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MORTALITY FLUCTUATION RESERVE AND GAAP ACCOUNTING

Editor's Note: The Northwestern National Life Insurance Company recently prepared a position paper on the Need for a Mortality Fluctuation Reserve in GAAP Accounting for Stock Life Insurance Companies. *This is an important subject and we are indebted to the Company for permission to reproduce the paper.*

In the pricing of individual policies of life insurance, it is necessary to make an assumption concerning the future mortality experience which will occur. Actual mortality experience will fluctuate around this assumed basis from year to year for several reasons, including the following:

1. A limited number of lives.
2. Variations in the amount of insurance at risk on each life. This is determined by a company's sales pattern and its retention limits.
3. Natural causes such as secular trends in mortality, flu epidemics, etc.

For these reasons, even the largest life insurance companies will experience fluctuations in mortality from year to year. It is felt, however, that most medium size and all large life insurance companies can predict reasonably well their long term mortality experience. The smaller companies which may not have significant historical experience relating to their own underwriting practices and mortality results cannot predict reasonably well their long term mortality experience.

The problem then arises that year to year fluctuations in mortality, which are expected by the company, will flow through earnings and cause misunderstanding and possible apprehension on the part of the users of life insurance company financial statements. This seems to be unfair to both the company and the users of the statements, when the company management is confident that over a number of years the relatively unpredictable peaks and valleys will average out to very close to expected mortality.

The solution to this problem seems to call for a means of avoiding these year to year fluctuations in mortality, while at the same time reflecting the true long term mortality of the company. We believe that a mortality fluctuation reserve, based on the principles of risk theory, should be employed as the means of achieving this end.

It is important that a mortality fluctuation reserve be set up in such a way that it absorbs temporary fluctuations in mortality—be they positive or negative fluctuations—and that the changes in the reserve be outside the control of company management. That is, it should be of a "lock in" nature. The only change which should take place in the basis of a mortality fluctuation reserve is adjustment of the expected mortality measure used and then only when both company management and the company's independent accountants agree that such a change is called for.

Northwestern National has used a reserve based on the principles cited above since December 31, 1972 in statutory reporting. The calculation of the formula portion of the reserve is based on risk theory. This portion of the reserve is equal to the square root of four times the product of expected mortality and the retention limit. For more details concerning the theory of the reserve, the reader is referred to the Study Notes of the Society of Actuaries on Risk Theory.

In our practical application of the mortality fluctuation reserve, we have provided for additions to and deductions from the formula reserve in those years when actual mortality has deviated significantly from the expected. Basically, actual mortality outside the range of 97% to 103% of expected either is added to or draws on the reserve, as appropriate.

The appendix shows how this formula would have operated had the Northwestern National Stock Department been using it in the period 1962-1972.

Under GAAP accounting, we would plan to report the amount of money going into the mortality fluctuation reserve from earnings through proper footnote disclosure. We would also report surplus due to the reserve in the Surplus Change Table. Proper footnoting appears to us to adequately disclose the effect of the mortality fluctuation reserve on earnings.

We feel that our solution to this problem of year to year fluctuation in mortality does not conflict with, but is in harmony with, the objectives of various accounting and regulatory bodies. We cite the following:

1. The objectives of the Audit Guide tend to support us.

The new Audit Guide for audits stock life insurance companies, while not considering a mortality fluctuation reserve directly, does contain various references to conservatism in mortality assumptions as well as to actuarial opinion which we believe support the spirit and the purpose of the mortality fluctuation reserve as part of the policy liabilities for future benefits. References from the Audit Guide are as follows: (Italics are ours).

a. Page 68, first new paragraph states, "The inclusion of a provision for *the risk of adverse deviations* in arriving at reasonably conservative assumptions will cause some profits to emerge over the life of the contract as risks are eliminated . . .".

b. Page 69, "limited payment contracts . . .", middle of the page, "and *the risk of adverse deviations . . .*".

c. Page 70, end of paragraph continued from previous page, "However, *the risks of adverse deviation* with respect to the mortality and withdrawal assumptions are more significant than is the case with whole-life contracts."

d. Page 76, the second paragraph of the Mortality section reads, "The mortality assumption to be used in determining annual reserve additions in conformity with general accepted accounting principles should be based on realistic estimates of expected mortality. As in the case of other estimates, *provision for adverse deviations should be included.*"

e. Page 96, fourth new paragraph, "Unlike statutory reserves, for which the factors for many plans are published, a company calculating reserves in conformity with generally accepted accounting principles should develop its own factors based on *assumptions that are reasonably conservative and that include provision for the risk of adverse deviation* from such assumptions." For purposes of mortality assumptions we are suggesting a larger than one year time period.

