Appendix I

Reserve Analysis

Reserves produced by the 2001 CSO Table were compared to reserves produced on a realistic basis, as described below.

Approach

The comparison reserves used in this report were set using a one-year preliminary term reserve calculation involving interest, mortality and, (for term insurance), lapse. These reserve calculations were done on a continuous basis and mean reserves were used for the comparisons. For UL, reserves are dependent on the accumulated value within the contract. We used the product of a major writer of UL to determine the accumulation values. The premium level selected was that which produced an accumulation value near zero at age 100, given illustrated charges and credits (COIs, expense loads, credited interest, etc.). Note, that reserves for UL are equal to the greater of the accumulation value and the calculated reserve.

The Academy Task Force initially considered the use of Gross Premium Reserves (GPR) for this comparison. However, after discussion, we did not feel that a GPR "test" would be appropriate.

The problem with a GPR test is that it is a "gross" valuation, recognizing all the elements that affect pricing and experience. For an individual company, there is a relationship between the pricing assumptions and the emergence of experience. To the extent there are differences, those differences would be reflected in the gross premium reserve and exert a discipline on the company through the reserving process. The problem with an industry GPR is in the differences. For an industry calculation, both the pricing and the expected experience have to be set by assumptions. The results can be "controlled" by how the pricing and experience are set in relation to one another.

This control of the results can be eliminated if the assumptions for expenses (used in a broad sense to include expenses, taxes, cost of capital, etc.) and profits are eliminated from the equation. If it is assumed that the pricing and experience assumptions for these factors are equal, except for a first year allowance to recognize that expenses are front ended, the resulting GPR reduces to a reserve calculation using only interest, mortality, and lapse. The Academy Task Force felt this was a better value for comparison.

The comparison did not consider deficiency reserves because we did not have gross premium assumptions upon which to base them.

Assumptions are based on industry statistics, but were chosen to simulate the experience of companies that are at approximately the 85th percentile for each of the elements used in calculating the reserves. In other words, according to our assumptions, only 15 percent of companies would have experience less favorable in any one of the assumptions used in the reserve calculations than those generated in the comparison reserves.

Comparisons were made using only the ultimate, composite (of smokers and nonsmokers) mortality table. As noted in the report, tests of the valuation table demonstrated that reserves produced by the new select and ultimate tables were generally greater than those produced by the ultimate table alone. If reserves produced by the ultimate table are reasonable in relation to the comparison reserves, reserves produced by the select and ultimate tables will be greater, and reasonable as well. The report also notes that aggregate reserves for a block of business are nearly the same if either the smoking distinct tables or the composite table is used. Thus, if the composite table produces reasonable reserves in relation to the comparison reserves, the smoking distinct tables will produce reasonable reserves also.

Two forms of reserve analysis were done:

- Comparison reserves calculated using 85th percentile values for each assumption (interest, mortality and sometimes persistency) were compared to statutory reserves produced by the table. This comparison was done without aggregating (i.e., on a cell-by-cell basis).

- We also determined how much a particular assumption needed to change, while holding the other assumptions at the 85th percentile level, to produce comparison reserves that were equal to the statutory reserve produced by the new table. This was done with aggregation at the plan level (20-year level premium term, whole life, and universal life) for a model office company.

Assumptions

Assumptions necessary to calculate the comparison reserves were needed for mortality, interest, and lapse. Our original intent was to consider both variation by company and variation in experience over time. We were able to find distributions representing variation by company for all three factors. However, we only found a suitable distribution of variation over time for the interest assumption. As a result, the interest rate considers variation over time but the lapse and mortality assumptions do not.

To set the interest assumption, we started with a value that represented the environment that might be expected to exist at the 85th percentile of all possible futures. Then we determined where the 85th percentile company would fall relative to that overall environment. For the other assumptions, we made a conservative assumption as to the environment using our collective judgment and then used our data to find where the 85th percentile company would be relative to that environment.

Mortality

Assumptions for the variation in mortality by company were developed by examining the spread of experience between the companies that contributed experience to the 1990-95 Basic Table. The standard deviation, by company, of the actual to expected mortality ratios exhibited by these 21 companies was 20 percent.

Assumptions, for the variation in mortality over time, were more difficult to develop. The overall trend in mortality has been downward for some time, but some feel that changes in underwriting that are unlikely to be repeated are a major part of the cause of the improvement. In addition, it is not likely that this trend is uniform by age. Finally, any view of the future should consider adverse deviations such as the 1917 flu epidemic or AIDS. Given the unknowns, we opted to use mortality that does not increase or decrease over time, assuming that the downward trend will absorb any catastrophic situations. (Note, that the 2001 VBT anticipates improvements in mortality through 2001, but does not provide for additional improvement thereafter.)

Combining these two sets of assumptions, lead to a base case assumption of 120 percent of the 2001 VBT for all years.

The reserve analysis outlined in this Appendix was only done using the ultimate, composite (of smokers and nonsmokers) table.

Interest

To gain insights into company variation in investment return, the Academy Task Force examined variations in interest earnings by company over the past five years using the NAIC database. We found the following:

Table I-1
Average Net Investment Income
1995-1999

80th Percentile	7.90%
50th Percentile	7.18%
20th Percentile	6.09%

(Results were expressed in this fashion because some large outliers had an undue effect on standard deviation calculations.)

If one assumes that variation in interest rates by company is normally distributed, the difference between the 20th percentile and the 80th is 1.68 standard deviations. This suggests that the standard deviation of this distribution is about one percent ([7.90-6.09]/1.68=1.08, rounded down).

Information on the variability in interest rates over time was obtained from an analysis of the results of the interest rate model used for C3 testing, based on the 12/31/00 yield curve. This model produces treasury rates at various durations. We focused on 10-year maturities as most representative of how insurance companies invest. The key statistic reviewed was the geometric mean over 30 years for each of the 200 scenarios. The mean was 6.6 percent with a standard deviation of 1.8 percent.

The final assumption, needed to develop the interest rate, concerned the fact that companies will earn more than a treasury rate on their investments. We added a corporate spread of 70 BP to the treasury rates to get a number that is more comparable to what companies might earn.

