

**1993 VALUATION ACTUARY  
SYMPOSIUM PROCEEDINGS**

**SESSION 16**

**Appointed Actuary Opinion and Memorandum Issues**

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**David J. Kunesh**

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## APPOINTED ACTUARY OPINION AND MEMORANDUM ISSUES

**MS. MEREDITH A. RATAJCZAK:** As moderator for this session, I have the honor of introducing my illustrious panel of speakers. Paul Wharram is an assistant vice president at Crown Life Insurance Company in Toronto. Paul is responsible for reserves and asset/liability analysis for Crown Life's GIC profit center. For the 1993 year-end Paul will serve as the appointed actuary for Crown Life's U.S. annual statement. Paul's other areas of expertise include financial reporting for individual and group life insurance and long-term-disability insurance.

Dan Kunesh is a vice president and principal in Tillinghast's Chicago office. He has been with Tillinghast since September 1985 and was life manager of the office from July 1986 through 1992. Dan's background spans a broad array of insurance services including financial reporting and analysis, the design and implementation of management-based financial statements, business valuations and negotiation activity for mergers and acquisitions, due diligence reviews, financial examinations, strategic business planning, profit management studies, asset/liability matching studies, and actuarial opinions. Dan's most recent project experience includes special actuarial and management consultation to regulators in a troubled company situation and various asset/liability cash-flow management situations. Prior to joining Tillinghast in 1985, Dan was President of Kunesh, Montgomery and Associates, an insurance services firm.

I have been a consulting actuary with Milliman & Robertson (M&R) since 1987. Over the last six years I have worked primarily with life insurance companies on a variety of assignments including extensive work in actuarial appraisals for mergers and acquisitions, demutualization, cash-flow testing, asset and liability management, life insurance product development, financial analyses and projections, and statutory and GAAP valuations. Since May of 1992, I have been serving as life systems manager, and I currently manage the development group working on M&R's PC-based projection software, ALFA.

Since the adoption of the revisions to the standard valuation law, the word *issues* has taken on a whole new meaning. At this symposium you have been bombarded with information about

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pending regulatory issues, small company issues, asset modeling issues, general modeling issues, general asset issues, GAAP issues, and the list goes on and on. As I mentioned previously, this session will deal with the granddaddy of all issues you will be faced with: opinion and memorandum issues.

It is through these documents that the appointed actuary will demonstrate and document the conclusions reached about reserve adequacy after dealing with all the aforementioned issues. I think my panelists would have felt cheated without the word *issues* in the session title.

Our biographies should have demonstrated that this panel was put together to provide several different perspectives about the opinion and memorandum issues facing the appointed actuary at year-end 1993. These issues include but are certainly not limited to:

1. What criteria are used to form an opinion?
2. How do you analyze the results of the year-end testing?
3. How much documentation is necessary for a Section 7 opinion or how much memorandum detail is necessary to support a Section 8 opinion?
4. What reliances can be made and how should they be documented?
5. How should you handle a qualified opinion?
6. What are the options other than cash-flow testing and when are they appropriate?
7. How much due diligence is necessary?

Paul and Dan are going to address each of these issues but each from a different perspective. Paul will provide the insurance company perspective -- a Canadian company with U.S. business. As I mentioned previously, Dan has recently been working with regulators in a distressed company situation, so he will provide the perspective from a consultant and a regulator. I have been up on this podium for each of the last three years, so I am going to keep my comments to a minimum. I will focus on where to go for help and guidance tackling these issues.

With all the issues raised at this symposium, I am sure you are asking yourself, "How am I going to cope with everything that must get done at year-end?" Year-end 1992 was bad, but I

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expect that year-end 1993 will be worse as more and more states adopt the revisions to the standard valuation law and the opinion and memorandum regulation. There is only one answer to this question. Do it early and often.

By early I mean perform your analysis whether that be cash-flow testing or some other method, based on preliminary asset and liability data. Unless a state specifically objects to the practice of preparing an opinion about reserve adequacy based on other than year-end data, year-end filing preparation can be made much more manageable if it does not coincide with annual statement work. The appointed actuary, of course, must be comfortable that the preliminary data are an accurate proxy for the same data, in terms of mix and characteristics, at year-end.

