,291	5,684,887	51.65	110,066
2011	5,689,908.78	450,641	567,279	5,122,630	52.32	97,910
2012	9,251,218.32	573,576	722,033	8,529,185	52.99	160,958
2013	2,573,888.06	114,538	144,184	2,429,704	53.68	45,263
2014	1,991,038.35	53,360	67,171	1,923,868	54.37	35,385
	122,131,826.65	19,244,213	24,225,132	97,906,695		2,003,097
COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PERCENT .. 48.9						1.64

ENBRIDGE GAS NEW BRUNSWICK

ACCOUNT 477.01 - STATIONS

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2014

YEAR (1)	ORIGINAL COST (2)	CALCULATED ACCRUED (3)	ALLOC. BOOK RESERVE (4)	FUTURE BOOK ACCRUALS (5)	REM. LIFE (6)	ANNUAL ACCRUAL (7)
SURVIVOR CURVE.. IOWA 35-S3						
NET SALVAGE PERCENT.. 0						
2002	1,778,344.92	729,833	865,926	912,419	19.39	47,056
2003	805,421.11	307,027	364,279	441,142	20.29	21,742
2004	2,996,203.54	1,054,364	1,250,972	1,745,232	21.18	82,400
2005	2,267,816.57	728,649	864,521	1,403,296	22.18	63,269
2006	835,531.77	242,889	288,181	547,351	23.18	23,613
2007	386,347.00	100,489	119,227	267,120	24.18	11,047
2008	3,303,985.63	758,265	899,660	2,404,326	25.18	95,486
2009	932,038.03	185,382	219,950	712,088	26.18	27,200
2010	819,633.25	137,944	163,667	655,966	27.18	24,134
2011	225,883.03	31,104	36,904	188,979	28.18	6,706
2012	676,975.82	72,504	86,024	590,952	29.18	20,252
2013	181,919.56	13,917	16,512	165,408	30.18	5,481
2014	205,561.83	9,435	11,194	194,368	31.18	6,234
	15,415,662.06	4,371,802	5,187,017	10,228,645		434,620
COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PERCENT ..						23.5 2.82

ENBRIDGE GAS NEW BRUNSWICK

ACCOUNT 477.02 - METERS AND REGULATORS

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2014

YEAR (1)	ORIGINAL COST (2)	CALCULATED ACCRUED (3)	ALLOC. BOOK RESERVE (4)	FUTURE BOOK ACCRUALS (5)	REM. LIFE (6)	ANNUAL ACCRUAL (7)
SURVIVOR CURVE.. IOWA 20-S0.5						
NET SALVAGE PERCENT.. 0						
2002	1,955,861.41	1,196,205	549,620	1,406,241	8.57	164,089
2003	1,176,278.83	686,712	315,523	860,756	8.91	96,606
2004	2,861,247.22	1,582,842	727,268	2,133,979	9.29	229,707
2005	1,190,927.19	620,235	284,979	905,948	9.66	93,783
2006	1,876,072.06	912,521	419,276	1,456,796	10.03	145,244
2007	1,348,515.75	606,293	278,573	1,069,943	10.40	102,879
2008	949,619.51	388,869	178,674	770,946	10.82	71,252
2009	1,059,008.91	388,868	178,673	880,336	11.20	78,601
2010	1,549,176.55	498,525	229,057	1,320,120	11.59	113,902
2011	2,493,115.20	679,873	312,381	2,180,734	12.00	181,728
2012	2,119,662.29	465,902	214,068	1,905,594	12.42	153,429
2013	1,581,883.56	257,847	118,473	1,463,411	12.84	113,973
2014	1,728,496.63	175,961	80,850	1,647,647	13.23	124,539
	21,889,865.11	8,460,653	3,887,415	18,002,451		1,669,732
COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PERCENT .. 10.8						7.63

ENBRIDGE GAS NEW BRUNSWICK

ACCOUNT 483.00 - OFFICE FURNITURE AND EQUIPMENT

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2014

YEAR (1)	ORIGINAL COST (2)	CALCULATED ACCRUED (3)	ALLOC. BOOK RESERVE (4)	FUTURE BOOK ACCRUALS (5)	REM. LIFE (6)	ANNUAL ACCRUAL (7)
SURVIVOR CURVE.. 20-SQUARE						
NET SALVAGE PERCENT.. 0						
2002	137,885.19	93,073	74,518	63,367	6.50	9,749
2003	143,210.49	89,507	71,662	71,548	7.50	9,540
2004	7,862.02	4,521	3,620	4,242	8.50	499
2005	7,677.13	4,030	3,227	4,450	9.50	468
2006	20,033.31	9,516	7,619	12,414	10.50	1,182
2007	85,525.60	36,348	29,101	56,425	11.50	4,907
2008	39,697.86	14,887	11,919	27,779	12.50	2,222
2009	1,422.14	462	370	1,052	13.50	78
2010	9,296.30	2,556	2,046	7,250	14.50	500
2011	10,538.89	2,371	1,899	8,640	15.50	557
2012	659.03	115	92	567	16.50	34
	463,807.96	257,386	206,073	257,735		29,736
COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PERCENT .. 8.7 6.41						

ENBRIDGE GAS NEW BRUNSWICK

ACCOUNT 484.00 - TRANSPORTATION EQUIPMENT

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2014

YEAR (1)	ORIGINAL COST (2)	CALCULATED ACCRUED (3)	ALLOC. BOOK RESERVE (4)	FUTURE BOOK ACCRUALS (5)	REM. LIFE (6)	ANNUAL ACCRUAL (7)
SURVIVOR CURVE.. IOWA 8-S3						
NET SALVAGE PERCENT.. +15						
2008	323,375.88	226,355	264,120	10,749	1.61	6,676
2009	391,976.30	253,617	295,930	37,250	2.04	18,260
2010	82,367.59	47,636	55,583	14,429	2.58	5,593
2011	116,308.47	57,390	66,965	31,897	3.25	9,814
2012	293,710.34	115,590	134,875	114,779	4.06	28,271
2013	185,881.75	52,898	61,723	96,276	4.97	19,371
2014	2,959.00	507	591	1,924	5.95	323
	1,396,579.33	753,993	879,787	307,305		88,308
COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PERCENT ..						3.5 6.32

