

---

# 2003 VALUATION ACTUARY SYMPOSIUM

## September 11–12, 2003

### San Diego, California

## Session 15PD

### Minimum Guaranteed Benefits on Variable Annuities

**Moderator:** JOHN O'SULLIVAN  
**Panelists:** TIMOTHY HILL  
JAMES W. LAMSON

*Summary: There has been significant activity in the area of guaranteed minimum benefits on variable annuities, as well as a better appreciation of the tail risks associated with these benefits. This session provides an update on the current status of the actuarial guidelines on death and living benefits, the Academy's work on a non-formulaic, risk-based capital standard and GAAP developments. The practical considerations and alternatives of implementing these standards are also discussed. Participants will better understand the requirements of these standards and their financial implications, as well as the issues involved in a successful implementation.*

**MR. JOHN O'SULLIVAN:** It seems that we've been having this type of panel discussion at Valuation Actuary Symposiums for the last five to seven years. There is always something new to talk about. Our panel today consists of three consulting actuaries. Each of us was a member of a Quad M group that worked on a proposal for guaranteed living benefits, and we've been active in the successor groups to the Quad M group.

I'll start the discussion by taking care of some old business, such as AG34 and AG39. Then Jim Lamson will discuss more of the details about the standards for risk-based capital (RBC) and variable annuity reserves. Then I'll share some of the numerical results out of the variable annuity reserve working group and some of my thoughts about things to watch for and things to start working on. Then Tim Hill will talk about GAAP developments and the impact of the proposed standards on various companies.

---

\* Copyright © 2004, Society of Actuaries

**Note:** The chart(s) referred to in the text can be found at the end of the manuscript.

Jim Lamson is the vice chair of the Variable Annuity Reserve Working Group from the Academy. He's also the president of Actuarial Resources Corp. and has a long background in life and annuity financial reporting and in product development. He's also a member of the Life Valuation Subcommittee of the Academy.

Tim Hill is a consulting actuary with Milliman USA. He was the principal modeler of the work that we did on the Quad M group and, like the rest of us, has remained actively interested in what's been happening with the Academy.

My firm is Trinity Actuarial Consulting. I'm going to talk a bit about the dollar for dollar problem. Initially, when people thought about the effect of a withdrawal, the focus was on making sure that there was no increase in dollar amount at risk. In Table 1, there are two columns titled before and after.

Table 1  
AG 34 - Dollar for Dollar in GMDDB Calculation  
The Worry: Customer Anti-Selection

	Before	After
GMDDB	\$180,000	\$92,500
Acct Value	\$90,000	\$2,500
NAR	\$90,000	\$90,000
Note: Revenue went down 97 percent (assuming asset-based charges)		

The "after" column reflects the withdrawal of \$87,500. The problem is not with the net amount at risk (NAR) increasing. The problem is that almost all of the products have asset-based charges that are working off of the account value. So, after this dollar for dollar withdrawal, your revenue has gone down by 97 percent. That's really where the gist of the problem is; you have less revenue to cover even the reduced or, in this case, no reduced benefit cost.

There are a couple of practical considerations here. First of all, when customers strip out the contract, you have to set up a reserve on that basis. There is an ambiguity in the way that AG33 and AG34 interact as far as the interaction of those regulations. The industry seems to be having pretty low usage. In the discussions that I've been part of at the Academy, I've heard numbers that have been less than 5 percent of strip outs in companies that have had dollar for dollar adjustments. If we fully reflect it in AG34, it's inconsistent with what's happening with the new RBC standard, because the new RBC standard is really based on company experience and a prudent best estimate, not in providing for the worse case. I think the ultimate solution is the new framework for RBC and for variable annuity reserves.

Of the responses that are under consideration, one is to somehow limit the applicability of AG33, which says to consider all possible situations. Limit it so it doesn't have its full impact on variable annuities or ultimately limit the amount, the impact of using it on AG34. So for the AG34 part of the calculation, you don't need to consider all possible benefit streams. Another proposal was not to include it in

formula reserves, but rather to put it in the asset adequacy testing. The last approach is to provide more directed guidance. The numbers that I've seen were to specify either a 10 or 20 percent usage in the reserve calculation.

