REPORT OF THE SOCIETY OF ACTUARIES COMMITTEE ON NONFORFEITURE AND VALUATION MORTALITY PROBLEMS—INDIVIDUAL LIFE INSURANCE AND ANNUITIES,* NOVEMBER 28, 1983 BLENDED 1980 CSO AND 1980 CET MORTALITY TABLES

The U.S. Supreme Court decision in *Arizona Governing Committee* v. *Norris,* which prohibited employers from making contributions after August 1, 1983, to a defined contribution pension plan if the benefits to be derived from those contributions differ by sex, created a problem for companies wishing to use the sex-distinct Commissioners 1980 Standard Ordinary (1980 CSO) mortality tables and the Commissioners 1980 Extended Term (1980 CET) mortality tables in their pension-related policies. In response to this dilemma, the Executive Committee of the National Association of Insurance Commissioners (NAIC), at its September 21, 1983, meeting adopted "an interim procedure authorizing the use of tables that are a 'blend' of the 1980 CSO and CET sex distinct tables for plans impacted by the Norris decision." Commissioner Roger C. Day's October 21 letter to NAIC members, the resolution, and a subsequent amendment recommended by the NAIC Technical Staff Actuarial Group (TSAG) appear in Appendix A.

The use of blended mortality tables replaced an earlier interim procedure permitting use of the 1980 CSO male mortality tables for calculation of nonforfeiture benefits in policies affected by the Norris decision. However, there was no indication in the September 21 resolution as to the proportions of male and female mortality rates nor was the method of blending specified. The TSAG, wishing to make the NAIC Executive Committee's resolution more definite, asked for suggestions fom the Society of Actuaries Committee to Develop a New Mortality Basis for Individual Annuity Valuation (subsequently renamed and given an expanded charge). In a telephone conversation with Robert J. Callahan, F.S.A., of the New York Insurance Department, on October 6 and in a subsequent report to the TSAG on October 13, Robert J. Johansen, the Chairman of the Society Committee, suggested (1) providing three blended tables, 25, 50 and 75 percent male, (2) using the Teachers Insurance and Annuity Association (TIAA) method of blending male and female l_x's, and (3) using age 45 or 50 as the pivotal age at which the proportion of males and females would be fixed.

Using a blended table of l_x's where the percentage distribution of males and females is set at a particular age provides mortality rates which tend to follow the natural course of survival of males and females in a group insured at the pivotal age. A copy of the January 4, 1980, Teachers Insurance and Annuity Association-College Retirement Equities Fund (TIAA-CREF) memorandum describing the blending method was filed with some thirty state insurance departments. An excerpt appears in Appendix B.

Because of differences in the relative mortality rates of males and females, the blending process produces a somewhat higher proportion of males at ages below the pivotal age and a lower proportion at the older ages. This, incidentally, is the reason why a simple combining of mortality rates is not appropriate: doing so would, in effect, overstate the proportion of males at the high ages and result in higher mortality rates than a combined group is likely to experience. At age 70, for example, an average of the male and female mortality rates gives a mortality rate per 1,000 of 31.00 versus 30.16 obtained by blending l_x's.

The chairman felt that the choice of pivotal age would have a negligible effect at the younger ages because the mortality rates are very low at these ages. The choice of a pivotal age would have a somewhat greater effect at the higher ages, but by using age 45 or 50, there would not be as great an effect at ages 65 through 70 as there would be from using, say, age 30.

Table 1 shows, for several companies' recent pension life insurance issues, distributions by age based on amounts of insurance.

Following the October 13 meeting of the TSAG at which it recommended adopting the 25, 50, and 75 percent blended tables, further analysis was made of the effects on mortality rates of the choice of a pivotal age and percent of male l_x to total l_x at the pivotal age. The tables in Appendix C, Comparison of Change in Pivotal Age or Percent Male l_x to Total l_x to Total l_x, show that, for any choice of pivotal age, the effects are small at the young ages. The choice of pivotal age is, however, significant at the very high ages. Table 2 summarizes the results of the tests for the 50 percent male ratio. The effect is somewhat less for 25 percent male and somewhat greater for 75 percent male.

Summing up, the choice of age 45 as the pivotal age as compared with other pivotal ages does not result in any sizable change in the values of the mortality rates at the important ages where pension-life insurance policies are likely to be in force, and it is more representative of the average issue age of current business affected by the Norris decision than a higher pivotal age would be. Use of a younger pivotal age would not have a measurable effect on mortality rates at the young ages but might result in an understatement of the surviving male lives at the higher ages because of the longer period over which the disparate male and female mortality rates operate.

TABLE 1

DISTRIBUTION OF PENSION-LIFE INSURANCE POLICIES ISSUED BY SEVERAL COMPANIES
(By Amount of Life Insurance)

COMPANY	A	B	C	D	E 1982	E 1983*	F 1982	F 1983*
ISSUE AGE GROUP	Males							
Under 20	0%	0%	0%	1%	15%	15%	0%	0%
20–29	11	6	20	30	49	48	12	9
30–39	36	59	32	35	22	23	31	28
40–49	32	31	24	20	9	9	31	36
50–59	18	4	19	} 14	4	4	22	22
60 and over	3	0	5	}	1	1	4	5
	Females							
Under 20	1%	0%	0%	1%	19%	20%	0%	0%
20–29	28	11	35	33	42	42	26	25
30–39	33	63	31	36	22	22	36	35
40–49	21	24	21	19	11	11	24	23
50–59	14	2	11	} 11	5	5	12	14
60 and over	3	0	2	}	1	0	2	3
	Total							
Under 20	1%	0%	0%		16%	17%	0%	0%
20–29	14	8	24		46	45	15	12
30–39	35	60	31	NOT	23	23	32	30
40–49	30	29	24	AVAIL-	10	10	30	33
50–59	17	3	17	ABLE	4	4	20	21
60 and over	3	0	4		1	1	3	4

*Nine-months' issues.

Assuming that age 45 is a satisfactory choice for the pivotal age, the next task is to examine the choice of percentages of the male l_x to the total l_x at the pivotal age.

Initially, the chairman had suggested three blended tables, 25, 50, and 75 percent males. Subsequently, one of the Committee members pointed out that his company would likely be issuing policies to pension plans with as much as 90 percent males. Looking to provide for such groups, a second set of ratios, 20, 40, 60, and 80 percent, was analyzed as a possibility. However, it seems desirable to include 50 percent males as well. This would mean five blended tables, in addition to the existing all male and all female, or a total of seven tables. Table 3 shows for pivotal age 45 the effects of changing the proportions of males.

Since the blended mortality tables are primarily intended for use in determining cash values, amounts of nonforfeiture paid-up insurance, and periods of extended term insurance, the effect of changes in the percent male was investigated. Sets of nonforfeiture values for a whole life policy at 4

TABLE 2

EFFECT OF CHOICE OF PIVOTAL AGE
(Ratio of Male l_x to Total l_x is 50%)

PIVOTAL AGE:	40	45	50	55	60	65
Table Age	Blended 1980 CSO Values of 1,000 q_x at the Table Age					
20	1.48	1.48	1.48	1.48	1.48	1.50
30	1.54	1.54	1.54	1.54	1.55	1.55
40	2.72	2.72	2.72	2.72	2.72	2.73
50	5.83	5.83	5.84	5.84	5.85	5.87
60	12.70	12.71	12.73	12.74	12.78	12.84
70	30.15	30.16	30.19	30.24	30.34	30.52
80	79.03	79.07	79.11	79.20	79.39	79.72
	Ratios (percent) of Male l_x to Total l_x at the Table Age					
20	50.27	50.36	50.53	50.82	51.39	52.43
30	50.11	50.20	50.37	50.65	51.23	52.27
40	50.00	50.09	50.25	50.54	51.11	52.16
50	49.75	49.84	50.00	50.29	50.86	51.91
60	48.89	48.98	49.14	49.43	50.00	51.05
70	46.16	46.25	46.41	46.70	47.27	48.31
80	39.73	39.82	39.97	40.25	40.80	41.82

TABLE 3

EFFECT OF CHANGE IN PERCENT MALE

PERCENT MALE l_x/ TOTAL l_x AT PIVOTAL AGE 45:	0%	20%	25%	40%	50%	60%	75%	80%	100%
Table Age	Blended 1980 CSO Values of 1,000 q_x at the Table Age								
20	1.05	1.22	1.27	1.39	1.48	1.56	1.70	1.74	1.90
30	1.35	1.42	1.44	1.50	1.54	1.58	1.64	1.65	1.73
40	2.42	2.54	2.56	2.66	2.72	2.78	2.87	2.90	3.02
50	4.96	5.31	5.39	5.66	5.83	6.01	6.27	6.36	6.71
60	9.47	10.75	11.08	12.05	12.71	13.37	14.38	14.72	16.08
70	22.11	25.19	25.99	28.45	30.16	31.92	34.65	35.59	39.51
80	65.99	70.65	71.92	76.04	79.07	82.34	87.83	89.83	98.84
	Ratios (percent) of Male l_x to Total l_x at the Table Age								
20	0	20.23	25.27	40.35	50.36	60.35	75.27	80.23	100.00
30	0	20.13	25.15	40.20	50.20	60.20	75.15	80.13	100.00
40	0	20.06	25.07	40.09	50.09	60.09	75.07	80.06	100.00
50	0	19.90	24.88	39.85	49.84	59.85	74.88	79.90	100.00
60	0	19.35	24.24	39.02	48.98	59.01	74.23	79.34	100.00
70	0	17.70	22.29	36.45	46.25	56.34	72.08	77.49	100.00
80	0	14.19	18.07	30.61	39.82	49.81	66.50	72.58	100.00

and 6 percent interest were produced by Richard K. Wong, F.S.A. a member
of the Committee. A comparison for issue age 45, at 4 percent interest, is

TABLE 4

PERCENT MALE l_x/TOTAL l_x*

End of Policy Year	0	25	50	75	100
	Cash Values per $1,000 Face Amount—Issue Age 45				
5	41 (27)	44 (30)	47 (33)	51 (36)	54 (39)
10	122 (91)	129 (98)	137 (105)	145 (114)	154 (122)
15	213 (166)	223 (177)	234 (189)	246 (201)	259 (215)
20	315 (257)	326 (270)	339 (284)	354 (299)	370 (317)
	Amount of Reduced Paid-Up Insurance per $1,000 Face Amount				
5	120 (122)	123 (127)	127 (132)	131 (137)	135 (142)
10	305 (331)	310 (337)	316 (344)	323 (351)	330 (359)
15	460 (497)	465 (502)	471 (509)	478 (516)	487 (524)
20	592 (632)	595 (634)	599 (638)	605 (644)	613 (651)
	Period of Extended Term Insurance: Years/Days				
5	6/51(4/106)	5/360(4/120)	5/321(4/137)	5/297(4/160)	5/282(4/182)
10	12/125(10/143)	11/181(9/288)	10/316(9/130)	10/141(9/10)	10/8(8/298)
15	14/176(13/46)	13/150(12/54)	12/193(11/140)	11/300(10/293)	11/97(10/131)
20	14/93(13/152)	13/113(12/178)	12/167(11/250)	11/260(11/2)	11/30(10/166)

*At pivotal age 50.

shown in Table 4. Values at 6 percent interest are shown in parentheses. Note that the pivotal age is 50, not 45.

Differences are smaller at issue age 35. A comparison at issue age 65 shows smaller differences in cash values, in going from 0 percent males to 75 and 100 percent males. Table 5 shows this effect. Note that at durations 10, 15, and 20 the cash values decrease and then increase.

In weighing the use of five tables (100%, 75%, 50%, 25%, 0% male) as opposed to the use of seven tables (100%, 80%, 60%, 50%, 40%, 20%, and 0% male), it should be kept in mind that the choice of an interest rate in calculating cash values and nonforfeiture benefits has as much or more effect on the values as the choice of a particular blend of male and female lives. Choosing an appropriate blended table can, at most, provide some degree of equity to a group of insured lives as a group. The question of complete equity is not now at issue since the Norris decision and the Committee, in providing blended CSO and CET tables, is working with a *fait accompli* in this regard.

The extended term insurance periods were calculated on the basis of a blended CET table obtained by applying the CET loading formula to the blended CSO table for each pivotal age and percent male l_x to total. The CET tables should not be derived by blending the male and female CET table l_x's.

TABLE 5

PERCENT MALE l_x/TOTAL* l_x

End of Policy Year	0	25	50	75	100
Cash Values per $1,000 Face Amount—Issue Age 65					
5	108	110	113	117	124
10	285	284	286	291	301
15	451	447	446	448	456
20	601	594	589	587	591
Amount of Reduced Paid-Up Insurance per $1,000 Face Amount					
5	178	177	177	180	186
10	416	409	405	404	408
15	596	585	577	572	573
20	729	719	709	701	698
Period of Extended Term Insurance: Years/Days					
5	3/251	3/87	2/327	2/235	2/172
10	5/246	5/53	4/244	4/91	3/331
15	5/287	5/146	4/363	4/224	4/86
20	5/48	4/319	4/222	4/108	3/345

*At pivotal age 50.

In calculating the blended CSO tables, the following method was used. Values of l_x were taken from the tables in the report of the Committee on Specifications for Monetary Values—1980 CSO Tables. The values of l_x in these tables were based on a radix of 200 at age 99. The appended tables follow this rule.

At the pivotal age in each case two ratios were formed; the ratio to be applied to all the male l_x's is $MR = (l_x^M + l_x^F) \times Z/l_x^M$ where Z is the chosen ratio of male l_x to total l_x; the other, to be applied to the female l_x's, is $FR = (l_x^M + l_x^F) \times (1 - Z)/l_x^F$. MR and FR appear in the tables in Appendix C. Totals of the adjusted male and female l_x's were formed at each age and used to calculate mortality rates. These mortality rates were then used to calculate new blended l_x's starting from a radix of 200 at age 99. The CET l_x's were also calculated from a radix of 200 at age 99.

Tables of values of l_x and 1,000 q_x for every age and for 25, 50, and 75 percent male l_x to total l_x at pivotal ages 45 and 50 and for 20, 40, 50, 60, and 80 percent male l_x to total l_x at pivotal age 45 appear in Appendix D and Appendix E, respectively. The October 13 recommendation from the TSAG called for the 100 percent Male CSO and CET tables to be designated 1980 CSO-A and 1980 CET-A. The 75 percent male would be B; the 50 percent, C; the 25 percent, D; and the 100 percent female, E. (Note: At its December 1983 meeting, the NAIC adopted seven tables for use with Norris-affected policies: the 80, 60, 50, 40, and 20 percent blends as well as 100

percent male and 100 percent female. The five blended tables were identified by the letters B through F, respectively, with A being 100 percent male and G, 100 percent female.)

It is our understanding that the calculation of valuation reserves on the separate male and female 1980 CSO mortality tables will continue to be required. This would both assure that adequate reserves will be maintained in future years and provide some indication of the proportions of policies issued on male and female lives.

Commissioners reserve valuation method (CRVM) reserves and net level reserves were provided by Richard Wong for the 25, 50, and 75 percent blended CSO tables as well as the 100 percent male and 100 percent female tables. Age 50 was used as the pivotal age. Comparing cash values with the reserves calculated on each blended table indicates that the cash values are lower than the reserves in each case, but cash values on a blended male/female table will exceed CRVM reserves on the all female mortality table. In applying valuation tests to assure that reserves cover cash values, this fact must be kept in mind. It is suggested that such tests be made in the aggregate. At the same time, it must be realized that if the percentage of insured females is actually higher than is assumed, in effect, by the use of a blended table, then the aggregate valuation reserves may not cover cash values. Appendix F compares statutory cash values with CRVM reserves and net level reserves for issue age 45, interest at 4 percent, and mortality rates for 100, 75, 50, and 25 percent male and female.

The short time afforded the Committee for the construction of blended 1980 CSO and 1980 CET mortality tables has not permitted any study of extension of the method to the proposed Smoker/Nonsmoker mortality tables. If desired, the methods described in this report could be extended to the Smoker/Nonsmoker tables.

This is a report of the Society of Actuaries Committee on Nonforfeiture and Valuation Mortality Problems—Individual Life Insurance and Annuities.† The ideas and tables presented in the report have generally been agreed to by members of the Committee, including the use of age 45 as the pivotal age at which the percentages of the male l_x to the total l_x would be applied. However, the short time for completion of this task, between the meeting of the TSAG on October 13 and the mailing of this report to the TSAG prior to their December 3 meeting did not leave sufficient time for the Committee members to review this report and submit their comments prior to the submission to the TSAG.

Consequently, the Chairman acknowledges his sole responsibility for the statements in the report. Neither the Executive Committee nor the Board of

† Formerly the Committee to Develop a New Mortality Basis for Individual Annuity Valuation.

Governors of the Society has seen this report prior to its transmission to the TSAG.

Robert J. Johansen, F.S.A.
Chairman
Society of Actuaries Committee on
Nonforfeiture and Valuation Mortality
Problems—Individual Life
Insurance and Annuities

NOTE.—Subsequent to the preparation of this report, the Board of Governors of the Society of Actuaries accepted this study as the final report of the Committee, expressed its appreciation for this work and that of the ''Blended Selection Factors for Blended 1980 CSO Tables,'' and discharged the Committee. As a result, the report transmitted to the NAIC ultimately had Society approval.

APPENDIX A

October 21, 1983 Memorandum to NAIC members from NAIC President, Roger C. Day

RE: *Norris* Decision—NAIC Adoption of Blended 1980 CSO and 1980 CET Mortality Tables.

In my letter of August 29, 1983, I pointed out that in order to comply with the *Norris* decision, certain plans of insurance would have to contain nonforfeiture values which do not vary by sex. This presents a problem with respect to the 1980 CSO Tables, which are presently sex distinct.

On September 21, 1983 at Tampa, Florida, the Executive Committee of the NAIC adopted the recommendation of the (A) Committee for an interim procedure authorizing the use of tables that are a ''blend'' of the 1980 CSO and CET sex distinct tables for plans impacted by the *Norris* decision. The blended Tables would make it possible for life insurers to obtain sets of minimum nonforfeiture values that do not differ by sex.