Combining these assumptions yields an interest rate assumption of 4.5 percent for all years. This number was calculated as the mean of the projection for the 30 year geometric mean less one standard deviation in interest rate movement over time, less one standard deviation in interest rate variation by company, plus the corporate spread (6.6% - 1.8% - 1.0% + 0.7% = 4.5%).

Lapse

The comparison reserves allowed for consideration of lapse rates. For level term insurance, early lapse reduces the overall cost of insurance and will reduce the necessary reserve.

Data on variation in term insurance lapse rates by company was obtained from the LIMRA, International study, 1993-94 UNITED STATES LAPSES BY DURATION AND PRODUCT LINE: LONG-TERM ORDINARY LAPSE SURVEY∗. Our overall focus was on lapse rates by duration. We were particularly interested in the portion of the report that gave information on lapse rates for different quartiles of the company population contributing to the study.

Using the LIMRA data, we calculated the standard deviation of the variation in lapse rates by company for each duration grouping. While information was available for the variation in lapse rates by issue age, we used the data for all ages combined to simplify the calculations. The following table shows the results.

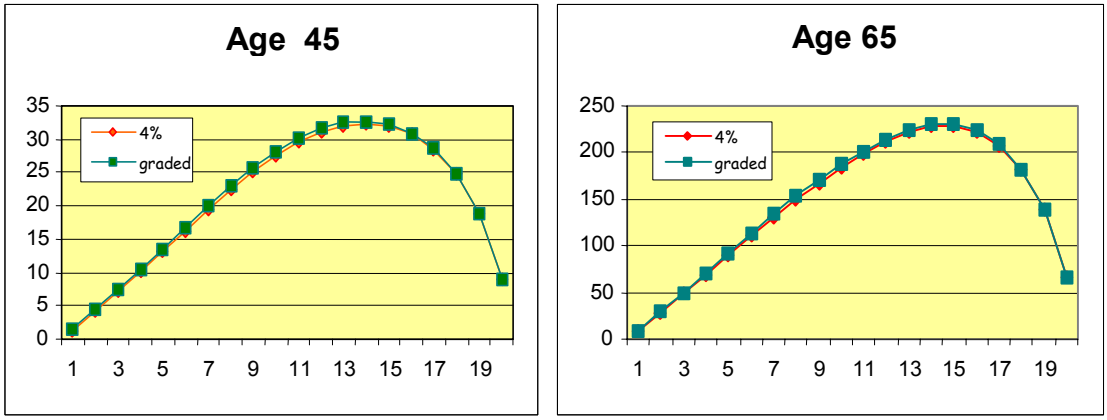
Table I-2
Level Term Lapse Rates by Volume[1]

POLICY YEAR	1st Quartile	Median	3rd Quartile	Std Dev[2]	85th %[3]
1	9.1%	10.3%	14.0%	3.6%	6.7%
2	8.1%	10.4%	13.7%	4.2%	6.2%
3-5	8.6%	9.7%	14.9%	4.7%	5.0%
6-10	4.9%	7.1%	9.7%	3.6%	3.5%
11+	4.0%	6.5%	8.2%	3.1%	3.4%

[1] Source: LIMRA International
[2] Standard Deviation is calculated as (3rd quartile - 1st quartile)/1.35
[3] 85th percentile is calculated as one standard deviation under the median

In order to simplify the calculation of comparison reserves, lapse rates level by duration were desirable. We did tests comparing reserves calculated using the values in the right-hand column above to those based on a level 4 percent. The results of those tests are shown below. As the charts show, there is little difference between the reserves calculated with either assumption. As a result, we opted for a level four percent lapse rate as representative of the graded scale.

Charts I-1a – I-1b
20 Year Level Premium Term Comparison Reserves by Lapse Rate
Male Lives

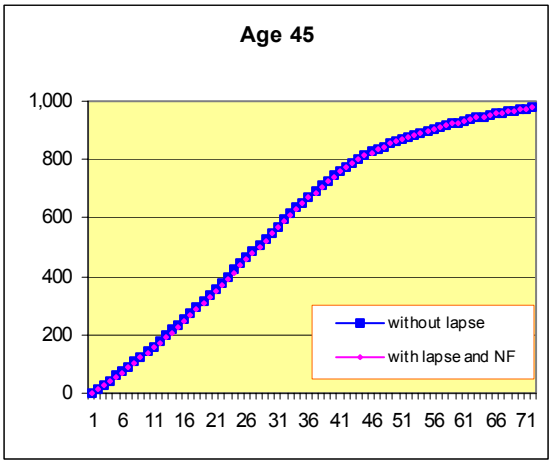


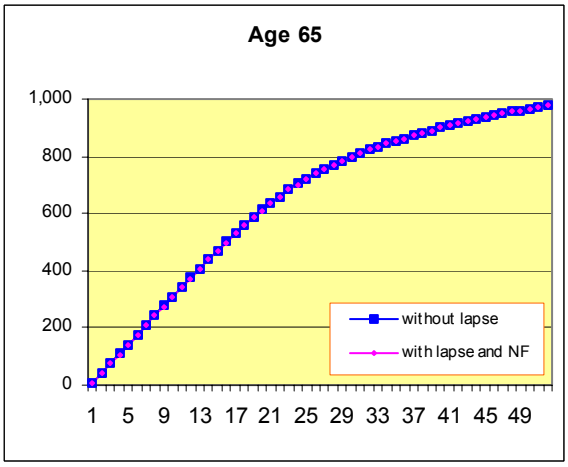
As noted earlier, we were unable to get information on the volatility of lapse rates over time. Obviously, lapse rates will vary over time with changes in the environment for insurance. For example, reductions in term insurance prices during the 1990's probably caused increased lapse rates during that time period. However, given that we had no information upon which to build a distribution, we simply assumed that lapse experience doesn't change over time.

Upon review of these two sets of assumptions, the Academy Task Force decided to use a level lapse rate of four percent for term.

For permanent insurance, the presence of nonforfeiture values reduces the effect of lapsation on reserve values. If the nonforfeiture value is assumed to be equal to the reserve, lapse will have no effect on insurance costs as the reserve released will be equal to the benefit paid. Thus, the Academy Task Force considered leaving lapse rates out of the calculation of comparison reserves for permanent insurance. However, in practice cash values are often less than reserves. The Academy Task Force ran tests using a nonforfeiture value interest rate that was one percent greater than the valuation interest rate, along with a level lapse rate of four percent, to determine if ignoring lapse was indeed a conservative approach. Results of this test are shown below for selected cells.