AG39 is the successor to Quad M. It stands as an interpretation of the standard valuation law. It was effective for year-end 2002 for most people, but it's temporary. It's going to end no later than the beginning of 2006. It's a stand-alone reserve. So, in other words, unlike what happens with the rest of the variable annuity reserve that's supposed to be part of an integrated type of benefit/revenue stream, here you're determining an add-on reserve. It's an accumulation of fees that requires asset adequacy tests, but just in aggregating the variable annuity guaranteed life benefits (VAGLBs).

The practice note that came out in December 2002 amplified the meaning of "in force." Basically, the "in force" contracts are those contracts that still are eligible for the VAGLB. The accumulation is at no interest and, almost as sort of a premonition, the asset adequacy testing is done separately, so it's just looking at the VAGLB benefits and the VAGLB revenue. You can't use redundancies somewhere else. It mentions two resources, one being the regime switching lognormal modeling of returns, and the other being the December 2002 RBC Report.

The heritage of Quad M is still with us. Formula reserves are extremely difficult and time consuming for the industry to develop. We worked four years on Quad M and it never really took off, for a couple of reasons. First of all, it wasn't all-inclusive. It didn't handle all the benefits, for example, the Gain death benefit. The second reason is that it has a very limited safe harbor. If you had any kind of a path-dependent benefit, you couldn't use the safe harbor, which was the Keel method. By path dependent, I mean that the size of the benefit depends on which path you took through the whole universe of possible investment returns. Quite often, it pushed you toward stochastic modeling, either full or on a limited basis. The limited basis was called "representative scenario," and it was a poor fit with what was emerging from the stochastic RBC standard. So there's a search for a better solution.

The stochastic models let you see what's happening with the risks, so they're far better for that. The tails, assuming that you have a calibration standard for the stochastic models, are fatter, so you capture the tail risk. I am hopeful that the RBC and the variable annuity reserves will be on a consistent approach, and Jim Lamson will be talking about how each of these is done.

We have a different starting point for reserves. This requires a little bit of explanation. I've been doing variable annuities since 1987. The classic method was to take the formula reserve and do some asset adequacy testing as a second layer, but this new approach really turns everything around. Here, you start looking at your experience and at your business in force and the risk characteristics, then put

together a model and use the model to tell you what you should be setting up as far as the reserve goes.

It allows you to incorporate risk management and the diversity of products. There's no doubt that you get time diversification, benefit diversification and age diversification. You can think about a Gain death benefit and how risk for that will often offset a guaranteed minimum death benefit risk. The diversity of product offerings can be taken into account with this better solution. It would recognize hedging and reinsurance, both proportional and non-proportional.

So with that, Jim Lamson is going to take it from here.

**MR. JAMES LAMSON:** I'm going to go through a description of proposed C-3 requirements and then give you an update as to where we are in developing similar requirements for variable annuities on the statutory reserve side. Those that have been following the development of the C-3 Phase II approach to RBC determination during the last couple of years already know that the process first develops what's called the total asset requirement (TAR). TAR is determined by applying the conditional tail expectation measure to a large array of beginning asset amounts determined to ensure solvency through stochastic scenario testing. You then subtract whichever reserves the company holds, and the C-3 risk-based capital component is what's left over. If you are unable or unwilling to perform the needed projections and have only guaranteed minimum death benefits and no VAGLBs, then you can apply the alternative factors on a seriatim basis adjusted as necessary to fit your product features.

The scope of products subject to the new requirements has been widened since last December's report to include all variable annuities, not just those with death benefit or living benefit guarantees. Secondly, there are some group life contracts out there that are also included in the requirements, as they wrap around mutual funds and provide death benefit or living benefit guarantees relative to the performance of the mutual funds. Separate account products that just guarantee an index are excluded. It was also decided to not include variable universal life products at this time. Finally, the effective date of the new requirements, if adopted by the NAIC, could be as early as December 2004 for both reserves and risk-based capital.

You might ask yourself how big a job is this going to be. First, you need to allocate the assets with which you will start the projection equal to an estimate of what your actual reserves will be. Secondly, you need to develop a model of your business in force, if that's not already being done on a routine basis. The model will need to accommodate projections done with a large number, such as 1,000 stochastically generated return scenarios. Then you need to project the cumulative surplus or deficit at the end of each future projection year under each of the scenarios.

