

**1993 VALUATION ACTUARY  
SYMPOSIUM PROCEEDINGS**

**SESSION 1**

**The Valuation Actuary --  
An Overview of 1993 Developments**

**Donna R. Claire**

**Frank P. Dino**

**William F. Bluhm**

**Richard S. Miller**



**THE VALUATION ACTUARY --  
AN OVERVIEW OF 1993 DEVELOPMENTS**

**MS. DONNA R. CLAIRE:** I am the Chairperson of the Practice Notes Task Force, which is a task force under the Academy of Actuaries Committee on Life Insurance Financial Reporting. These Practice Notes are evolving documents. Included in the handouts are draft copies of these Practice Notes. These still do not reflect the latest comments from regulators, and they need a final review by the Academy of Actuaries' staff. All of the notes were revised in 1993 to reflect comments received. Our task force appreciates any and all comments on these notes. Please send any comments to me at my *Yearbook* address.

Now, let me introduce the panelists for this session. They represent various parties who are involved with the valuation actuary.

The first speaker will be Mr. Frank Dino, who is chief actuary of the Colorado Insurance Department. He will give us a regulator's viewpoint of various valuation actuary issues. Frank is a member of the Life and Health Actuarial (Technical) Task Force of the NAIC, and has played an important role in shaping the various regulations and actuarial guidelines that effect the valuation actuary. I may not always agree with Frank, but I have found him to be at least willing to listen to and weigh differing comments before deciding on regulations.

Bill Bluhm will be the next speaker. Bill is a consulting actuary with Milliman and Robertson. He also chairs the American Academy of Actuaries State Health Committee. I thought it would be interesting if Bill could give us a short update on the valuation actuary with regard to health insurance.

Dick Miller will be our last speaker. Dick is a partner at Tillinghast. He has been involved with various Society of Actuaries committees that impact the valuation actuary. Dick will give us an update on the various projects that effect the valuation actuary from an industry viewpoint.

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I want to explain a little bit about the appendix which appears at the end of this session chapter. It is a sample actuarial opinion and memorandum. What is in boldface in the actuarial opinion are those items that have been changed from the suggested wording in the Actuarial Opinion and Memorandum Regulation to reflect comments made in the legal Practice Note by Lauren Bloom. The regulators do not give Brownie points for creative writing. Therefore, please feel free to copy any of the sections in these documents which are applicable to your companies.

Before going on to our first speaker, I would like to read a letter from Mr. Robert Callahan:

New York has not yet adopted the equivalent of the Model Standard Valuation Law promulgated by the NAIC in 1990 and amended in 1991, and the prognosis of such adoption is now uncertain. The New York Legislature considered, but did not adopt, the equivalent of that model in 1992 and 1993. The proposal was submitted by the NYS Insurance Department with the assistance of an industry committee organized by the Life Insurance Council of New York. A draft supporting replacement of Regulation 126 was then also prepared.

Consequently, with regards to any cash flow analysis of liabilities and supporting assets as of 12/31/93, insurance companies should plan to comply with Regulation 126 through the second amendment dated 11/25/92. The NYS Insurance Department is thus primarily interested in the sufficiency of reserves of the type covered by Regulation 126. Other reserves may be separately analyzed in the materials submitted to New York. Any aggregate reserve test shall continue to comply with Section 95.8(d)(2).

Signed -- Robert J. Callahan, Chief Actuary I

Roughly translated, this means that a separate memorandum will probably continue to be needed in New York.

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**MR. FRANK P. DINO:** We are living in an exciting time of expanding actuarial needs and responsibilities. With escalating regulatory concern over insurer impairment and insolvency, the actuarial profession is increasingly challenged to provide expert advice, recommendations, and assistance in preventing, or at least identifying, financial concerns of insurers.

Management people expect their actuarial staff to guide them through the increasingly complicated mixture of innovative products desired by insureds and assets developed by the investment community. Regulators expect these actuaries to provide expert analysis and advice to assist them in the protection of the financial stability of the insurance system.

States are quickly adopting the NAIC recommended amendments to the Standard Valuation Law, which provide that the annual actuarial opinion must consider the adequacy of the statutory reserves in light of assets' ability to support them. State regulators will be using the information contained within the opinions and the supporting memorandum to determine the financial condition and stability of an insurer. This information is a significant tool that should not be ignored and may be advantageously utilized by both regulators and company management. The management people should use the results to analyze their investment philosophy and the types of products and guarantees offered. Regulators will use this information, not only to determine if a company is insolvent, or in need of regulatory intervention, but also to analyze methods of rehabilitation. Given the types of interest sensitive and dynamic products currently being offered, it is important to analyze the impact of differing rehabilitation approaches to determine if the company could again become a viable insurer.

Representatives of several states met in conjunction with a recent NAIC meeting to jointly analyze selected opinions and memorandums, and to discuss mutual concerns and problems. As would be expected when a new requirement is implemented, there were many memorandums that were somewhat less than acceptable. Some of the general concerns noted were that (1) in many cases, insufficient details and technical analyses were provided, (2) the basis of the choice of assumption was not well noted or discussed, (3) reinsurance may not have been adequately

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modeled, (4) off-balance-sheet obligations may not have been included and modeled, and (5) sensitivity testing was not performed, or if it was, the results were not detailed. As an example, a clearly questionable supposition is the failure to vary the lapse assumption for deferred annuity products by economic scenario. I would have believed that this would not be assumed by a valuation actuary, especially since this is the very situation and product type that precipitated this new requirement; however, I recently reviewed a memorandum that incorporated this very assumption. Other reviewed memorandums assumed that asset cash flows will be fairly stable across the different economic scenarios. For a normally diversified asset portfolio, this would not be a reasonable assumption. Of even greater concern is that most actuaries rely heavily on asset cash-flow analyses from the investment officer of their company. Although we may rely on the company's investment officer, the actuary still has a responsibility to analyze the information and anticipated cash flows for reasonableness. Blind acceptance and reliance on unreasonable assumptions is unacceptable. I believe that the actuary's involvement in this particular area must be greatly expanded.

In addition, the actuary must review the results from the software utilized in the analysis with a careful eye. Many, if not most, of the systems are newly developed, and inevitable program faults, perhaps material, can be expected to be found for several more years. Even if the actuary has rigorously examined and compiled the input data, a software system may take these data and give flawed results. Blind faith in the software cannot be accepted; the results must be analyzed for reasonableness.

The actuary must remember that the purpose of performing asset adequacy testing is to test for adequacy of the fund held for policyholder benefits across the C-1, C-2, and C-3 risks. If the actuary assumes that the timing, default, early repayment, and call assumption of the assets and the timing and intensity of the obligation outflows is what has been previously anticipated, then the analysis does not serve much value. If the asset and obligation flows are sensitive to economic changes, the evaluation must not be limited to the pricing assumptions or the expected outcomes. One actuary has informed me that the lapse assumptions of interest sensitive products would not vary, as they assumed they would react as fast as anyone else in the market, and

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therefore, the policyholder would have no reason to leave. It is difficult to accept this as a reasonable explanation across all scenarios. Another company told me that its commercial real estate would be unaffected because it is better at underwriting its investments than other companies. This, also, should not be considered an acceptable response. Assumptions will be reviewed not only for reasonableness by the regulator but also for consistency from year to year and as compared to other insurers with similar asset or policy profiles.

The Actuarial Standards Board has recently adopted a new standard of practice governing these opinions. I hope this will aid in the future preparation of these memorandums. One thing that is important to note is that detailed cash-flow testing is not always required to comply with this standard. Depending upon the product, other less detailed methods may be acceptable. Additionally, the Life & Health Actuarial Task Force is already considering amendments to the model regulation to add more specificity to require that certain assumptions are disclosed in the supporting memorandum.

The valuation actuary must consider the company's practice and philosophy regarding nonguaranteed elements. It is not a responsible assumption to consider that all dividends and other nonguaranteed elements suddenly cease in determining cash flows. The company's standard philosophy should be included in the various tested scenarios. The cash flows will then determine if the company practice needs to be modified. Some of these nonguaranteed elements, currently referred to as "enhancements" are coming under the scrutiny of the Life & Health Actuarial Task Force. It is currently perceived that enhancements, if illustrated, should be valued as if they were guaranteed. The policyholder has a perception that these will be credited, and as the company also intends to credit these enhancements, they should set aside sufficient surplus to realistically be able to do so. Insurers should not illustrate an enhancement that requires a certain level of surplus and then use that same surplus for other purposes. The task force is concerned with the potential of creating a disproportionate equity position with regard to terminating and persisting policyholders. The current draft of the new Second Standard Nonforfeiture Law has specifically identified this within its purpose. Once the model law is completed, the task force will most likely be pursuing regulations in this area.

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Once the assets and liabilities have been modeled and the various scenarios chosen and tested, an evaluation of the results must be performed. Although the NAIC model regulation requires seven economic scenarios, there are no standards currently established that assist the actuary in determining what results are necessary to support issuing an unqualified opinion. This is an area that is clearly subject to professional judgment and, of course, is also a very possible subject of disagreement between the opining actuary and the reviewing regulatory actuary. One practice, which may be expected from regulators, would be for the actuary to expand the testing to other requested scenarios. Requests for stochastic testing should not be unexpected.

Regarding statutory accounting issues, the valuation actuary must remember that he is testing the adequacy of the supporting assets as reflected on the NAIC reporting blank. As such, only the admitted portion of any asset should be used. The NAIC model regulation requiring asset adequacy testing does not envision the use of nonadmitted assets to support policy obligations.

Finally, asset adequacy testing may require greater reserves, but could never be used as a basis to reduce statutory formula reserves. The valuation actuary must remember the audience of the work product. This is a statutory valuation that is oriented toward consumer protection, not the shareholder's interests. As such, conservative standards will generally prevail.

An additional item that the actuary should remember is that the model regulation provides significant oversight and authority of the commissioner over the actuary. Not only could questionable ethics and practices be brought before the Actuarial Board for Counseling & Discipline (ABCD) committee of the Academy, but the actuary may also have to defend his position to the commissioner. If the commissioner finds that state laws have been violated, fraud or incompetence have occurred or has rejected the opinion, the actuary may be prevented from practicing in the state. This is a material change, in that the commissioner has a level of authority over a professional.

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These detailed opinions on asset analysis and solvency testing, in concert with the new risk-based capital and surplus standards developed by the NAIC will provide significant tools for regulators and others to evaluate and promote insurer solvency.

Another major development is that actuaries will soon be asked to give an opinion on the sufficiency of a company's surplus. This requirement will transcend the testing of the reserves for the company's current obligations and will provide management, and regulators, with information on the viability of the continued operation of the company, allowing for new business and even for changes in a company's plan of operation. The Society of Actuaries Dynamic Solvency Task Force was commissioned by the Board of Governors to produce a plan of action in this area. Its recently released report recommended several activities, which will pursue additional developments and educational resources to be used by actuaries in this area. In brief, the report states that the condition of financial solvency means that the insurer's assets are adequate to carry out its business plan including making provisions for future commitments. The scope of the analysis will extend beyond the current business and will include future sales and beyond, and include additional assets above those supporting reserves and will include assets supporting the surplus of the company. I have imposed this condition for at least two years on new companies applying for licensure in Colorado. Many actuaries are currently hesitant to opine on anything other than the current policy obligations, but solvency testing will be increasingly required to be performed. I hope that the Actuarial Standards Board will turn its attention to the development of standards and guidelines to assist in this type of testing.

In addition to addressing issues specific to the valuation actuary framework, some other areas receiving NAIC attention are reinsurance and valuation standards.

In the reinsurance area, the model regulation governing financial reinsurance has been amended by the NAIC. The amendments are intended to tighten the restrictions on financial reinsurance arrangements. The amendments shift the market back to more traditional forms of reinsurance where all significant risks are transferred to the reinsurer under the agreement rather than splitting the risks of a contract for the purpose of deriving surplus relief. Regulators will only

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permit reserve credits when there is a true transfer of liabilities and obligations under the policies covered by the agreements. Financial arrangements and accounting manipulation have to stop! The valuation actuary will need to look at all of the contract terms of the transaction, including premium and commission adjustments, and experience refunds. The anticipated cash flows, under various economic scenarios, should clearly demonstrate if surplus was simply borrowed with no risks transferred other than the timing of the ceding insurers repayment to the reinsurer or if less than all the significant risks of a contract were transferred to the reinsurer. If this is the case, no reserve credit can be assumed in the valuation.

A second reinsurance issue is assumption reinsurance. A model act is progressing in the NAIC to regulate assumption reinsurance. Assumption reinsurance is the term used to describe the sale of a block of business from one insurer to another as opposed to indemnity reinsurance. Although regulators recognize valid purposes may be served in allowing such transfers, we have also seen abuses. Many times the insurer does not have the best interest of the policyholder in mind when it agrees to the transfer, and is simply trying to recognize future profits. The model basically provides that policyholders are entitled to have a control over their destiny. It defines assumption reinsurance to be a novation, which requires the individual positive consent of each policyholder. The methods that constitute positive consent are detailed in the act. If a policyholder does not respond to two notices over a 14-month period, the consent would be deemed to have been given. A policyholder maintains the right to reject the transfer and stay with the original insurer at any time during this 14-month period if he hasn't yet given positive consent.

There are currently discussions over the appropriate accounting treatment for the transaction during this 14-month period. Some believe that it should be accounted for in the same way as indemnity reinsurance, while others believe that the assumption should be considered completed, and recognize that there is a contingent liability for those policyholders who reject the transfer. The NAIC will be looking into this area.

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The Life and Health Actuarial Task Force frequently addresses valuation issues and concerns of specific issues or products. A current issue, which should be of interest to you, is Guideline GGG. This guideline is intended to provide direction for the appropriate valuation of individual two-tiered products, in particular, two-tiered annuities. Current industry practice is widely diversified in the valuation of these products. The guideline addresses the acceptable use of differing valuation interest rates for different benefits available under the contract. The guideline requires all benefits under the contract to be considered in determining one valuation interest rate; however, the annuitization options may use a different valuation rate during the annuitization period, with the deferred period being valued using the previously determined single valuation rate. You should be aware that implementation of Guideline GGG will materially increase the reserves of many annuity writers.

I hope that the seminars that you will now be attending will provide you with specific technical details of how to incorporate these issues and ideas into your valuation process. I would be happy to get together with anyone who would like to discuss any of these issues further.



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**MR. WILLIAM F. BLUHM:** I'm here wearing the hat of the Chairman of the American Academy of Actuaries State Health Committee, which until recently was the State Health Issues Committee.

About nine or ten months ago, our committee was brainstorming the issues facing health actuaries. We realized that most health actuaries were feeling very nervous about the new valuation law, and that many of them were going to be asked to provide new and different actuarial opinions than they had in the past. At that point in time, most of the attention from the Academy had been focused on the life and annuity side of the market, and not much was available to health actuaries. We therefore decided to embark on a process to develop the Practice Notes.

One of the committee members, Leonard Koloms, volunteered to head up the effort and has spent a few hundred hours since then putting it all together. He organized a working group of about 50 people, organized into eight subcommittees. All of those people have put in a fantastic amount of time. Time will not permit me to name them all. In reaction to this, Leonard has been rewarded with an even higher-paying job; he is now the Chairman of the newly formed Financial Reporting Subcommittee of the State Health Committee. We hope that in a year or two, if the need is still there, that subcommittee may spin off and become a full-blown committee.

The approach we took on the Practice Notes was to first talk about basic principles and issues. We felt this was needed because such thinking had not been done in the health area as it had been in the life area. The result of this was the Basic Principles and Issues Practice Note, which set the basic structure for all of the other various practice notes. General oversight was provided by Leonard and myself. We were also helped by another person on the committee who had volunteered to help editorially, Al Ford. The Basic Principles and Issues Work Group was headed by Mike Abroe. The Long-Term Care Note was chaired by Bart Munson; the Small Group one was headed by Jim O'Connor; Medicare Supplement was chaired by Neal Lund;

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Individual Medical was by Tom Stoiber; Large Group Medical was headed by Rick Nelson; Individual Disability Insurance was by Dave Scarlett; and Group LTD was by Mike Cowell. The full list of names should be inside each of those notes.

We are looking for feedback on those drafts. We expect the next draft will probably be ready in mid-November 1993. Feedback can be sent to Leonard Koloms at his *Yearbook* address, or to me. We expect to have the final 1993 version ready in December.

We apologize to you for these practice notes being mailed out late. However, we have been up against some pretty tight time frames, as you can imagine. We had eight separate groups working in parallel to draft the notes, then we needed to get them reviewed, and get a couple of versions of editorial changes in them. To do that, we pushed the deadline as far as we could to get them out.

There is one outstanding issue, which you may want to think about, and if you have opinions, provide us with some input. This is the question of materiality. Health actuaries have some very different concerns than life actuaries in the area of valuation. In many instances, there is much more of a focus on rate adequacy than on assets. The concerns and procedures of health actuaries, in the absence of life and annuity business, is very different than what life and annuity actuaries worry about in the absence of health insurance. The question is: How material is the health or life business in the practices, procedures, assumptions, and conclusions of the valuation actuary? This is an important issue that hasn't been really addressed, and we'd appreciate some input.

Our group is also going to be meeting with various people from Capitol Hill and from the NAIC on solvency issues related to HIPC's (Health Alliances) and Accountable Health Plans (AHPs), and the evolving reform issues currently going on. If any of you would like to provide input or volunteer for that, please feel free to get in touch with me.

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I'd like to close by thanking everybody who has worked on all of these notes and putting all this together. It's been a lot of hard work and, on behalf of the profession, we appreciate it.



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**MR. RICHARD S. MILLER:** There are several current developments in reinsurance that should be considered. I will not go into any detail on any of them, but this checklist may be useful:

- **NAIC Assumption Reinsurance Model Act**
  - Exposed draft of June 23, 1993
  - Any authorized insurer (ceding or assuming)
  - Notices of transfer
  - Policyholder consent or rejection
    - \* Deemed consent
  - Requires Commissioner's affirmative approval
  - Pending insolvency can force novation and transfer
  
- **Model Regulation on Credit for Reinsurance**
  - NAIC adopted September 1992
  - Contained in Academy Life & Health Valuation Law Manual
  
- **Reinsurance Treaty filing required in: Arizona, California, Colorado, Florida, Illinois, Indiana, Louisiana, Missouri, New York, Oregon, South Dakota**
  - For domestic ceding insurers
  
- **Proposed New York Regulation 102 Revision of May 25, 1993**

Note that the grandfather expiry in the credit for reinsurance regulations is December 31, 1994, and early expiry is possible in individual states. The New York Regulation 102 revision is substantially to adopt the NAIC model credit for reinsurance regulation.

In the tax area there are three current developments:

- **Final deferred acquisition cost (DAC) regulation**

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- Effect of Section 338(h)(10) purchase election open
- Omnibus Budget Reconciliation Act of 1993
  - Amortization of goodwill and certain other intangibles
- Proposed Treasury regulation on treatment of asset valuation reserve (AVR) and interest maintenance reserve (IMR) for purposes of Section 809
  - Add to net worth -- not treated as reserves
  - Effective for 1992 tax year

Final DAC regulations contained no great surprises but they did leave open the appropriate treatment of deemed purchases of in-force business under Section 338(h)(10).

I will discuss the intangibles amortization in some detail, but mutual company people should also note the temporary regulation on IMR and AVR. The adverse IRS position on the AVR is probably expected, but the IMR question is not as clear a case, particularly when the IMR becomes negative. Note that the regulation came out on August 7, 1993, for application to last year-end.

The major topic I will discuss is the treatment of intangibles in the Omnibus Budget Reconciliation Act. It is generally effective for acquisitions after August 10, 1993, and specifically applies to insurance in force acquired by either assumption reinsurance or through purchase of a company under a Section 338(h)(10) election treating the acquisition as the purchase of the underlying assets, rather than purchase of the stock. The following outline summarizes the important aspects of the new Section 197 relative to life insurance companies.

### **Section 197, Amortization of Goodwill and Certain Other Intangibles**

- Effective date -- August 11, 1993
  - Optional to July 25, 1991
  - Grandfather on old basis for existing binding contracts on August 10, 1993

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- Applies to insurance in force acquired by assumption reinsurance
  - Adjusted basis amortized over 15 years
  - Adjusted basis is excess of
    - \* amount paid, over
    - \* DAC capitalized
  - DAC amortized over ten years
  - Amount paid, defined by Regulation 1.817-4(d)(2)
    - \* residual method
      - i. tax reserves assumed plus
      - ii. cash paid, less
      - iii. cash received
      - iv. or tax reserves less
      - v. net assets, at fair market value, received (paid)
  
- Applies to insurance in force acquired by a Section 338(h)(10) purchase of a company.
  - DAC on net assets acquired? Probably not
  - Residual method? Almost certainly
  - Otherwise same as assumption reinsurance

At first blush the only substantive change for assumption reinsurance is the specified 15-year straight-line amortization, rather than a demonstrated average life, usually taken to be ten years or less.

However, the amount capitalized, thus offsetting the immediate deduction of the tax purchase price, is increased from the prior situation where only the DAC effect was capitalized for "specified contracts." For assumption reinsurance of contracts other than "specified contracts" the net change is to increase the amortization period from ten to 15 years. The amortization is prorated over 180 months from the purchase date. The option to apply the current rules to assumption reinsurance acquisitions back to July 25, 1991, may be useful for some transactions.

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I have seen one otherwise excellent write-up, which suggests that a five-year amortization of any DAC may be available for assuming small companies. I do not think it is correct, however.

Note that the determination of the amount paid is unchanged from that defined by Regulation 1.817-4(d)(2). In this case the ceding commission and amount paid become interchangeable terms.