Enclosed is a copy of the proposal as adopted entitled, *NAIC Proposed Procedure for Permitting Same Minimum Nonforfeiture Standards for Men and Women Insured Under 1980 CSO and 1980 CET Mortality Tables.* The preamble explains the need for this action and the intent of the proposed procedure.

Section 5-c.(8)(f) of the Standard Nonforfeiture Law for Life insurance permits the substitution for the 1980 CSO and CET Tables of any ordinary mortality tables that are adopted after 1980 by the NAIC and approved by regulation promulgated by the Commissioner. Now that the NAIC has adopted

these "blended" tables, state insurance commissioners may promulgate them under that authority. The NAIC will promulgate a model regulation to supplement this interim model language after the Technical Advisory Task Force submits its recommendations at the December meeting in San Diego.

Because of the need for immediate action to accommodate unisex policy requirements, I urge you to seriously consider using the language in the enclosed model on an interim basis.

NAIC PROPOSED PROCEDURE FOR PERMITTING SAME MINIMUM NONFORFEITURE STANDARDS FOR MEN AND WOMEN INSUREDS UNDER 1980 CSO AND 1980 CET MORTALITY TABLES

Preamble

The U.S. Supreme Court in its decision in *Arizona Governing Committee v. Norris* makes it illegal for an employer to make contributions after August 1, 1983 to a defined contribution pension plan if the benefits derived from those contributions differ by sex. Although there is some uncertainty as to the breadth of the Supreme Court's decision, it would seem to require that after August 1, 1983, employer pension plans may need to be funded by life insurance products that have identical nonforfeiture values for men and women. Since the 1980 CSO and 1980 CET Mortality Tables contain mortality rates that vary by both age and sex, it is very difficult if not impossible for companies to determine actual nonforfeiture values that are identical for men and women and also satisfy a sex-differentiated minimum standard. For this reason, this regulation permits the same minimum nonforfeiture standards—for men and women insureds under the 1980 CSO and 1980 CET Mortality Tables.

A few background comments may be helpful in understanding the intent of this regulation:

1. No attempt was made to define which policies and situations are covered by the *Norris* decision and which are not. The breadth of the *Norris* decision is unclear and may ultimately have to be resolved by further court decisions or Federal legislation.
2. Insurers are given flexibility to use either
   a. the existing tables with mortality rates that vary by age and sex, or
   b. tables of mortality rates which are a blend of the male and female mortality rates.
3. No change is made in minimum valuation standards, since these do not involve any contractual relationship between the insurer and its policyholder clients and the Supreme Court did not address state statutory valuation standards.
4. Section 5 is included to make it clear that an insurer who issues the same kind of policy on a sex-distinct basis in some circumstances and on a sex-neutral basis in others shall not be deemed to be in violation of the state unfair discrimination laws.

5. A cutoff date of January 1, 1989 is provided in anticipation of a more permanent resolution of this issue by that time.
6. The effective date is August 1, 1983, the date the judgment in the *Norris* decision became effective.

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Section 1. Authority

This Rule is promulgated by the Commissioner of Insurance pursuant to Section (insert applicable reference to the Standard Nonforfeiture Law for Life Insurance) of the (insert state) Insurance Laws.

Section 2. Purpose

The purpose of this Rule is to permit individual life insurance policies to provide the same cash surrender values and paid-up nonforfeiture benefits to both men and women. No change in minimum valuation standards is implied by this rule.

Section 3. Definitions

A. As used in this Rule, "1980 CSO Table, with or without Ten-Year Select Mortality Factors" means that mortality table, consisting of separate rates of mortality for male and female lives, developed by the Society of Actuaries Committee to Recommend New Mortality Tables for Valuation of Standard Individual Ordinary Life Insurance, incorporated in the 1980 NAIC Amendments to the Model Standard Valuation Law and Standard Nonforfeiture Law for Life Insurance, and referred to in those models as the Commissioners 1980 Standard Ordinary Mortality Table, with or without Ten-Year Select Mortality Factors.

B. As used in this Rule, "1980 CSO Table (M), with or without Ten-Year Select Mortality Factors" means that mortality table consisting of the rates of mortality for male lives from the 1980 CSO Table, with or without Ten-Year Select Mortality Factors.

C. As used in this Rule, "1980 CSO Table (F), with or without Ten-Year Select Mortality Factors" means that mortality table consisting of the rates

of mortality for female lives from the 1980 CSO Table, with or without Ten-Year Select Mortality Factors.

D. As used in this Rule, "1980 CET Table" means that mortality table consisting of separate rates of mortality for male and female lives, developed by the Society of Actuaries Committee to Recommend New Mortality Tables for Valuation of Standard Individual Ordinary Life Insurance, incorporated in the 1980 NAIC Amendments to the Model Standard Valuation Law and Standard Nonforfeiture Law for Life Insurance, and referred to in those models as the Commissioners 1980 Extended Term Insurance Table.

E. As used in this Rule, "1980 CET Table (M)" means that mortality table consisting of the rates of mortality for male lives from the 1980 CET Table.

F. As used in this Rule, "1980 CET Table (F)" means that mortality table consisting of the rates of mortality for female lives from the 1980 CET Table.

Section 4. Rule

For any policy of insurance on the life of either a male or female insured delivered or issued for delivery in this state before January 1, 1989 and after the operative date of Section (insert applicable reference corresponding to paragraph 5-c(11) of the NAIC Model Standard Nonforfeiture Law for Life Insurance) for that policy form.

(i) a mortality table which is a blend of the 1980 CSO Table (M) and the 1980 CSO Table (F) with or without Ten-Year Select Mortality Factors may at the option of the company be substituted for the 1980 CSO Table, with or without Ten-Year Select Mortality Factors, and

(ii) a mortality table which is of the same blend as used in (i) but applied to form a blend of the 1980 CET Table (M) and the 1980 CET Table (F) may at the option of the company be substituted for the 1980 CET Table.

for use in determining minimum cash surrender values and amounts of paid-up nonforfeiture benefits.

Section 5. Unfair Discrimination

It shall not be a violation of (insert applicable reference to unfair trade practices statute) for an insurer to issue the same kind of policy of life insurance on both a sex distinct and sex neutral basis.

Section 6. Separability

If any provision of this Rule or the application thereof to any person or circumstance is for any reason held to be invalid, the remainder of the

regulation and the application of such provision to other persons or circumstances shall not be affected thereby.

Section 7. Effective Date

The effective date of this Rule is August 1, 1983 to comply with the Norris Decision.

Text of Amendment to the Model Regulation Recommended by the TSAG at its October 1983 meeting

Section 4 of the Model Regulation adopted by the NAIC Executive Committee at Tampa, Florida, be amended to add a paragraph stating:

The following blends will be considered as the basis for acceptable tables:
A. 100% Male 0% Female for tables to be designated as the "1980 CSO-A" and "1980 CET-A" tables.
B. 75% Male 25% Female for tables to be designated as the "1980 CSO-B" and "1980 CET-B" tables.
C. 50% Male 50% Female for tables to be designated as the "1980 CSO-C" and "1980 CET-C" tables.
D. 25% Male 75% Female for tables to be designated as the "1980 CSO-D" and "1980 CET-D" tables.
E. 0% Male 100% Female for tables to be designated as the "1980 CSO-E" and "1980 CET-E" tables.

Blends A and E are not to be used as blended tables for policies issued on or after January 1, 1986. The same blend must be used for the 1980 CSO Table and 1980 CET Table for a specific plan.

APPENDIX B

Excerpt from TIAA-CREF Memorandum explaining their methodology in deriving a nonsex-distinct annuity table:

From this analysis, . . . we concluded that a 50/50 male/female population clustered around age 65 was the most reasonable representation [of TIAA-CREF annuitants at retirement]. Therefore we selected age 65 as the pivotal age for a 50/50 male/female distribution. We used 100,000 male lives and 100,000 female lives at age 65 as the nuclei for the new table, from which the numbers living at all other ages would be calculated, and from which the merged-gender grouping at each age (e.g., 200,000 at age 65) would be derived, as follows:
1. Working in both directions from the 100,000 male and female nuclei at age 65, we calculated the number living and number dying at each age above and below 65 for males and females separately, using sex-distinct 1971 IAM Table mortality rates for each age.

2. Then at each age we added the number of men living to the number of women living and added the number of men dying to the number of women dying.
3. Finally, by dividing the total number of *persons* dying at each age by the total number of persons living at the beginning of each year of age we determined the mortality rate on a merged-gender, or "unisex" basis for each and every age.

The result is a mortality table showing the merged number of persons living at each age, the merged number of persons dying at each age, and the merged-gender mortality rate for each age.

APPENDIX C

1980 CSO

COMPARISON OF CHANGE IN PIVOTAL AGE OR PERCENT MALE l_x TO TOTAL l_x
PIVOTAL AGE IS 40

Ratio Male l_x to Total l_x = 25% MR = .339171901 FR = 2.8526803			Ratio Male l_x to Total l_x = 50% MR = .678343803 FR = 1.90178686			Ratio Male l_x to Total l_x = 75% MR = 1.0175157 FR = .950893431		
Age	M/T%	1.000q_x	Age	M/T%	1.000q_x	Age	M/T%	1.000q_x
0	25.34	3.21	0	50.44	3.54	0	75.33	3.86
5	25.30	.79	5	50.39	.83	5	75.29	.86
10	25.29	.69	10	50.38	.71	10	75.29	.71
15	25.27	.97	15	50.36	1.10	15	75.27	1.21
20	25.21	1.26	20	50.27	1.48	20	75.21	1.69
25	25.13	1.31	25	50.18	1.47	25	75.13	1.62
30	25.09	1.44	30	50.11	1.54	30	75.09	1.63
35	25.05	1.77	35	50.06	1.88	35	75.05	1.99
40	25.00	2.57	40	50.00	2.72	40	75.00	2.87
45	24.93	3.80	45	49.91	4.06	45	74.93	4.30
50	24.81	5.39	50	49.75	5.83	50	74.81	6.27
55	24.60	7.92	55	49.46	8.77	55	74.59	9.61
60	24.17	11.07	60	48.89	12.70	60	74.16	14.37
65	23.42	17.13	65	47.84	19.77	65	73.35	22.54
70	22.23	25.98	70	46.16	30.15	70	72.01	34.64
75	20.41	43.53	75	43.48	49.52	75	69.77	56.34
80	18.02	71.90	80	39.73	79.03	80	66.42	87.80
85	15.33	121.74	85	35.20	129.06	85	61.97	138.92
90	12.77	194.72	90	30.52	200.22	90	56.85	208.32
95	11.10	318.61	95	27.26	320.77	95	52.93	323.93

PIVOTAL AGE IS 45

Ratio Male l_x to Total l_x = 25% MR = .339492851 FR = 2.84513942			Ratio Male l_x to Total l_x = 50% MR = .678985702 FR = 1.89675961			Ratio Male l_x to Total l_x = 75% MR = 1.01847855 FR = .948379807		
Age	M/T%	1.000q_x	Age	M/T%	1.000q_x	Age	M/T%	1.000q_x
0	25.40	3.21	0	50.53	3.54	0	75.40	3.86
5	25.36	.79	5	50.48	.83	5	75.36	.86
10	25.36	.70	10	50.47	.71	10	75.35	.71
15	25.34	.98	15	50.45	1.10	15	75.34	1.21
20	25.27	1.27	20	50.36	1.48	20	75.27	1.70
25	25.20	1.32	25	50.27	1.47	25	75.20	1.62
30	25.15	1.44	30	50.20	1.54	30	75.15	1.64
35	25.12	1.77	35	50.15	1.88	35	75.12	1.99
40	25.07	2.56	40	50.09	2.72	40	75.07	2.87
45	25.00	3.80	45	50.00	4.06	45	75.00	4.30
50	24.88	5.39	50	49.84	5.83	50	74.88	6.27
55	24.66	7.93	55	49.55	8.77	55	74.66	9.62
60	24.24	11.08	60	48.98	12.71	60	74.23	14.38
65	23.48	17.13	65	47.93	19.78	65	73.42	22.54
70	22.29	25.99	70	46.25	30.16	70	72.08	34.65
75	20.47	43.54	75	43.57	49.55	75	69.85	56.36
80	18.07	71.92	80	39.82	79.07	80	66.50	87.83
85	15.38	121.77	85	35.29	129.11	85	62.06	138.96
90	12.81	194.74	90	30.59	200.23	90	56.94	208.39
95	11.14	318.70	95	27.32	320.74	95	53.01	323.98

COMPARISON OF CHANGE IN PIVOTAL AGE OR PERCENT MALE l_x TO TOTAL l_x
PIVOTAL AGE IS 50

Ratio Male l_x to Total l_x = 25% MR = .340069714 FR = 2.83172084			Ratio Male l_x to Total l_x = 50% MR = .680139427 FR = 1.88781389			Ratio Male l_x to Total l_x = 75% MR = 1.02020914 FR = .943906947		
Age	$M/T\%$	$1,000q_x$	Age	$M/T\%$	$1,000q_x$	Age	$M/T\%$	$1,000q_x$
0	25.53	3.22	0	50.70	3.54	0	75.52	3.86
5	25.49	.79	5	50.64	.83	5	75.48	.86
10	25.48	.69	10	50.63	.71	10	75.47	.72
15	25.46	.98	15	50.61	1.09	15	75.46	1.21
20	25.40	1.26	20	50.53	1.48	20	75.39	1.69
25	25.32	1.31	25	50.43	1.47	25	75.32	1.62
30	25.27	1.44	30	50.37	1.54	30	75.27	1.63
35	25.24	1.77	35	50.31	1.89	35	75.24	2.00
40	25.19	2.57	40	50.25	2.72	40	75.19	2.87
45	25.12	3.81	45	50.16	4.05	45	75.12	4.30
50	25.00	5.40	50	50.00	5.84	50	75.00	6.28
55	24.78	7.93	55	49.71	8.77	55	74.78	9.62
60	24.36	11.09	60	49.14	12.73	60	74.35	14.39
65	23.60	17.15	65	48.09	19.80	65	73.54	22.56
70	22.40	26.01	70	46.41	30.19	70	72.21	34.68
75	20.58	43.57	75	43.73	49.59	75	69.98	56.39
80	18.16	71.95	80	39.97	79.11	80	66.64	87.87
85	15.46	121.80	85	35.43	129.15	85	62.21	139.03
90	12.88	194.78	90	30.73	200.26	90	57.10	208.48
95	11.21	318.64	95	27.45	320.80	95	53.17	323.84

PIVOTAL AGE IS 55

Ratio Male l_x to Total l_x = 25% MR = .341120488 FR = 2.80771505			Ratio Male l_x to Total l_x = 50% MR = .682240976 FR = 1.87181003			Ratio Male l_x to Total l_x = 75% MR = 1.02336147 FR = .935905016		
Age	$M/T\%$	$1,000q_x$	Age	$M/T\%$	$1,000q_x$	Age	$M/T\%$	$1,000q_x$
0	25.75	3.22	0	50.99	3.55	0	75.73	3.87
5	25.71	.79	5	50.93	.83	5	75.69	.87
10	25.70	.69	10	50.92	.70	10	75.69	.72
15	25.68	.98	15	50.90	1.09	15	75.67	1.22
20	25.62	1.27	20	50.82	1.48	20	75.61	1.70
25	25.54	1.32	25	50.72	1.47	25	75.53	1.62
30	25.49	1.44	30	50.65	1.54	30	75.49	1.63
35	25.46	1.77	35	50.60	1.89	35	75.45	2.00
40	25.41	2.56	40	50.54	2.72	40	75.40	2.87
45	25.34	3.81	45	50.45	4.06	45	75.34	4.30
50	25.22	5.41	50	50.29	5.84	50	75.22	6.27
55	25.00	7.94	55	50.00	8.79	55	75.00	9.62
60	24.57	11.10	60	49.43	12.74	60	74.57	14.41
65	23.81	17.17	65	48.38	19.83	65	73.77	22.58
70	22.60	26.05	70	46.70	30.24	70	72.44	34.72
75	20.77	43.63	75	44.02	49.65	75	70.23	56.45
80	18.34	72.00	80	40.25	79.20	80	66.90	87.97
85	15.62	121.85	85	35.70	129.25	85	62.48	139.13
90	13.01	194.79	90	30.98	200.34	90	57.38	208.55
95	11.32	318.74	95	27.69	320.74	95	53.46	324.14

COMPARISON OF CHANGE IN PIVOTAL AGE OR PERCENT MALE l_x TO TOTAL l_x
PIVOTAL AGE IS 60

Ratio Male l_x to Total l_x = 25% MR = .343230348 FR = 2.76114769			Ratio Male l_x to Total l_x = 50% MR = .686460697 FR = 1.84076513			Ratio Male l_x to Total l_x = 75% MR = 1.02969105 FR = .920382563		
Age	M/T%	1,000q_x	Age	M/T%	1,000q_x	Age	M/T%	1,000q_x
0	26.19	3.23	0	51.56	3.55	0	76.15	3.87
5	26.15	.80	5	51.51	.83	5	76.11	.87
10	26.14	.69	10	51.49	.71	10	76.10	.72
15	26.12	.98	15	51.47	1.10	15	76.09	1.22
20	26.06	1.27	20	51.39	1.48	20	76.03	1.70
25	25.98	1.32	25	51.29	1.48	25	75.95	1.62
30	25.93	1.44	30	51.23	1.55	30	75.91	1.64
35	25.89	1.78	35	51.18	1.88	35	75.87	2.00
40	25.84	2.57	40	51.11	2.72	40	75.83	2.87
45	25.77	3.81	45	51.02	4.06	45	75.76	4.31
50	25.65	5.40	50	50.86	5.85	50	75.64	6.28
55	25.43	7.95	55	50.57	8.80	55	75.43	9.64
60	25.00	11.13	60	50.00	12.78	60	75.00	14.43
65	24.22	17.22	65	48.95	19.89	65	74.21	22.63
70	23.01	26.11	70	47.27	30.34	70	72.89	34.80
75	21.14	43.72	75	44.58	49.81	75	70.70	56.59
80	18.68	72.11	80	40.80	79.39	80	67.40	88.12
85	15.92	121.98	85	36.22	129.45	85	63.02	139.33
90	13.27	194.87	90	31.47	200.47	90	57.94	208.72
95	11.55	318.74	95	28.15	320.76	95	54.03	324.10

