

**A PROPOSED NEW INDUSTRIAL VALUATION TABLE**

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**E**ARLY in 1960, The Honorable Thomas Thacher, Superintendent of Insurance for the State of New York, in his capacity as Chairman of the Industrial Table Study Subcommittee of the Life Insurance Committee of the National Association of Insurance Commissioners, appointed an Industry Advisory Committee of company actuaries to work with the technicians of the insurance departments represented on his subcommittee in the preparation of a modern mortality table to replace the 1941 Standard Industrial Mortality Table. The Advisory Committee submitted its report at the N.A.I.C. meeting in Philadelphia in June, 1961, and the purpose of this paper is to present the Industry Committee's recommendations to the Society of Actuaries for consideration by Society members prior to the next meeting of the N.A.I.C., at which a vote will be taken on whether or not to adopt the new table. Another purpose is to include in actuarial literature the several tables which the Committee developed in the process of its investigation.

**DEVELOPMENT OF BASIC DATA AND CONSIDERATION  
AS TO NEED FOR A NEW TABLE**

In order to develop information on which to base an opinion as to the need for a new Industrial Table and, also, to provide data from which to construct such a table, questionnaires (Exhibit 1) were sent to all life insurance companies which had at least \$50 million of Industrial life insurance in force on December 31, 1958. In deciding on the material which should be requested from the companies, the Committee was of the opinion that the period reviewed should be the most recent for which data would be available. Twenty-two of the companies circularized found it possible to submit data to the Committee and several other companies provided information about the character of their business. The Committee was interested in the proportions of nonwhite and female business and the degree of homogeneity to be found in the data submitted by the companies. It appeared that, in general, the companies either were able to separate white and nonwhite business or had such a small proportion of nonwhite business that the homogeneity of data would not be affected. The proportion of female business, both written and in force, was in the area of 50% for most companies reporting this information. The Committee then decided that the data submitted for white business were, in general, homogeneous and could be used for further studies.

In considering whether a new valuation table is needed at this time, there is the obvious fact that the present table has been in use for a long period of time and that it would be reasonable to expect a considerable improvement in Industrial mortality paralleling the Ordinary mortality experience which has resulted in the replacement of the Commissioners 1941 Standard Ordinary Table with the Commissioners 1958 Standard Ordinary Table. The data on which the 1941 Standard Industrial Mortality Table was based were derived from the experience of the Metropolitan Life Insurance Company during the years 1930 to 1939, on one particular plan of insurance. Table 1 is an indication of the improvement in Industrial mortality since the 1941 Standard Industrial Table was adopted and shows the over-all ratios of actual deaths, by amounts, of the twenty-two contributing companies for the period January 1, 1954 to December 31, 1958 to expected deaths on that table.

As a further demonstration of the improvement in Industrial mortality

TABLE 1  
RATIO OF ACTUAL DEATHS 1954-  
1958, BY AMOUNTS, TO EX-  
PECTED ON 1941 STANDARD  
INDUSTRIAL TABLE

Company No.	Ratio
1. ....	.416
2. ....	.675
3. ....	.423
4. ....	.364
5. ....	.454
6. ....	.412
7. ....	.414
8. ....	.481
9. ....	.384
10. ....	.326
11. ....	.339
12. ....	.423
13. ....	.373
14. ....	.542
15. ....	.417
16. ....	.317
17. ....	.489
18. ....	.360
19. ....	.409
20. ....	.455
21. ....	.403
22. ....	.345

over the last twenty-five years, Table 2 compares  $q_x$ 's from Table X, as shown in the report of the N.A.I.C. Committee To Study the Need for a New Mortality Table and Related Topics which was presented in 1939 as a Modern Industrial Experience Mortality Table, and the  $q_x$ 's from the basic table described later in this report.

## DEVELOPMENT OF BASIC TABLE

The Committee first considered following the method used in developing the 1941 Standard Industrial Table, namely, to use the experience of one of the larger companies and add sufficient margins to make it suitable for use by the industry generally. However, tests indicated that

TABLE 2

Age Next Birthday	Table X $q_x$	1954-1958 Basic Table $q_x$	Percentage Improvement
10.....	.00125	.00038	69.60%
20.....	.00261	.00100	61.69
30.....	.00433	.00130	69.98
40.....	.00773	.00285	63.13
50.....	.01589	.00755	52.49
60.....	.03233	.01781	44.91
70.....	.06868	.04068	40.77
80.....	.13887	.09137	34.20
90.....	.26266	.20105	23.46

the experience of no one company was sufficiently representative to be used for this purpose. It was decided, therefore, to prepare an aggregate table combining the data on white lives from all the companies whose submissions appeared to be sufficiently homogeneous for this purpose. Accordingly, a basic experience mortality table was developed which is designated for this purpose, "The 1954-1958 Industrial Experience Mortality Table," for which the data of eighteen companies were used. These companies are listed in alphabetical order in Exhibit 2.

The 1954-1958 Industrial Experience Mortality Table which is shown in Exhibit 4 is the aggregate experience of the eighteen companies from January 1, 1954 to December 31, 1958, excluding the first calendar years of issue, except for age one next birthday at issue. Because of variations in practice among companies relating to graded benefits at juvenile ages, the table is based on number of policies for ages 1-9 and, for ages 10 and over, upon amounts of insurance. The data used consisted of 17,004,693 policy years exposed and 18,689 policies terminated as death claims for ages 1-9, and \$86,356,443,374 of insurance years exposed and \$674,043,039 paid as death claims for ages 10 and over. This exposure is about

twice the juvenile data and five times the adult data used as a basis for the 1941 Standard Industrial Table.

From the combined data, raw calendar year death rates were calculated for ages 1-4 separately and in quinquennial age groups above that age centering on ages 7, 12, 17, etc., up to 72. Using the rates for the quinquennial age groups as pivotal values, they were graduated by Jenkins' Modified Osculatory Fifth Difference Formula, thus producing a smoothly graduated table of calendar year rates for ages 7 and over. These were adjusted to a policy year rate by interpolating halfway between the calendar year rates. Small adjustments were made in a few of the interpolated values to minimize third differences. For the very young ages, it was felt that, in addition to the halfway interpolation, a special adjustment was required to reflect the strongly upward concavity of the mortality curve at those ages. For ages 2 through 4, therefore, the interpolated rates were further adjusted by applying ratios of policy year to interpolated calendar year mortality rates from the experience of one large company in the years 1958 and 1959. For age 1, the same company's experience for 1958 and 1959 was used to obtain a ratio of first policy year to first calendar year mortality which was applied to the uninterpolated calculated value. The final rates for ages 5, 6 and 7 were then determined by grading the rates for ages 1 through 4 into rates for ages 8 and over by inspection of differences.

Since this table is based on Industrial data where the age at issue is taken as age next birthday, the material considered for age 1 includes issues for a full year of age, which differs from Ordinary mortality at age 0 where only six months of age would be included. After careful review, the Committee concluded that it was not necessary to make any special adjustment to the mortality for age one next birthday to adjust it back to age one day at issue as was done with the 1958 CSO Table. The rate of mortality shown for age one is, therefore, the actual combined experience rate with an appropriate adjustment to make it a policy year rate.

The data submitted for ages 75 and over were in considerably smaller volume and showed widely varying results by company. The Committee considered that the results from the combined data were unreliable at ages 75 and over, and it was decided, therefore, to use the 1949-1951 U.S. Life Table for Total Whites in order to extend the table to age 100. Pivotal values at quinquennial ages 7 through 72 after adjustment to a policy year basis, together with pivotal values at ages 77 through 97 on an age next birthday basis from the United States Life Tables, were graduated with the same Jenkins' Modified Osculatory Fifth Difference Formula. The rates produced in this manner for ages 67 through 99 were used in

developing the valuation table described later in this paper. The rates obtained for ages 98 and 99 were .33483 and .35483, respectively. It was decided that this basic table should terminate with a rate of unity at age 100 and that the valuation table should terminate with a rate of unity at age 99. For the older ages, the valuation table was calculated as being 125% of the basic table rates, with adjustments at the ages 93 to 99 to grade smoothly into unity at age 99. In order to obtain basic table rates consistent with the proposed valuation table at the very highest ages, the loading formula was applied in reverse. That is, for ages 93 and over, the Committee used 80% of the valuation table rates which produced a sequence of basic table values grading satisfactorily into unity at age 100.

#### THE PROPOSED VALUATION TABLE

The amount of loading to be added to any basic mortality table to produce a table suitable for valuation purposes is, of course, a matter of opinion since there can be no one entirely correct valuation table. In deciding upon the loading to be used, the Committee was guided by the feeling that there may be even greater variations in Industrial mortality experience by company than is the case with Ordinary mortality and that, undoubtedly, many of the companies with the highest mortality experience were unable to submit data. While the evidence which the Committee developed clearly shows a considerable improvement in Industrial mortality on standard lives over the past twenty-five years, there is a possibility that future Industrial mortality may not improve but actually become higher, since many companies are finding an increasing proportion of their Industrial business being written on nonwhite lives. While the data considered for the basic table were essentially white data, the Committee gave some consideration in their deliberations on loading as to what the level of mortality in a valuation table should be if it were to cover the experience of companies on all of their business, white and nonwhite combined. Column 6 of Table 3, which is based on the United States Life Tables 1949-1951, gives some indication of the increase in mortality which would be experienced if Industrial business which is initially all white and 50% female were changed so that half of it were nonwhite with the same proportion of females.

The Committee also considered data submitted by one large company to determine what allowance, if any, should be made for year to year fluctuations in mortality experience. Apparently, the only fluctuations of this character that were significant were those due to war deaths during World War II and the Korean War. It appeared that the excess deaths from war, including an allowance for civilian lives, with data for the latter

relating to experience in England and Wales, amounted to about 4.00 per thousand lives for the age group 15-19 and 20.00 per thousand lives in the age group 20-24. The Committee made no specific use of these data in determining the margins for the recommended valuation table since changing methods of warfare may produce future excess war mortality of a totally different character from that of the past.

In order to get as much information as possible as to the variation of mortality experience by companies, additional efforts were made by the

TABLE 3

AGE NEXT BIRTHDAY  (1)	U.S. LIFE TABLES 1949-1951 ( $q_x$ AT SELECTED AGES)				(6)*
	White Males (2)	White Females (3)	Nonwhite Males (4)	Nonwhite Females (5)	
7.....	.00074	.00053	.00108	.00090	1.28
12.....	.00062	.00039	.00089	.00057	1.22
17.....	.00120	.00059	.00192	.00150	1.46
22.....	.00169	.00076	.00344	.00244	1.70
27.....	.00168	.00092	.00420	.00318	1.92
32.....	.00190	.00122	.00515	.00413	1.99
37.....	.00269	.00173	.00687	.00582	1.94
42.....	.00431	.00263	.00940	.00826	1.77
47.....	.00701	.00406	.01394	.01216	1.68
52.....	.01106	.00609	.02058	.01707	1.60
57.....	.01731	.00931	.02953	.02387	1.50
62.....	.02569	.01468	.03855	.03098	1.36
67.....	.03707	.02255	.04765	.03865	1.22

\* Ratio of the  $q_x$ 's for nonwhite and white lives combined to white lives only, females being 50% in each case.

Committee in 1961 to get data from other smaller companies. Seven companies reported, and these companies are listed in Exhibit 3, together with the four companies who submitted data in response to the original request but whose data were not used in constructing the basic table. While the data which these companies were able to supply were not exactly in the form used by the Committee in developing the basic table, and in some cases did not cover the same period, this information was, nevertheless, of considerable help to the Committee in reaching a decision as to the amount of loading to be added to the basic table.

The Committee's recommended valuation table is shown in Exhibit 5, together with commutation columns at  $2\frac{3}{4}\%$ ,  $3\%$  and  $3\frac{1}{4}\%$  interest. The amount of loading and percentage loading used by the Committee, compared with the loading contained in other recent valuation tables, are shown in Tables 4 and 5 following.

**TABLE 4**  
**COMPARISON OF AMOUNT OF LOADING CONTAINED IN**  
**VALUATION TABLES OVER THEIR RESPECTIVE**  
**BASIC TABLES**

Age	1941 CSO	1958 CSO	1941 SI	Proposed Industrial Valuation Table
2.....	.00077	.00077	.00132	.00118
7.....	.00083	.00082	.00132	.00085
12.....	.00089	.00087	.00132	.00086
17.....	.00098	.00092	.00132	.00093
22.....	.00107	.00097	.00132	.00100
27.....	.00119	.00102	.00132	.00112
32.....	.00134	.00107	.00132	.00136
37.....	.00152	.00112	.00146	.00172
42.....	.00175	.00122	.00199	.00220
47.....	.00205	.00142	.00285	.00280
52.....	.00244	.00177	.00402	.00352
57.....	.00297	.00232	.00572	.00436
62.....	.00370	.00321	.00848	.00538
67.....	.00473	.00496	.01077	.00799
72.....	.00621	.00765	.01077	.01192
77.....	.00840	.01118	.01077	.01779
82.....	.01173	.01685	.01077	.02702
87.....	.01700	.02415	.01077	.04042
92.....	.02609	.03469	.01077	.05757

**TABLE 5**  
**COMPARISON OF LOADING PERCENTAGES CONTAINED**  
**IN VALUATION TABLES OVER THEIR RESPECTIVE**  
**BASIC TABLES**

Age	1941 CSO	1958 CSO	1941 SI	Proposed Industrial Valuation Table
2.....	22.8%	102.7%	19.0%	83.1%
7.....	50.6	186.4	75.1	180.9
12.....	86.4	223.1	111.4	195.5
17.....	77.2	131.4	67.1	117.7
22.....	70.4	109.0	44.3	91.7
27.....	62.0	105.2	36.0	95.7
32.....	51.9	90.7	29.5	93.8
37.....	41.9	66.7	25.0	81.1
42.....	33.1	41.4	25.0	62.9
47.....	26.1	28.7	25.0	48.9
52.....	20.6	21.6	25.0	39.1
57.....	16.5	17.5	25.0	31.5
62.....	13.5	15.2	25.0	25.5
67.....	11.3	15.0	21.4	25.0
72.....	9.8	15.0	14.4	25.0
77.....	8.8	15.0	9.6	25.0
82.....	8.2	15.0	6.4	25.0
87.....	8.1	15.0	4.4	25.0
92.....	8.8	15.0	3.1	25.0

Table 6 presents a measure of the improvement in Industrial mortality provided for in the proposed valuation table over that in the present table compared with the improvement provided for in the 1958 CSO Table over the 1941 CSO Table.

In the actual development of the valuation table, the Committee used a combination of several formulas. For ages over 63, where the data were considerably less reliable, it was felt that there should be a flat margin of 25%. A formula with second differences constant was used for ages 23-62.