Charts I-2a – I-2b
Comparison of Whole Life Comparison Reserves for Male Lives With and Without Lapse





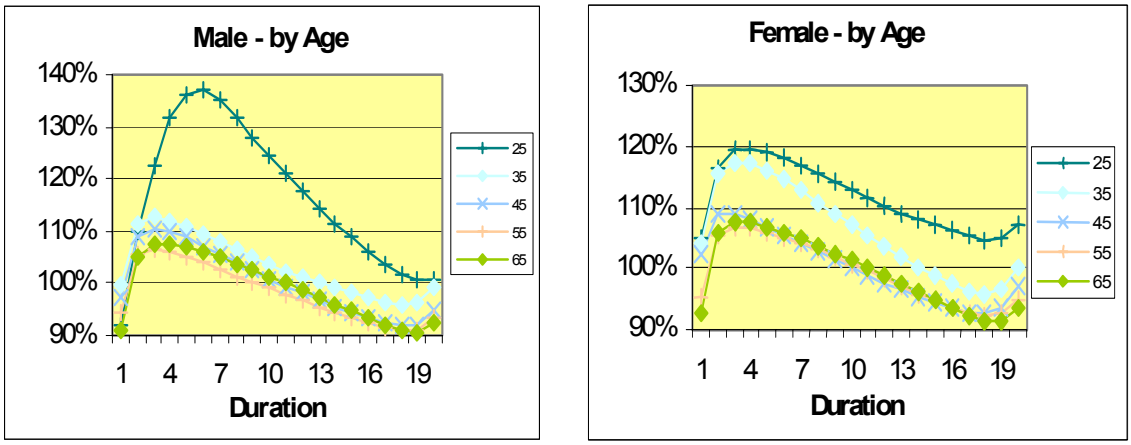
As these charts show, if there is any material difference at all, using reserves calculated without a lapse assumption is the conservative approach. As a result, we opted for the simpler approach of ignoring lapses.

For universal life, we felt that a lapse rate similar to that for term insurance was appropriate. However, the model that was available to us was somewhat limited and did not allow for easy consideration of lapse rates. As a result, we used an 8.5 percent interest rate assumption to simulate the effect of a 4.5 percent interest rate and a four percent lapse rate.

Analysis by Cell

As noted above, the analysis by cell, compares statutory reserves produced by the new table to the comparison reserves. This comparison is done on a cell by cell basis for each duration, but only using ultimate mortality. Results of the comparison for term insurance are shown below.

Charts I-3a – I-3b
Ratio of Statutory Reserves Based on the New Table to Comparison Reserves for 20 Year Level Premium Term Insurance



For both men and women, statutory reserves using the new table are higher than the comparison reserves in most of the early durations and a little lower at the later durations. This effect is more pronounced at the younger ages and for males.

The following table shows comparative results for a model of a block of term business. This model is described in Appendix D. For each cell in the model, reserves were calculated for a block of business determined by assuming five percent sales increases and four percent lapse each year. All the cells in the block were then weighted together using the sales distribution statistics obtained from LIMRA and the results were analyzed after various time periods.

Table I-3
Ratio of Statutory Reserves Based on the 2001 CSO Table and Comparison Reserves for 20 Year Level Premium Term Insurance

	Male	female	both
After 5 years	107.6%	108.9%	107.8%
After 10 years	104.9%	106.2%	105.1%
After 15 years	102.0%	103.3%	102.2%
After 20 years	100.6%	101.9%	100.8%

This analysis shows that the reserves produced by the table are greater than the comparison reserves for the block of term insurance. Additional detail of the results of the analysis of term insurance can be found in tables I-9 and I-10.

Results for permanent insurance are summarized below.

Chart I-4a
Ratio of Statutory Reserves Based on the 2001 CSO Table and Comparison Reserves for Whole Life Insurance

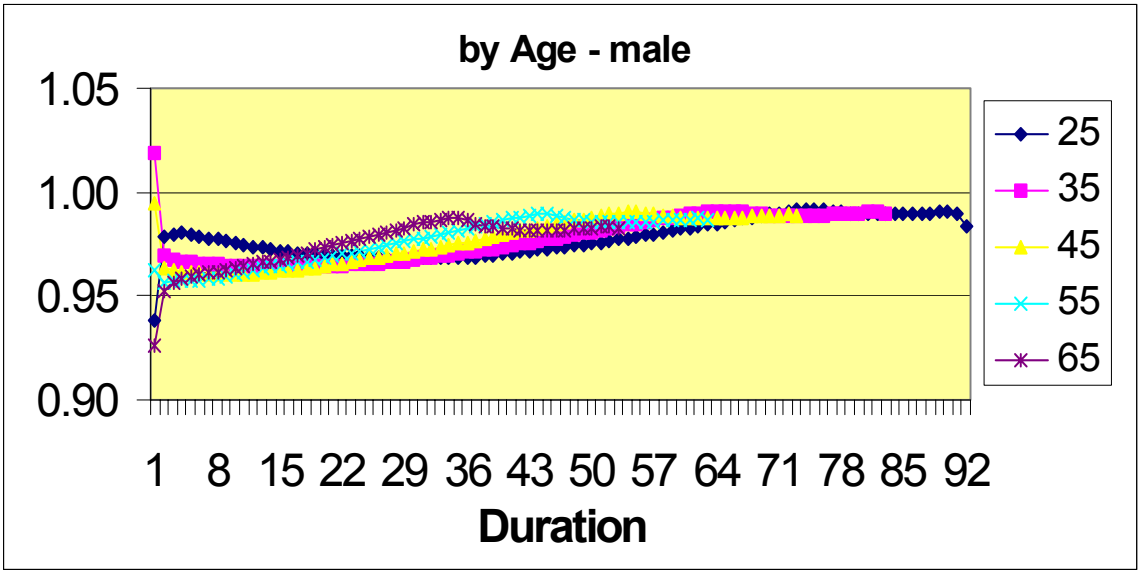
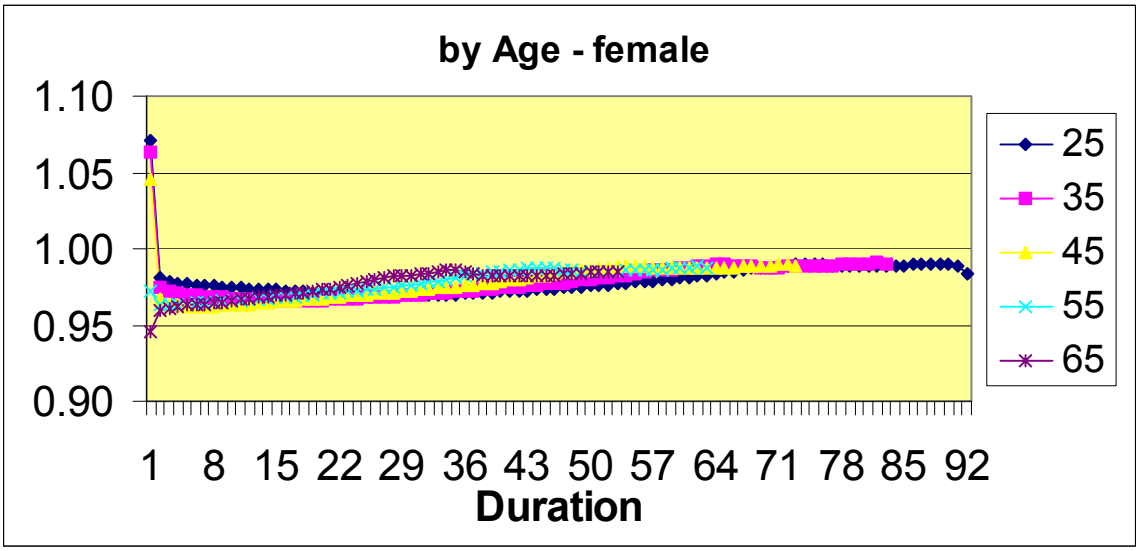


