

**1987 VALUATION
ACTUARY HANDBOOK**

Appendix 3

**COMMITTEE REPORT OF ADVISORY SUBGROUP I
FOR REGULATIONS ON ACTUARIAL OPINION
AND MEMORANDUM IN NEW YORK**

Section 1: Background Information

In 1985 New York revised its reserve and nonforfeiture laws for guaranteed interest contracts and annuities with and without life contingencies. An advisory group and several advisory subgroups were appointed by the New York Insurance Department to suggest regulations to the Department with regard to this law. Subgroup I (hereafter referred to as the Committee) was formed to prepare regulations for Section 4217, paragraph (c) (4) (B) (vi), which deal with the concept of the Qualified Actuary and Actuarial Opinion and Memorandum.

Both the ACLI (American Council of Life Insurance) and LICONY (Life Insurance Council of New York) invited the industry to suggest representatives to be appointed by the Department to serve on this committee. After the group was appointed in September 1985, its first meeting was held in October of 1985. Members of the New York Insurance Department were present at the first meeting to offer advice and suggestions as to the charge by the Department to the Committee. Mr. Callahan, Chief, Actuarial Valuation Bureau of the New York Insurance Department, prepared a list of concerns for the Committee to consider. Various subgroups were formed from the original Committee to write portions of the proposed regulations. The entire Committee reviewed the final product.

The actual regulation, New York Regulation Number 126, combines the work of this committee with that of Subgroup II, which proposed minimum reserve standards. This report does not generally address this part of the regulations.

The regulations were the result of many discussions and compromises within the committee and between the committee and members of the New York Insurance Department. They are fairly general, by necessity, in order to cover most situations. The purpose of this report is to give reasons the regulations were written as they were and to present the other viewpoints which were not adopted as suggestions. In addition, details are provided in this report to give additional guidance in preparing the Actuarial Opinion and Memorandum to those actuaries who want it. This report was prepared based on the regulations as they were released in August, 1986.

Historical Background in New York

In the 1970s, rising interest rates caused annuity writers to seek relief from surplus strain incurred from new business. With the advice of an industry group, the New York Insurance Department developed evolving rules during the 1970s which were then summarized in a Circular Letter in 1980, which provided for valuation interest rates based on current new money rates. In 1981, another circular letter was written developing the concept of actuarial certification. In 1982, New York adopted Circular Letter 33 based on legislation enacted in 1982 which required actuarial opinions by qualified actuaries in order to increase the interest rates used for determining reserves to be held in the annual statement

to those permitted under the Dynamic Valuation law. Without an actuarial opinion filed, the New York Valuation Law required a stronger valuation standard.

Under the Insurance Law and Circular Letter 33 on Actuarial Opinion and Memorandum, the only companies which were required to file an opinion were those that wanted to hold lower reserves. Approximately 30 to 40 Opinions and Memoranda were submitted annually. The content and quality of the Opinions and Memoranda varied considerably. The New York Insurance Department wanted a stronger regulation which would result in a more uniform Actuarial Opinion and Memorandum to be submitted on reserves for all types of annuities and guaranteed investment contracts (GICs), no matter where the reserves are held in the annual statement.

Major changes in the law were brought about from insurance company concerns over Single Premium Deferred Annuities (SPDAs). Of all the states, New York traditionally has had one of the most conservative reserve requirements with regard to SPDAs. Several companies wanted to hold lower annuity reserves. The Insurance Department was concerned, however, about the financial soundness of SPDA contracts and GICs. Therefore the new law states that insurance companies must file an Actuarial Opinion and Memorandum for all annuities, annuity benefits, and GICs. Those companies that do not provide an acceptable opinion would be forced to hold additional reserves. The law is an amendment to the Dynamic Valuation Law, which means that the law covers all annuities and GICs issued after January 1, 1982, and all annuities and GICs issued prior to that date but valued on a change in fund basis.

**Differences Anticipated Between Proposed Regulations,
and Recommendations of the American Academy of Actuaries**

In writing regulations on the Valuation Actuary, the Committee has generally attempted to be consistent with drafts of proposed recommendations and interpretations of the American Academy of Actuaries. Since the Academy recommendations cover the entire life insurance company, and the New York law on actuarial opinions and memoranda only deals with certain blocks of business, some inconsistencies were inevitable. For example, the Academy recommendation on the adequacy of total company surplus against possible economic scenario deviations was not felt to be meaningful, since in New York, an actuary is only examining a part of the company's business. Comments on total company surplus, therefore, were not included in the proposed regulations for New York. Also, the New York law states that an Actuarial Memorandum should be filed with the State. This is not stated in the Academy recommendations; a report to management is discussed instead. The difference between the two documents is that the Memorandum shows that reserves held in the annual statement make proper provision for liabilities under reasonable economic scenarios, while the AAA Actuarial Report to Management also discusses amounts needed to cover adverse deviations under plausible scenarios. This does not mean that New York does not want plausible tests done; it only means that it may not be necessary to strengthen reserves because of possible losses under plausible scenarios.

There are other areas where the proposed regulations in New York differ from Academy recommendations. For example, the quality of assets section and the section on lapse rates contain more detail than the Academy recommendations. This is because the New York Insurance Department has

expressed concern about these areas, and would like the regulation to address these issues more thoroughly than was done in the Academy recommendations.

Confidentiality of Actuarial Memorandum

The committee agreed that the Actuarial Opinion should be a public document. Opinions diverged, however, as to whether or not the Actuarial Memorandum should be made public. The reason to make it a public document is to encourage actuaries to be more thorough with the work that would be opened to inspection by the general public. The reason against making the Memorandum a public document is that certain information, such as investment strategy, might be disclosed in more detail to the Department if the material were confidential. Obviously, an insurer having certain investment strategies giving it a competitive edge would be reluctant to disclose such information to be ultimately viewed by other companies.

As a compromise, the regulations are written so that an insurer desiring confidentiality must specifically request this and comply with the requirements of Regulation 71 governing confidentiality in New York. Confidentiality may be denied or accepted in part or in total. The Department may also request additional information, generally on a confidential basis.

Date of Filing Actuarial Opinion and Memorandum

One of the problems the New York Insurance Department has had is receiving opinions on a timely basis. An argument can be made to allow time after the annual statement to file the Actuarial Opinion and Memorandum in

order to present the New York Insurance Department the best document possible. The counter-argument is that the Actuarial Opinion and Memorandum state that the reserves held in the annual statement are adequate. If an actuary waits until the annual statement is finished to analyze the results for the Actuarial Opinion and Memorandum, he may find that the reserves in the annual statement are inadequate. Therefore, the proposed regulations state that the Actuarial Opinion and Memorandum should be filed at the same time as the annual statement submission to the State. Technically, the Opinion and Memorandum should be sent before the annual statement so that they can be reviewed for acceptability. As a practical matter, if they are later found to be unacceptable, the annual statement figures can be revised on audit, and appropriate action can be taken as to subsequent statements.

Most Committee members stated that the necessary testing facilities for the Actuarial Memorandum would be set up before year end. Some members felt they would work from data available before the end of the year to set up most of the tests, and then possibly substitute the 12/31 numbers into the tests when available. Others thought that they would wait until the year end data were totally available. One problem with the latter approach is that results are not forecast in advance, and surprises may occur if results do not turn out as intuitively expected. It is recommended that testing be done periodically on the blocks of business being considered so that any corrective action needed, in terms of investment strategy, can be implemented as soon as possible.

Definition of Qualified Actuary

The proposed regulations require that an individual be a Member of the American Academy of Actuaries (MAAA) under both the primary and secondary routes to becoming a qualified actuary in New York. This is a change from the prior circular letter, which gave the Insurance Department leeway to appoint someone who was not a MAAA. The change was enacted because the Academy has standards for Valuation Actuaries, as well as disciplinary procedures for abuses. It is anticipated that most disciplinary procedures will be handled by the American Academy of Actuaries.

There was a debate within the Committee as to whether or not the regulations should require the actuary to be a Fellow of the Society of Actuaries. The argument against this is that the Society of Actuaries focuses on education and research rather than professional conduct. The argument for this requirement is that it ensures that the actuary has a minimum standard of knowledge from being exposed to materials covered on actuarial exams. It was decided to include the FSA requirement in the primary route to becoming a qualified actuary. Some leeway is allowed, however, in the secondary route by stating that the Superintendent of Insurance may recognize anyone demonstrating his qualifications to the satisfaction of the Superintendent and who is a member of the Academy. The proposed regulations state that the Superintendent can ultimately determine whether any actuary is or is not qualified.

Cashflow analysis is essential to the development of the Actuarial Memorandum. The secondary route mentions that knowledge of cashflow analysis is one of the items required from a qualified actuary.

The subject of cashflow analysis and other items which enter into forming an opinion on the accuracy of reserves are fairly new. Therefore, continued education is necessary. It is not a formal requirement, since there is no mechanism currently in place to provide the necessary education. It may be found, however, that in order to remain qualified, an actuary must take it upon himself to keep up with current literature.