Don't forget to calculate the present value of each of the resulting annual surpluses or deficits for each projection year for each scenario. Once you've finished the

projection for a given scenario, select the future deficit having the worst present value and add the beginning assets to it. This amount represents the assets required to ensure solvency throughout the entire scenario. Scenarios having only future surpluses can reduce the beginning assets, but never less than the cash surrender value.

Do this for a large number of scenarios, such as 1,000. This will give you an array of results, one for each scenario. Now rank those 1,000 results and compute the average of the worst 10 percent, that is, the average of the largest 100 deficits. This is called the 90th percentile conditional tail expectation. It is a measure designed to capture the tails of the distribution of expected future outcomes.

The result is called the total asset requirement. It represents the assets needed today for the variable annuity operation to survive not only 90 percent of the expected future outcomes, but because the average is taking over the worst 10 percent of outcomes, perhaps 95 percent or so of them. As you can see, an advantage of the conditional tail expectation measure is that it allows results in the tails of the distribution to contribute to determining the required assets—something very important for high-impact, low-frequency events.

When building the model for the projections, you must include all your variable annuity business along with other business subject to the requirements. You have to determine the number and type of asset classes for your particular circumstances, probably five to seven, or perhaps more. Variable sub-accounts for each contract, and actual assets, have to be summarized into these categories. Then you need to determine appropriate assumptions for policyholder behavior in the projections on what is called a "prudent best-estimate basis," incorporating conservatism to the extent of your uncertainty regarding the assumptions. The less certain you are, the larger the margin. The range of assumptions is probably not too different from what you're using now in cash flow testing.

Some of the policyholder behavior assumptions include mortality and lapse or surrender rates. Rates of partial withdrawal should be developed, since the policies that are reduced due to withdrawals can continue and cause you to incur expenses for policy administration and other functions. Also, if your contracts contain the dollar-for-dollar partial withdrawal feature, you need to model the possibility of certain contract holders withdrawing almost all of their funds during projected adverse market conditions. This effectively creates a paid-up insurance policy equal to the net amount at risk at the time of withdrawal.

For any living benefit guarantees, you need to develop benefit election rates to apply once waiting periods have been satisfied. Given that little experience exists with these benefits, you're likely to want to see which election rates were used in pricing and profit-testing those benefits. If your contract allows additional premium payments to be made, then you'll need to develop payment rates that are sensitive

to the scenario with more premium flow under some projected conditions than under others.

You need the rates of expense that the company will incur. These should include a portion of overhead. You will, of course, need to model the actual mechanics and features of your variable annuity products, such as the minimum death benefit guarantees, both downside and upside. You will need to know the amount of the charge that's assessed for each benefit.

For the VAGLBs, you'll need to model the benefits, the waiting period and the charges assessed for each. Dollar cost averaging and other transfers to and from a separate account need to be modeled. All other variable annuity product features need to be modeled, including surrender charges, which can be very complicated and difficult to model under varying conditions. Your model should also reflect any reinsurance treaties you have entered into, so that premiums and reinsurance recoveries can be modeled properly, since reinsurance overall should logically result in a cost to you, but may be your safety net in the extreme scenarios.

Regarding dividends, the projections are to include payment of expected policyholder dividends, whereas stockholder dividends are not required to be paid. This latter point was somewhat contentious, but because the stockholder dividends are a function of total company operations rather than just of the variable annuity line of business and other considerations lent support for not requiring modeling of stockholder dividends. Finally, your projections should include the determination of taxable income and resulting Federal income tax.

Starting assets should be consistent with what you use for asset adequacy analysis. You should include 100 percent of the assets held for the contracts in the separate account, even though you're starting the projections with assets equal to estimated reserves. This is because the actual cash values and account performance after the surrender charges have worn off will be determined using 100 percent of these assets. Assets that you've purchased to hedge the guarantees in your contracts may be included in the projections. In addition, you must solve for the general account assets needed to make starting projection assets equal to estimated reserves. Starting with an overabundance of separate account assets may result in negative general account assets.

As for assumed asset returns, equity return scenarios must be generated in such a manner as to meet the calibration standards published as part of the C-3 Phase II recommendations. These calibration standards were developed by fitting a regime-switching lognormal distribution with two regimes for the historical returns from December 1952 to December 2002. They are expressed as a table of values representing the maximum-gross, wealth-accumulation factors for left-tail quantiles and minimum gross-wealth accumulation factors for right-tail quantiles, thus ensuring sufficiently fat tails for the distribution of returns.