For Section 338(h)(10) acquisitions, the new law specifically applies and should eliminate the question of how much of the purchase price applies to in-force insurance value and how much might be nondeductible goodwill. Even with a 15-year amortization period, this is almost certainly a beneficial change for potential purchasers of life insurance companies.

There are at least two further questions that should be quickly dealt with by regulation. The questions are whether to require a DAC treatment of the acquired earning assets and how to compute the purchase price. My guess is that no DAC will be required, thus preserving the true liquidation function (and the longer amortization period). I am much more confident that the residual method will apply as the computation rule. It is interesting to note that the residual method produces an amortizable goodwill or in-force insurance value greater than the purchase price of the stock for most of the acquisitions in the 1979-83 era. This is because the fair market value of the asset side of the statutory balance sheets was usually significantly less than the stated value of the tax reserves and liabilities, yielding a significant imputed negative net worth.

In summary, the fight to establish and define the value of in-force insurance will no longer be required, thus grieving lawyers, consulting actuaries, accountants, economists, and other expert witnesses, but leaving both the taxpayer purchasers and the IRS free to pursue other more fruitful paths.

# **THE VALUATION ACTUARY – AN OVERVIEW OF 1993 DEVELOPMENTS**

## **APPENDIX**

### **VALUATION ACTUARY REPORTS**

By Donna R. Claire, FSA, M.A.A.A.

Attached are sample actuarial opinions and memorandums. These documents were first presented at the "Postmortem 1992 Valuation Actuary Symposium" given in Orlando in June of 1993. These documents reflect the changes recommended by Mr. Larry Gorski of the Illinois Insurance Department.

These are strictly sample opinions and memorandums: There are a number of other assumptions that can be made which would be equally accurate.

Included in this report should be enough information that another qualified actuary would be able to take the information and reproduce the results. Additional information may be available at the company if further details are requested.

**SAMPLE ACTUARIAL OPINION**

I, Donna R. Claire, am a consulting actuary with Claire Thinking, Inc. I am a Fellow of the Society of Actuaries and a Member of the American Academy of Actuaries. I was appointed by the Board of Directors of Saavik Life Insurance Company to render this opinion. **A copy of the Board Resolution, dated December 15, 1992, was sent to notify the Commissioner of this appointment.** I meet the qualification standards for rendering the opinion and am familiar with the valuation requirements applicable to life and health companies.

**This opinion is strictly for the company management of Saavik Life Insurance Company and the insurance regulators of this company. The opinion and the memorandum, which details the results of asset adequacy testing, were written in order to comply with the Standard Valuation Law and relevant actuarial standards of practice. These documents are not intended for use by any other party, and I take no responsibility for the use of these documents for any purpose other than for which it was intended.**

**This opinion is meant to be reviewed as a whole, and no part should be separately considered or relied upon. This opinion should not be reviewed or relied upon without the benefit of the advice of a qualified actuary.**

I have examined the actuarial assumptions and actuarial methods used in determining reserves and related actuarial items listed in the attached chart, as shown in the annual statement of the company, as prepared for filing with state regulatory officials as of December 31, 1992. Tabulated reserves are those reserves and related actuarial items which have been subjected to asset adequacy analysis.

I have relied on Li Ability, Vice President and Actuary, for the accuracy of the in-force liability records. I have relied on Ay Set, Chief Investment Officer, for the accuracy of the in-force asset records, as certified in the attached statements.

In other respects my examination included such review of the actuarial assumptions and actuarial methods and such tests of the actuarial calculations as I considered necessary.

In my opinion the reserves and related actuarial values concerning the statement items identified above:

- (a) Are computed in accordance with presently accepted actuarial standards consistently applied and are fairly stated, in accordance with sound actuarial principles;
- (b) Are based on actuarial assumptions that produce reserves at least as great as those called for in any contract provision as to reserve basis and method, and are in accordance with all other contract provisions;

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- (c) Meet the requirements of the insurance law and regulation of the state of New York and are at least as great as the minimum aggregate amounts required by the state in which this statement is filed;
- (d) 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;
- (e) Include provision for all actuarial reserves and related statement items that ought to be established.

The reserves and related items, when considered in light of the assets held by the company with respect to such reserves and related actuarial items including, but not limited to, the investment earnings on such assets, and the considerations anticipated to be received and retained under such policies and contracts, make adequate provision, according to presently accepted actuarial standards of practice, for the anticipated cash flows required by the contractual obligations and related expenses of the company.

The actuarial methods, considerations, and analyses used in forming my opinion conform to the appropriate standards of practice as promulgated by the Actuarial Standards Board, which standards form the basis of this statement of opinion.

This opinion is updated annually as required by statute. To the best of my knowledge, there have been no material changes from the applicable date of the annual statement to the date of the rendering of this opinion, which should be considered in reviewing this opinion.

The impact of unanticipated events subsequent to the date of this opinion is beyond the scope of this opinion. The analysis of asset adequacy portion of this opinion should be viewed recognizing that the company's future experience will not follow all the assumptions used in the analysis.

Donna R. Claire, FSA, M.A.A.A.

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# 1993 VALUATION ACTUARY SYMPOSIUM

## EXHIBIT 1

### Saavik Life Insurance Company Reserves and Related Actuarial Items as of 12/31/92

	<u>Asset Adequacy Tested Amounts</u>			Other Amount (3)	Total Amount = (1) + (2) + (3)
	Formula	Additional	Analysis		
	<u>Reserves</u> (1)	<u>Reserve</u> (2)	<u>Method</u>		
<i>Exhibit 8</i>					
A Life Insurance	\$100,000,000	\$0 CFT			
	<u>\$1,000,000</u>	<u>\$0</u> Conserv			
	\$101,000,000	\$0	\$100,000		\$101,100,000
B Annuities	\$1,000,000,000	\$0 CFT			
	<u>\$25,000,000</u>	<u>\$0</u> Conserv			
	\$1,025,000,000	\$0	\$0		\$1,025,000,000
C SCI	\$25,000,000	\$0 CFT			\$25,000,000
D Accidental Death Benefits	\$2,000,000	\$0 Conserv			\$2,000,000
E Disability – Active	\$50,000,000	\$0 Conserv.			\$50,000,000
F Disability – Disabled	\$15,000,000	\$0 Conserv.			\$15,000,000
G Miscellaneous	<u>\$1,000,000</u>	<u>\$0</u> Conserv.	\$500,000		\$1,500,000
<b>Total Exh. 8, Item 1, Page 3</b>	<b>\$1,219,000,000</b>	<b>\$0</b>	<b>\$600,000</b>		<b>\$1,219,600,000</b>
<i>Exhibit 9</i>					
A Active Life Reserve	\$2,000,000	\$0 CFT			
	<u>\$1,000,000</u>	<u>\$0</u> Trends			
	<u>\$25,000,000</u>	<u>\$0</u> GPVal.			
	\$28,000,000	\$0	\$0		\$28,000,000
B. Claim Reserve	\$1,000,000	\$0 CFT			
	<u>\$25,000,000</u>	<u>\$0</u> GPVal			
	\$26,000,000	\$0	\$0		\$26,000,000
<b>Total Exh. 9, Item 2, Page 3</b>	<b>\$54,000,000</b>	<b>\$0</b>	<b>\$0</b>		<b>\$54,000,000</b>
<i>Exhibit 10</i>					
1 Premiums and Other Deposit Funds	\$0	\$0	\$1,000,000		\$1,000,000
1 2 Guaranteed Interest Contracts (Page 3, Line 10 2)	\$100,000,000	\$0 CFT	\$0		\$100,000,000
1 3 Other Contract Deposit Funds (Page 3, Line 10.3)	\$50,000,000	\$0 CFT			
	<u>\$45,000,000</u>	<u>\$0</u> Conserv			
	\$95,000,000	\$0	\$0		\$95,000,000
2 Supplemental Contracts Not Involving Life Contingencies (Page 3, Line 3)	\$40,000,000	\$0 CFT	\$1,000,000		\$41,000,000
3 Dividend and Coupon Accumulations (Page 3, Line 5)	\$3,500,000	\$0 CFT	\$0		\$3,500,000
<b>Total Exh. 10</b>	<b>\$238,500,000</b>	<b>\$0</b>	<b>\$2,000,000</b>		<b>\$240,500,000</b>

# THE VALUATION ACTUARY -- AN OVERVIEW OF 1993 DEVELOPMENTS

## EXHIBIT 1 (continued)

### Reserves and Related Actuarial Items as of 12/31/92

	<u>Asset Adequacy Tested Amounts</u>			<u>Total Amount</u> = (1) + (2) + (3)	
	<u>Formula</u>	<u>Additional</u>	<u>Analysis</u>		
	<u>Reserves</u> (1)	<u>Reserve</u> (2)	<u>Method</u> (3)		
<i>Exhibit 11, Part 1</i>					
1. Life (Page 3, Line 4.1)	\$1,000,000	\$0	Conserv.	\$700,000	\$1,700,000
2. Health (Page 3, Line 4.2)	\$25,000,000	\$0	Trends		
	<u>\$500,000</u>	\$0	GPVal.		
	\$25,500,000	\$0		\$350,000	\$25,850,000
<b>Total Exh. 11, Part 1</b>	<b>\$26,500,000</b>	<b>\$0</b>		<b>\$1,050,000</b>	<b>\$27,550,000</b>
<i>Other Liabilities</i>					
1. Dividends Due and Unpaid (Page 3, Line 6)	\$1,000,000	\$0	Conserv.	\$0	\$1,000,000
2. Dividend Liability (Page 3, Line 7.1)	\$1,500,000	\$0	GPVal.		
	<u>\$5,000,000</u>	\$0	CFT		
	\$6,500,000	\$0		\$0	\$6,500,000
3. Cost of Collection in Excess of Loading (Page 3, Line 15)	\$0	\$0		\$500,000	\$500,000
4. Funds Held Under Reinsurance Treaties with Unauthorized Companies (Page 3, Line 24.3)	\$0	\$0		\$10,000	\$10,000
<b>Total – Other Liabilities</b>	<b>\$7,500,000</b>	<b>\$0</b>		<b>\$510,000</b>	<b>\$8,010,000</b>
<i>Separate Accounts</i>					
	\$250,000,000 *	\$0	CFT		
	<u>\$2,400,000</u>	\$0	Control		
<b>Total – Separate Accounts</b>	<b>\$252,400,000</b>	<b>\$0</b>		<b>\$0</b>	<b>\$252,400,000</b>
<b>TOTAL RESERVES</b>	<b>\$1,797,900,000</b>	<b>\$0</b>		<b>\$4,160,000</b>	<b>\$1,802,060,000</b>
<b>IMR</b>	<b>\$1,000,000</b>	<b>\$0</b>	CFT	<b>\$0</b>	<b>\$1,000,000</b>
<b>AVR</b>		<b>\$0</b>		<b>\$2,000,000</b>	<b>\$2,000,000</b>

\*Note: All separate account products were variable annuities and variable supplemental contracts. There were no market value adjusted products in Saavik Life as of December 31, 1992

#### ANALYSIS METHODS

- CFT:** The asset adequacy analysis of a majority of the liabilities was determined by cash flow testing.
- GPVal.:** For certain product types, such as disability income insurance, a gross premium valuation was done
- Trends:** There are certain product types, such as Group Disability Income Insurance, where development methods using historical trends of claims were used.
- Conserv:** There are certain products or riders, such as accidental death benefits, where the level of reserves is such that reasonably anticipated deviations are provided for.
- Control:** Highly risk controlled. Reserves equal the fund balance with no future guarantees. Withdrawals are permitted at market value.

## 1993 VALUATION ACTUARY SYMPOSIUM

### Reliance Statement From Liability Officer

I, Li Ability, FSA, M.A.A.A., Vice President and Actuary of Saavik Life Insurance Company, hereby affirm that the listings and summaries of policies and contracts in force as of December 31, 1992, and other liabilities prepared for and submitted to Donna R. Claire, were prepared under my direction and, to the best of my knowledge and belief, are substantially accurate and complete.

\_\_\_\_\_  
Li Ability, FSA, M.A.A.A.

\_\_\_\_\_  
Vice President and Actuary  
\_\_\_\_\_  
Saavik Life Insurance Company  
\_\_\_\_\_  
100 Accuracy Avenue  
\_\_\_\_\_  
Littletown, New York 11746  
\_\_\_\_\_  
Address of Officer

\_\_\_\_\_  
(212) 555-1317  
\_\_\_\_\_  
Telephone number

# THE VALUATION ACTUARY – AN OVERVIEW OF 1993 DEVELOPMENTS

## Reliance Statement From Asset Officer

I, Ay Set, Chief Investment Officer of Saavik Life Insurance Company, hereby affirm that the listings and summaries related to data prepared for and submitted to Donna R. Claire in support of the asset-oriented aspects of the opinion were prepared under my direction and, to the best of my knowledge and belief, are substantially accurate and complete.

\_\_\_\_\_  
Ay Set

Chief Investment Officer  
Saavik Life Insurance Company  
100 Accuracy Avenue  
Littletown, New York 11746  
Address of Officer

(212) 555-5276  
Telephone Number



**CONFIDENTIAL**

**SAAVIK LIFE INSURANCE COMPANY**

**REPORT ON  
ASSET ADEQUACY ANALYSIS  
for December 31, 1992**

Donna R. Claire, FSA, M.A.A.A.  
President  
Claire Thinking, Inc.  
55 Shoreham Drive East  
Dix Hills, New York 11746  
(516) 586-0112

February 28, 1993

## 1993 VALUATION ACTUARY SYMPOSIUM

The attached is a report of the asset adequacy testing for the Saavik Life Insurance Company for December 31, 1992.

This report is confidential and for the exclusive use of the State Insurance Examiners of the Saavik Life Insurance Company.

# THE VALUATION ACTUARY -- AN OVERVIEW OF 1993 DEVELOPMENTS

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**CONFIDENTIAL**

Report on Asset Adequacy Analysis for Saavik Life  
February 28, 1993

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**I. OVERVIEW**

**A. INTRODUCTION**

This memorandum has been prepared on the Saavik Life Insurance Company in conjunction with the actuarial opinion on reserves, which was filed with Saavik Life's 1992 Annual Statement. This report details the asset adequacy analysis of the 12/31/92 reserves.

The analysis done for this report examines results on both a statutory and market value basis. The actuarial methods, considerations, and analyses used in the preparation of this report conform to the appropriate standards of practice as promulgated by the Actuarial Standards Board. In addition, the analysis is consistent with the NAIC Model Actuarial Opinion and Memorandum Regulation.

The in-force data used in this report were obtained from various sources within Saavik. These data were reviewed for reasonableness, but I have relied on various officers of Saavik Life for the accuracy of the in-force asset and liability records.

The Saavik Life Insurance Company is a mutual life insurance company selling various forms of individual participating life insurance, immediate annuities, disability income, medical expense, group insurance, and pension products. Saavik Life has been in business since 1900.

Various forms of asset adequacy analysis were performed on the different in-force products at Saavik Life in both separate and general accounts. For certain products, the reserves were considered immaterial, so asset adequacy analysis was not performed. The December 31, 1992 statutory reserve numbers of Saavik Life are shown in Table 1 in the back of this section. The table also shows the method of asset adequacy test performed. Descriptions of each of the asset adequacy methods used is given in section IV.

For many of the products, cash-flow testing was done based on the seven interest rate scenarios described in the NAIC Model Actuarial Opinion and Memorandum Regulation. Additional sensitivity tests were also done for various product lines.

The policies and assets examined were those in force on December 31, 1992. New business was excluded from the testing done, except to the extent that, when determining maintenance expenses, a going concern was assumed.

The results reached in this analysis are dependent on the assumptions used. Actual results will vary as experience differs from the assumptions.

**CONFIDENTIAL**

Report on Asset Adequacy Analysis for Saavik Life  
February 28, 1993

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**B. DETAILS, RELIANCE, AND LIMITATIONS**

In developing the actuarial opinion for Saavik, many of my conclusions were based on information contained in the actuarial memorandums provided by the actuaries in the various business units of Saavik Life. These memorandums are included as part of this report as appendixes. **(NOTE: Not included in this sample; but this setup shows how this can be handled.)** A listing of these memorandums are included below:

Appendix 1: "Actuarial Memorandum Supporting the Actuarial Opinion as to Reserve Adequacy for Individual Insurance, Individual Annuities, and Supplementary Contracts" by Valerie Actuary, FSA, M.A.A.A.

Appendix 2: "Actuarial Memorandum Supporting the Actuarial Opinion With Respect to Asset Adequacy Analysis for 1992 Statutory Reserves and Related Actuarial Items For Group Annuity Contracts" by Ian Actuary, FSA, M.A.A.A.

Appendix 3: "Actuarial Memorandum Supporting the Actuarial Opinion For Group Insurance, Individual Disability Income, and Medical Expense Contracts" by Heathcliff Actuary, FSA, M.A.A.A.

In addition, information provided by the Investment Department of Saavik Life was used in asset adequacy analysis. As stated in my actuarial opinion, I have relied on Chief Investment Officer Ay Set for the in-force asset summaries provided.

I have also relied upon computer databases providing inventories of current liabilities maintained under the supervision of Vice President and Actuary Li Ability.

The signed reliance memos of each of the above-named individuals are contained within the actuarial memorandums in the appendixes. **(Not included)**

This report and any opinions and conclusions contained therein have been prepared for the use of the State Insurance Examiners of Saavik Life. Disclosure of this report in whole or in part to any other party is prohibited without the prior written consent from me.

This report has been prepared in conformity with its intended utilization by a person technically competent in the areas addressed and for the stated purpose only. Judgments as to the data contained in the report should be made only after studying the report in its entirety, as the conclusions reached by review of a section or sections on an isolated basis may be incorrect.

I will be available to explain and/or amplify any matters presented herein, and it is assumed that the user of this report will seek such explanation and/or amplification as to any matter in question.

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Report on Asset Adequacy Analysis for Saavik Life  
February 28, 1993

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**C. SIGNIFICANT FINDINGS**

The asset adequacy analysis performed indicates that the current level of reserves and the assets in support of the reserves make adequate provision, according to presently accepted actuarial standards of practice, for all product lines examined. On a companywide basis, there is no negative market value of surplus in any of the basic 7 scenarios examined.

**D. CAVEATS**

Asset adequacy analysis is based on a myriad of assumptions. Since future experience will not match all these assumptions, actual results will differ from that modeled.

**E. SIGNATURE SECTION**

I will be available to explain and/or amplify any matters presented herein, and it is assumed that the user of such report will seek such explanation and/or amplification to any matter in question.

Donna R. Claire, FSA, M.A.A.A.  
President,  
Claire Thinking, Inc.  
55 Shoreham Drive East  
Dix Hills, New York 11746

Telephone: (516) 586-0112

**CONFIDENTIAL**

Report on Asset Adequacy Analysis for Saavik Life  
February 28, 1993

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**II. RESERVES**

**A. PRODUCT DESCRIPTIONS**

Saavik Life writes a full line of insurance products, including individual participating life insurance, single premium immediate annuities, group life insurance, group accident and health insurance, disability income insurance, individual medical expense, and pension products. In addition, Saavik Life also issues supplementary contracts involving and not involving life contingencies. Reserves for all products were examined in forming my opinion.

Further descriptions of the various product categories examined are given in the detailed memorandums from the business units as shown in the appendixes. **(Not included)**

**B. SOURCE OF INFORMATION**

The in force data on reserves were obtained from the various computer systems that support the product lines. Each of the business units also examined the details of the various products in order to determine the appropriate assumptions to use for the asset adequacy analysis. My conclusions are based on information provided by the business units, particularly by Valerie Actuary FSA, M.A.A.A., for the individual life, individual annuity, and supplementary contract lines of business; Ian Actuary, FSA, M.A.A.A., for group annuity contracts; and Heathcliff Actuary, FSA, M.A.A.A., for group insurance, individual disability income, and medical expense contracts. The details of the information used by each of the business units and the reliance memos discussed in Section I.B are given in the memorandums from those business units.

**C. RESERVE METHOD AND BASIS**

The reserve methods and basis used for the various products are detailed in the memorandums from the business units, which are attached in the appendixes. **(Not included)** These reserve methods comply with the laws of Saavik Life's domiciliary state, New York, for every product. These reserves are at least as great as the minimum aggregate amounts required by the laws in each of the states which require this form of actuarial opinion under the revised Standard Valuation Law and Regulation.