PIVOTAL AGE IS 65

Ratio Male l_x to Total l_x = 25% MR = .347216208 FR = 2.67869074			Ratio Male l_x to Total l_x = 50% MR = .694432416 FR = 1.78579383			Ratio Male l_x to Total l_x = 75% MR = 1.04164862 FR = .892896912		
Age	M/T%	1,000q_x	Age	M/T%	1,000q_x	Age	M/T%	1,000q_x
0	27.00	3.24	0	52.60	3.57	0	76.90	3.88
5	26.96	.80	5	52.55	.83	5	76.87	.87
10	26.95	.70	10	52.54	.71	10	76.86	.72
15	26.94	.98	15	52.52	1.10	15	76.84	1.22
20	26.87	1.28	20	52.43	1.50	20	76.78	1.71
25	26.79	1.33	25	52.33	1.48	25	76.71	1.63
30	26.74	1.45	30	52.27	1.55	30	76.67	1.64
35	26.70	1.77	35	52.22	1.90	35	76.63	2.01
40	26.65	2.58	40	52.16	2.73	40	76.58	2.88
45	26.58	3.82	45	52.07	4.08	45	76.52	4.32
50	26.46	5.43	50	51.91	5.87	50	76.40	6.29
55	26.23	7.98	55	51.62	8.84	55	76.19	9.67
60	25.79	11.18	60	51.05	12.84	60	75.78	14.49
65	25.00	17.30	65	50.00	20.01	65	75.00	22.72
70	23.76	26.24	70	48.31	30.52	70	73.71	34.93
75	21.85	43.90	75	45.62	50.06	75	71.56	56.81
80	19.33	72.33	80	41.82	79.72	80	68.32	88.43
85	16.49	122.18	85	37.20	129.80	85	63.99	139.66
90	13.76	195.01	90	32.38	200.79	90	58.96	209.04
95	11.98	318.83	95	29.00	321.03	95	55.07	324.36

COMPARISON OF CHANGE IN PIVOTAL AGE OR PERCENT MALE l_x TO TOTAL l_x
PIVOTAL AGE IS 40

Ratio Male l_x to Total l_x = 20% MR = .271337521 FR = 3.04285898			Ratio Male l_x to Total l_x = 40% MR = .542675042 FR = 2.28214424			Ratio Male l_x to Total l_x = 60% MR = .814012564 FR = 1.52142949			Ratio Male l_x to Total l_x = 80% MR = 1.08535009 FR = .760714745		
Age	$M/T\%$	$1,000q_x$	Age	$M/T\%$	$1,000q_x$	Age	$M/T\%$	$1,000q_x$	Age	$M/T\%$	$1,000q_x$
0	20.29	3.15	0	40.43	3.41	0	60.43	3.67	0	80.28	3.93
5	20.25	.79	5	40.38	.82	5	60.38	.84	5	80.25	.88
10	20.25	.69	10	40.37	.70	10	60.37	.71	10	80.24	.72
15	20.23	.95	15	40.35	1.05	15	60.35	1.14	15	80.23	1.24
20	20.18	1.22	20	40.26	1.39	20	60.26	1.56	20	80.18	1.74
25	20.11	1.29	25	40.17	1.41	25	60.17	1.53	25	80.11	1.65
30	20.07	1.42	30	40.11	1.50	30	60.11	1.58	30	80.07	1.65
35	20.04	1.75	35	40.06	1.84	35	60.06	1.93	35	80.04	2.01
40	20.00	2.54	40	40.00	2.66	40	60.00	2.78	40	80.00	2.90
45	19.94	3.76	45	39.91	3.95	45	59.91	4.15	45	79.94	4.35
50	19.84	5.31	50	39.76	5.66	50	59.76	6.01	50	79.84	6.35
55	19.66	7.76	55	39.48	8.43	55	59.48	9.11	55	79.65	9.78
60	19.30	10.75	60	38.94	12.05	60	58.93	13.37	60	79.28	14.71
65	18.65	16.61	65	37.95	18.70	65	57.91	20.86	65	78.58	23.10
70	17.65	25.18	70	36.37	28.44	70	56.26	31.90	70	77.42	35.58
75	16.13	42.42	75	33.90	47.04	75	53.58	52.13	75	75.48	57.82
80	14.15	70.63	80	30.53	76.01	80	49.72	82.31	80	72.50	89.80
85	11.96	120.49	85	26.59	125.91	85	44.90	132.66	85	68.49	141.33
90	9.89	193.83	90	22.65	197.80	90	39.71	203.08	90	63.73	210.54
95	8.56	318.33	95	19.98	319.83	95	35.99	321.94	95	59.98	324.89

PIVOTAL AGE IS 45

Ratio Male l_x to Total l_x = 20% MR = .271594281 FR = 3.03481538			Ratio Male l_x to Total l_x = 40% MR = .543188561 FR = 2.27611154			Ratio Male l_x to Total l_x = 60% MR = .814782843 FR = 1.51740769			Ratio Male l_x to Total l_x = 80% MR = 1.08637712 FR = .758703845		
Age	$M/T\%$	$1,000q_x$	Age	$M/T\%$	$1,000q_x$	Age	$M/T\%$	$1,000q_x$	Age	$M/T\%$	$1,000q_x$
0	20.34	3.15	0	40.51	3.41	0	60.51	3.67	0	80.34	3.92
5	20.31	.79	5	40.47	.81	5	60.46	.84	5	80.31	.87
10	20.30	.70	10	40.45	.70	10	60.45	.71	10	80.30	.72
15	20.29	.95	15	40.43	1.05	15	60.43	1.14	15	80.29	1.24
20	20.23	1.22	20	40.35	1.39	20	60.35	1.56	20	80.23	1.74
25	20.17	1.29	25	40.26	1.40	25	60.26	1.53	25	80.17	1.65
30	20.13	1.42	30	40.20	1.50	30	60.20	1.58	30	80.13	1.65
35	20.10	1.74	35	40.15	1.83	35	60.15	1.93	35	80.10	2.02
40	20.06	2.54	40	40.09	2.66	40	60.09	2.78	40	80.06	2.90
45	20.00	3.75	45	40.00	3.96	45	60.00	4.15	45	80.00	4.35
50	19.90	5.31	50	39.85	5.66	50	59.85	6.01	50	79.90	6.36
55	19.71	7.76	55	39.57	8.43	55	59.57	9.11	55	79.71	9.78
60	19.35	10.75	60	39.02	12.05	60	59.01	13.37	60	79.34	14.72
65	18.71	16.62	65	38.03	18.71	65	58.00	20.88	65	78.64	23.11
70	17.70	25.19	70	36.45	28.45	70	56.34	31.92	70	77.49	35.59
75	16.18	42.43	75	33.98	47.05	75	53.67	52.16	75	75.54	57.84
80	14.19	70.65	80	30.61	76.04	80	49.81	82.34	80	72.58	89.83
85	12.00	120.52	85	26.66	125.93	85	44.99	132.68	85	68.56	141.38
90	9.92	193.80	90	22.71	197.78	90	39.80	203.08	90	63.81	210.53
95	8.59	318.37	95	20.05	319.76	95	36.06	322.03	95	60.07	324.89

COMPARISON OF CHANGE IN PIVOTAL AGE OR PERCENT MALE l_x TO TOTAL l_x
PIVOTAL AGE IS 50

Ratio Male l_x to Total l_x = 20% MR = .272055771 FR = 3.02050223			Ratio Male l_x to Total l_x = 40% MR = .544111542 FR = 2.26537668			Ratio Male l_x to Total l_x = 60% MR = .816167313 FR = 1.51025112			Ratio Male l_x to Total l_x = 80% MR = 1.08822308 FR = .755125558		
Age	M/T%	$1,000q_x$	Age	M/T%	$1,000q_x$	Age	M/T%	$1,000q_x$	Age	M/T%	$1,000q_x$
0	20.45	3.15	0	40.67	3.41	0	60.67	3.67	0	80.44	3.93
5	20.42	.79	5	40.62	.81	5	60.62	.85	5	80.41	.87
10	20.41	.69	10	40.61	.70	10	60.61	.71	10	80.40	.72
15	20.39	.95	15	40.59	1.05	15	60.59	1.14	15	80.39	1.24
20	20.34	1.22	20	40.51	1.39	20	60.50	1.56	20	80.33	1.74
25	20.28	1.29	25	40.41	1.41	25	60.41	1.53	25	80.27	1.65
30	20.23	1.42	30	40.35	1.50	30	60.35	1.57	30	80.23	1.66
35	20.20	1.75	35	40.30	1.84	35	60.30	1.93	35	80.20	2.01
40	20.16	2.53	40	40.24	2.66	40	60.24	2.77	40	80.16	2.90
45	20.10	3.76	45	40.15	3.95	45	60.15	4.15	45	80.10	4.36
50	20.00	5.31	50	40.00	5.66	50	60.00	6.01	50	80.00	6.36
55	19.82	7.76	55	39.72	8.43	55	59.72	9.11	55	79.81	9.79
60	19.45	10.76	60	39.18	12.06	60	59.17	13.38	60	79.44	14.72
65	18.81	16.63	65	38.18	18.73	65	58.15	20.89	65	78.75	23.12
70	17.80	25.21	70	36.60	28.49	70	56.50	31.94	70	77.60	35.61
75	16.27	42.46	75	34.13	47.09	75	53.83	52.19	75	75.66	57.87
80	14.27	70.67	80	30.74	76.08	80	49.97	82.40	80	72.70	89.87
85	12.06	120.55	85	26.78	125.97	85	45.15	132.73	85	68.70	141.42
90	9.98	193.85	90	22.82	197.81	90	39.95	203.16	90	63.96	210.56
95	8.64	318.43	95	20.14	319.67	95	36.22	321.84	95	60.22	324.95

PIVOTAL AGE IS 55

Ratio Male l_x to Total l_x = 20% MR = .272896391 FR = 2.99489605			Ratio Male l_x to Total l_x = 40% MR = .545792781 FR = 2.24617204			Ratio Male l_x to Total l_x = 60% MR = .818689172 FR = 1.49744803			Ratio Male l_x to Total l_x = 80% MR = 1.09158556 FR = .748724013		
Age	M/T%	$1,000q_x$	Age	M/T%	$1,000q_x$	Age	M/T%	$1,000q_x$	Age	M/T%	$1,000q_x$
0	20.64	3.15	0	40.95	3.41	0	60.94	3.67	0	80.62	3.93
5	20.60	.79	5	40.90	.82	5	60.89	.85	5	80.59	.87
10	20.60	.69	10	40.89	.70	10	60.88	.71	10	80.58	.72
15	20.58	.95	15	40.87	1.05	15	60.86	1.14	15	80.57	1.24
20	20.53	1.22	20	40.79	1.39	20	60.78	1.57	20	80.52	1.73
25	20.46	1.29	25	40.69	1.41	25	60.69	1.54	25	80.46	1.65
30	20.42	1.42	30	40.63	1.50	30	60.63	1.58	30	80.42	1.65
35	20.39	1.75	35	40.58	1.84	35	60.58	1.93	35	80.38	2.02
40	20.35	2.54	40	40.52	2.66	40	60.52	2.78	40	80.34	2.90
45	20.29	3.76	45	40.43	3.96	45	60.43	4.15	45	80.29	4.36
50	20.19	5.31	50	40.28	5.66	50	60.28	6.02	50	80.19	6.36
55	20.00	7.77	55	40.00	8.45	55	60.00	9.12	55	80.00	9.79
60	19.64	10.77	60	39.45	12.08	60	59.45	13.40	60	79.63	14.74
65	18.98	16.64	65	38.46	18.76	65	58.44	20.92	65	78.94	23.14
70	17.97	25.24	70	36.87	28.53	70	56.79	32.00	70	77.80	35.65
75	16.43	42.50	75	34.39	47.16	75	54.12	52.28	75	75.87	57.92
80	14.41	70.72	80	30.99	76.16	80	50.26	82.50	80	72.93	89.94
85	12.19	120.59	85	27.01	126.06	85	45.44	132.84	85	68.95	141.50
90	10.09	193.87	90	23.03	197.91	90	40.23	203.21	90	64.22	210.64
95	8.73	318.35	95	20.34	319.86	95	36.48	321.79	95	60.50	325.07

COMPARISON OF CHANGE IN PIVOTAL AGE OR PERCENT MALE l_x TO TOTAL l_x

PIVOTAL AGE IS 60

Ratio Male l_x to Total l_x = 20% MR = .274584279 FR = 2.9452242			Ratio Male l_x to Total l_x = 40% MR = .549168558 FR = 2.20891815			Ratio Male l_x to Total l_x = 60% MR = .823752837 FR = 1.4726121			Ratio Male l_x to Total l_x = 80% MR = 1.09833712 FR = .736306051		
Age	M/T%	1,000q_x	Age	M/T%	1,000q_x	Age	M/T%	1,000q_x	Age	M/T%	1,000q_x
0	21.02	3.16	0	41.50	3.42	0	61.49	3.68	0	80.98	3.93
5	20.98	.79	5	41.45	.82	5	61.44	.84	5	80.95	.88
10	20.97	.69	10	41.44	.70	10	61.43	.71	10	80.94	.72
15	20.96	.96	15	41.42	1.05	15	61.41	1.15	15	80.93	1.24
20	20.90	1.23	20	41.34	1.40	20	61.32	1.58	20	80.87	1.74
25	20.84	1.29	25	41.24	1.41	25	61.23	1.54	25	80.81	1.65
30	20.80	1.43	30	41.18	1.50	30	61.17	1.58	30	80.77	1.66
35	20.76	1.75	35	41.14	1.84	35	61.12	1.93	35	80.74	2.02
40	20.72	2.54	40	41.07	2.66	40	61.06	2.78	40	80.70	2.90
45	20.66	3.76	45	40.99	3.96	45	60.98	4.16	45	80.65	4.35
50	20.56	5.32	50	40.83	5.67	50	60.82	6.02	50	80.55	6.37
55	20.37	7.78	55	40.55	8.46	55	60.55	9.14	55	80.36	9.81
60	20.00	10.80	60	40.00	12.12	60	60.00	13.44	60	80.00	14.76
65	19.34	16.69	65	39.00	18.81	65	58.99	20.98	65	79.32	23.18
70	18.31	25.30	70	37.41	28.62	70	57.35	32.09	70	78.19	35.71
75	16.74	42.58	75	34.91	47.29	75	54.68	52.42	75	76.29	58.03
80	14.70	70.81	80	31.48	76.33	80	50.83	82.68	80	73.38	90.09
85	12.43	120.68	85	27.47	126.21	85	46.00	133.05	85	69.44	141.68
90	10.30	193.96	90	23.44	198.04	90	40.78	203.41	90	64.75	210.85
95	8.92	318.41	95	20.70	319.97	95	37.01	321.86	95	61.04	324.98

PIVOTAL AGE IS 65

Ratio Male l_x to Total l_x = 20% MR = .277772967 FR = 2.85727012			Ratio Male l_x to Total l_x = 40% MR = .555545933 FR = 2.14295259			Ratio Male l_x to Total l_x = 60% MR = .833318899 FR = 1.42863506			Ratio Male l_x to Total l_x = 80% MR = 1.11109187 FR = .71431753		
Age	M/T%	1,000q_x	Age	M/T%	1,000q_x	Age	M/T%	1,000q_x	Age	M/T%	1,000q_x
0	21.72	3.17	0	42.52	3.43	0	62.47	3.69	0	81.61	3.94
5	21.68	.79	5	42.47	.82	5	62.42	.85	5	81.58	.88
10	21.68	.69	10	42.46	.70	10	62.41	.71	10	81.58	.72
15	21.66	.96	15	42.44	1.06	15	62.39	1.15	15	81.56	1.24
20	21.60	1.23	20	42.36	1.41	20	62.31	1.58	20	81.51	1.74
25	21.54	1.30	25	42.26	1.42	25	62.22	1.54	25	81.45	1.66
30	21.50	1.43	30	42.20	1.51	30	62.16	1.59	30	81.42	1.66
35	21.46	1.75	35	42.15	1.84	35	62.11	1.94	35	81.39	2.02
40	21.42	2.54	40	42.09	2.66	40	62.05	2.79	40	81.35	2.90
45	21.36	3.77	45	42.00	3.97	45	61.97	4.17	45	81.29	4.36
50	21.25	5.34	50	41.85	5.70	50	61.82	6.03	50	81.19	6.38
55	21.06	7.80	55	41.56	8.50	55	61.54	9.17	55	81.02	9.82
60	20.68	10.84	60	41.01	12.18	60	61.00	13.51	60	80.66	14.81
65	20.00	16.76	65	40.00	18.92	65	60.00	21.09	65	80.00	23.26
70	18.94	25.40	70	38.39	28.79	70	58.37	32.27	70	78.90	35.84
75	17.34	42.73	75	35.87	47.54	75	55.72	52.70	75	77.04	58.23
80	15.23	70.99	80	32.39	76.62	80	51.88	83.03	80	74.19	90.35
85	12.90	120.86	85	28.31	126.53	85	47.05	133.43	85	70.32	142.01
90	10.69	194.08	90	24.20	198.27	90	41.80	203.69	90	65.70	211.14
95	9.27	318.42	95	21.41	320.01	95	37.99	322.08	95	62.03	325.21