ENBRIDGE GAS NEW BRUNSWICK

ACCOUNT 486.00 - TOOLS AND WORK EQUIPMENT

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2014

YEAR (1)	ORIGINAL COST (2)	CALCULATED ACCRUED (3)	ALLOC. BOOK RESERVE (4)	FUTURE BOOK ACCRUALS (5)	REM. LIFE (6)	ANNUAL ACCRUAL (7)
SURVIVOR CURVE.. 10-SQUARE						
NET SALVAGE PERCENT.. 0						
2002	122,685.88	122,686	122,686			
2003	147,298.67	147,299	147,299			
2004	19,861.04	19,861	19,861			
2005	9,607.00	9,607	9,607			
2006	45,942.68	43,646	15,467	30,476	0.50	30,476
2007	82,155.18	69,832	24,746	57,409	1.50	38,273
2008	70,719.28	53,039	18,796	51,923	2.50	20,769
2009	51,543.39	33,503	11,872	39,671	3.50	11,335
2010	48,984.00	26,941	9,547	39,437	4.50	8,764
2011	91,176.17	41,029	14,540	76,636	5.50	13,934
2012	52,224.97	18,279	6,478	45,747	6.50	7,038
2013	952,508.56	238,127	84,385	868,124	7.50	115,750
2014	2,071.84	311	110	1,962	8.50	231
	1,696,778.66	824,160	485,394	1,211,385		246,570
COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PERCENT .. 4.9						14.53

ENBRIDGE GAS NEW BRUNSWICK

ACCOUNT 488.00 - COMMUNICATIONS EQUIPMENT

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2014

YEAR (1)	ORIGINAL COST (2)	CALCULATED ACCRUED (3)	ALLOC. BOOK RESERVE (4)	FUTURE BOOK ACCRUALS (5)	REM. LIFE (6)	ANNUAL ACCRUAL (7)
SURVIVOR CURVE.. 10-SQUARE						
NET SALVAGE PERCENT.. 0						
2008	1,977.54	1,483	1,978			
2010	79,178.81	43,548	79,178			
	81,156.35	45,031	81,156			
COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PERCENT .. 0.0 0.00						

ENBRIDGE GAS NEW BRUNSWICK

ACCOUNT 490.00 - COMPUTER HARDWARE

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2014

YEAR (1)	ORIGINAL COST (2)	CALCULATED ACCRUED (3)	ALLOC. BOOK RESERVE (4)	FUTURE BOOK ACCRUALS (5)	REM. LIFE (6)	ANNUAL ACCRUAL (7)
SURVIVOR CURVE.. 5-SQUARE						
NET SALVAGE PERCENT.. 0						
2002	704.38-	704-	701-	3-		
2003	704.36	704	704			
2004	0.01					
2005	9,192.00	9,192	9,192			
2006	35,354.27	35,354	35,354			
2007	63,804.41	63,804	63,804			
2008	44,921.45	44,921	44,921			
2009	150,438.06	150,438	150,438			
2010	124,520.79	124,521	124,521			
2011	215,944.03	194,350	192,517	23,427	0.50	23,427
2012	101,981.27	71,387	70,714	31,267	1.50	20,845
2013	145,257.34	72,629	71,944	73,313	2.50	29,325
2014	48,977.04	14,693	14,554	34,423	3.50	9,835
	940,390.65	781,289	777,962	162,429		83,432
COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PERCENT .. 1.9						8.87

ENBRIDGE GAS NEW BRUNSWICK

ACCOUNT 491.50 - COMPUTER SOFTWARE

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2014

YEAR (1)	ORIGINAL COST (2)	CALCULATED ACCRUED (3)	ALLOC. BOOK RESERVE (4)	FUTURE BOOK ACCRUALS (5)	REM. LIFE (6)	ANNUAL ACCRUAL (7)
SURVIVOR CURVE.. 7-SQUARE						
NET SALVAGE PERCENT.. 0						
2002	40.00	40	40			
2011	194,893.23	125,289	194,893			
2012	197,566.85	98,783	165,883	31,684	3.50	9,053
2013	14,765.45	5,273	8,855	5,910	4.50	1,313
2014	2,678.89	574	964	1,715	5.50	312
	409,944.42	229,959	370,635	39,310		10,678
COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PERCENT .. 3.7 2.60						

ENBRIDGE GAS NEW BRUNSWICK

ACCOUNT 491.60 - INTANGIBLE SOFTWARE

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2014

YEAR (1)	ORIGINAL COST (2)	CALCULATED ACCRUED (3)	ALLOC. BOOK RESERVE (4)	FUTURE BOOK ACCRUALS (5)	REM. LIFE (6)	ANNUAL ACCRUAL (7)
SURVIVOR CURVE.. 5-SQUARE						
NET SALVAGE PERCENT.. 0						
2009	1,866,037.00	1,866,037	1,866,037			
2011	501.02	451	1,405-	1,906	0.50	1,906
2012	21,448.67	15,014	46,778-	68,227	1.50	45,485
2013	47,459.59	23,730	73,933-	121,392	2.50	48,557
	1,935,446.28	1,905,232	1,743,921	191,525		95,948
COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PERCENT .. 2.0						4.96

APPENDIX A

ESTIMATION OF SURIVOR CURVES

ESTIMATION OF SURVIVOR CURVES

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 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.