TABLE 6

Age $x$	1000 $q_x$ 1941 CSO	1000 $q_x$ 1958 CSO	Percentage Reduction	1000 $q_x$ 1941 Std. Ind.	1000 $q_x$ Proposed Valuation Table	Percentage Reduction
	(1)	(2)	(3)	(4)	(5)	(6)
0.....	22.58	7.08	68.6%			
1.....	5.77	1.76	69.5	31.54	10.57	66.5%
2.....	4.14	1.52	63.3	8.25	2.60	68.5
3.....	3.38	1.46	56.8	5.20	1.72	66.9
4.....	2.99	1.40	53.2	4.10	1.54	62.4
7.....	2.47	1.26	49.0	3.07	1.32	57.0
12.....	1.92	1.26	34.4	2.50	1.30	48.0
17.....	2.25	1.62	28.0	3.28	1.72	47.6
22.....	2.59	1.86	28.2	4.29	2.09	51.3
27.....	3.11	1.99	36.0	4.97	2.29	53.9
32.....	3.92	2.25	42.6	5.78	2.81	51.4
37.....	5.15	2.80	45.6	7.29	3.84	47.3
42.....	7.03	4.17	40.7	9.93	5.70	42.6
47.....	9.91	6.36	35.8	14.27	8.53	40.2
52.....	14.30	9.96	30.3	20.08	12.53	37.6
57.....	21.00	15.54	26.0	28.61	18.20	36.4
62.....	31.18	24.31	22.0	42.38	26.45	37.6
67.....	46.56	38.04	18.3	61.20	39.93	34.8
72.....	69.66	58.65	15.8	85.52	59.61	30.3
77.....	103.99	85.70	17.6	123.16	88.95	27.8
82.....	154.16	129.17	16.2	178.03	135.09	24.1
87.....	225.63	185.13	17.9	256.30	202.11	21.1
92.....	323.64	265.93	17.8	363.28	287.93	20.7

For ages 9-22, a cubic formula was used, having the same slope at age 22 as the formula for ages 23 and over, and subject to a minimum of 85¢ per thousand. A more complex curve was used for ages 1-8 in order to fit better the peculiarities of the mortality curve at these ages.

In deciding on the level of loading to be included in the valuation table, tests were made not only with the all-white data submitted by the eighteen companies which were originally used, but also with combined white and nonwhite data where these were available, and the additional data from other smaller companies. For the ages from 1 to 74, the valuation table covers 99% of the mortality ratios, *i.e.*, those developed in



accordance with Exhibit 1, shown by the original eighteen companies on their white business. It covers about 70% of all the mortality ratios on combined white and nonwhite mortality, and it covers about 82% of the mortality ratios submitted by the eleven additional companies. Of the total of all mortality ratios available for review by the Committee, the valuation table covers about 87%. This is a slightly lower proportion than that covered by the 1958 CSO Table which was about 90%. However, the Committee believes adequate provision is made in the valuation table for variation by company since some of these ratios relate to business now considered substandard.

#### EFFECT OF PROPOSED VALUATION TABLE ON RESERVES

In general, the table produces aggregate reserves lower than those now required by the 1941 Standard Industrial Table. Using the premium paying business of one of the large companies with a total amount of insurance of almost \$1 $\frac{1}{4}$  billion as a model office, 2 $\frac{3}{4}$ % reserves using the Commissioners Reserve Method were 7.95% lower on the proposed table than on the 1941 Standard Industrial Table. When the calculations were made on the Net Level basis, the reduction was 7.96%. This amount of reduction with the adoption of the new table was confirmed by another rough model office approach applied to the data of one of the smaller contributing companies where the reduction also was practically 8%. The volume of reserves using the Commissioners Reserve Method on the 1941 Standard Industrial basis was about \$15 million for the small company and \$106 million for the larger company.

The new table produces the greatest percentage reductions in reserves at the younger ages and on the limited payment life forms. The reserves are slightly higher at older ages and on endowment forms than on the old table. Consequently, for any given company, the effect of the new table would depend upon the distribution of its own business. Table 7 compares net valuation premiums and mean reserves for illustrative plans and ages on the proposed table and on the 1941 Standard Industrial Table. It should be noted that for Industrial business, mean reserves are the mean of two terminal reserves since there is no deferred premium asset.

#### EXTENDED TERM INSURANCE

There are very scanty data available on mortality experience under extended term insurance of Industrial policies. However, there is a certain amount of expense involved in handling extended term insurance for which there is no provision if all values are exactly equivalent. If a special table were not available, a company could be in the situation of having to use a lower mortality table to determine the value of ex-

tended term insurance on Industrial policies than it would be using to determine similar values on Ordinary policies. Consequently, the Committee has recommended a special extended term table, which is shown in Exhibit 6 with commutation columns, for use on a permissive basis in calculating extended term insurance nonforfeiture values. The loading used in developing this table is the same as was used for the Commissioners Extended Term Table, namely, .75 deaths per thousand

TABLE 7  
2½% NET PREMIUMS AND MEAN RESERVE FACTORS PER \$1,000  
TWENTY YEAR PAYMENT LIFE

	PROPOSED INDUSTRIAL VALUATION TABLE		1941 STANDARD INDUSTRIAL TABLE	
	Net Level Prem. Method	Comm. Res. Val. Method	Net Level Prem. Method	Comm. Res. Val. Method
<i>Age 10</i>				
1st Year Net Premium . . .	14.87	1.20	18.38	2.53
Renewal Net Premium . . .	14.87	15.82	18.38	19.49
Mean Reserve 1 . . . . .	7.03	0	8.15	0
2 . . . . .	21.27	7.48	24.75	8.80
3 . . . . .	35.90	22.67	41.91	26.63
4 . . . . .	50.91	38.27	59.57	44.98
5 . . . . .	66.28	54.25	77.69	63.79
10 . . . . .	148.85	140.14	174.29	164.21
15 . . . . .	242.59	237.69	282.57	276.88
19 . . . . .	327.49	326.07	380.40	378.75
<i>Age 30</i>				
1st Year Net Premium . . .	23.89	2.48	28.55	5.25
Renewal Net Premium . . .	23.89	25.40	28.55	30.25
Mean Reserve 1 . . . . .	10.99	0	12.02	0
2 . . . . .	33.28	11.74	36.38	12.80
3 . . . . .	56.16	35.51	61.39	38.76
4 . . . . .	79.60	59.87	87.03	65.39
5 . . . . .	103.60	84.83	113.31	92.69
10 . . . . .	232.22	218.61	254.57	239.54
15 . . . . .	375.94	368.26	413.49	404.94
19 . . . . .	503.50	501.26	555.70	553.19
<i>Age 50</i>				
1st Year Net Premium . . .	40.98	10.48	49.05	17.08
Renewal Net Premium . . .	40.98	43.41	49.05	51.83
Mean Reserve 1 . . . . .	15.85	0	16.78	0
2 . . . . .	47.74	16.74	50.41	17.64
3 . . . . .	80.06	50.34	84.42	52.99
4 . . . . .	112.82	84.42	118.83	88.77
5 . . . . .	146.06	118.98	153.65	124.98
10 . . . . .	320.40	300.48	334.76	313.48
15 . . . . .	513.57	501.94	532.50	519.75
19 . . . . .	690.49	686.92	720.17	716.12

TABLE 7—Continued  
 2½% NET PREMIUMS AND MEAN RESERVE FACTORS PER \$1,000  
 LIFE PAID-UP AT AGE 75

	PROPOSED INDUSTRIAL VALUATION TABLE		1941 STANDARD INDUSTRIAL TABLE	
	Net Level Prem. Method	Comm. Res. Val. Method	Net Level Prem. Method	Comm. Res. Val. Method
<i>Age 10</i>				
1st Year Net Premium...	8.10	1.20	10.49	2.53
Renewal Net Premium...	8.10	8.36	10.49	10.80
Mean Reserve 1.....	3.62	0	4.09	0
2.....	10.81	3.60	12.45	4.30
3.....	18.17	10.95	21.12	13.03
4.....	25.70	18.54	30.03	22.01
5.....	33.38	26.27	39.12	31.18
10.....	73.91	67.12	86.15	78.61
15.....	118.88	112.46	136.08	128.97
19.....	159.20	153.09	179.70	172.96
<i>Age 30</i>				
1st Year Net Premium...	15.72	2.48	19.76	5.25
Renewal Net Premium...	15.72	16.32	19.76	20.48
Mean Reserve 1.....	6.80	0	7.58	0
2.....	20.57	7.07	22.74	7.79
3.....	34.64	21.35	38.21	23.51
4.....	49.00	35.92	53.98	39.54
5.....	63.65	50.78	70.05	55.86
10.....	140.72	129.00	154.41	141.56
15.....	223.05	212.58	243.83	232.41
19.....	291.84	282.41	317.17	306.94
<i>Age 50</i>				
1st Year Net Premium...	36.87	10.48	45.16	17.08
Renewal Net Premium...	36.87	38.75	45.16	47.39
Mean Reserve 1.....	13.78	0	14.68	0
2.....	41.31	14.33	44.12	15.26
3.....	69.10	42.99	73.75	45.84
4.....	97.13	71.91	103.55	76.61
5.....	125.42	101.09	133.51	107.53
10.....	270.93	251.28	285.05	264.06
15.....	424.75	410.22	438.08	422.31
19.....	555.89	545.96	567.35	556.28

TABLE 7—Continued  
 2½% NET PREMIUMS AND MEAN RESERVE FACTORS PER \$1,000  
 TWENTY YEAR ENDOWMENT

	PROPOSED INDUSTRIAL VALUATION TABLE		1941 STANDARD INDUSTRIAL TABLE	
	Net Level Prem. Method	Comm. Res. Val. Method	Net Level Prem. Method	Comm. Res. Val. Method
<i>Age 10</i>				
1st Year Net Premium . . .	38.03	24.36	38.90	23.05
Renewal Net Premium . . .	38.03	38.98	38.90	40.01
Mean Reserve 1 . . . . .	19.00	11.92	18.75	10.61
2 . . . . .	57.43	43.61	56.82	40.88
3 . . . . .	96.92	83.69	96.09	80.81
4 . . . . .	137.52	124.88	136.52	121.92
5 . . . . .	179.23	167.20	178.10	164.20
10 . . . . .	405.67	396.96	403.66	393.58
15 . . . . .	666.27	661.38	663.70	658.01
19 . . . . .	903.76	902.34	902.55	900.90
<i>Age 30</i>				
1st Year Net Premium . . .	39.27	17.86	41.20	17.90
Renewal Net Premium . . .	39.27	40.78	41.20	42.90
Mean Reserve 1 . . . . .	18.94	7.94	18.61	6.55
2 . . . . .	57.33	35.78	56.29	32.68
3 . . . . .	96.78	76.13	95.04	72.40
4 . . . . .	137.31	117.58	134.88	113.24
5 . . . . .	178.93	160.16	175.86	155.24
10 . . . . .	404.63	391.01	399.06	384.03
15 . . . . .	663.92	656.24	658.07	649.52
19 . . . . .	902.13	899.90	899.47	896.96

or 30%, whichever is greater, added to the recommended valuation table. The resultant rates for the last five years of age were modified by formula to grade to a rate of unity at age 99.

Table 8 compares minimum values for \$100 of insurance on representative plans and ages, using the proposed valuation table for cash values and the proposed extended term table for extended insurance, with the values permitted under the present statutes, namely, the 1941 Standard Industrial Table for cash values and 130% of that table for extended term insurance.

#### CONSIDERATION OF A SUBSTANDARD TABLE

The Committee's recommendation for a valuation table relates to Industrial business issued on a standard basis. For substandard Industrial business, the Committee assumed that present statutory language would be continued so that, where business is issued on a substandard basis, any

TABLE 8

AGE	DURATION	PROPOSED IND. VALUE TABLE @3% MINIMUM VALUES PER \$100		1941 STANDARD INDUSTRIAL TABLE @3% MINIMUM VALUES PER \$100			
		Cash Value	Extended*		Cash Value	Extended†	
			Yrs.	Days		Yrs.	Days
20 Year Payment Whole Life							
10.....	5	\$ 4.43	20	302	\$ 5.54	13	204
	10	12.70	37	99	15.27	29	92
	15	22.22	44	60	26.32	37	119
	20	33.28	Paid-up		39.15	Paid-up	
30.....	5	8.15	14	162	9.01	9	356
	10	21.24	22	271	23.49	17	208
	15	36.02	27	101	39.97	22	44
	20	52.83	Paid-up		58.91	Paid-up	
50.....	5	12.13	5	295	12.93	4	30
	10	30.23	9	352	31.76	7	44
	15	50.55	12	206	52.60	9	184
	20	74.81	Paid-up		78.91	Paid-up	
Whole Life Paid-up at Age 75							
10.....	5	\$ 1.00	4	169	\$ 1.51	3	354
	10	4.93	19	207	6.11	12	149
	15	9.35	25	251	11.04	18	211
	20	14.42	27	216	16.56	21	69
30.....	5	3.95	8	38	4.42	5	58
	10	11.67	14	115	12.93	10	140
	15	19.97	16	245	22.00	12	225
	20	28.73	17	99	31.37	13	94
50.....	5	9.77	4	266	10.60	3	131
	10	24.79	8	78	26.25	5	299
	15	40.81	9	282	42.16	7	46
	20	58.30	10	319	59.61	8	100
		Cash Value	Extended*		Cash Value	Extended†	
			Yrs.	P.E.		Yrs.	P.E.
20 Year Endowment							
10.....	5	\$ 16.58	15	\$21.70	\$ 16.40	15	\$17.38
	10	40.21	10	52.24	39.95	10	49.94
	15	67.75	5	78.12	67.47	5	77.29
	20	100.00	Policy Matures		100.00	Policy Matures	
30.....	5	16.39	15	13.72	15.95	15	2.85
	10	39.98	10	47.95	39.33	10	42.44
	15	67.44	5	76.59	66.81	5	74.65
	20	100.00	Policy Matures		100.00	Policy Matures	

\* Proposed Industrial Extended Term Table.

† 130% 1941 SI Table.

other valuation table may be used with the approval of the state authorities. If this were done, the Committee felt that there would be no need to produce a substandard Industrial valuation table.

#### ACKNOWLEDGMENTS

The author wishes to acknowledge his debt to the other members of the Industry Advisory Committee—Messrs. Eugene W. Bates, John M. Bragg, George E. Immerwahr, William K. Nicol, Russell L. Wagner and the late V. W. Pfeiffer—not only for their labors on the Committee but for their suggestions and review of the report and this paper. A considerable volume of calculations was handled by the electronic calculating machines of two companies which, of course, made possible the completion of a rather large amount of work in a comparatively short period of time.