I think many of you who are involved with the cash-flow testing at your respective companies view the whole process as a big pain in the neck. Let's face it -- it takes a significant amount of time and resources to build the models that produce the results that serve as the basis for the appointed actuary's opinion. Why not use these models more than once a year to provide management data or to analyze reserve adequacy prior to year-end? It is much easier to react to and correct a situation that may be leading to a reserve deficiency when you are not in the throes of compiling your annual statement.

Many of the symposium sessions talked about methods or techniques you may use in the months to come. They may sound simple and straightforward now, but two months from now may be a different story. Unfortunately, there is no cookbook available that is entitled *How To Be The Appointed Actuary*. As much as we would like to have a book like this in some instances, every company has different issues, and one book cannot possibly cover them all. There are some good sources of information you can look to for general help and guidance as you are preparing your actuarial opinion and memorandum.

The first general source of information is the actuarial standards of practice (ASP). ASP 7 and 14 will provide guidance relating to cash-flow testing -- if and when it should be done. ASP 22 and the exposure draft -- "Statutory Statement of Opinion Not Including an Asset Adequacy

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"Analysis" provide guidance regarding the opinion and memorandum and the issues that must be addressed by the actuary in the course of preparation. The standard valuation law and the opinion and memorandum regulation are other important sources of information. Since these are the standards adopted by the states, it would seem foolish not to consult these sources for guidance on what information should be provided in the memorandum at a minimum. Sample opinion and memorandum language is also provided.

Some of the more general sources of information include the practice notes, the *Life and Health Valuation Manual* and the *Proceedings of the Valuation Actuary Symposium*. Some of the how-to sessions at the symposium over the last few years, such as those dealing with modeling collateralized mortgage obligations, may help to answer questions that arise during the modeling process.

I think it is clear that 1992 was bad and 1993 will be worse, but as we develop the expertise and get comfortable with the methods used, what was once a big black box should become more clear and manageable. We will have many issues to tackle and more will arise as new asset types come into existence or as you add new blocks of business to your company. The familiarity with the process will better enable us to react to changes in the environment around us.

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**MR. DANIEL J. KUNESH:** In my comments, I will share observations from the perspective of an actuary working for a state insurance department. It is refreshing to note that, perhaps for the first time ever, states are taking a serious look at the actuary's work relative to the certification of reserves. Of course, it may not be so refreshing if you are one of the actuaries being asked to supply substantial additional information regarding your submission to the state.

Let me start with the criteria needed to formulate an opinion. Before starting your work as valuation actuary, it is important to outline the foundation for your review and to establish a set of criteria, or rules, that you will follow in formulating your opinion. Critical to this phase is a recognition of the fact that cash-flow testing of reserve adequacy comprises a serious attempt to evaluate and understand the risk structure of a company's various lines of business and the assets allocated to those lines of business. Thus, our work must focus on risk analysis. Approached in this fashion, the process becomes a management tool yielding meaningful information. The regulatory compliance aspect becomes a necessary by-product of this effort.

It is critical that objectivity rules in your approach. We cannot be objective with cash-flow testing if we have any preconceived notions about the company and its operations, for example, whether or not a given investment strategy or marketing strategy is appropriate.

Being objective can be difficult for an actuary who has worked with one company for many years and is deeply embedded into its culture. We must put aside any biases we may have if the process is to work right and our conclusions are to be meaningful and believable. Keep in mind that state insurance department examiners and advisors will likely approach any review of your opinion and actuarial memorandum with objectivity and an industry perspective. Unfortunately, solvency concerns can create its own set of biases, which may influence a regulator's perspective.

Early in the process, you should define a basis for determining the need for additional reserves. By this I mean, if stochastic interest rate scenarios are used, confidence limits must be defined

to determine the need for additional reserves. If deterministic scenarios are used, probability functions are needed to weigh the observed results of each interest rate scenario. Results will vary widely, and we must establish a basis for determining whether additional reserves are indeed necessary. More guidance is needed from the actuarial profession through research and analysis.

In preparing for this effort, the appointed actuary must thoroughly understand his company's economic situation and its positioning relative to competitors. For example, a company with a strong surplus to asset ratio well over 10 or 15% needs to be less concerned about precision than perhaps a company whose surplus to asset ratio is 5% or less. Similarly, a company with a low or average rating from A.M. Best or another independent rating agency will likely be under a brighter spotlight than an A++ company.