The choice of distribution functions for generating the stochastic scenarios is up to you. However, given that the regime-switching lognormal distribution was used to generate the calibration points, you may want to consider using this distribution to avoid introducing additional conservatism. Return scenarios will have to be generated for each asset category. As for the fixed account, you can use the forward rates derived from the swap curve, or if you have an interest rate model that is integrated with the equity return model, you can use that instead. You will want to generate returns appropriate for the time period of your model: monthly, quarterly or annually.

For the projection of accumulated deficiencies or surpluses, projections need to be run until the effect of omitting further results is immaterial. However long this may be will depend on the market in which your business is sold, the product features and other aspects that will have a bearing on the potential for the business to produce large losses. To determine surplus, you can use a so-called "working reserve" equal to the contract cash value, in lieu of a reserve determined using stochastic scenarios within stochastic scenarios. You don't have to calculate the working reserve by running 1,000 scenarios at the end of each of future year.

For the accumulated surplus or deficiency, losses are considered positive numbers while gains are negative because we're focusing on the assets needed to prevent cumulative losses from developing. This may be calculated at the end of each year as the working reserve less assets. Gains are allowed to reduce assets needed for a scenario, but never to less than the aggregate cash value at the start of the projections.

All the different arrays of values can get confusing, so let's pin things down a little bit. Even though projections may run for 20 or even 30 years, only a single value for each scenario is retained—the greatest present value of future cumulative losses at the end of each future year. Of course, since the reserve requirements are being designed to avoid running two sets of projections, you will want to keep track of two different sets of present values: one calculated using after-tax interest rates for RBC purposes, and another calculated on a pre-tax basis. This reflects that RBC is not tax deductible, whereas there is a tax deduction for reserve increases.

We decided to include a value of surplus at time zero in the determination of the greatest present value of future deficiencies. Logically, it results from having equal treatment for all models regardless of the time step. So, as one decreases the interval from annually to quarterly to monthly and, ultimately, down to the moment, the surplus at time zero should be considered. This also offers the advantage of not needing to invent the "modified" conditional tail expectation where a floor value of zero is introduced, to eliminate allowing surpluses from some scenarios to offset deficiencies from others. So now we just talk about CTE and not MCTE.

Another change since last December's report that played into the other decisions just mentioned was to specify that future deficiencies should be measured at the ends of projection years, whereas previously the frequency was up to the practitioner. Finally, including time zero allows a floor for the treatment of negative deficiency values (i.e., gains) equal to the cash value at the start of the projections less beginning assets. Allowing these negative deficiencies to this extent is needed to avoid a ratchet effect that would cause, no matter how big your beginning assets, a need for an add-on to increase it.

To calculate the conditional tail expectation, you should rank these greatest present values from the scenario having the greatest present value of deficiency down to that having the smallest deficiency. A late change for the September C-3 Phase II report from the Academy adds the starting cash value to these amounts, rather than adding it to the CTE applied to just the deficiency present values, but this still produces the same result.

One is to average the worst 10 percent of these ranked scenarios for RBC, and average perhaps the worst 40 percent of the scenarios for reserves, although that has not yet been decided by the Life and Health Actuarial Task Force (LHATF). The average is the 100 minus X percentile conditional tail expectation, or 90 CTE, for determining the total asset requirement. There is still a somewhat remote possibility that LHATF would decide to set reserves using a percentile method rather than CTE, such as at the 83 1/3 percentile, for example.

The new requirements include a beneficial and fundamental advantage that should not be ignored. The "benefits of aggregation" refers to the fact that gains on one block of business may appropriately be used to offset losses on another. This means that longer projections are almost always better than shorter ones. It also means that you need to organize the projections in such a way to allow aggregation of results across the total model at the end of each future projection year.

This means that offsetting risks are netted against each other, such as those in contracts having both a guaranteed minimum death benefit and those paying a death benefit equal to a percentage of the gain in the contract. This offsetting of risk translates into having projected profits offset projected losses, such as can occur on profits from business past the end of the surrender charge period being netted against losses on earlier duration business that is "in the money." This can have a big impact when the "solvent at every duration" measure is applied. You certainly do not want to divide up your business to make the modeling job easier and apply the C-3 Phase II requirements on a piece-wise basis, as you will then lose the benefits of aggregation.