## EXHIBIT 1

### INDUSTRY ADVISORY COMMITTEE ON PREPARATION OF NEW INDUSTRIAL MORTALITY TABLE

#### DEFINITIONS AND NOTES

1. Where possible, the committee is desirous of having data as on the attached questionnaire, separately for Weekly Premium Industrial, Monthly Premium Industrial, white business and nonwhite business. Please submit separate pages for as much of this detail as possible. If it is not possible to make any separations, please submit what data you have with proper identification.
2. All experience in the first calendar year of issue should be omitted except for age 1 next birthday at issue.
3. Please, if possible, avoid combining standard and substandard data but, if impossible, add a note as to estimate of relative proportions.
4. Exclude any extended insurance and reduced paid up insurance granted as nonforfeiture benefits from both exposures and claims.
5. For the juvenile ages, because of the possibility of graded benefits, please be sure that the exposures and claims are consistent.
6. The data requested should be obtainable from valuation records. For companies which use an attained age valuation method, both claims and exposures are easily developed. For companies using a group valuation method, probably the easiest way to produce the required data would be to tabulate their business in force at the end of each year from December 31, 1953 to December 31, 1958, inclusive, according to attained age next birthday on that date, excluding the first policy year for all except age 1. The attained age will be the attained age next birthday at issue plus the valuation year minus the year of issue. The exposures, for example, for the age group 35-39 would be expressed as follows:

$$\frac{1}{2} \{ (S_{34-38}^{53} + S_{35-39}^{54}) + (S_{34-38}^{54} + S_{35-39}^{55}) + 3 \text{ more similar terms} \\ + D_{35-39}^{54} + D_{35-39} + 3 \text{ more similar terms} \}$$

where  $S$  = valuation in force at end of year indicated

and  $D$  = deaths for the year indicated.

The attained age next birthday for deaths is the age next birthday at issue plus the calendar year of death minus the calendar year of issue. Rejected or compromised claims should, of course, be excluded, if possible, both from the claims and the valuation in force.

**EXHIBIT 1—Continued**

Mortality experience under Industrial insurance policies from  
January 1, 1954 to December 31, 1958.

Attained Ages Next Birthday	White Lives—Weekly Premium			
	By Number of Policies		By Amounts of Insurance	
	Exposures	Claims	Exposures	Claims
1				
2				
3				
4				
5- 9				
10-14				
15-19				
20-24				
25-29				
30-34				
35-39				
40-44				
45-49				
50-54				
55-59				
60-64				
65-69				
70-74				
75-79				
80-84				
85-89				
90-94				
95-99				
Total				

If you are unable to separate experience between white and non-white, what proportion of your business do you estimate to be nonwhite?

What proportion of your new issues do you estimate to be nonwhite?

What proportion of your business in force do you estimate to be female?

What proportion of your new issues do you estimate to be female?

.....Company  
By.....



## EXHIBIT 2

### LIST OF COMPANIES CONTRIBUTING DATA FOR 1954-1958 BASIC INDUSTRIAL MORTALITY TABLE

American National Insurance Company  
The Colonial Life Insurance Company of America  
Commonwealth Life Insurance Company  
Home Life Insurance Company of America  
Home Security Life Insurance Company  
Interstate Life and Accident Insurance Company  
John Hancock Mutual Life Insurance Company  
Life & Casualty Insurance Company of Tennessee  
Life Insurance Company of Georgia  
Metropolitan Life Insurance Company  
Monumental Life Insurance Company  
The National Life and Accident Insurance Company  
The Prudential Insurance Company of America  
Southern Life and Health Insurance Company  
Southland Life Insurance Company  
Sun Life Insurance Company of America  
Washington National Insurance Company  
The Western and Southern Life Insurance Company

## EXHIBIT 3

### LIST OF ADDITIONAL COMPANIES CONTRIBUTING DATA FOR CONSIDERATION IN DETERMINING PROPOSED INDUSTRIAL VALUATION TABLE

Baltimore Life Insurance Company  
Delta Life Insurance Company  
Family Fund Life Insurance Company  
Independent Life and Accident Insurance Company  
Liberty Life Insurance Company  
Liberty National Life Insurance Company  
Mutual Savings Life Insurance Company  
National Burial Life Insurance Company  
Pilot Life Insurance Company  
Southern Life Insurance Company  
State Capital Life Insurance Company

EXHIBIT 4

THE 1954-58 INDUSTRIAL EXPERIENCE MORTALITY TABLE

Age Next Birth-day $x$	$l_x$	$d_x$	1000 $q_x$	Age Next Birth-day $x$	$l_x$	$d_x$	1000 $q_x$
1	1,000,000	5,110	5.11	51	904,480	7,462	8.25
2	994,890	1,413	1.42	52	897,018	8,082	9.01
3	993,477	894	.90	53	888,936	8,738	9.83
4	992,583	744	.75	54	880,198	9,436	10.72
5	991,839	625	.63	55	870,762	10,171	11.68
6	991,214	535	.54	56	860,591	10,947	12.72
7	990,679	466	.47	57	849,644	11,759	13.84
8	990,213	416	.42	58	837,885	12,619	15.06
9	989,797	386	.39	59	825,266	13,518	16.38
10	989,411	376	.38	60	811,748	14,457	17.81
11	989,035	396	.40	61	797,291	15,444	19.37
12	988,639	435	.44	62	781,847	16,474	21.07
13	988,204	484	.49	63	765,373	17,542	22.92
14	987,720	543	.55	64	747,831	18,643	24.93
15	987,177	622	.63	65	729,188	19,761	27.10
16	986,555	700	.71	66	709,427	20,893	29.45
17	985,855	779	.79	67	688,534	21,992	31.94
18	985,076	857	.87	68	666,542	23,089	34.64
19	984,219	925	.94	69	643,453	24,162	37.55
20	983,294	983	1.00	70	619,291	25,193	40.68
21	982,311	1,031	1.05	71	594,098	26,176	44.06
22	981,280	1,070	1.09	72	567,922	27,084	47.69
23	980,210	1,088	1.11	73	540,838	27,907	51.60
24	979,122	1,097	1.12	74	512,931	28,647	55.85
25	978,025	1,105	1.13	75	484,284	29,294	60.49
26	976,920	1,123	1.15	76	454,990	29,834	65.57
27	975,797	1,142	1.17	77	425,156	30,254	71.16
28	974,655	1,170	1.20	78	394,902	30,522	77.29
29	973,485	1,207	1.24	79	364,380	30,615	84.02
30	972,278	1,264	1.30	80	333,765	30,496	91.37
31	971,014	1,330	1.37	81	303,269	30,136	99.37
32	969,684	1,406	1.45	82	273,133	29,517	108.07
33	968,278	1,491	1.54	83	243,616	28,620	117.48
34	966,787	1,595	1.65	84	214,996	27,429	127.58
35	965,192	1,718	1.78	85	187,567	25,948	138.34
36	963,474	1,869	1.94	86	161,619	24,198	149.72
37	961,605	2,039	2.12	87	137,421	22,218	161.68
38	959,566	2,236	2.33	88	115,203	20,071	174.22
39	957,330	2,470	2.58	89	95,132	17,821	187.33
40	954,860	2,721	2.85	90	77,311	15,543	201.05
41	952,139	3,009	3.16	91	61,768	13,304	215.39
42	949,130	3,322	3.50	92	48,464	11,164	230.36
43	945,808	3,660	3.87	93	37,300	9,224	247.29
44	942,148	4,032	4.28	94	28,076	7,657	272.73
45	938,116	4,437	4.73	95	20,419	6,420	314.39
46	933,679	4,864	5.21	96	13,999	5,322	380.20
47	928,815	5,322	5.73	97	8,677	4,146	477.76
48	923,493	5,809	6.29	98	4,531	2,787	615.20
49	917,684	6,323	6.89	99	1,744	1,395	800.00
50	911,361	6,881	7.55	100	349	349	1,000.00

EXHIBIT 4—Continued

THE 1954-58 INDUSTRIAL EXPERIENCE MORTALITY TABLE  
COMMUTATION COLUMNS 2½% INTEREST

Age Next Birthday <i>x</i>	<i>D<sub>x</sub></i>	<i>N<sub>x</sub></i>	<i>C<sub>x</sub></i>	<i>M<sub>x</sub></i>
1	973,236.010	30,367,872.479	4,840.1324	160,470.5664
2	942,348.198	29,394,636.469	1,302.5568	155,630.4340
3	915,824.643	28,452,288.271	802.0662	154,327.8772
4	890,511.455	27,536,463.628	649.6266	153,525.8110
5	866,028.189	26,645,952.173	531.1156	152,876.1844
6	842,318.703	25,779,923.984	442.4671	152,345.0688
7	819,332.427	24,937,605.281	375.0864	151,902.6017
8	797,028.735	24,118,272.854	325.8794	151,527.5153
9	775,371.187	23,321,244.119	294.2856	151,201.6359
10	754,324.874	22,545,872.932	278.9894	150,907.3503
11	733,857.141	21,791,548.058	285.9652	150,628.3609
12	713,930.230	21,057,690.917	305.7211	150,342.3957
13	694,516.888	20,343,760.687	331.0547	150,036.6746
14	675,597.790	19,649,243.799	361.4701	149,705.6199
15	657,154.627	18,973,646.009	402.9778	149,344.1498
16	639,163.569	18,316,491.382	441.3742	148,941.1720
17	621,615.627	17,677,327.813	478.0403	148,499.7978
18	604,500.672	17,055,712.186	511.8304	148,021.7575
19	587,809.992	16,451,211.514	537.6568	147,509.9271
20	571,540.194	15,863,401.522	556.0772	146,972.2703
21	555,687.421	15,291,861.328	567.6209	146,416.1931
22	540,247.387	14,736,173.907	573.3260	145,848.5722
23	525,214.885	14,195,926.520	567.3682	145,275.2462
24	510,590.671	13,670,711.635	556.7508	144,707.8780
25	496,368.477	13,160,120.964	545.8014	144,151.1272
26	482,537.874	12,663,752.487	539.8466	143,605.3258
27	469,083.388	12,181,214.613	534.2873	143,065.4792
28	455,994.558	11,712,131.225	532.7369	142,531.1919
29	443,257.587	11,256,136.667	534.8751	141,998.4550
30	430,859.370	10,812,879.080	545.1429	141,463.5799
31	418,782.711	10,382,019.710	558.2556	140,918.4370
32	407,016.159	9,963,236.999	574.3610	140,360.1814
33	395,548.422	9,556,220.840	592.7825	139,785.8204
34	384,369.185	9,160,672.418	617.1584	139,193.0379
35	373,464.774	8,776,303.233	646.9597	138,575.8795
36	362,822.406	8,402,838.459	684.9858	137,928.9198
37	352,426.845	8,040,016.053	727.2901	137,243.9340
38	342,267.207	7,687,589.208	776.2121	136,516.6439
39	332,330.558	7,345,322.001	834.4950	135,740.4318
40	322,601.571	7,012,991.443	894.6919	134,905.9368
41	313,072.774	6,690,389.872	962.9091	134,011.2449
42	303,730.788	6,377,317.098	1,034.6201	133,048.3358
43	294,567.120	6,073,586.310	1,109.3805	132,013.7157
44	285,573.948	5,779,019.190	1,189.4280	130,904.3352
45	276,741.422	5,493,445.242	1,273.8703	129,714.9072
46	268,060.847	5,216,703.820	1,359.0879	128,441.0369
47	259,527.381	4,948,642.973	1,447.2615	127,081.9490
48	251,134.131	4,689,115.592	1,537.4170	125,634.6875
49	242,875.363	4,437,981.461	1,628.6646	124,097.2705
50	234,746.385	4,195,106.098	1,724.9567	122,468.6059

EXHIBIT 4—Continued

THE 1954-58 INDUSTRIAL EXPERIENCE MORTALITY TABLE  
COMMUTATION COLUMNS 2½% INTEREST

Age Next Birthday <i>x</i>	<i>D<sub>x</sub></i>	<i>N<sub>x</sub></i>	<i>C<sub>x</sub></i>	<i>M<sub>x</sub></i>
51.....	226,738.678	3,960,359.713	1,820.5393	120,743.6492
52.....	218,849.707	3,733,621.035	1,919.0303	118,923.1099
53.....	211,073.385	3,514,771.328	2,019.2644	117,004.0796
54.....	203,404.955	3,303,697.943	2,122.2046	114,984.8152
55.....	195,838.822	3,100,292.988	2,226.2870	112,862.6106
56.....	188,371.107	2,904,454.166	2,332.0120	110,636.3236
57.....	180,997.532	2,716,083.059	2,437.9468	108,304.3116
58.....	173,715.369	2,535,085.527	2,546.2259	105,866.3648
59.....	166,519.827	2,361,370.158	2,654.6215	103,320.1389
60.....	159,408.470	2,194,850.331	2,763.0358	100,665.5174
61.....	152,379.028	2,035,441.861	2,872.6737	97,902.4816
62.....	145,428.083	1,883,062.833	2,982.2479	95,029.8079
63.....	138,553.599	1,737,634.750	3,090.5940	92,047.5600
64.....	131,754.758	1,599,081.151	3,196.6627	88,956.9660
65.....	125,031.812	1,467,326.393	3,297.6769	85,760.3033
66.....	118,387.785	1,342,294.581	3,393.2680	82,462.6264
67.....	111,825.988	1,223,906.796	3,476.1639	79,069.3584
68.....	105,356.914	1,112,080.808	3,551.8843	75,593.1945
69.....	98,985.259	1,006,723.894	3,617.4684	72,041.3102
70.....	92,718.550	907,738.635	3,670.8777	68,423.8418
71.....	86,566.154	815,020.085	3,712.0300	64,752.9641
72.....	80,537.268	728,453.931	3,737.9989	61,040.9341
73.....	74,643.770	647,916.663	3,748.5015	57,302.9352
74.....	68,897.504	573,272.893	3,744.9141	53,554.4337
75.....	63,308.617	504,375.389	3,727.0014	49,809.5196
76.....	57,887.225	441,066.772	3,694.1160	46,082.5182
77.....	52,643.816	383,179.547	3,645.8603	42,388.4022
78.....	47,588.997	330,535.731	3,579.7144	38,742.5419
79.....	42,735.611	282,946.734	3,494.5223	35,162.8275
80.....	38,097.313	240,211.123	3,387.7754	31,668.3052
81.....	33,689.902	202,113.810	3,258.1832	28,280.5298
82.....	29,530.042	168,423.908	3,105.8486	25,022.3466
83.....	25,633.852	138,893.866	2,930.8653	21,916.4980
84.....	22,016.922	113,260.014	2,733.7222	18,985.6327
85.....	18,693.940	91,243.092	2,516.9029	16,251.9105
86.....	15,676.712	72,549.152	2,284.3372	13,735.0076
87.....	12,972.804	56,872.440	2,041.2861	11,450.6704
88.....	10,584.314	43,899.636	1,794.6761	9,409.3843
89.....	8,506.359	33,315.322	1,550.8412	7,614.7082
90.....	6,727.854	24,808.963	1,316.4012	6,063.8670
91.....	5,231.388	18,081.109	1,096.6141	4,747.4658
92.....	3,994.761	12,849.721	895.5907	3,650.8517
93.....	2,992.255	8,854.960	720.1571	2,755.2610
94.....	2,192.013	5,862.705	581.8148	2,035.1039
95.....	1,551.531	3,670.692	474.7657	1,453.2891
96.....	1,035.241	2,119.161	383.0340	978.5234
97.....	624.499	1,083.920	290.4089	595.4894
98.....	317.376	459.421	189.9922	305.0805
99.....	118.890	142.045	92.5531	115.0883
100.....	23.155	23.155	22.5352	22.5352