The appointed actuary must also be thoroughly familiar with the experience data needed by his projection model. Are the right data available? Are they reliable? Accordingly, the actuary must define appropriate standards for testing biased data. Similarly, he must identify the level of due diligence required when he must rely on others for data. For example, what review procedures are required of investment cash-flow information received from the investment department? It is my recommendation that we rely only upon company officers responsible for data completeness and accuracy. However, regardless of who we rely upon, some level of due diligence should be performed before we accept data. Minimally, the actuary must understand the basis used by another expert to prepare the data we need. For example the actuary must understand to what extent and how investment options have been considered in the preparation of investment cash flows, (for example prepayment levels and bond calls).

Finally, the appointed actuary must understand the variations that can and do exist in state valuation laws for formula reserves. Unfortunately this is a very difficult process, one for which the actuary may need to rely upon others for research. He must also know and understand the various NAIC actuarial guidelines that apply and their applicability to his company's situation. Similarly some states have interpreted certain aspects of the standard valuation law differently

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in written communications to companies. We must understand their applicability to our products and valuation procedures.

Let's move on to the analysis of results. To date, actuaries have paid most attention to surplus accrued at the end of the projection period. For example, if at the end of the projection period surplus is positive, the natural conclusion is that initial assets associated with the line of business must be adequate.

Most actuaries seem to base their conclusions on a "book value" analysis of results, even though they will also measure market values at the end of the projection period. Regulators are concerned that this approach relies upon a projection period that extends many years into the future, thus raising questions about its validity. Regulatory actuaries will often look for results at earlier interim periods. I believe it is essential for the appointed actuary to analyze both market and book values at the end of *each* projection year to determine whether, at any point in time, total-company surplus may prove to be inadequate. The problem is this approach introduces solvency measurement into a process designed to measure reserve adequacy.

To quantify any required additional reserves, observed deficits must be discounted back to the valuation date. Different discount rates can and have been used in this process, including portfolio rates, spot yield rates, and new money rates projected by each interest rate scenario. I'm not sure we could gain a consensus that any one approach is the best. However, whatever discounting procedure the actuary does follow, it should be clearly defined and supported in the memorandum.

I believe it is more important to evaluate year-to-year cash flows (i.e., the year-to-year statutory profits of the company) than the present value of ending surplus. Emphasis should be placed on the early years of projection because they are more predictable and of greater concern to management and to regulators. Similarly, I believe that statutory profits, as opposed to pure cash flows, should be used because statutory is the basis for any dividend distributions to shareholders or policyholders and it is obviously the basis of surplus accrual. The stream of

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year-to-year statutory profits must also consider planned shareholder distributions, to the extent such distributions are derived from line-of-business profits, and federal income tax allocations to the various lines of business.

Another critical element of analysis is a careful evaluation of results for both base scenarios and sensitivity scenarios. Base scenarios include the seven standard NAIC scenarios plus any additional scenarios the actuary deems appropriate. Sensitivity scenarios may actually look beyond interest rates to a plausible range of experience assumptions. For example, if the company is currently having an expense overrun problem, the actuary probably should look at different expense scenarios, marking the period over which the overrun will be eliminated. Based on my conversations with various state actuaries, this is an area of critical concern to regulators and will likely be an area that the regulatory actuary will ask for additional testwork in the future.

Another perplexing problem in analysis is how to interpret the wide range of results that you will get when you test an array of projection scenarios. What criteria does one use to determine the need for additional reserves? As stated earlier, if stochastic test work has been performed, the definition of an appropriate confidence limit can be helpful, perhaps 90 to 95%. Under deterministic scenarios, the appointed actuary must make a decision about the likelihood of occurrence for the tested scenarios. This, as you know, is no easy process and is one which senior management will likely get involved.

Finally, many appointed actuaries are likely to aggregate the results of various lines of business. This can be appropriate and should be given careful consideration, particularly in companies that have a diverse set of business units. Where substantial risk covariance exists among the various lines of business, the actuary should be careful that such covariance has been properly measured and is described in the memorandum.