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

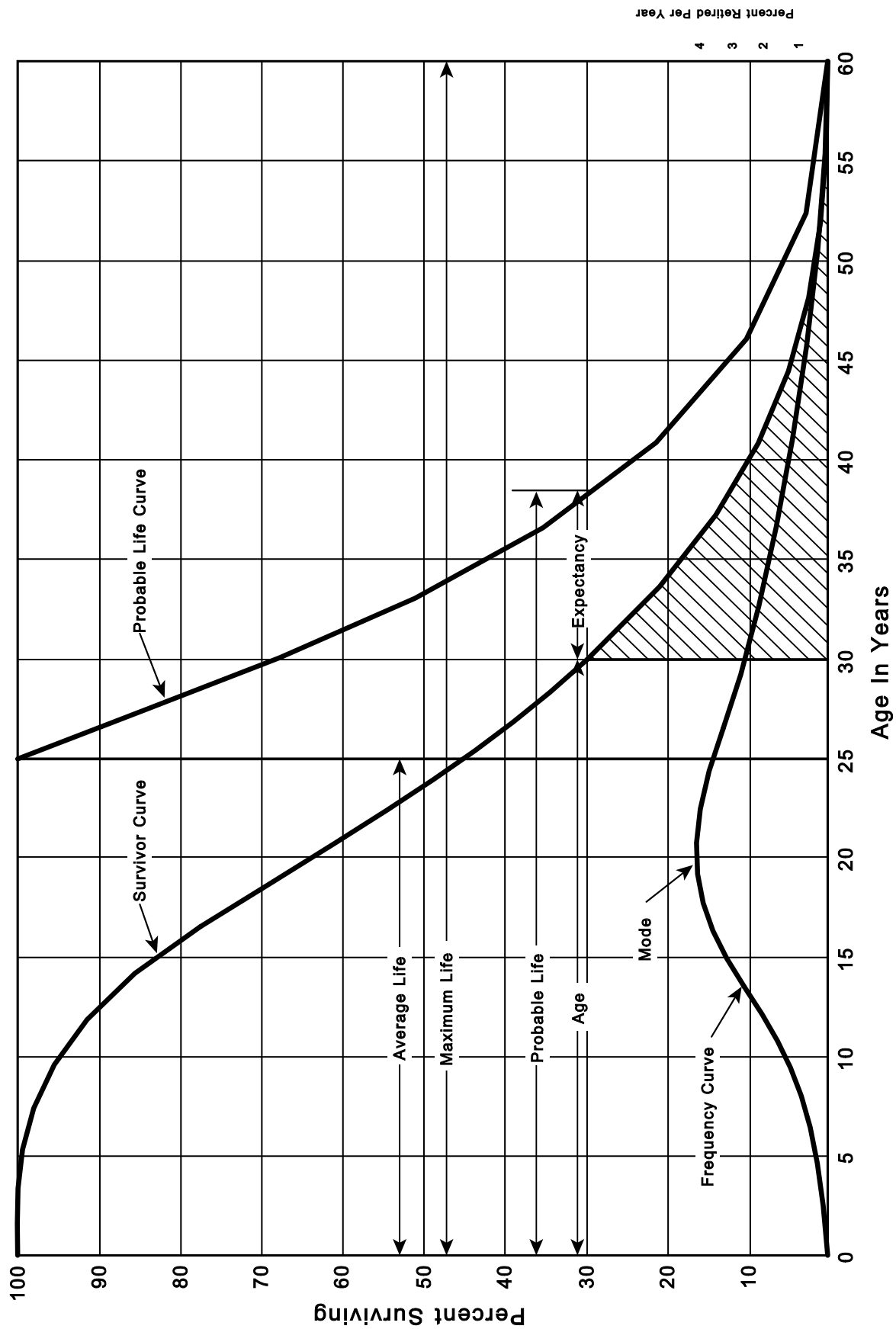


Figure 1. A Typical Survivor Curve and Derived Curves

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, which constitute three of the four families, was published in 1935 in the form of the Experiment Station's Bulletin 125.¹ These curve types 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 thesis³ presenting his development of the fourth family consisting of the four O type survivor curves.

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

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

³Couch, 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.