EXHIBIT 4—Continued

THE 1954-58 INDUSTRIAL EXPERIENCE MORTALITY TABLE  
COMMUTATION COLUMNS 3% INTEREST

Age Next Birthday x	D <sub>x</sub>	N <sub>x</sub>	C <sub>x</sub>	M <sub>x</sub>
1	970,873.786	28,583,343.586	4,816.6651	138,349.2156
2	937,779.244	27,612,469.800	1,293.0952	133,532.5505
3	909,172.190	26,674,690.556	794.3074	132,239.4553
4	881,897.139	25,765,518.366	641.7809	131,445.1479
5	855,569.034	24,883,621.227	523.4277	130,803.3670
6	830,126.120	24,028,052.193	435.0040	130,279.9393
7	805,512.685	23,197,926.073	367.8647	129,844.9353
8	781,683.286	22,392,413.388	318.8294	129,477.0706
9	758,596.982	21,610,730.102	287.2203	129,158.2412
10	736,214.704	20,852,133.120	271.6304	128,871.0209
11	714,499.927	20,115,918.416	277.7464	128,599.3905
12	693,411.503	19,401,418.489	296.2138	128,321.6441
13	672,918.838	18,708,006.986	319.9810	128,025.4303
14	652,999.279	18,035,088.148	348.5310	127,705.4493
15	633,631.352	17,382,088.869	387.6098	127,356.9183
16	614,788.460	16,748,457.517	423.5115	126,969.3085
17	596,458.488	16,133,669.057	457.5804	126,545.7970
18	578,628.330	15,537,210.569	488.7351	126,088.2166
19	561,286.343	14,958,582.239	512.1501	125,599.4815
20	544,426.047	14,397,295.896	528.4109	125,087.3314
21	528,040.567	13,852,869.849	538.0712	124,558.9205
22	512,122.673	13,324,829.282	542.1602	124,020.8493
23	496,664.319	12,812,706.609	535.2239	123,478.6891
24	481,663.144	12,316,042.290	523.9333	122,943.4652
25	467,110.187	11,834,379.146	512.3827	122,419.5319
26	452,992.653	11,367,268.959	505.5623	121,907.1492
27	439,293.130	10,914,276.306	499.1417	121,401.5869
28	425,999.043	10,474,983.176	496.4852	120,902.4452
29	413,094.818	10,048,984.133	497.2680	120,405.9600
30	400,565.662	9,635,889.315	505.5838	119,908.6920
31	388,393.118	9,235,323.653	516.4883	119,403.1082
32	376,564.209	8,846,930.535	530.0989	118,886.6199
33	365,066.220	8,470,366.326	545.7729	118,356.5210
34	353,887.450	8,105,300.106	566.8365	117,810.7481
35	343,013.212	7,751,412.656	592.7657	117,243.9116
36	332,429.771	7,408,399.444	626.0831	116,651.1459
37	322,121.267	7,075,969.673	663.1361	116,025.0628
38	312,075.958	6,753,848.406	706.0249	115,361.9267
39	302,280.342	6,441,772.448	757.1954	114,655.9018
40	292,718.865	6,139,492.106	809.8458	113,898.7064
41	283,383.227	5,846,773.241	869.4783	113,088.8606
42	274,259.868	5,563,390.014	931.9636	112,219.3823
43	265,339.753	5,289,130.146	996.8807	111,287.4187
44	256,614.530	5,023,790.393	1,066.2165	110,290.5380
45	248,074.104	4,767,775.863	1,139.1400	109,224.3215
46	239,709.505	4,519,101.759	1,212.3946	108,085.1815
47	231,515.280	4,279,392.254	1,287.9176	106,872.7869
48	223,484.199	4,047,876.974	1,364.8262	105,584.8693
49	215,610.124	3,824,392.775	1,442.3211	104,220.0431
50	207,887.896	3,608,782.651	1,523.8882	102,777.7220

EXHIBIT 4—Continued

THE 1954-58 INDUSTRIAL EXPERIENCE MORTALITY TABLE  
COMMUTATION COLUMNS 3% INTEREST

Age Next Birthday <i>x</i>	<i>D<sub>x</sub></i>	<i>N<sub>x</sub></i>	<i>C<sub>x</sub></i>	<i>M<sub>x</sub></i>
51.....	200,309.021	3,400,894.755	1,604.4255	101,253.8338
52.....	192,870.352	3,200,585.734	1,687.1199	99,649.4083
53.....	185,565.649	3,007,715.382	1,770.9321	97,962.2884
54.....	178,389.892	2,822,149.733	1,856.6950	96,191.3563
55.....	171,337.375	2,643,759.841	1,943.0281	94,334.6613
56.....	164,403.938	2,472,422.466	2,030.3612	92,391.6332
57.....	157,585.113	2,308,018.528	2,117.4412	90,361.2720
58.....	150,877.814	2,150,433.415	2,206.1177	88,243.8308
59.....	144,277.197	1,999,555.601	2,294.4519	86,037.7131
60.....	137,780.496	1,855,278.404	2,382.3605	83,743.2612
61.....	131,385.112	1,717,497.908	2,470.8812	81,360.9007
62.....	125,087.480	1,586,112.796	2,558.9035	78,890.0195
63.....	118,885.252	1,461,025.316	2,645.4327	76,331.1160
64.....	112,777.142	1,342,140.064	2,729.5823	73,685.6833
65.....	106,762.788	1,229,362.922	2,809.0023	70,956.1010
66.....	100,844.190	1,122,600.134	2,883.4123	68,147.0987
67.....	95,023.568	1,021,755.944	2,946.6832	65,263.6864
68.....	89,309.208	926,732.376	3,003.5621	62,317.0032
69.....	83,704.407	837,423.168	3,051.5968	59,313.4411
70.....	78,214.818	753,718.761	3,089.1353	56,261.8443
71.....	72,847.581	675,503.943	3,116.1841	53,172.7090
72.....	67,609.623	602,656.362	3,130.3680	50,056.5249
73.....	62,510.043	535,046.739	3,131.5440	46,926.1569
74.....	57,557.818	472,536.696	3,120.9535	43,794.6129
75.....	52,760.423	414,978.878	3,098.4864	40,673.6594
76.....	48,125.225	362,218.455	3,063.6926	37,575.1730
77.....	43,659.827	314,093.230	3,016.3329	34,511.4804
78.....	39,371.849	270,433.403	2,954.4200	31,495.1475
79.....	35,270.676	231,061.554	2,877.1088	28,540.7275
80.....	31,366.266	195,790.878	2,782.4520	25,663.6187
81.....	27,670.233	164,424.612	2,669.5200	22,881.1667
82.....	24,194.784	136,754.379	2,538.5315	20,211.6467
83.....	20,951.550	112,559.595	2,389.6965	17,673.1152
84.....	17,951.614	91,608.045	2,223.5447	15,283.4187
85.....	15,205.207	73,656.431	2,042.2202	13,059.8740
86.....	12,720.117	58,451.224	1,849.0171	11,017.6538
87.....	10,500.611	45,731.107	1,648.2732	9,168.6367
88.....	8,546.494	35,230.496	1,445.6262	7,520.3635
89.....	6,851.941	26,684.002	1,246.1831	6,074.7373
90.....	5,406.187	19,832.061	1,055.2307	4,828.5542
91.....	4,193.495	14,425.874	876.9151	3,773.3235
92.....	3,194.439	10,232.379	714.4271	2,896.4084
93.....	2,386.970	7,037.940	573.0865	2,181.9813
94.....	1,744.360	4,650.970	461.8727	1,608.8948
95.....	1,231.681	2,906.610	375.9772	1,147.0221
96.....	819.829	1,674.929	302.5966	771.0449
97.....	493.354	855.100	228.8660	468.4483
98.....	250.119	361.746	149.3660	239.5823
99.....	93.468	111.627	72.5858	90.2163
100.....	18.159	18.159	17.6305	17.6305

EXHIBIT 4—Continued

THE 1954-58 INDUSTRIAL EXPERIENCE MORTALITY TABLE  
COMMUTATION COLUMNS 3½% INTEREST

Age Next Birthday <i>x</i>	<i>D<sub>x</sub></i>	<i>N<sub>x</sub></i>	<i>C<sub>x</sub></i>	<i>M<sub>x</sub></i>
1. ....	968,523.002	26,966,063.744	4,793.3681	119,712.2781
2. ....	933,243.438	25,997,540.742	1,283.7249	114,918.9100
3. ....	902,584.012	25,064,297.304	786.6423	113,635.1851
4. ....	873,386.735	24,161,713.292	634.0487	112,848.5428
5. ....	845,261.094	23,288,326.557	515.8693	112,214.4941
6. ....	818,138.943	22,443,065.463	427.6844	111,698.6248
7. ....	791,958.701	21,624,926.520	360.7991	111,270.9404
8. ....	766,669.420	20,832,967.819	311.9484	110,910.1413
9. ....	742,225.020	20,066,298.399	280.3411	110,598.1929
10. ....	718,581.664	19,324,073.379	264.4826	110,317.8518
11. ....	695,698.388	18,605,491.715	269.7829	110,053.3692
12. ....	673,530.108	17,909,793.327	287.0242	109,783.5863
13. ....	652,042.379	17,236,263.219	309.3033	109,496.5621
14. ....	631,208.739	16,584,220.840	336.0848	109,187.2588
15. ....	611,004.098	15,953,012.101	372.8631	108,851.1740
16. ....	591,398.661	15,342,008.003	406.4125	108,478.3109
17. ....	572,376.794	14,750,609.342	438.0426	108,071.8984
18. ....	553,922.048	14,178,232.548	466.7343	107,633.8558
19. ....	536,019.511	13,624,310.500	487.9109	107,167.1215
20. ....	518,659.315	13,088,290.989	502.1833	106,679.2106
21. ....	501,831.294	12,569,631.674	510.1259	106,177.0273
22. ....	485,525.026	12,067,800.380	512.7579	105,666.9014
23. ....	469,729.398	11,582,275.354	504.9722	105,154.1435
24. ....	454,438.754	11,112,545.956	493.1228	104,649.1713
25. ....	439,641.264	10,658,107.202	481.0838	104,156.0485
26. ....	425,321.593	10,218,465.938	473.5307	103,674.9647
27. ....	411,460.216	9,793,144.345	466.3848	103,201.4340
28. ....	398,042.299	9,381,684.129	462.7795	102,735.0492
29. ....	385,050.343	8,983,641.830	462.3868	102,272.2697
30. ....	372,467.727	8,598,591.487	468.9810	101,809.8829
31. ....	360,274.580	8,226,123.760	477.9360	101,340.9019
32. ....	348,456.282	7,865,849.180	489.3429	100,862.9659
33. ....	336,998.582	7,517,392.898	502.5920	100,373.6230
34. ....	325,888.286	7,180,394.316	520.7252	99,871.0310
35. ....	315,109.576	6,854,506.030	543.2265	99,350.3058
36. ....	304,647.646	6,539,396.454	572.3703	98,807.0793
37. ....	294,485.883	6,234,748.808	604.7765	98,234.7090
38. ....	284,611.575	5,940,262.925	642.3318	97,629.9325
39. ....	275,010.525	5,655,651.350	687.2180	96,987.6007
40. ....	265,666.802	5,380,640.825	733.2230	96,300.3827
41. ....	256,571.185	5,114,974.023	785.3073	95,567.1597
42. ....	247,709.787	4,858,402.838	839.7056	94,781.8524
43. ....	239,072.921	4,610,693.051	896.0215	93,942.1468
44. ....	230,651.602	4,371,620.130	956.0218	93,046.1253
45. ....	222,435.360	4,140,968.528	1,018.9354	92,090.1035
46. ....	214,414.828	3,918,533.168	1,081.8343	91,071.1681
47. ....	206,583.858	3,704,118.340	1,146.4417	89,989.3338
48. ....	198,934.777	3,497,534.482	1,211.9604	88,842.8921
49. ....	191,460.947	3,298,599.705	1,277.6743	87,630.9317
50. ....	184,156.657	3,107,138.758	1,346.6616	86,353.2574

EXHIBIT 4—Continued

THE 1954-58 INDUSTRIAL EXPERIENCE MORTALITY TABLE  
COMMUTATION COLUMNS 3½% INTEREST

Age Next Birthday x	D <sub>x</sub>	N <sub>x</sub>	C <sub>x</sub>	M <sub>x</sub>
51.....	177,013.297	2,922,982.101	1,414.3995	85,006.5958
52.....	170,027.050	2,745,968.804	1,483.6985	83,592.1963
53.....	163,191.411	2,575,941.754	1,553.6342	82,108.4978
54.....	156,501.001	2,412,750.343	1,624.9298	80,554.8636
55.....	149,949.889	2,256,249.342	1,696.3688	78,929.9338
56.....	143,533.548	2,106,299.453	1,768.3233	77,233.5650
57.....	137,247.220	1,962,765.905	1,839.6995	75,465.2417
58.....	131,087.390	1,825,518.685	1,912.1034	73,625.5422
59.....	125,049.049	1,694,431.295	1,983.8500	71,713.4388
60.....	119,129.030	1,569,382.246	2,054.8707	69,729.5888
61.....	113,324.335	1,450,253.216	2,126.0626	67,674.7181
62.....	107,631.163	1,336,928.881	2,196.4699	65,548.6555
63.....	102,046.787	1,229,297.718	2,265.2453	63,352.1856
64.....	96,569.415	1,127,250.931	2,331.6420	61,086.9403
65.....	91,198.058	1,030,681.516	2,393.6736	58,755.2983
66.....	85,933.743	939,483.458	2,451.1323	56,361.6247
67.....	80,777.675	853,549.715	2,498.8525	53,910.4924
68.....	75,736.184	772,772.040	2,540.9198	51,411.6399
69.....	70,811.316	697,035.856	2,575.3049	48,870.7201
70.....	66,007.084	626,224.540	2,600.6721	46,295.4152
71.....	61,328.707	560,217.456	2,617.0917	43,694.7431
72.....	56,781.171	498,888.749	2,622.6383	41,077.6514
73.....	52,371.232	442,107.578	2,617.2710	38,455.0131
74.....	48,105.472	389,736.346	2,602.1038	35,837.7421
75.....	43,989.153	341,630.874	2,577.1167	33,235.6383
76.....	40,027.389	297,641.721	2,542.0076	30,658.5216
77.....	36,225.440	257,614.332	2,496.6525	28,116.5140
78.....	32,588.519	221,388.892	2,439.4854	25,619.8615
79.....	29,123.245	188,800.373	2,369.8968	23,180.3761
80.....	25,836.636	159,677.128	2,286.3778	20,810.4793
81.....	22,736.998	133,840.492	2,188.2688	18,524.1015
82.....	19,833.037	111,103.494	2,075.8559	16,335.8327
83.....	17,132.897	91,270.457	1,949.4162	14,259.9768
84.....	14,644.189	74,137.560	1,809.4844	12,310.5606
85.....	12,373.749	59,493.371	1,657.9014	10,501.0762
86.....	10,326.359	47,119.622	1,497.4220	8,843.1748
87.....	8,503.894	36,793.263	1,331.6180	7,345.7528
88.....	6,904.599	28,289.369	1,165.0743	6,014.1348
89.....	5,522.189	21,384.770	1,001.9052	4,849.0605
90.....	4,346.462	15,862.581	846.3293	3,847.1553
91.....	3,363.319	11,516.119	701.6115	3,000.8260
92.....	2,555.840	8,152.800	570.2223	2,299.2145
93.....	1,905.168	5,596.960	456.3033	1,728.9922
94.....	1,388.895	3,691.792	366.8622	1,272.6889
95.....	978.315	2,302.897	297.9128	905.8267
96.....	649.608	1,324.582	239.1878	607.9139
97.....	389.972	674.974	180.4693	368.7261
98.....	197.228	285.002	117.4954	188.2568
99.....	73.524	87.774	56.9598	70.7614
100.....	14.250	14.250	13.8016	13.8016