Let's move on to the memorandum detail. To date, I have seen the memorandums from some 20 or 30 companies. Some have been good, and unfortunately others have been largely deficient

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in the level of detail provided in certain key areas. First, let me say that your focus should be on the quality of the disclosure included in the memorandum and not the quantity. A well-structured 25-page report can be far more valuable to a reviewing actuary, or regulatory actuary, than a wordy 200-page report that details every single assumption and includes endless pages of projection results.

For direction, the appointed actuary would be well-advised to read and have a clear understanding of the disclosure requirements of Section 9 of the model NAIC actuarial opinion and memorandum regulation (the model regulation). In the dozen or so states that have passed the revised standard valuation law and model regulation, the regulatory actuary is following a checklist of required disclosure items outlined in the model regulation. Some appointed actuaries have already complained that states are being too picky putting form over substance in their reviews. However, careful adherence to the minimum disclosure requirements of the model regulation can save many headaches later on.

In preparing your memorandum I believe special attention must be paid to at least the following items:

1. Recognize the support available for all key projection assumptions. This includes a description of any experience analysis performed and reliance placed on pricing or industry data. I believe this discussion is even more important than a disclosure of the assumptions themselves. In other words, it is more important to describe how assumptions were selected and what data were relied upon in establishing assumptions than it is to disclose in detail the assumptions themselves.
2. Know how the projection software treats any dynamic relationship between the various assumptions. This includes the level of lapses to the level of credited interest rates and competitor rates under each interest rate scenario.
3. Be aware of biases and limitations that may exist relative to data, software, assumptions, models, and results. Keep in mind that by disclosing these biases and limitations, you are actually protecting yourself, should subsequent litigation result.

4. Reconcile key items to the annual statement. This includes formula reserves and assets by class and type. Any use of a projection date other than year-end will force the actuary to reconcile amounts at the projection date to that at the current valuation date. In this light, it would be important for the actuary to disclose why an earlier date was selected and an indication whether or not recalculation at the valuation date would have created materially different results.

The disclosure should also include the methods used to formulate the opinion. In other words what projection results were used in the analysis; which scenarios were analyzed; were both book values or market values considered; which results were used in forming a conclusion about reserve adequacy? As stated earlier, this would cover such things as a recognition of the present value of ending surplus versus the year-to-year statutory cash flows and any aggregations of data used to recognize risk covariance.

The appointed actuary should also disclose which scenarios were tested and why, and the key results of each scenario. Similarly, sensitivity test work should also be discussed in the memorandum. In other words, the appointed actuary should discuss which tests were performed, and why and how they impacted the final conclusion about reserve adequacy.

Regarding assets, the appointed actuary should disclose assets included in the projection, any asset modeling performed, investment risks, and investment options considered in the process. Regulatory actuaries look for detailed disclosure about a company's investment and reinvestment strategies and whether or not the selected strategies bear any relationship to the company's actual investment practices. Unfortunately I have seen several memorandums that simply disclose tested investment strategies without any discussion as to why those strategies were selected and whether or not they bear any relationship to the company's practices.

As stated earlier, any limitations of the projection software should be disclosed, particularly in those areas that the valuation actuary considers important, such as the inability of software to adequately test risk covariance. Similarly, any limitations in the analysis process itself should

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be disclosed. By this I mean that the actuary should clearly indicate that, in large part, the test work performed is intended to measure variations in the interest rate environment and not in the company's economic environment. At best, the appointed actuary can only test a limited number of economic scenarios, while doing sensitivity testing. He or she should clearly caution the reader of the memorandum that any conclusion about reserve adequacy will exclude consideration of all plausible variations in economic factors, beyond interest rates.

Finally, where cash-flow testing was not used, the appointed actuary should disclose why, what was used, why what was used is valid, how the analysis was performed (in other words, how the various asset risks were actually considered), the results of alternative testwork, conclusions, and the basis of conclusions. You do not have to be wordy in this disclosure process, but you should be complete. Based on my conversations with attorneys recently involved with litigation involving actuaries, it would be my advice to disclose more than not enough. Explicit disclosure can prevent implicit assumptions about the quality of your work.

Let me offer a few comments about documentation for a Section 7 opinion. I believe most would agree that an actuarial memorandum is still required under our professional standards, if not under current regulatory provision. Obviously, it is important to describe in detail the criteria used to claim an exemption from a Section 8 opinion.