APPENDIX D

BLENDED 1980 CSO AND 1980 CET MORTALITY TABLES
PIVOTAL AGE IS 45; RATIO OF MALE l_x TO TOTAL l_x IS 25%

	BLENDED 1980 CSO TABLE						BLENDED 1980 CET TABLE				
Age	l_x	$1,000\,q_x$	Age	l_x	$1,000\,q_x$	Age	l_x	$1,000\,q_x$	Age	l_x	$1,000\,q_x$
0	77,914	3.21	50	71,331	5.39	0	1,136,713	4.17	50	998,409	7.01
1	77,664	.93	51	70,947	5.80	1	1,131,973	1.68	51	991,410	7.54
2	77,592	.86	52	70,536	6.26	2	1,130,071	1.61	52	983,935	8.14
3	77,525	.83	53	70,094	6.78	3	1,128,252	1.58	53	975,926	8.81
4	77,461	.82	54	69,619	7.33	4	1,126,469	1.57	54	967,328	9.53
5	77,397	.79	55	69,109	7.93	5	1,124,700	1.54	55	958,109	10.31
6	77,336	.76	56	68,561	8.53	6	1,122,968	1.51	56	948,231	11.09
7	77,277	.75	57	67,976	9.13	7	1,121,272	1.50	57	937,715	11.87
8	77,219	.71	58	67,355	9.72	8	1,119,590	1.46	58	926,584	12.64
9	77,164	.71	59	66,700	10.37	9	1,117,955	1.46	59	914,872	13.48
10	77,109	.70	60	66,008	11.08	10	1,116,323	1.45	60	902,540	14.40
11	77,055	.70	61	65,277	11.92	11	1,114,704	1.45	61	889,543	15.50
12	77,001	.75	62	64,499	12.92	12	1,113,088	1.50	62	875,755	16.80
13	76,943	.81	63	63,666	14.17	13	1,111,418	1.56	63	861,042	18.42
14	76,881	.88	64	62,764	15.59	14	1,109,684	1.63	64	845,182	20.27
15	76,813	.98	65	61,786	17.13	15	1,107,875	1.73	65	828,050	22.27
16	76,738	1.06	66	60,728	18.76	16	1,105,958	1.81	66	809,609	24.39
17	76,657	1.13	67	59,589	20.43	17	1,103,956	1.88	67	789,863	26.56
18	76,570	1.18	68	58,372	22.11	18	1,101,881	1.93	68	768,884	28.74
19	76,480	1.23	69	57,081	23.92	19	1,099,754	1.98	69	746,786	31.10
20	76,386	1.27	70	55,716	25.99	20	1,097,576	2.02	70	723,561	33.79
21	76,289	1.27	71	54,268	28.43	21	1,095,359	2.02	71	699,112	36.96
22	76,192	1.30	72	52,725	31.37	22	1,093,146	2.05	72	673,273	40.78
23	76,093	1.30	73	51,071	34.91	23	1,090,905	2.05	73	645,817	45.38
24	75,994	1.32	74	49,288	39.00	24	1,088,669	2.07	74	616,510	50.70

	BLENDED 1980 CSO TABLE						BLENDED 1980 CET TABLE				
Age	l_x	1,000 q_x	Age	l_x	1,000 q_x	Age	l_x	1,000 q_x	Age	l_x	1,000 q_x
25	75,894	1.32	75	47,366	43.54	25	1,086,415	2.07	75	585,253	56.60
26	75,794	1.33	76	45,304	48.50	26	1,084,166	2.08	76	552,128	63.05
27	75,693	1.34	77	43,107	53.74	27	1,081,911	2.09	77	517,316	69.86
28	75,592	1.37	78	40,790	59.26	28	1,079,650	2.12	78	481,176	77.04
29	75,488	1.40	79	38,373	65.24	29	1,077,361	2.15	79	444,106	84.81
30	75,382	1.44	80	35,870	71.92	30	1,075,045	2.19	80	406,441	93.50
31	75,273	1.49	81	33,290	79.54	31	1,072,691	2.24	81	368,439	103.40
32	75,161	1.54	82	30,642	88.32	32	1,070,288	2.29	82	330,342	114.82
33	75,045	1.60	83	27,936	98.44	33	1,067,837	2.35	83	292,412	127.97
34	74,925	1.68	84	25,186	109.59	34	1,065,328	2.43	84	254,992	142.47
35	74,799	1.77	85	22,426	121.77	35	1,062,739	2.52	85	218,663	158.30
36	74,667	1.88	86	19,695	134.74	36	1,060,061	2.63	86	184,049	175.16
37	74,527	2.02	87	17,041	148.51	37	1,057,273	2.77	87	151,811	193.06
38	74,376	2.17	88	14,510	163.04	38	1,054,344	2.92	88	122,502	211.95
39	74,215	2.36	89	12,144	178.35	39	1,051,265	3.11	89	96,538	231.86
40	74,040	2.56	90	9,978	194.74	40	1,047,996	3.33	90	74,155	253.16
41	73,850	2.81	91	8,035	212.37	41	1,044,506	3.65	91	55,382	276.08
42	73,642	3.05	92	6,329	231.68	42	1,040,694	3.97	92	40,092	301.18
43	73,417	3.29	93	4,863	254.00	43	1,036,562	4.28	93	28,017	330.20
44	73,175	3.54	94	3,628	281.08	44	1,032,126	4.60	94	18,766	365.40
45	72,916	3.80	95	2,608	318.70	45	1,027,378	4.94	95	11,909	414.31
46	72,639	4.08	96	1,777	376.52	46	1,022,303	5.30	96	6,975	489.48
47	72,343	4.36	97	1,108	475.65	47	1,016,885	5.67	97	3,561	618.35
48	72,028	4.68	98	581	656.05	48	1,011,119	6.08	98	1,359	852.87
49	71,691	5.02	99	200	1,000.00	49	1,004,971	6.53	99	200	1,000.00

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BLENDED 1980 CSO AND 1980 CET MORTALITY TABLES
PIVOTAL AGE IS 45; RATIO OF MALE l_x TO TOTAL l_x IS 50%

BLENDED 1980 CSO TABLE						BLENDED 1980 CET TABLE					
Age	l_x	$1,000\,q_x$	Age	l_x	$1,000\,q_x$	Age	l_x	$1,000\,q_x$	Age	l_x	$1,000\,q_x$
0	96,981	3.54	50	88,170	5.83	0	1,528,592	4.60	50	1,332,106	7.58
1	96,638	.97	51	87,656	6.30	1	1,521,560	1.72	51	1,322,009	8.19
2	96,544	.91	52	87,104	6.82	2	1,518,943	1.66	52	1,311,182	8.87
3	96,456	.89	53	86,510	7.42	3	1,516,422	1.64	53	1,299,552	9.65
4	96,370	.85	54	85,868	8.07	4	1,513,935	1.60	54	1,287,011	10.49
5	96,288	.83	55	85,175	8.77	5	1,511,513	1.58	55	1,273,510	11.40
6	96,208	.79	56	84,428	9.50	6	1,509,125	1.54	56	1,258,992	12.35
7	96,132	.77	57	83,626	10.23	7	1,506,801	1.52	57	1,243,443	13.30
8	96,058	.73	58	82,771	10.99	8	1,504,511	1.48	58	1,226,905	14.29
9	95,988	.72	59	81,861	11.81	9	1,502,284	1.47	59	1,209,373	15.35
10	95,919	.71	60	80,894	12.71	10	1,500,076	1.46	60	1,190,809	16.52
11	95,851	.72	61	79,866	13.75	11	1,497,886	1.47	61	1,171,137	17.88
12	95,782	.78	62	78,768	14.96	12	1,495,684	1.53	62	1,150,197	19.45
13	95,707	.87	63	77,590	16.39	13	1,493,396	1.62	63	1,127,826	21.31
14	95,624	.97	64	76,318	18.02	14	1,490,977	1.72	64	1,103,792	23.43
15	95,531	1.10	65	74,943	19.78	15	1,488,413	1.85	65	1,077,930	25.71
16	95,426	1.21	66	73,461	21.64	16	1,485,659	1.96	66	1,050,216	28.13
17	95,311	1.31	67	71,871	23.59	17	1,482,747	2.06	67	1,020,673	30.67
18	95,186	1.39	68	70,176	25.58	18	1,479,693	2.14	68	989,369	33.25
19	95,054	1.44	69	68,381	27.73	19	1,476,526	2.19	69	956,472	36.05
20	94,917	1.48	70	66,485	30.16	20	1,473,292	2.23	70	921,991	39.21
21	94,777	1.49	71	64,480	32.96	21	1,470,007	2.24	71	885,840	42.85
22	94,636	1.50	72	62,355	36.29	22	1,466,714	2.25	72	847,882	47.18
23	94,494	1.49	73	60,092	40.20	23	1,463,414	2.24	73	807,879	52.26
24	94,353	1.49	74	57,676	44.66	24	1,460,136	2.24	74	765,659	58.06

	BLENDED 1980 CSO TABLE						BLENDED 1980 CET TABLE				
Age	l_x	$1,000\,q_x$	Age	l_x	$1,000\,q_x$	Age	l_x	$1,000\,q_x$	Age	l_x	$1,000\,q_x$
25	94,212	1.47	75	55,100	49.55	25	1,456,865	2.22	75	721,205	64.42
26	94,074	1.47	76	52,370	54.80	26	1,453,631	2.22	76	674,745	71.24
27	93,936	1.46	77	49,500	60.31	27	1,450,404	2.21	77	626,676	78.40
28	93,799	1.48	78	46,515	66.06	28	1,447,199	2.23	78	577,545	85.88
29	93,660	1.51	79	43,442	72.23	29	1,443,972	2.26	79	527,945	93.90
30	93,519	1.54	80	40,304	79.07	30	1,440,709	2.29	80	478,371	102.79
31	93,375	1.58	81	37,117	86.80	31	1,437,410	2.33	81	429,199	112.84
32	93,227	1.64	82	33,895	95.68	32	1,434,061	2.39	82	380,768	124.38
33	93,074	1.70	83	30,652	105.81	33	1,430,634	2.45	83	333,408	137.55
34	92,916	1.79	84	27,409	117.02	34	1,427,129	2.54	84	287,548	152.13
35	92,750	1.88	85	24,202	129.11	35	1,423,504	2.63	85	243,803	167.84
36	92,576	2.00	86	21,077	141.91	36	1,419,760	2.75	86	202,883	184.48
37	92,391	2.14	87	18,086	155.41	37	1,415,856	2.89	87	165,455	202.03
38	92,193	2.31	88	15,275	169.55	38	1,411,764	3.06	88	132,028	220.42
39	91,980	2.51	89	12,685	184.45	39	1,407,444	3.26	89	102,926	239.79
40	91,749	2.72	90	10,345	200.23	40	1,402,856	3.54	90	78,245	260.30
41	91,499	2.97	91	8,274	217.23	41	1,397,890	3.86	91	57,878	282.40
42	91,227	3.22	92	6,477	235.91	42	1,392,494	4.19	92	41,533	306.68
43	90,933	3.49	93	4,949	257.43	43	1,386,659	4.54	93	28,796	334.66
44	90,616	3.75	94	3,675	283.81	44	1,380,364	4.88	94	19,159	368.95
45	90,276	4.06	95	2,632	320.74	45	1,373,628	5.28	95	12,090	416.96
46	89,909	4.36	96	1,788	377.93	46	1,366,375	5.67	96	7,049	491.31
47	89,517	4.68	97	1,112	476.61	47	1,358,628	6.08	97	3,586	619.59
48	89,098	5.03	98	582	656.44	48	1,350,368	6.54	98	1,364	853.37
49	88,650	5.41	99	200	1,000.00	49	1,341,537	7.03	99	200	1,000.00

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BLENDED 1980 CSO AND 1980 CET MORTALITY TABLES
PIVOTAL AGE IS 45; RATIO OF MALE l_x TO TOTAL l_x IS 75%

	BLENDED 1980 CSO TABLE						BLENDED 1980 CET TABLE				
Age	l_x	$1,000\,q_x$	Age	l_x	$1,000\,q_x$	Age	l_x	$1,000\,q_x$	Age	l_x	$1,000\,q_x$
0	127,320	3.86	50	114,963	6.27	0	2,217,214	5.02	50	1,917,304	8.15
1	126,829	1.02	51	114,242	6.80	1	2,206,084	1.77	51	1,901,678	8.84
2	126,700	.94	52	113,465	7.39	2	2,202,179	1.69	52	1,884,867	9.61
3	126,581	.93	53	112,626	8.06	3	2,198,457	1.68	53	1,866,753	10.48
4	126,463	.91	54	111,718	8.81	4	2,194,764	1.66	54	1,847,189	11.45
5	126,348	.86	55	110,734	9.62	5	2,191,121	1.61	55	1,826,039	12.51
6	126,239	.83	56	109,669	10.47	6	2,187,593	1.58	56	1,803,195	13.61
7	126,134	.78	57	108,521	11.36	7	2,184,137	1.53	57	1,778,654	14.77
8	126,036	.74	58	107,288	12.27	8	2,180,795	1.49	58	1,752,383	15.95
9	125,943	.73	59	105,972	13.28	9	2,177,546	1.48	59	1,724,432	17.26
10	125,851	.71	60	104,565	14.38	10	2,174,323	1.46	60	1,694,668	18.69
11	125,762	.75	61	103,061	15.62	11	2,171,148	1.50	61	1,662,995	20.31
12	125,668	.82	62	101,451	17.04	12	2,167,891	1.57	62	1,629,220	22.15
13	125,565	.92	63	99,722	18.70	13	2,164,487	1.67	63	1,593,133	24.31
14	125,449	1.06	64	97,857	20.53	14	2,160,872	1.81	64	1,554,404	26.69
15	125,316	1.21	65	95,848	22.54	15	2,156,961	1.96	65	1,512,917	29.30
16	125,164	1.37	66	93,688	24.68	16	2,152,733	2.12	66	1,468,589	32.08
17	124,993	1.49	67	91,376	26.92	17	2,148,169	2.24	67	1,421,477	35.00
18	124,807	1.58	68	88,916	29.27	18	2,143,357	2.33	68	1,371,725	38.05
19	124,610	1.65	69	86,313	31.81	19	2,138,363	2.40	69	1,319,531	41.35
20	124,404	1.70	70	83,567	34.65	20	2,133,231	2.45	70	1,264,968	45.05
21	124,193	1.70	71	80,671	37.92	21	2,128,005	2.45	71	1,207,981	49.30
22	123,982	1.69	72	77,612	41.69	22	2,122,791	2.44	72	1,148,428	54.20
23	123,772	1.68	73	74,376	46.08	23	2,117,611	2.43	73	1,086,183	59.90
24	123,564	1.65	74	70,949	51.00	24	2,112,465	2.40	74	1,021,121	66.30

	BLENDED 1980 CSO TABLE						BLENDED 1980 CET TABLE				
Age	l_x	$1,000\ q_x$	Age	l_x	$1,000\ q_x$	Age	l_x	$1,000\ q_x$	Age	l_x	$1,000 q_x$
25	123,360	1.62	75	67,331	56.36	25	2,107,395	2.37	75	953,421	73.27
26	123,160	1.59	76	63,536	62.07	26	2,102,400	2.34	76	883,564	80.69
27	122,964	1.59	77	59,592	68.00	27	2,097,480	2.34	77	812,269	88.40
28	122,768	1.59	78	55,540	74.15	28	2,092,572	2.34	78	740,464	96.40
29	122,573	1.61	79	51,422	80.66	29	2,087,675	2.36	79	669,083	104.86
30	122,376	1.64	80	47,274	87.83	30	2,082,748	2.39	80	598,923	114.18
31	122,175	1.68	81	43,122	95.86	31	2,077,770	2.43	81	530,538	124.62
32	121,970	1.73	82	38,988	105.00	32	2,072,721	2.48	82	464,422	136.50
33	121,759	1.80	83	34,894	115.39	33	2,067,581	2.55	83	401,028	150.01
34	121,540	1.90	84	30,868	126.77	34	2,062,309	2.65	84	340,870	164.80
35	121,309	1.99	85	26,955	138.96	35	2,056,844	2.74	85	284,695	180.65
36	121,068	2.12	86	23,209	151.76	36	2,051,208	2.87	86	233,265	197.29
37	120,811	2.27	87	19,687	165.07	37	2,045,321	3.02	87	187,244	214.59
38	120,537	2.44	88	16,437	178.86	38	2,039,144	3.19	88	147,063	232.52
39	120,243	2.65	89	13,497	193.25	39	2,032,639	3.45	89	112,868	251.23
40	119,924	2.87	90	10,889	208.39	40	2,025,626	3.73	90	84,512	270.91
41	119,580	3.13	91	8,620	224.60	41	2,018,070	4.07	91	61,617	291.98
42	119,206	3.39	92	6,684	242.39	42	2,009,856	4.41	92	43,626	315.11
43	118,802	3.67	93	5,064	262.67	43	2,000,993	4.77	93	29,879	341.47
44	118,366	3.97	94	3,734	288.20	44	1,991,448	5.16	94	19,676	374.66
45	117,896	4.30	95	2,658	323.98	45	1,981,172	5.59	95	12,304	421.17
46	117,389	4.64	96	1,797	380.19	46	1,970,097	6.03	96	7,122	494.25
47	116,844	5.00	97	1,114	477.69	47	1,958,217	6.50	97	3,602	621.00
48	116,260	5.38	98	582	656.50	48	1,945,489	6.99	98	1,365	853.45
49	115,635	5.81	99	200	1,000.00	49	1,931,890	7.55	99	200	1,000.00

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BLENDED 1980 CSO AND 1980 CET MORTALITY TABLES

PIVOTAL AGE IS 50; RATIO OF MALE l_x TO TOTAL l_x IS 25%

	BLENDED 1980 CSO TABLE						BLENDED 1980 CET TABLE				
Age	l_x	$1,000\,q_x$	Age	l_x	$1,000\,q_x$	Age	l_x	$1,000\,q_x$	Age	l_x	$1,000\,q_x$
0	78,110	3.22	50	71,509	5.40	0	1,140,410	4.19	50	1,001,627	7.02
1	77,858	.93	51	71,123	5.80	1	1,135,632	1.68	51	994,596	7.54
2	77,786	.86	52	70,710	6.27	2	1,133,724	1.61	52	987,097	8.15
3	77,719	.84	53	70,267	6.78	3	1,131,899	1.59	53	979,052	8.81
4	77,654	.82	54	69,791	7.34	4	1,130,099	1.57	54	970,427	9.54
5	77,590	.79	55	69,279	7.93	5	1,128,325	1.54	55	961,169	10.31
6	77,529	.76	56	68,730	8.54	6	1,126,587	1.51	56	951,259	11.10
7	77,470	.75	57	68,143	9.13	7	1,124,886	1.50	57	940,700	11.87
8	77,412	.71	58	67,521	9.73	8	1,123,199	1.46	58	929,534	12.65
9	77,357	.71	59	66,864	10.37	9	1,121,559	1.46	59	917,775	13.48
10	77,302	.69	60	66,171	11.09	10	1,119,922	1.44	60	905,403	14.42
11	77,249	.71	61	65,437	11.92	11	1,118,309	1.46	61	892,347	15.50
12	77,194	.75	62	64,657	12.94	12	1,116,676	1.50	62	878,516	16.82
13	77,136	.81	63	63,820	14.18	13	1,115,001	1.56	63	863,739	18.43
14	77,074	.88	64	62,915	15.59	14	1,113,262	1.63	64	847,820	20.27
15	77,006	.98	65	61,934	17.15	15	1,111,447	1.73	65	830,635	22.30
16	76,931	1.05	66	60,872	18.77	16	1,109,524	1.80	66	812,112	24.40
17	76,850	1.14	67	59,729	20.44	17	1,107,527	1.89	67	792,296	26.57
18	76,762	1.18	68	58,508	22.13	18	1,105,434	1.93	68	771,245	28.77
19	76,671	1.23	69	57,213	23.94	19	1,103,301	1.98	69	749,056	31.12
20	76,577	1.26	70	55,843	26.01	20	1,101,116	2.01	70	725,745	33.81
21	76,481	1.28	71	54,391	28.44	21	1,098,903	2.03	71	701,208	36.97
22	76,383	1.30	72	52,844	31.39	22	1,096,672	2.05	72	675,284	40.81
23	76,284	1.30	73	51,185	34.93	23	1,094,424	2.05	73	647,726	45.41
24	76,185	1.32	74	49,397	39.04	24	1,092,180	2.07	74	618,313	50.75