EXHIBIT 5

PROPOSED INDUSTRIAL VALUATION MORTALITY TABLE

Age Next Birthday $x$	$l_x$	$d_x$	1000 $q_x$	Age Next Birthday $x$	$l_x$	$d_x$	1000 $q_x$
1	1,000,000	10,570	10.57	51	838,241	9,740	11.62
2	989,430	2,573	2.60	52	828,501	10,381	12.53
3	986,857	1,697	1.72	53	818,120	11,053	13.51
4	985,160	1,517	1.54	54	807,067	11,751	14.56
5	983,643	1,416	1.44	55	795,316	12,479	15.69
6	982,227	1,346	1.37	56	782,837	13,230	16.90
7	980,881	1,295	1.32	57	769,607	14,007	18.20
8	979,586	1,244	1.27	58	755,600	14,810	19.60
9	978,342	1,213	1.24	59	740,790	15,638	21.11
10	977,129	1,202	1.23	60	725,152	16,483	22.73
11	975,927	1,230	1.26	61	708,669	17,355	24.49
12	974,697	1,267	1.30	62	691,314	18,285	26.45
13	973,430	1,324	1.36	63	673,029	19,296	28.67
14	972,106	1,400	1.44	64	653,733	20,370	31.16
15	970,706	1,485	1.53	65	633,363	21,458	33.88
16	969,221	1,570	1.62	66	611,905	22,524	36.81
17	967,651	1,664	1.72	67	589,381	23,534	39.93
18	965,987	1,748	1.81	68	565,847	24,501	43.30
19	964,239	1,832	1.90	69	541,346	25,411	46.94
20	962,407	1,896	1.97	70	515,935	26,235	50.85
21	960,511	1,959	2.04	71	489,700	26,973	55.08
22	958,552	2,003	2.09	72	462,727	27,583	59.61
23	956,549	2,028	2.12	73	435,144	28,067	64.50
24	954,521	2,052	2.15	74	407,077	28,418	69.81
25	952,469	2,086	2.19	75	378,659	28,630	75.61
26	950,383	2,129	2.24	76	350,029	28,688	81.96
27	948,254	2,172	2.29	77	321,341	28,583	88.95
28	946,082	2,233	2.36	78	292,758	28,283	96.61
29	943,849	2,303	2.44	79	264,475	27,778	105.03
30	941,546	2,401	2.55	80	236,697	27,033	114.21
31	939,145	2,508	2.67	81	209,664	26,042	124.21
32	936,637	2,632	2.81	82	183,622	24,805	135.09
33	934,005	2,765	2.96	83	158,817	23,322	146.85
34	931,240	2,924	3.14	84	135,495	21,609	159.48
35	928,316	3,101	3.34	85	113,886	19,694	172.93
36	925,215	3,312	3.58	86	94,192	17,628	187.15
37	921,903	3,540	3.84	87	76,564	15,474	202.11
38	918,363	3,802	4.14	88	61,090	13,304	217.78
39	914,561	4,097	4.48	89	47,786	11,190	234.17
40	910,464	4,407	4.84	90	36,596	9,197	251.31
41	906,057	4,757	5.25	91	27,399	7,377	269.24
42	901,300	5,137	5.70	92	20,022	5,765	287.93
43	896,163	5,538	6.18	93	14,257	4,407	309.11
44	890,625	5,976	6.71	94	9,850	3,358	340.91
45	884,649	6,440	7.28	95	6,492	2,551	392.95
46	878,209	6,920	7.88	96	3,941	1,873	475.26
47	871,289	7,432	8.53	97	2,068	1,235	597.20
48	863,857	7,965	9.22	98	833	641	769.51
49	855,892	8,525	9.96	99	192	192	1,000.00
50	847,367	9,126	10.77				

EXHIBIT 5—Continued

PROPOSED INDUSTRIAL VALUATION MORTALITY TABLE  
COMMUTATION COLUMNS 2½% INTEREST

Age Next Birthday <i>x</i>	<i>D<sub>x</sub></i>	<i>N<sub>x</sub></i>	<i>C<sub>x</sub></i>	<i>M<sub>x</sub></i>
1	973,236.010	29,210,868.146	10,011.7807	191,436.6180
2	937,176.550	28,237,632.136	2,371.8886	181,424.8373
3	909,722.077	27,300,455.586	1,522.4902	179,052.9487
4	883,851.794	26,390,733.509	1,324.5746	177,530.4585
5	858,871.819	25,506,881.715	1,203.2954	176,205.8839
6	834,681.686	24,648,009.896	1,113.1976	175,002.5885
7	811,229.076	23,813,328.210	1,042.3537	173,889.3909
8	788,474.995	23,002,099.134	974.5046	172,847.0372
9	766,397.753	22,213,624.139	924.7887	171,872.5326
10	744,961.103	21,447,226.386	891.8757	170,947.7439
11	724,131.095	20,702,265.283	888.2253	170,055.8682
12	703,862.232	19,978,134.188	890.4567	169,167.6429
13	684,133.614	19,274,271.956	905.6124	168,277.1862
14	664,917.856	18,590,138.342	931.9671	167,371.5738
15	646,190.034	17,925,220.486	962.0932	166,439.6067
16	627,933.317	17,279,030.452	989.9392	165,477.5135
17	610,137.376	16,651,097.135	1,021.1284	164,487.5743
18	592,786.537	16,040,959.759	1,043.9667	163,466.4459
19	575,877.237	15,448,173.222	1,064.8510	162,422.4792
20	559,399.613	14,872,295.985	1,072.5558	161,357.6282
21	543,355.292	14,312,896.372	1,078.5348	160,285.0724
22	527,734.401	13,769,541.080	1,073.2449	159,206.5376
23	512,536.878	13,241,806.679	1,057.5576	158,133.2927
24	497,761.788	12,729,269.801	1,041.4336	157,075.7351
25	483,398.263	12,231,508.013	1,030.3546	156,034.3015
26	469,430.242	11,748,109.750	1,023.4491	155,003.9469
27	455,842.966	11,278,679.508	1,016.1751	153,980.4978
28	442,626.615	10,822,836.542	1,016.7534	152,964.3227
29	429,763.407	10,380,209.927	1,020.5611	151,947.5693
30	417,240.662	9,950,446.520	1,035.5127	150,927.0082
31	405,038.124	9,533,205.858	1,052.7105	149,891.4955
32	393,144.977	9,128,167.734	1,075.1906	148,838.7850
33	381,547.658	8,735,022.757	1,099.2916	147,763.5944
34	370,236.629	8,353,475.099	1,131.3925	146,664.3028
35	359,196.227	7,983,238.470	1,167.7661	145,532.9103
36	348,414.937	7,624,042.243	1,213.8432	144,365.1442
37	337,876.119	7,275,627.306	1,262.6812	143,151.3010
38	327,570.525	6,937,751.187	1,319.8383	141,888.6198
39	317,483.592	6,610,180.662	1,384.1805	140,568.7815
40	307,602.284	6,292,697.070	1,449.0654	139,184.6010
41	297,920.554	5,985,094.786	1,522.2861	137,735.5356
42	288,424.725	5,687,174.232	1,599.8927	136,213.2495
43	279,105.436	5,398,749.507	1,678.6201	134,613.3568
44	269,956.841	5,119,644.071	1,762.9022	132,934.7367
45	260,968.816	4,849,687.230	1,848.9351	131,171.8345
46	252,135.314	4,588,718.414	1,933.5707	129,322.8994
47	243,453.596	4,336,583.100	2,021.0536	127,389.3287
48	234,916.753	4,093,129.504	2,108.0266	125,368.2751
49	226,521.417	3,858,212.751	2,195.8510	123,260.2485
50	218,262.949	3,631,691.334	2,287.7423	121,064.3975

EXHIBIT 5—Continued

PROPOSED INDUSTRIAL VALUATION MORTALITY TABLE  
COMMUTATION COLUMNS 2½% INTEREST

Age Next Birthday $x$	$D_x$	$N_x$	$C_x$	$M_x$
51	210,133.619	3,413,428.385	2,376.3137	118,776.6552
52	202,133.291	3,203,294.766	2,464.9163	116,400.3415
53	194,258.482	3,001,161.475	2,554.2378	113,935.4252
54	186,505.112	2,806,902.993	2,642.8599	111,381.1874
55	178,870.631	2,620,397.881	2,731.4753	108,738.3275
56	171,351.864	2,441,527.250	2,818.3537	106,006.8522
57	163,947.450	2,270,175.386	2,904.0157	103,188.4985
58	156,655.547	2,106,227.936	2,988.3197	100,284.4828
59	149,474.500	1,949,572.389	3,070.9403	97,296.1631
60	142,403.025	1,800,097.889	3,150.2469	94,225.2228
61	135,441.505	1,657,694.864	3,228.1308	91,074.9759
62	128,588.419	1,522,253.359	3,310.0888	87,846.8451
63	121,836.791	1,393,664.940	3,399.6181	84,536.7563
64	115,176.334	1,271,828.149	3,492.7865	81,137.1382
65	108,600.970	1,156,651.815	3,580.8689	77,644.3517
66	102,113.505	1,048,050.845	3,658.1615	74,063.4828
67	95,722.379	945,937.340	3,719.9000	70,405.3213
68	89,440.566	850,214.961	3,769.0986	66,685.4213
69	83,277.681	760,774.395	3,804.4652	62,916.3227
70	77,244.373	677,496.714	3,822.7078	59,111.8575
71	71,354.297	600,252.341	3,825.0530	55,289.1497
72	65,619.519	528,898.044	3,806.8684	51,464.0967
73	60,056.410	463,278.525	3,769.9929	47,657.2283
74	54,679.068	403,222.115	3,714.9778	43,887.2354
75	49,500.660	348,543.047	3,642.5224	40,172.2576
76	44,533.303	299,042.387	3,552.2156	36,529.7352
77	39,789.198	254,509.084	3,444.4908	32,977.5196
78	35,279.790	214,719.886	3,317.1175	29,533.0288
79	31,018.444	179,440.096	3,170.6954	26,215.9113
80	27,017.571	148,421.652	3,003.0735	23,045.2159
81	23,291.400	121,404.081	2,815.5564	20,042.1424
82	19,852.473	98,112.681	2,610.0408	17,226.5860
83	16,711.101	78,260.208	2,388.3173	14,616.5452
84	13,875.527	61,549.107	2,153.6696	12,228.2279
85	11,350.493	47,673.580	1,910.2777	10,074.5583
86	9,136.431	36,323.087	1,664.1167	8,164.2806
87	7,227.787	27,186.656	1,421.6789	6,500.1639
88	5,612.664	19,958.869	1,189.5955	5,078.4850
89	4,272.851	14,346.205	973.7901	3,888.8895
90	3,184.702	10,073.354	778.9321	2,915.0994
91	2,320.535	6,888.652	608.0669	2,136.1673
92	1,650.361	4,568.117	462.4759	1,528.1004
93	1,143.715	2,917.756	344.0733	1,065.6245
94	769.032	1,774.041	255.1566	721.5512
95	493.293	1,005.009	188.6491	466.3946
96	291.441	511.716	134.8032	277.7455
97	148.838	220.275	86.5063	142.9423
98	58.348	71.437	43.6975	56.4360
99	13.089	13.089	12.7385	12.7385