Some actuaries feel that the disclosure requirements of the opinion itself should be adequate. However, I believe there are circumstances when the appointed actuary may still feel compelled to conduct some level of cash-flow testing even though he or she is exempt under the requirements of the model regulation. For example, a small company with substantial universal life reserves may be exempt by definition under the regulation but still may be subject to substantial interest rate risk.

In the memorandum the appointed actuary should discuss how he complied with the various special requirements of applicable NAIC actuarial guidelines and other state interpretations or rules. Similarly, the memorandum should not only disclose assumptions, but also changes in

those assumptions, why changes were made from one reporting period to the next, and whether the appropriate regulatory approvals were obtained. Disclosure should be given of reserve methodology and any approximations used in the determination of formula reserves. It is also essential to disclose any biases and limitations in the data used to estimate reserves, such as health claim reserves.

If the appointed actuary's Section 7 opinion has been qualified for any reason, full disclosure of the reasons for qualification should appear in the memorandum. This, as you know, can be a very difficult process, given management's desire to avoid regulatory confrontation.

Thus, while one would expect a Section 7 actuarial memorandum to be considerably shorter, it still must include many of the same elements that are also included in a Section 8 memorandum.

Let's move on to reliances. This has been an area of great concern to most appointed actuaries. When are reliances required? Who should we rely upon? As I see it, there have been two areas of concern.

The first relates to the reliance on other actuaries in large companies. Only one actuary will sign off on the reserves of the company. In large company situations, however, where there are several lines of business, the corporate actuary may be selected as the appointed actuary for purposes of providing an opinion. Reliance upon other actuaries cannot appear in the opinion itself. Accordingly, the memorandum is the vehicle to disclose any reliances on other line-of-business actuaries. It should also outline the review process employed by the appointed actuary in drawing conclusions.

Most important, where the appointed actuary must rely upon other actuaries, he must control the process. In other words, he must control the level of due diligence that is required. This includes the level of documentation, standards for the appropriateness of assumptions, and the accuracy of modeling techniques.

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Regarding nonactuarial areas of reliance, such as for the quality of the in force or investment cash flows, the appointed actuary must look to experts from other departments or organizations. It would be my recommendation that only qualified company officers or qualified professionals from outside organizations be relied upon for this purpose. As stated earlier, regulators will look for expertise in the reliance statements. As with other actuaries, the appointed actuary should control the process. He should clearly understand the input of the relied upon individual and should collect appropriate back-up support.

Appropriate reliance statements must be collected from all relied-upon individuals and submitted with the opinion to the various state insurance departments. The actuarial memorandum should also disclose any limitations, concerns, or qualifications that the appointed actuary may have about the data received from relied-upon individuals.

Recognizing the importance of asset cash flows to the process, some regulators have expressed concern about an appointed actuary's total reliance on an investment officer for asset cash flows. There is some fear that regulators will no longer allow the actuary to express reliance on investment professionals for asset cash-flow data. This, I believe, would be inappropriate because we as actuaries generally do not have the in-depth knowledge and expertise about a company's asset portfolio and the behavior of the investment markets. Nevertheless, the message is clear that regardless of who we rely upon, we must understand the process followed by a relied-upon expert if we are to feel comfortable that such data are complete, accurate and representative.

I will end by commenting on qualified opinions. First, let me ask you two questions. Do you believe the current wording of the opinion says too much or does it say enough? Will regulators actually accept variations in this wording?

My greatest concern about the current wording is that we may be giving the reader an inappropriate level of comfort about the adequacy of a company's reserves. As you know, cash-flow-testing procedures followed to date mainly test a limited number of interest rate

environments. While we are encouraged to sensitivity test, very little work is being done to test the impact of varying economic environments. Thus we really don't know if reserves would stand up in times of a severely depressed economy, for example.

One lawyer told me that, if we are concerned about what the standard wording may imply to the reader, we should modify the wording to our liking. In other words, if we wish to put in some qualifying language in the opinion, we should do so and let the regulators come back to us with questions. Nothing in the law says we cannot qualify our opinion.

This brings up an interesting question. That is, what exactly is a qualification to the opinion? Is any variance from the standard wording a qualification? Is the simple disclosure that we have not tested a plausible range of economic scenarios a qualification?