	BLENDED 1980 CSO TABLE						BLENDED 1980 CET TABLE				
Age	l_x	1,000 q_x	Age	l_x	1,000 q_x	Age	l_x	1,000 q_x	Age	l_x	1,000 q_x
25	76,084	1.31	75	47,469	43.57	25	1,089,919	2.06	75	586,934	56.64
26	75,984	1.34	76	45,401	48.53	26	1,087,674	2.09	76	553,690	63.09
27	75,882	1.34	77	43,198	53.77	27	1,085,401	2.09	77	518,758	69.90
28	75,780	1.37	78	40,875	59.30	28	1,083,133	2.12	78	482,497	77.09
29	75,676	1.40	79	38,451	65.27	29	1,080,837	2.15	79	445,301	84.85
30	75,570	1.44	80	35,941	71.95	30	1,078,513	2.19	80	407,517	93.54
31	75,461	1.49	81	33,355	79.58	31	1,076,151	2.24	81	369,398	103.45
32	75,349	1.54	82	30,701	88.36	32	1,073,740	2.29	82	331,184	114.87
33	75,233	1.60	83	27,988	98.46	33	1,071,281	2.35	83	293,141	128.00
34	75,113	1.68	84	25,232	109.64	34	1,068,763	2.43	84	255,619	142.53
35	74,987	1.77	85	22,466	121.80	35	1,066,166	2.52	85	219,186	158.34
36	74,854	1.87	86	19,730	134.75	36	1,063,479	2.62	86	184,480	175.18
37	74,714	2.02	87	17,071	148.54	37	1,060,693	2.77	87	152,163	193.10
38	74,563	2.17	88	14,535	163.06	38	1,057,755	2.92	88	122,780	211.98
39	74,401	2.36	89	12,165	178.39	39	1,054,666	3.11	89	96,753	231.91
40	74,225	2.57	90	9,995	194.78	40	1,051,386	3.34	90	74,315	253.21
41	74,034	2.80	91	8,048	212.35	41	1,047,874	3.64	91	55,498	276.06
42	73,827	3.05	92	6,339	231.74	42	1,044,060	3.97	92	40,177	301.26
43	73,602	3.29	93	4,870	253.98	43	1,039,915	4.28	93	28,073	330.17
44	73,360	3.54	94	3,633	281.08	44	1,035,464	4.60	94	18,804	365.40
45	73,100	3.81	95	2,612	318.64	45	1,030,701	4.95	95	11,933	414.23
46	72,821	4.08	96	1,780	376.57	46	1,025,599	5.30	96	6,990	489.54
47	72,524	4.37	97	1,110	475.84	47	1,020,163	5.68	97	3,568	618.59
48	72,207	4.67	98	582	656.18	48	1,014,368	6.07	98	1,361	853.03
49	71,870	5.02	99	200	1,000.00	49	1,008,211	6.53	99	200	1,000.00

BLENDED 1980 CSO AND 1980 CET MORTALITY TABLES
PIVOTAL AGE IS 50; RATIO OF MALE l_x TO TOTAL l_x IS 50%

	BLENDED 1980 CSO TABLE						BLENDED 1980 CET TABLE				
Age	l_x	$1,000\,q_x$	Age	l_x	$1,000\,q_x$	Age	l_x	$1,000\,q_x$	Age	l_x	$1,000\,q_x$
0	97,064	3.54	50	88,246	5.84	0	1,527,384	4.60	50	1,331,024	7.59
1	96,720	.98	51	87,731	6.30	1	1,520,358	1.73	51	1,320,922	8.19
2	96,625	.90	52	87,178	6.83	2	1,517,728	1.65	52	1,310,104	8.88
3	96,538	.89	53	86,583	7.42	3	1,515,224	1.64	53	1,298,470	9.65
4	96,452	.86	54	85,941	8.08	4	1,512,739	1.61	54	1,285,940	10.50
5	96,369	.83	55	85,247	8.77	5	1,510,303	1.58	55	1,272,438	11.40
6	96,289	.79	56	84,499	9.50	6	1,507,917	1.54	56	1,257,932	12.35
7	96,213	.76	57	83,696	10.24	7	1,505,595	1.51	57	1,242,397	13.31
8	96,140	.73	58	82,839	11.00	8	1,503,322	1.48	58	1,225,861	14.30
9	96,070	.72	59	81,928	11.81	9	1,501,097	1.47	59	1,208,331	15.35
10	96,001	.71	60	80,960	12.73	10	1,498,890	1.46	60	1,189,783	16.55
11	95,933	.73	61	79,929	13.76	11	1,496,702	1.48	61	1,170,092	17.89
12	95,863	.78	62	78,829	14.97	12	1,494,487	1.53	62	1,149,159	19.46
13	95,788	.87	63	77,649	16.41	13	1,492,200	1.62	63	1,126,796	21.33
14	95,705	.97	64	76,375	18.03	14	1,489,783	1.72	64	1,102,761	23.44
15	95,612	1.09	65	74,998	19.80	15	1,487,221	1.84	65	1,076,912	25.74
16	95,508	1.21	66	73,513	21.66	16	1,484,485	1.96	66	1,049,192	28.16
17	95,392	1.31	67	71,921	23.61	17	1,481,575	2.06	67	1,019,647	30.69
18	95,267	1.38	68	70,223	25.61	18	1,478,523	2.13	68	988,354	33.29
19	95,136	1.44	69	68,425	27.75	19	1,475,374	2.19	69	955,452	36.08
20	94,999	1.48	70	66,526	30.19	20	1,472,143	2.23	70	920,979	39.25
21	94,858	1.49	71	64,518	33.00	21	1,468,860	2.24	71	884,831	42.90
22	94,717	1.50	72	62,389	36.32	22	1,465,570	2.25	72	846,872	47.22
23	94,575	1.49	73	60,123	40.24	23	1,462,272	2.24	73	806,883	52.31
24	94,434	1.49	74	57,704	44.69	24	1,458,997	2.24	74	764,675	58.10

	BLENDED 1980 CSO TABLE						BLENDED 1980 CET TABLE				
Age	l_x	$1,000\,q_x$	Age	l_x	$1,000\,q_x$	Age	l_x	$1,000\,q_x$	Age	l_x	$1,000\,q_x$
25	94,293	1.47	75	55,125	49.59	25	1,455,729	2.22	75	720,247	64.47
26	94,154	1.46	76	52,391	54.84	26	1,452,497	2.21	76	673,813	71.29
27	94,017	1.47	77	49,518	60.37	27	1,449,287	2.22	77	625,777	78.48
28	93,879	1.48	78	46,529	66.11	28	1,446,070	2.23	78	576,666	85.94
29	93,740	1.50	79	43,453	72.28	29	1,442,845	2.25	79	527,107	93.96
30	93,599	1.54	80	40,312	79.11	30	1,439,599	2.29	80	477,580	102.84
31	93,455	1.58	81	37,123	86.85	31	1,436,302	2.33	81	428,466	112.91
32	93,307	1.64	82	33,899	95.72	32	1,432,955	2.39	82	380,088	124.44
33	93,154	1.70	83	30,654	105.87	33	1,429,530	2.45	83	332,790	137.63
34	92,996	1.79	84	27,409	117.07	34	1,426,028	2.54	84	286,988	152.19
35	92,830	1.89	85	24,200	129.15	35	1,422,406	2.64	85	243,311	167.90
36	92,655	2.00	86	21,075	141.95	36	1,418,651	2.75	86	202,459	184.54
37	92,470	2.15	87	18,083	155.47	37	1,414,750	2.90	87	165,097	202.11
38	92,271	2.31	88	15,272	169.61	38	1,410,647	3.06	88	131,729	220.49
39	92,058	2.50	89	12,682	184.49	39	1,406,330	3.25	89	102,684	239.84
40	91,828	2.72	90	10,342	200.26	40	1,401,759	3.54	90	78,056	260.34
41	91,578	2.97	91	8,271	217.27	41	1,396,797	3.86	91	57,735	282.45
42	91,306	3.22	92	6,474	235.98	42	1,391,405	4.19	92	41,428	306.77
43	91,012	3.49	93	4,946	257.40	43	1,385,575	4.54	93	28,719	334.62
44	90,694	3.75	94	3,673	283.88	44	1,379,284	4.88	94	19,109	369.04
45	90,354	4.05	95	2,630	320.80	45	1,372,553	5.27	95	12,057	417.04
46	89,988	4.36	96	1,786	378.00	46	1,365,320	5.67	96	7,029	491.40
47	89,596	4.69	97	1,111	476.36	47	1,357,579	6.10	97	3,575	619.27
48	89,176	5.03	98	582	656.19	48	1,349,298	6.54	98	1,361	853.05
49	88,727	5.42	99	200	1,000.00	49	1,340,474	7.05	99	200	1,000.00

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BLENDED 1980 CSO AND 1980 CET MORTALITY TABLES
PIVOTAL AGE IS 50; RATIO OF MALE l_x TO TOTAL l_x IS 75%

	BLENDED 1980 CSO TABLE						BLENDED 1980 CET TABLE				
Age	l_x	$1,000\,q_x$	Age	l_x	$1,000\,q_x$	Age	l_x	$1,000\,q_x$	Age	l_x	$1,000\,q_x$
0	127,984	3.86	50	115,555	6.28	0	2,227,822	5.02	50	1,926,366	8.16
1	127,490	1.02	51	114,829	6.80	1	2,216,638	1.77	51	1,910,647	8.84
2	127,360	.95	52	114,048	7.39	2	2,212,715	1.70	52	1,893,757	9.61
3	127,239	.93	53	113,205	8.07	3	2,208,953	1.68	53	1,875,558	10.49
4	127,121	.91	54	112,291	8.81	4	2,205,242	1.66	54	1,855,883	11.45
5	127,005	.86	55	111,302	9.62	5	2,201,581	1.61	55	1,834,633	12.51
6	126,896	.83	56	110,231	10.47	6	2,198,036	1.58	56	1,811,682	13.61
7	126,791	.78	57	109,077	11.36	7	2,194,563	1.53	57	1,787,025	14.77
8	126,692	.75	58	107,838	12.28	8	2,191,205	1.50	58	1,760,631	15.96
9	126,597	.73	59	106,514	13.29	9	2,187,918	1.48	59	1,732,531	17.28
10	126,505	.72	60	105,098	14.39	10	2,184,680	1.47	60	1,702,593	18.71
11	126,414	.75	61	103,586	15.63	11	2,181,469	1.50	61	1,670,737	20.32
12	126,319	.82	62	101,967	17.06	12	2,178,197	1.57	62	1,636,788	22.18
13	126,215	.92	63	100,227	18.70	13	2,174,777	1.67	63	1,600,484	24.31
14	126,099	1.06	64	98,353	20.54	14	2,171,145	1.81	64	1,561,576	26.70
15	125,965	1.21	65	96,333	22.56	15	2,167,215	1.96	65	1,519,882	29.33
16	125,813	1.36	66	94,160	24.69	16	2,162,967	2.11	66	1,475,304	32.10
17	125,642	1.49	67	91,835	26.94	17	2,158,403	2.24	67	1,427,947	35.02
18	125,455	1.59	68	89,361	29.29	18	2,153,568	2.34	68	1,377,940	38.08
19	125,256	1.65	69	86,744	31.83	19	2,148,529	2.40	69	1,325,468	41.38
20	125,049	1.69	70	83,983	34.68	20	2,143,373	2.44	70	1,270,620	45.08
21	124,838	1.71	71	81,070	37.93	21	2,138,143	2.46	71	1,213,340	49.31
22	124,625	1.69	72	77,995	41.71	22	2,132,883	2.44	72	1,153,510	54.22
23	124,414	1.68	73	74,742	46.12	23	2,127,679	2.43	73	1,090,967	59.96
24	124,205	1.66	74	71,295	51.04	24	2,122,509	2.41	74	1,025,553	66.35

	BLENDED 1980 CSO TABLE						BLENDED 1980 CET TABLE				
Age	l_x	1,000 q_x	Age	l_x	1,000 q_x	Age	l_x	1,000 q_x	Age	l_x	1,000 q_x
25	123,999	1.62	75	67,656	56.39	25	2,117,394	2.37	75	957,508	73.31
26	123,798	1.60	76	63,841	62.11	26	2,112,376	2.35	76	887,313	80.74
27	123,600	1.59	77	59,876	68.05	27	2,107,412	2.34	77	815,671	88.47
28	123,403	1.59	78	55,801	74.19	28	2,102,481	2.34	78	743,509	96.45
29	123,207	1.61	79	51,661	80.71	29	2,097,561	2.36	79	671,798	104.92
30	123,009	1.63	80	47,491	87.87	30	2,092,611	2.38	80	601,313	114.23
31	122,808	1.68	81	43,318	95.92	31	2,087,631	2.43	81	532,625	124.70
32	122,602	1.73	82	39,163	105.05	32	2,082,558	2.48	82	466,207	136.57
33	122,390	1.81	83	35,049	115.44	33	2,077,393	2.56	83	402,537	150.07
34	122,168	1.89	84	31,003	126.82	34	2,072,075	2.64	84	342,128	164.87
35	121,937	2.00	85	27,071	139.03	35	2,066,605	2.75	85	285,721	180.74
36	121,693	2.12	86	23,307	151.81	36	2,060,922	2.87	86	234,080	197.35
37	121,435	2.27	87	19,769	165.12	37	2,055,007	3.02	87	187,884	214.66
38	121,159	2.44	88	16,505	178.94	38	2,048,801	3.19	88	147,553	232.62
39	120,863	2.65	89	13,552	193.30	39	2,042,265	3.45	89	113,229	251.29
40	120,543	2.87	90	10,932	208.48	40	2,035,219	3.73	90	84,776	271.02
41	120,197	3.13	91	8,653	224.63	41	2,027,628	4.07	91	61,800	292.02
42	119,821	3.39	92	6,709	242.39	42	2,019,376	4.41	92	43,753	315.11
43	119,415	3.67	93	5,083	262.78	43	2,010,471	4.77	93	29,966	341.61
44	118,977	3.98	94	3,747	288.18	44	2,000,881	5.17	94	19,729	374.63
45	118,503	4.30	95	2,667	323.84	45	1,990,536	5.59	95	12,338	420.99
46	117,993	4.64	96	1,803	380.33	46	1,979,409	6.03	96	7,144	494.43
47	117,446	5.00	97	1,117	477.88	47	1,967,473	6.50	97	3,612	621.24
48	116,859	5.38	98	583	656.77	48	1,954,684	6.99	98	1,368	853.80
49	116,230	5.81	99	200	1,000.00	49	1,941,021	7.55	99	200	1,000.00

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APPENDIX E

BLENDED 1980 CSO AND 1980 CET MORTALITY TABLES
PIVOTAL AGE IS 45; RATIO OF MALE l_x TO TOTAL l_x IS 80%

	BLENDED 1980 CSO TABLE						BLENDED 1980 CET TABLE				
Age	l_x	$1,000\,q_x$	Age	l_x	$1,000\,q_x$	Age	l_x	$1,000\,q_x$	Age	l_x	$1,000\,q_x$
0	136,260	3.92	50	122,860	6.36	0	2,437,508	5.10	50	2,104,361	8.27
1	135,726	1.04	51	122,079	6.90	1	2,425,077	1.79	51	2,086,958	8.97
2	135,585	.95	52	121,237	7.50	2	2,420,736	1.70	52	2,068,238	9.75
3	135,456	.94	53	120,328	8.19	3	2,416,621	1.69	53	2,048,073	10.65
4	135,329	.91	54	119,343	8.96	4	2,412,537	1.66	54	2,026,261	11.65
5	135,206	.87	55	118,274	9.78	5	2,408,532	1.62	55	2,002,655	12.71
6	135,088	.83	56	117,117	10.67	6	2,404,630	1.58	56	1,977,201	13.87
7	134,976	.79	57	115,867	11.58	7	2,400,831	1.54	57	1,949,777	15.05
8	134,869	.75	58	114,525	12.54	8	2,397,134	1.50	58	1,920,433	16.30
9	134,768	.73	59	113,089	13.57	9	2,393,538	1.48	59	1,889,130	17.64
10	134,670	.72	60	111,554	14.72	10	2,389,996	1.47	60	1,855,806	19.14
11	134,573	.75	61	109,912	16.00	11	2,386,483	1.50	61	1,820,286	20.80
12	134,472	.83	62	108,153	17.47	12	2,382,903	1.58	62	1,782,424	22.71
13	134,360	.94	63	106,264	19.16	13	2,379,138	1.69	63	1,741,945	24.91
14	134,234	1.08	64	104,228	21.05	14	2,375,117	1.83	64	1,698,553	27.37
15	134,089	1.24	65	102,034	23.11	15	2,370,771	1.99	65	1,652,064	30.04
16	133,923	1.39	66	99,676	25.29	16	2,366,053	2.14	66	1,602,436	32.88
17	133,737	1.53	67	97,155	27.61	17	2,360,990	2.28	67	1,549,748	35.89
18	133,532	1.62	68	94,473	30.03	18	2,355,607	2.37	68	1,494,128	39.04
19	133,316	1.69	69	91,636	32.66	19	2,350,024	2.44	69	1,435,797	42.46
20	133,091	1.74	70	88,643	35.59	20	2,344,290	2.49	70	1,374,833	46.27
21	132,859	1.75	71	85,488	38.95	21	2,338,453	2.50	71	1,311,219	50.64
22	132,626	1.73	72	82,158	42.84	22	2,332,607	2.48	72	1,244,819	55.69
23	132,397	1.71	73	78,638	47.33	23	2,326,822	2.46	73	1,175,495	61.53
24	132,171	1.69	74	74,916	52.37	24	2,321,098	2.44	74	1,103,167	68.08