EXHIBIT 5—Continued

PROPOSED INDUSTRIAL VALUATION MORTALITY TABLE  
COMMUTATION COLUMNS 3% INTEREST

Age Next Birthday <i>x</i>	<i>D<sub>x</sub></i>	<i>N<sub>x</sub></i>	<i>C<sub>x</sub></i>	<i>M<sub>x</sub></i>
1	970,873.786	27,550,724.014	9,963.2388	168,425.5135
2	932,632.670	26,579,850.228	2,354.6595	158,462.2747
3	903,113.953	25,647,217.558	1,507.7625	156,107.6152
4	875,301.900	24,744,103.605	1,308.5775	154,599.8527
5	848,499.092	23,868,801.705	1,185.8777	153,291.2752
6	822,599.649	23,020,302.613	1,094.4212	152,105.3975
7	797,546.015	22,197,702.964	1,022.2850	151,010.9763
8	773,294.234	21,400,156.949	953.4224	149,988.6913
9	749,817.679	20,626,862.715	902.5859	149,035.2689
10	727,075.743	19,877,045.036	868.3504	148,132.6830
11	705,030.429	19,149,969.293	862.6973	147,264.3326
12	683,632.865	18,444,938.864	862.7653	146,401.6353
13	662,858.463	17,761,305.999	875.3200	145,538.8700
14	642,676.586	17,098,447.536	898.6067	144,663.5500
15	623,059.243	16,455,770.950	925.4029	143,764.9433
16	603,986.484	15,832,711.707	949.8758	142,839.5404
17	585,444.769	15,228,725.223	977.4246	141,889.6646
18	567,415.555	14,643,280.454	996.8600	140,912.2400
19	549,892.028	14,075,864.899	1,014.3340	139,915.3800
20	532,861.421	13,525,972.871	1,019.1934	138,901.0460
21	516,321.992	12,993,111.450	1,022.3874	137,881.8526
22	500,261.100	12,476,789.458	1,014.9036	136,859.4652
23	484,675.485	11,976,528.358	997.6416	135,844.5616
24	469,561.082	11,491,852.873	980.0466	134,846.9200
25	454,904.499	11,022,291.791	967.2672	133,866.8734
26	440,687.586	10,567,387.292	958.4525	132,899.6062
27	426,893.573	10,126,699.706	949.3307	131,941.1537
28	413,510.449	9,699,806.133	947.5654	130,991.8230
29	400,518.890	9,286,295.684	948.8055	130,044.2576
30	387,904.485	8,885,776.794	960.3691	129,095.4521
31	375,645.927	8,497,872.309	973.9493	128,135.0830
32	363,730.835	8,122,226.382	992.3331	127,161.1337
33	352,144.399	7,758,495.547	1,012.1141	126,168.8006
34	340,875.652	7,406,351.148	1,039.1411	125,156.6865
35	329,908.094	7,065,475.496	1,069.9455	124,117.5454
36	319,229.175	6,735,567.402	1,109.4635	123,047.5999
37	308,821.774	6,416,338.227	1,151.3006	121,938.1364
38	298,675.665	6,107,516.453	1,200.4950	120,786.8358
39	288,775.879	5,808,840.788	1,255.9634	119,586.3408
40	279,108.967	5,520,064.909	1,311.6466	118,330.3774
41	269,667.933	5,240,955.942	1,374.5790	117,018.7308
42	260,438.949	4,971,288.009	1,441.1491	115,644.1518
43	251,412.199	4,710,849.060	1,508.3949	114,203.0027
44	242,581.119	4,459,436.861	1,580.2852	112,694.6078
45	233,935.364	4,216,855.742	1,653.3832	111,114.3226
46	225,468.329	3,982,920.378	1,724.8707	109,460.9394
47	217,176.420	3,757,452.049	1,798.5351	107,736.0687
48	209,052.358	3,540,275.629	1,871.3791	105,937.5336
49	201,092.075	3,331,223.271	1,944.6129	104,066.1545
50	193,290.412	3,130,131.196	2,021.0730	102,121.5416

EXHIBIT 5—Continued

PROPOSED INDUSTRIAL VALUATION MORTALITY TABLE  
COMMUTATION COLUMNS 3% INTEREST

Age Next Birthday <i>x</i>	$D_x$	$N_x$	$C_x$	$M_x$
51. ....	185,639.521	2,936,840.784	2,094.2247	100,100.4686
52. ....	178,138.320	2,751,201.263	2,167.0368	98,006.2439
53. ....	170,782.788	2,573,062.943	2,240.1136	95,839.2071
54. ....	163,568.419	2,402,280.155	2,312.2110	93,599.0935
55. ....	156,492.079	2,238,711.736	2,383.9393	91,286.8825
56. ....	149,550.118	2,082,219.657	2,453.7936	88,902.9432
57. ....	142,740.496	1,932,669.539	2,522.2382	86,449.1496
58. ....	136,060.767	1,789,929.043	2,589.1595	83,926.9114
59. ....	129,508.673	1,653,868.276	2,654.2861	81,337.7519
60. ....	123,082.290	1,524,359.603	2,716.2238	78,683.4658
61. ....	116,781.145	1,401,277.313	2,776.6215	75,967.2420
62. ....	110,603.131	1,284,496.168	2,840.2058	73,190.6205
63. ....	104,541.474	1,173,893.037	2,909.9459	70,350.4147
64. ....	98,586.631	1,069,351.563	2,982.4380	67,440.4688
65. ....	92,732.738	970,764.932	3,050.2287	64,458.0308
66. ....	86,981.556	878,032.194	3,108.5042	61,407.8021
67. ....	81,339.608	791,050.638	3,153.2940	58,299.2979
68. ....	75,817.199	709,711.030	3,187.2439	55,146.0039
69. ....	70,421.687	633,893.831	3,209.3422	51,958.7600
70. ....	65,161.228	563,472.144	3,216.9041	48,749.4178
71. ....	60,046.424	498,310.916	3,211.0648	45,532.5137
72. ....	55,086.434	438,264.492	3,188.0425	42,321.4489
73. ....	50,293.933	383,178.058	3,149.4982	39,133.4064
74. ....	45,679.563	332,884.125	3,096.0050	35,983.9082
75. ....	41,253.085	287,204.562	3,028.2538	32,887.9032
76. ....	37,023.285	245,951.477	2,946.0083	29,859.6494
77. ....	32,998.929	208,928.192	2,849.7337	26,913.6411
78. ....	29,188.061	175,929.263	2,737.6928	24,063.9074
79. ....	25,600.230	146,741.202	2,610.4958	21,326.2146
80. ....	22,244.097	121,140.972	2,466.4882	18,715.7188
81. ....	19,129.722	98,896.875	2,306.8636	16,249.2306
82. ....	16,265.682	79,767.153	2,133.2884	13,942.3670
83. ....	13,658.636	63,501.471	1,947.3271	11,809.0786
84. ....	11,313.485	49,842.835	1,751.7437	9,861.7515
85. ....	9,232.222	38,529.350	1,550.0032	8,110.0078
86. ....	7,413.319	29,297.128	1,346.9904	6,560.0046
87. ....	5,850.407	21,883.809	1,147.9602	5,213.0142
88. ....	4,532.046	16,033.402	958.2288	4,065.0540
89. ....	3,441.816	11,501.356	782.4919	3,106.8252
90. ....	2,559.077	8,059.540	624.3940	2,324.3333
91. ....	1,860.147	5,500.463	486.2450	1,699.9393
92. ....	1,319.723	3,640.316	368.9244	1,213.6943
93. ....	912.360	2,320.593	273.8066	844.7699
94. ....	611.980	1,408.233	202.5556	570.9633
95. ....	391.600	796.253	149.3953	368.4077
96. ....	230.798	404.653	106.4945	219.0124
97. ....	117.582	173.855	68.1740	112.5179
98. ....	45.983	56.273	34.3536	44.3439
99. ....	10.290	10.290	9.9903	9.9903

EXHIBIT 5—Continued

PROPOSED INDUSTRIAL VALUATION MORTALITY TABLE  
COMMUTATION COLUMNS 3½% INTEREST

Age Next Birthday <i>x</i>	<i>D<sub>x</sub></i>	<i>N<sub>x</sub></i>	<i>C<sub>x</sub></i>	<i>M<sub>x</sub></i>
1.....	968,523.002	26,041,359.518	9,915.0490	148,819.1916
2.....	928,121.757	25,072,836.516	2,337.5968	138,904.1426
3.....	896,569.674	24,144,714.759	1,493.2124	136,566.5458
4.....	866,855.140	23,248,145.085	1,292.8117	135,073.3334
5.....	838,276.331	22,381,289.945	1,168.7534	133,780.5217
6.....	810,721.156	21,543,013.614	1,076.0059	132,611.7683
7.....	784,126.082	20,732,292.458	1,002.6498	131,535.7624
8.....	758,441.497	19,948,166.376	932.8458	130,533.1126
9.....	733,635.190	19,189,724.879	880.9681	129,600.2668
10.....	709,661.589	18,456,089.689	845.5004	128,719.2987
11.....	686,478.073	17,746,428.100	837.9621	127,873.7983
12.....	664,031.842	17,059,950.027	835.9991	127,035.8362
13.....	642,294.114	16,395,918.185	846.1106	126,199.8371
14.....	621,230.513	15,753,624.071	866.5171	125,353.7265
15.....	600,809.525	15,132,393.558	890.1957	124,487.2094
16.....	581,007.649	14,531,584.033	911.5251	123,597.0137
17.....	561,807.748	13,950,576.384	935.6905	122,685.4886
18.....	543,188.036	13,388,768.636	951.9854	121,749.7981
19.....	525,138.122	12,845,580.600	966.3273	120,797.8127
20.....	507,642.023	12,320,442.478	968.6058	119,831.8854
21.....	490,694.371	11,812,800.455	969.2886	118,862.8796
22.....	474,279.497	11,322,106.084	959.8637	117,893.5910
23.....	458,390.738	10,847,826.587	941.2533	116,933.7273
24.....	443,020.721	10,389,435.849	922.4139	115,992.4740
25.....	428,153.345	9,946,415.128	908.1817	115,070.0601
26.....	413,768.181	9,518,261.783	897.7265	114,161.8784
27.....	399,846.275	9,104,493.602	887.0296	113,264.1519
28.....	386,373.285	8,704,647.327	883.2364	112,377.1223
29.....	373,328.178	8,318,274.042	882.2509	111,493.8859
30.....	360,694.676	7,944,945.864	890.8412	110,611.6350
31.....	348,450.250	7,584,251.188	901.2507	109,720.7938
32.....	336,580.831	7,235,800.938	916.0389	108,819.5431
33.....	325,070.239	6,899,220.107	932.0369	107,903.5042
34.....	313,905.967	6,574,149.868	954.6084	106,971.4673
35.....	303,070.541	6,260,243.901	980.5271	106,016.8589
36.....	292,550.263	5,957,173.360	1,014.2805	105,036.3318
37.....	282,327.379	5,664,623.097	1,049.9799	104,022.0513
38.....	272,390.581	5,382,295.718	1,092.1939	102,972.0714
39.....	262,724.349	5,109,905.137	1,139.8916	101,879.8775
40.....	253,314.684	4,847,180.788	1,187.5464	100,739.8959
41.....	244,153.552	4,593,866.104	1,241.5111	99,552.4395
42.....	235,226.820	4,349,712.552	1,298.4851	98,310.9284
43.....	226,524.101	4,114,485.732	1,355.7834	97,012.4433
44.....	218,038.019	3,887,961.631	1,416.9609	95,656.6599
45.....	209,757.876	3,669,923.612	1,478.9146	94,239.6990
46.....	201,676.413	3,460,165.736	1,539.1228	92,760.7844
47.....	193,789.122	3,258,489.323	1,600.9686	91,221.6616
48.....	186,088.254	3,064,700.201	1,661.7773	89,620.6930
49.....	178,568.977	2,878,611.947	1,722.6275	87,958.9157
50.....	171,225.534	2,700,042.970	1,786.0244	86,236.2882

EXHIBIT 5—Continued

PROPOSED INDUSTRIAL VALUATION MORTALITY TABLE  
COMMUTATION COLUMNS 3½% INTEREST

Age Next Birthday x	D <sub>x</sub>	N <sub>x</sub>	C <sub>x</sub>	M <sub>x</sub>
51.....	164,049.844	2,528,817.436	1,846.1876	84,450.2638
52.....	157,039.860	2,364,767.592	1,905.7503	82,604.0762
53.....	150,190.966	2,207,727.732	1,965.2460	80,698.3259
54.....	143,498.160	2,057,536.766	2,023.5853	78,733.0799
55.....	136,957.683	1,914,038.606	2,081.3083	76,709.4946
56.....	130,565.358	1,777,080.923	2,137.1077	74,628.1863
57.....	124,318.445	1,646,515.565	2,191.3999	72,491.0786
58.....	118,213.874	1,522,197.120	2,244.0963	70,299.6787
59.....	112,248.760	1,403,983.246	2,294.9730	68,055.5824
60.....	106,420.533	1,291,734.486	2,342.8397	65,760.6094
61.....	100,727.894	1,185,313.953	2,389.1360	63,417.7697
62.....	95,168.146	1,084,586.059	2,437.9296	61,028.6337
63.....	89,734.609	989,417.913	2,491.7440	58,590.7041
64.....	84,418.289	899,683.304	2,547.6344	56,098.9601
65.....	79,213.421	815,265.015	2,599.2333	53,551.3257
66.....	74,120.787	736,051.594	2,642.4786	50,952.0924
67.....	69,145.208	661,930.807	2,674.0631	48,309.6138
68.....	64,294.662	592,785.599	2,696.3089	45,635.5507
69.....	59,574.550	528,490.937	2,708.4295	42,939.2418
70.....	54,990.892	468,916.387	2,708.2377	40,230.8123
71.....	50,551.706	413,925.495	2,696.7762	37,522.5746
72.....	46,263.714	363,373.789	2,670.9582	34,825.7984
73.....	42,136.513	317,110.075	2,632.2766	32,154.8402
74.....	38,177.906	274,973.562	2,581.3030	29,522.5636
75.....	34,394.877	236,795.656	2,518.7019	26,941.2606
76.....	30,793.527	202,400.779	2,444.3626	24,422.5587
77.....	27,379.877	171,607.252	2,358.7565	21,978.1961
78.....	24,159.284	144,227.375	2,260.5322	19,619.4396
79.....	21,138.290	120,068.091	2,150.2856	17,358.9074
80.....	18,322.635	98,929.801	2,026.7462	15,208.6218
81.....	15,719.147	80,607.166	1,890.9907	13,181.8756
82.....	13,333.365	64,888.019	1,744.4729	11,290.8849
83.....	11,169.198	51,554.654	1,588.5494	9,546.4120
84.....	9,229.076	40,385.456	1,425.5404	7,957.8626
85.....	7,513.032	31,156.380	1,258.3132	6,532.3222
86.....	6,018.231	23,643.348	1,090.8569	5,274.0090
87.....	4,737.938	17,625.117	927.4218	4,183.1521
88.....	3,661.380	12,887.179	772.2659	3,255.7303
89.....	2,773.865	9,225.799	629.1072	2,483.4644
90.....	2,057.445	6,451.934	500.7843	1,854.3572
91.....	1,491.898	4,394.489	389.0400	1,353.5729
92.....	1,055.898	2,902.591	294.4582	964.5329
93.....	728.203	1,846.693	218.0105	670.0747
94.....	487.271	1,118.490	160.8885	452.0642
95.....	311.045	631.219	118.3763	291.1757
96.....	182.878	320.174	84.1786	172.7994
97.....	92.943	137.296	53.7577	88.6208
98.....	36.259	44.353	27.0235	34.8631
99.....	8.094	8.094	7.8396	7.8396