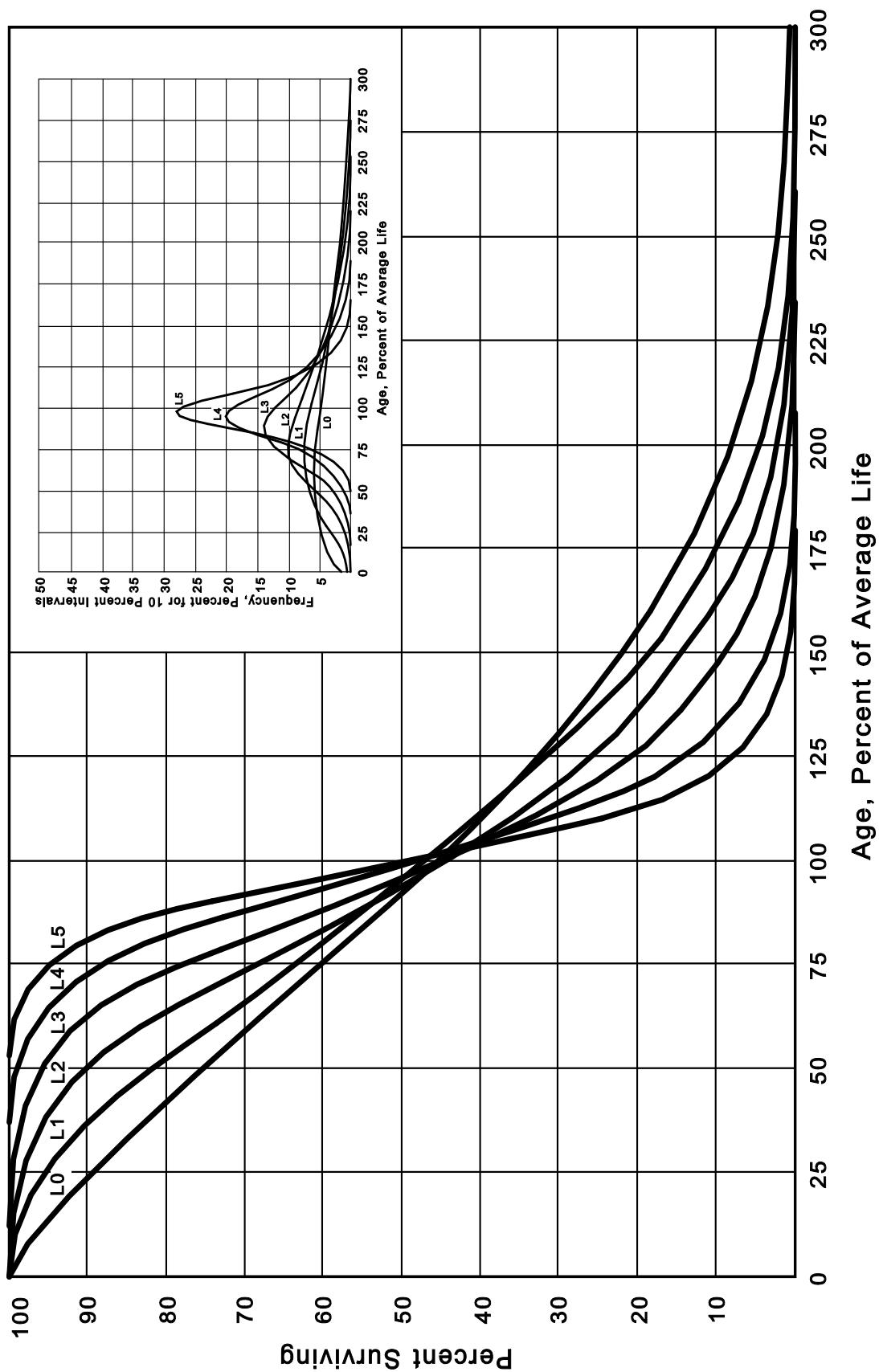


Figure 2. Left Modal or "L" Iowa Type Survivor Curves

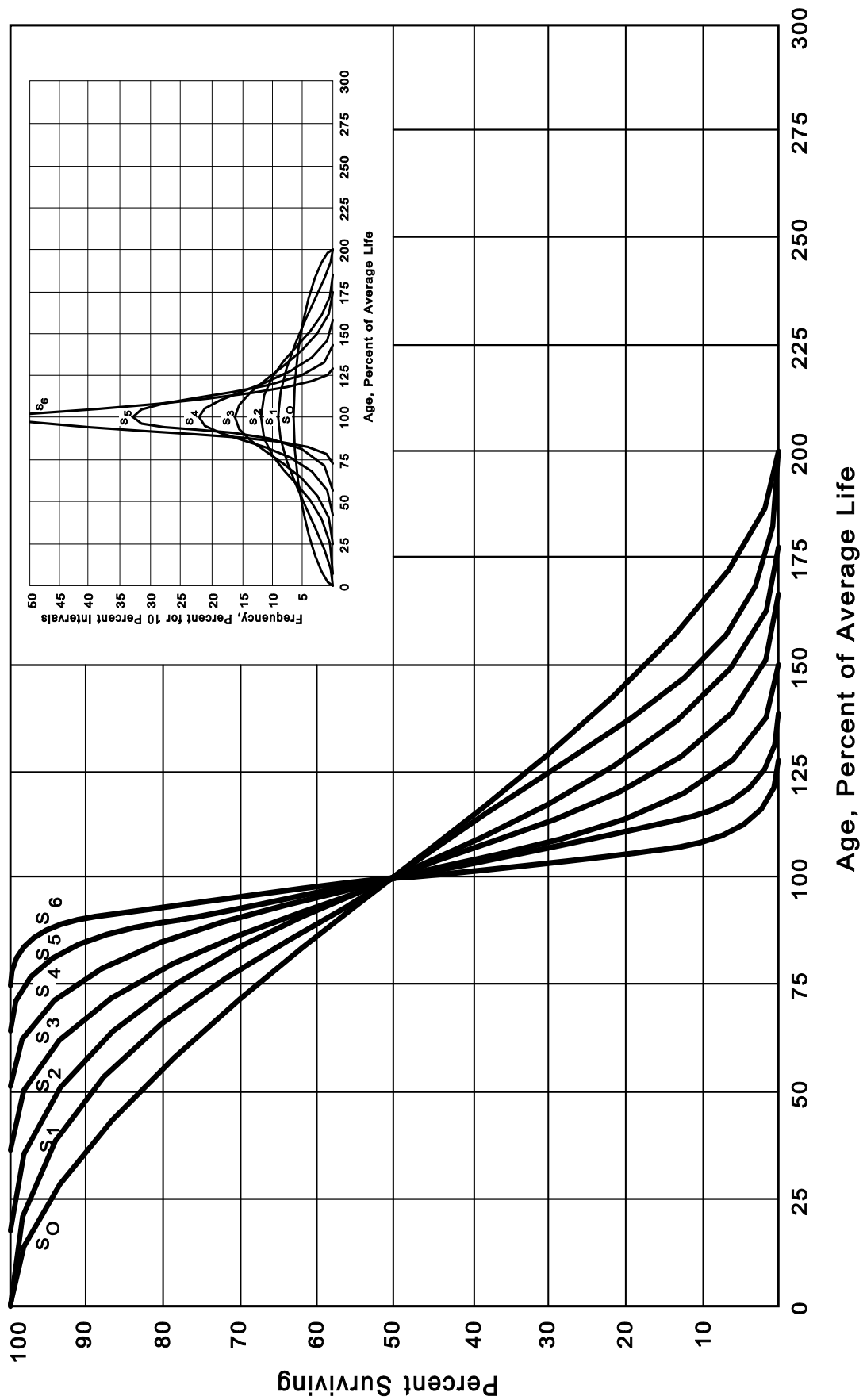


Figure 3. Symmetrical or "S" Iowa Type Survivor Curves

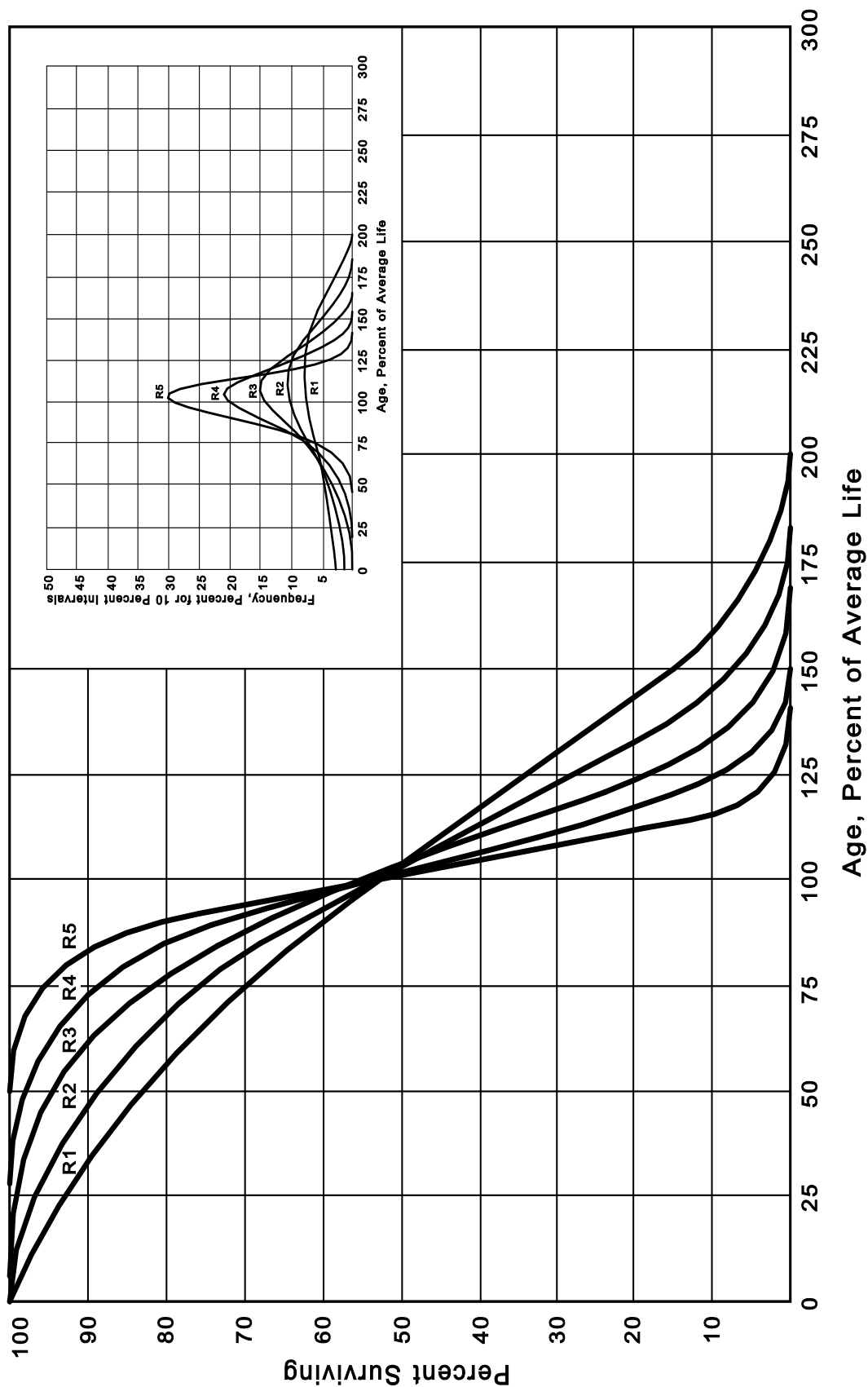


Figure 4. Right Modal or "R" Iowa Type Survivor Curves

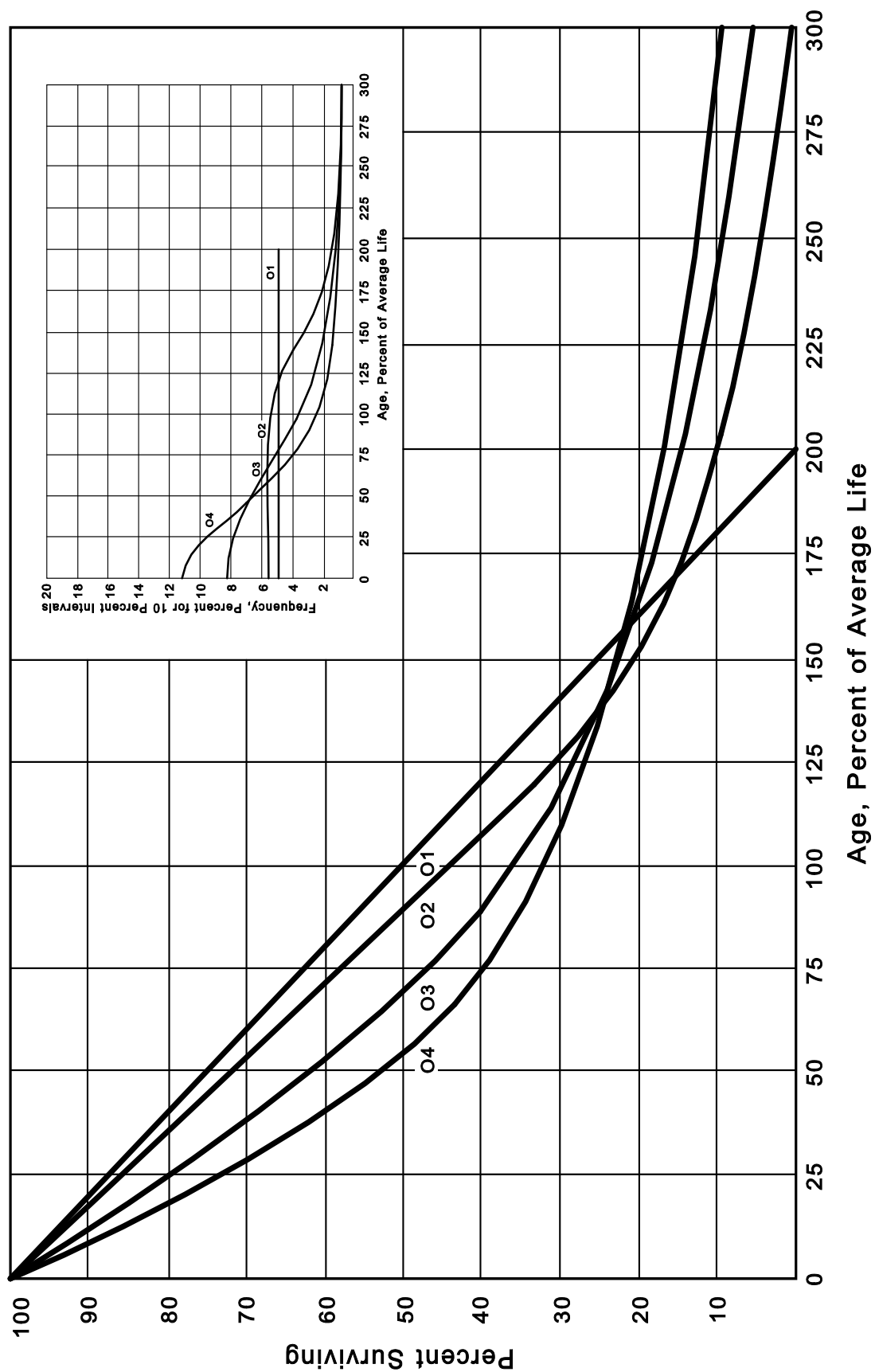


Figure 5. Origin Modal or "O" Iowa Type Survivor Curves

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,"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 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 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 2005-2014 during which there were placements during the years 2000-2014. 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 the following pages. 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 2000 were

⁴Winfrey, Robley, Supra Note 1.

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

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

SCHEDULE 1. RETIREMENTS FOR EACH YEAR 2005-2014