Appointment of the Actuary to Sign Opinions

There was a large amount of discussion as to who should appoint the actuary to write the Actuarial Opinion for the company. A strong contingent felt that this Actuary should be appointed by the Board of Directors, or by the Chief Operating Officer if the Board so designates. This opinion is based on the fact that the Board of Directors is ultimately responsible for the bottom line results of the insurance company, and they should be aware of the appointment of the Valuation Actuary. It was also felt that the Actuary writing this opinion would have more cooperation from various informational sources — for example, the Investment Department — if the actuary were appointed by the Board. There was a slightly stronger contingent which argued that requiring appointment of the Actuary by the Board would entail a change in the legal status of the actuary so appointed, and this was not called for by the law. The committee-proposed regulation only required the appointment of the actuary by the life insurance company. However, members of the New York Insurance Department desired

Board appointment of the Qualified Actuary, so the regulation required Board appointment.

There was discussion as to whether the proposed regulations should refer to the actuary who is appointed to sign the Actuarial Opinion and Memorandum as a Valuation Actuary. The majority of the committee was against this, since the definition of Valuation Actuary as it is developing in the industry may not be the same (generally it seems more extensive) as that which was requested by New York law. Since the New York law does not require the term Valuation Actuary, the committee voted not to use it.

Another issue arose as to whether the actuary writing the opinion could be an employee of the company. An overwhelming majority felt that the Actuary could be an employee of the company. The fact that insiders would have the best knowledge of the company, and would probably be well positioned to determine the adequacy of the reserves, argues in favor of this position. The argument that an outside consultant should be retained to be the qualified actuary is based on the belief that an outsider may not be subject to as much pressure as an employee to produce the results that management wants, as opposed to the results the actuary feels are most legitimate. However, many feel that consultants are not truly independent, as they are subject to losing contracts if they are critical of management. Since the actuary has the fiduciary responsibility to do the job properly, and would be subject to the disciplinary procedures of the Academy if due diligence were not performed, it was felt that both insiders and outsiders could be depended on.

There was a difference of opinion as to how many Actuaries writing opinions a company may have. On one hand there is a feeling that one person should be responsible for the coordination of all the lines of business. There are some companies, however, that currently divide the responsibility of testing the adequacy of reserves among more than one actuary. In fact, more than one actuary may sign the Annual Statement. Also, each product line has different characteristics. A company may feel that the actuary should be the person who most understands and is responsible for any particular product line. Therefore, multiple appointed actuaries were provided for. However, one actuary should be designated as contact person in case the Insurance Department has any questions on the Actuarial Opinion and Memorandum.

The New York Insurance Department wants to know who is a designated Qualified Actuary for a company. Several committee members felt the identification paragraph in the Actuarial Opinion should be sufficient to identify the designated actuaries. Mr. Callahan of the Insurance Department, however, stated that he wanted to know the qualifications of every actuary appointed to be responsible for the Actuarial Opinion and Memorandum. The regulations require, therefore, that notice of the appointment be filed with the Chief, Actuarial Valuation Bureau of the New York Insurance Department. This notice can be filed with the Actuarial Opinion and Memorandum. A sample notice is:

"I, Name O. Actuary, have been designated to write the Actuarial Opinions for The Best Insurance Company. I am a Member of the American Academy of Actuaries and meet its qualifications and standards for Valuation Actuary. I am also a Fellow of the Society of Actuaries. I am familiar with current valuation laws and procedures."

If an actuary is seeking to be qualified via the secondary route, as mentioned in the proposed regulations, the notice to the Chief, Actuarial Valuation Bureau, should include further information as to experience and qualifications. For example, the letter can state:

"I, Name O. Actuary, have been appointed actuary for The Best Insurance Company. I am a Member of the American Academy of Actuaries and meet its qualifications and standards for Valuation Actuary. I am an Associate of the Society of Actuaries and have had six years of Valuation experience. In addition, I have attended Valuation Actuary seminars in 1984, 1985 and 1986 and have kept abreast of all work written in the Transactions of the Society of Actuaries on cashflow analysis and contingency risk."

This notice can be filed with the Chief, Actuarial Valuation Bureau, at any time during the year. For those looking to be qualified under the Secondary Route, approval of appointment by the Superintendent or his designee prior to the time the Actuarial Opinion and Memorandum is sent to New York should be obtained.

It was the opinion of Mr. Callahan and the majority of the committee that the New York Insurance Department should be informed of any change in actuary appointed to be responsible for the Actuarial Opinion and Memorandum and the reason for it. This would curtail the chance that a Company would change designated actuaries if its designated actuary gave a less favorable Actuarial Opinion than company management would prefer. A counter argument was made that a company may not be honest as to the reason for change in designated

actuaries. It was felt, however, that few companies would deliberately lie to the Insurance Department. The notice of change in designated actuary can be stated as follows:

"The actuary designated to write the Actuarial Opinion for The Best Insurance Company for 1987 is Fran C. Actuary. She is a member of the American Academy of Actuaries and a Fellow of the Society of Actuaries. The prior actuary so designated was Fred D. Actuary. The change in designated Actuaries was a result of a transfer of job responsibilities, as Fred D. Actuary is now the Marketing Vice President."

Actuary(ies) Designated To Sign Actuarial Opinion and Memorandum

If there is more than one designated actuary within a company, the Actuarial Opinion must include a description of the reserves covered in the report by each designated actuary. One method of doing so is to have one Opinion, with the actuary designated to examine the appropriateness of the reserve noted next to the listing of those reserves. Another method is to have each designated actuary write an Actuarial Opinion. If this second method is used, one actuary must still be designated as contact for the Insurance Department. As previously stated, the qualification description of the actuary should be included in the identification paragraph of the Actuarial Opinion.

Scope of Business

According to the New York law, the Actuary must report opinions on all annuities, annuity benefits, and guaranteed interest contracts in force at the end of the year. The section referred to in the law applies only to reserves held after 1981 (when the dynamic valuation law was adopted). In order to be in compliance with the law, therefore, cashflow analysis needs to be done only on 1982 and later issues or on 1982 or later increases in funds if a change in fund method is used. Since many insurers use a change in fund method and use the date of declaration of a new rate as the date of issue, as a practical matter, this requirement extends to pre-1982 business in many cases. It was left to the option of the insurer to determine if additional business would be covered. For example, an insurer may have a block of SPIAs which include business from 1980 and later and which are all credited with the same interest rate and are backed by one pool of assets; this insurer may choose to do his or her tests on the entire block.

Inforce business should be included in cashflow analysis. Future deposits on existing contracts may be included in the cash flow analysis. However, future new business may only be considered for unit expense assumptions for modeling to be done on a "going concern basis." This means that the actuary makes the assumption that the company is continuing its business indefinitely. The cashflow analysis does not have to be exact. Various approximations can be made as long as these will not materially affect the results and are reasonable.

Reliance

The Committee recognized that the designated actuary probably will not perform all the analysis alone. A reliance paragraph may be added, therefore, stating what items the actuary relied on others for and detailing the extent of such reliance. For example, an investment officer may provide the investment cash flow under different scenarios. The designated actuary should, however, review all results for reasonableness. If, for example, the investment cash flow provided by the investment officer does not reflect any changes in prepayments or calls when interest rates change, it is up to the actuary to question whether this assumption should be changed.

Investment Strategies

There was discussion as to how to express which reserves the statement applied to. The principle was to get a good enough description so that the products could be identified. However, every company seemed to identify products somewhat differently. The list in the regulation was suggested by Mr. Callahan. Each company should use a list that would be applicable to itself. The location of the reserves on the Annual Statement and whether they are in a separate account should be noted. There is a problem in that, by only covering 1982 and later business, the reserves in the opinion may not agree with the reserves in the Annual Statement, being a subset of the annual statement numbers. This should also be noted.

Several Committee members felt that various investment philosophies should be tested. This would be helpful, especially if the actuary did not know

the investment philosophy of the Company. The Committee as a whole, however, did not feel that it should be a requirement, since there are companies which have specific investment policies for each line of business.

An investment philosophy may be "dynamic"; that is, it may be a set of decision rules that apply under various situations. For example, an investment philosophy could involve investing in longer assets during periods of normal yield curves and in shorter assets during periods with inverted curves. Dynamic investment strategies do not include "good intentions" or unspecified techniques for predicting future interest rates. They must be well-defined rules based on knowledge of the current situation only.

Actuarial Opinion

Many committee members did not like to refer to assets' making "good and sufficient provision" for reserves in the Actuarial Opinion. The phrase "good and sufficient" is not well defined and may imply more surety than the Actuary can comfortably give. Instead it was proposed that the regulations require the actuary to state an opinion that the assets make "reasonable provision" according to presently accepted actuarial standards of practice for anticipated cashflows. However, the "good and sufficient" wording was used in the law, so it was felt that this wording must also be used in the regulations.