Chart I-4b
Ratio of Statutory Reserves Based on the 2001 CSO Table and Comparison Reserves for Whole Life Insurance



For permanent insurance, the statutory reserves produced using the new table are slightly lower than the comparison reserves. Ratios range from 95 percent to 99 percent for both males and females with the lower numbers at the early durations and the higher numbers at the higher durations. The following table shows comparison results on an overall basis based on a model office calculation like that outlined above for term insurance.

Table I-4
Ratio of Statutory Reserves Based on the 2001 CSO Table and Comparison Reserves for Whole Life

	Male	female	both
After 10 years	96.4%	96.7%	96.5%
After 20 years	96.5%	96.8%	96.6%
After 30 years	96.6%	96.9%	96.7%
After 40 years	96.8%	97.0%	96.9%

While these ratios are less than 100 percent the whole life comparison reserves assume that there are no lapses. As shown later in this section (see Table I-6 and the paragraph following it), had the 85th percentile lapse assumption (four percent) been included in the analysis of whole life reserves, then the statutory reserves would be at least as large as the comparison reserves. Additional detail of the results of the analysis of whole life insurance can be found in tables I-7 and I-8.

Results for level premium to zero UL are shown below. This plan has reserves that are calculated and then compared to the cash value. The greater of the two is held. For a typical plan, the cash value floor takes over at a relatively early duration. Before that, reserves produced by the new table are substantially higher than the comparison reserves.

Chart I-5a
Ratio of Statutory Reserves Based on the 2001 CSO Table and Comparison Reserves for
UL with a Level Premium to Produce a Zero Value at Age 100

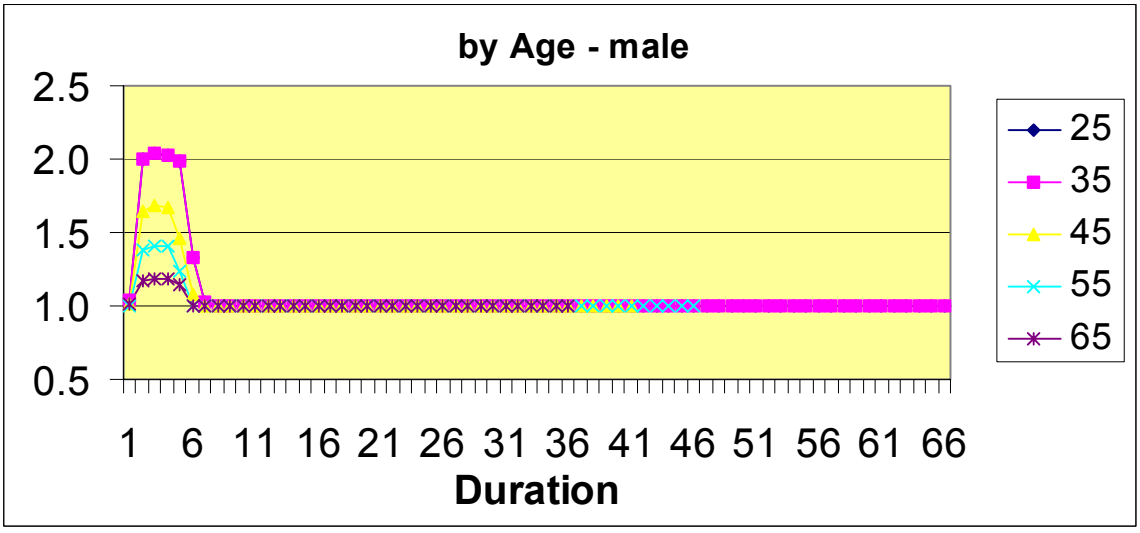
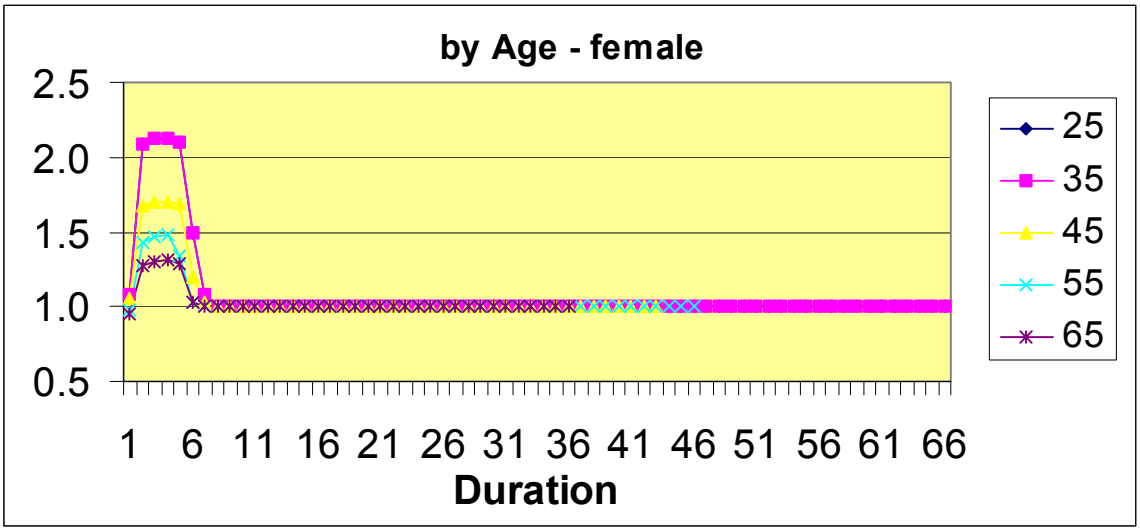