SUMMARIZED BY AGE INTERVAL

Experience Band 2005-2014											Placement Band 2000-2014		
Year Placed	Retirements, Thousands of Dollars										Total During Age Interval	Age Interval	
	During Year												
(1)	<u>2005</u> (2)	<u>2006</u> (3)	<u>2007</u> (4)	<u>2008</u> (5)	<u>2009</u> (6)	<u>2010</u> (7)	<u>2011</u> (8)	<u>2012</u> (9)	<u>2013</u> (10)	<u>2014</u> (11)	(12)	(13)	
1999	10	11	12	13	14	16	23	24	25	26	26	13½-14½	
2000	11	12	13	15	16	18	20	21	22	19	44	12½-13½	
2001	11	12	13	14	16	17	19	21	22	18	64	11½-12½	
2002	8	9	10	11	11	13	14	15	16	17	83	10½-11½	
2003	9	10	11	12	13	14	16	17	19	20	93	9½-10½	
2004	4	9	10	11	12	13	14	15	16	20	105	8½-9½	
2005		5	11	12	13	14	15	16	18	20	113	7½-8½	
2006			6	12	13	15	16	17	19	19	124	6½-7½	
2007				6	13	15	16	17	19	19	131	5½-6½	
2008					7	14	16	17	19	20	143	4½-5½	
2009						8	18	20	22	23	146	3½-4½	
2010							9	20	22	25	150	2½-3½	
2011								11	23	25	151	1½-2½	
2012									11	24	153	½-1½	
2013										13	80	0-½	
Total	53	68	86	106	128	157	196	231	273	308	1,606		