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**Report on Asset Adequacy Analysis for Saavik Life  
February 28, 1993**

**TABLE 1**

**Saavik Life Insurance Company  
Reserves and Related Actuarial Items as of 12/31/92**

	<u>Asset Adequacy Tested Amounts</u>			<u>Other Amount</u> (3)	<u>Total Amount</u> = (1) + (2) + (3)
	<u>Formula Reserves</u> (1)	<u>Additional Actuarial Reserve</u> (2)	<u>Analysis Method</u>		
<i>Exhibit 8</i>					
A. Life Insurance	\$100,000,000	\$0 CFT			
	<u>\$1,000,000</u>	<u>\$0 Conserv.</u>			
	\$101,000,000	\$0	\$100,000		\$101,100,000
B. Annuities	\$1,000,000,000	\$0 CFT			
	<u>\$25,000,000</u>	<u>\$0 Conserv.</u>			
	\$1,025,000,000	\$0	\$0		\$1,025,000,000
C. SCI	\$25,000,000	\$0 CFT			\$25,000,000
D. Accidental Death Benefits	\$2,000,000	\$0 Conserv.			\$2,000,000
E. Disability – Active	\$50,000,000	\$0 Conserv.			\$50,000,000
F. Disability – Disabled	\$15,000,000	\$0 Conserv.			\$15,000,000
G. Miscellaneous	<u>\$1,000,000</u>	<u>\$0 Conserv.</u>	\$500,000		\$1,500,000
<b>Total Exh. 8, Item 1, Page 3</b>	<b>\$1,219,000,000</b>	<b>\$0</b>	<b>\$600,000</b>		<b>\$1,219,600,000</b>
<i>Exhibit 9</i>					
A. Active Life Reserve	\$2,000,000	\$0 CFT			
	\$1,000,000	\$0 Trends			
	<u>\$25,000,000</u>	<u>\$0 GPVal.</u>			
	\$28,000,000	\$0	\$0		\$28,000,000
B. Claim Reserve	\$1,000,000	\$0 CFT			
	<u>\$25,000,000</u>	<u>\$0 GPVal.</u>			
	\$26,000,000	\$0	\$0		\$26,000,000
<b>Total Exh. 9, Item 2, Page 3</b>	<b>\$54,000,000</b>	<b>\$0</b>	<b>\$0</b>		<b>\$54,000,000</b>
<i>Exhibit 10</i>					
1. Premiums and Other Deposit Funds	\$0	\$0	\$1,000,000		\$1,000,000
1.2 Guaranteed Interest Contracts (Page 3, Line 10.2)	\$100,000,000	\$0 CFT	\$0		\$100,000,000
1.3 Other Contract Deposit Funds (Page 3, Line 10.3)	\$50,000,000	\$0 CFT			
	<u>\$45,000,000</u>	<u>\$0 Conserv.</u>			
	\$95,000,000	\$0	\$0		\$95,000,000
2. Supplemental Contracts Not Involving Life Contingencies (Page 3, Line 3)	\$40,000,000	\$0 CFT	\$1,000,000		\$41,000,000
3. Dividend and Coupon Accumulations (Page 3, Line 5)	\$3,500,000	\$0 CFT	\$0		\$3,500,000
<b>Total Exh. 10</b>	<b>\$238,500,000</b>	<b>\$0</b>	<b>\$2,000,000</b>		<b>\$240,500,000</b>

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Report on Asset Adequacy Analysis for Saavik Life  
February 28, 1993

**TABLE 1 (continued)**

**Saavik Life Insurance Company  
Reserves and Related Actuarial Items as of 12/31/92**

	<u>Asset Adequacy Tested Amounts</u>			<u>Other Amount</u> (3)	<u>Total Amount</u> <u>= (1) + (2) + (3)</u>
	<u>Formula</u>	<u>Additional</u>	<u>Analysis</u>		
	<u>Reserves</u> (1)	<u>Reserve</u> (2)	<u>Method</u>		
<i>Exhibit 11, Part 1</i>					
1 Life (Page 3, Line 4.1)	\$1,000,000	\$0	Conserv	\$700,000	\$1,700,000
2 Health (Page 3, Line 4.2)					
	\$25,000,000	\$0	Trends		
	\$500,000	\$0	GPVal.		
	\$25,500,000	\$0		\$350,000	\$25,850,000
<b>Total Exh. 11, Part 1</b>	<b>\$26,500,000</b>	<b>\$0</b>		<b>\$1,050,000</b>	<b>\$27,550,000</b>
<i>Other Liabilities</i>					
1 Dividends Due and Unpaid (Page 3, Line 6)	\$1,000,000	\$0	Conserv	\$0	\$1,000,000
2. Dividend Liability (Page 3, Line 7.1)	\$1,500,000	\$0	GPVal		
	\$5,000,000	\$0	CFT		
	\$6,500,000	\$0			\$6,500,000
3 Cost of Collection in Excess of Loading (Page 3, Line 15)	\$0	\$0		\$500,000	\$500,000
4 Funds Held Under Reinsurance Treaties with Unauthorized Companies (Page 3, Line 24.3)	\$0	\$0		\$10,000	\$10,000
<b>Total - Other Liabilities</b>	<b>\$7,500,000</b>	<b>\$0</b>		<b>\$510,000</b>	<b>\$8,010,000</b>
<i>Separate Accounts</i>					
	\$250,000,000	\$0	CFT		
	\$2,400,000	\$0	Control		
<b>Total - Separate Accounts</b>	<b>\$252,400,000</b>	<b>\$0</b>		<b>\$0</b>	<b>\$252,400,000</b>
<b>TOTAL RESERVES</b>	<b>\$1,797,900,000</b>	<b>\$0</b>		<b>\$4,160,000</b>	<b>\$1,802,060,000</b>
<b>IMR</b>	<b>\$1,000,000</b>	<b>\$0</b>	<b>CFT</b>	<b>\$0</b>	<b>\$1,000,000</b>
<b>AVR</b>		<b>\$0</b>		<b>\$2,000,000</b>	<b>\$2,000,000</b>

**ANALYSIS METHODS**

**CFT:** The asset adequacy analysis of a majority of the liabilities was determined by cash flow testing

**GPVal.:** For certain product types, such as disability income insurance, a gross premium valuation was done

**Trends:** There are certain product types, such as Group Disability Income Insurance, where development methods using historical trends of claims were used

**Conserv:** There are certain products or riders, such as accidental death benefits, where the level of reserves is such that reasonably anticipated deviations are provided for

**Control:** Highly risk controlled. Reserves equal the fund balance with no future guarantees. Withdrawals are permitted at market value

**CONFIDENTIAL**

Report on Asset Adequacy Analysis for Saavik Life  
February 28, 1993

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**D. INVESTMENT RESERVES**

At December 31, 1992, Saavik Life had \$1 million in IMRs. As required by the NAIC Model Actuarial Opinion and Memorandum Regulation, consideration of these reserves was included in the testing.

As of the end of 1992, Saavik Life also held \$2 million in AVRs. Specific recognition was not given to these reserves, except to the extent that they provided an extra cushion to cover any excess defaults or possible write-downs of assets.

**E. REINSURANCE**

There were a number of reinsurance treaties in effect at the end of 1992 for various products at Saavik Life. The actuaries in the business units considered the effects of these reinsurance treaties in any asset adequacy analysis done.

**F. AMOUNT OF RESERVES AND RELATED ACTUARIAL ITEMS**

Table 1 at the end of Section I summarized the amount of reserves and related actuarial items examined in developing my actuarial opinion. The details on the amount of the various reserves and related actuarial items for each of the business units are given in the memorandums in the appendixes.

**CONFIDENTIAL**

Report on Asset Adequacy Analysis for Saavik Life  
February 28, 1993

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**III. ASSETS**

**A. PORTFOLIO DESCRIPTION**

Saavik Life invests in a variety of assets. The majority of these assets are investment grade bonds, both public bonds and private placements. In addition, there have been investments in a variety of asset categories. These include common stock, commercial mortgages, real estate, and collateralized mortgage obligations (CMOs).

Table 2 at the end of this section lists the total assets of Saavik Life by major investment category.

These assets are specifically designated in support of particular products, and for assets purchased prior to 1987, an investment year method (IYM) approach is taken. The method followed in the segmented and IYM approach is on file with and has been approved by the New York Insurance Department.

**B. ASSETS BACKING SURPLUS AND OTHER LIABILITIES**

Certain assets of Saavik Life were not used in the modeling, since they were assumed to back surplus and other nonreserve liabilities. The largest asset in this category is investments in affiliates and subsidiaries. Since these are generally considered a corporate asset, they were not used in the modeling of reserve liabilities. A certain amount of cash was also assumed to back the nontested reserves, since this amount is needed to pay outstanding expenses and other nonreserve liabilities. The amount of these assets are given below:

**Saavik Life Assets Not Used in Cash-Flow Testing**

Investments in affiliates and subsidiaries	\$50,000,000
Cash	\$25,000,000

Surplus and nonreserve liabilities, which total \$75 million for Saavik Life, were not included in the cash-flow testing.

**C. INVESTMENT AND DISINVESTMENT ASSUMPTIONS**

There are different reinvestment and disinvestment assumptions used for each of the various product lines. The details of the assumptions used are given in the memorandums from the specific business units, which are attached as appendixes. **(Not included)**

**CONFIDENTIAL**

Report on Asset Adequacy Analysis for Saavik Life  
February 28, 1993

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**D. SOURCE OF ASSET DATA**

The information on assets in force was obtained from various computer databases, as indicated in the reliance memos in the appendixes. A seriatim listing of the assets was used in projecting the assets. These data included bond ratings, call and sinking fund schedules.

**E. ASSET VALUATION BASIS**

The valuation basis for the assets included in this memorandum are listed below. They have been valued in accordance with NAIC asset valuation bases and procedures. In particular,

<u>Asset</u>	<u>Valuation Basis</u>
Bonds	Amortized cost. Category 6 bonds (bonds in default) are shown at lower of amortized cost or market value.
Real Estate	Lower of: depreciated cost less encumbrances, or market value.
Mortgage Loans	Outstanding loan balance. If in the process of foreclosure, then carried at market value.
Common Stocks	Market value

**F. DESCRIPTION OF ASSETS**

A description of each of the major asset types follows:

**1. Bonds**

The category labeled bonds consists of publicly traded bonds and private placements. The default rate assigned to each asset depended on the NAIC rating. For assets that did not have an NAIC rating code, Saavik Life's internal NAIC code based on expected rating was used.

In the modeling, a seriatim listing of assets was used. The actual coupon rates were used to project cash flows. Call schedules and sinking fund schedules were also reflected in the modeling.

As of December 31, 1992, Saavik Life had only approximately 0.2% of its assets in Schedule D assets rated 5 or 6 by the NAIC, and 8% of its assets in assets rated 3 or higher by the NAIC.

**CONFIDENTIAL**

Report on Asset Adequacy Analysis for Saavik Life  
February 28, 1993

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For bonds in default, it was assumed that these assets would have no current cash return, but would appreciate at a market rate of interest over the next two years, and would be sold at the end of that period.

The NAIC 1 category of bonds included \$100 million of CMOs. These are exclusively the A tranche of GNMA pools, with an average expected life of under three years.

## **2. Commercial Mortgages**

Saavik Life has \$150 million (about 8% of its portfolio) in commercial mortgages. There are a number of properties in this portfolio. It consists of commercial mortgages issued by banks on a variety of property types (office buildings, apartment houses, churches, warehouses, etc.) The mortgages are geographically diverse. The largest commercial mortgage in this portfolio is \$10 million. The default rate has been very low, with no principal having been lost to date. Approximately 30% of the mortgages are adjustable rate mortgages. The average term is five years or less. In the modeling, these were assumed to have default rates consistent with the proposed risk-based-capital formula for commercial mortgages.

## **3. Treasuries**

Saavik Life had 20% of its assets in Treasury bonds. These were modeled similarly to corporate bonds, except that no defaults were assumed.

## **4. Common Stocks**

Common stocks made up less than 1% of the assets used in the testing. All the common stocks in Saavik Life are New York Stock Exchange issues, and all are currently paying dividends, with an average current dividend rate of 2%. For the stocks currently in Saavik Life's portfolio, the average market rate of increase over the past ten years has been approximately 250% of the inflation rate. Saavik Life actively trades its common stock portfolio, although it will only buy high grade stocks listed on the New York Stock Exchange. For conservatism, the assumption was made for modeling that the common stocks annually earn 150% of the inflation rate.

## **5. Policy Loans**

There are \$20 million of policy loans outstanding in Saavik Life. These were modeled directly, according to the terms of the policy loans, with the liabilities affected.

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**6. Real Estate**

The real estate in Saavik Life consists of a number of properties. The Investment Department provided the projections as to the current cash flow, the current and projected market value, and the expected date of sale of the properties.

**7. Cash**

Cash was modeled as 90-day paper.

**8. Separate Account Assets**

Separate account assets back the variable annuity product.

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**TABLE 2**  
**Assets of Saavik Life Used in Modeling**  
**As of December 31, 1992**  
**(Amounts in \$ Millions)**

<u>Asset Category</u>	<u>Amount</u>	<u>% of Total</u>
Bonds:		
U.S. Government	\$360	20.0%
NAIC Rating 1	224	12.4
NAIC Rating 2	500	27.7
NAIC Rating 3	100	5.5
NAIC Rating 4	50	2.8
NAIC Rating 5	2	0.1
NAIC Rating 6	1	0.1
<b>Total Bonds</b>	<b>\$1,237</b>	<b>68.6%</b>
Real Estate:	\$ 4	0.2%
Commercial Mortgage Loans	150	8.3
Common Stocks	10	0.6
Cash	100	5.5
Policy Loans	20	1.1
<b>Total Cash and Invested Assets</b>	<b>\$1,521</b>	<b>84.3%</b>
Deferred & Uncollected Premiums	\$ 10	0.6%
Investment Income Due & Accrued	20	1.1
Separate Account Assets	252	14.0
<b>TOTAL ASSETS</b>	<b>\$1,803</b>	<b>100.0%</b>

## IV. ANALYSIS BASIS

### A. METHODOLOGY

There were a number of different methods of asset adequacy analysis used, depending on the type of product and the amount of reserves involved. A list of the various methodologies are given below:

#### 1. Cash-Flow Testing

The asset adequacy analysis of the majority of the liabilities of Saavik Life was determined by cash-flow testing. For certain product lines, in-house systems were used for this testing. For other product lines, PTS, a commercial software package developed by Chalke Incorporated, was used for the cash-flow modeling.

#### 2. Gross Premium Valuation

For certain product types, such as disability income insurance, a gross premium valuation was done.

#### 3. Development Methods

There are certain products, such as those for group disability income insurance, where historical trends of claims were used.

#### 4. Conservatism

There are certain products or riders, such as accidental death benefits, where the level of the reserves is such that reasonably anticipated deviations from current experience are provided for.

#### 5. Controlled

Reserves are equal to the fund balance with no future guarantees. Withdrawals are only permitted at market value.

NOTE: Details of the type of asset adequacy analysis performed for each major product line are given in the memorandums attached in the appendixes.

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**B. ASSUMPTIONS**

The following is a description of the major assumptions used in most of the cash-flow modeling for Saavik Life.

**1. Yield Curve**

Interest rates are needed to determine the market value of assets and the rate at which new money is assumed to be reinvested. It was also assumed rates move from the steep 12/31/92 curve to the normal curve over two years.

The "level" interest rates used are given below:

**Treasury Interest Rates**

<u>90-Day Rate</u>	<u>Five-Year Rate</u>	<u>Ten-Year Rate</u>	<u>30-Year Rate</u>
3.3%	6.17%	7.19%	7.57%

The interest rates assumed for all other types of assets were based off of the Treasury rates. For the assets used in the testing, below are sample rates based on the 1992 level of Treasury rates:

**Interest Rates Used in Model**

<u>Asset Type</u>	<u>Net Spread Over Treasuries</u>	<u>Sample Rates</u>
7-Yr. NC NAIC 2 Public Bond	80 Basis Points	7.7
7-Yr. NC NAIC 2 Private Bond	100 Basis Points	7.9
15-Yr. Call NAIC 2 Public Bond*	100 Basis Points	8.3
5-Yr. Commercial mort.	250 Basis Points	8.67

\*Assumed callable after five years at 105% of par, grading to par in year ten

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**2. Scenarios Tested**

For all general account products that used cash-flow testing to determine asset adequacy, the scenarios in the NAIC Model Actuarial Opinion and Memorandum Regulation were tested. These are described below:

<u>Scenario</u>	<u>Description</u>
Level	Level interest rates as described in III. A. 1. above
Increasing	Rates increase 0.5% each year for the next ten years
Cap	Rates increase by 1% each year for the next five years, then decrease by 1% a year for the following five years
Cup	Rates decrease by 1% each year for the next five years, then increase by 1% a year for the following five years
Pop Up	Rates increase by 3% in 1993 and stay at that level
Decreasing	Rates decrease by 0.5% each year for the next ten years
Pop Down	Rates decrease by 3% in 1993 and stay at that level

The yield curve is historically steeper than what is considered normal. Therefore, the baseline scenarios tested assumed that the yield curve would return to normal in two years after the test date.

In addition, 100 random interest rate scenarios were tested. These random scenarios started with the current interest rates, and assumed short-term interest rate volatility was 18%, with the intermediate interest rate volatility of 12%. These volatility factors are consistent with the volatility experienced throughout the 1980s.

**3. Defaults**

The default assumption used for assets was equal to 10% of the AVR maximum for the NAIC 2 bonds (which is equal to 20 basis points a year). For mortgage loans, the default assumption was 80 basis points a year.

It was assumed that total default costs are equivalent to the default charges for each year of the model.

#### 4. Prepayments

Prepayments for mortgage-backed securities (MBSs) backing the CMOs were based on the Public Security Association (PSA) Standard Prepayment Model rate. Additional prepayments were assumed when the coupon rate that would be used for newly issued mortgages in a particular economic environment was lower than the rate on in-force mortgages. Chart 1, at the end of this appendix, shows the assumed cash flows from the CMOs for the total company under the basic seven scenarios.

Current prepayment assumptions were obtained for all mortgage assets from various investment banks. In addition, expected cash flows assuming interest rates increase or decrease by 300 basis points were obtained for each mortgage asset from investment banks. The appropriate reliance memo is attached. **(Not included)**

The prepayment function is a prepayment factor multiplied by the PSA rates, where the prepayment function is calculated using the following function:

$$P(r) = \min + (\max - \min)[1 - e^{-a(\text{Parameter} - \text{MPV})^B}], \text{ where}$$

Parameter	=	the ratio of market value/book value
MPV	=	Maximum Parameter Value, above which the PSA factor values monotonically increase as the Prepayment Parameter value increases
min	=	minimum prepayment factor to be used (e.g., .75)
max	=	maximum prepayment factor to be used (e.g., 10)
a	=	a calculated value, based on the MPV value and the user specified value at which prepayments equal (min PSA + max PSA)/2 (e.g., min+max PSA/2 = 1.15)
B	=	The curvature of the prepayment factor curve (e.g., 2)

Each mortgage was modeled with different factors. These factors were chosen to reproduce the expected prepayments as modeled by the various investment banks.

Here is an example of how the above calculation would work: Given a 30-year MBS issued in 1986, with an 8% coupon rate, the 100% PSA would equal 6%. This is the prepayment rate that would be expected in a level interest rate environment. Using the values given above as examples, the calculated value of *a* would be 7.7016. If interest rates were to fall 3%, the above formula would result in a market value to book value ratio ("Parameter" is the above equation) of 1.15, so the equation would be  $.75 + 9.25 \times [1 - e^{-7.7016 \times (1.15 - .85)^2}]$ , or a factor of 5.375 x PSA, or 32% prepayments expected if rates drop 3%.

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**5. Calls**

Call schedules and call premiums were entered on a seriatim basis for all bonds noted as callable.

Calls are determined by using "call input parameters" and a hypothetical parameter equal to ratio of the theoretical market value to the call price. The first call input parameter is the maximum value of the market value/call value ratio where the call rate is assumed to be zero. The assumption used for modeling was 1.01 for all bonds. The second call input parameter is the minimum market value/call value ratio where the call rate is assumed to be one. This assumption is 1.1 for all bonds. The call rate is linearly interpolated between these two values. Therefore, if the market price of the bond rises 10% or more, 100% is assumed to be called.

**6. Market Rate**

To determine excess lapses, an assumption as to what was a market rate (competitor's rate) was made. The actual formulas are given in the attached appendixes. (Not included)

**7. Dividend and Interest Crediting Methodology**

The dividend and interest crediting methodologies used for the various products are given in the attached appendixes. (Not included) Some sensitivity of this assumption was tested for certain product lines.

**8. Lapses**

The baseline lapses used for each product are given in the attached appendixes. (Not included)

Additional lapses were assumed to be triggered when the credited rate was below the market rate. This dynamic lapse formula varied by product. These are shown in the attached appendixes. (Not included)

**9. Annuitization**

The annuitizations assumed for each product line are given in the attached appendixes. (Not included)

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**10. Mortality**

The mortality basis used for the products are given in the attached appendixes. **(Not included)** In general, industry tables were used. These were compared to company experience to ensure that the tables being used were a reasonable representation of what could be expected by Saavik Life.

**11. Expenses**

The expense assumptions used are based on a company allocation of expenses. The resulting expense totals were compared to annual statement numbers to check for reasonableness. The actual expense assumptions used are given in the attached appendixes. **(Not included)**

**C. RATIONALE FOR TESTING**

Various types of asset adequacy analysis were performed on most reserves and related actuarial items of Saavik Life. Certain products were not tested under asset adequacy, since the amounts were considered immaterial.

**D. RATIONALE FOR DEGREE OF ANALYSIS**

All major product lines, which might have interest sensitive cash flows, were examined using cash-flow testing. Other types of asset adequacy was performed where interest rates did not appear to be a major factor in the cash flows of a product line. Where it was deemed necessary, additional sensitivity tests were performed. Details of the testing are included in the business units' memorandums which are in the appendixes. **(Not included)**

**E. CRITERIA FOR DETERMINING ASSET ADEQUACY**

The basic criteria used to determine asset adequacy where cash-flow testing was done was if there was positive market value of surplus at the end of the test period for at least six of the base seven interest rate scenarios in the NAIC Model Actuarial Opinion and Memorandum Regulation.

Initially each business unit determined reserve adequacy based on its business unit alone. However, due to the desire to have positive surplus on all seven scenarios, the supplementary contracts and annuity results were aggregated. This was done by discounting the results at the end of the projection period back to 12/31/92. The post-tax new money rates inherent in each interest scenario were used as the discount factors.