The cumulative deficiency needs to be determined by aggregating across all business regardless of its contract duration. What would have perhaps been the largest deficiency when considered by itself is reduced by profits on other business, and thus ceases to produce the greatest present value deficiency.

Now we know how to compute the C-3 component of RBC for variable annuities. Let's shift our focus to how we might piggyback off of this pioneering work performed by the C-3 Phase II work group to develop a new way of calculating variable annuity reserves that use the new technology. We got started on the variable annuity reserve work group (VARWG) in January 2003 with the assumption that a reserve could be developed using the same projections, assumptions and scope. By getting our work group started before the C-3 Phase II work was complete, we hoped to influence potential changes and modifications that would benefit application of the methods to reserve calculations. We have been successful in this regard. Some of the changes made since the December Phase II report have been made to accommodate the needs of the reserve calculation process.

The two main differences between the RBC and reserve results are in the discount rate, as noted earlier, and in the CTE level. The September report of the VARWG is requesting, among other things, that LHATF indicate the CTE level for calculation of reserves. Our report includes some numerical results at 60 CTE and 65 CTE. Tom Campbell, the chairman of the VARWG, is presenting our September report to the LHATF meeting.

A lot of work has been done so far. We have about five hours per week of conference calls between the main group and the three subgroups that are working on tax issues, analysis of numerical results and allocation of the aggregate reserve to individual policies. To learn more about the results of this activity, you can find the March, June and September reports of the VARWG on the American Academy Web site. You can also obtain the reports of the C-3 Phase II work group on the American Academy's site as well.

One of the main questions about which we asked LHATF to provide guidance addresses the form they would like to see the reserve requirements take. One potential form of the requirements could be that of an actuarial guideline, which would interpret the commissioner's annuity reserve valuation method (CARVM) to include these new requirements. This offers the advantage of having new requirements apply to business already in force if desired by LHATF, and would result in fairly uniform requirements by each state.

Another approach would be to draft a model regulation under section nine of the Standard Valuation Law. It is unknown as to whether the new requirements could apply to business already in force, but would basically amend the CARVM method as applicable to variable annuities. This approach would likely result in fairly uniform requirements by state, helped by codification.

The third way the new requirements could take effect is through modification of the Standard Valuation Law. This approach would likely take a long time to put the requirements in place, and they would likely not be as uniform by state. Again, there is a question as to whether the requirements could be made applicable to

business already in force. As with the model regulation approach, this would also entail broadening the definition of CARVM as applied to variable annuities.

Tax reserves on variable annuities must qualify as life reserves. The tax code specifies that they must be computed or estimated on the basis of recognized mortality or morbidity tables and assumed rates of interest. This may be a problem for reserves computed according to the actuary's own assumed rates of mortality and forward interest rates derived from a swap curve. In addition, for tax reserves to be deductible, they must be computed on a seriatim basis using the CARVM method and discounted with the larger of the applicable federal interest rate and the prevailing state assumed rate. Thus, we have our challenges ahead of us to make sure that variable annuity reserves remain deductible.

Other tax issues identified by the subgroup include splitting the reserve between the separate account and the general account. Even if the new requirements are put in place through an actuarial guideline, the IRS may take the position that this is reserve strengthening, based on positions taken recently by the IRS. This may subject any change in reserves to spreading over 10 years.

As I mentioned, Tom Campbell is presenting the VARWG September report to LHATF. We're hoping to get direction as to the level at which to set reserves. It seems likely that CTE 60 or CTE 65 may prove to be considered adequate. Assuming that the regulators are happy with the total asset requirement, then how much is held as a reserve and how much is held as capital may be regarded by some as simply a geography issue. As I mentioned earlier, the C-3 Phase II work group is developing factors for the total asset requirement that can be modified to reflect the company's actual product features and then can be applied on a seriatim basis to contracts in force. This allows companies to avoid running stochastic scenarios for purposes of determining the TAR. It seems likely that we will need to develop corresponding alternative factors for reserves, or else their absence would negate the advantages offered by the alternative factors for RBC. One problem with the alternative factors is that they need to be modified by the user to adjust for differences in product features. Evolving benefit designs need to be supported with new factors; or else the companies offering them will be forced to use stochastic modeling.