SCHEDULE 2. OTHER TRANSACTIONS FOR EACH YEAR 2005-2014
SUMMARIZED BY AGE INTERVAL

Experience Band 2005-2014 Placement Band 2000-2014

Year Placed (1)	During Year										Total During Age Interval (12)	Age Interval (13)
	2005 (2)	2006 (3)	2007 (4)	2008 (5)	2009 (6)	2010 (7)	2011 (8)	2012 (9)	2013 (10)	2014 (11)		
1999	-	-	-	-	-	-	60 ^a	-	-	-	-	13½-14½
2000	-	-	-	-	-	-	-	-	-	-	-	12½-13½
2001	-	-	-	-	-	-	-	-	-	-	-	11½-12½
2002	-	-	-	-	-	-	-	(5) ^b	-	-	60	10½-11½
2003	-	-	-	-	-	-	-	6 ^a	-	-	-	9½-10½
2004	-	-	-	-	-	-	-	-	-	-	(5)	8½-9½
2005	-	-	-	-	-	-	-	-	-	-	-	7½-8½
2006	-	-	-	-	-	-	-	-	-	-	-	6½-7½
2007	-	-	-	-	-	-	-	(12) ^b	-	-	-	5½-6½
2008	-	-	-	-	-	-	-	-	22 ^a	-	-	4½-5½
2009	-	-	-	-	-	-	-	(19) ^b	-	-	10	3½-4½
2010	-	-	-	-	-	-	-	-	-	-	-	2½-3½
2011	-	-	-	-	-	-	-	-	-	(102) ^c	(121)	1½-2½
2012	-	-	-	-	-	-	-	-	-	-	-	½-1½
2013	-	-	-	-	-	-	-	-	-	-	-	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.

retired in 2005. 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 2005 retirements of 2000 installations and ending with the 2014 retirements of the 2009 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 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 the following page. The surviving plant at the beginning of each year from 2005 through 2014 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

SCHEDULE 3. PLANT EXPOSED TO RETIREMENT JANUARY 1
OF EACH YEAR 2005-2014
SUMMARIZED BY AGE INTERVAL

Experience Band 2005-2014										Placement Band 2000-2014		
Year Placed (1)	Exposures, Thousands of Dollars										Total at Beginning of Age Interval (12)	Age Interval (13)
	Annual Survivors at the Beginning of the Year											
	<u>2005</u> (2)	<u>2006</u> (3)	<u>2007</u> (4)	<u>2008</u> (5)	<u>2009</u> (6)	<u>2010</u> (7)	<u>2011</u> (8)	<u>2012</u> (9)	<u>2013</u> (10)	<u>2014</u> (11)		
1999	255	245	234	222	209	195	239	216	192	167	167	13½-14½
2000	279	268	256	243	228	212	194	174	153	131	323	12½-13½
2001	307	296	284	271	257	241	224	205	184	162	531	11½-12½
2002	338	330	321	311	300	289	276	262	242	226	823	10½-11½
2003	376	367	257	346	334	321	307	267	280	261	1,097	9½-10½
2004	420 ^a	416	407	397	386	374	361	347	332	316	1,503	8½-9½
2005		460 ^a	455	444	432	419	405	390	374	356	1,952	7½-8½
2006			510 ^a	504	492	479	464	448	431	412	2,463	6½-7½
2007				580 ^a	574	561	546	530	501	482	3,057	5½-6½
2008					660 ^a	653	639	623	628	609	3,789	4½-5½
2009						750 ^a	742	724	685	663	4,332	3½-4½
2010							850 ^a	841	821	799	4,955	2½-3½
2011								960 ^a	949	923	5,719	1½-2½
2012									1,080 ^a	1,069	6,579	½-1½
2013										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.

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 2006 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 2005-2014, 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 the following page, 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

SCHEDULE 4. ORIGINAL LIFE TABLE

CALCULATED BY THE RETIREMENT RATE METHOD

Experience Band 2005-2014

Placement Band 2000-2014

(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	<u>167</u>	<u>26</u>	0.1557	0.8443	42.24
					35.66
Total	<u>44,780</u>	<u>1,606</u>			

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.

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	=	$143,000 \div 3,789,000$	= 0.0377
Survivor Ratio	=	$1.000 - 0.0377$	= 0.9623
Percent surviving at age 5½	=	$(88.15) \times (0.9623)$	= 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. 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 Schedule 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