It should be noted that the actuary cannot submit a totally unqualified opinion, since the actuary cannot predict the future. The proposed regulations state that the opinion is in effect the actuary's "best guess." The impact of events unanticipated in the projections is, of course, beyond the scope of the

opinion, and it is understood that the company's future experience cannot follow all the assumptions used in the cashflow projections.

To form an opinion, all relevant factors relating to the reserves must be considered. Such factors include any reinsurance agreements, the company dividend or interest crediting philosophy, and the assets backing the reserves. Some companies do not have a written investment philosophy. In this instance the actuary must assume an investment policy or test several investment policies, and explain in the Actuarial Memorandum what is used.

It is up to the actuary to keep abreast of literature published on the subject of cashflow analysis. Examples of such literature can be found in Appendix A. (Note: This is also an appendix to Regulation 126.)

If the actuary feels there are major doubts about the adequacy of the reserves, it should explicitly be stated in the Opinion paragraph. Additionally, the regulator may determine if the opinion is qualified in any respect, and if any items were omitted from the Opinion Memorandum. The surveillance procedures suggested by the Standing Technical Actuarial Committee of the NAIC were added to the proposed regulations. These procedures reinforce the Superintendent's authority to obtain all information which is deemed necessary.

Any material item that occurs after the date of valuation and the date of the Opinion should be reflected in the Opinion. Examples of this are the sale of a portion of the business to another insurance company, or defaults on a significant portion of assets backing the reserves.

General Description of Actuarial Memorandum

The Actuarial Memorandum for New York State need not be the same as the Actuarial Report to Management recommended by the Academy. The Report to Management may be more extensive, showing, for example, the breakpoint scenario where the reserves are no longer sufficient. In addition, various "plausible" scenarios may be shown in the Report to Management which may show potential cashflow problems. These plausible scenarios need not be submitted to New York unless specifically requested (most likely on a confidential basis). Of course, if the actuary so desires, the Actuarial Report to Management could be used for the Actuarial Memorandum. The general format of the proposed Actuarial Memorandum consists of a list of the items to be covered as stated in Regulation 126, Section 95.8, "Description of an Actuarial Memorandum," and the detail of these items under Section 95.9, "Details to be Considered for Actuarial Memorandum." Appendix B shows a sample of Actuarial Opinion and Memorandum. (Note: This appendix is also part of Regulation 126.)

Consistency of Assumptions

One major point that the Committee often reiterated is the importance for the assumptions used in the cashflow analysis to be consistent. This point has also been expressed by Mr. Callahan and others in the New York Insurance Department. Mr. Callahan has received a number of Actuarial Memoranda where this consistency was not apparent. For example, one Opinion received on SPDAs assumed that the interest crediting rate would go down to the guaranteed rate in the next year. The lapse rate, however, would remain the same as that

currently experienced within the company. This is probably not a reasonable assumption. (The only way it would be reasonable is if interest rates decreased dramatically, so that the guaranteed rate were now a "market" rate.) The proposed regulation has a separate section dealing with consistency of assumptions.

The proposed regulations list the following items which may be dependent on interest rates:

1. interest crediting rates assumed;
2. withdrawal assumptions;
3. call or prepayment of investments;
4. default assumptions;
5. additional flexible payments;
6. experience rating refunds or dividends; and
7. expenses.

Of course, not all of the above would apply in every case. For example, single premium immediate annuities would not need any withdrawal assumptions if they were not commutable. Often these items are more dependent on the yield curve than on interest rate levels. For example, withdrawals are likely to be very sensitive to inversions in the yield curve (periods when short term rates exceed long term rates).

Alternatives to Cash Flow Analysis

The majority of the proposed regulation deals with cash flow analysis. However, the committee realized that the methods to measure risk are still evolving. Therefore, the proposed regulations would permit alternatives to cash flow analysis if it can be proven that the alternative methods are at least as good as cash flow analysis.

Identification of Liabilities and Assets

The liabilities used in cashflow testing should reflect the reserves stated in the annual statement. In the case of binding commitments where the commitment has been made but all money has not yet been received, the actuary can choose how to reflect the considerations. The inclusion or exclusion of such commitments should be disclosed in the Memorandum.

Earnings from "surplus" should not be used to demonstrate the sufficiency of reserves. If, however, assets having values equal to statutory minimum reserves are insufficient, additional reserves must be set up to enable the actuary to render a favorable opinion unless offset by these reserves in other classes of annuity and guaranteed interest contract business. Ascertaining the amount of such additional reserves is one of the key goals of the regulation.

Reserves being tested should reflect the reserves actually held in the Annual Statement for the particular block of business, whether in the general account or the separate account. Similarly, the actual assets supporting each statement reserve should be used in the test. It is possible that the actual

amount of assets used to back a block of business is less than reserves due to reserve strains. If the actuary can prove the amount of assets allocated to the block is sufficient to cover liabilities, the additional assets would not be needed. If, however, the actuary wants to test assets equal to reserve, he or she must make an assumption as to the investment cash flow of the additional assets. Three possibilities are to use a cash flow stream off "corporate account assets" or general account assets, or to assume these assets would be the same as those assets currently backing the line.

The actuary must reflect asset values as defined by the investment method used within the insurance company for cashflow calculations. A suggestion to require asset segmentation by product was rejected. One reason for the rejection is that some companies can take advantage of opposing traits of different blocks of business. For example, many GIC products have very short time horizons, whereas immediate annuities have very long ones. Combining the asset needs of these two product lines may result in better investment performance for both lines. This is not to say that segmentation is bad. A number of companies represented in the Committees have segmented portfolios which in many cases have proved satisfactory. However, the method of allocating assets cannot permit the insurance company to pick and choose general account assets to be used for the GIC and annuity line of business without considering the effect on any remaining lines of business.

Projection of Cashflow

The proposed regulations list items that should be considered in projecting cashflow. One major pricing difference between group GICs and individual

annuities is that it is often assumed that GICs surrender at the end of their interest rate guarantee period. This is not necessarily the assumption used for individual annuities. Group GIC customers are assumed to be sophisticated, and their business must be resolved at the end of the interest guarantee period so that they may pursue better opportunities. For individual deferred annuities, experience has shown that a majority of contracts will continue beyond the end of the interest guarantee period. It is up to the actuary to determine what level of lapse rates should be assumed for individual annuity pricing. In presuming that individual annuities continue after the end of the guarantee period, the actuary should assume renewal guarantees that are consistent with the interest crediting philosophy which is used by that company.

Deviations in mortality or annuities involving life contingencies should be considered in both the immediate and deferred period. Catastrophic mortality changes such as quantity jumps in life expectancies from medical breakthroughs are probably best handled through surplus. However, reasonable changes in trends and deviations in total deaths are matters for margins in reserve mortality rates.

The proposed regulations list items that should be considered in the projection of investment cashflow, such as mortgage prepayment or bond call provisions. Such a projection would most likely require information provided from the Investment Department. The actual projection of the cashflow using this information, however, would be the responsibility of the actuary and may need to be varied by the actuary based on the investment provisions (e.g., call and prepayment) and the interest rate scenario projected.

The Committee recognized that it would be difficult to establish an investment cashflow for certain assets. Although it would have been helpful to provide guidelines as to the handling of certain assets, the Committee did not feel it had the knowledge at this time to provide such guidelines. It is anticipated that further work will be done on this subject, for example, within a Society of Actuaries committee. In the interim, it will be left to the actuary to handle these assets and to explain the cash flow assumptions used for assets with undefined cash flow streams. One suggestion made for equity investments is as follows. The actuary may assume that all equity investments are liquidated with the following restrictions: 1) the total amount assumed liquidated cannot exceed 25% of the company's entire asset portfolio; and 2) the liquidation value must be either book value or fair market value. It was recognized that this suggestion is just that, since any assumption about the cashflows associated with equities is fairly arbitrary.

Some Committee members were uncomfortable with having to project cashflows past the time a majority of assets expired because there are so many assumptions that must go into the analysis. The majority of the Committee held, however, that it was important for the analysis to project the run out of the insurance cashflow. The time period will vary by the type of product. For example, many group GICs will mature in less than 10 years. The time period for annuities in the payout stage may be 40 years or more. By running out the majority of the cash flow, the actuary has a better idea as to the effect of any investment strategy on future potential gains and losses.

Investment Quality

The subject of quality of assets was very controversial. Mr. Callahan has expressed concern regarding assumptions used if assets are less than investment quality. Opinions ranged from not mentioning this at all to the insistence that quality of assets be reflected in the interest rate the actuary uses. A compromise was reached, and the proposed regulations state that the actuary should take into account the quality of assets in the projection of investment cashflow. It is up to the actuary to decide whether it would be preferable to reflect asset quality in the assumed interest rate or to assume that the MSVR includes a margin to cover the possibility of asset default.

One straightforward method to reflect investment quality in the cash flow projection is to incorporate a deduction from the investment income that varies with the investment quality of the underlying assets. The deduction would be lowest for the highest quality assets and increase progressively as investment quality declines. This concept is consistent with the concepts underlying the funding of the MSVR, and assumed deductions could conceptually be thought of as a part of the contribution to the MSVR. Actual losses of investment income and principal could be ignored, as they would then be charged to the MSVR.