Some of the issues still outstanding include how to provide reserve guidance for separate account products that incorporate guarantees of performance but are not subject to CARVM, and to the group life products that guarantee mutual fund performance, which I referred to earlier. We need to develop a means of allocating the aggregate reserve down to the individual contract level for tax reserve purposes. We also need to develop a methodology that will allow actuaries to do most of the work anticipated by the projection methods prior to year-end.

A major issue surrounding RBC in reserve calculations based on stochastic scenarios is how to audit the results. To address this, a subgroup has been formed

by LHATF and the life risk-based capital-working group of the NAIC. Some of the topics they're reviewing include validation of models used by companies, validation of specific results, documentation that should be provided, and whether centralized auditing could be performed whereby the states pool their efforts and resources.

In closing, when could the new reserve standard become effective? If LHATF chooses to do so, they could expose the new guideline, law or regulation in December 2003, with modifications of it based on comments and re-exposures of the final requirements in March 2004. If all goes as planned, LHATF will adopt the new requirements in June 2004, with adoption by its parent committee in September and adoption by the Plenary and Executive Committees of the NAIC in December. This would mean that the effective date could be as early as December 2004, but that's up to LHATF, of course. A lot depends on what happens at the LHATF meeting. This is because our work group will need to finalize its work during the next couple of months, which depends heavily on the feedback we receive in terms of the form of the requirement and CTE level at which to set reserves.

Thanks for your attention. I'll turn it back over to John now.

**MR. O'SULLIVAN:** I'm going to go over some numerical results of the variable-annuity reserve working group. These are results from a model from one team. There are about five different team models that are involved with the RBC group. We've taken one of those models and adapted it for some of the reserve work. The product experience is the same thing as the C-3 Phase II work. All the money is allocated to the Standard & Poor (S&P) 500. They are unit results that are floored at the cash surrender value. Unit results assume no diversification benefit and no aggregation benefit. It's as if this were the only cell that you went ahead and issued. So we get the result, and if it is lower than the cash-surrender value then we floor it at the cash-surrender value. Its male attained age 65 on the valuation date. We looked at four different durations: duration zero, 3.5 years, 6.5 years and 9.5 years. So at each of these durations, we're looking at a person who has attained age 65. So it's not like duration 6.5 is the same group that we're looking at for a duration of 3.5, because we've got different attained age.

The single premium is \$100,000. The mortality is 65 percent of the 1994 Minimum Death Benefit Guarantee table. One thing I want to point out is that there's no trail commission to be paid reflected in these numbers. That can have a dramatic effect, as some of these other changes can. To make the modeling easier, we modeled all of the fund depletion as surrenders. It has some effect if you have proportional withdrawals, but basically we are understating the expenses a little bit. But if you have dollar-for-dollar adjustments, these numbers will not work.

We spiked the base lapses at 40 percent in contract year eight. It's a seven-year surrender charge period, and the ultimate is 15 percent in years 10 and forward. It assumes dynamic lapses. A dynamic lapse multiplier times the base rate is what the

actual lapses are. They start out operating when it's 10 percent in the money and the base lapse rate is reduced up to 50 percent.

I want to define what "in the money" percentage means here. For the maximum anniversary value (MAV) or an annual ratchet, the guaranteed minimum death benefit was assumed to be 10 percent simple growth to 1.5 years before the valuation date. So if start with \$100,000 and you're looking at valuation date 6.5, you have \$150,000 as the guaranteed minimum death benefit. The roll-up was 5 percent compounding to the valuation date, and "in the money" was determined by taking the ratio of the GMDB to the account value. We modeled four guaranteed minimum death benefits. You have the return of premium, you have the MAV (or annual ratchet), and you have a 5 percent roll-up. And then you had a combo benefit, which was labeled "high." And the combo benefit paid the higher of the annual ratchet (that is, the MAV) or the 5 percent roll-up. We used the MAV to determine what the "in the money" percentages were.