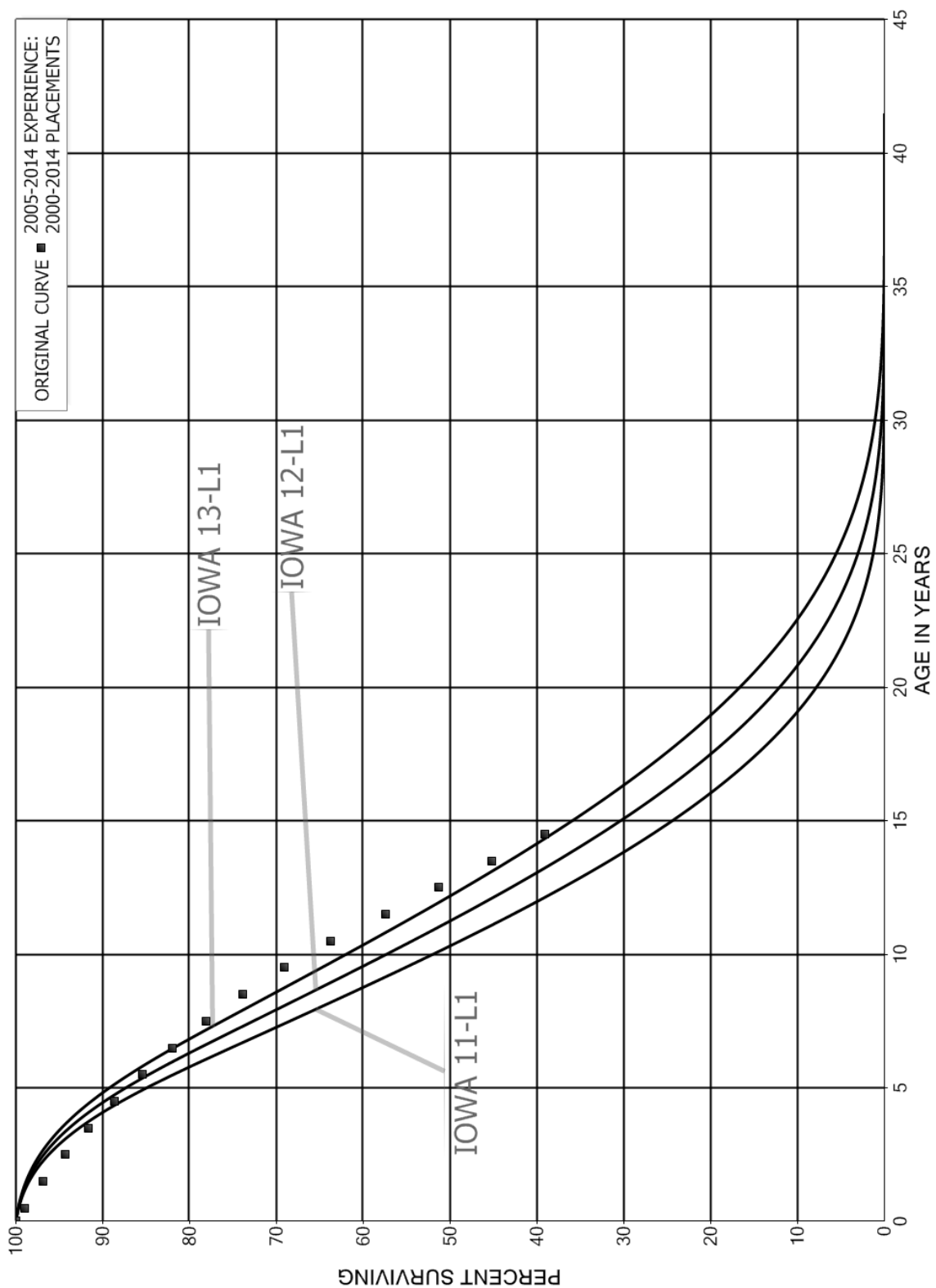


FIGURE 7. ILLUSTRATION OF THE MATCHING OF AN ORIGINAL SURVIVOR CURVE WITH AN S0 IOWA TYPE CURVE
ORIGINAL AND SMOOTH SURVIVOR CURVES

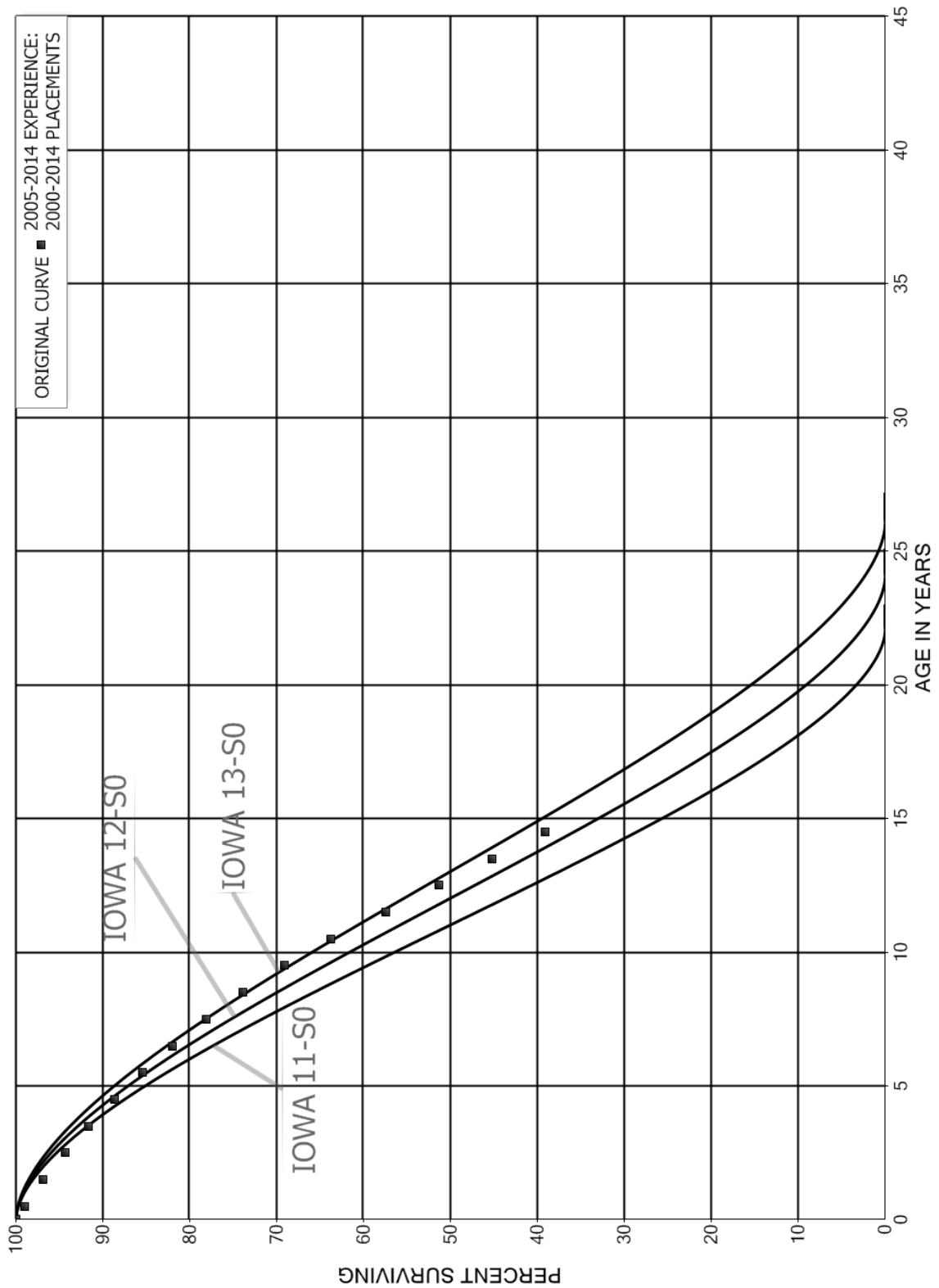


FIGURE 8. ILLUSTRATION OF THE MATCHING OF AN ORIGINAL SURVIVOR CURVE WITH AN R1 IOWA TYPE CURVE
ORIGINAL AND SMOOTH SURVIVOR CURVES