It is my opinion that we should not be afraid to use clarifying disclosures in the opinion itself. Minimally, clarifying disclosure should be included in the supporting actuarial memorandum. However, keep in mind that most readers of the opinion will never see your memorandum. If it is important enough, then we should say it in the opinion itself. Whenever variations in the standard wording of the opinion are used, a complete explanation should appear in the memorandum. I hope this will stem regulatory concerns about noncompliance.

As I see it, a qualified opinion does not necessary mean a financially troubled company. It simply means that the appointed actuary wishes to disclose certain critical facts or limitations that should be understood by the reader of the opinion.

In today's highly litigious American society, we cannot be too careful. The appointed actuary concept has yet to be tested in our system of jurisprudence. Perhaps the best advice is, when in doubt, disclose, even if it means that you have to qualify your opinion. And before signing that opinion, make sure that you clearly understand your exposure to legal liability.

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**MR. PAUL F. WHARRAM:** My remarks will focus on my own company, what we did in 1992, and what we hope to do in 1993.

Last year we used homegrown asset/liability software that was only able to answer the basic questions. This year we will use Chalke's system to help us produce our actuarial opinion and memorandum.

The particular topics I will discuss are:

1. Criteria used to form an opinion, including the standard valuation law requirements, how to aggregate lines of business, and how many scenarios you need to pass.
2. The kinds of reliances that you might want to consider, the ones that I chose to disclose, and the ones that were close.
3. Year-by-year cash flows and profits, how we use them, along with an example of how our investment division uses them.
4. How much information we put in our actuarial memorandum.
5. What type of documentation is sufficient to support the use of methods other than cash-flow testing, and one example of a block of business that we used another method to analyze.

For me, the actuarial memorandum provides some good information about our company, but our main concern, and that of our shareholders, is our GAAP results. As a practical matter, this means we will use the simplest analysis allowed.

In order to form my actuarial opinion:

1. I test the required seven scenarios.
2. I use an infinity test. At the end of the projection period the accumulated surplus plus the book value of remaining assets, less the book value of remaining liabilities must be positive. As long as our statutory reserves remain significantly higher than our net

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GAAP liabilities, I am not concerned by the surplus position during the projection period.

3. I select a projection period that is long enough to reduce any unmatured assets or liabilities to 10% of their initial value. This results in projection periods of 10 to 40 years, depending on the kinds of liabilities or assets.

ASP 22 does not require that my actuarial opinion consider the pattern of annual gains and losses. The draft version did include such a requirement, but the approved version does not.

Since our annual statement reserves are already large compared to our GAAP requirements, and raising more capital is undesirable, we choose to do our asset adequacy analysis on the whole company aggregated basis. This will allow offsets to occur, and helps to ensure that we use consistent assumptions across all lines.

In fact, how we aggregate depends on the audience. For the actuarial opinion, we aggregate the whole company to minimize the need for additional reserves.

For state examiners, external auditors, rating agencies, and senior management, we measure asset adequacy analysis results by major lines or business units. I have found that the same analysis can be used for each of them. Last year the separate lines we used were:

- Individual -- both life and annuities
- Group annuities
- Group life
- Reinsurance assumed

Business units do additional testing themselves. For example the individual unit measures participating and nonparticipating life separately, so that it can manage the products and risks of each independently.

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Our pricing actuaries will do asset adequacy analysis on each new product. For in-force business, testing will be done as part of the annual business plan.

Having decided to use the seven prescribed scenarios, to use the infinity test, and to aggregate at the company level, I require positive results for all seven scenarios to pass.

Two negative accumulated surpluses is viewed as a failure, and we would need to set up additional reserves.

With one negative scenario, I would test more scenarios to determine if an increase was needed.

So far we have always passed all seven scenarios.

Our goal in asset adequacy analysis is to meet the requirements of the standard valuation law without increasing statutory reserves. We do additional tests for our own internal reasons even though we do not report this in our actuarial memorandum. Some of the additional tests that are useful are:

- The pattern of profits for the first three to five years to monitor surplus strain.
- Cash flows used in planning investment strategies.
- Trends from previous years help in strategic planning.

I will describe a list of some information and processes that must be relied upon to prepare your annual statement and actuarial memorandum. These are items that affect my ability to sign an actuarial opinion, since all can lead to wrong reserves.