Another method to view a cash flow projection with significant credit risk is that it requires two distinct margins. First, the annual expected percentage loss of principal and interest could be expressed as a reduction in the assumed investment earnings rate. Second, fluctuations could be recognized by setting up

an additional "fluctuation reserve." The MSVR may serve the second purpose, but reduction of the interest rate seems to be best handled by a reduction in expected value.

The actuary can rely on the investment officer for determination of the quality of assets, since the investment officer would most likely be more familiar with the asset quality of the particular investments in the company portfolio. However, it is up to the actuary to determine if the investment results look reasonable. The Committee did not feel that this provision gives the actuary a right to completely ignore any question on the quality of assets. For example, if the actuary is told that the asset default risk is zero, but the company is investing in junk bonds, the actuary should still build a risk factor for asset default into the asset projections.

The actuary should also consider the role of diversification asset or liability (less reserve) in determining the proper provision for investment risk. For example, a company which invests a substantial portion of its assets in high yield bonds from a single company or a single industry is taking a much larger risk than a company which has diversified its assets.

Aggregate Reserve Tests

Section 4217(C)(5) of the New York valuation law clearly provides that aggregate reserve tests can be used to meet statutory minimum reserve requirements.

Thus, it is appropriate to combine group and individual annuities (e.g., group GICs and individual, immediate and deferred) for the purposes of aggregate testing for compliance with statutory minimum reserve requirements. While the valuation law does not explicitly provide for aggregate reserve tests to satisfy the cash flow analysis requirements (separately for life insurance as opposed to annuities and guaranteed interest contracts) anticipated in the development of the statutorily required actuarial opinion, it clearly seems that such aggregate tests are consistent with the underlying concept of a good and sufficient reserve. The considerations involved in making these two tests, however, are quite different.

For purposes of demonstrating that statutory minimum requirements are met, all that is necessary is to show for each class of annuity business the actual statutory reserve held and the corresponding statutory minimum reserve. If for all of the classes of business considered, the actual aggregate reserve held exceeds the corresponding aggregate statutory minimum, then it is clear that minimum reserve requirements have been satisfied on an aggregate basis.

Such a straightforward aggregate analysis is not necessarily appropriate in preparing a cash flow analysis required for purposes of the actuarial opinion. Heretofore, cash flow analyses have been prepared specifically for a particular class of business where attempts have been made to reflect the sensitivity of the various cash flows to various future interest rate scenarios. When aggregate cash flow tests are used, great care must be exercised in processing and interpreting the resultant cash flows.

It is appropriate to group all business where policyholders have no interest in future experience results; such business is considered "guaranteed" business. In this case, the benefits are defined by contractual terms, and the cash flow analysis may proceed along conventional lines.

There are some classes of annuity business, particularly under group insurance programs such as group deferred annuities and IPG contracts, where the policyholder retains an interest in future cash flows through the operation of the insurer's experience rating plan (stock companies) or dividend distribution policies (mutual companies). It may be desirable for the valuation actuary to treat such business separately in preparing the actuarial opinion. In fact, a detailed analysis of cash flows for such business may not be necessary. The valuation actuary could demonstrate that reserves held for such business meet a good and sufficient test by describing the following for each class of business:

- (i) statement (contractual) valuation basis;
- (ii) actual interest earned and mortality experience with respect to such business;
- (iii) the treatment of actuarial gains (i.e., excess interest and favorable mortality) in accordance with the company's experience rating plan or dividend distribution policies;
- (iv) withdrawal provisions.

The explanation of withdrawal provisions may be sufficient to establish that there is not material mismatch risk present with respect to the class of business. If such a demonstration cannot be made, a detailed analysis of asset and liability cash flows would be required.

As a general rule, the only cash flows with respect to business where policyholders share in future gains or losses that may be used in aggregate reserve tests are pricing and profit margins. The clearest example of this is the difference between interest earned and interest credited.

When the valuation actuary relies upon an aggregate good and sufficient test, the actuarial opinion should clearly describe each class of business included in the test and state to what extent reserves and corresponding assets with respect to one class of business are used to support another class of business.

Scenarios to be Tested

As previously mentioned, the projections must be made far enough into the future to account for the majority (e.g., 75%) of insurance cashflows. Any remaining cashflows at the end of the projection period should be discounted back to that point at interest. Discounting the remaining cash flows should be consistent with the methods employed to discount all other cash flows within the analysis and must appropriately reflect the assumed interest rate scenario and reinvestment assumptions.

There was a debate within the Committee concerning interest scenarios to be tested. No consensus exists as to what constitutes reasonable interest rate scenarios. Because regulations are very hard to change once enacted, the Committee felt that it would be better to provide general guidelines in the regulations than to elaborate on them in detail. This would leave it up to the actuary to keep current on this subject in order to determine which scenarios are reasonable for product testing. Another reason for not detailing different

scenarios is that investment cashflow may be unique to different blocks of business. That is, one scenario may have a meaningful effect on the investment cashflow of one particular product, while not being relevant to the investment cashflow of another. However, because the scenarios that Mr. Callahan has received in memoranda submitted in previous years differ so widely, he felt that certain scenarios should be specified. The actuary can use different scenarios, but reasons for differing must be explained.

Mr. Callahan suggested the following interest rate scenarios:

- 1) level rates;
- 2) uniformly increasing rates over 10 years, and then level;
- 3) uniformly increasing rates over 5 years, then uniformly decreasing to the original level at the end of 10 years, and then level thereafter;
- 4) a "pop-up" in rates, and then level thereafter;
- 5) uniformly decreasing rates over 10 years, and then level thereafter;
- 6) uniformly decreasing rates over 5 years, then uniformly increasing to the original level at the end of 10 years, and then level thereafter;
and
- 7) a "pop-down" in rates, and then level thereafter.

The range of the "pop-up" and "pop-down" scenarios, 4 and 7 above, could be 3% each way respectively. For scenarios 2, 3, 5 and 6, a range of 5% each way is suggested. A floor to these rates was set of 4% interest, because it (at least at that time) seemed reasonable that rates would not fall below that rate in the near future. It is the Valuation Actuary's responsibility to ultimately decide what scenarios will be tested.

For many products, yield curve may be more important than interest rate level. In this case, a scenario would consist of a two way matrix with a set of spot rates for several durations (say 1 year, 5 years, 10 years and 20 years) for each of the future years in the projection. The reason for specifying a yield curve is to test the effect of its being "flattened," "steepened" or even "inverted." This is particularly important for products which grant implicit "options" (e.g., bailout, book value cash outs, etc.), because the contractholder can only actually profit from the option if the yield curve changes.

Mr. Callahan had indicated that some Actuarial Opinions and Memoranda previously filed only covered the current year's cashflow. This is not sufficient. The regulation states that the period tested should cover the major runout of insurance cash flows. For a number of products, such as individual deferred annuities, Mr. Callahan felt 10 years would be acceptable (less than 10 years is sufficient if, for example, a group GIC is maturing in less than 10 years). For products with a long runout, such as single payment immediate annuities or structured settlements, this period could be longer than 10 years. There was some discussion in the committee as to whether the period should be shorter of the runout of the insurance or the current investment cash flows. This suggestion has merit, since after the runout of current investment cash flows, all assets used in the testing would be based on speculation. The counter reasoning is that one of the items being tested is the adequacy of the investment strategy, so the runout from current investments is not as important as the liability cash flow stream. The latter reasoning was supported by the majority of the committee.

Insurance companies generally have an investment crediting or dividend philosophy. This philosophy is usually related to some interest rate scenario. Some companies credit interest based on asset portfolio earnings. Others base interest crediting philosophy on the market rate. The advantage of basing this philosophy on the actual portfolio earnings is that the company can be assured of gaining some margin from the interest rate spreads. The disadvantage is that in a quickly rising interest environment, the company may be subject to additional lapses if its products lag competitively. If a company is following the strategy of paying market rates, its lapse rates are probably very low, since its products are likely to be most competitive. The problem may arise, however, where this company may not be able to earn enough money on its assets to really afford to pay such a high return on its liabilities.

Since the interest crediting philosophy has a significant effect on the projected cashflows, the philosophy should be spelled out in the Actuarial Memorandum. Note that this is an assumption, not a prediction of what action management will take in the future. Normally it would be specified as a rule such as the following: e.g., credit the lower of the last credited rate and the current market rate. If the interest crediting rule is not that actually being used, the actuary should justify its use. For example, if a product is supposed to "credit the investment earnings rate less 175 basis point," but the actual spread is 75 basis points, the actual spread should be used unless there are extenuating circumstances.

As to which rate should be the starting rate for the projections, the Committee concluded there was no one right answer; companies may use a rate based on recent investments allocated to support the products being tested, or

the recent rate on some appropriate outside index such as average yields Treasury bonds of the proper duration on a date close to the valuation date. The "proper duration" depends on the investment strategy used by the company. For example, if a company invests separately for individual deferred annuities versus single payment immediate annuities, the duration of investments used for the former is likely to be shorter than that used for the latter.