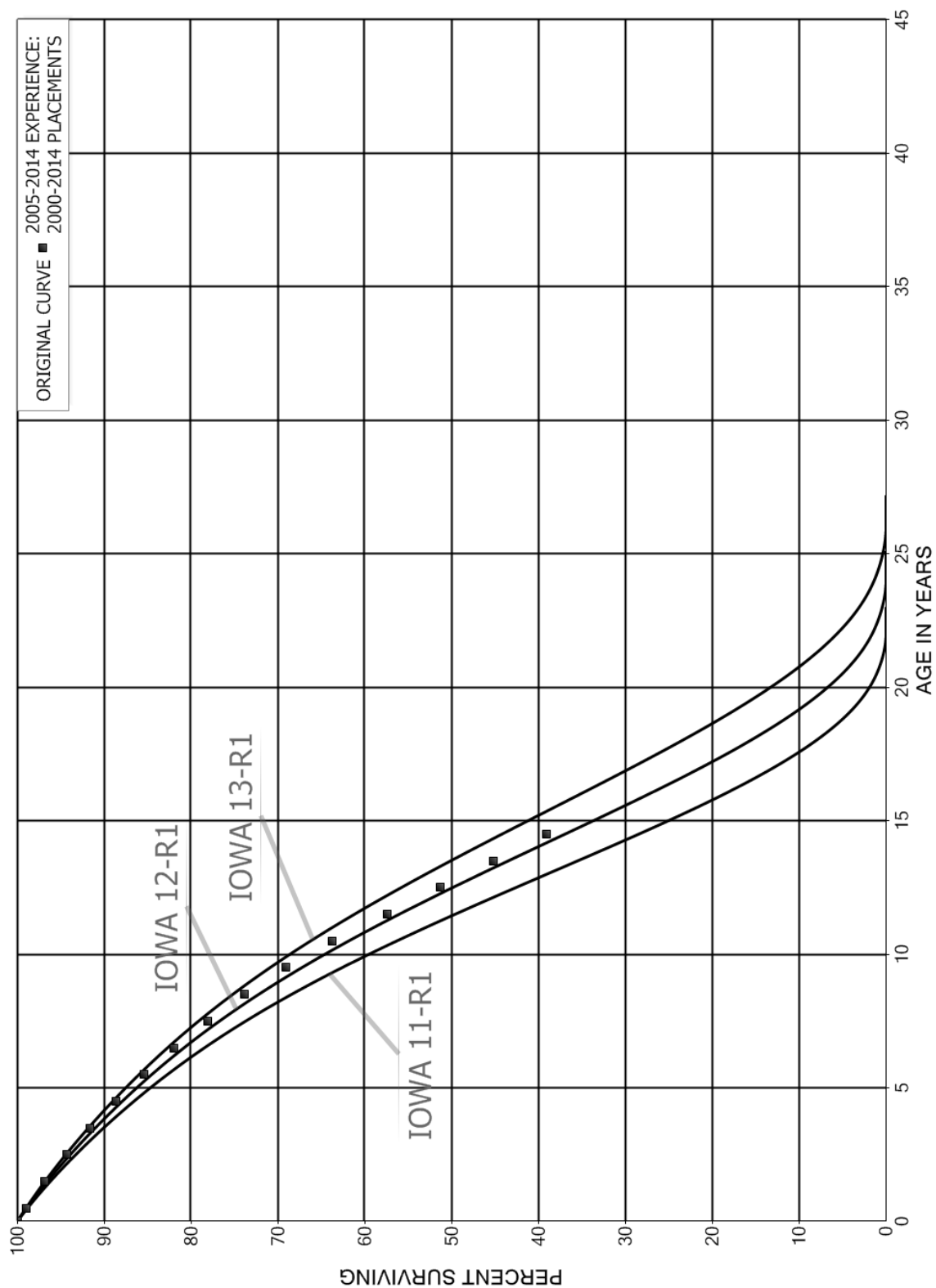
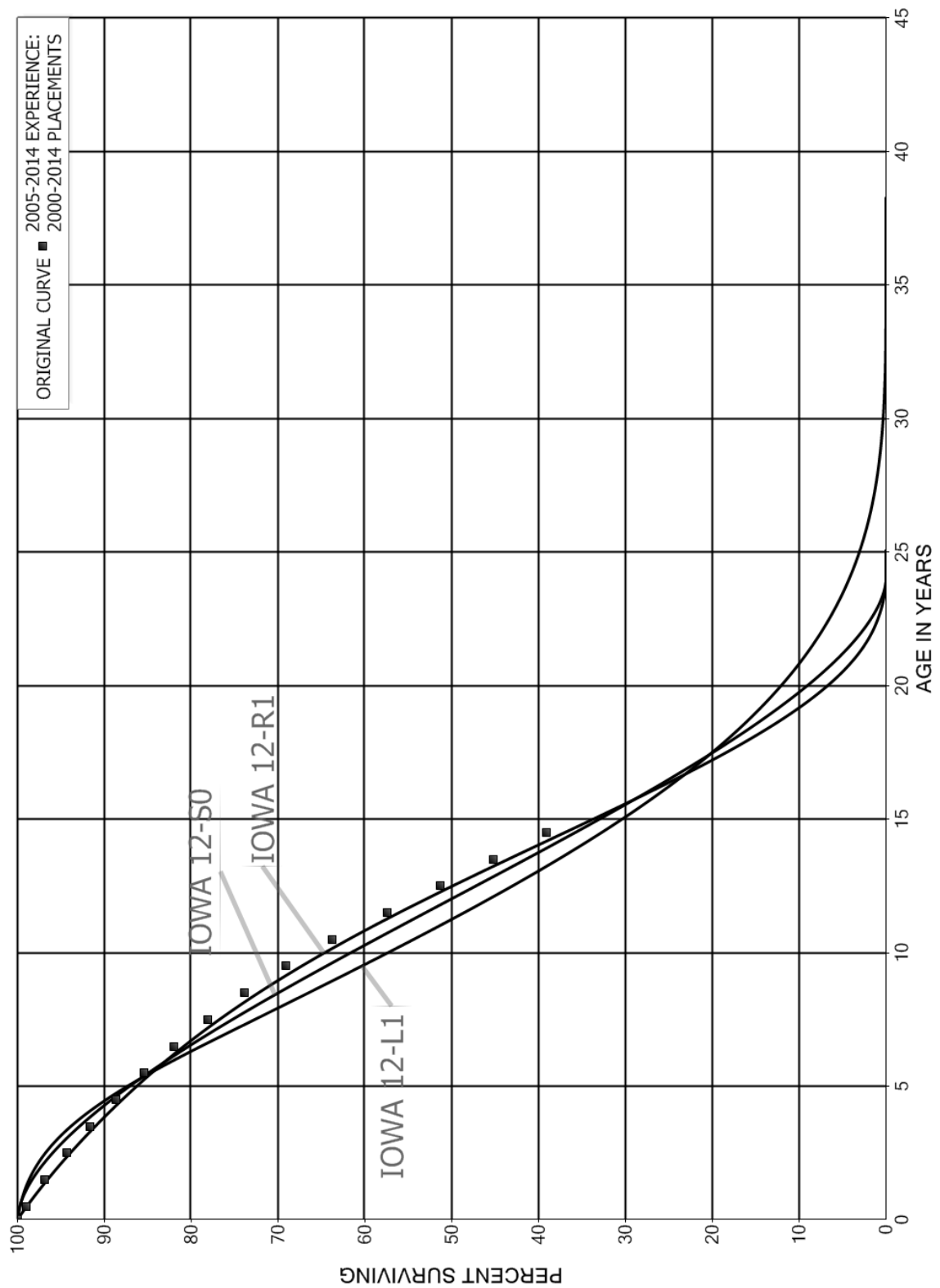


FIGURE 9. ILLUSTRATION OF THE MATCHING OF AN ORIGINAL SURVIVOR CURVE WITH AN L1, S0 AND R1 IOWA TYPE CURVE
ORIGINAL AND SMOOTH SURVIVOR CURVES





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