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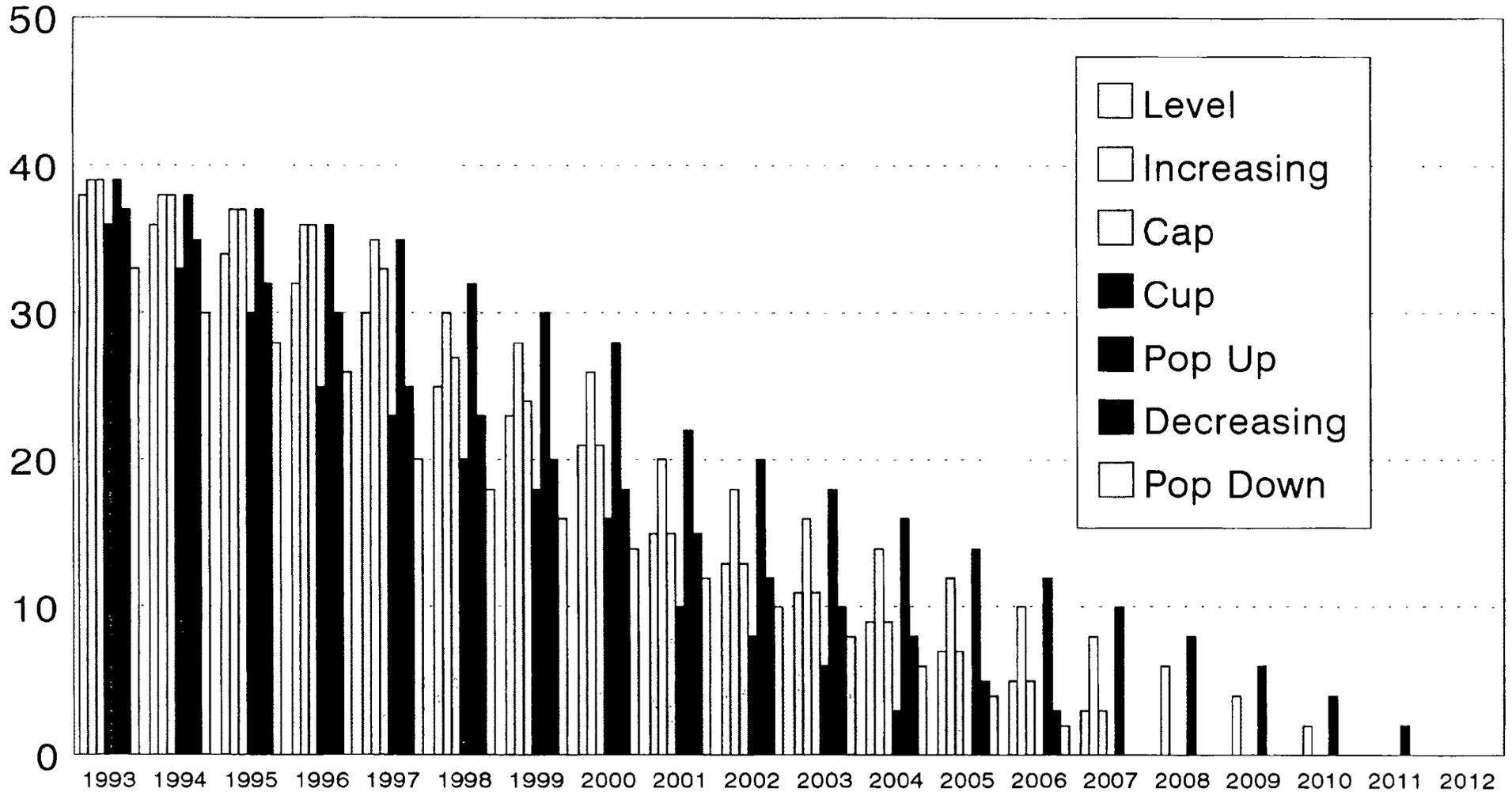
Where other methods of asset adequacy analysis were done, the results were satisfactory if the testing showed reserves were adequate when certain adverse deviations were tested.

**F. EFFECT OF FEDERAL INCOME TAXES**

Federal income taxes were modeled in the cash flows, assuming the rate paid was 34% of the net taxable gains. In addition, the surplus (Section 809) tax was reflected assuming a long-term DER of 2%.

CHART 1

Cash Flows From CMOs For Saavik Life  
 Based on December 31, 1992 Data  
 (Amounts in \$Millions)



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**V. SUMMARY OF RESULTS**

Table 4 shows the results of the present value of market surplus of the testing on a companywide basis for each of the seven basic scenarios. Table 5 shows the present value of market surplus for the randomly generated 100 scenarios.

All the business unit of Saavik Life showed the reserve levels to be adequate. Attached is a summary of the major findings for each profit line. **(Not included)**

Details of the further testing done by the business unit are given in the appendixes. **(Not included)**

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**TABLE 4**

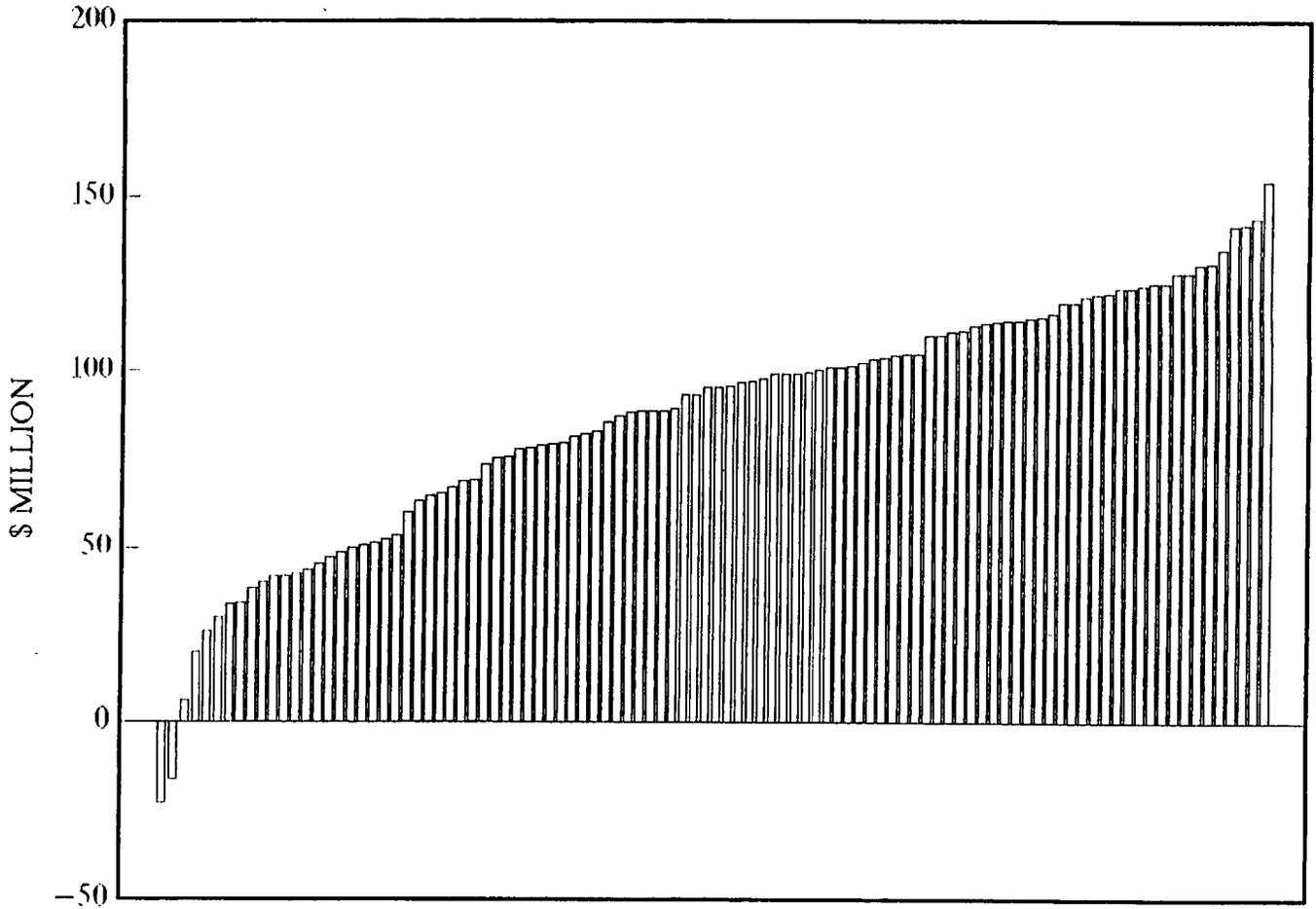
**Present Value of Twentieth Year Market Value of Surplus  
For Saavik Life, Based on December 31, 1992 Data  
(Amounts in \$Millions)**

<u>Scenario</u>	<u>Amount</u>
Level	\$150
Increasing	95
Cap	105
Cup	130
Pop Up	45
Decreasing	145
Pop Down	100

Note: Scenarios are described in Section IV. B. 2

TABLE 5

P. V. of Twentieth-Year Surplus For 100 Scenarios  
For Saavik Life Based on 12/31/92 Data





**PRACTICE NOTES**  
**November 1993**

**TO:** Members of the American Academy of Actuaries  
and Other Interested Parties

**FROM:** Practice Notes Work Group

**SUBJ:** 1993 Practice Notes for Life and Health Insurance  
Appointed Actuaries in the U.S.

The Practice Notes which accompany this letter have not been promulgated by the Actuarial Standards Board or any other authoritative body of the American Academy of Actuaries. A "practice notes work group" was organized by the Committee on Life Insurance Financial Reporting of the American Academy of Actuaries and charged with developing a description of some of the current practices used by valuation actuaries in the United States in 1993. Many of the 1993 notes contain revisions of the 1992 notes.

At least one of the members of the work group has had direct experience relevant to each of the subjects of these practice notes. The practice notes represent a description of practices believed by the work group to be commonly employed by actuaries in the United States in 1993. However, no representation of completeness is made. Other approaches are not doubt in common use. The intention of the notes is to assist actuaries who are faced with the requirement of adequacy testing for the first time by supplying examples of some of the common approaches to this work. It should be recognized that the information contained herein is not binding on any actuary or organization, and is not, nor is it intended to be, a definitive statement of what constitutes generally accepted actuarial practices in this area.

The practice notes work group would appreciate receiving any comments on the Practice Notes as to appropriateness, procedures, desirability of annual updating, additional practices currently employed by actuaries, substantive disagreements, etc. Please send these comments to Donna Claire at her Directory address.

Practice Notes Work Group

Donna R. Claire, Chairperson

Arnold A. Dicke

Douglas C. Doll

Craig F. Likkell

Linn K. Richardson

Henry W. Siegel

Steven A. Smith

Charles N. Vest

Michael L. Zurcher

The work group thanks all those who made suggestions and comments on the 1992 and 1993 Practice Notes.

**CURRENT PRACTICE NOTES  
FOR LIFE AND HEALTH INSURANCE  
APPOINTED ACTUARIES**

November, 1993

**Practice Note**

**Subject**

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1993-1	General Considerations
1993-2	Suggested Procedures for Accepting or Resigning the Position of Appointed Actuary for Life or Health Insurers in the U.S.
1993-3	Reliance Upon Third Parties
1993-4	Interest Rate Models
1993-5	Use of the AVR/IMR in Cash Flow Testing
1993-6	Modeling Bond Default Risk
1993-7	Modeling Mortgage and Real Estate C-1 Risk
1993-8	Modeling CMOs
1993-9	Alternative Methods of Testing for Obligation Risk
1993-10	Special Issues for Valuing Single Premium Group Annuity Contracts
1993-11	Special Issues Involving Structured Settlements
1993-12	Notification of Reserve Misstatement

**Practice Legal Note**

1993-L1	Wording for Actuarial Opinions
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**November 1993**

**GENERAL CONSIDERATIONS**

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*This practice note has not been promulgated by the Actuarial Standards Board or any other authoritative body of the American Academy of Actuaries. A "practice notes work group" was organized by the Committee on Life Insurance Financial Reporting of the American Academy of Actuaries and charged with developing a description of some of the current practices used by valuation actuaries in the United States. This committee was formed in 1992; changes were made to these notes to reflect additional information on current practices for 1993. At least one of the members of the work group has had direct experience relevant to the subjects of these practice notes. The practice notes represent a description of practices believed by the work group to be commonly employed by actuaries in the United States in 1993. However, no representation of completeness is made. Other approaches are no doubt in common use. The intention of the notes is to assist actuaries who are faced with the requirement of adequacy testing by supplying examples of some of the common approaches to this work. It should be recognized that the information contained herein is not binding on any actuary or organization, and is not, nor is it intended to be, a definitive statement of what constitutes generally accepted actuarial practice in this area.*

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**NOTE:** This practice note covers some possible answers to a number of different questions asked by and posed to members of the task force, which have not otherwise been covered in other practice notes.

**Q. What "current practices" are the practice notes based on?**

**A.** Since 1986, some actuaries have been performing cash flow tests for certain annuity and other interest sensitive lines of business under the requirements of New York Regulation 126. Many practices that have been developed were in response to this regulation. Reviews of these practices have been published from

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time to time. (e.g. "Proceedings of the Valuation Actuary Symposium", 1987).

Also, in 1990, the Actuarial Standards Board published Actuarial Standard of Practice No. 14 (ASOP No. 14) which required the actuary to do cash flow testing under certain circumstances. Since the release of ASOP No. 14, some regulators have required cash flow testing in order to show reserve adequacy. Practices developed because of this testing are also included as "current practices".

A survey was taken in early 1993 on the practices followed by appointed actuaries for year end 1992. This survey was jointly sponsored by the Society of Actuaries and the American Academy of Actuaries. There were 132 responses to this survey. Certain results from this survey were incorporated into the 1993 Practice Notes.

A "Postmortem 1992 Valuation Actuary Symposium" was held in June 1993. Approximately 70 actuaries attended. Additional surveys were taken at this seminar. Results of some of these surveys were also used to update the Practice Notes.

Comments from insurance regulators were also incorporated into the 1993 Practice Notes.

**Q. Are these practice notes expected to become a "standard" that actuaries must follow?**

A. Absolutely not. These practice notes document what is believed to be "current practice". There are a number of reasons an actuary would use methods other than those described in these practice notes. First, the appointed actuary is the one opining on the reserves, and he or she could be aware of special circumstances pertaining to a particular company or block of business. Also, an actuary may have developed better testing methods, and "current practice" may not have caught up with the improved method of testing.

Finally, the practice notes may not necessarily represent the total range of "current practice" in all areas. Each note was reviewed by actuaries familiar with the topic of the note, and these actuaries have concluded that the note represents approaches acceptable under current practice. Moreover, comments were solicited from the actuarial community. It is quite possible, however, that other

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approaches which are properly termed "current practices" were not documented.

**Q. How is an asset (reserve) adequacy analysis different from a solvency test?**

An asset adequacy analysis is a determination as to whether projected asset cash flows, together with projected premiums or considerations, are reasonably likely to cover projected liability cash flows. The assets included in this type of analysis include only assets backing the liabilities and do not include assets backing the surplus of the company. Also, no projection of new business is made. The main objective of the asset adequacy test is to determine whether the liabilities and reserves are deficient and an additional reserve would need to be established.

A solvency test is more inclusive than an asset adequacy analysis. All of the assets and liabilities of the company are included in a solvency test. Also, a projection of new business is usually included. The main objective of the solvency test is to determine whether the surplus of the company is sufficient to support the current operations of the company.

The NAIC Model Actuarial Opinion and Memorandum Regulation (the Model Regulation) in support of the Standard Valuation Law requires an actuary to opine, in certain circumstances, that "the reserves and related items, when considered in light of the assets held by the company with respect to such reserves and related actuarial items. . .make adequate provision, according to presently accepted actuarial standards of practice, for the anticipated cash flows required by the contractual obligations and related expenses of the company." The required opinion thus is an asset adequacy opinion on reserve adequacy, as opposed to a solvency opinion.

The actuary is not currently required by either the ASB's standards of practice or the model Standard Valuation Law (as of August 1, 1993) to test for solvency with regard to the actuarial opinion which is filed with the statutory annual statement. However, reserves are typically the largest liability of a life insurance company, so reserve adequacy testing is an important tool in assessing the health of life insurance companies.

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**Q. How long should the projection period be?**

A. Many actuaries use shorter projection periods for single-premium deferred annuities (SPDAs) than for structured settlements and immediate annuities. New York requires that all remaining policies in the short lines (deferred annuities and single-premium whole life (SPWL)) be forced to cash-surrender at the end of the 10 year projection, and assets to be sold as needed at the then-prevailing interest rates. Projections may also be done for longer periods, such as 20 years, since investment earnings may eventually fall to where they don't support guaranteed minimum interest rates in "down and die" scenarios.

**Q. What lines may be combined for purposes of cash flow testing?**

A. Generally, the appointed actuary opines on the adequacy of reserves in the aggregate. Thus, in theory, life insurance may be combined with annuities. More commonly, actuaries test the products by major business units. These business units may not necessarily represent statement lines of business. Aggregation may be done after the individual business units results are calculated. For example, long duration annuities (immediate annuities) and short duration annuities (SPDAs) are aggregated.

Some states, such as New York, may have different requirements. These state requirements may not allow aggregation across major lines of business.

The NAIC Model Regulation states that, if the aggregation is done after the line of business results are calculated, the results must have been developed using consistent economic scenarios or such results should be subject to mutually independent risks.

**Q. If lines of business are being aggregated, must the same projection period be used for all lines of business?**

A. Some actuaries use the same number of years to test all lines of business being aggregated. The typical test period appears to be 20 years. However, it is not a requirement that the same projection be used. Since products with cash values (life insurance and SPDAs) are generally of shorter duration than

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immediate annuities and structured settlements, it may be difficult to find a common projection period that produces meaningful results for each duration for all lines combined; therefore, some actuaries use different projection periods, depending on the line of business being tested.

**Q. Can the lines themselves be combined, or only the results?**

**A. Both methods currently are being utilized.**

When different projection periods are used, combining the lines may not make sense. Instead, some actuaries project each business unit separately and discount the excess of ending market value of assets less the ending present value of liabilities back to the projection date, in order to get comparable results to combine.

**Q. How may assets be allocated among the lines if cash flow testing is done separately for each line?**

**A. Regulations will normally require that any assets that are contractually allocated to a specific line for a special purpose (such as by reinsurance treaty or separate account) be allocated to that line for the cash flow testing. Beyond that, if the company has segmented the assets by line (officially or unofficially), then this allocation may represent a good place to start. However, to the extent that the actuarial opinion covers all lines of business, investments can be assigned differently, providing that the same asset is not used twice and the resulting liability rates (e.g annual crediting rates) are not distorted.**

Some companies maintain records of the years in which assets were purchased and the years in which the money was received under various contracts so the actuary may make use of these allocations to assign assets to liabilities.

Many actuaries feel it is important to maintain reasonable consistency from year to year in the method of allocating the assets to product lines. If a change in allocation is made, it may be useful to document the impact of the change on the adequacy test.

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**Q. What are acceptable criteria for adequacy?**

One criterion used by many actuaries is the estimated ending net market value, calculated by estimating the market value of assets at the interest rates in effect at the end of the scenario, and deducting the present value (at the same interest rates) of the remaining projected benefits and expenses. This gives the market value of ending surplus.

Some actuaries compare statutory values of assets and liabilities in determining reserve adequacy.

**Q. How may the discount rate be determined?**

A. There are currently several methods of determining a discount rate. The method suggested by members of the New York Insurance Department is to run a scenario, then rerun the scenario adding \$1000 of existing assets. The ratio of the ending differences can be used to determine the discount rate for that scenario.

There are other methods of determining a discount rate currently being used by actuaries. One is to use the after tax portfolio rate (i.e. the average investment earnings rate) used in each scenario. Another method is to use the one-year Treasury forward rates which are generated in each scenario. An alternative is to use the Treasury spot rate for the length of the projection period, e.g. 20 years, that is generated under each scenario.

**Q. Are extra reserves set up if any of the scenarios fails to meet the adequacy criterion?**

A. Not necessarily, although it is a possibility. Approximately 10% of those responding to the 1992 Valuation Actuary Survey reported that they increased reserves as a result of cash flow testing.

For sets of random scenarios, it would depend on what percent of scenarios are failed and by how much. As noted above, an actuarial test of reserve adequacy is not a solvency test. While a test of solvency would presumably require the passing of a very large percentage of scenarios, a reserve typically may be

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considered adequate as long as moderately adverse scenarios are passed.

At this time, there is no specific rule as to what percentage of random scenarios must be passed to determine reserve adequacy. In judging the results of a multi-scenario test, the actuary is prudent to bear in mind that the surplus that is generated by any scenario is subject to a number of assumptions used in the testing (e.g. investment strategy, interest crediting strategy, dynamic lapse formula, etc.). The liberalism or conservatism of these various assumptions influences the results.

Note: There are several insurance regulators who would like to have the failure of any of the basic 7 scenarios be disclosed in either the actuarial opinion or an executive summary to the actuarial memorandum.

**Q. Is it enough to verify that there are still sufficient assets at the end of the projection period only, or should intermediate points in time be checked also?**

A. The final wording of ASOP No. 22, *Statutory Statements of Opinion Based on Asset Adequacy Analysis by Appointed Actuaries for Life or Health Insurers*, removed all references to the checking of intermediate points. Such references had occurred in earlier drafts. Thus, according to ASOP No. 22, a reserve adequacy test does not require that intermediate points be checked. Moreover, such tests involve projected cash flows. The projection of intermediate statutory reserves is not required by the standard.

Some actuaries feel it is useful to look at intermediate cash flows to assure that any negative cash flows could potentially be funded from company resources or by borrowing.

Poor performance at intermediate points in time may have an impact on the choice of assumptions beyond that point in time. For example, a string of years with substantial statutory losses may influence future excess lapse assumptions. Some actuaries use the results of intermediate years to see if the situation is so bad that a lapse-mortality spiral could occur, resulting in the need to increase reserves.