Chart I-5b
Ratio of Statutory Reserves Based on the 2001 CSO Table and Comparison Reserves for UL with a Level Premium to Produce a Zero Value at Age 100



The following table shows the reserves for a block of UL on a level premium to zero basis.

Table I-5
Ratio of Statutory Reserves Based on the 2001 CSO Table and Comparison Reserves for UL with a Level Premium to Produce a Zero Value at Age 100

	Male	female	both
After 10 years	110.3%	114.7%	111.5%
After 20 years	103.1%	104.2%	103.4%
After 30 years	102.0%	102.6%	102.1%
After 40 years	101.6%	102.1%	101.7%

The UL on a level premium to zero basis comparison reserves are lower than the statutory reserves using the 2001 CSO table. Additional detail on UL with a level premium to zero is shown in tables I-11 and I-12.

The Academy Task Force also considered reserves based on the new table for other forms of UL. In general, as the premium goes up from the level premium to zero, without the addition of any "no lapse" guarantee, the cash value floor will come into play earlier, but statutory reserves should still exceed the comparison reserves prior to that time. As the premium goes down from the level premium to zero, the reserve comparisons will tend toward those for term insurance, reverting to the cash value when the surrender charge wears off. In either case, the statutory reserves will exceed the comparison reserves.

The addition of a "no lapse" guarantee adds a significant complication. The Academy Task Force attempted comparisons of values for a product with a "no lapse" guarantee to age 100, but we were unable to do a reserve computation that considered both lapse and the cash values available on lapse. This factor can be significant when the cash value floor does not form the basis for the reserve, which is common during the first 20 – 25 durations of this type of policy.

Sensitivity Testing

The reserve analysis also considered how experience for individual factors needed to change to produce comparison reserves that are equal to statutory reserves produced by the new table. Table I-6 summarizes the results of this sensitivity testing performed on individual factors. Table I-6 is the same as Table 4 in the Reserve Analysis section of the main report. While keeping two of the factors constant at the 85^{th} percentile, the table shows the percentile of the remaining factor that results in the comparison reserve being equal to the statutory reserve. This testing was done using the model office distribution shown in Appendix D to aggregate results. Results are shown for 20 years after first issue.

Table I-6
Maximum Deviations in Experience, with Others at the 85 Percentile Level that Produces Comparison Reserves Equal to Statutory Reserves

	Mortality		Interest		Lapse	
	Value	Pct'ile	Value	Pct'ile	Value	Pct'ile
Whole Life	110%	69.1%	4.80%	81.4%	3.9%	85.9%
20 Year Term	121%	85.3%	4.10%	87.3%	3.5%	91.5%

As an example, consider whole life. As shown in Table I-4, the ratio of statutory reserves to comparison reserves for whole life is 96.6 percent after 20 years. In order to increase this ratio to 100 percent while holding the interest and lapse assumptions constant (4.50 percent interest and no lapses), the mortality assumption must be reduced from 120 percent of the 2001 VBT (the 85th percentile) to 110 percent of the 2001 VBT (the 69th percentile). Likewise, holding the mortality and lapse assumptions constant (120 percent of the 2001 VBT and no lapses), the interest assumption needs to be increased from 4.50 percent (the 85th percentile) to 4.80 percent (the 81st percentile) in order for the statutory reserves to equal or exceed the comparison reserves. Finally, holding mortality at 120 percent of the 2001 VBT and interest at 4.50 percent requires a lapse rate assumption of 3.9 percent (less than that used for term insurance) for the statutory reserves to be at least as big as the comparison reserves.

For term, the new table produces reserves that can handle small changes beyond the 85th percentile for all three variables.

Conclusion

Based on this analysis, we conclude that statutory minimum reserves produced by the 2001 CSO Table using the current regulatory valuation system are reasonable in comparison to reserves produced using a methodology similar to the statutory methodology and experience assumptions that would cover 85% of the companies in the U.S. for each of mortality and interest for permanent insurance and including lapse assumptions covering 85% of companies in the U.S. for term insurance. Mortality experience was based on the data available to the SOA VBT Task Force. For 20-year level premium term insurance, the statutory reserves exceeded the comparison reserves by a small margin on a model office basis. While the same cannot be said for whole life, the shortage was small and can easily be covered by a modest improvement in the interest assumption or by including lapses in the calculation. For UL, the statutory reserves produced by the new table were always greater than or equal to the comparison reserves.