Additional Considerations In Regard to Lapse Rates

Lapse rate assumptions can have a major impact on the cashflow analysis. Lapse rates will vary depending on whether the product being considered is a group GIC which allows premature surrenders or an individual deferred annuity where the lapse rate may be different if one is considering surrenders at or prior to the interest maturity period. A separate section of the proposed regulations, therefore, is devoted to lapse rate assumptions. This section lists major factors which can impact lapse rates. These items include: 1) the difference between the new money rate and the interest crediting rate; 2) any fixed or market value adjustments; 3) the loyalty of the business; and 4) bailouts or any incentives for persistency.

Lapse rate assumptions, under various interest scenarios, could vary substantially between companies. In fact, they can vary substantially within a company. For example, one company may issue an SPDA product through its career agency system, and a similar product through brokers. Two sets of lapse rate assumptions may be developed based on the actual experience of this business. It is likely that the lapse assumption on the brokered business is higher than that on business placed by the career agency system, even though the

products sold are similar. This occurs since brokers are more likely to lapse a policy if a more competitive product is available elsewhere. In any case, it is up to the actuary to determine what level of lapse rates best fits the business sold.

Methodology

In order for the cashflow analysis to be meaningful, the insurance and investment cashflow must be coordinated at a common reference date. The papers by James A. Geyer and Michael E. Mateja mentioned in Appendix A can provide valuable information to the actuary on how to model insurance business and coordinate future cashflows.

Numerical Summary

A table in the Actuarial Opinion and Memorandum should be prepared giving a summary of asset versus liability sufficiencies under the different interest rate scenarios presented. Some Actuarial Opinions and Memoranda may show positive present values at the beginning of the projection period for all interest rate scenarios. Others may show a potential negative reserve balance under one or more scenarios. It is up to the actuary to decide whether to submit a qualified Opinion when the present value of the liabilities exceeds the present value of the assets under one or more scenarios.

Description of Asset Sufficiency

There are some actuaries who feel that there should be a stronger definition of asset sufficiency — i.e., that at all intermediate points in time, the

assets would have to exceed reserves. However, the vast majority of the committee felt that asset sufficiency can be demonstrated if the present value of all cashflows is positive or the cash residue when all business has matured or terminated is positive. An actuary should, however, be concerned, if during any intermediate point in time, there are extended periods of negative statutory earnings. Under such circumstances, asset sufficiency is really heavily dependent upon profits to be realized many years in the future. Such an assumption would be appropriate only if the assumption underlying the analysis were realistic and perhaps conservative.

Assets exceeding reserves at all points in the projection period is viewed by some to be a function of reserve conservatism. When dealing with a very conservative statutory reserve basis, there is a question as to whether assets must be greater than reserves at all times. However, if the reserves are realistically stated, the relationship between assets and liabilities is a matter of greater concern.

Aggregate reserve testing is allowed where deficiencies in one product grouping may be offset with sufficiencies in other product groupings, as long as all products are within the annuity or GIC line.

Macaulay Duration

Use of the Macaulay duration in determining reserve standards is required by the annuity law in New York. There was a suggestion that the Macaulay duration also be used on the Actuarial Memorandum. This was overwhelmingly rejected. Members of the committee saw a number of problems with the

Macaulay duration. One problem is that it is not well defined for the liability side; for example, in calculating the duration of individual deferred annuities, how should lapse rates be reflected? Also, calls and prepayments on the asset side are not addressed with the traditional Macaulay formula.

A more major problem with the Macaulay duration is that, in its traditional form, it ignores the fact that cash flows can also be dependent on interest rates. The Macaulay duration is defined as the derivative with respect to interest of the present value of cash flows over the present value of cash flows, traditionally defined as:

$$\frac{tv^t (CF)_t}{v^t (CF)_t}$$

However, the $(CF)_t$ is also dependent on interest in many cases. Therefore, the formula should also reflect this.

Although the Macaulay duration is not used with the actuarial memorandum, the traditional definition of Macaulay duration is used with regard to the minimum reserves in Regulation 126. It requires the use of a 100% lapse rate on individual deferred annuities at the end of the interest guarantee period. If the difference between the assets and liabilities is greater than three years, there is a potential for higher reserves being required. However, if the actuary can prove that additional reserves are not necessary by showing reserve adequacy in the Actuarial Memorandum, this will be acceptable.

Appropriate Reserve Vis-a-vis Minimum Statutory Valuation Reserves

The Committee discussed at some length the relationship between reserve levels that are appropriate and reserve levels defined by minimum statutory valuation reserve standards. Conceptually, the actuarial opinion prepared by the valuation actuary is designed to test whether the actual reserves held and the corresponding asset can mature the obligations under a range of future experience conditions. If the actual reserves held are those defined by the minimum statutory reserve standards, then the actuarial opinion effectively becomes an opinion about the appropriateness of minimum valuation reserve standards. If the reserves actually held are less than the statement value of the minimum valuation reserve standards and if the actuary demonstrates that the assets used are good and sufficient to support the liabilities, then the valuation actuary effectively proves in the preparation of the actuarial opinion that reserves less than those defined by statutory minimum valuation standards can safely be held. Of course, if there is substantial risk present with respect to a particular class of business, the valuation actuary could also conclude that the reserve held should exceed that defined by the minimum valuation standards.

Given that a good and sufficient reserve always reflects an assessment of the actual levels of risk present with a particular class of business, it is to be expected that a good and sufficient reserve level will be different than the reserve level defined by a minimum valuation standards. Minimum valuation standards are insensitive to the actual risk exposure of a particular insurer and have been set at very conservative levels. The implicit assumption is that such a conservative reserve level would indeed produce a good and sufficient reserve for all insurers. While this premise is valid for many traditional forms of

insurance and annuity products, it is not valid for the newer interest sensitive products, and the cash flow analysis requirements underlying the actuarial opinion are designed to reveal when the minimum valuation reserve standards produce inadequate reserves and are not appropriate.

As understanding of the mismatch risk associated with interest sensitive products has grown, many companies have developed matching strategies designed to control this risk. Where a high degree of matching is achieved, the valuation actuary can easily demonstrate that a reserve and supporting assets materially less than those defined by minimum valuation standards could meet a stringent good and sufficient test. At one extreme, for example, if an insurer has been able to achieve exact matching, then a valuation reserve equal to contractholder account balances might mature obligations, whereas the minimum valuation standards would call for valuation reserves equal to account balances plus an additional 5% or 10% or more of account balances, depending upon the specific level and length of the guarantees and type of GIC as defined by the Valuation law.

The Committee believes that minimum statutory valuation standards should contain some degree of conservatism, but there is considerable concern that the level of conservatism required is completely unrealistic and unreasonable for those companies that have conscientiously managed their business to control mismatch risk. Most companies have responded to this problem by relying upon aggregate reserve tests, so that the actual level of reserves held with respect to interest sensitive business is consistent with the levels indicated in the cash flow tests supporting the actuarial opinion. Excess reserves are generally found in older blocks of immediate annuities. Many

insurers do not have many, if any, such blocks. Reliance upon aggregate reserve tests in this regard may not be an effective long-term solution to the problem. Some members of the Committee believe further that the reserve level defined by cash flow analysis supporting an actuarial opinion should be accepted as the minimum valuation reserve standard, provided the opinion and supporting actuarial memorandum do indeed meet form and substance requirements satisfactory to the Superintendent. This will require legislation unless separate account funding guarantees with both assets and liabilities valued at market were used.

Some committee members have the opinion that abandoning statutory reserve requirements at this time is unworkable. As was clearly apparent from a review of actuarial opinions and memoranda submitted under the current regulation, there is a wide variation in the standards of practice for performing actuarial opinions. Competitive pressures may lead to actuaries' having a standard of conservatism consistent with that of the most liberal of the practitioners. Given the current lack of standards, that may be too liberal to adequately protect the interests of the contractholders. Much more development is required before the minimum reserve standards are eliminated. Also, it is clear that the Superintendent does not currently have authority to set minimum valuation reserve levels as described above except for market value separate accounts. Other than for market value separate accounts, this approach is not reflected in the regulations. Members of the Committee believe, however, that such an approach is clearly consistent with the underlying concept of the actuarial opinion, and the Committee would like to pursue this idea with the Department after the current effort to develop regulations come to an end.