Other actuaries point out that surplus is normally available to cover statutory

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shortfalls in intermediate years. Such surplus is not reflected in reserve adequacy tests; therefore, some level of imbalance at intermediate points may be tolerated, particularly on a line of business basis.

Of the 132 actuaries who responded to the survey on 1992 practices, 84% looked at intermediate results. This could have been partly in response to some regulators' requests that book and market surplus at intermediate points be checked. For example, for year-end 1992, the California Insurance Department requested that the results of intermediate years be shown. Some actuaries felt this was a request for solvency testing, not reserve adequacy testing. If a regulator asks for tests which go beyond asset adequacy testing of the reserve, some actuaries separate such additional tests from the tests which are made to support the appointed actuary's required opinion on reserve adequacy.

**Q. If, based on the asset adequacy tests, the reserves are judged to be inadequate, how does the actuary decide the amount of additional reserves required?**

A. One method is to experiment with projections based on progressively greater amounts of starting assets. When a level that produces satisfactory results is found, reserves are strengthened to this level.

Note: the Model Regulation allows for a three-year grade-in of any additional reserves required. However, some states may require the additional reserves to be put up immediately.

**Q. If additional reserves are to be set up, does the reserve increase go through the gain from operations or is it booked directly to the surplus of the company?**

A. In 1992, actuaries chose to put up the additional reserves in several different ways (e.g., in Exhibit 8 as a separate line, in Exhibit 8 as part of the basic reserves for the product, or in Exhibit 10). Some actuaries included the reserve increase in the net gain from operations calculation; some booked the reserve increase directly to surplus.

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In 1993, there will be a separate line for additional reserves established due to cash flow testing. The July 1993 draft of the proposed revision of the NAIC Accounting Procedures Manual states that these extra reserves would flow through surplus.

**Q. Since it is nearly impossible to wait for year-end data and then get the opinion completed by the end of February, may the actuary use data from prior valuation periods for the purpose of the year-end opinion?**

**A. ASOP No. 22 allows data prior to year-end to be used in the testing provided that significant changes have not occurred.**

Approximately one half of the actuaries who responded to the 1992 survey of Valuation Actuaries based their testing on earlier than December 31, 1992 results. These actuaries reconciled with annual statement year-end numbers, but used the earlier (generally 9/30/92) results if there was not a material change between that date and the end of the year. Some actuaries update results for the actual end-of-year yield curve, since this can have a major impact.

There were several regulators who were not in favor of using numbers other than year-end numbers in the testing. This is because the annual statement numbers are the numbers that they have readily available, and it is on these numbers that an actuary is opining. These regulators did mention that they were particularly concerned with companies which actively traded their asset portfolios. They would prefer to grant extensions past the March deadline for those who could not complete the testing in that time frame. They did suggest that sensitivity testing could be performed earlier in the year, as long as these results could be reconciled to year-end numbers.

**Q. How are shareholder dividends treated in asset adequacy testing?**

**A. This question was asked in a survey on the 1992 asset adequacy testing. About 20% mentioned that shareholder dividends were used in the testing. Some mentioned that this was not applicable to their company, because they were a mutual company.**

Some actuaries said that it was not necessary to reflect shareholder dividends,

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**November 1993**

since this is a function of surplus, which is not part of reserve adequacy testing. Other actuaries pointed out that there are times when the payment of shareholder dividends is a necessity for business, e.g., when required by the terms of an acquisition. Still others viewed shareholder dividends as any other expense which must be paid.

Some actuaries stated that shareholder dividends would be paid where surplus was above the target surplus. Other actuaries based the assumed payout on company experience or plan projections. Other formulas included a constant percent of statutory gains, or a level X basis-points-a-year charge.

**Q. How are policyholder dividends treated in asset adequacy testing?**

A. Most actuaries treat policyholder dividends similar to interest credited on SPDAs or universal life. They start with the current dividend scale, and may update this scale periodically for changes which would be made to dividends due to changes in the interest rates, expenses, etc. Because companies declare dividends for a year at a time, a number of actuaries build in a lag factor to any dividend changes.

**Q. With regard to the actuarial opinion, what determines whether a reserve is in the "formula reserve," "additional reserve," or "other amount" columns of the reserve table that appears in the scope paragraph of the opinion?**

A. The NAIC Model Regulation contains a reserve table which gives the format for listing reserves that are to be included in the opinion. However, other than the headings on the columns, it does not explicitly describe what should go into each column. One way to prepare this table is as follows:

Column (i) Formula reserves - This is only for formula reserves which were subject to asset adequacy analysis. Obviously formula reserves consist of reserves determined through a statutory formula. However, it also includes any reserves that do not have a specified statutory reserve formula but are calculated by a standard methodology or procedure each year.

Column (ii) Additional reserves - This would be the amount of any additional reserve above the formula reserve that is being held due to the results of the

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asset adequacy analysis. Section 5E of the Model Regulation addresses this issue.

Column (iii) Analysis method - This is the method used for asset adequacy analysis. The appointed actuary may need to list more than one method for each line in the table, with the corresponding reserve amounts for each method. The appointed actuary may refer to ASOP Nos. 14 and 22 in doing this.

Column (iv) Other amount - This is for the reserves that were not asset-adequacy analyzed. (One common reason for not analyzing certain business is because it is de minimis).

Column (v) Total amounts - the total of columns (i), (ii) and (iv).

**Q. In what ways did the regulators feel that the 1992 opinions and memoranda could be improved?**

**A.** A group of actuarial insurance regulators reviewed some of the 1992 opinions and memoranda during the June 1992 NAIC meeting. Some of the areas they identified as requiring improvement are as follows:

1. Reliances: some opinions and memoranda were not clear as to who developed, and took responsibility for, certain assumptions. (See Practice Note 1993-3 regarding new NAIC rules on data reliance).
2. Assumption details: Insufficient details and technical analysis were provided.
3. Reinsurance: there were several cases where reinsurance assumed or ceded did not appear to be adequately modelled.
4. Off-balance-sheet items: Some actuaries did not model off-balance-sheet items.

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5. Sensitivity testing: Some actuaries either did not perform sensitivity testing, or did not include the results in the memorandum.

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Comments are welcome as to the appropriateness of the practice notes, desirability of annual updating, substantive disagreements, etc. They should be sent to Donna Claire at her Directory address.

**PRACTICE NOTE 1993-2**  
**November 1993**

**PROCEDURES TO FOLLOW IN ACCEPTING OR RESIGNING THE POSITION OF  
APPOINTED ACTUARY FOR LIFE OR HEALTH INSURERS IN THE UNITED STATES**

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**ACCEPTING AN APPOINTMENT**

**Q. What is the source of information regarding procedures that an actuary may follow in accepting or resigning a position as appointed actuary?**

**A.** Since the concept of appointed actuary is relatively new in the United States, there are not many "current practices" which have developed on this subject in the U.S. Some of the suggestions contained in this practice note are based on procedures established by the Canadian Institute of Actuaries, based on concepts codified in Canadian law, which differs in significant respects from U.S. law. Some of the information in this practice note is based on the Codes of

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**November 1993**

Professional Conduct of the various U.S. organizations representing actuaries.

**Q. What information may the appointed actuary wish to obtain from the previous appointed actuary?**

A. Prior to accepting the position as appointed actuary, the actuary may feel it prudent to meet with the most recent appointed actuary of the company to review: (1) reasons for the termination of the status as appointed actuary; (2) the most recent opinion and supporting memorandum and the supporting documentation. This will permit the actuary to become informed of any items of concern to the previous appointed actuary (e.g., inadequate access to management or the Board of Directors, the qualifications of the persons or firms providing major reliance, adverse scenarios in the cash flow testing performed, etc.).

**Q. What is the relationship between the appointed actuary and the Board of Directors?**

A. The NAIC's model Actuarial Opinion and Memorandum Regulation (the Model Regulation) states that the appointed actuary shall be chosen by either the Board of Directors or by its authority through an executive officer of the company.

Prior to accepting the position as appointed actuary, the actuary may wish to determine whether the following conditions will exist:

1. The actuary will be permitted to appear before the Board of Directors to present the statement of actuarial opinion and supporting memorandum, if the actuary wishes to do so;
2. If the statement of actuarial opinion and supporting memoranda is presented to the Board by a person other than the appointed actuary, there is assurance that the opinion and supporting memoranda will be presented in their entirety, not amended or edited by a third party;
3. The actuary will be permitted to meet with the Board of Directors at such other times as the actuary believes necessary in order to communicate problems which may emerge between the annual statements of actuarial opinion;

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4. The actuary will have access to information, records, and members of company management as necessary to perform the duties of the appointed actuary;
5. The Board of Directors will agree to keep the actuary informed of certain transactions or conditions specified by the actuary via some agreed-upon process (e.g., attendance at Board Meetings, copies of Board minutes and agendas);
6. The resources required to fulfill the actuary's duties (e.g., electronic data processing, support staff) will be made available;
7. The Board (or its delegate) agree to make available such persons or officers as may be identified by the actuary to be used in reliance (e.g., investment officer, administrative officer). If the contemplated persons or firms refuse to be relied upon or are found to be unqualified, then the actuary will be permitted to consult with the Board of Directors regarding alternative resources.

**Q. What is the relationship between the appointed actuary and those the actuary is relying on?**

A. Prior to accepting the position of appointed actuary, or as soon as possible thereafter, the actuary may wish to meet with the persons or firms intended to be used as reliance. In placing reliance, the actuary should be mindful of Actuarial Standard of Practice No. 22, *Statutory Statements of Opinion Based on Asset Adequacy Analysis by Appointed Actuaries for Life or Health Insurers*, subsection 6.3; Sections 7(B)5 and 8(B)5 of the Model Regulation, and ASOP No. 23, *Data Quality*. See also Practice Note 1993-3 on Reliance upon Third Parties.

**Q. What documentation may be provided with regard to the appointed actuary's personal qualifications?**

A. Prior to accepting the position of appointed actuary, the actuary may wish to document his or her qualifications. These include issues addressed in the

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*Qualification Standards for Public Statements of Actuarial Opinion*, adopted by the American Academy of Actuaries.

In addition to those requirements, the actuary may wish to document his or her personal breadth and depth of knowledge regarding the products, markets and strategies of the particular company, and in doing so identify areas where support or reliance may be needed to allow the performance of his or her duties as appointed actuary. For further discussion of reliance on third parties, see Practice Note 1993-3.

The actuary may wish to document how his or her continuing education requirements were met for the year.

**Q. What are the considerations regarding late appointments?**

A. Special concerns are appropriate if the appointment is made late in the year, and the ability of the actuary to carry out the duties in a timely manner in order to form an unqualified opinion is thereby endangered.

Prior to accepting the position of appointed actuary, the actuary may wish to inform the Board of Directors (or its delegate) of any such concerns.

**Q. How should an actuary acknowledge the appointment as appointed actuary?**

A. ASOP No. 22 requires the actuary to acknowledge acceptance of appointment as appointed actuary in writing. The acceptance letter may record the issues (and agreements reached) which are addressed in the previous sections of this Practice Note.

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**November 1993**

**RESIGNING AN APPOINTMENT**

**Q. What are some possible causes for resigning an appointment?**

A. There are normal causes for resignation, such as job transfer or retirement. If the conditions agreed upon with the Board of Directors (or its delegate) before appointment may not be fulfilled, or if subsequent needs arise to which the Board of Directors does not agree, or which may not be fulfilled, the appointed actuary may wish to inform the Board and try to rectify the situation. If the appointed actuary determines that rectification will not take place to the appointed actuary's satisfaction, the appointed actuary may wish to resign the position.

**Q. How should the resignation by the appointed actuary be documented?**

A. ASOP No. 22 requires the resignation to be in writing. The actuary may wish to record the reason for resignation in a memorandum to the Board of Directors.

If and when an appointed actuary is replaced by another appointed actuary, the Model Regulation requires that the company notify the Insurance Commissioner and "give reasons for replacement."

**Q. What will the appointed actuary's relationship be with successor appointed actuaries?**

A. The resigning actuary may wish to meet with the proposed successor and provide copies of the most recent actuarial opinions and supporting memoranda and related work papers, to enable the proposed successor to fulfill his or her duties. The resigning actuary may wish to discuss any concerns with the proposed successor at that time. Such communications may be required by law,

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**November 1993**

regulation, actuarial standards of practice, or the Code of Professional Conduct. If the resigning actuary is a consulting actuary, he or she may charge market rates to perform this work.

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**SPECIAL ISSUES FOR VALUING SINGLE PREMIUM GROUP ANNUITY CONTRACTS**

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**Q. What mortality assumptions can be used for single premium group annuities?**

A. When doing cash flow testing, projections of future mortality improvement (ideally, generational mortality) may be incorporated. Note: Currently, an updated Group Annuity Mortality Table is under development by the Society of Actuaries. At this time, it is anticipated that this table will incorporate generational mortality.

If credible, a company's own mortality experience may be considered when determining the assumptions for liability projections.

**Q. What ancillary benefits are appropriate to consider in testing?**

A. There are a number of ancillary benefits that may be considered when developing cash flow testing. These include: early retirement benefits (usually subsidized), pre-retirement joint-and-survivor benefits, special death benefits, and other types of ancillary benefits which are often provided under terminal funding (or "closeout") contracts.

Liability cash flow projections can make provision for these type of benefits, both in timing and amounts. One method of developing these assumptions is to use the pricing assumptions for these ancillary benefits. If these ancillary benefits have a substantial impact on results, sensitivity testing of the assumptions may be appropriate.

**Q. What are special considerations for annuities under participating contracts?**

A. Because of the wide variety of types of contractual arrangements, different methods of cash flow testing and modeling may be appropriate for different companies and contracts. The actuary may wish to examine the nature of the guarantees when determining methods and assumptions for cash flow testing these types of liabilities.

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If the annuities are fully guaranteed by the insurance company and the plan sponsor/contractholder is not obligated to deposit additional funds in the future to support the annuities (typical of IPG contracts), it may be appropriate to treat these annuities as though they are non-participating annuities in cash flow testing.

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**PRACTICE NOTE 1993-3**  
**November 1993**

**RELIANCE UPON THIRD PARTIES**

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**Q. May the appointed actuary rely upon the company's auditor for the substantial accuracy of records and information?**

**A. Subsection 7(B)5 and 8(B)5 of the NAIC Model Actuarial Opinion and Memorandum Regulation (the Model Regulation) offer, as an alternative, the following sentence as recommended language for the actuarial opinion:**

**"I have relied upon [name of accounting firm] for the substantial accuracy of the inforce inventory and information concerning the liabilities. . ."**

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However, a Notice to Practitioners dated February 1991 from the American Institute of Certified Public Accountants (AICPA) states in part:

"The auditor should not consent to be referred to in an actuarial opinion in which the actuary expresses reliance on the auditor for the accuracy of the underlying data. If the auditor becomes aware that an actuary has expressed such reliance on the auditor, the auditor should advise the actuary that he or she does not consent to such reference, and the auditor should consider other actions that may be appropriate and may also wish to consult with legal counsel."

**Q. On whom may the appointed actuary rely for substantial accuracy of records and information?**

A. The Model Regulation allows the actuary to rely on company officers and investment managers. A statement from those relied upon, stating what information and assumptions were provided by that person, must be attached to the actuarial opinion and actuarial memorandum. A suggested form for this statement is given in Instruction No. 7 to the annual statement for 1994 (see below). Some actuaries intend to use this form for 1993.

The actuary should be aware, however, that both ASOP No. 22, *Statutory Statements of Opinion Based on Asset Adequacy Analysis by Appointed Actuaries for Life and Health Insurers*, and ASOP No. 23, *Data Quality*, contain specific requirements governing appointed actuaries' obligations to satisfy themselves that data and analyses provided by third parties are reasonable and consistent. The actuary should become familiar with these obligations, and should comply with the standards when relying upon third parties for data or analysis.

Of course, the actuary has the option of personally reviewing the underlying basic records himself or herself. In that case, recommended language is presented in Sections 7(B)4 and 8(B)4 of the Model Regulation. Some actuaries are reluctant to take this responsibility unless they are also qualified auditors.

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**Q. What other tests of data reliability must the actuary perform?**

A. Beginning with the 1994 annual statement, the actuary will be required to state that certain inforce claim and asset information from the valuation model reconciles to certain annual statement totals. The Annual Statement Instruction No. 6 (see below) gives suggested language for the actuarial opinion reflecting this reconciliation.

The external auditors will also be required to extend their audit procedures to the same annual statement figures. In the event that an auditor should find a material error in those annual statement figures, the auditor must inform the actuary of the problem and the actuary must decide whether there is a material effect on reserves. In this way, the regulators can be assured that the actuary has relied on data that an outside auditor has reviewed. The AICPA is considering requiring as part of the audited statement a Supplemental Schedule of Assets and Liabilities that would contain all the totals to which the appointed actuary must reconcile.

This Supplemental Schedule (see below) contains a complete list of annual statement items which must be reconciled. Only the information actually used by the actuary in the valuation needs to be reconciled to the statement. If, for instance, an actuary does not perform cash flow testing in the valuation, reconciliation of asset figures would not be necessary.

Although this schedule will not be in the 1993 annual statement, some actuaries are intending to use this schedule in 1993 as a checklist as to what items need to be reviewed.

**Q. Under what circumstances must claim figures be reconciled to Schedule O?**

A. Part 1 of Schedule O is only completed for those lines of business for which claim runout data are used to establish claim reserves. This is always the case for group and individual health insurance. Certain large companies may use this process for other lines of business as well (e.g., individual life and group life). In that case, a separate table for those lines of business need to be included for Schedule O, Parts 1 and 2.

**PRACTICE NOTE 1993-3**  
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The intent of the statement instruction is that the schedule should be completed even if the data is used only for a part of the reserve (e.g. the reserve for claims submitted more than 15 days after the closing date of the statement.)

**Q. Is this reconciliation all that an actuary must do to satisfy the requirement of ASOP No. 22?**

A. While this reconciliation provides general satisfaction that the data is reasonable, the division of data among important subsets can have a material effect on reserves. Accordingly, many actuaries make more detailed tests than are required by the annual statement instructions.

**PRACTICE NOTE 1993-3**  
**November 1993**

**A Attachment No.1<sup>1</sup> to Practice Note 1993-3 - Reliance on Third Parties**

**Annual Statement Instructions - Actuarial Opinion**

**6. The scope paragraph should include a paragraph such as the following regarding data used by the actuary in forming the opinion:**

**"In forming my opinion on [specify types of reserves] I relied upon data prepared by [name and title of company officer(s) certifying in-force records and/or other data] as certified in the attached statements. I evaluated that data for reasonableness and consistency. I also reconciled that data to [Exhibits and Schedules to be listed as applicable\*] of the company's current annual statement. In other respects, my examination included such review of the actuarial assumptions and actuarial methods used and such tests of the calculations as I considered necessary."**

**\*A complete list of all schedules and exhibits should be included in the Annual Statement Instructions. See Attachment 3.**

**7. There shall be attached to the actuarial opinion a statement(s) by the company officer(s) who prepared the underlying data similar to the following:**

**"I, [name of officer], [title], of [name of company] hereby affirm that the listings and summaries of policies and contracts in force as of December 31, 19 , and other liabilities prepared for and submitted to [name of appointed actuary] were prepared under my direction and, to the best of my knowledge and belief, are**

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<sup>1</sup> Source: Proposed amendments to the NAIC Life and Accident & Health Annual Statement Instructions (Approved by NAIC Blanks Task Force, October 1993).

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substantially accurate and complete and are the same as, or derived from, the in-force records and other data which form the basis for the annual statement(s)."

"I, [name of officer], [title], of [name of company], hereby affirm the listings, summaries, and analysis relating to data prepared for and submitted to [name of appointed actuary] in support of the asset-oriented aspects of the opinion were prepared under my direction and, to the best of my knowledge and belief, are substantially accurate and complete and the same as, or derived from, the records and other data which form the basis for the annual statement(s)."

Attachment No. 2<sup>2</sup> to Practice Note 1993-3 - Reliance on Third Parties

Annual Statement Instructions - Annual Audited Financial Reports

The following should be included in the modification to paragraph 9 "Scope of Examination and Report of Independent Certified Public Accountant."

"The supplemental information should be included as a schedule to the audited annual statutory financial statements. The auditor should issue a report on the supplemental information as to whether the information is fairly stated in relation to the financial statement taken as a whole. (The auditor should refer to Au Section 551.)"

In the above paragraph, the supplemental information represents a schedule listing the items to which the auditor has extended its procedures to.

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<sup>2</sup> Source: adapted from proposed amendment to paragraph 9 (see footnote 1).

**PRACTICE NOTE 1993-3**  
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Attachment No. 3<sup>3</sup> to Practice Note 1993-3 - Reliance on Third Parties

Example Insurance Company  
Supplemental Schedule of Assets and Liabilities - December 31, 199X

**INVESTMENT INCOME EARNED**

Government bonds	XXXXXX
Other bonds (unaffiliated)	XXXXXX
Bonds of affiliates	XXXXXX
Preferred stocks (unaffiliated)	XXXXXX
Preferred stocks of affiliates	XXXXXX
Common stocks (unaffiliated)	XXXXXX
Common stocks of affiliates	XXXXXX
Mortgage loans	XXXXXX
Real estate	XXXXXX
Premium notes, policy loans and liens	XXXXXX
Collateral loans	XXXXXX
Cash on hand and on deposit	XXXXXX
Short term investments	XXXXXX
Other Invested Assets	XXXXXX
Financial options and futures	XXXXXX
Aggregate write-ins for investment income	<u>XXXXXX</u>
Gross investment income	<u>XXXXXX</u>

**ASSETS**

<b>Real Estate Owned (Schedule A - Part 1)</b>	<u>XXXXXX</u>
<b>Mortgage Loans by Type - Book Value (Schedule B - Part 1)</b>	
Farm mortgages	XXXXXX
Residential mortgages	XXXXXX
Commercial mortgages	<u>XXXXXX</u>
Total mortgage loans by type	<u>XXXXXX</u>

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<sup>3</sup> (see footnote on preceding page.)