Table 2 shows a simple example. You can see the duration is 6.5. The guaranteed minimum death benefit was determined for the annual ratchet, which is \$150,000 or \$100,000 accumulated at 10 percent simple interest through a year 1½ less than the duration. The account value is determined using the GMDB amount and the percent in the money. You can see that for the combo benefit, the account value is the same as under the MAV benefit. The roll-up component of the combo GMDB is actually a 5 percent compounding rate to the valuation date. So the roll-up component of the combo benefit is only 28percent "in the money." But when we look at some of the numbers, it will look like the combo, or high benefit, comes off easier than the roll-up benefit. But when we're looking at 40 percent "in the money" for this high benefit, it's 40 percent "in the money" with respect to the ratchet, but it's only 28 percent in the money with respect to the roll-up component.

Table 2  
Example for High Benefit Duration 6.5 with ITM = 40 percent

	MAV	Roll-Up
GMDB	\$150,000	\$137,317
AV	\$107,143	\$107,143
ITM	40 percent	28 percent

The way that we looked at the numbers was to express whatever was being held above the cash surrender value as a percentage of the account value. Table 3 shows another example. It's at duration 9.5, so the account value and the surrender value are the same. We're going to look at reserve at CTE 60 and at what I'm labeling total provision, which is the total-asset requirement, based on CTE 90.

Table 3 Example

MAV Benefit at Duration 9.5 Years with 40 percent ITM	
Death Benefit	\$180,000
Account Value	\$128,571
Current Reserve	\$128,571
Proposed	
Reserve CTE 60	\$128,694
Total CTE 90	\$129,281

To make it easier, we translated these extra amounts into the extra amount above the cash surrender value expressed as a percentage of account value (Table 4).

Table 4  
Extra Amounts (Above CSV)

	Extra Amount	Percent Extra
Current Reserve	0	0.00 percent
Proposed		
Res. (CTE 60)	123	1.10 percent
Total (CTE 90)	710	0.55 percent
Note: Percent Extra = (Measure –CSV) / AV		

We modeled two different products. Table 5 is the same product that was modeled by the RBC group. It has a basic annuity charge of 150 basis points, charges five basis points more for return of premium, 20 per roll-up, 15 for a maximum anniversary value and 25 basis points for a high. I've characterized these as being a little rich in the revenue side compared with your in-force business.

Table 5  
Product Charges

Mort. And Exp. Charges	1.50 percent
plus	
Return of Premium	0.05 percent
5 percent Roll-up	0.20 percent
Max Anniversary Value	0.15 percent
High (Cornb. R/U + MAV)	0.25 percent
Surrender Charge: Seven years starting at 7 percent	

We looked at two numbers of an early duration. First is the MAV benefit. At 40 percent "in the money," you end up holding a current reserve that is 1.74 percent above your cash-surrender value. Under the assumptions that I laid out with the CTE of 60, you'd only have to hold 0.45 percent above the cash- surrender value. So this is a lower amount that you have to hold as a reserve, but when you look at the total provision that would be held, it would be 2.07 percent versus the 1.74 percent.

This new standard tends to be kinder to the annual ratchet and the return premium and a little bit harsher on roll-ups and high death benefits, which I think is because

the tail is being captured more with the CTE measure. You have 5 percent roll-up death benefit duration 3.5 at 40 percent of the money currently you'd be setting up a reserve of 2.27 percent of account value above cash surrender value. With CTE 60, it comes out to be about the same—1.99 or less. But you can see that the total provision there is a pretty big number, 9.18 percent, which would include the component for the reserves.

You will get a better picture once you get by the surrender charge period. With duration at 9.5, you can see what's happening for each of the benefits. If one were to look just at zero percent "in the money," you can see that you'd be setting up 0.06 percent for the return of premium; for the MAV, it would be five basis points of account value that you would be setting up. On the current reserve basis, you wouldn't be setting up anything extra for these benefits. As for the 5 percent roll-up, it's a lot higher than it is for the high, and obviously higher than the return of premium or the annual ratchet. When looking at the reserve component, the 5 percent roll-up is the one that's going to generate the highest numbers. For return of premium, you have a total provision, or the TAR, which is calculated at CTE 90. That would be 0.69 percent of which 0.12 percent would be in your reserve component and the rest of it would be in your RBC component.