Table I-7
Comparison of Tabular Mean Reserves Using the 2001 CSO and Comparison Reserves

Plan: Whole Life Gender: male Smoking Status composite Table: Ultimate

	Age 25			Age 35			Age 45			Age 55			Age 65		
	Statutory	Comparison		Statutory	Comparison		Statutory	Comparison		Statutory	Comparison		Statutory	Comparison	
Duration	Reserve	Reserve	Ratio	Reserve	Reserve	Ratio	Reserve	Reserve	Ratio	Reserve	Reserve	Ratio	Reserve	Reserve	Ratio
1	0.524	0.558	93.9%	0.592	0.581	101.9%	1.298	1.305	99.5%	3.027	3.145	96.3%	8.312	8.974	92.6%
5	23.048	23.527	98.0%	37.555	38.873	96.6%	57.823	60.143	96.1%	89.341	93.299	95.8%	133.451	139.082	96.0%
10	57.565	59.022	97.5%	91.453	94.795	96.5%	139.089	144.824	96.0%	205.249	213.707	96.0%	295.273	306.450	96.4%
15	99.914	102.795	97.2%	153.829	159.448	96.5%	229.182	238.256	96.2%	325.449	337.311	96.5%	453.352	468.424	96.8%
20	150.240	154.912	97.0%	226.621	234.971	96.4%	326.860	338.945	96.4%	450.503	465.154	96.9%	593.418	609.849	97.3%
25	208.482	215.166	96.9%	307.319	318.300	96.6%	428.155	442.308	96.8%	572.665	588.876	97.2%	705.479	721.043	97.8%
30	276.450	285.552	96.8%	394.811	408.101	96.7%	533.541	549.215	97.1%	680.906	696.902	97.7%	784.600	797.306	98.4%
35	351.799	363.211	96.9%	485.543	500.287	97.1%	636.489	652.676	97.5%	767.505	781.837	98.2%	841.911	852.828	98.7%
40	433.493	446.903	97.0%	579.939	595.633	97.4%	727.707	743.012	97.9%	828.650	840.090	98.6%	883.054	898.731	98.3%
45	518.211	532.818	97.3%	672.151	687.906	97.7%	800.686	814.037	98.4%	872.939	882.500	98.9%	919.130	936.318	98.2%
50	606.351	621.678	97.5%	753.856	768.473	98.1%	852.213	862.751	98.8%	904.733	917.562	98.6%	950.124	966.643	98.3%
55	692.453	707.673	97.8%	819.225	831.818	98.5%	889.536	898.216	99.0%	932.613	946.273	98.6%			
60	768.743	782.759	98.2%	865.379	875.264	98.9%	916.330	927.536	98.8%	956.564	969.436	98.7%			
65	829.779	841.795	98.6%	898.810	906.894	99.1%	939.825	951.545	98.8%						
70	872.874	882.285	98.9%	922.810	933.044	98.9%	960.009	970.915	98.9%						
75	904.090	911.763	99.2%	943.855	954.457	98.9%									
80	926.499	936.134	99.0%	961.934	971.732	99.0%									
85	946.147	956.090	99.0%												
90	962.686	972.188	99.0%												

Table I-8
Comparison of Tabular Mean Reserves Using the 2001 CSO and Comparison Reserves

Plan: Whole Life Gender: female Smoking Status composite Table: Ultimate

	Age 25			Age 35			Age 45			Age 55			Age 65		
	Statutory	Comparison		Statutory	Comparison		Statutory	Comparison		Statutory	Comparison		Statutory	Comparison	
Duration	Reserve	Reserve	Ratio	Reserve	Reserve	Ratio	Reserve	Reserve	Ratio	Reserve	Reserve	Ratio	Reserve	Reserve	Ratio
1	0.264	0.247	107.1%	0.475	0.446	106.4%	0.916	0.875	104.6%	2.501	2.572	97.2%	5.831	6.166	94.6%
5	20.680	21.173	97.7%	31.932	32.915	97.0%	49.573	51.512	96.2%	72.634	75.361	96.4%	109.990	114.245	96.3%
10	51.062	52.386	97.5%	78.345	80.987	96.7%	117.634	122.149	96.3%	168.217	174.131	96.6%	247.345	256.091	96.6%
15	87.438	89.860	97.3%	132.908	137.575	96.6%	192.945	199.897	96.5%	273.015	282.044	96.8%	388.183	400.543	96.9%
20	131.129	135.038	97.1%	194.863	201.653	96.6%	275.833	285.048	96.8%	384.587	396.348	97.0%	524.189	538.712	97.3%
25	182.493	188.217	97.0%	263.418	272.183	96.8%	366.712	378.079	97.0%	498.987	512.754	97.3%	642.284	656.438	97.8%
30	240.815	248.436	96.9%	338.870	349.428	97.0%	463.465	476.622	97.2%	609.463	624.096	97.7%	746.889	760.032	98.3%
35	305.349	314.719	97.0%	421.595	433.822	97.2%	562.671	576.975	97.5%	705.390	718.964	98.1%	816.743	828.606	98.6%
40	376.376	387.312	97.2%	509.668	523.215	97.4%	658.474	672.963	97.8%	790.359	802.444	98.5%	879.814	895.911	98.2%
45	454.251	466.623	97.3%	599.974	614.251	97.7%	741.660	754.749	98.3%	847.101	857.703	98.8%	924.209	940.565	98.3%
50	537.159	550.633	97.6%	687.182	701.328	98.0%	815.344	826.717	98.6%	898.333	911.941	98.5%	953.099	968.091	98.5%
55	622.170	636.186	97.8%	762.905	775.520	98.4%	864.549	874.356	98.9%	934.394	947.924	98.6%			
60	704.264	718.018	98.1%	829.978	840.806	98.7%	908.977	921.115	98.7%	957.861	970.106	98.7%			
65	775.546	787.742	98.5%	874.769	884.023	99.0%	940.248	952.136	98.8%						
70	838.686	849.097	98.8%	915.211	926.440	98.8%	960.598	971.259	98.9%						
75	880.850	889.711	99.0%	943.677	954.581	98.9%									
80	918.920	929.573	98.9%	962.201	971.929	99.0%									
85	945.715	956.020	98.9%												
90	962.773	972.321	99.0%												

Table I-9
Comparison of Tabular Mean Reserves Using the 2001 CSO and Comparison Reserves