**PRACTICE NOTE 1993-3**  
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Attachment No. 3 to Practice Note 1993-3 - Reliance on Third Parties(continued)

**Mortgage Loans by Standing - Book Value (Schedule B - Part 2)**

Good standing	XXXXXX
Good standing with restructured loans	XXXXXX
Interest overdue more than three months	XXXXXX
Foreclosure in process	<u>XXXXXX</u>
Total mortgage loans by standing	<u>XXXXXX</u>

Attachment #3 to Practice Note 1993-3 - Reliance on Third Parties (continued)

**Other Long Term Assets - Statement Value (Schedule BA)**

XXXXXX

**Collateral Loans (Schedule C)**

XXXXXX

**Bonds & Stocks of Parents, Subsidiaries and Affiliates - Book Value (Schedule D)**

Bonds	XXXXXX
Preferred Stocks	XXXXXX
Common Stocks	<u>XXXXXX</u>
Total	<u>XXXXXX</u>

**Bonds by Maturity - Statement Value (Schedule D - Part 1)**

Due within 1 year or less	XXXXXX
Over 1 year through 5 years	XXXXXX
Over 5 years through 10 years	XXXXXX
Over 10 years through 20 years	XXXXXX
Over 20 years	<u>XXXXXX</u>
Total by maturity	<u>XXXXXX</u>

**Bonds by Class - Statement Value (Schedule D - Part 1)**

Class 1	XXXXXX
Class 2	XXXXXX
Class 3	XXXXXX
Class 4	XXXXXX
Class 5	XXXXXX
Class 6	<u>XXXXXX</u>
Total by class	<u>XXXXXX</u>

**PRACTICE NOTE 1993-3**  
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Attachment No. 3 to Practice Note 1993-3 - Reliance on Third Parties(continued)

Total Bonds Publicly Traded (Schedule D - Part 1)	<u>XXXXXX</u>
Total Bonds Privately Placed (Schedule D - Part 1)	<u>XXXXXX</u>
Preferred Stocks - Statement Value (Schedule D - Part 2)	<u>XXXXXX</u>
Common Stocks - Market Value (Schedule D - Part 2)	<u>XXXXXX</u>
Short Term Investments - Book Value (Schedule DA - Part 1)	<u>XXXXXX</u>
Financial Options Owned - Statement Value (Schedule DB - Part A)	<u>XXXXXX</u>
Financial Options Written & In Force - Stmt Value (Sch. DB - Pt B)	<u>XXXXXX</u>
Financial Futures Contracts Open - Contract Price (Sch. DB - Pt C)	<u>XXXXXX</u>
Cash on Deposit (Schedule E)	<u>XXXXXX</u>

**INFORCE**

<b>Life Insurance In Force</b>	
Industrial	<u>XXXXXX</u>
Ordinary	<u>XXXXXX</u>
Credit Life	<u>XXXXXX</u>
Group Life	<u>XXXXXX</u>
<b>Accidental Death Insurance In Force</b>	<u>XXXXXX</u>
<b>Disability Insurance In Force</b>	
Industrial	<u>XXXXXX</u>
Ordinary	<u>XXXXXX</u>
Credit Life	<u>XXXXXX</u>
Group Life	<u>XXXXXX</u>
<b>Supplementary Contracts In Force</b>	
Ordinary - Not Involving Life Contingencies	
Amount on Deposit	<u>XXXXXX</u>
Income Payable	<u>XXXXXX</u>
Ordinary - Involving Life Contingencies	

**PRACTICE NOTE 1993-3**  
**November 1993**

**Attachment No. 3 to Practice Note 1993-3 - Reliance on Third Parties(continued)**

Income Payable	<u>XXXXXX</u>
Group - Not Involving Life Contingencies	
Amount on Deposit	<u>XXXXXX</u>
Income Payable	<u>XXXXXX</u>
Group - Involving Life Contingencies	
Income Payable	<u>XXXXXX</u>
<b>Annuities - Ordinary</b>	
Immediate - Amount of Income Payable	<u>XXXXXX</u>
Deferred - Fully Paid Account Balance	<u>XXXXXX</u>
Deferred - Not Fully Paid - Account Balance	<u>XXXXXX</u>
<b>Annuities - Group</b>	
Amount of Income Payable	<u>XXXXXX</u>
Fully Paid Account Balance	<u>XXXXXX</u>
Not Fully Paid - Account Balance	<u>XXXXXX</u>
<b>Accident and Health Insurance - Premiums In Force</b>	
Ordinary	<u>XXXXXX</u>
Group	<u>XXXXXX</u>
Credit	<u>XXXXXX</u>
<b>Deposit Funds and Dividend Accumulations</b>	
Deposit Funds	<u>XXXXXX</u>
Dividend Accumulations	<u>XXXXXX</u>
<b>Claims Payments 199X (Schedule O)</b>	
Group Accident and Health	

**PRACTICE NOTE 1993-3**  
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**Attachment No. 3 to Practice Note 1993-3 - Reliance on Third Parties(continued)**

199X	<u>XXXXXX</u>
199X - 1	<u>XXXXXX</u>
199X - 2	<u>XXXXXX</u>

**Other Accident and Health**

199X	<u>XXXXXX</u>
199X - 1	<u>XXXXXX</u>
199X - 2	<u>XXXXXX</u>

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The members of the work group are Donna R. Claire, chairperson; Arnold A. Dicke, Douglas C. Doll, Craig F. Likkell, Linn K. Richardson, Henry W. Siegel, Steven A. Smith, Charles N. Vest, and Michael L. Zurcher.

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**INTEREST RATE MODELS**

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**Q: What approaches to modeling interest rates are included in current actuarial practice?**

**A:** Approaches currently used to represent interest rates in actuarial models may be broadly categorized as deterministic and stochastic. The most familiar deterministic approach is a single interest rate model, in which projections are made and present values are calculated using a single interest rate. A slight generalization of this approach is the single scenario method, in which a series of interest rates are used for future years, such as one rate for 15 years and another rate thereafter. A second deterministic approach is the multiple fixed scenario method. In this approach, several scenarios (series of future interest rates) are used. An example of this approach is the "New York Seven" scenarios, which are

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required for filings under New York Regulation 126. These are also the basic seven scenarios stated in the NAIC Model Actuarial Opinion and Memorandum Regulation (the Model Regulation). The multiple fixed scenario method can be further generalized by constructing yield curve scenarios (series of future yield curves).

Stochastic methods generally fall into two categories: random scenario models and option pricing models. Random scenario models generate scenarios of future interest rates or yield curves by applying a random number generator to one or more probability distributions. The interest rate or yield curve for each period is generated from the probability distribution and based on the interest rates that apply to the previous period. In this way, a full set of interest rates for all future periods is developed. This interest rate scenario is used to determine the magnitude of cash flows (if interest sensitive) and to discount them to a valuation date. A number of such scenarios and the corresponding present values of the cash flows are developed. Option pricing models use a somewhat different approach. They too are based on an interest rate model, but the model is typically applied to asset and/or liability cash flows to produce an option-adjusted present value. The behavior of this value with respect to incremental changes in the initial yield curve is then studied. Option pricing models do not necessarily produce values for individual underlying scenarios.

**Q: Which of these approaches are appropriate if cash flow testing is required?**

**A:** A cash flow test is an adequacy test which involves sensitivity testing of the interest rate model. Since stochastic models are based on a range of values for interest rates, this requirement is met if a sufficient number of scenarios are used. Sensitivity testing involves the examination of variations in the results of a test as one or more of the assumptions are varied. In order to test sensitivity to the interest rate model, the results of individual scenarios may be examined. Thus, option pricing models are not typically used for cash flow testing unless the models produce values for each distinct underlying scenario. The multiple fixed scenario method is in effect a sensitivity test for the single scenario method, and so is appropriate. Application of a single scenario deterministic model would generally not be considered to constitute adequate cash flow testing.

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**Q. Is there any time when a single interest rate scenario path may be appropriate?**

A. If interest rate involvement is not a critical variable, such as short-term health insurance backed by short-term assets, then a single interest rate scenario with multiple "other assumption" scenarios is the approach used by some actuaries.

**Q: What considerations guide the use of the multiple fixed scenario method?**

A: The usefulness of the multiple fixed scenario method depends on the range of scenarios used. Normally, practitioners utilize scenarios representing a number of significantly different future interest rate environments. These environments typically differ by level of interest rate and by rate and direction of change of interest rates. Also, yield curve inversions are frequently represented. The range of scenarios includes moderately adverse interest rate environments.

**Q: Are any scenario sets in common use?**

A: The most commonly used set of deterministic scenarios is the so-called "New York Seven" scenarios, required for submissions under that state's Regulation 126. These scenarios are actually redetermined each year so that the initial values can be set to equal current interest rates. A common practice is to extend the New York Seven approach to yield curves, and to add scenarios in which inversions are assumed to occur.

In the current interest rate environment, the floor of 4% which was in Regulation 126 until 1992 was considered inappropriate by many practitioners. Both the Model Regulation and New York Regulation 126 now state that the minimum interest rate should reflect the low interest rates in effect in 1992 by flooring the interest rate at one half of the starting 5 year Treasury rate.

Regulation 126 also sets a maximum interest rate of 25%. This maximum is commonly used by actuaries, although some actuaries also feel that some scenarios which reach interest rates higher than the Regulation 126 maximum should be considered, especially when the current interest rates are high. The Model Regulation does not specify any maximum interest rates.

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In the survey of what actuaries did for year-end 1992 asset adequacy testing, 29% tested just the basic 7 scenarios. Another 29% tested the basic 7 scenarios plus 1 to 3 inverted yield curve scenarios. Approximately 40% of the actuaries tested under more than 10 scenarios; some of those used stochastically generated scenarios in addition to the basic 7 scenarios.

Some actuaries develop their own scenarios for use in forming their opinion regarding adequacy, and look to the "New York Seven" as part of their sensitivity testing.

**Q: What meaning can be attached to the mean of the results under multiple deterministic scenarios?**

A: Some regulators believe that no meaning can be attached to an average over scenarios chosen in such a manner, because the fact that a certain portion of the scenarios have produced satisfactory results gives no information about the statistical likelihood that a satisfactory result will occur.

**Q: What types of random scenario models are included in current actuarial practice?**

A: There are several types of random scenario models commonly used. One type of model uses binomial lattice to predict future rates. Another method is to use a Monte Carlo approach to calculate period-to-period changes in interest rates. Sometimes, changes in long-term and short-term rates are calculated separately (i.e., using distinct distribution functions) and an interpolation procedure is used to approximate a yield curve. The standard deviation of the distribution is called the volatility.

**Q: What distribution functions are commonly used by actuaries?**

A: The lognormal distribution is commonly used currently. Such a distribution, with quarterly volatility of around 16% for short-term rates and 8% for longer-term rates, is believed by many actuaries to validate reasonably to recent Treasury yield curves. However, some recent research indicates other distributions may be preferable. A source of information on this subject is found in a report by David

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Becker, entitled "Statistical Tests of the Lognormal Distribution as a Basis for Interest Rate Changes" in the Transactions of the Society of Actuaries, Volume XLIII (1991), page 7. A description of the lognormal distribution is found in the Proceedings of the Valuation Actuary Symposium, 1987, p. 22, and 1991, p. 540.

**Q: What is reversion to the mean?**

**A:** Reversion to the mean is a tendency, built into a model, for random values to move toward a target value (mean) as the number of trials increases. For random scenario models, this is accomplished by modifying the output of the sampling procedure, perhaps by multiplying by a reversion factor which, in turn, is a function of a parameter called the "strength" of mean reversion. If the strength is zero, no mean reversion occurs; if it is unity, the interest rate is set to the target value. The reversion factor may be a function of the difference between the random value and the target value. At this time, there does not appear to be a substantial amount of research into choosing the proper value for a target value.

**Q: When is reversion to the mean used by actuaries?**

**A:** Actuaries sometimes use reversion to the mean to control the variations in interest rates produced by the Monte Carlo approach. For example, a reasonable proportion of the scenarios may be expected to include "pop-up" events at a frequency of, say, 5% or more, but such events should not occur in every scenario. Reversion can control this effect.

**Q: How should an interest rate model be validated?**

**A:** Normally, an interest rate model will revolve around the current yield curve. Moreover, for random scenario models, the volatility typically will fall within the range observed in recent history. The frequency of inversions should also be considered in validating the interest rate model in most instances (cf. D. Becker, Profits and Rewards, 10/91, p. 6).

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**Q: Are models ever used which violate the validation requirements?**

A: Yes. Such models may be used for sensitivity tests and other purposes. For example, some practitioners set the mean of the "change" random variable to a level that will cause a large number of scenarios to fall in the regions that are expected to produce less acceptable results.

**Q. What does "yield curve normalization" mean?**

A. A number of actuaries surveyed said that the yield curve was abnormally steep at the end of 1992, i.e., the short-term rates were abnormally lower than long-term rates. Therefore, a number of actuaries changed the yield curves tested so that the yield curve would be "normal" (i.e., less steep) after a period of years, typically 2 years. The actuarial regulators represented on the Life and Health Actuarial (Technical) Task Force appear to favor testing scenarios which show normalization whenever the starting yield curve has an abnormal shape, either flat, inverted or unnaturally steep.

**Q: How many random scenarios are sufficient?**

A: Given the complexity of interest rates, a definitive answer cannot be given. Currently, some practitioners use from 40 to several thousand scenarios. The accuracy of the estimate of the possible range of surplus for the business being tested can be expected to increase with the square root of the number of scenarios. Testing the improvement gained from additional scenarios in a given situation may be useful. Some practitioners examine the scenario set to assure the presence of a significant number of scenarios of the kind thought most likely to produce less acceptable results.

**Q: If some elements of a set of random scenarios are clearly unreasonable, can these be ignored or replaced?**

A: Practitioners generally resist this practice. First, throwing out selected scenarios in a random sample destroys the randomness of the sample. In addition, recent history is not a safe guide to what is "reasonable": most actuaries in the 1970s never expected the high interest rates of the early 1980s, and most

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actuaries in the 1980s did not expect the low interest rates we see today. However, if the set as a whole seems to be "too wild" or "too tame," or "too sparse in inversions," then many actuaries would consider modifying the parameters and generating another set.

**Q: Does current actuarial practice include the use of option-pricing models for reserve adequacy testing?**

**A:** Option-pricing models have been used for pricing and profitability testing of insurance and annuity products. Research is currently being conducted by the Society of Actuaries in the hope of extending their applicability to reserve adequacy testing. Normally, option-pricing models are constructed to estimate market values of options. In order to use option-pricing models for reserve testing, it is necessary to take account of the book-value orientation of statutory accounting.

**Q: What considerations govern the use of option-pricing models for reserve adequacy testing?**

**A:** It is prudent to check option-pricing models for internal consistency -- for example, to avoid the possibility of risk-free arbitrage. If several different option-pricing models are used (say, for certain assets and liabilities), many actuaries feel the consistency of the calculations must be checked. Also, the inability to study the variation of results as a function of the underlying interest rate scenarios leads some actuaries to adopt a higher degree of conservatism in using option-pricing models than other methods.

One limitation of option-pricing models is that they generally focus on C-3 risk and usually ignore the C-1 and C-2 risks.

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At this time, there are regulators who will not accept asset adequacy testing done solely on the basis of option-pricing as described above, since the method has not yet been proved to their satisfaction to be adequate to test reserve adequacy.

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**PRACTICE NOTE 1993-5**  
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**USE OF THE AVR/IMR IN CASH FLOW TESTING**

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**Q. How may the portion of the asset valuation reserve (AVR) which can be used to support a certain business unit be determined, and how can it be used?**

**A. One method is to take the pro rata share of the AVR, based on the assets chosen to back the line, based on page 46 of the annual statement, letting:**

ratio = [actual current bond and preferred stock component (Line 6)] / [maximum current bond and preferred stock component (Line 7)];

factor = reserve factor by investment grade group (page 48); and

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statement value = amount in Schedule D Column 4 (without accrued interest); the pro rata share of AVR and IMR for the assets backing the line is equal to the sum over all investment grade groups of  $((AVR + IMR) * Product Reserve)/(Assets - AVR/IMR)$ .

There are several ways in which this can be used.

1. For each scenario, make the projection twice: without defaults and with defaults. Discount the difference in ending surplus back to the projection date at an appropriate sequence of interest rates for the scenario. If the maximum present value of this difference, for all specified scenarios, is less than the pro rata portion of the AVR described above, then one can run the projections without the AVR assets and without defaults (under the assumption that the AVR covers the cost of defaults).
2. If this pro rata share of AVR is not sufficient to cover the present value of cost of defaults for all scenarios, then for each scenario one could add assets equal to the lesser of the cost of defaults or the pro rata AVR, and run the projections with defaults modeled.
3. Alternatively, if one can model the development of the AVR itself, then one could start with assets equal to the liability reserves plus the full pro rata AVR, and model the contributions to AVR as well as the projected defaults. (Note: New York prohibits the use of more assets than the present value of defaults.)

**Q. The Model Actuarial Opinion and Memorandum Regulation states that the interest maintenance reserve (IMR) must be used in asset adequacy testing. Why?**

A. The IMR is part of the statutory reserve. The IMR consists of the capital gain (or loss) on formerly owned assets which were sold or called, amortized over the remaining life that the asset would have had. The purpose of the IMR is to maintain the original matching between assets and liabilities that might be destroyed by the sale of an asset. Originally, it was anticipated that the IMR would be allowed to go negative, as long as the asset adequacy testing showed

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that the total statutory reserves, including the negative IMR, were sufficient to cover the liabilities. However, currently, regulators do not allow the IMR to be a negative number in the annual statement.

**Q. How does one determine which portion of the IMR can be used to support certain products, and how can it be used?**

A. If one allocates those former assets by line, then one possibility is to increase the starting assets by the amount of the unamortized portion of the capital gains for the former assets which are allocated to a certain product or business unit. Another possibility is to allocate the IMR proportionately to starting assets. The advantage to this second method is that it is simpler. A disadvantage to this method is that longer liabilities probably have longer assets, which produce higher capital gains when sold after a given drop in interest rates than shorter assets do.

Alternatively, if one has software which is able to model the development of the IMR itself, then one could start with assets equal to the liability reserves plus the portion of the IMR, and model the changes to IMR as assets are called and sold during the projection.

**Q. If products with relatively short lives are cashed out at the end, and the IMR and AVR are being modelled, what happens to them at the end?**

A. The AVR only covers default risk. If at the end of the period, there are still assets left, the AVR should be considered when determining the amount of those assets. The Interest Maintenance Reserve may be positive (or negative) even when there are no policies left that need to have interest maintained. Since the

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IMR must be included in testing, the value of the IMR should be included in calculating the ending surplus.

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**PRACTICE NOTE 1993-6**  
**November 1993**

**MODELING BOND DEFAULT RISK**

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**Q. What is asset risk?**

**A. Asset risk, as defined in Actuarial Standard of Practice No. 22, *Statutory Statements of Opinions Based on Asset Adequacy Analysis by Appointed Actuaries for Life or Health Insurers*, is "the risk that the amount or timing of items of cash flow connected with assets will differ from expectations or assumptions for reasons other than a change in investment rates of return." This risk, which includes default risk, is commonly referred to as C-1 risk.**

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**Q. What are the current practices used in modeling default risk?**

A. C-1 bond default risk has been most thoroughly evaluated in relation to risk based capital needs. The analysis often takes the form of cash flow testing where the capital required to protect a company from threats to financial security under severely adverse conditions is developed. C-1 bond default risk has traditionally been evaluated independently of other forms of insurance risk.

In contrast, cash flow testing for reserve adequacy assessment usually makes provision for all forms of risk with the primary emphasis on investment-rate-of-return risk (C-3 risk). The testing measures asset and liability cash flow variations resulting from changes in interest rate environments. However, other insurance risk assumptions, including default risks, are sometimes held static over the modeling period.

One current practice of incorporating bond defaults into asset adequacy analysis results in a constant percentage reduction in the level of investment income. This is accomplished by reducing the asset value of all assets within a given asset quality class by the expected default rate for that period, with adjustment for residual values. The default assumptions are based on published historical default studies or company experience, and usually average the experience over a number of years. More sophisticated modeling varies the default assumptions by the rating quality of the bonds.

**Q. What are the limitations with the current practice mentioned above?**

A. As stated above, cash flow testing for asset adequacy analysis emphasizes exposure to interest rate risk. Asset and liability assumptions determine how policyholders, insurers and borrowers vary their actions in response to changing interest rates. While there are other influences that affect these actions, cash flow testing under multiple interest rate scenarios can provide a sufficient test for reserve adequacy with respect to the C-3 form of risk.

Default risk exposure, however, is more correlated to general economic conditions than interest rate levels. Default risk will be correlated to interest rate fluctuations only to the extent that more general economic conditions have correlation to

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interest rates. This correlation is not robust and actuaries have therefore not generally attempted to vary default experience within interest rate scenarios even though some cash flow software provides such a mechanism. Cash flow models also have not integrated economic conditions with interest rate scenarios. Actuaries have built default risk into cash flow asset adequacy testing through static default experience assumptions.