Committee Members

Donna Claire, Chairman

Syed Ali

Charles Brown

Joseph Buff

William Carroll

Raymond d'Amico

Armond dePalo

Arnold Dicke

Michael Gersie

John Jacobus

Richard Leggett

Robert Mallory

Robert Matczak

Michael Mateja

Esther Milnes

Gordon Munro

James O'Connor

Carl Ohman

Frank Sabatini

Louis Weisz

Jonathan Wooley

Joseph Yau

Actuarial Opinion
Pursuant to Section 4217 of the
New York State Valuation Law
RST Insurance Company
Valuation Date: December 31, 1988

Section 2: Actuarial Opinion Pursuant to Section 4217 of the
New York State Valuation Law

We, A. B. Cee (FSA, MAAA) and X. Y. Zee (FSA, MAAA), are officers of RST Insurance Company. In a letter to the Chief, Actuarial Valuation Bureau, dated March 16, 1988, we were appointed by the Board of Directors of RST Insurance Company to write this Actuarial Opinion. A copy of the Board resolution dated March 16, 1988, was enclosed with the letter. Mr. Cee is the company's primary contact person for this Opinion and accompanying Memorandum and has specific responsibility for the group products included herein; Mr. Zee has responsibility for the individual product line.

We have examined the actuarial assumptions and actuarial methods used in determining policy reserves and related actuarial items listed below, as shown in the Annual Statement of the company, prepared for filing with state regulatory officials as of December 31, 1988.

<u>Product Description</u>	<u>Amount of Reserves (000)</u>	<u>Page and Line Number</u>
Group Guaranteed Interest Contracts subject to market value charges	\$100,000	Exhibit 8, line x, and Page 3, line y
Group Immediate Annuities	25,000	Exhibit 8, line x
Individual Guaranteed Interest Contracts	50,000	Exhibit 8, line x

We have considered the provisions of the Company's inforce policies and contracts, the applicable distribution policies and the related administrative expenses for the product categories stated above. We have considered the characteristics of the Company's assets, the investment policy as it might affect future insurance and investment cash flows under the policies, and its plan of segmentation. Our examination included such tests and calculations as were considered necessary to form the Opinion stated below.

The cashflow tests were conducted on a "going concern basis" for those contracts in force on the valuation date with reasonable margins for adverse deviations. Such tests were conducted for various paths of future interest rates. Such tests do not include any provisions for sales of new business after the valuation date. Particular attention was given to those provisions and characteristics that might cause future insurance and investment cashflows to vary with changes in the level of prevailing interest rates. Assets and reserves tested are consistent with those values as presented in the Annual Statement.

In making our examination, we have relied upon listings and summaries of policies in force and other associated data prepared by T. U. Vee (ASA, MAAA), Assistant Actuary for RST Insurance Company. We performed no verification as to the accuracy of this data. We relied on the stated investment policy of the company and on the projected investment cashflows as provided by B. C. Dee, Chief Investment Officer of RST Insurance Company. Projected cashflows were varied by interest scenario based on call and prepayment provisions. We have reviewed these results for reasonableness.

In our opinion, the policy reserves and other actuarial items resulting from the products identified above:

- 1) Are computed in accordance with commonly accepted actuarial standards consistently applied and fairly stated, and are in accordance with sound actuarial principles;
- 2) Are based on actuarial assumptions which produce reserves at least as great as those called for in any policy or contract provision as to reserve basis and method, and are in accordance with all other policy or contract provisions;
- 3) Meet the requirements of the Insurance Law of the State of New York;
- 4) Are computed on the basis of assumptions consistent with those used in computing the corresponding items in the Annual Statement of the preceding year-end;
- 5) Include provisions for all actuarial reserves and related statement items which ought to be established;
- 6) Make good and sufficient provision, according to presently accepted actuarial standards of practice, for the cashflows required by the contractual obligations and related expenses of the company.

This Opinion is updated annually as required by statute. The impact of events unanticipated in the projections, and occurring subsequent to December 31, 1988, are beyond the scope of this Opinion. Events occurring between December 31, 1988, and the date the Opinion was completed have been reviewed for materiality. No event materially impacting this Opinion has occurred. The cashflow portion of this opinion should be viewed recognizing that the Company's future experience is not likely to follow all the assumptions used in the cashflow projections.

A. B. Cee, FSA, MAAA
Actuary for the Group Products

X. Y. Zee, FSA, MAAA
Actuary for the Individual Products

February 15, 1989

Section 3:

**Actuarial Memorandum
Supporting the
Actuarial Opinion
Pursuant to Section 4217 of the
New York State Valuation Law**

RST Insurance Company

Valuation Date: December 31, 1988

**ACTUARIAL MEMORANDUM
(Continued)**

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I. Reserves Included in this Memorandum

A. Product Descriptions

1. Group Accumulation Annuity (GAA)

The Group Accumulation Annuity offers guaranteed interest crediting rates applied on a book value basis to monies invested in the general account. Payment of full principal plus compound interest is made at the end of the guarantee period. The customer may select a guarantee period of from 2-8 years.

The guaranteed interest rate for each deposit is that rate in effect for such contracts the day the contribution is received at the home office. The rates in effect are subject to daily change.

Transfers and withdrawals out of the general account can be made without charge at an employee's retirement, disability, death or termination of employment. All other transfers or withdrawals are subject to a market-value adjustment charge. Such a charge will be made if the current interest rate for new deposits is greater than the guaranteed interest rate being credited to the transferred or withdrawn funds.

2. Group Immediate Annuity (GIA)

Group Immediate Annuities are nonparticipating annuities with guaranteed benefits. For these annuities, monthly benefits as well as the annuity provisions are guaranteed. Benefit payments have already commenced.

The purchase basis of the annuity was that basis in effect on the date the premium was received in the home office. The current annuity purchase rate is subject to daily change.

Voluntary terminations of the annuity for its then-current value are not permitted.

3. Individual Accumulation Annuity (IAA)

The Individual Accumulation Annuity offers guaranteed interest crediting rates applied on a book value basis to monies invested in the general account. The guaranteed interest rate for each deposit is that rate in effect for such contracts on the day money is received in the home office. The current interest rate is subject to daily change.

At the end of each plan year, the interest earned on contributions is rolled forward and reapplied at the interest rate then in effect for new contributions. In addition, a portion of each prior contribution will roll forward and be reapplied at the then-current interest rate. Currently this roll forward provision results in a contribution being totally and uniformly rolled forward over a 5-year period.

The IAA guarantees a minimum 4% rate of interest for the first 10 plan years and 3% thereafter. These guaranteed rates may be changed for future participants.

Transfers or withdrawals out of the general account can be made without charge at a participant's retirement, disability or death. Matured funds (i.e., those being rolled forward) are subject to a surrender charge which grades to zero over 10 years. Unmatured funds are subject to a flat 7% withdrawal charge.

B. Sources of the Inforce Data

An inventory of our contractual liabilities was made in conjunction with the reserve calculations as of December 31, 1988. The inventory included considerations of such items as: current size of the customer's account; interest rates guaranteed; length of the guarantee period, size of the monthly income benefit, annuity form and methods of expense payment. Adjustments were made to this inventory to reflect changes made in the course of finalizing the Annual Statement reserves. Under some products there may be interest rate guarantees extending to deposits beyond the valuation date. These guarantees extend no more than one year beyond the valuation date, and there are contractual limits to the maximum size of deposits. Such future deposits are not included in this Memorandum or the accompanying Opinion.

C. Valuation Bases of Reserves

The valuation bases below correspond to the nomenclature of Regulation No. 126 (11 NYCRR 95).

1. GAA — Other annuities and guaranteed interest contracts, with cash settlement options but without future interest rate guarantees, valued on a change in fund basis.
2. GIA — Other annuities and guaranteed interest contracts, without cash settlement options, valued on an issue year basis.
3. IAA — Other annuities and guaranteed interest contracts, with cash settlement options and with future interest rate guarantees, valued on a change in fund basis.

Reserves for all products were calculated on a seriatim basis, and no aggregate reserve tests as provided for in 4217(c)(5) of the New York Insurance Law were relied upon. The Annual Statement values of reserves included in this Memorandum are,

<u>Product</u>	<u>Statement Value (000)</u>	<u>Shown in Annual Statement</u>
GAA	\$100,000	Exhibit 8, line x, and Page 3, line y
GIA	25,000	Exhibit 8, line x
IAA	<u>50,000</u>	Exhibit 8, line x
Total	\$175,000	

II. Assets Included in this Memorandum

A. Asset Descriptions and Investment Policy

Assets held in support of the reserves included in this Opinion consist of bonds, mortgage loans on commercial real estate, mortgage loans on residential real estate, cash and other liquid

investments. Assets included are of high quality, and none are more than three months in default.

In selecting and managing the assets supporting these contracts, the company has utilized an investment strategy of immunization. The strategy of immunization is employed in an attempt to reduce the risk of financial loss due to interest rate changes. Investments are selected so that their maturities and durations are consistent with those of liabilities.

For purposes of allocating investment income to its lines of business, the company utilizes an approved plan of segmentation which is on file at the New York State Insurance Department. While the segmentation plan targets identifiable assets to support particular lines of business, for purposes of financial solvency all assets of the General Account support all promises. GAA and GIA reserves are supported by assets included in Segment 1; IAA reserves are supported by assets included in Segment 2.