EXHIBIT 6

PROPOSED INDUSTRIAL EXTENDED TERM INSURANCE TABLE

Age Next Birth-day $x$	$l_x$	$d_x$	1000 $q_x$	Age Next Birth-day $x$	$l_x$	$d_x$	1000 $q_x$
1 . . . .	1,000,000	13,740	13.74	51 . . . .	789,994	11,937	15.11
2 . . . .	986,260	3,334	3.38	52 . . . .	778,057	12,675	16.29
3 . . . .	982,926	2,428	2.47	53 . . . .	765,382	13,440	17.56
4 . . . .	980,498	2,245	2.29	54 . . . .	751,942	14,234	18.93
5 . . . .	978,253	2,142	2.19	55 . . . .	737,708	15,049	20.40
6 . . . .	976,111	2,069	2.12	56 . . . .	722,659	15,877	21.97
7 . . . .	974,042	2,016	2.07	57 . . . .	706,782	16,722	23.66
8 . . . .	972,026	1,963	2.02	58 . . . .	690,060	17,583	25.48
9 . . . .	970,063	1,930	1.99	59 . . . .	672,477	18,453	27.44
10 . . . .	968,133	1,917	1.98	60 . . . .	654,024	19,326	29.55
11 . . . .	966,216	1,942	2.01	61 . . . .	634,698	20,209	31.84
12 . . . .	964,274	1,977	2.05	62 . . . .	614,489	21,132	34.39
13 . . . .	962,297	2,030	2.11	63 . . . .	593,357	22,114	37.27
14 . . . .	960,267	2,103	2.19	64 . . . .	571,243	23,141	40.51
15 . . . .	958,164	2,185	2.28	65 . . . .	548,102	24,138	44.04
16 . . . .	955,979	2,266	2.37	66 . . . .	523,964	25,072	47.85
17 . . . .	953,713	2,356	2.47	67 . . . .	498,892	25,897	51.91
18 . . . .	951,357	2,435	2.56	68 . . . .	472,995	26,625	56.29
19 . . . .	948,922	2,515	2.65	69 . . . .	446,370	27,237	61.02
20 . . . .	946,407	2,574	2.72	70 . . . .	419,133	27,709	66.11
21 . . . .	943,833	2,633	2.79	71 . . . .	391,424	28,026	71.60
22 . . . .	941,200	2,673	2.84	72 . . . .	363,398	28,160	77.49
23 . . . .	938,527	2,694	2.87	73 . . . .	335,238	28,110	83.85
24 . . . .	935,833	2,714	2.90	74 . . . .	307,128	27,872	90.75
25 . . . .	933,119	2,743	2.94	75 . . . .	279,256	27,448	98.29
26 . . . .	930,376	2,782	2.99	76 . . . .	251,808	26,830	106.55
27 . . . .	927,594	2,820	3.04	77 . . . .	224,978	26,016	115.64
28 . . . .	924,774	2,876	3.11	78 . . . .	198,962	24,988	125.59
29 . . . .	921,898	2,941	3.19	79 . . . .	173,974	23,754	136.54
30 . . . .	918,957	3,051	3.32	80 . . . .	150,220	22,303	148.47
31 . . . .	915,906	3,178	3.47	81 . . . .	127,917	20,655	161.47
32 . . . .	912,728	3,331	3.65	82 . . . .	107,262	18,837	175.62
33 . . . .	909,397	3,501	3.85	83 . . . .	88,425	16,881	190.91
34 . . . .	905,896	3,696	4.08	84 . . . .	71,544	14,833	207.33
35 . . . .	902,200	3,916	4.34	85 . . . .	56,711	12,749	224.81
36 . . . .	898,284	4,177	4.65	86 . . . .	43,962	10,696	243.30
37 . . . .	894,107	4,462	4.99	87 . . . .	33,266	8,740	262.74
38 . . . .	889,645	4,786	5.38	88 . . . .	24,526	6,944	283.11
39 . . . .	884,859	5,150	5.82	89 . . . .	17,582	5,352	304.42
40 . . . .	879,709	5,533	6.29	90 . . . .	12,230	3,995	326.69
41 . . . .	874,176	5,971	6.83	91 . . . .	8,235	2,882	350.01
42 . . . .	868,205	6,433	7.41	92 . . . .	5,353	2,004	374.31
43 . . . .	861,772	6,920	8.03	93 . . . .	3,349	1,346	401.84
44 . . . .	854,852	7,454	8.72	94 . . . .	2,003	888	443.13
45 . . . .	847,398	8,016	9.46	95 . . . .	1,115	570	511.21
46 . . . .	839,382	8,595	10.24	96 . . . .	545	329	603.67
47 . . . .	830,787	9,213	11.09	97 . . . .	216	155	717.59
48 . . . .	821,574	9,851	11.99	98 . . . .	61	52	852.46
49 . . . .	811,723	10,512	12.95	99 . . . .	9	9	1,000.00
50 . . . .	801,211	11,217	14.00				



EXHIBIT 6—Continued

PROPOSED INDUSTRIAL EXTENDED TERM INSURANCE TABLE  
COMMUTATION COLUMNS 2½% INTEREST

Age Next Birthday <i>x</i>	<i>D<sub>x</sub></i>	<i>N<sub>x</sub></i>	<i>C<sub>x</sub></i>	<i>M<sub>x</sub></i>
1. ....	973,236.010	28,310,740.652	13,014.3677	215,527.6219
2. ....	934,173.963	27,337,504.642	3,073.4072	202,513.2542
3. ....	906,098.333	26,403,330.679	2,178.3184	199,439.8470
4. ....	879,669.208	25,497,232.346	1,960.2307	197,261.5286
5. ....	854,165.519	24,617,563.138	1,820.2393	195,301.2979
6. ....	829,484.402	23,763,397.619	1,711.1484	193,481.0586
7. ....	805,572.941	22,933,913.217	1,622.6912	191,769.9102
8. ....	782,389.903	22,128,340.276	1,537.7432	190,147.2190
9. ....	759,912.284	21,345,950.373	1,471.4280	188,609.4758
10. ....	738,102.571	20,586,038.089	1,422.4008	187,138.0478
11. ....	716,925.601	19,847,935.518	1,402.3850	185,715.6470
12. ....	696,335.426	19,131,009.917	1,389.4498	184,313.2620
13. ....	676,309.261	18,434,674.491	1,388.5145	182,923.8122
14. ....	656,820.012	17,758,365.230	1,399.9477	181,535.2977
15. ....	637,840.940	17,101,545.218	1,415.6052	180,135.3500
16. ....	619,354.166	16,463,704.278	1,428.7913	178,719.7448
17. ....	601,348.986	15,844,350.112	1,445.7804	177,290.9535
18. ....	583,808.707	15,243,001.126	1,454.2671	175,845.1731
19. ....	566,729.390	14,659,192.419	1,461.8452	174,390.9060
20. ....	550,099.605	14,092,463.029	1,456.0963	172,929.0608
21. ....	533,920.648	13,542,363.424	1,449.6080	171,472.9645
22. ....	518,181.193	13,008,442.776	1,432.2435	170,023.3565
23. ....	502,880.353	12,490,261.583	1,404.8620	168,591.1130
24. ....	488,016.406	11,987,381.230	1,377.4127	167,186.2510
25. ....	473,577.727	11,499,364.824	1,354.8718	165,808.8383
26. ....	459,548.025	11,025,787.097	1,337.3581	164,453.9665
27. ....	445,911.329	10,566,239.072	1,319.3434	163,116.6084
28. ....	432,657.619	10,120,327.743	1,309.5310	161,797.2650
29. ....	419,768.443	9,687,670.124	1,303.2871	160,487.7340
30. ....	407,230.478	9,267,901.681	1,315.8472	159,184.4469
31. ....	395,015.518	8,860,671.203	1,333.9370	157,868.5997
32. ....	383,109.389	8,465,655.685	1,360.7371	156,534.6627
33. ....	371,495.116	8,082,546.296	1,391.9059	155,173.9256
34. ....	360,160.519	7,711,051.180	1,430.1049	153,782.0197
35. ....	349,091.081	7,350,890.661	1,474.6766	152,351.9148
36. ....	338,273.334	7,001,799.580	1,530.8645	150,877.2382
37. ....	327,688.926	6,663,526.246	1,591.5490	149,346.3737
38. ....	317,327.113	6,335,837.320	1,661.4271	147,754.8247
39. ....	307,172.747	6,018,510.207	1,739.9389	146,093.3976
40. ....	297,211.639	5,711,337.460	1,819.3054	144,353.4587
41. ....	287,437.764	5,414,125.821	1,910.7778	142,534.1533
42. ....	277,834.005	5,126,688.057	2,003.5253	140,623.3755
43. ....	268,394.533	4,848,854.052	2,097.5173	138,619.8502
44. ....	259,113.707	4,580,459.519	2,198.9078	136,522.3329
45. ....	249,979.883	4,321,345.812	2,301.4074	134,323.4251
46. ....	240,988.016	4,071,365.929	2,401.5954	132,022.0177
47. ....	232,136.620	3,830,377.913	2,505.3777	129,620.4223
48. ....	223,418.340	3,598,241.293	2,607.1776	127,115.0446
49. ....	214,831.596	3,374,822.953	2,707.6581	124,507.8670
50. ....	206,374.187	3,159,991.357	2,811.9226	121,800.2089

EXHIBIT 6—Continued

PROPOSED INDUSTRIAL EXTENDED TERM INSURANCE TABLE  
COMMUTATION COLUMNS 2½% INTEREST

Age Next Birthday *	D <sub>x</sub>	N <sub>x</sub>	C <sub>x</sub>	M <sub>x</sub>
51.....	198,038.868	2,953,617.170	2,912.3261	118,988.2863
52.....	189,826.231	2,755,578.302	3,009.6150	116,075.9602
53.....	181,736.109	2,565,752.071	3,105.8496	113,066.3452
54.....	173,766.276	2,384,015.962	3,201.2993	109,960.4956
55.....	165,914.298	2,210,249.686	3,294.0117	106,759.1963
56.....	158,179.757	2,044,335.388	3,382.2375	103,465.1846
57.....	150,563.998	1,886,155.631	3,466.9058	100,082.9471
58.....	143,067.399	1,735,591.633	3,547.8477	96,616.0413
59.....	135,690.497	1,592,524.234	3,623.7410	93,068.1936
60.....	128,435.137	1,456,833.737	3,693.6038	89,444.4526
61.....	121,304.096	1,328,398.600	3,758.9914	85,750.8488
62.....	114,298.523	1,207,094.504	3,825.4742	81,991.8574
63.....	107,413.964	1,092,795.981	3,896.1005	78,166.3832
64.....	100,643.038	985,382.017	3,967.9221	74,270.2827
65.....	93,981.506	884,738.979	4,028.1021	70,302.3606
66.....	87,438.084	790,757.473	4,071.9865	66,274.2585
67.....	81,025.905	703,319.389	4,093.4075	62,202.2720
68.....	74,763.921	622,293.484	4,095.8431	58,108.8645
69.....	68,667.097	547,529.563	4,077.8489	54,013.0214
70.....	62,751.443	478,862.466	4,037.4846	49,935.1725
71.....	57,034.479	416,111.023	3,974.3793	45,897.6879
72.....	51,533.630	359,076.544	3,886.5031	41,923.3086
73.....	46,267.881	307,542.914	3,775.7687	38,036.8055
74.....	41,253.799	261,275.033	3,643.6012	34,261.0368
75.....	36,506.082	220,021.234	3,492.1395	30,617.4356
76.....	32,036.894	183,515.152	3,322.1537	27,125.2961
77.....	27,857.305	151,478.258	3,135.1458	23,803.1424
78.....	23,976.587	123,620.953	2,930.6698	20,667.9966
79.....	20,404.208	99,644.366	2,711.3795	17,737.3268
80.....	17,146.730	79,240.158	2,477.6218	15,025.9473
81.....	14,210.193	62,093.428	2,233.1356	12,548.3255
82.....	11,596.736	47,883.235	1,982.0737	10,315.1899
83.....	9,304.288	36,286.499	1,728.7190	8,333.1162
84.....	7,326.549	26,982.211	1,478.3368	6,604.3972
85.....	5,652.124	19,655.662	1,236.6269	5,126.0604
86.....	4,264.224	14,003.538	1,009.7227	3,889.4335
87.....	3,140.374	9,739.314	802.9904	2,879.7108
88.....	2,253.334	6,598.940	620.9073	2,076.7204
89.....	1,572.119	4,345.606	465.7484	1,455.8131
90.....	1,064.294	2,773.487	338.3531	990.0647
91.....	697.456	1,709.193	237.5558	651.7116
92.....	441.234	1,011.737	160.7635	414.1558
93.....	268.661	570.503	105.0880	253.3923
94.....	156.383	301.842	67.4744	148.3043
95.....	84.723	145.459	42.1521	80.8299
96.....	40.303	60.736	23.6787	38.6778
97.....	15.546	20.433	10.8571	14.9991
98.....	4.273	4.887	3.5449	4.1420
99.....	.614	.614	.5971	.5971

EXHIBIT 6—Continued

PROPOSED INDUSTRIAL EXTENDED TERM INSURANCE TABLE  
COMMUTATION COLUMNS 3% INTEREST

Age Next Birthday <i>x</i>	$D_x$	$N_x$	$C_x$	$M_x$
1	970,873.786	26,750,204.215	12,951.2678	191,741.6243
2	929,644.641	25,779,330.429	3,051.0823	178,790.3565
3	899,516.531	24,849,685.788	2,157.2466	175,739.2742
4	871,159.773	23,950,169.257	1,936.5567	173,582.0276
5	843,849.631	23,079,009.484	1,793.8913	171,645.4709
6	817,477.595	22,235,159.853	1,682.2863	169,851.5796
7	791,985.282	21,417,682.258	1,591.4490	168,169.2933
8	767,326.300	20,625,696.976	1,504.4760	166,577.8443
9	743,472.515	19,858,370.676	1,436.1013	165,073.3683
10	720,381.874	19,114,898.161	1,384.8816	163,637.2670
11	698,014.996	18,394,516.287	1,362.0797	162,252.3854
12	676,322.383	17,696,501.291	1,346.2408	160,890.3057
13	655,277.432	17,020,178.908	1,342.0691	159,544.0649
14	634,849.612	16,364,901.476	1,349.8357	158,201.9958
15	615,009.011	15,730,051.864	1,361.6198	156,852.1601
16	595,734.507	15,115,042.853	1,370.9673	155,490.5403
17	577,012.050	14,519,308.346	1,383.9017	154,119.5730
18	558,821.972	13,942,296.296	1,388.6465	152,735.6713
19	541,156.957	13,383,474.324	1,392.4945	151,347.0248
20	524,002.609	12,842,317.367	1,383.6518	149,954.5303
21	507,356.746	12,318,314.758	1,374.1430	148,570.8785
22	491,205.222	11,810,958.012	1,354.3870	147,196.7355
23	475,543.886	11,319,752.790	1,325.2695	145,842.3485
24	460,367.824	10,844,208.904	1,296.6215	144,517.0790
25	445,662.831	10,383,841.080	1,271.9146	143,220.8575
26	431,410.446	9,938,178.249	1,252.4260	141,948.9429
27	417,592.667	9,506,767.803	1,232.5564	140,696.5169
28	404,197.217	9,089,175.136	1,220.4201	139,463.9605
29	391,204.063	8,684,977.919	1,211.6531	138,243.5404
30	378,598.116	8,293,773.856	1,220.3608	137,031.8873
31	366,350.626	7,915,175.740	1,234.1351	135,811.5265
32	354,446.084	7,548,825.114	1,255.8744	134,577.3914
33	342,866.538	7,194,379.030	1,281.5232	133,321.5170
34	331,598.610	6,851,512.492	1,313.4970	132,039.9938
35	320,626.901	6,519,913.882	1,351.1470	130,726.4968
36	309,937.107	6,199,286.981	1,399.2237	129,375.3498
37	299,510.589	5,889,349.874	1,451.1591	127,976.1261
38	289,335.820	5,589,839.285	1,511.1965	126,524.9670
39	279,397.367	5,300,503.465	1,578.7677	125,013.7705
40	269,680.812	5,021,106.098	1,646.7757	123,435.0028
41	260,179.255	4,751,425.286	1,725.3755	121,788.2271
42	250,875.843	4,491,246.031	1,804.7327	120,062.8516
43	241,764.047	4,240,370.188	1,884.8127	118,258.1189
44	232,837.563	3,998,606.141	1,971.1255	116,373.3062
45	224,084.761	3,765,768.578	2,058.0000	114,402.1807
46	215,500.020	3,541,683.817	2,142.3791	112,344.1807
47	207,080.942	3,326,183.797	2,229.5350	110,201.8016
48	198,819.923	3,119,102.855	2,314.4953	107,972.2666
49	190,714.556	2,920,282.932	2,397.8616	105,657.7713
50	182,761.901	2,729,568.376	2,484.1525	103,259.9097