BLENDED 1980 CSO AND 1980 CET MORTALITY TABLES
PIVOTAL AGE IS 45; RATIO OF MALE l_x TO TOTAL l_x IS 80%—*Continued*

	BLENDED 1980 CSO TABLE						BLENDED 1980 CET TABLE				
Age	l_x	$1,000\,q_x$	Age	l_x	$1,000\,q_x$	Age	l_x	$1,000\,q_x$	Age	l_x	$1,000\,q_x$
25	131,948	1.65	75	70,993	57.84	25	2,315,435	2.40	75	1,028,063	75.19
26	131,730	1.63	76	66,887	63.65	26	2,309,878	2.38	76	950,763	82.75
27	131,515	1.61	77	62,630	69.70	27	2,304,380	2.36	77	872,087	90.61
28	131,303	1.61	78	58,265	75.95	28	2,298,942	2.36	78	793,067	98.74
29	131,092	1.63	79	53,840	82.57	29	2,293,516	2.38	79	714,760	107.34
30	130,878	1.65	80	49,394	89.83	30	2,288,057	2.40	80	638,038	116.78
31	130,662	1.70	81	44,957	97.94	31	2,282,566	2.45	81	563,528	127.32
32	130,440	1.75	82	40,554	107.18	32	2,276,974	2.50	82	491,780	139.33
33	130,212	1.83	83	36,207	117.65	33	2,271,282	2.58	83	423,260	152.95
34	129,974	1.91	84	31,947	129.10	34	2,265,422	2.66	84	358,522	167.83
35	129,726	2.02	85	27,823	141.38	35	2,259,396	2.77	85	298,351	183.79
36	129,464	2.14	86	23,889	154.17	36	2,253,137	2.89	86	243,517	200.42
37	129,187	2.30	87	20,206	167.49	37	2,246,625	3.05	87	194,711	217.74
38	128,890	2.47	88	16,822	181.24	38	2,239,773	3.22	88	152,315	235.61
39	128,572	2.68	89	13,773	195.54	39	2,232,561	3.48	89	116,428	254.20
40	128,227	2.90	90	11,080	210.53	40	2,224,792	3.77	90	86,832	273.69
41	127,855	3.16	91	8,747	226.51	41	2,216,405	4.11	91	63,067	294.46
42	127,451	3.42	92	6,766	244.13	42	2,207,296	4.45	92	44,496	317.37
43	127,015	3.72	93	5,114	264.04	43	2,197,474	4.84	93	30,374	343.25
44	126,543	4.01	94	3,764	289.36	44	2,186,838	5.21	94	19,948	376.17
45	126,036	4.35	95	2,675	324.89	45	2,175,445	5.66	95	12,444	422.36
46	125,488	4.70	96	1,806	380.97	46	2,163,132	6.11	96	7,188	495.26
47	124,898	5.07	97	1,118	477.69	47	2,149,915	6.59	97	3,628	621.00
48	124,265	5.45	98	584	657.38	48	2,135,747	7.09	98	1,375	854.59
49	123,588	5.89	99	200	1,000.00	49	2,120,605	7.66	99	200	1,000.00

BLENDED 1980 CSO AND 1980 CET MORTALITY TABLES
PIVOTAL AGE IS 45; RATIO OF MALE l_x TO TOTAL l_x IS 60%

	BLENDED 1980 CSO TABLE						BLENDED 1980 CET TABLE				
Age	l_x	$1,000\,q_x$	Age	l_x	$1,000\,q_x$	Age	l_x	$1,000\,q_x$	Age	l_x	$1,000\,q_x$
0	107,405	3.67	50	97,377	6.01	0	1,760,557	4.77	50	1,529,496	7.81
1	107,011	.99	51	96,792	6.50	1	1,752,159	1.74	51	1,517,551	8.45
2	106,905	.93	52	96,163	7.05	2	1,749,110	1.68	52	1,504,728	9.17
3	106,806	.90	53	95,485	7.68	3	1,746,171	1.65	53	1,490,930	9.98
4	106,710	.88	54	94,752	8.37	4	1,743,290	1.63	54	1,476,051	10.88
5	106,616	.84	55	93,959	9.11	5	1,740,448	1.59	55	1,459,992	11.84
6	106,526	.81	56	93,103	9.88	6	1,737,681	1.56	56	1,442,706	12.84
7	106,440	.77	57	92,183	10.68	7	1,734,970	1.52	57	1,424,182	13.88
8	106,358	.73	58	91,198	11.50	8	1,732,333	1.48	58	1,404,414	14.95
9	106,280	.73	59	90,149	12.39	9	1,729,769	1.48	59	1,383,418	16.11
10	106,202	.71	60	89,032	13.37	10	1,727,209	1.46	60	1,361,131	17.38
11	106,127	.74	61	87,842	14.48	11	1,724,687	1.49	61	1,337,475	18.82
12	106,048	.80	62	86,570	15.79	12	1,722,117	1.55	62	1,312,304	20.53
13	105,963	.89	63	85,203	17.30	13	1,719,448	1.64	63	1,285,362	22.49
14	105,869	1.01	64	83,729	19.01	14	1,716,628	1.76	64	1,256,454	24.71
15	105,762	1.14	65	82,137	20.88	15	1,713,607	1.89	65	1,225,407	27.14
16	105,641	1.27	66	80,422	22.84	16	1,710,368	2.02	66	1,192,149	29.69
17	105,507	1.38	67	78,585	24.90	17	1,706,913	2.13	67	1,156,754	32.37
18	105,361	1.47	68	76,628	27.04	18	1,703,277	2.22	68	1,119,310	35.15
19	105,206	1.52	69	74,556	29.32	19	1,699,496	2.27	69	1,079,966	38.12
20	105,046	1.56	70	72,370	31.92	20	1,695,638	2.31	70	1,038,798	41.50
21	104,882	1.58	71	70,060	34.90	21	1,691,721	2.33	71	995,688	45.37
22	104,716	1.58	72	67,615	38.38	22	1,687,779	2.33	72	950,514	49.89
23	104,551	1.56	73	65,020	42.48	23	1,683,846	2.31	73	903,093	55.22
24	104,388	1.55	74	62,258	47.11	24	1,679,956	2.30	74	853,224	61.24

	BLENDED 1980 CSO TABLE						BLENDED 1980 CET TABLE				
Age	l_x	1,000 q_x	Age	l_x	1,000 q_x	Age	l_x	1,000 q_x	Age	l_x	1,000 q_x
25	104,226	1.53	75	59,325	52.16	25	1,676,092	2.28	75	800,973	67.81
26	104,067	1.52	76	56,231	57.58	26	1,672,271	2.27	76	746,659	74.85
27	103,909	1.51	77	52,993	63.24	27	1,668,475	2.26	77	690,772	82.21
28	103,752	1.53	78	49,642	69.13	28	1,664,704	2.28	78	633,984	89.87
29	103,593	1.54	79	46,210	75.41	29	1,660,908	2.29	79	577,008	98.03
30	103,433	1.58	80	42,725	82.34	30	1,657,105	2.33	80	520,444	107.04
31	103,270	1.63	81	39,207	90.17	31	1,653,244	2.38	81	464,736	117.22
32	103,102	1.67	82	35,672	99.12	32	1,649,309	2.42	82	410,260	128.86
33	102,930	1.75	83	32,136	109.33	33	1,645,318	2.50	83	357,394	142.13
34	102,750	1.83	84	28,623	120.58	34	1,641,205	2.58	84	306,598	156.75
35	102,562	1.93	85	25,172	132.68	35	1,636,971	2.68	85	258,539	172.48
36	102,364	2.04	86	21,832	145.47	36	1,632,584	2.79	86	213,946	189.11
37	102,155	2.20	87	18,656	158.84	37	1,628,029	2.95	87	173,487	206.49
38	101,930	2.36	88	15,693	172.87	38	1,623,226	3.11	88	137,664	224.73
39	101,689	2.56	89	12,980	187.54	39	1,618,178	3.33	89	106,727	243.80
40	101,429	2.78	90	10,546	203.08	40	1,612,789	3.61	90	80,707	264.00
41	101,147	3.03	91	8,404	219.76	41	1,606,967	3.94	91	59,400	285.69
42	100,841	3.29	92	6,557	238.20	42	1,600,636	4.28	92	42,430	309.66
43	100,509	3.56	93	4,995	259.26	43	1,593,785	4.63	93	29,291	337.04
44	100,151	3.84	94	3,700	285.17	44	1,586,406	4.99	94	19,419	370.72
45	99,766	4.15	95	2,645	322.03	45	1,578,490	5.40	95	12,220	418.64
46	99,352	4.47	96	1,793	378.56	46	1,569,966	5.81	96	7,104	492.13
47	98,908	4.81	97	1,114	476.70	47	1,560,844	6.25	97	3,608	619.71
48	98,432	5.17	98	583	657.10	48	1,551,089	6.72	98	1,372	854.23
49	97,923	5.58	99	200	1,000.00	49	1,540,666	7.25	99	200	1,000.00

BLENDED 1980 CSO AND 1980 CET MORTALITY TABLES
PIVOTAL AGE IS 45; RATIO OF MALE l_x TO TOTAL l_x IS 50%

	BLENDED 1980 CSO TABLE						BLENDED 1980 CET TABLE				
Age	l_x	1,000 q_x	Age	l_x	1,000 q_x	Age	l_x	1,000 q_x	Age	l_x	1,000 q_x
0	96,981	3.54	50	88,170	5.83	0	1,528,592	4.60	50	1,332,106	7.58
1	96,638	.97	51	87,656	6.30	1	1,521,560	1.72	51	1,322,009	8.19
2	96,544	.91	52	87,104	6.82	2	1,518,943	1.66	52	1,311,182	8.87
3	96,456	.89	53	86,510	7.42	3	1,516,422	1.64	53	1,299,552	9.65
4	96,370	.85	54	85,868	8.07	4	1,513,935	1.60	54	1,287,011	10.49
5	96,288	.83	55	85,175	8.77	5	1,511,513	1.58	55	1,273,510	11.40
6	96,208	.79	56	84,428	9.50	6	1,509,125	1.54	56	1,258,992	12.35
7	96,132	.77	57	83,626	10.23	7	1,506,801	1.52	57	1,243,443	13.30
8	96,058	.73	58	82,771	10.99	8	1,504,511	1.48	58	1,226,905	14.29
9	95,988	.72	59	81,861	11.81	9	1,502,284	1.47	59	1,209,373	15.35
10	95,919	.71	60	80,894	12.71	10	1,500,076	1.46	60	1,190,809	16.52
11	95,851	.72	61	79,866	13.75	11	1,497,886	1.47	61	1,171,137	17.88
12	95,782	.78	62	78,768	14.96	12	1,495,684	1.53	62	1,150,197	19.45
13	95,707	.87	63	77,590	16.39	13	1,493,396	1.62	63	1,127,826	21.31
14	95,624	.97	64	76,318	18.02	14	1,490,977	1.72	64	1,103,792	23.43
15	95,531	1.10	65	74,943	19.78	15	1,488,413	1.85	65	1,077,930	25.71
16	95,426	1.21	66	73,461	21.64	16	1,485,659	1.96	66	1,050,216	28.13
17	95,311	1.31	67	71,871	23.59	17	1,482,747	2.06	67	1,020,673	30.67
18	95,186	1.39	68	70,176	25.58	18	1,479,693	2.14	68	989,369	33.25
19	95,054	1.44	69	68,381	27.73	19	1,476,526	2.19	69	956,472	36.05
20	94,917	1.48	70	66,485	30.16	20	1,473,292	2.23	70	921,991	39.21
21	94,777	1.49	71	64,480	32.96	21	1,470,007	2.24	71	885,840	42.85
22	94,636	1.50	72	62,355	36.29	22	1,466,714	2.25	72	847,882	47.18
23	94,494	1.49	73	60,092	40.20	23	1,463,414	2.24	73	807,879	52.26
24	94,353	1.49	74	57,676	44.66	24	1,460,136	2.24	74	765,659	58.06

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BLENDED 1980 CSO AND 1980 CET MORTALITY TABLES
PIVOTAL AGE IS 45; RATIO OF MALE l_x TO TOTAL l_x IS 50%—*Continued*

	BLENDED 1980 CSO TABLE						BLENDED 1980 CET TABLE				
Age	l_x	$1,000\,q_x$	Age	l_x	$1,000\,q_x$	Age	l_x	$1,000\,q_x$	Age	l_x	$1,000\,q_x$
25	94,212	1.47	75	55,100	49.55	25	1,456,865	2.22	75	721,205	64.42
26	94,074	1.47	76	52,370	54.80	26	1,453,631	2.22	76	674,745	71.24
27	93,936	1.46	77	49,500	60.31	27	1,450,404	2.21	77	626,676	78.40
28	93,799	1.48	78	46,515	66.06	28	1,447,199	2.23	78	577,545	85.88
29	93,660	1.51	79	43,442	72.23	29	1,443,972	2.26	79	527,945	93.90
30	93,519	1.54	80	40,304	79.07	30	1,440,709	2.29	80	478,371	102.79
31	93,375	1.58	81	37,117	86.80	31	1,437,410	2.33	81	429,199	112.84
32	93,227	1.64	82	33,895	95.68	32	1,434,061	2.39	82	380,768	124.38
33	93,074	1.70	83	30,652	105.81	33	1,430,634	2.45	83	333,408	137.55
34	92,916	1.79	84	27,409	117.02	34	1,427,129	2.54	84	287,548	152.13
35	92,750	1.88	85	24,202	129.11	35	1,423,504	2.63	85	243,803	167.84
36	92,576	2.00	86	21,077	141.91	36	1,419,760	2.75	86	202,883	184.48
37	92,391	2.14	87	18,086	155.41	37	1,415,856	2.89	87	165,455	202.03
38	92,193	2.31	88	15,275	169.55	38	1,411,764	3.06	88	132,028	220.42
39	91,980	2.51	89	12,685	184.45	39	1,407,444	3.26	89	102,926	239.79
40	91,749	2.72	90	10,345	200.23	40	1,402,856	3.54	90	78,245	260.30
41	91,499	2.97	91	8,274	217.23	41	1,397,890	3.86	91	57,878	282.40
42	91,227	3.22	92	6,477	235.91	42	1,392,494	4.19	92	41,533	306.68
43	90,933	3.49	93	4,949	257.43	43	1,386,659	4.54	93	28,796	334.66
44	90,616	3.75	94	3,675	283.81	44	1,380,364	4.88	94	19,159	368.95
45	90,276	4.06	95	2,632	320.74	45	1,373,628	5.28	95	12,090	416.96
46	89,909	4.36	96	1,788	377.93	46	1,366,375	5.67	96	7,049	491.31
47	89,517	4.68	97	1,112	476.61	47	1,358,628	6.08	97	3,586	619.59
48	89,098	5.03	98	582	656.44	48	1,350,368	6.54	98	1,364	853.37
49	88,506	5.41	99	200	1,000.00	49	1,341,537	7.03	99	200	1,000.00

BLENDED 1980 CSO AND 1980 CET MORTALITY TABLES
PIVOTAL AGE IS 45; RATIO OF MALE l_x TO TOTAL l_x IS 40%

	BLENDED 1980 CSO TABLE						BLENDED 1980 CET TABLE				
Age	l_x	$1,000\,q_x$	Age	l_x	$1,000\,q_x$	Age	l_x	$1,000\,q_x$	Age	l_x	$1,000\,q_x$
0	88,415	3.41	50	80,614	5.66	0	1,345,746	4.43	50	1,176,481	7.36
1	88,114	.95	51	80,158	6.10	1	1,339,784	1.70	51	1,167,822	7.93
2	88,030	.89	52	79,669	6.60	2	1,337,506	1.64	52	1,158,561	8.58
3	87,952	.86	53	79,143	7.16	3	1,335,312	1.61	53	1,148,621	9.31
4	87,876	.84	54	78,576	7.77	4	1,333,162	1.59	54	1,137,927	10.10
5	87,802	.81	55	77,965	8.43	5	1,331,042	1.56	55	1,126,434	10.96
6	87,731	.78	56	77,308	9.11	6	1,328,966	1.53	56	1,114,088	11.84
7	87,663	.76	57	76,604	9.79	7	1,326,933	1.51	57	1,100,897	12.73
8	87,596	.72	58	75,854	10.48	8	1,324,929	1.47	58	1,086,883	13.62
9	87,533	.71	59	75,059	11.23	9	1,322,981	1.46	59	1,072,080	14.60
10	87,471	.70	60	74,216	12.05	10	1,321,049	1.45	60	1,056,428	15.67
11	87,410	.71	61	73,322	13.01	11	1,319,133	1.46	61	1,039,874	16.91
12	87,348	.77	62	72,368	14.14	12	1,317,207	1.52	62	1,022,290	18.38
13	87,281	.84	63	71,345	15.50	13	1,315,205	1.59	63	1,003,500	20.15
14	87,208	.94	64	70,239	17.03	14	1,313,114	1.69	64	983,279	22.14
15	87,126	1.05	65	69,043	18.71	15	1,310,895	1.80	65	961,509	24.32
16	87,035	1.15	66	67,751	20.46	16	1,308,535	1.90	66	938,125	26.60
17	86,935	1.24	67	66,365	22.31	17	1,306,049	1.99	67	913,171	29.00
18	86,827	1.31	68	64,884	24.17	18	1,303,450	2.06	68	886,689	31.42
19	86,713	1.36	69	63,316	26.18	19	1,300,765	2.11	69	858,829	34.03
20	86,595	1.39	70	61,658	28.45	20	1,298,020	2.14	70	829,603	36.99
21	86,475	1.41	71	59,904	31.10	21	1,295,242	2.16	71	798,916	40.43
22	86,353	1.42	72	58,041	34.27	22	1,292,444	2.17	72	766,616	44.55
23	86,230	1.42	73	56,052	38.02	23	1,289,639	2.17	73	732,463	49.43
24	86,108	1.42	74	53,921	42.32	24	1,286,840	2.17	74	696,257	55.02