Plan: 20 Yr Term Gender: male Smoking Status composite Table: Ultimate

	Age 25			Age 35			Age 45			Age 55			Age 65		
	Statutory	Comparison		Statutory	Comparison		Statutory	Comparison		Statutory	Comparison		Statutory	Comparison	
Duration	Reserve	Reserve	Ratio	Reserve	Reserve	Ratio	Reserve	Reserve	Ratio	Reserve	Reserve	Ratio	Reserve	Reserve	Ratio
1	0.524	0.569	92.0%	0.592	0.593	99.8%	1.298	1.331	97.5%	3.027	3.208	94.4%	8.312	9.157	90.8%
2	0.801	0.729	110.0%	1.924	1.727	111.4%	4.835	4.439	108.9%	12.510	11.861	105.5%	29.919	28.415	105.3%
3	1.041	0.849	122.6%	3.251	2.887	112.6%	8.274	7.501	110.3%	21.717	20.378	106.6%	51.140	47.579	107.5%
4	1.266	0.961	131.7%	4.557	4.067	112.0%	11.658	10.608	109.9%	30.704	28.928	106.1%	72.048	66.947	107.6%
5	1.511	1.109	136.2%	5.822	5.252	110.8%	15.029	13.824	108.7%	39.490	37.554	105.2%	92.608	86.533	107.0%
6	1.783	1.302	136.9%	7.039	6.436	109.4%	18.345	17.110	107.2%	47.958	46.133	104.0%	112.692	106.236	106.1%
7	2.078	1.538	135.1%	8.185	7.593	107.8%	21.550	20.402	105.6%	55.924	54.465	102.7%	132.063	125.830	105.0%
8	2.392	1.815	131.8%	9.227	8.682	106.3%	24.555	23.611	104.0%	63.159	62.283	101.4%	150.270	144.815	103.8%
9	2.710	2.116	128.0%	10.136	9.667	104.8%	27.271	26.635	102.4%	69.451	69.327	100.2%	166.896	162.720	102.6%
10	3.017	2.425	124.4%	10.868	10.500	103.5%	29.606	29.360	100.8%	74.652	75.411	99.0%	181.787	179.401	101.3%
11	3.307	2.737	120.8%	11.382	11.130	102.3%	31.437	31.629	99.4%	78.638	80.372	97.8%	194.655	194.552	100.1%
12	3.560	3.031	117.4%	11.660	11.531	101.1%	32.671	33.319	98.1%	81.299	84.068	96.7%	205.091	207.723	98.7%
13	3.758	3.289	114.3%	11.688	11.677	100.1%	33.232	34.334	96.8%	82.554	86.377	95.6%	212.496	218.223	97.4%
14	3.884	3.486	111.4%	11.499	11.602	99.1%	33.125	34.665	95.6%	82.243	87.073	94.5%	215.966	224.963	96.0%
15	3.914	3.599	108.7%	11.123	11.341	98.1%	32.335	34.269	94.4%	80.173	85.887	93.3%	214.355	226.519	94.6%
16	3.837	3.614	106.2%	10.509	10.828	97.1%	30.701	32.931	93.2%	76.028	82.378	92.3%	206.374	221.229	93.3%
17	3.630	3.496	103.8%	9.590	9.967	96.2%	27.992	30.335	92.3%	69.344	75.905	91.4%	190.355	206.860	92.0%
18	3.254	3.195	101.9%	8.264	8.631	95.7%	23.918	26.083	91.7%	59.370	65.427	90.7%	164.302	180.604	91.0%
19	2.676	2.662	100.6%	6.427	6.678	96.2%	18.194	19.751	92.1%	45.312	49.792	91.0%	125.762	138.823	90.6%
20	1.503	1.495	100.5%	3.316	3.345	99.1%	8.988	9.458	95.0%	22.516	24.082	93.5%	61.121	66.197	92.3%

Table I-10

Comparison of Tabular Mean Reserves Using the 2001 CSO and Comparison Reserves

Plan: 20 Yr Term Gender: female Smoking Status composite Table: Ultimate

	Age 25			Age 35			Age 45			Age 55			Age 65		
	Statutory	Comparison		Statutory	Comparison		Statutory	Comparison		Statutory	Comparison		Statutory	Comparison	
Duration	Reserve	Reserve	Ratio	Reserve	Reserve	Ratio	Reserve	Reserve	Ratio	Reserve	Reserve	Ratio	Reserve	Reserve	Ratio
11	0.264	0.252	105.0%	0.475	0.455	104.3%	0.916	0.893	102.5%	2.501	2.624	95.3%	5.831	6.292	92.7%
2	0.665	0.570	116.6%	1.502	1.300	115.5%	3.974	3.650	108.9%	8.871	8.416	105.4%	20.441	19.328	105.8%
3	1.053	0.882	119.4%	2.505	2.135	117.3%	6.971	6.408	108.8%	14.997	14.051	106.7%	34.806	32.347	107.6%
4	1.424	1.190	119.6%	3.482	2.974	117.1%	9.880	9.163	107.8%	20.841	19.548	106.6%	48.880	45.445	107.6%
5	1.780	1.493	119.2%	4.444	3.831	116.0%	12.668	11.882	106.6%	26.378	24.888	106.0%	62.568	58.540	106.9%
6	2.127	1.798	118.3%	5.383	4.701	114.5%	15.295	14.526	105.3%	31.596	30.058	105.1%	75.745	71.512	105.9%
7	2.455	2.097	117.0%	6.290	5.579	112.7%	17.729	17.052	104.0%	36.442	35.002	104.1%	88.235	84.173	104.8%
8	2.751	2.379	115.6%	7.147	6.447	110.9%	19.922	19.407	102.7%	40.857	39.657	103.0%	99.846	96.320	103.7%
9	3.015	2.642	114.1%	7.937	7.285	109.0%	21.824	21.533	101.4%	44.785	43.955	101.9%	110.398	107.757	102.5%
10	3.235	2.870	112.7%	8.641	8.071	107.1%	23.396	23.377	100.1%	48.148	47.813	100.7%	119.678	118.245	101.2%
11	3.388	3.043	111.4%	9.237	8.776	105.3%	24.592	24.885	98.8%	50.850	51.111	99.5%	127.446	127.508	100.0%
12	3.472	3.154	110.1%	9.692	9.367	103.5%	25.345	25.969	97.6%	52.783	53.711	98.3%	133.418	135.211	98.7%
13	3.489	3.199	109.1%	9.966	9.795	101.7%	25.587	26.532	96.4%	53.816	55.446	97.1%	137.257	140.941	97.4%
14	3.434	3.177	108.1%	10.024	10.008	100.2%	25.251	26.483	95.3%	53.792	56.109	95.9%	138.553	144.184	96.1%
15	3.316	3.096	107.1%	9.825	9.955	98.7%	24.293	25.748	94.3%	52.536	55.463	94.7%	136.815	144.308	94.8%
16	3.126	2.944	106.2%	9.321	9.572	97.4%	22.671	24.253	93.5%	49.832	53.206	93.7%	131.449	140.529	93.5%
17	2.851	2.708	105.3%	8.473	8.792	96.4%	20.309	21.877	92.8%	45.393	48.931	92.8%	121.196	131.199	92.4%
18	2.470	2.361	104.6%	7.221	7.531	95.9%	17.117	18.477	92.6%	38.894	42.172	92.2%	104.453	114.135	91.5%
19	1.965	1.875	104.8%	5.504	5.700	96.6%	13.003	13.902	93.5%	29.997	32.413	92.5%	80.002	87.496	91.4%
20	1.072	1.003	106.9%	2.757	2.755	100.1%	6.580	6.787	97.0%	15.325	16.143	94.9%	39.456	42.207	93.5%