2. The SEC recognizes reserves of a quite similar type.

Even though this mortality reserve is not regarded as a catastrophe reserve, its use does not appear to be in conflict with present regulations of the Securities and Exchange Commission on the subject of "Accounting For Catastrophe Reserves."

3. APB opinions do not seem to prohibit the use of a mortality fluctuation reserve.

We are unable to find specific regulations in APB opinions released to-date which would prohibit use of the reserve. This includes our study of the recent Exposure Draft entitled, "Proposed APB Opinion Reporting the Effects of Extraordinary Events and Transactions."

All of the above material appears to us to make the inclusion of a mortality fluctuation reserve as a part of the policy liabilities for future benefits sound.

The policy reserves developed under the Audit Guide leave substantially less room for adverse deviations than do those under statutory reporting. We feel that for a company in our size category, assumptions made as to expenses, interest and lapsation can be reasonably developed on a sound basis; however, the mortality assumption cannot be determined on a basis which will prevent substantial random deviations from year to year.

In conclusion, a simple percentage adjustment in the mortality rates used in calculating GAAP reserves does not, in our opinion, include satisfactory provision for the risks of adverse deviation. We believe that a mortality fluctuation reserve is called for by the Audit Guide in order to provide for the risks of year to year fluctuations in mortality which would otherwise be misleading to the users of our financial statements. □

APPENDIX

Example of the Operation of Mortality Fluctuation Reserve

Year	(1) *Mortality Gain*	(2) *Accum. Mortality Gain*	(3) *"Formula" Portion of the Reserve*	(4) *"Formula" Increase*	(5) *Effect on Line 33*	(6) *Mortality Fluctuation Reserve*
1962	$ — — —	$ — — —	$1,058,867	$ — — —	$ — — —	$1,058,867
1963	+21,000	+21,000	1,091,788	32,921	−53,921	1,112,788
1964	0	+21,000	1,129,248	37,460	−37,460	1,150,248
1965	0	+21,000	1,176,435	47,187	−47,187	1,197,435
1966	0	+21,000	1,220,164	43,729	−43,729	1,241,164
1967	0	+21,000	1,268,542	48,378	−48,378	1,289,542
1968	0	+21,000	1,323,329	54,787	−54,787	1,344,329
1969	+489,000	+510,000	1,404,186	80,857	−569,857	1,914,186
	−315,000*	+195,000	1,719,186	+315,000*	0	1,914,186
1970	−274,000	−79,000	1,808,978	89,792	+184,208	1,729,978
1971	−3,000	−82,000	1,900,842	91,864	−88,864	1,818,842
1972	+647,000	+565,000	1,993,289	92,447	−739,447	2,558,289

(1) If actual mortality falls in the range of 97% to 103% of expected, (1) equals zero. If actual mortality is less than 97% of expected, (1) is a positive number equal to 97% of expected, less actual. If actual mortality exceeds 103% of expected, (1) is a negative number equal to 103% of expected, less actual.

$(2) = (2)_{-1} + (1)$

$(3) = \sqrt{4 \times \text{Retention Limit} \times \text{Expected Mortality}}$

1962-1969 Retention Limit = 100,000

1970-1972 Retention Limit = 150,000

$(4) = (3) - (3)_{-1}$

$(5) = -[(1) + (4)]$

$(6) = (3) + (2) = (6)_{-1} - (5) = (6)_{-1} + (1) + (4)$

* Increase in "Formula" Portion of the Reserve due to increase in retention limit.

Actuarial Meetings

Oct. 7 to 9, Conference of Actuaries in Public Practice, Montreal

Oct. 7, American Academy of Actuaries, Montreal

Oct. 9, Actuarial Club of Pacific States

Oct. 10, Baltimore Actuaries Club

Oct. 16, Seattle Actuarial Club

Oct. 17-18, Canadian Institute of Actuaries, Toronto

Nov. 20, Seattle Actuarial Club

Nov. 20, Nebraska Actuarial Club

Note to all Clubs—Be sure to get in the schedule of your meetings dates as soon as possible. We like to publish them 2 months in advance, if possible. □

Society Examinations Seminars

NORTHEASTERN UNIVERSITY

Seminars for Parts 7, 9E, and 9I will be held as follows

Part 7—October 21 - November 14

Parts 9E and 9I—October 7 - November 8

Complete information can be obtained from:

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