EXHIBIT 6—Continued

PROPOSED INDUSTRIAL EXTENDED TERM INSURANCE TABLE  
COMMUTATION COLUMNS 3% INTEREST

Age Next Birthday $x$	$D_x$	$N_x$	$C_x$	$M_x$
51.....	174,954.587	2,546,806.475	2,566.6078	100,775.7572
52.....	167,292.214	2,371,851.888	2,645.9099	98,209.1494
53.....	159,773.716	2,204,559.674	2,723.8873	95,563.2395
54.....	152,396.225	2,044,785.958	2,800.7839	92,839.3522
55.....	145,156.716	1,892,389.733	2,874.9021	90,038.5683
56.....	138,053.948	1,747,233.017	2,944.7378	87,163.6662
57.....	131,088.222	1,609,179.069	3,011.1278	84,218.9284
58.....	124,258.990	1,478,090.847	3,073,9494	81,207.8006
59.....	117,565.847	1,353,831.857	3,132.0847	78,133.8512
60.....	111,009.514	1,236,266.010	3,184.7201	75,001.7665
61.....	104,591.507	1,125,256.496	3,233.2322	71,817.0464
62.....	98,311.921	1,020,664.989	3,282.4298	68,583.8142
63.....	92,166.037	922,353.068	3,334.9162	65,301.3844
64.....	86,146.673	830,187.031	3,388.1491	61,966.4682
65.....	80,249.398	744,040.358	3,431.1875	58,578.3191
66.....	74,480.849	663,790.960	3,460.1500	55,147.1316
67.....	68,851.354	589,310.111	3,469.9097	51,686.9816
68.....	63,376.065	520,458.757	3,463,5472	48,217.0719
69.....	58,066.613	457,082.692	3,439.9612	44,753.5247
70.....	52,935.391	399,016.079	3,397.6442	41,313.5635
71.....	47,995.939	346,080.688	3,336.4217	37,915.9193
72.....	43,261.578	298,084.749	3,254.7321	34,579.4976
73.....	38,746.800	254,823.171	3,154.3234	31,324.7655
74.....	34,463.929	216,076.371	3,036.5209	28,170.4421
75.....	30,423.604	181,612.442	2,903.2312	25,133.9212
76.....	26,634.248	151,188.838	2,755.2079	22,230.6900
77.....	23,103.286	124,554.590	2,593.8031	19,475.4821
78.....	19,836.571	101,451.304	2,418.7487	16,881.6790
79.....	16,840.059	81,614.733	2,232.3320	14,462.9303
80.....	14,117.239	64,774.674	2,034.9235	12,230.5983
81.....	11,671.134	50,657.435	1,829.6700	10,195.6748
82.....	9,501.528	38,986.301	1,620.0264	8,366.0048
83.....	7,604.758	29,484.773	1,409.5202	6,745.9784
84.....	5,973.740	21,880.015	1,202.4441	5,336.4582
85.....	4,597.304	15,906.275	1,003.4016	4,134.0141
86.....	3,460.000	11,308.971	817.3025	3,130.6125
87.....	2,541.921	7,848.971	648.3890	2,313.3100
88.....	1,819.495	5,307.050	500.1459	1,664.9210
89.....	1,266.354	3,487.555	374.2535	1,164.7751
90.....	855.217	2,221.201	271.2248	790.5216
91.....	559.083	1,365.984	189.9631	519.2968
92.....	352.836	806.901	128.2436	329.3337
93.....	214.315	454.065	83.6269	201.0901
94.....	124.446	239.750	53.5644	117.4632
95.....	67.257	115.304	33.3811	63.8988
96.....	31.917	48.047	18.7062	30.5177
97.....	12.281	16.130	8.5563	11.8115
98.....	3.367	3.849	2.7869	3.2552
99.....	.482	.482	.4683	.4683

EXHIBIT 6—Continued

PROPOSED INDUSTRIAL EXTENDED TERM INSURANCE TABLE  
COMMUTATION COLUMNS 3½% INTEREST

Age Next Birthday x	D <sub>x</sub>	N <sub>x</sub>	C <sub>x</sub>	M <sub>x</sub>
1	968,523.002	25,327,038.473	12,888.6257	171,303.8732
2	925,148.180	24,358,515.471	3,028.9731	158,415.2475
3	892,998.320	23,433,367.291	2,136.4289	155,386.2744
4	862,752.985	22,540,368.971	1,913.2250	153,249.8455
5	833,682.887	21,677,615.986	1,767.9872	151,336.6205
6	805,673.065	20,843,933.099	1,653.9793	149,568.6333
7	778,658.917	20,038,260.034	1,560.8819	147,914.6540
8	752,588.190	19,259,601.117	1,472.0066	146,353.7721
9	727,426.967	18,507,012.927	1,401.7053	144,881.7655
10	703,128.045	17,779,585.960	1,348.4394	143,480.0602
11	679,647.246	17,076,457.915	1,323.0264	142,131.6208
12	656,930.964	16,396,810.669	1,304.4754	140,808.5944
13	634,948.275	15,739,879.705	1,297.2844	139,504.1190
14	613,664.725	15,104,931.430	1,301.6325	138,268.8346
15	593,046.769	14,491,266.705	1,309.8166	136,905.2021
16	573,069.621	13,898,219.936	1,315.6152	135,595.3855
17	553,715.495	13,325,150.315	1,324.8118	134,279.7703
18	534,961.382	12,771,434.820	1,326.1352	132,954.9585
19	516,796.268	12,236,473.438	1,326.5902	131,628.8233
20	499,202.483	11,719,677.170	1,314.9743	130,302.2331
21	482,174.114	11,220,474.687	1,302.7753	128,987.2588
22	465,693.945	10,738,300.573	1,280.9364	127,684.4835
23	449,754.361	10,272,606.628	1,250.3631	126,403.5471
24	434,347.081	9,822,852.267	1,219.9958	125,153.1840
25	419,455.143	9,388,505.186	1,194.2197	123,933.1882
26	405,057.735	8,969,050.043	1,173.0742	122,738.9685
27	391,134.660	8,563,992.308	1,151.6683	121,565.8943
28	377,671.246	8,172,857.648	1,137.5674	120,414.2260
29	364,645.722	7,795,186.402	1,126.6609	119,276.6586
30	352,041.109	7,430,540.680	1,132.0102	118,149.9977
31	339,827.901	7,078,499.571	1,142.0154	117,017.9875
32	327,989.124	6,738,671.670	1,159.3182	115,875.9721
33	316,505.693	6,410,682.546	1,180.1306	114,716.6539
34	305,362.913	6,094,176.853	1,206.6459	113,536.5233
35	294,544.360	5,788,813.940	1,238.2277	112,329.8774
36	284,034.760	5,494,269.580	1,279.1817	111,091.6497
37	273,815.017	5,210,234.820	1,323.4492	109,812.4680
38	263,872.693	4,936,419.803	1,374.8659	108,489.0188
39	254,191.907	4,672,547.110	1,432.8635	107,114.1529
40	244,757.845	4,418,355.203	1,490.9676	105,681.2894
41	235,562.636	4,173,597.358	1,558.3483	104,190.3218
42	226,589.483	3,938,034.722	1,626.0764	102,631.9735
43	217,831.050	3,711,445.239	1,694.1172	101,005.8971
44	209,280.265	3,493,614.189	1,767.4074	99,311.7799
45	200,925.343	3,284,333.924	1,840.8353	97,544.3725
46	192,759.982	3,083,408.581	1,911.6705	95,703.5372
47	184,780.806	2,890,648.599	1,984.6237	93,791.8667
48	176,979.837	2,705,867.793	2,055.2628	91,807.2430
49	169,353.780	2,528,887.956	2,124.1361	89,751.9802
50	161,898.896	2,359,534.176	2,195.2483	87,627.8441

EXHIBIT 6—Continued

PROPOSED INDUSTRIAL EXTENDED TERM INSURANCE TABLE  
COMMUTATION COLUMNS 3¼% INTEREST

Age Next Birthday <i>x</i>	<i>D<sub>x</sub></i>	<i>N<sub>x</sub></i>	<i>C<sub>x</sub></i>	<i>M<sub>x</sub></i>
51.....	154,607.556	2,197,635.280	2,262.6223	85,432.5958
52.....	147,478.352	2,043,027.724	2,326.8842	83,169.9735
53.....	140,509.292	1,895,549.372	2,389.6594	80,843.0893
54.....	133,696.822	1,755,040.080	2,451.1712	78,453.4299
55.....	127,037.277	1,621,343.258	2,509.9453	76,002.2587
56.....	120,528.579	1,494,305.981	2,564.6908	73,492.3134
57.....	114,170.011	1,373,777.402	2,616.1625	70,927.6226
58.....	107,960.119	1,259,607.391	2,664.2772	68,311.4601
59.....	101,897.581	1,151,647.272	2,708.0917	65,647.1829
60.....	95,982.060	1,049,749.691	2,746.9344	62,939.0912
61.....	90,213.898	953,767.631	2,782.0253	60,192.1568
62.....	84,592.210	863,553.733	2,817.5187	57,410.1315
63.....	79,111.983	778,961.523	2,855.6399	54,592.6128
64.....	73,766.135	699,849.540	2,894.1977	51,736.9729
65.....	68,550.001	626,083.405	2,923.8649	48,842.7752
66.....	63,468.388	557,533.404	2,941.4057	45,918.9103
67.....	58,529.188	494,065.016	2,942.5602	42,977.5046
68.....	53,744.304	435,535.828	2,930.0528	40,034.9444
69.....	49,122.542	381,791.524	2,903.0536	37,104.8916
70.....	44,673.259	332,668.982	2,860.3987	34,201.8380
71.....	40,406.680	287,995.723	2,802.0558	31,341.4393
72.....	36,332.743	247,589.043	2,726.8311	28,539.3835
73.....	32,462.266	211,256.300	2,636.3094	25,812.5524
74.....	28,804.142	178,794.034	2,531.7080	23,176.2430
75.....	25,365.766	149,989.892	2,414.7163	20,644.5350
76.....	22,152.612	124,624.126	2,286.0516	18,229.8187
77.....	19,169.263	102,471.514	2,146.9198	15,943.7671
78.....	16,418.952	83,302.251	1,997.1778	13,796.8473
79.....	13,904.955	66,883.299	1,838.7891	11,799.6695
80.....	11,628.479	52,978.344	1,672.1237	9,960.8804
81.....	9,590.326	41,349.865	1,499.8238	8,288.7567
82.....	7,788.628	31,759.539	1,324.7585	6,788.9329
83.....	6,218.707	23,970.911	1,149.8286	5,464.1744
84.....	4,873.132	17,752.204	978.5294	4,314.3458
85.....	3,741.211	12,879.072	814.5747	3,335.8164
86.....	2,808.874	9,137.861	661.8905	2,521.2417
87.....	2,058.569	6,328.987	523.8249	1,859.3512
88.....	1,469.946	4,270.418	403.0829	1,335.5263
89.....	1,020.594	2,800.472	300.8920	932.4434
90.....	687.577	1,779.878	217.5311	631.5514
91.....	448.403	1,092.301	151.9877	414.0203
92.....	282.301	643.898	102.3581	262.0326
93.....	171.056	361.597	66.5855	159.6745
94.....	99.087	190.541	42.5459	93.0890
95.....	53.422	91.454	26.4502	50.5431
96.....	25.290	38.032	14.7863	24.0929
97.....	9.708	12.742	6.7469	9.3066
98.....	2.655	3.034	2.1922	2.5597
99.....	.379	.379	.3675	.3675

## DISCUSSION OF PRECEDING PAPER

BERT A. WINTER:

Mr. Brown and the Advisory Committee which he heads are to be congratulated on their thoroughgoing and highly professional work in preparing new standard Industrial valuation and extended insurance mortality tables, and on this lucid and comprehensive description of their labors.

The new valuation table, like the 1958 CSO, will produce aggregate reserves, for most distributions of business, lower than the corresponding 1941 table with the same rate of interest and valuation method. It is difficult to see how the Committee could have achieved any other result, after properly taking into account the observed improvement in mortality and the necessity of providing, at all attained ages including the twenties and thirties, adequate margins for variations in company underwriting and racial composition and for expenses on paid-up insurance arising at net rates from the nonforfeiture or dividend provisions of these policies.

In connection with the extended insurance table, it will be recalled that the Phillips Advisory Committee, in recommending the CET table, was influenced by the fact that many companies use premium loan, rather than extended insurance, as the automatic option in their Ordinary policies. This protection against an inadequate statutory maximum basis is not available on Industrial insurance, because of the impracticality of an automatic premium loan provision for small premiums collected weekly or monthly at the home of the insured. Therefore, I am in full accord with the Committee's recommendation that the CET 30%/75¢ formula be applied to the valuation mortality rate to obtain the extended insurance mortality rate, for I do not see how a more conservative approach can be justified in the absence of more reliable actual experience.

In summary, I regard the new standard Industrial valuation and extended insurance tables as eminently suitable for the purposes for which the Committee prepared them, and as giving full and proper recognition to the improvement in Industrial mortality over the last twenty years.

(AUTHOR'S REVIEW OF DISCUSSION)

WILLIAM C. BROWN:

On behalf of the Industry Advisory Committee, for whom this paper is, in effect, a report, I appreciate very much Mr. Winter's discussion of it.

His conclusions as to the effect of the new table on reserves and his reasons for supporting the use of an extended insurance table are exactly those of the Committee. Consequently, I, personally, and the Committee, appreciate very much his approval of the tables developed and his support of these tables as being suitable for the purposes for which they were intended.