Asset data information is an obvious item to consider. Where did you get the book value and cash flows for the assets? If you do analysis for lines of business, how do you make sure that each asset is only used once? What cash flows do you have for impaired assets?

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Liability data includes policy data. What tests have you used to verify that your valuation file matches the policy master file? How have you tried to correct material errors?

If you purchased reserve software, do you know how it works? Have you reviewed the documented formulas to see that it does what you want it to do? Has the vendor released a new version, and if so, have any of the answers changed?

I use a review process where each year we recalculate reserves for sample plans, ages, and durations. We do this on a different system from our valuation system. You can build or buy software to do these calculations on your PC.

Cash-flow software is more difficult to test than reserve software. How can you know exactly what it does, or even what it is designed to do?

How many of us do all of the asset adequacy analysis work ourselves? Probably no one. If the people doing most of the work report to you, then staying involved in their work means that you are not relying on them.

Often the work is decentralized, done by actuaries in the business units, and tested by the appointed actuary. Here it is a good idea to get something in writing from these actuaries even though you do not disclose a reliance. In these cases I make sure that the book values agree, or if there are timing differences, I make modifications so that they do agree.

There are many economic assumptions used in asset adequacy analysis, including expenses, interest, and the impact of the options in the assets. Is there any difference between selecting values yourself, or asking other experts in your company? As long as you examine these assumptions using sensitivity testing, then I don't think it matters where the base assumptions come from, and you do not need to disclose a reliance.

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It's not generally clear which situations create a need to disclose the reliance. It is common practice to disclose the asset data reliance. I do at my company since I'm not the expert on assets. Since we test the policy data carefully in corporate actuarial, I do not disclose a liability reliance. My first reaction to software is that I should disclose a reliance, but you really need to do your own verification. Also, I doubt that you will find any vendors who will give you a reliance letter.

So far, year-by-year cash flows or profits are not required by the standard valuation law, the actuarial memorandum regulation, or ASPs 7, 14, or 22, but cash flows, along with Macaulay duration are good tools for investment management. Your asset adequacy analysis will also help test various investment strategies.

Disinvestment is rarely a significant factor if you consider the whole company. Most disinvestment will be done by transfer of assets between lines, and then you will get unreasonable-results for the whole company if you use different interest rates for borrowing and lending between lines. When you are testing the whole company, make sure that your only disinvestment costs are for assets that are sold, or for money that is borrowed from outside the company. For a closed block of business, it is more important to measure the disinvestment risk and the cost of disinvesting.

Next is a simplified example that shows how our investment division used cash flows to change our investment allocations for one line of business:

| <u>Years</u> | <u>Net<br/>Cash Flow</u> | <u>Old<br/>Allocation</u> | <u>New<br/>Allocation</u> |
|--------------|--------------------------|---------------------------|---------------------------|
| 1            | \$34M                    | 10%                       | 0%                        |
| 2-3          | (47)                     | 20                        | 40                        |
| 4-6          | (24)                     | 25                        | 25                        |
| 7-9          | 43                       | 45                        | 0                         |
| 10-13        | 43                       | 0                         | 0                         |
| 14-20        | (17)                     | 0                         | 35                        |
| 21+          | (21)                     | 0                         | 0                         |

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Some of our current cash flows are positive, and others are negative. I have grouped similar years together to simplify the table.

The old allocation shows the investment strategy by duration of purchases. It was based on a previous set of cash flows, and the Macaulay duration of those liabilities.

Our most recent cash-flow study showed that the negative cash flows had moved to different durations, and that our assets were now too short. The new allocation is designed to correct the shortages over the next three to six months.

Year-by-year statutory profits are the cash flows plus changes in statutory reserves. Our company has sufficient surplus and is not concerned by the amount of surplus strain generated by our new business. For other companies it may be valuable to examine the projected profits more carefully.

Section 9.B of the actuarial opinion and memorandum regulation lists the required contents of the memorandum. To illustrate, I will describe our 1992 memorandum.

For our analysis, we grouped our liabilities into eight blocks that corresponded to business units and product types. For example one block contained annuities and supplementary contracts. Another block contained separate account policies. For each block, I identified the amount of reserve, method and basis, and described the products.