Factors other than economic-related default fluctuations also affect an asset portfolio's exposure to default risk. These factors are related to the specific make-up of the assets supporting the liabilities. These factors include the number of assets, the size of the individual issues and concentrations of assets with specific characteristics. For example, if a significant percentage of the portfolio's value is maintained in several very large issues, the default risk is greater than a portfolio of equal-sized assets. Similarly, a portfolio of 100 bonds of equal size is more risky than an equal-sized 600 bond portfolio. These types of variations in risk are not captured by applying a default loss factor ratably across all the assets in the portfolio, even if the loss assumptions vary with economic conditions.

**Q. What types of considerations should be reviewed in developing default experience assumptions?**

A. In performing asset adequacy analysis, the appointed actuary should consider reviewing historical bond default experience to develop average experience assumptions. The review could consider default experience over a 10 to 20-year period of time along with more recent experience. Company default experience may be valuable to study if the portfolio is large enough, especially related to private placement bond experience.

A Society of Actuaries study on the credit risk for commercial mortgages and private placements is available. Information from this study could be useful in developing default risk charges.

Consideration should also be given to potential changes in future experience relative to past. Variations in annual rates of default and loss severity should be noted, keeping in mind that the magnitude of these variations likely differ by

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quality ratings. From these reviews, the actuary may develop "average" default experience assumptions for use in cash flow testing. A number of actuaries do use different default assumptions depending on the actual quality rating of the asset classes.

**Q. Are there other specific considerations in modeling defaults?**

A. Current practice and state-of-the-art cash flow software generally does not allow for the full integration of interest rate risk and default risk. The software also typically does not provide the analytical tools required to evaluate how default risk will vary by economic conditions or how default risk varies by specific makeup of the portfolio (number of issuers, size concentrations, publics vs. privates, etc.).

The appointed actuary will have an understanding of how default experience of the modeled asset portfolio can deviate due to its specific characteristics. One approach to develop this understanding is using a default model that permits several variations in asset makeup (e.g., quality, size, and concentration).

**Q. Should sensitivity testing be done on the C-1 risk?**

A. A survey of what actuaries did for 1992 year end testing showed that 30% did sensitivity testing on the C-1 risk. The results of this testing would probably be more significant for companies with lower-quality assets.

**Q. Why should the default risks be tested, since the risk-based capital provision and the AVR cover default risk?**

A. The risk-based capital formula determines an appropriate minimum level of surplus. Since the asset adequacy testing is for reserve adequacy, not company solvency, the surplus does not impact the testing. However, the actuary can consider the asset maintenance reserve (AVR) in determining the reserves needed to cover defaults, since the AVR is a reserve.

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**Q. What are possible methods of testing for bond default risk in an asset adequacy analysis?**

A. Using the knowledge gained from a historical review of default rates under changing economic conditions and a review of potential default variations due to portfolio characteristics, the appointed actuary will have gained insight into the potential annual fluctuation in default experience as well as fluctuations over a successive period of years. Current software technology does not readily permit default risk assessment much beyond a static reduction in yield, certainly not a full integration of default risk with interest rate risk. However, the appointed actuary may want to take a more rigorous approach to default risk assessment than just reducing the yield by the "average" default loss.

Some actuaries test for asset adequacy using the static approach within interest rate scenario cash flow testing. The static default assumptions (where default losses are level over the modeling period for a specific asset quality and grade) can consider assumptions developed from at least three experience period reviews: a 10 to 20 year historical analysis, a more recent historical review (3 to 5 years), and a short-term "best estimate" set of assumptions looking forward. The assumptions provided from this initial analysis for the static approach will provide a "base level" if further default testing is necessary.

The actuary may wish to examine the effect on reserve adequacy of possible fluctuations (due to economic changes or portfolio specific characteristics) around the expected default rate. This type of assessment is more important if the base level testing indicates reserve levels at or nearing inadequacy. The approach to this second level of testing is not straightforward using currently available software. One kind of test that could be performed under the static approach would be to use a default assumption that deviates from the expected value by, for example, one standard deviation. Such a test will allow the actuary to observe the sensitivity of results to the default assumption.

**Q. Are there any other considerations in evaluating bond risk?**

A. A number of actuaries evaluate the default risk of other bonds issued by the same issuer if they constitute a significant percentage of the portfolio.

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In addition to asset default risk, actuaries can consider obligation and investment-rate-of-return risk exposures.

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**PRACTICE NOTE 1993-7**  
**November 1993**

**MODELING MORTGAGE AND REAL ESTATE C-1 RISK**

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**Q. Are there any "standard" assumptions which can be used?**

**A. The latest draft of the revisions to New York Regulation 126 allows using an annual expense charge (or reduction in annual investment income) of 10% of the appropriate asset valuation reserve (AVR) maximum for assets considered in the default component of the AVR (but 20% for NAIC Category 4, 5, or 6 bonds). However, if company experience calls for higher charges, the actuary is required by the regulation to use such higher charges. Currently, the AVR maximum for mortgages is 3.5%, multiplied by a company experience factor which can range from 0.5 to 3. Regulation 126 also allows an appropriate allocation, applicable to the reserves being tested, of assets supporting the default component of the AVR to be used in cash flow testing. However, this allocation may not be greater than the amount of such assets needed to cover the risk of asset default.**

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The revisions to Regulation 126 are silent on the issue of assets considered in the equity component of the AVR, namely common stocks and real estate.

It is likely that the AVR maximums and risk-based capital (RBC) factors will line up at some point in the future. The practicing actuary may want to consider basing default charges on the RBC factors rather than the AVR maximums. For example, the RBC factor for loans in the process of foreclosure is 20%. In the current environment, such loans are apt to be more like bonds in categories 4, 5, or 6, where New York suggests charging 20% of the AVR maximum, than category 1, 2, or 3, which uses 10% of the AVR maximum. Using 20% of the RBC factor results in a charge of 400 basis points. Using 10% of the normal 3.5% AVR maximum results in a charge of only 35 basis points, which may be inadequate in today's environment, for loans in the process of foreclosure.

Using the RBC factors for delinquent loans and loans in the process of foreclosure may help to address one of the shortcomings of the AVR. This shortcoming is that the overall average factor will be 3.5% whether industry experience is unusually good or unusually bad. The use of higher factors for problem loan categories will produce a higher average factor in bad times, and a lower one in good times.

One additional point to consider about the use of either the AVR maximums or RBC factors is that the company experience factor used in both considers only the incidence of mortgage problems, not the severity of loss when problems occur. Thus a company with a high incidence of problems but low levels of losses may be able to justify the use of somewhat lower factors. Also, the experience factor does not yet incorporate loans in good standing with restructured terms. The *Quarterly Survey of Loan Delinquencies and Foreclosures* of the American Council of Life Insurance includes data on restructured *commercial* loans, in sufficient quantity to be used as an industry average. Restructures were 2.92% of total loans as of December 1990, 5.09% as of December 1991, and 7.44% as of December 1992. Any significant variation in a company's experience from this average could justify an adjustment to the experience factor. One version of the experience factor could be (delinquent loans + loans in the process of foreclosure + restructured loans + foreclosures) divided by (total mortgage loans + foreclosures) relative to the industry average, for the prior two years.

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**Q. What approach may be taken to developing company experience?**

A. Participation in the Society of Actuaries' Credit Risk Study for Commercial Mortgages and Private Placements can provide a structure for determining the ultimate loss on mortgages, following the loan, if necessary, through the process of foreclosure and ultimate sale. This study also gathers data items that may be used in developing a quality rating system for mortgages. The emergence of a rating system will offer the advantage of basing charges on loans a company holds, rather than on past experience, which may be on different loans. As loans of various qualities mature over the course of the projections, the use of a rating system would also enable default charges to be based on the quality of loans still held at the particular time the charges apply.

The SOA study released data for 1986 through 1989. This study is being updated for more recent years.

If an internal quality system exists in the company, this can be used in determining expected defaults. It would be helpful if this rating system were to be compared against that being developed by the SOA to ensure that items to be considered in the broad-based rating system will be available with the internal records.

**Q. To what can a company's results be compared?**

A. The ACLI study on commercial mortgages provides information on the incidence of problems, back as far as 1965. The industry averages used in the mortgage experience factor for the AVR and the RBC also provide some recent information, although restructured loans are not yet included.

A study entitled "Commercial Mortgages: Default Occurrence and Estimated Yield Impact" published by Mark Snyderman of Aldrich, Eastman, and Waltch in the Fall 1991 issue of the *Journal of Portfolio Management*, tracks the experience of over 7,000 loans held by life insurance companies from 1972 through 1989. This study analyzes the severity of loss as well as the incidence of default, and shows an average loss of 32% on 155 foreclosed loans. Defaults are found to reduce the portfolio average yield by 31 to 52 basis points a year, depending upon the

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default loss severity assumption for unforced loans. Annual default rates are studied by years since loan origination, and peak in the early years at 1.6% before settling down to about 1%. The study shows that 41% of defaulted loans were actually foreclosed, with 59% either becoming current or being paid off. The average time from initial default to final disposition was 3 years for foreclosed loans.

In the current environment most experts expect higher default rates, higher loss rates, and longer disposition times for commercial mortgages than found in the Snyderman study, with the situation continuing for a least a few more years. However, the Snyderman study may be considered by the actuary when developing long term loss assumptions, perhaps after factoring in several years of more severe assumptions.

A report entitled "Commercial Mortgage Stress Test" published June 8, 1992 by Fitch Investors Service, Inc. provides significant additional data on default probabilities and loss severity, including comments on assumptions that might be appropriate for the immediate future. The report also includes a summarization of the qualitative factors that should be considered in rating a pool of mortgages. Many of these factors typically would apply in evaluating individual mortgages.

**Q. How might the company's internal rating system be used by the appointed actuary?**

A. If a company has had an internal rating system long enough to do an experience study by rating, these results can be used. (Note: these results must be used in New York if the results are worse than the charges suggested in New York Regulation 126.) If, however, the internal rating system is fairly new or has recently undergone recent refinements, one may want to estimate how the mortgage ratings would correspond to the bond ratings. One can then use the resulting charges suggested in New York Regulation 126 for bonds. If the resulting weighted average charge is less than the overall charge required for mortgages, one could ratio up the charge used for each specific rating.

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**Q. What about liquidity concerns?**

A. While the yield degradation assumptions outlined above can provide an adequate measure of the amount of losses, companies with significant mortgage holdings or with any significant need for liquidity may wish to consider incorporating additional timing elements into their cash flow testing. For example, the Snyderman study showed an average of 3 years from the time of initial default to ultimate disposition. In the current environment, it may be reasonable to assume either a longer time period or a lower price at disposition.

Interest-only loans in particular may have difficulty finding another lender to refinance with at maturity, especially over the next several years. One may assume that a company will have to refinance 50% to 75% of loans with significant balloon payments coming due in the next few years. Reasonable credit charges should cover the fact that some of these loans may have to be refinanced at below-market rates. However, the size of the maturity payments may necessitate modeling this refinancing explicitly if these payments are important to meeting the cash needs of the business being tested.

**Q. How can existing foreclosed real estate be modeled?**

A. The best analysis generally would be on a property-by-property basis. While the results of such analysis may be summarized to an overall level which can be used for asset adequacy analysis, possible variations by property may be too great to make the use of broad-based assumptions feasible. This is more important if the amount would have a material effect on results.

The Fitch report includes a summary of some of the additional factors which may be considered in evaluating nonperforming loans and foreclosed real estate.

**Q. Where can market data on real estate be obtained?**

A. There are a number of publications which discuss real estate. Examples of these include *National Real Estate Investor*, a monthly magazine which contains an overview of submarkets, published by Communications Channels Inc; *Viewpoint 1992*, a national summary of capitalization rates, discount rates and

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market absorption, published by Valuation Network Inc., and an annual empirical survey of space available and new construction, published by TCW Realty Advisors.

**Q. How should limited partnerships be evaluated?**

A. One method to evaluate limited partnerships is to be consistent with the evaluation of such assets under RBC - i.e., to look through the limited partnership package to the underlying assets. Each asset can then be evaluated on its own merits.

**Q. What should be examined with regard to concentration of a portfolio?**

A. If the company has a large percentage of assets in mortgages and real estate, there are various tests of concentration that an actuary may want to consider in determine the adequacy of assets in relation to the liabilities. These include a large percentage of the company's assets in:

1. A single property or development
2. A single city or geographic location
3. A single type of asset (e.g., hotels)

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**November 1993**

**CMOs**

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**Q. What are CMOs and where can general information on them be found?**

Collateralized mortgage obligations (CMOs) are a broad class of investments that, at the core, are supported by residential mortgage loans. There are many types of CMOs, with various levels of risk. A good source of general information on CMOs is in the 1991 Valuation Actuary Symposium Proceedings, in two presentations by Randall Lee Boushek and David A. Hall ("CMO Boot Camp: In the Tranches", pages 107-166, and "Practical Asset/Liability Modeling For CMOs", pages 331-406).

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**Q. What are the challenges of projecting CMO cash flows?**

In the 1990 Valuation Actuary Symposium, Mr. Boushek described CMOs as nothing more than "contrived but uncertain" cash flows. The uncertainty is due to the underlying driver of the cash flows - mortgage payments and the prepayment function. The contrivance is due to 1) the extreme complexity of many CMO structures, 2) the fact that CMO structures differ among various CMOs, and 3) lack of readily available data on CMO structures at points in time after issue. (At the time of issue, the structure is readily available in the prospectus.)

**Q. What constitutes an adequate CMO model?**

A. The desired sophistication and accuracy of a CMO model used for cash flow projections depends on the relative importance of CMO holdings in the portfolio and the volatility of the CMOs held. An accurate model generally will have, as a minimum, model features of the following: 1) cash flows of the modeled tranche, dependent (if appropriate) on cash flows of other tranches, and 2) prepayment rates dynamic over time as interest rates change.

One method of testing the accuracy of the model is to compare results over different scenarios with the results projected by CMO databases and systems operated by broker\dealers or independent vendors. Two of the vendors are Global Advanced Technologies (GAT) and INTEX. A second method which provides some information is to compare the setup that would have been used one year ago with the actual cash flows received in the past year from the CMOs.

For companies with large exposures to CMOs, access to a "live" database of CMO issues can help with the two major problems with building CMO models. The first problem is that the great variety of tranches that exists makes it difficult for simple models to accommodate them all. The second problem is the difficulty of maintaining up-to-date data, not only on the tranche owned, but the other CMO tranches that accompany the tranche owned.

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**Q. What prepayment assumptions may be used?**

A. The appointed actuary is not trying to *predict* a specific prepayment rate as much as trying to *correlate* prepayment rates with changes in interest rates and other economic variables. The actuary's primary objective typically is to ensure that the correlations are reasonable. The following is a list of some of the items which the actuary can check for reasonableness:

1. prepayment rate rises as interest rates decrease, and such changes follow an S curve (some additional prepayments with small changes in interest rates; then prepayments accelerate as the difference between the original coupon rates and current market rates widens; eventually prepayments leveling off at some rate); likewise, the prepayment rate slows as interest rates increase;
2. prepayments are generally slower for lower coupon collateral and faster for higher coupon collateral;
3. prepayment rates vary by type of collateral (GNMA versus FNMA/FHLMC, 15-year versus 30 year, new versus seasoned mortgages);
4. prepayment rates are consistent across CMOs with comparable collateral; and
5. prepayment rates for the level-interest-rate scenario bear a reasonable relationship to "street median" PSAs or historical PSAs. (PSAs are the Public Security Association Standard Prepayment Model).

The appointed actuary generally will evaluate the sensitivity of results to the prepayment function. If it is a key assumption, the actuary may wish to perform sensitivity tests.

**Q. What other assumptions besides prepayment rates are necessary to consider for CMOs?**

- A.
1. Another assumption the valuation actuary may want to evaluate is the sensitivity of indexed tranches (e.g. the floating rate tranches indexed to LIBOR), with regard to the link of the index to the scenario interest rate.
  2. For a CMO which is non-agency backed, a default assumption is needed.

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**Q. What should be shown in the actuarial memorandum regarding CMOs?**

A. The NAIC's Model Actuarial Opinion and Memorandum Regulation states that the memorandum should include portfolio descriptions and investment assumptions. Details as to assumptions used in modelling CMOs include the prepayment assumption, and any simplifying assumptions used in modelling the company's CMOs.

For 1992, some actuaries included charts as to the cash flows off the inforce CMO portfolio under each of the scenarios tested.

For 1992, the Illinois Insurance Department requested additional details on CMOs to be included in actuarial memoranda. This includes an accounting of the amount of CMOs of various types, e.g., interest only mortgage strips (IOs), principal only mortgage strips (POs), planned amortization classes (PACs), targeted amortization classes (TACs), zero coupon tranches (Z tranches), and residual strips. One of the purposes of this information is to determine the volatility of the prepayments for the CMOs owned.

The Invested Asset Working Group of the NAIC is currently preparing recommendations as to what information should be shown for CMOs. It would be useful for appointed actuaries to obtain a copy of this document.

**Q. What are suitable methods of determining the market value of CMOs at a future point in time?**

A. The market values of CMOs are important if the CMOs are modelled as being sold at a certain point in the future. In order to model the CMO, the underlying mortgage and the tranches preceding the CMO tranche owned are considered.

There are currently several methods of modelling the market value of CMOs being used by appointed actuaries. One of these methods is to use option pricing to evaluate the expected market value at each future period used in the testing. Another method is to assume the interest rates from the point being tested remain level from

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that point on, and evaluate the worth of the underlying mortgage pool and from there, determine the market value of the CMO owned.

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**PRACTICE NOTE 1993-9**  
**November 1993**

**ALTERNATIVE METHODS OF TESTING FOR OBLIGATION RISK**

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**Q. What is obligation risk?**

**A. Obligation risk, as defined in Actuarial Standard of Practice No. 22, *Statutory Statements of Opinions Based on Asset Adequacy by Appointed Actuaries for Life or Health Insurers*, is "the risk that the amount or timing of items of cash flow connected with the obligations considered will differ from expectations or assumptions for reasons other than a change in investment rates or return or a change in asset cash flows." This risk is commonly referred to as C-2, or pricing, risk.**

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**Q. What type of sensitivity testing is commonly done?**

A. A survey of appointed actuaries in the context of asset adequacy testing for year end 1992 showed that 66% did sensitivity testing on lapse assumptions, and 53% did sensitivity testing on morbidity/mortality assumptions. Other types of sensitivity testing done on obligation risks included expenses, interest crediting strategies, dividends, reinsurance, amount of renewal premiums, and federal income tax assumptions.

**Q. How does the appointed actuary decide on the scope of obligation risk testing?**

A. The first step is to identify the material, or major, risks under the category of obligation risk. A review of sensitivity analyses from prior pricing and/or projection work, combined with the appointed actuary's general knowledge of the product line(s) might provide the basis for identification of the material risks. In then deciding on the scope of testing, the actuary generally will consider the potential volatility of future experience, the significance of any variance in terms of its effect on results (i.e., ending surplus), the existence of any repricing capability for non-guaranteed elements and any interrelationships with asset, investment-rate-of-return or other obligation risks. The obligation risks to be considered in this manner generally include mortality (including potential AIDS claim impact), morbidity, lapse, and expense risks. While both favorable and unfavorable deviations in future experience are possible, many actuaries believe the appointed actuary's primary concern should be the potential for adverse deviation with any obligation risk.

**Q. What are some alternative methods of testing for obligation risk in an asset adequacy analysis?**

A. At least three general methods are available, each with significant potential variations in application to any particular company or line of business. The three methods described in this note are:

- Scenario-Specific Testing
- Sensitivity Testing
- Health Claim Liability Methods

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**Q. What is meant by scenario-specific testing?**

A. As the name implies, scenario-specific testing involves the development of specific alternative obligation risk scenarios within the context of cash flow testing for investment-rate-of-return risk and/or asset risk. While actuaries generally think of variations in economic and/or interest rate assumptions when considering alternative scenarios for cash flow testing, it is also possible to incorporate variations in key components of obligation risk. A scenario is in fact defined as "[a] set of economic and operating assumptions on the basis of which cash flow testing is performed," per subsection 2.9 in Actuarial Standard of Practice No. 7, *Performing Cash Flow Testing for Insurers*. Variations in key assumptions with respect to obligation risk can be considered as part of the scenario's "operating assumptions." Such variations in scenarios can be generated using either stochastic or deterministic methods, similar to the different methods used to develop variations in interest rates. The actuary is prudent to take care in the development of scenarios to keep the number to a manageable size that is still sufficient to reflect a range of conditions for all of the important categories of risk.

**Q. What is meant by sensitivity testing for obligation risk?**

A. In the context of an asset adequacy analysis, sensitivity testing of non-asset-related variables can be utilized to demonstrate the adequacy of reserves with respect to obligation risk. The sensitivity tests are designed to be applied after the completion of a basic set of scenarios involving different economic assumptions which are primarily focused on testing for asset and/or investment-rate-of-return risk. This approach would involve, for each significant type of obligation risk, determining the range of variations of the base assumption that has a reasonable possibility of occurring. The scenarios would then be rerun to determine the impact of such variation.

Certain combination sensitivities can also be tested in order to evaluate the impact of potential combinations of adverse experience.

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**Q. What is meant by using health claim liability methods for obligation risk testing?**

A. Health claim liability methods are described in Actuarial Standard of Practice No. 5, *Incurred Health Claim Liabilities* and include tabular methods, development methods and loss-ratio methods. These methods are obviously applicable to health insurance and similar lines that involve liabilities which are largely insensitive to the level of interest rates.

The key concerns of the appointed actuary are that:

1. the method is applied consistent with the standard to provide a reasonable estimate of the liability;
2. the liability or reserve can be demonstrated to be insensitive to interest rates and/or the choice of assets backing the liability (a going concern assumption may be involved here); and
3. the method is validated and/or updated regularly based on follow-up studies and updated experience analysis.