B. Sources of the Inforce Data

An inventory of included assets was made as of the valuation date. This inventory included quantitative characteristics (such as par value, coupon rate, timing of contractual cash flows) and qualitative characteristics (such as call and prepayment options, prepayment penalties, and possibilities of resetting the yield rate to a market rate).

Immunization strategies for the various segments are carried out with attention to the maturity and duration needs of the segment as a whole. As such, all assets go towards backing all the products of the segment, and it is not possible or proper to earmark assets within a segment for specific products. Since GAA and GIA contracts comprise the vast majority of liabilities backed by Segment 1 assets, this memorandum includes a level percentage of all Segment 1 cashflows. This percentage was calculated as the ratio of GAA and GIA statement reserves to Segment 1 asset values as presented in the Annual Statement. This method of selecting Segment 1 assets for the specific support of the included contracts is unlikely to have a material impact on the sufficiency of the remaining Segment 1 assets to support the remaining Segment 1 liabilities.

In selecting Segment 2 assets used for the support of IAA contracts, only those assets with an original maturity of 10 years or less were considered. This limitation is consistent with the fact that IAA liabilities are among the shorter in the Segment 2 portfolio. Similar to the process used for group contracts, a level percentage of the eligible cashflows was assumed to be used to support the IAA contractual liabilities. This level percentage was calculated as the ratio of IAA statement reserves to the Annual Statement value of the eligible assets. The selection of these assets to support IAA reserves is unlikely to have a material impact on the sufficiency of the remaining Segment 2 assets to support the remaining Segment 2 liabilities.

The effect of the asset selection methods described above is to choose assets with an Annual Statement value equal to the Annual Statement value of reserves included in the Memorandum.

C. Valuation Basis of Assets

The assets included in this Memorandum have the following Annual Statement values and appear in Exhibit 13 on the indicated line:

<u>Asset Type</u>	<u>Statement Value (000)</u>	<u>Exhibit 13 Line No.</u>
Bonds	\$ 85,000	1
Mortgage Loans	70,000	3.1
Cash and other liquid assets	<u>20,000</u>	8.1 & 8.2
Total	\$175,000	

III. Methods Used to Project Future Cashflows

A. In General

Independent projections were made of quarterly asset and liability cashflows under the assumed interest rate scenarios. These projections extended until assets and liabilities as of the valuation date had expired.

The cashflow projections were used as input into a model which, for each quarter,

1. Nets the current quarter's asset and liability cashflows. Any net asset cashflow is invested in assets which are typical of Segment 1 investments as of the valuation date. The yield of

the newly purchased asset is dependent on the assumed interest rate for the then-current quarter. Net liability cashflow is treated as a negative asset purchase (i.e., borrowing) at terms similar to those available for asset purchase.

2. Adds to (subtracts from) the asset cashflow calculated in (1) the future asset cashflow projections.
3. Advances to the next quarter.

The model continues this process over the projection period.

B. Insurance Cashflows

1. Future considerations — For all included contracts, no future considerations are required to keep the current contractual liabilities in-force. This Memorandum considers only the closed block of business as of the valuation date and makes no provision for future considerations.
2. Benefit payments and maturing funds — Projections of cashflows resulting from benefit payments (i.e., an employee's death, termination, retirement or disability) were made with consideration to prior experience and include margins for adverse deviations.

Maturing funds (including rollovers for IAA contracts) were calculated per our contractual liabilities. It was assumed maturing funds were taken out of the company.

3. Voluntary withdrawals – Projections for all products include the possibility of voluntary withdrawals of funds before the end of the guarantee period. It is assumed such voluntary withdrawals are most likely when current interest rates exceed those guaranteed to funds currently on deposit. The following formulas represent the percentage of the total fund voluntarily withdrawn each year:

$$\text{GAA: } 4(i_c - i_g) \quad \text{where } i_c = \text{current rate}$$
$$i_g = \text{guaranteed rate}$$

GIA: None

$$\text{IAA: } 5(i_c - i_g)$$

For purposes of calculating voluntary withdrawals, $(i_c - i_g)$ is never assumed to be less than zero.

4. Dividends – While contractually possible, it is not expected that participating dividends will be paid to contractholders of either GAA or IAA contracts.

C. Investment Cashflows

1. Scheduled payments – Projections of scheduled payments of asset principal and interest are done on a seriatim basis. Such projections utilize data extracted during the inventory of assets as of the valuation date.

2. Nonscheduled payments — By design, the Segment 1 and 2 portfolios are composed of investments with extremely limited opportunities for prepayment or call by the borrower. Usually no such opportunities exist, but if they do, they normally carry a severe prepayment penalty. When such options do exist, possibilities of prepayment or call were analyzed in light of the contractual yield rate and the assumed then-current interest rate. The conversion of such options was assumed to occur when it was materially in the economic best interest of the option holder.

3. Default risks — Assets included are of high quality, and after consultation with the Chief Investment Officer, the risk of asset default was considered immaterial. For ease of calculation, such possibilities were ignored.

D. Other Cashflows

1. Operating expenses — For all products some expense collections are made via a reduction in the guaranteed interest crediting rate. These collections include provisions for general administrative expenses, investment expenses and other expenses unique to each product. Expense charges collected in such a way are considered as part of the liability cashflow and are calculated as a function of a customer's account value or monthly benefit. The model assumes that expenses are incurred

at the time collections are made (at the contract's anniversary date or monthly benefit payment). The level of charges for each product (which includes margins for adverse deviations) is:

GAA	.085%
GIA	.060%
IAA	1.300%

Other policy fees are assumed to be collected when billed, exactly offset incurred expenses, and are not included in cashflows.

2. Federal Income Tax — For both GAA and IAA contracts collections for Federal Income Tax are made via a reduction in the guaranteed interest crediting rate. For both products, a charge of .300% is levied against the contract's fund value at the anniversary date. For GIA contracts, charges for Federal Income Tax were assumed to be .750% of each monthly benefit payment.

IV. Input Parameters Used in Projecting Cashflows

A. Interest Rate Levels

1. Current spot yield curve — After consultation with the Chief Investment Officer, a spot yield curve representing available investment rates as of the valuation date was established. Spot yield rates were set for 1/4, 1, 3, 5, 7, and 15 year maturities. Spot yield rates for other maturities of less than 15 years were calculated as linear interpolations between the given rates. The 15 year rate was held constant for any maturities greater than 15 years. The spot yield curve as of the valuation date is

shown in Appendix _ and is the same for all future interest rate scenarios.

2. Future interest rate scenarios tested – Projections were made under eight scenarios of future interest rates. Appendix C shows the key rates on yearly anniversaries of the valuation date. The rates assumed at interim dates were calculated as linear interpolations of the given rates.

Concise descriptions of the eight scenarios are,

Scenario A: Rates remain level during the projection period.

Scenario B: Rates rise sharply and then level off.

Scenario C: Rates rise gradually and then level off.

Scenario D: Rates rise gradually and then fall to the original levels.

Scenario E: Rates fall sharply and then level off.

Scenario F: Rates fall gradually and then level off.

Scenario G: Rates fall gradually and then rise to their original level.

Scenario H: The yield curve inverts and then returns to its original shape.

B. Investment (Borrowing) Opportunities for Excess (Deficient) Cashflows

As described above, the model invests excess asset over liability quarterly cashflows in investments consistent with the current company investment policy for Segments 1 and 2. Similarly, negative cashflows are treated as borrowings under the same terms as available investments.

After consultation with the Chief Investment Officer, the available assets (or borrowings) were assumed to be investments of 5 or 10 year maturity. Such investments pay quarterly interest with full return of principal at maturity. The interest rates on these investments are consistent with the then-current interest crediting rates under the particular interest rate scenario being tested. The choice between 5 or 10 year maturities was made with regard to which would better aid our attempts to duration match the asset and liability portfolios.

- C. Length of the projection period — Modeling takes place for a 10-year projection period. Although some benefit cashflows under GIA contracts do extend beyond the 10-year projection period, more than 95% of the liabilities as of the valuation date will have expired within the 10-year period.

At the end of the projection period, future asset and liability cashflows are discounted to December 31, 1998, using the spot yield curve assumed to be in effect at that time. The level of surplus projected for that time is the excess of the asset present value over the present value of liabilities (using the assumed interest rates).

V. Summary of Results

A. Numerical Results

The following table indicates the present value of assets, liabilities and surplus at the end of the 10-year projection period under each of the eight interest rate scenarios.

Present Value (in 000's) as of December 31, 1998

	<u>GAA and GIA</u>			<u>IAA</u>		
	<u>Assets</u>	<u>Liab</u>	<u>Surplus</u>	<u>Assets</u>	<u>Liab</u>	<u>Surplus</u>
Scenario A	11,392	647	10,745	7,163	-0-	7,163
Scenario B	11,575	512	11,063	8,214	-0-	8,214
Scenario C	13,984	533	13,451	8,637	-0-	8,637
Scenario D	11,520	574	10,946	7,777	-0-	7,777
Scenario E	7,694	673	7,021	5,212	-0-	5,212
Scenario F	9,082	656	8,426	5,668	-0-	5,668
Scenario G	10,523	650	9,873	6,442	-0-	6,442
Scenario H	4,927	715	4,212	-813	-0-	-813

B. How results were used in forming the Opinion

The nearly uniformly positive surplus results are supportive of the opinion that "the reserves for such annuities, benefits or contract, and the assets held by the company in support of such reserves, make good and sufficient provision for the liability of the company with respect thereto."