Table I-11

Comparison of Tabular Mean Reserves Using the 2001 CSO and Comparison Reserves

Plan: UL – Level Premium to Zero Gender: male Smoking Status composite Table: Ultimate

	Age 25			Age 35			Age 45			Age 55			Age 65		
	Statutory	Comparison		Statutory	Comparison		Statutory	Comparison		Statutory	Comparison		Statutory	Comparison	
Duration	Reserve	Reserve	Ratio	Reserve	Reserve	Ratio	Reserve	Reserve	Ratio	Reserve	Reserve	Ratio	Reserve	Reserve	Ratio
1	0.206	0.199	103.6%	0.206	0.199	103.6%	0.505	0.499	101.3%	1.250	1.254	99.7%	3.322	3.292	100.9%
5	11.856	5.979	198.3%	11.856	5.979	198.3%	20.611	14.152	145.6%	33.337	26.921	123.8%	42.339	37.030	114.3%
10	39.976	39.976	100.0%	39.976	39.976	100.0%	70.957	70.957	100.0%	112.248	112.248	100.0%	132.415	132.415	100.0%
15	76.305	76.305	100.0%	76.305	76.305	100.0%	125.769	125.769	100.0%	186.120	186.120	100.0%	223.225	223.225	100.0%
20	118.275	118.275	100.0%	118.275	118.275	100.0%	184.748	184.748	100.0%	258.142	258.142	100.0%	300.097	300.097	100.0%
25	168.444	168.444	100.0%	168.444	168.444	100.0%	252.606	252.606	100.0%	339.764	339.764	100.0%	358.852	358.852	100.0%
30	228.161	228.161	100.0%	228.161	228.161	100.0%	325.338	325.338	100.0%	424.256	424.256	100.0%	376.449	376.449	100.0%
35	298.042	298.042	100.0%	298.042	298.042	100.0%	411.034	411.034	100.0%	507.441	507.441	100.0%	315.382	315.382	100.0%
40	375.543	375.543	100.0%	375.543	375.543	100.0%	508.166	508.166	100.0%	584.005	584.005	100.0%			
45	470.787	470.787	100.0%	470.787	470.787	100.0%	619.005	619.005	100.0%	629.324	629.324	100.0%			
50	586.914	586.914	100.0%	586.914	586.914	100.0%	742.925	742.925	100.0%						
55	727.459	727.459	100.0%	727.459	727.459	100.0%	909.949	909.949	100.0%						
60	917.133	917.133	100.0%	917.133	917.133	100.0%									
65	1226.177	1226.177	100.0%	1226.177	1226.177	100.0%									

Table I-12

Comparison of Tabular Mean Reserves Using the 2001 CSO and Comparison Reserves

Plan: UL – Level Premium to Zero Gender: female Smoking Status composite Table: Ultimate

	Age 25			Age 35			Age 45			Age 55			Age 65		
	Statutory	Comparison		Statutory	Comparison		Statutory	Comparison		Statutory	Comparison		Statutory	Comparison	
Duration	Reserve	Reserve	Ratio	Reserve	Reserve	Ratio	Reserve	Reserve	Ratio	Reserve	Reserve	Ratio	Reserve	Reserve	Ratio
1	0.159	0.148	107.7%	0.159	0.148	107.7%	0.346	0.327	105.9%	0.975	0.992	98.3%	2.094	2.188	95.7%
5	9.785	4.651	210.4%	9.785	4.651	210.4%	17.083	10.151	168.3%	25.045	18.701	133.9%	32.560	25.322	128.6%
10	32.008	32.008	100.0%	32.008	32.008	100.0%	55.020	55.020	100.0%	87.777	87.777	100.0%	122.546	122.546	100.0%
15	60.287	60.287	100.0%	60.287	60.287	100.0%	97.466	97.466	100.0%	152.526	152.526	100.0%	207.379	207.379	100.0%
20	92.601	92.601	100.0%	92.601	92.601	100.0%	144.527	144.527	100.0%	221.543	221.543	100.0%	280.995	280.995	100.0%
25	132.183	132.183	100.0%	132.183	132.183	100.0%	202.939	202.939	100.0%	298.330	298.330	100.0%	328.284	328.284	100.0%
30	180.038	180.038	100.0%	180.038	180.038	100.0%	271.976	271.976	100.0%	376.257	376.257	100.0%	327.639	327.639	100.0%
35	239.962	239.962	100.0%	239.962	239.962	100.0%	350.633	350.633	100.0%	436.040	436.040	100.0%	213.637	213.637	100.0%
40	311.960	311.960	100.0%	311.960	311.960	100.0%	434.971	434.971	100.0%	469.254	469.254	100.0%			
45	396.463	396.463	100.0%	396.463	396.463	100.0%	513.017	513.017	100.0%	437.607	437.607	100.0%			
50	492.812	492.812	100.0%	492.812	492.812	100.0%	584.090	584.090	100.0%						
55	594.807	594.807	100.0%	594.807	594.807	100.0%	618.577	618.577	100.0%						
60	705.481	705.481	100.0%	705.481	705.481	100.0%									
65	829.061	829.061	100.0%	829.061	829.061	100.0%									