	BLENDED 1980 CSO TABLE						BLENDED 1980 CET TABLE				
Age	l_x	$1,000\,q_x$	Age	l_x	$1,000\,q_x$	Age	l_x	$1,000\,q_x$	Age	l_x	$1,000\,q_x$
25	85,986	1.40	75	51,639	47.05	25	1,284,048	2.15	75	657,949	61.17
26	85,866	1.41	76	49,209	52.18	26	1,281,287	2.16	76	617,702	67.83
27	85,745	1.42	77	46,641	57.57	27	1,278,519	2.17	77	575,803	74.84
28	85,623	1.44	78	43,956	63.21	28	1,275,745	2.19	78	532,710	82.17
29	85,500	1.46	79	41,178	69.29	29	1,272,951	2.21	79	488,937	90.08
30	85,375	1.50	80	38,325	76.04	30	1,270,138	2.25	80	444,894	98.85
31	85,247	1.55	81	35,411	83.72	31	1,267,280	2.30	81	400,916	108.84
32	85,115	1.60	82	32,446	92.52	32	1,264,365	2.35	82	357,280	120.28
33	84,979	1.66	83	29,444	102.65	33	1,261,394	2.41	83	314,306	133.45
34	84,838	1.75	84	26,422	113.82	34	1,258,354	2.50	84	272,362	147.97
35	84,690	1.83	85	23,415	125.93	35	1,255,208	2.58	85	232,061	163.71
36	84,535	1.95	86	20,466	138.78	36	1,251,970	2.70	86	194,070	180.41
37	84,370	2.09	87	17,626	152.39	37	1,248,590	2.84	87	159,058	198.11
38	84,194	2.25	88	14,940	166.68	38	1,245,044	3.00	88	127,547	216.68
39	84,005	2.45	89	12,450	181.76	39	1,241,309	3.20	89	99,910	236.29
40	83,799	2.66	90	10,187	197.78	40	1,237,337	3.46	90	76,302	257.11
41	83,576	2.90	91	8,172	215.12	41	1,233,056	3.77	91	56,684	279.66
42	83,334	3.15	92	6,414	234.03	42	1,228,407	4.10	92	40,832	304.24
43	83,071	3.41	93	4,913	255.85	43	1,223,371	4.43	93	28,409	332.61
44	82,788	3.66	94	3,656	282.58	44	1,217,951	4.76	94	18,960	367.35
45	82,485	3.96	95	2,623	319.76	45	1,212,154	5.15	95	11,995	415.69
46	82,158	4.24	96	1,784	377.41	46	1,205,911	5.51	96	7,009	490.63
47	81,810	4.55	97	1,111	476.21	47	1,199,266	5.92	97	3,570	619.07
48	81,438	4.89	98	582	656.10	48	1,192,166	6.36	98	1,360	852.93
49	81,040	5.26	99	200	1,000.00	49	1,184,584	6.84	99	200	1,000.00

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BLENDED 1980 CSO AND 1980 CET MORTALITY TABLES
PIVOTAL AGE IS 45; RATIO OF MALE l_x TO TOTAL l_x IS 20%

	BLENDED 1980 CSO TABLE						BLENDED 1980 CET TABLE				
Age	l_x	$1,000\ q_x$	Age	l_x	$1,000\ q_x$	Age	l_x	$1,000\ q_x$	Age	l_x	$1,000\ q_x$
0	75,108	3.15	50	68,862	5.31	0	1,080,889	4.10	50	950,863	6.90
1	74,871	.92	51	68,496	5.70	1	1,076,457	1.67	51	944,302	7.41
2	74,802	.85	52	68,106	6.15	2	1,074,659	1.60	52	937,305	8.00
3	74,738	.82	53	67,687	6.65	3	1,072,940	1.57	53	929,807	8.65
4	74,677	.81	54	67,237	7.19	4	1,071,255	1.56	54	921,764	9.35
5	74,617	.79	55	66,754	7.76	5	1,069,584	1.54	55	913,146	10.09
6	74,558	.76	56	66,236	8.34	6	1,067,937	1.51	56	903,932	10.84
7	74,501	.74	57	65,684	8.91	7	1,066,324	1.49	57	894,133	11.58
8	74,446	.71	58	65,099	9.47	8	1,064,735	1.46	58	883,779	12.31
9	74,393	.70	59	64,483	10.08	9	1,063,180	1.45	59	872,900	13.10
10	74,341	.70	60	63,833	10.75	10	1,061,638	1.45	60	861,465	13.98
11	74,289	.70	61	63,147	11.55	11	1,060,099	1.45	61	849,422	15.02
12	74,237	.74	62	62,418	12.54	12	1,058,562	1.49	62	836,664	16.30
13	74,182	.80	63	61,635	13.74	13	1,056,985	1.55	63	823,026	17.86
14	74,123	.86	64	60,788	15.10	14	1,055,347	1.61	64	808,327	19.63
15	74,059	.95	65	59,870	16.62	15	1,053,648	1.70	65	792,460	21.61
16	73,989	1.03	66	58,875	18.19	16	1,051,857	1.78	66	775,335	23.65
17	73,913	1.09	67	57,804	19.81	17	1,049,985	1.84	67	756,998	25.75
18	73,832	1.15	68	56,659	21.45	18	1,048,053	1.90	68	737,505	27.89
19	73,747	1.19	69	55,444	23.19	19	1,046,062	1.94	69	716,936	30.15
20	73,659	1.22	70	54,158	25.19	20	1,044,033	1.97	70	695,320	32.75
21	73,569	1.24	71	52,794	27.57	21	1,041,976	1.99	71	672,548	35.84
22	73,478	1.25	72	51,338	30.43	22	1,039,902	2.00	72	648,444	39.56
23	73,386	1.27	73	49,776	33.92	23	1,037,822	2.02	73	622,792	44.10
24	73,293	1.28	74	48,088	37.94	24	1,035,726	2.03	74	595,327	49.32

BLENDED 1980 CSO TABLE						BLENDED 1980 CET TABLE					
Age	l_x	1,000 q_x	Age	l_x	1,000 q_x	Age	l_x	1,000 q_x	Age	l_x	1,000 q_x
25	73,199	1.29	75	46,264	42.43	25	1,033,623	2.04	75	565,965	55.16
26	73,105	1.30	76	44,301	47.33	26	1,031,514	2.05	76	534,746	61.53
27	73,010	1.31	77	42,204	52.53	27	1,029,399	2.06	77	501,843	68.29
28	72,914	1.35	78	39,987	58.03	28	1,027,278	2.10	78	467,572	75.44
29	72,816	1.38	79	37,667	63.98	29	1,025,121	2.13	79	432,298	83.17
30	72,716	1.42	80	35,257	70.65	30	1,022,937	2.17	80	396,344	91.85
31	72,613	1.47	81	32,766	78.26	31	1,020,717	2.22	81	359,940	101.74
32	72,506	1.52	82	30,202	87.04	32	1,018,451	2.27	82	323,320	113.15
33	72,396	1.58	83	27,573	97.15	33	1,016,139	2.33	83	286,736	126.30
34	72,282	1.66	84	24,894	108.33	34	1,013,771	2.41	84	250,521	140.83
35	72,162	1.74	85	22,197	120.52	35	1,011,328	2.49	85	215,240	156.68
36	72,036	1.85	86	19,522	133.53	36	1,008,810	2.60	86	181,516	173.59
37	71,903	1.99	87	16,915	147.37	37	1,006,187	2.74	87	150,007	191.58
38	71,760	2.15	88	14,422	161.93	38	1,003,430	2.90	88	121,269	210.51
39	71,606	2.32	89	12,087	177.40	39	1,000,520	3.07	89	95,741	230.62
40	71,440	2.54	90	9,943	193.80	40	997,448	3.30	90	73,661	251.94
41	71,259	2.77	91	8,016	211.61	41	994,156	3.60	91	55,103	275.09
42	71,062	3.02	92	6,320	231.05	42	990,577	3.93	92	39,945	300.37
43	70,847	3.25	93	4,860	253.44	43	986,684	4.23	93	27,947	329.47
44	70,617	3.49	94	3,628	280.66	44	982,510	4.54	94	18,739	364.86
45	70,371	3.75	95	2,610	318.37	45	978,049	4.88	95	11,902	413.88
46	70,107	4.02	96	1,779	376.21	46	973,276	5.23	96	6,976	489.07
47	69,825	4.30	97	1,110	475.72	47	968,186	5.59	97	3,564	618.44
48	69,525	4.61	98	582	656.09	48	962,774	5.99	98	1,360	852.92
49	69,204	4.94	99	200	1,000.00	49	957,007	6.42	99	200	1,000.00

APPENDIX F

CASH VALUES AND RESERVES—1980 CSO

PLAN: WHOLE LIFE   ISSUE AGE: 45   PIVOTAL AGE: 50

INTEREST RATE: 4%   CONTINUOUS FUNCTIONS   ANB

PERCENT MALE l_x TO TOTAL l_x IS 100%

FACTORS:	$NAP = 20.88627$	$B' = 20.88627$	$B' = 20.88627$
	$NFE = 2.17033$	$B'' = 1.02013$	$B'' = 0.00000$
	$NFR = 0.00000$	ALPHA = 4.56022	ALPHA = 20.88627
	$E' = 36.10784$		

ATTAINED AGE	DURATION	STATUTORY CASH VALUE	CRVM RESERVES	NET LEVEL RESERVES
46	1	0.00	0.00	16.69
47	2	0.00	17.35	33.75
48	3	16.93	35.09	51.19
49	4	35.41	53.23	69.03
50	5	54.27	71.74	87.23
51	6	73.52	90.63	105.81
52	7	93.14	109.89	124.74
53	8	113.06	129.44	143.97
54	9	133.28	149.28	163.48
55	10	153.73	169.36	183.22
56	11	174.42	189.67	203.19
57	12	195.33	210.19	223.37
58	13	216.48	230.96	243.79
59	14	237.87	251.95	264.43
60	15	259.49	273.17	285.30
61	16	281.32	294.60	306.37
62	17	303.32	316.19	327.60
63	18	325.41	337.87	348.92
64	19	347.53	359.58	370.27
65	20	369.63	381.27	391.60
66	21	391.67	402.91	412.87
67	22	413.64	424.47	434.07
68	23	435.56	445.98	455.23
69	24	457.44	467.46	476.35
70	25	479.27	488.89	497.42
71	26	501.00	510.22	518.39
72	27	522.51	531.33	539.15
73	28	543.68	552.11	559.58
74	29	564.34	572.38	579.52
75	30	584.42	592.09	598.90

CASH VALUES AND RESERVES—1980 CSO

PLAN: WHOLE LIFE ISSUE AGE: 45 PIVOTAL AGE: 50
INTEREST RATE: 4% CONTINUOUS FUNCTIONS ANB
PERCENT MALE l_x TO TOTAL l_x IS 75%

FACTORS:			
$NAP = 19.75455$	$B' = 19.75455$	$B' = 19.75455$
$NFE = 2.04604$	$B'' = 0.94572$	$B'' = 0.00000$
$NFR = 0.00000$	$ALPHA = 4.31291$	$ALPHA = 19.75455$
$E' = 34.69319$		

ATTAINED AGE	DURATION	STATUTORY CASH VALUE	CRVM RESERVES	NET LEVEL RESERVES
46	1	0.00	0.00	15.78
47	2	0.00	16.41	31.93
48	3	15.45	33.20	48.46
49	4	32.92	50.36	65.35
50	5	50.78	67.90	82.61
51	6	69.00	85.79	100.22
52	7	87.58	104.03	118.17
53	8	106.48	122.59	136.44
54	9	125.66	141.43	154.98
55	10	145.13	160.54	173.79
56	11	164.83	179.89	192.83
57	12	184.80	199.50	212.13
58	13	205.05	219.38	231.70
59	14	225.59	239.56	251.56
60	15	246.41	260.00	271.68
61	16	267.53	280.74	292.09
62	17	288.87	301.69	312.71
63	18	310.36	322.79	333.48
64	19	331.94	343.99	354.34
65	20	353.53	365.19	375.21
66	21	375.13	386.40	396.08
67	22	396.69	407.57	416.92
68	23	418.31	428.79	437.81
69	24	439.96	450.06	458.74
70	25	461.67	471.38	479.72
71	26	483.38	492.69	500.70
72	27	505.00	513.93	521.60
73	28	526.39	534.93	542.27
74	29	547.38	555.55	562.56
75	30	567.88	575.67	582.37

CASH VALUES AND RESERVES—1980 CSO

PLAN: WHOLE LIFE   ISSUE AGE: 45   PIVOTAL AGE: 50

INTEREST RATE: 4%   CONTINUOUS FUNCTIONS   ANB

PERCENT MALE l_x TO TOTAL l_x IS 50%

FACTORS:			
	$NAP = 18.66173$	$B' = 18.66173$	$B' = 18.66173$
	$NFE = 1.92906$	$B'' = 0.87689$	$B'' = 0.00000$
	$NFR = 0.00000$	ALPHA = 4.05893	ALPHA = 18.66173
	$E' = 33.32716$		

ATTAINED AGE	DURATION	STATUTORY CASH VALUE	CRVM RESERVES	NET LEVEL RESERVES
46	1	0.00	0.00	14.92
47	2	0.00	15.51	30.20
48	3	14.03	31.37	45.83
49	4	30.55	47.61	61.82
50	5	47.46	64.21	78.18
51	6	64.71	81.17	94.88
52	7	82.33	98.48	111.93
53	8	100.28	116.11	129.30
54	9	118.52	134.03	146.95
55	10	137.05	152.23	164.88
56	11	155.86	170.71	183.09
57	12	174.97	189.48	201.58
58	13	194.41	208.58	220.39
59	14	214.21	228.03	239.55
60	15	234.38	247.85	259.07
61	16	254.88	267.99	278.91
62	17	275.69	288.43	299.05
63	18	296.73	309.10	319.41
64	19	317.91	329.91	339.91
65	20	339.17	350.79	360.48
66	21	360.46	371.71	381.09
67	22	381.85	392.73	401.79
68	23	403.32	413.81	422.56
69	24	424.94	435.06	443.49
70	25	446.75	456.48	464.59
71	26	468.67	478.02	485.81
72	27	490.60	499.56	507.03
73	28	512.41	520.99	528.14
74	29	533.94	542.14	548.97
75	30	555.07	562.90	569.42

PLAN: WHOLE LIFE   ISSUE AGE: 45   PIVOTAL AGE: 50
INTEREST RATE: 4%   CONTINUOUS FUNCTIONS   ANB
PERCENT MALE l_x TO TOTAL l_x IS 25%

FACTORS:			
	$NAP = 17.60590$	$B' = 17.60590$	$B' = 17.60590$
	$NFE = 1.81887$	$B'' = 0.81171$	$B'' = 0.00000$
	$NFR = 0.00000$	ALPHA = 3.82395	ALPHA = 17.60590
	$E' = 32.00738$		

ATTAINED AGE	DURATION	STATUTORY CASH VALUE	CRVM RESERVES	NET LEVEL RESERVES
46	1	0.00	−0.00	14.08
47	2	0.00	14.64	28.52
48	3	12.69	29.64	43.31
49	4	28.33	45.02	58.47
50	5	44.33	60.74	73.97
51	6	60.69	76.82	89.82
52	7	77.39	93.23	106.00
53	8	94.43	109.99	122.52
54	9	111.81	127.07	139.36
55	10	129.48	144.43	156.48
56	11	147.49	162.13	173.93
57	12	165.82	180.14	191.69
58	13	184.55	198.55	209.84
59	14	203.70	217.38	228.40
60	15	223.31	236.65	247.40
61	16	243.32	256.32	266.79
62	17	263.74	276.39	286.58
63	18	284.45	296.74	306.64
64	19	305.37	317.30	326.91
65	20	326.43	338.00	347.32
66	21	347.59	358.79	367.82
67	22	368.91	379.74	388.48
68	23	390.40	400.87	409.31
69	24	412.16	422.25	430.39
70	25	434.19	443.91	451.74
71	26	456.47	465.81	473.33
72	27	478.87	487.82	495.03
73	28	501.24	509.81	516.71
74	29	523.43	531.61	538.21
75	30	545.26	553.07	559.36

PLAN: WHOLE LIFE   ISSUE AGE: 45   PIVOTAL AGE: 50

INTEREST RATE: 4%   CONTINUOUS FUNCTIONS   ANB

PERCENT MALE l_x TO TOTAL l_x IS 0%

FACTORS:	$NAP = 16.58401$	$B' = 16.58401$	$B' = 16.58401$
	$NFE = 1.71488$	$B'' = 0.75240$	$B'' = 0.00000$
	$NFR = 0.00000$	ALPHA = 3.56324	ALPHA = 16.58401
	$E' = 30.73001$		

ATTAINED AGE	DURATION	STATUTORY CASH VALUE	CRVM RESERVES	NET LEVEL RESERVES
46	1	0.00	0.00	13.30
47	2	0.00	13.83	26.95
48	3	11.48	28.02	40.95
49	4	26.26	42.55	55.29
50	5	41.40	57.44	69.98
51	6	56.90	72.68	85.02
52	7	72.77	88.28	100.41
53	8	88.97	104.21	116.13
54	9	105.52	120.49	132.19
55	10	122.42	137.10	148.58
56	11	139.66	154.06	165.31
57	12	157.31	171.41	182.43
58	13	175.40	189.19	199.98
59	14	194.00	207.49	218.03
60	15	213.12	226.29	236.58
61	16	232.77	245.60	255.64
62	17	252.88	265.38	275.15
63	18	273.38	285.54	295.04
64	19	294.16	305.97	315.20
65	20	315.11	326.57	335.53
66	21	336.28	347.39	356.07
67	22	357.66	368.41	376.81
68	23	379.30	389.69	397.81
69	24	401.31	411.33	419.16
70	25	423.69	433.33	440.87
71	26	446.44	455.70	462.94
72	27	469.37	478.25	485.19
73	28	492.40	500.89	507.53
74	29	515.27	523.38	529.72
75	30	537.86	545.60	551.64

FEBRUARY 7, 1984, REPORT OF THE SOCIETY OF ACTUARIES COMMITTEE ON NONFORFEITURE AND VALUATION MORTALITY PROBLEMS—INDIVIDUAL LIFE INSURANCE AND ANNUITIES BLENDED SELECTION FACTORS FOR BLENDED 1980 CSO TABLES

INTRODUCTION

The report (dated November 28, 1983) of the Society of Actuaries Committee on Nonforfeiture and Valuation Mortality Problems—Individual Life Insurance and Annuities (NVMP Committee) on "Blended 1980 CSO and 1980 CET Mortality Tables" was discussed at the December 1983 meeting of the NAIC Technical Staff Actuarial Group (TSAG). This report presented blended 1980 CSO and CET tables for 80, 60, 50, 40, and 20 percent males using age 45 as the pivotal age. These tables were recommended by the TSAG for adoption by the NAIC and were adopted by the NAIC at its December 1983 meeting together with a formula for blended select factors.