The small negative surplus indicated for IAA contracts under Scenario H, although disturbing, is small enough to be viewed as:

1. A manageable risk over the projection period
2. Within the tolerance of error given the projection methodology.

At present, given the positive surplus results under all other scenarios and our ability to aggregate results with those of the group products, assets supporting the IAA contracts included in this memorandum are viewed as sufficient.

Additional factors which support the conclusion that assets are sufficient to cover liabilities are:

1. These products are priced with surplus contributions which provide a margin for adverse experience.
2. Contract design helps minimize risk of loss due to anti-selection by contractholders and participants.
3. The segment's investment strategies are designed to minimize risks from changes in interest rates.
4. A broad spectrum of future interest rate scenarios was tested.

APPENDIX I
SUMMARY OF SPOT YIELD RATES UNDER THE VARIOUS SCENARIOS TESTED

SCENARIO A: LEVEL RATES							SCENARIO B: SHARPLY RISING RATES						
DATE	1/4 YR	1 YR	3 YR	5 YR	7 YR	10 YR	DATE	1/4 YR	1 YR	3 YR	5 YR	7 YR	10 YR
12/31/88	6.00	7.00	7.75	8.75	10.00	11.00	12/31/88	6.00	7.00	7.75	8.75	10.00	11.00
12/31/89	6.00	7.00	7.75	8.75	10.00	11.00	12/31/89	8.00	8.00	9.25	10.25	11.50	12.50
12/31/90	6.00	7.00	7.75	8.75	10.00	11.00	12/31/90	9.00	10.00	10.75	11.75	13.00	14.00
12/31/91	6.00	7.00	7.75	8.75	10.00	11.00	12/31/91	11.00	11.50	12.25	13.25	14.50	15.50
12/31/92	6.00	7.00	7.75	8.75	10.00	11.00	12/31/92	12.00	12.00	13.25	14.25	16.00	17.00
12/31/93	6.00	7.00	7.75	8.75	10.00	11.00	12/31/93	12.00	13.00	13.75	14.75	16.00	17.00
12/31/94	6.00	7.00	7.75	8.75	10.00	11.00	12/31/94	12.00	13.00	13.75	14.75	16.00	17.00
12/31/95	6.00	7.00	7.75	8.75	10.00	11.00	12/31/95	12.50	13.00	13.75	14.75	16.00	17.00
12/31/96	6.00	7.00	7.75	8.75	10.00	11.00	12/31/96	12.50	13.00	13.75	14.75	16.00	17.00
12/31/97	6.00	7.00	7.75	8.75	10.00	11.00	12/31/97	12.50	13.00	13.75	14.75	16.00	17.00
12/31/98	6.00	7.00	7.75	8.75	10.00	11.00	12/31/98	12.50	13.00	13.75	14.75	16.00	17.00

SCENARIO C: GRADUALLY RISING RATES							SCENARIO D: RISING THEN FALLING RATES						
DATE	1/4 YR	1 YR	3 YR	5 YR	7 YR	10 YR	DATE	1/4 YR	1 YR	3 YR	5 YR	7 YR	10 YR
12/31/88	6.00	7.00	7.75	8.75	10.00	11.00	12/31/88	6.00	7.00	7.75	8.75	10.00	11.00
12/31/89	7.00	7.50	8.25	9.25	10.50	11.50	12/31/89	7.00	7.50	8.25	9.25	10.50	11.50
12/31/90	7.00	8.00	8.75	9.75	11.00	12.00	12/31/90	7.00	8.00	8.75	9.75	11.00	12.00
12/31/91	8.00	8.50	9.25	10.25	11.50	12.50	12/31/91	8.00	8.50	9.25	10.25	11.50	12.50
12/31/92	8.00	9.00	9.75	10.75	12.00	13.00	12/31/92	8.50	9.00	9.75	10.75	12.00	13.00
12/31/93	9.00	9.50	10.25	11.25	12.50	13.50	12/31/93	9.00	9.50	10.25	11.25	12.50	13.50
12/31/94	9.00	10.00	10.75	11.75	13.00	14.00	12/31/94	8.50	9.00	9.75	10.75	12.00	13.00
12/31/95	10.00	10.50	11.25	12.25	13.50	14.50	12/31/95	8.00	8.50	9.25	10.25	11.50	12.50
12/31/96	10.00	10.50	11.25	12.25	13.50	14.50	12/31/96	7.50	8.00	8.75	9.75	11.00	12.00
12/31/97	10.00	10.50	11.25	12.25	13.50	14.50	12/31/97	7.00	7.50	8.25	9.25	10.50	11.50
12/31/98	10.00	10.50	11.25	12.25	13.50	14.50	12/31/98	6.50	7.00	7.75	8.75	10.00	11.00

SCENARIO E: SHARPLY FALLING RATES							SCENARIO F: GRADUALLY FALLING RATES						
DATE	1/4 YR	1 YR	3 YR	5 YR	7 YR	10 YR	DATE	1/4 YR	1 YR	3 YR	5 YR	7 YR	10 YR
12/31/88	6.00	7.00	7.75	8.75	10.00	11.00	12/31/88	6.00	7.00	7.75	8.75	10.00	11.00
12/31/89	5.00	6.00	6.75	7.75	9.00	10.00	12/31/89	6.00	6.00	7.25	8.25	9.50	10.50
12/31/90	4.00	5.00	5.75	6.75	8.00	9.00	12/31/90	5.50	6.00	6.75	7.75	9.00	10.00
12/31/91	3.00	4.00	4.75	5.75	7.00	8.00	12/31/91	5.00	5.50	6.25	7.25	8.50	9.50
12/31/92	3.00	4.00	4.75	5.75	7.00	8.00	12/31/92	4.50	5.00	5.75	6.75	8.00	9.00
12/31/93	3.00	4.00	4.75	5.75	7.00	8.00	12/31/93	4.00	4.50	5.25	6.25	7.50	8.50
12/31/94	3.00	4.00	4.75	5.75	7.00	8.00	12/31/94	3.50	4.00	4.75	5.75	7.00	8.00
12/31/95	3.00	4.00	4.75	5.75	7.00	8.00	12/31/95	3.00	4.00	4.75	5.75	7.00	8.00
12/31/96	3.00	4.00	4.75	5.75	7.00	8.00	12/31/96	3.00	4.00	4.75	5.75	7.00	8.00
12/31/97	3.00	4.00	4.75	5.75	7.00	8.00	12/31/97	3.00	4.00	4.75	5.75	7.00	8.00
12/31/98	3.00	4.00	4.75	5.75	7.00	8.00	12/31/98	3.00	4.00	4.75	5.75	7.00	8.00

SCENARIO G: FALLING THEN RISING RATES							SCENARIO H: INVERTED YIELD CURVE						
DATE	1/4 YR	1 YR	3 YR	5 YR	7 YR	10 YR	DATE	1/4 YR	1 YR	3 YR	5 YR	7 YR	10 YR
12/31/88	6.00	7.00	7.75	8.75	10.00	11.00	12/31/88	6.00	7.00	7.75	8.75	10.00	11.00
12/31/89	6.00	6.50	7.25	8.25	9.50	10.50	12/31/89	7.20	7.50	8.00	8.75	9.50	10.20
12/31/90	6.00	6.00	6.75	7.75	9.00	10.00	12/31/90	7.90	8.00	8.25	8.75	9.20	9.40
12/31/91	6.00	5.50	6.25	7.25	8.50	9.50	12/31/91	8.50	8.50	8.50	8.75	8.80	8.80
12/31/92	4.00	6.00	6.75	7.75	9.00	9.00	12/31/92	9.30	9.00	8.75	8.75	8.40	7.80
12/31/93	4.00	4.50	5.25	6.25	7.50	8.50	12/31/93	10.00	9.00	9.00	8.75	8.00	7.00
12/31/94	4.00	5.00	5.75	6.75	8.00	9.00	12/31/94	9.30	9.00	8.75	8.75	8.40	7.80
12/31/95	5.00	6.50	7.25	8.25	9.50	9.50	12/31/95	8.80	8.50	8.50	8.75	8.80	8.40
12/31/96	6.00	6.00	6.75	7.75	9.00	10.00	12/31/96	7.80	8.00	8.25	8.75	9.20	9.40
12/31/97	6.00	6.50	7.25	8.25	9.50	10.50	12/31/97	7.20	7.50	8.00	8.75	9.50	10.20
12/31/98	6.00	7.00	7.75	8.75	10.00	11.00	12/31/98	6.50	7.00	7.75	8.75	10.00	11.00