For the five largest blocks, specific assets were already assigned to the lines that correspond to these blocks. In this way over 80% of the assets were directly assigned. For the other blocks, the remaining assets were used in equal proportions. In all cases we used bonds, mortgages, policy loans, and cash, but did not use, or need to use, stocks, real estate, or other investments.

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Our investment assumption was either short-term money, or bonds, depending on the line of business. This is consistent with current actual strategies. For disinvestment we do not have any long-term shortages, so our strategy is to borrow.

On a single-page spreadsheet, I listed for each of the blocks, the amount of each asset class, and split the liabilities shown in the actuarial opinion. I find this table to be a convenient summary.

The methods for projecting cash flows and for projecting the accumulated surplus are discussed, along with the criteria used for determining asset adequacy.

Although we aggregate everything for forming the opinion, results are shown for each block under each of the seven scenarios.

The base scenario year-by-year cash flows for assets and liabilities are shown separately and net, along with the accumulated surplus at the end of the projection period. Last year my memorandum was 15 pages, and the appendix was 20 pages.

One published list of methods, other than cash-flow testing, can be found in ASP 22, section 5.3.1.a. There are four methods for asset adequacy analysis listed:

1. Demonstrate that the reserve basis is conservative by comparing assumptions to experience, and show that the product is risk controlled. By risk controlled I mean that the experience is not strongly related to economic scenarios. Riders and supplementary benefits are good candidates for this treatment.
2. Calculate gross premium reserves and use sensitivity testing to determine the likely range of answers. The objective is to show that the actual statutory reserve always exceeds the gross premium reserve. This works best with products having limited risks such as YRT reinsurance, or a level commission ART product.
3. For health claim reserves, it is often sufficient to use loss ratio methods as described in ASP 5, "Incurred Health Claim Liabilities."

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4. Studies from previous years can sometimes be used, instead of using current studies, if you can show that the previous assumptions are still valid and consistent with actual experience. To apply this method you would want a stable block such as your 1958 CSO fixed premium universal life that was issued between 1982 and 1983.

When you use one of these non-cash-flow methods for doing asset adequacy analysis, you will need to:

1. Give a written explanation starting with a description of the method you have used.
2. Identify the block of liabilities, giving the amount of reserve, how this block can be distinguished from other policies, and where to look in the annual statement to find the reserves.
3. Explain what the risk factors are, and show how you measured the actual experience and compared it to the assumptions. Also, explain how the analysis supports the position that the reserves are sufficient.

Last year I used one of the non-cash-flow methods for our closed block of variable universal life. I used the "demonstration that the basis is conservative and the product is risk controlled" approach.

In 1988 we stopped selling this product, and since these are single premium policies, there have been no premiums since then. This block is the entire reserve shown in Exhibit 6 of our separate accounts statement, plus the associated general account liability for minimum death benefit guarantees.

The risk factors are:

1. Investment risk is zero. We credit the value of the separate account, and there is no guaranteed rate of return.
2. Issue expense loading is irrelevant since we have stopped sales and there are no renewal premiums.

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3. Investment expense load is 100 basis points. By contract with the external investment managers our current investment fee is 16 basis points, and the maximum is 75 basis points.
4. Administrative expense load is 60 basis points, while actual expenses are 110 basis points. This shortage is more than covered by the profit from the investment expense load. Also, management has a plan to reduce expenses by computerizing some manual processes and eliminating some management staff so that the load will become sufficient in a few years.
5. Policy loans are no risk since we have a contractual 70 basis point spread between the credited rate and the loan rate on policy loan balances.
6. Mortality charges are 1980 CSO. Since 1988, the cost of insurance (COI) deductions have totaled more than \$2 million per year, while death claims have never exceeded \$1 million. The COIs seem sufficient.
7. This product has front-end loads that covered actual issue expenses. Since the accumulation value is net of the load, there is no risk of expense loss on surrenders.
8. At issue, a guaranteed death benefit is determined. This could result in a cost to the company if the current death benefit falls below the guaranteed minimum death benefit. For this to happen, long-term rates of return on the separate accounts would need to fall below 4%, and today's 30% difference between the current and guaranteed death benefits would need to be eliminated by a further drop in the value of the separate accounts.

For the actuarial memorandum, my documentation of this method was a two-page memorandum.