The formula for blended select factors had not been part of the NVMP Committee report but was suggested by the Chairman in response to a request from the TSAG in the course of its December meeting. Subsequently, the Society's NVMP Committee was asked to produce a complete set of select factors for each of the blended CSO tables, now referred to as the 1980 CSO Tables B, C, D, E, and F: 80, 60, 50, 40, and 20 percent males, respectively. The 100 percent male and 100 percent female tables are referred to as 1980 CSO Tables A and G, respectively.

Derivation of Formula

The formula for blended select factors was intended primarily to be a practical approach to what might otherwise be an extensive calculation. It involved two assumptions or approximations.

The first assumption is that the ratio of male to total l_x at the pivotal age, 45, would be sufficiently close to the ratios at younger and older ages so that it could be used for all ages where select mortality factors would be used. Table I, taken from the Committee's November 28 report, shows, for each of 20, 40, 50, 60, and 80 percent males at pivotal age 45, the percentages of male to total for each of ages 20, 30, 40, 50, 60, 70, and 80. Except for the very high ages, the ratios do not differ significantly from the

TABLE I

PERCENT MALE l_x TO TOTAL l_x AT PIVOTAL AGE 45

Table	20%	40%	50%	60%	80%
Age X	Ratios (percent) of Male l_x to Total l_x at Table Age				
20	20.23%	40.35%	50.36%	60.35%	80.23%
30	20.13	40.20	50.20	60.20	80.13
40	20.06	40.09	50.09	60.09	80.06
50	19.90	39.85	49.84	59.85	79.90
60	19.35	39.02	48.98	59.01	79.34
70	17.70	36.45	46.25	56.34	77.49
80	14.19	30.61	39.82	49.81	72.58

pivotal age ratio. Consequently, the formula uses the pivotal age ratio for all ages.

The second simplifying assumption is that female mortality can be represented as 60 percent of male mortality in the following expression for a blended selection factor, where Z is the percent male to total at the pivotal age (45), $^zF_{x,t}^T$ is the blended selection factor for policy year t, $F_{x,t}^M$ and $F_{x,t}^F$ are the respective male and female select factors for policy year t; the x subscript identifies the issue age group.

Exact expression:

$$Z/100 \; F_{x,t}^M \; q_{x+t-1}^M + (1-Z/100) \; F_{x,t}^F \; q_{x+t-1}^F$$

$$= \;^zF_{x,t}^T \; [Z/100 \; q_{x+t-1}^M + (1-z/100)q_{x+t-1}^F].$$

If $0.6q_{x+t-1}^M$ is substituted for q_{x+t-1}^F, the mortality rates drop out on both sides of the equation, giving

$$Z/100 \; F_{x,t}^M + 0.6(1-Z/100) \; F_{x,t}^F = \;^zF_{x,t}^T \; [Z/100 + 0.6 \; (1-Z/100)].$$

$$^zF_{x,t}^T = [Z/100 \; F_{x,t}^M + 0.6 \; (1-Z/100) \; F_{x,t}^F]/[Z/100 + 0.6 \; (1-Z/100)],$$

which is the formula adopted by the NAIC at its December 1983 meeting.

Test of Formula

As a test of the formula, exact values (using $Z = 20\%$, 50%, 80%) were calculated at ages 22, 42, 62, and 70 for the first policy year where the effect of selection is greatest. Table II comparing the exact values with formula values indicates that the formula is sufficiently accurate. The exact values at issue age 70 were computed using the male to total ratios from Table I rather than 20, 50, and 80 percent.

TABLE II

PERCENT MALE TO TOTAL l_x AT PIVOTAL AGE 45

Issue Age	20%		50%		80%	
	Blended Selection Factors					
	Exact	Formula	Exact	Formula	Exact	Formula
22	90	90	83	83	78	78
42	81	80	76	75	72	72
62	63	63	58	58	54	54
70	57	56	53	53	50	50

Production of Blended Select Factors

A computer program using the formula derived above and the selection factors on page 669 of Volume XXXIII of the *Transactions* of the Society of Actuaries was used to calculate the selection factors on the following pages.

Robert J. Johansen
Chairman, Society of Actuaries Committee
on Nonforfeiture and Valuation Mortality
Problems—Individual Life Insurance
and Annuities

DISCUSSIONS

Two letters were received by the Committee commenting on the blended 1980 CSO mortality tables and the process by which they were derived. Edited versions of the letters are printed here.

Paul O. Kirley, F.S.A. described an alternate method of deriving values on a blended basis. His method blends male and female net single premiums directly using the columns of percentages of male l_x and female l_x to total l_x developed in the blending process.

Mr. Kirley's letter continues: If $W_x^{M,r}$ and $W_x^{F,r}$ denote the fractions of males and females, respectively, at age x which result from an assumed $W_r^{M,r}/W_r^{F,r}$ male/female split at a radix age r, and letting superscript B denote blended functions, then it is proven that

$$_t p_x^B = W_x^{M,r} \cdot {_t p_x^M} + W_x^{F,r} \cdot {_t p_x^F}. \tag{1}$$

$\ddot{a}_x{}^B = W_x{}^{M,r} \cdot \ddot{a}_x{}^M + W_x{}^{F,r} \cdot \ddot{a}_x{}^F$ and likewise for $\ddot{a}_x{}^B$, $\ddot{a}^B_{x:\overline{n}|}$ and $\ddot{a}^B_{x:\overline{n}|}$.

Similarly $A_x^B = W_x^{M,r} \cdot A_x^M + W_x^{F,r} \cdot A_x^F$ and likewise for $\bar{A}_x^B$, $A^{'B}_{x:\overline{n}|}$, $\bar{A}^B_{x:\overline{n}|}$, $A^B_{x:\overline{n}|}$, $\bar{A}^B_{x:\overline{n}|}$, and $A^{'B}_{x:\overline{n}|}$.

The relations for annuities follow by multiplying equation (1) by v^t and summing or integrating. The life insurance relations follow from those for annuities by standard relations such as $A_x = 1 - d\ddot{a}_x$. The alternate technique could frequently prove more convenient or could at least provide a checking technique.

Mr. Kirley raised the question of rounding errors involved in the blending process. Does the second procedure when applied to 1980 CSO male and 1980 CSO female tables produce the same results as the first?

He goes on to say that the specific examples at the radix age certainly seem to provide intuitive justification for the TIAA method. For example, taking $x = r$ in (1), one can see that $q_r^B = W_r^{M,r} \cdot q_r^M + W_r^{F,r} \cdot q_r$.

This relation can be verified by a hand calculation, as the weights are precisely the assumed split at the radix age. At other ages, one must rely on the blending calculations for the weights; these can also be simply calculated as in the following proof.

Proof of Relation (1):

In the TIAA blending process, let the constants k_r^M and k_r^F be chosen so that, if $W_r^{M,r}$ is the desired ratio of male l_x to total l_x at the radix age, r, then

$$W_r^{M,r} = \frac{k_r^M \cdot l_r^M}{k_r^M \cdot l_r^M + k_r^F \cdot l_r^F}$$

and likewise for females, so that $W_r^{M,r} + W_r^{F,r} = 1$.

Then at any age x,

$$_t p_x{}^B = \frac{k_r^M \cdot l_{x+t}^M + k_r^F \cdot l_{x+t}^F}{k_r^M \cdot l_x^M + k_r \cdot l_x^F}$$

by the TIAA process.

Also by that process, $W_x^{M,r} = \dfrac{k_r \cdot l_x^M}{k_r^M \cdot l_x^M + k_r^F \cdot l_x^F}$ is the fraction of males at

age x which results from the assumed male/female split at age r; likewise for females. Then

$$W_{xrb}^{M,r} \cdot {}_t p_x^M + W_x^{F,r} \cdot {}_t p_x^F$$

$$= \frac{k_r^M \cdot l_x^M}{k_r^M \cdot l_x^M + k_r^F \cdot l_x^F} \cdot \frac{l_{x+t}^M}{l_x^M} + \frac{k_r^F \cdot l_x^F}{k_r^M \cdot l_x^M + k_r^F \cdot l_x^F} \cdot \frac{l_{x+t}^F}{l_x^F}$$

$$= \frac{k_r^M \cdot l_{x+t}^M}{k_r^M \cdot l_x^M + k_r^F \cdot l_x^F} + \frac{k_r^F \cdot l_{x+t}^F}{k_r^M \cdot l_x^M + k_r^F \cdot l_x^F}$$

$$= {}_t p_x^B \text{ as required.}$$

A letter received from Stuart Kwassman, F.S.A., referring to the calculation and combination of separate male and female l_x's forward and backward from the pivotal age, questioned the additional work involved as opposed to taking a weighted average of the q_x's. Mr. Kwassman's letter viewed the additional work and the determination of a pivotal age as an unnecessary complication.

Mr. Kwassman wrote that he had developed unisex mortality tables by a similar approach, projecting the l_x's into the future in pricing a unisex life insurance product. He went on to say that this exercise is most appropriate in this situation. However, for the purpose of deriving a mortality table for nonforfeiture purposes, this method may not be appropriate.

His letter continued: "The 1980 CSO Mortality Tables were constructed based upon aggregate mortality experience (select and ultimate mortality experience combined, but with the first five policy years dropped from the experience) with mortality margins. There is no such "starting age" for the distribution of male and female lives since the 1980 CSO Tables are on an aggregate basis." Thus, one may consider this method of projecting both into the future and the past somewhat artificial.

Mr. Kwassman goes on: "There is a potential problem in using a blended mortality table for nonforfeiture purposes and a sex-distinct table for valuation purposes. This is probably mostly an administrative problem, but nonetheless deserves proper attention.

"As the amended NAIC Model Regulation currently reads, it would be necessary to compare the cash surrender value and the statutory Exhibit 8A reserve for all unisex policies. This might not be necessary for sex-distinct policies where the product is appropriately designed such that the statutory Exhibit 8A reserve is made to be always greater than or equal to the cash surrender value. A unisex product could not be so designed because the nonforfeiture mortality table and the valuation mortality table are not equal."

Mr. Kwassman stated that he was working on developing minimum statutory reserves for his company's universal life product based on the NAIC's

minimum valuation standard for flexible premium adjustable life products. The product has no front-end loads, and where the guaranteed mortality charges (i.e., the nonforfeiture table rates) are equal to the valuation table rates, the net level premium reserve is equal to the policy fund value. However, if the valuation table is not the same as the nonforfeiture table, it is necessary to project the greater of the policy fund value and the guaranteed maturity fund value and then take present values using the valuation table in order to determine the reserve.

Mr. Kwassman questioned the rationale for setting statutory reserves for unisex policies using sex-distinct mortality tables, saying that it should not be any different from that for nonsmoker and smoker insureds. Different valuation tables are not required for nonsmoker insureds and smoker insureds when they are considered to be in the same valuation class. He recommended the "use of blended mortality tables for valuation of unisex policies with the same blending percentages as for nonforfeiture."

Questioning how, in practice, these blending percentages would be determined, Mr. Kwassman asked if it would be necessary "to monitor the resulting actual percentage distribution of male to female lives within the population for a particular unisex product."

Committee's Review of Discussions

The Committee wishes to express its appreciation to Messrs. Kirley and Kwassman for their letters, both of which point out corollary aspects of the Committee's report.

Mr. Kirley has suggested an alternate quick method to derive annuity values on a blended basis. In the absence of commutation columns or a substantial computer program, his method could be used to calculate annuities and other values. All that is required is a set of male and female l_s's on the 1980 CSO table or any other table.

Mr. Kirley's method is mathematically equivalent to that used by the Committee and may be useful to some actuaries.

On the other hand, the NAIC had requested mortality tables which it would then approve for use. The Committee had to accede to this request and supply tables of q_x's. Again, in practice, complete tables of blended q_x's are needed in order to compute nonforfeiture values, and l_x's are needed to produce Age Last Birthday tables. Ratios corresponding to Mr. Kirley's k_r^M and k_r^F are to be found in Appendix C of the Committee's report where they appear as *MR* and *FR*.

Mr. Kwassman's suggested method for using weighted average q_x's was discussed in the Committee's report. The error in so doing would be small at young and middle ages but becomes appreciable at the very high ages

where survival causes female lives to predominate. It is also true that the choice of an interest rate has a much greater effect on values. The Committee's method provides an orderly and organized approach although not the only one. It has an advantage in that it should reflect the proportions of male and female survivors at most ages.

The requirement of separate male and female tables for valuation reserves, questioned by Mr. Kwassman, has not been unanimously supported by states in setting requirements, e.g., New York permits reserves calculated on blended tables. The use of sex-distinct tables is conservative in that reserves do not depend on any assumed proportion of males and females.

The use of blended mortality tables for reserves is a simplifying approach, but the valuation actuary must make sure that such reserves are sufficient for the actual male/female mix of business on which the reserves will be held.

It should be noted that the older life insurance valuation mortality tables, though based on the aggregate experience of male and female insureds, reflected largely male mortality because, by amount of insurance, the underlying experience was predominantly male. The proportions of female lives in a pension plan obviously can range from 0 to 100 percent, which is the reason five blended tables were prepared.

BLENDED 1980 CSO SELECTION FACTORS

1980 CSO—B
PERCENT MALE TO TOTAL = 80

ISSUE AGE GROUP	POLICY YEAR									
	1	2	3	4	5	6	7	8	9	10
<20	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
20–29	78	82	86	91	91	96	96	96	96	96
30–34	77	82	86	91	91	96	96	96	96	96
35–39	77	81	86	91	91	95	95	96	96	96
40–44	72	76	81	86	86	90	95	95	95	95
45–49	67	71	76	81	81	85	90	90	90	90
50–54	63	66	71	76	76	81	85	85	85	85
55–59	58	62	66	71	71	76	80	80	80	80
60–64	54	58	62	66	66	71	76	76	76	76
65–69	50	54	57	62	62	66	71	71	71	71
70 +	50	53	56	61	61	66	71	71	71	71

1980 CSO—C
PERCENT MALE TO TOTAL = 60

ISSUE AGE GROUP	POLICY YEAR									
	1	2	3	4	5	6	7	8	9	10
<20	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
20–29	81	85	88	93	93	96	96	96	96	96
30–34	80	83	88	92	92	96	96	96	96	96
35–39	79	82	87	92	92	95	95	96	96	96
40–44	74	78	82	87	87	91	94	95	95	95
45–49	69	73	78	82	82	86	89	90	90	90
50–54	65	68	73	78	78	81	85	85	85	85
55–59	61	63	68	73	73	76	80	80	80	80
60–64	57	59	63	68	68	72	76	76	76	76
65–69	53	55	59	63	63	67	71	71	73	73
70 +	51	54	58	62	62	67	71	71	73	73

1980 CSO—D
PERCENT MALE TO TOTAL = 50

ISSUE AGE GROUP	POLICY YEAR									
	1	2	3	4	5	6	7	8	9	10
<20	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
20–29	83	86	89	94	94	97	97	97	97	97
30–34	81	85	89	92	92	97	97	97	97	97
35–39	80	83	88	92	92	95	95	97	97	97
40–44	75	78	83	88	88	91	94	95	95	95
45–49	71	74	78	83	83	86	89	90	90	90
50–54	67	69	74	78	78	82	85	85	85	85
55–59	62	65	69	74	74	77	80	80	80	80
60–64	58	61	65	69	69	72	77	77	77	77
65–69	54	57	60	65	65	68	72	72	74	74
70 +	53	55	58	63	63	68	72	72	74	74

1980 CSO—E
PERCENT MALE TO TOTAL = 40

ISSUE AGE GROUP	POLICY YEAR									
	1	2	3	4	5	6	7	8	9	10
<20	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
20–29	85	88	90	95	95	97	97	97	97	97
30–34	83	86	90	93	93	97	97	97	97	97
35–39	81	84	88	93	93	95	95	97	97	97
40–44	77	79	84	88	88	91	94	95	95	95
45–49	72	75	79	84	84	86	89	90	90	90
50–54	68	70	75	79	79	82	85	85	85	85
55–59	64	66	70	75	75	77	80	80	80	80
60–64	60	62	66	70	70	73	77	77	77	77
65–69	56	58	61	66	66	68	72	72	75	75
70 +	54	56	59	64	64	68	72	72	75	75

1980 CSO—F
PERCENT MALE TO TOTAL = 20

ISSUE AGE GROUP	POLICY YEAR									
	1	2	3	4	5	6	7	8	9	10
<20	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
20–29	90	91	93	97	97	99	99	99	99	99
30–34	87	88	93	94	94	99	99	99	99	99
35–39	84	86	90	94	94	96	96	99	99	99
40–44	80	81	86	90	90	91	93	95	95	95
45–49	76	77	81	86	86	87	89	90	90	90
50–54	72	73	77	81	81	83	84	85	85	85
55–59	67	68	73	77	77	79	80	80	80	80
60–64	63	64	68	73	73	74	79	79	79	79
65–69	59	60	64	68	68	70	74	74	77	77
70 +	56	58	61	66	66	70	74	74	77	77