More detailed descriptions of health practices are planned to be given in separate Health Practice Notes to be published later this year.

**Q. Should results of sensitivity testing be shown in the actuarial memorandum regarding sensitivity testing?**

A. In a survey of 1992 practices, slightly over one half of the appointed actuaries stated that the results of the sensitivity tests were shown in their memoranda.

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A group of actuarial regulators met at the June 1993 NAIC meeting to review 1992 memoranda. One of their criticisms was that either sensitivity testing was not done, or the results of the testing were not discussed in the memoranda.

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**PRACTICE NOTE 1993-10**  
**November 1993**

**SPECIAL ISSUES FOR VALUING SINGLE PREMIUM GROUP ANNUITY CONTRACTS**

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**Q. What mortality assumptions can be used for single premium group annuities?**

**A.** When doing cash flow testing, projections of future mortality improvement (ideally, generational mortality) may be incorporated. Note: Currently, an updated Group Annuity Mortality Table is under development by the Society of Actuaries. At this time, it is anticipated that this table will incorporate generational mortality.

If credible, a company's own mortality experience may be considered when determining the assumptions for liability projections.

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**Q. What ancillary benefits are appropriate to consider in testing?**

A. There are a number of ancillary benefits that may be considered when developing cash flow testing. These include: early retirement benefits (usually subsidized), pre-retirement joint-and-survivor benefits, special death benefits, and other types of ancillary benefits which are often provided under terminal funding (or "closeout") contracts.

Liability cash flow projections can make provision for these type of benefits, both in timing and amounts. One method of developing these assumptions is to use the pricing assumptions for these ancillary benefits. If these ancillary benefits have a substantial impact on results, sensitivity testing of the assumptions may be appropriate.

**Q. What are special considerations for annuities under participating contracts?**

A. Because of the wide variety of types of contractual arrangements, different methods of cash flow testing and modeling may be appropriate for different companies and contracts. The actuary may wish to examine the nature of the guarantees when determining methods and assumptions for cash flow testing these types of liabilities.

If the annuities are fully guaranteed by the insurance company and the plan sponsor/contractholder is not obligated to deposit additional funds in the future to support the annuities (typical of IPG contracts), it may be appropriate to treat these annuities as though they are non-participating annuities in cash flow testing.

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**PRACTICE NOTE 1993-11**  
**November 1993**

**SPECIAL ISSUES INVOLVING STRUCTURED SETTLEMENTS**

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This practice note has been divided into three sections:

- |            |   |
|------------|---|
| Section A. | Guideline IX-A, which describes the minimum reserves allowed for substandard annuities and structured settlements.  |
| Section B. | Guideline IX-B, which defines a new Commissioner's Reserve Valuation Method for individual single premium immediate annuities (and any deferred payments associated therewith), some deferred annuities, and structured settlement annuity contracts. |

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Section C.                   Cash Flow testing for immediate annuities and structured settlements.

**Section A: Guideline IX-A Questions**

**Q.#A1   What does Guideline IX-A require?**

A. Guideline IX-A describes the minimum reserves allowed for substandard annuities. It also discusses when and the extent to which a substandard valuation table may be used for annuities. When less than standard reserves are allowed, Guideline IX-A requires them, by use of the "constant extra deaths method", to grade into standard reserves by the end of the (standard) mortality table.

**Q.#A2   How are minimum reserves calculated for substandard annuities, according to Guideline IX-A?**

A. According to Guideline IX-A, one must make a constant addition to the mortality rates, beginning with the annuitant's actual age, such that the life expectancy under the adjusted table is greater than or equal to:

1.     the life expectancy developed during the underwriting process or,
2.     if more than one life expectancy is developed during the underwriting process, the average of all such life expectancies.

**Q.#A3   When can a substandard mortality table be used under Guideline IX-A?**

A.     A substandard table may be used when valuing:

1.   benefits arising from court settlements; or
2.   settlements involving workers compensation; or
3.   settlements arising from long term disability claims; and the annuitant is the injured party and there are relevant hospital records or

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physicians reports that are kept on file by the company.

**Q.#A4** How does the magnitude of the Guideline IX-A minimum reserves compare to that of the "rated up in age" reserves that have historically been the more common choice as a reserve methodology?

A. Typically, all things being equal, the minimum reserve under Guideline IX-A (or the "constant application of extra deaths" method) will produce an initial reserve,  ${}^{ed}V_0$ , that is less than its rated age counterpart,  $V_0$ , assuming that the selected rated age and the application of constant extra deaths to the mortality table at the true age produce life expectancies which are equivalent. With survival however,  ${}^{ed}V_t$  fairly quickly exceeds  $V_t$ . Eventually, when the attained rated age reaches the limit of the mortality table,  $V_t$  would be 0 while  ${}^{ed}V_t$  would be approaching the standard reserve,  $V_t$ , that is, the reserve based on the true age of the annuitant without modification to the mortality table.

It should be noted that the presence of a certain period in the contract can alter the general relationship of the two reserves. It is possible that the initial reserve under an extra deaths methodology could exceed that under a rated age methodology under some conditions. It is also generally true that the absolute difference in initial reserve between the two methodologies decreases with increases in the certain period of the annuity contract.

For further information on this subject, actuaries may wish to consult the article entitled "NAIC Actuarial Guideline IX-A," in the July 1989 issue of *The Financial Reporter*, the newsletter of the Financial Reporting Section of the Society of Actuaries. The article was also reprinted as a Society of Actuaries Study Note, number 443-92-90.

**Section B: Guideline IX-B Questions**

**Q.#B1** What does Guideline IX-B require?

A. Guideline IX-B defines a new Commissioner's Reserve Valuation Method for Individual Single Premium Immediate Annuities (and any deferred payments

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associated therewith), some Deferred Annuities, and Structured Settlement Annuity contracts. The new reserve method typically requires the use of non-level interest rates, under either option 1, the "carve out" method, or option 2, the graded interest rate method. Insurers are no longer permitted to use level interest rate reserves.

If a block of annuities issued in a given calendar year can pass either the "110% year of issue aggregate test" or the "115% individual contract test", then the block can be reserved using the (level) valuation interest rate appropriate for Plan type A contracts without cash settlement options for that calendar year.

If the block fails the tests then one of two methods must be used:

- 1 - The "carve out" method, which requires lump sum benefits to be reserved at a lower interest rate.
- 2 - The graded interest rate method, which requires all benefits to be reserved using graded interest rates.

**Q.#B2 Guideline IX-B provides two methods for the reserving of Single Premium Immediate Annuities (SPIAs), the "carve out" method and the "graded interest rate" method. Of the two methods, which one generally provides the lower total reserve?**

A. Except for the case where there are no lump benefit payments, the graded interest rate reserve methodology will produce the lowest initial reserve,  ${}^{\text{Gr}}V_0$ , because a level (x%) interest rate for the first twenty years is calculated such that  ${}^{\text{Gr}}V_0$  is equal to an initial level interest rate reserve,  ${}^{\text{L}}V_0$ , which uses the appropriate (level) Plan Type A valuation rate for all benefits. Because the "carve out" method requires that any failing lump benefits (or groups of benefits) be segregated and reserved at level Plan Type A rates appropriate for their duration, the initial "carve out" reserve,  ${}^{\text{C}}V_0$ , is greater than or equal to  ${}^{\text{Gr}}V_0$ . Where a contract has no lump benefits,  ${}^{\text{Gr}}V_0 = {}^{\text{C}}V_0$ .

The graded reserves ultimately exceed carve out reserves as a result of the low ultimate interest rates which the graded methodology uses after the first 20 years. Under the "carve out" methodology, the lump sum benefits are reserved at appropriately lower level interest rates, whereas the benefit components which do not fail the 110% or 115% test can be reserved at the applicable level immediate

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annuity interest rate.

Under the graded methodology, all benefits payable beyond the first 20 years are subjected to a lower ultimate interest rate, whereas under the "carve out" method, only the lump sum benefits are subjected to a lower valuation interest rate. The optimal reserve may be to start out using the graded methodology and as appropriate, perhaps by year of issue, move to the "carve out" method at or near where the two reserves are equal and cross over.

In any event, no SPIA reserve can be considered sufficient under Guideline IX-B in the absence of adequate cash flow testing, especially in the generally downward interest rate scenarios.

**Q.#B3 Of the two carve out techniques (that is, the 110% aggregate test and the 115% seriatim test), which gives the lower reserve?**

A. Generally speaking, the 110% aggregate test will probably give the lower reserve because it permits the aggregation of contracts within a year of issue. Contracts without lump benefits can be combined with contracts with lump benefits. The potential exists for two contracts with differing benefit patterns, each of which has lump benefits which would fail the 115% seriatim test, to "cancel" each other out to some extent in the aggregate. However, a situation can exist where the 115% test would produce the lower reserve because of its larger tolerance, but in general, this is not the case.

As yet, the law does not permit benefit aggregation across years of issue, which could potentially provide an even lower reserve.

**Q.#B4 What is the rationale behind Guideline IX-B?**

A. Single Premium Immediate Annuity (SPIA) benefits in general, and Structured Settlement Annuity (SSA) benefits in particular are frequently quite long in duration. Prudent investment strategy usually dictates that portfolio managers invest as long and with as much call protection as possible. However, as it is rarely possible to cash flow match the assets and liabilities (since many of the annuity contracts will have benefit payments extending fifty or more years into the future) and given the C-3 risk from asset calls and prepayments, the utilization of

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a level valuation interest rate forever would not be conservative actuarial practice, irrespective of whether or not the underlying contracts contain deferred lump sum payments or have increasing benefit patterns. Level interest rate reserves would then likely be insufficient.

Thus, reserves based upon level valuation interest rates are no longer permitted for these liabilities under the Guideline. Instead, one must choose one of the two approaches given in the Guideline: the "carve out" method or the graded interest rate method.

SPIA reserves need adequate cash flow testing, especially in the generally downward interest rate scenarios.

**Q.#B5 Are there any additional considerations to using Option A versus Option B reserves for structured settlements?**

A. If the actuary uses Option B (graded) reserves, then the reserves are getting stronger over time. For example, if they are strengthened by 20 basis points per year, one builds up more of a sufficiency in later years. Then if interest rates go down, you would still have sufficient earnings to support the reserves. If one looks at only the market value of ending surplus, the effect of the graded reserve is not seen. In fact, if two companies are otherwise equal but one has reserves based on more strongly graded interest rates, then that company might be in a position to weaken reserves later on while the other company would need to strengthen theirs.

**Q.#B6 What are the effective dates for the guidelines?**

A. Beginning in 1990, insurers were required to comply with Guidelines IX-A and IX-B for 1990 and later issues. However, an insurer must be in compliance for all of its inforce which is subject to the 1980 Amendments to the Standard Valuation Law by its 1993 year-end valuation.

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**Section C: Questions on Cash Flow testing for Structured Settlements**

**Q.#C1 May cash flow testing be based on an open block of business with future issues, or must the current inforce be treated as a closed block?**

A. Testing the in-force as a closed block is a way to confirm that existing reserves and assets are sufficient to back the existing liabilities.

**Q.#C2 What length of time period should be used for cash flow testing?**

A. Since structured settlements are sometimes issued at very young actual ages, a case can be made for doing at least some of the projections over a period of many decades; perhaps as long as 50 years or more. This would mean that virtually all of the initial assets would have matured, and replacement assets would have been in place for many years.

A number of actuaries feel that the period chosen should be long enough that half to two thirds of the benefits (and 80-90% of the present value of the benefits) will have been paid by the end of the projection period. In general, 30 years may be an acceptable time frame for an average block; it is the period mentioned in New York's Regulation 126.

**Q.#C3 Are there any special considerations on the scenarios to be tested for structured settlements and other payout annuities?**

A. For structured settlements and other products where the testing period is more than 10 years, many actuaries test random scenarios in order to test the effect of varying the interest rates beyond ten years, since the scenarios mentioned in Regulation 126 and in the Model Actuarial Opinion and Memorandum Regulation only vary interest rates for a 10 year period.

For structured settlements and other products where long testing periods are used, consideration may be given to testing variations in interest rates greater than the maximum variation of 5% which is mentioned in Regulation 126 and in the Model Actuarial Opinion and Memorandum Regulation, since interest rates

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have varied by more than 5% in the past 15 years.

**Q#C4** What are some other sources available to the actuary wishing to become more familiar with this topic?

A. The SOA *Record*, Vol. 17, pages 1787-1808 is one such source of information.

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The members of the work group are Donna R. Claire, chairperson; Arnold A. Dicke, Douglas C. Doll, Craig F. Likkell, Linn K. Richardson, Henry W. Siegel, Steven A. Smith, Charles N. Vest, and Michael L. Zurcher.

Comments are welcome as to the appropriateness of the practice notes, desirability of annual updating, substantive disagreements, etc. They should be sent to Donna Claire at her Directory address.

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**NOTIFICATION OF RESERVE MISSTATEMENT**

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*This practice note has not been promulgated by the Actuarial Standards Board or any other authoritative body of the American Academy of Actuaries. A "practice notes work group" was organized by the Committee on Life Insurance Financial Reporting of the American Academy of Actuaries and charged with developing a description of some of the current practices used by valuation actuaries in the United States. This committee was formed in 1992; changes were made to these notes to reflect additional information on current practices for 1993. At least one of the members of the work group has had direct experience relevant to the subjects of these practice notes. The practice notes represent a description of practices believed by the work group to be commonly employed by actuaries in the United States in 1993. However, no representation of completeness is made. Other approaches are no doubt in common use. The intention of the notes is to assist actuaries who are faced with the requirement of adequacy testing by supplying examples of some of the common approaches to this work. It should be recognized that the information contained herein is not binding on any actuary or organization, and is not, nor is it intended to be, a definitive statement of what constitutes generally accepted actuarial practice in this area.*

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**Q. What must the appointed actuary do if notified of a reserve misstatement?**

A. The NAIC has adopted a new annual statement instruction, effective for actuarial opinions submitted in connection with annual statements for the year 1993. The instruction, which is given in full below, sets forth the procedure that must be followed if the appointed actuary discovers that his or her opinion would not have been issued or would have been materially altered had the actuary known that certain data or other information was factually incorrect as of the balance sheet date.

The instructions explicitly indicate that the opinion shall not be considered in error

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if the data or information in question concerned events subsequent to the balance sheet dates or if the actual results differed from projected results.

**Q. What may the actuary do if the actuary thinks there is a conflict between the responsibilities to notify the Commissioner and the responsibilities to his or her employer?**

A. In carrying out his or her responsibilities, the actuary may perceive a conflict of interest between the responsibilities to notify established in the instruction and the actuary's responsibility to his or her client or employer. In recognition of this, the instruction allows the actuary to provide, in place of the required notification, "such other notification [as] recommended by the actuary's attorney." In order to minimize the effects of any such conflict of interest, the actuary may wish to have the client or employer specify in the letter of appointment that the procedure described in this annual statement instruction is to be carried out by the appointed actuary.

**Q. What is the annual statement instruction regarding reserve misstatement?**

The Annual Statement Instructions for Life and Accident and Health Insurers - Actuarial Opinion, instruction #12 states:

The insurer required to furnish an actuarial opinion shall require its appointed actuary to notify its board of directors or its audit committee in writing within five (5) business days after any determination by the appointed actuary that the opinion submitted to the domiciliary Commissioner was in error as a result of reliance on data or other information (other than assumptions) that, as of the balance sheet date, was factually incorrect. The opinion shall be considered to be in error if the opinion would not have been issued or would have been materially altered had the correct data or other information been used. The opinion shall not be considered in error if it would have been materially altered or not issued solely because of data or information concerning events subsequent to the balance sheet date or because actual results differ from those projected.

Notification shall be required for any such determination made between the issuance of the opinion and the balance sheet date for which the next

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opinion will be issued. The notification should include a summary of such findings and an amended opinion.

An insurer who is notified pursuant to the preceding paragraphs shall forward a copy of the summary and the amended opinion to the domiciliary Commissioner within five (5) business days of receipt of such and shall provide the appointed actuary making such notification with a copy of the summary and the amended opinion being furnished to the domiciliary Commissioner. If the appointed actuary fails to receive such copy within the five (5) business day period referred to in the previous sentence, the appointed actuary shall notify the domiciliary Commissioner within the next five (5) business days that the submitted opinion should no longer be relied upon or such other notification recommended by the actuary's attorney.

If the actuary learns that the data or other information relied upon was factually incorrect, but cannot immediately determine what, if any, changes are needed in the statement of opinion, the actuary and the company should undertake as quickly as reasonably practical those procedures necessary for the actuary to make the determination discussed above. If the insurer does not provide the necessary data corrections and other support (including financial support) within ten (10) business days, the actuary should proceed with the notification discussed above.

No qualified actuary shall be liable in any manner to any person for any statement made in connection with the above paragraphs if such statement is made in a good faith effort to comply with the above paragraphs.

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**PRACTICE LEGAL NOTE 1993-L1**  
**November 1993**

**WORDING FOR ACTUARIAL OPINIONS**  
**November 1993**

By Lauren M. Bloom

*In 1992 many appointed actuaries, for the first time, had to prepare and file opinions under the 1990 amendments to the Standard Valuation Law ("SVL") and Model Actuarial Opinion and Memorandum Regulation (MR). This practice note is therefore not based on "current practices," but is instead developed by the legal counsel of the American Academy of Actuaries to give some general suggestions regarding matters that appointed actuaries may wish to consider when phrasing the opinions they issue under the SVL. It should not be regarded as an exclusive list of factors to be considered by the appointed actuary in every instance, nor should it be regarded as a substitute for individualized professional legal advice.*

**Q. What should the actuary be aware of with individual state variations of the SVL?**

**A.** It should be noted that not all states have adopted versions of the SVL that are identical to the model SVL proposed by the National Association of Insurance Commissioners ("NAIC"). Consequently, before preparing an opinion in any state, the appointed actuary should become familiar with the unique statutory and regulatory requirements imposed by that state's version of the SVL and MR. It is recommended that the appointed actuary consult with legal counsel to obtain the necessary familiarity, and to explore any questions that specific statutory provisions may suggest.

The NAIC model MR offers recommended language, to which the appointed actuary may wish to refer when drafting SVL opinions. However, the appointed actuary should be careful to take note of any inconsistencies between the NAIC model language and recommended language set forth in state regulation, and, when an inconsistency exists, conform to the latter.

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**Q. What are other sources of information on writing an actuarial opinion?**

A. Before preparing the opinion, the appointed actuary should be aware of Actuarial Standard of Practice No. 22, *Statutory Statements of Opinion Based on Asset Adequacy Testing by Appointed Actuaries for Life or Health Insurers*, that was adopted by the Actuarial Standards Board in April of 1993, as well as any other relevant standards of practice.

**Q. What can be done to reduce the possibility of misuse of the actuarial opinion?**

A. One issue that has arisen in the context of the SVL is that lenders, investors, and other third parties sometimes look to the actuary's opinion as an indication of the insurer's future solvency, even though the actuary's opinion was not intended for such use by such individuals. To reduce the likelihood that the appointed actuary will be legally liable to such third parties (especially in states that have declined to adopt the NAIC model SVL limiting appointed actuaries' negligence to third parties), the actuary may wish to include in the opinion a specific statement describing the purpose of the opinion, explaining for whose use it was prepared, and disclaiming responsibility if other parties attempt to use the opinion for any purposes other than that for which it was intended.

To prevent the opinion from being distorted or taken out of context, it may be wise to include a statement to the effect that the opinion is intended to be reviewed as a whole, and that no part of it should be separately considered or relied upon. It may also be advisable to indicate that the opinion is the product of professional expertise, and should not be reviewed or relied upon without the benefit of advice of a qualified life actuary.

**Q. Can the actuary deviate from the recommended language in the MR?**

A. The model regulation permits the actuary to modify the recommended language "to meet the circumstances of a particular case," and such modifications should be made as necessary to express clearly the actuary's professional judgment. This flexibility permits the appointed actuary to tailor the opinion to a

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given situation, and reduces the likelihood that inaccuracies will creep into the opinion through use of "boilerplate" language.

The actuary would be well-advised to write any qualifications or departures from the recommended language in a concise and comprehensible fashion. It is advisable to explain the relationship between the appointed actuary and the insurer (e.g. employer/employee or client/consultant), and to delineate clearly the scope of the opinion with a full description of what data the appointed actuary reviewed, and what analyses the appointed actuary conducted, in order to reach the opinion expressed. This description should be sufficiently detailed and complete to permit the reader to understand exactly what the appointed actuary did to prepare the opinion.

**Q. What should be in the opinion if the appointed actuary relied on other parties?**

A. If the appointed actuary has relied upon another party in preparing the opinion, it is advisable to describe the nature and scope of the reliance. (However, under the SVL the appointed actuary is solely responsible for the opinion notwithstanding any reliance.) It may also be prudent to describe any apparent flaws, inconsistencies or gaps in the underlying data so that the reader will understand that the appointed actuary was working with flawed data when preparing the opinion. The actuary should become familiar with the requirements of applicable standards of practice that address reliance and conform to those requirements when making these disclosures.

**Q. What is the purpose of any limiting language?**

A. Limiting language of the sort suggested above is not used to evade the significant responsibilities imposed upon the appointed actuary by the SVL. To the contrary, it is anticipated that appointed actuaries will undertake and fulfill their duties under the SVL in a highly skilled and professional fashion, and will have no intent or desire to evade those duties. Rather, the use of appropriately limiting

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language may aid the reader's efforts to understand the scope of the opinion, and assists the reader to a fuller comprehension of the circumstances under which each opinion was prepared.

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*Lauren Bloom is general counsel of the American Academy of Actuaries*