We wanted to take a look at another set of products, so we reduced the annuity charge by 25 basis points, left the add-on charges for the GMDB components unchanged, and modestly increased the expenses by about five basis points each year. The standard was the product that had a 150 basis point M&E charge, and the alternate was the one where we reduced it by 25 basis points. If it was at zero percent "in the money" it made a pretty big difference—not too much for return of premium or the MAV, but for the high and the 5 percent roll-up, it made a pretty big difference. When it is at 40 percent "in the money" it makes quite a bit more difference across each of these benefits.

Having used all these numbers as examples, I have to say that they will hold for virtually nobody. You can't generalize. You really need to model this stuff. The nuances and the benefits can make a big difference; what you charge can make a big difference. Your company experience may be very, very different than what was assumed here. And more than anything else, the aggregation can give you significant reductions in the amount. You have a mix of business across durations, "in the money" percentages, allocations and things of that nature, and that can draw down the amount quite a bit.

You have to work on a model. The group must be representative of the individual policies and properly represent the different funds' characteristics. If you have three contracts—A, B and C—with different allocations, you may have very different risk levels between each of the contracts. So you can't necessarily combine contracts that are "in the money" at the same attained age, same benefit, that type of thing. You need to somehow combine the number of funds into a more manageable level. If you have a situation where you have somebody at 100 percent

equity, 100 percent money market or 100 percent bond, his or her risk profile is going to be totally different. Getting this grouping down so you're reflecting the fund mix is quite time consuming and quite a challenge.

This RBC/Reserve Approach seems to be on a fast track, which leaves less time for implementation. Read the Academy Reports, the Phase II and the variable annuity reserve reports, especially if you want to comment. This is the opportune time since the September reports were just released. Expertise is evolving. Where we are now is a lot further along than three years ago, and I'm sure three years from now we'll be a lot more evolved than where we are today. The result depends a lot on experience assumptions, so you have to start looking at your experience a lot more closely. The model structure is going to take you some time to build, and you have to worry about the efficiency of the calculations.

Remember, if you're doing a stochastic, there are techniques that are now being experimented with that would allow the work to be offloaded from year-end, so you wouldn't have to do the stochastic modeling each quarter. But that may not work, and you may even get stuck doing stochastic quarterly results. So with that, here is Tim Hill.

**MR. TIMOTHY HILL:** What should you be doing right now? It's very hard to know what the impact of this new requirement is going to be on your block of business until you actually do it. We always get the question: What should I expect for my new capital requirements? Is it going to go up? Is it going to go down? What's the number going to be? You really can't say until you actually do the calculation.

For many companies, the impact is going to be pretty small. If you have large blocks of in-force business that you sold for the last 10 or 15 years, the early stuff had little or no guarantee and just kind of sits there as a cash cow turning out the mortality and expense (M&E) revenues. These contracts will offset guarantees that you sold in the later products, so you could be in a good position and have very little impact from this new RBC requirement. If you sold most of your business in 1998, 1999 and 2000, with very aggressive guarantees, then you're potentially going to have a big impact. A lot depends on your mix of business.

The sub-account allocation that you have on your block of business is another big factor. If you have a lot of very aggressive funds and your distribution is oriented toward people who elect aggressive funds, it's going to be a much bigger impact than if you have a lot of people with 50 percent of their money in a bond fund or higher than that. That makes a huge difference in your results.

Trail commissions that you pay create a rather sad result. We'd all love to pay more trails and less up front because that reduces the risk of lapses later. But for this particular example, a big up-front commission is sunk cost, and you don't consider that in your future projection of profits. But if you are paying 1 percent of account value trail, for instance, you do consider that and that is a big drain on your future

revenue. So you could have considerably higher RBC by paying a trail rather than an up-front commission. That's kind of a counterproductive result of this new requirement.

The CARVM allowance runoff is a big piece of your early cash flow when you do this modeling. Depending on what kind of scheduling you have for surrender charges, if it's a nice level seven, six, five, four, three, two, one type of surrender charge schedule, your RBC could be considerably less than if you have some big cliff after a few years. Remember that the only thing we care about is the worst surplus position along this path. If you have a level 7 percent surrender charge for seven years and then it falls off, all of a sudden you have to cover that 7 percent load in revenue in that single year and that could be the worse present value. So little things that you wouldn't expect to have big results can have big results with this modeling.

What should you be doing? Why should you start right now? Well, later may be too late. There are things that you might want to do to reduce your RBC. Let's say that you go home tomorrow and you build your big model and you say, "Oh, that's a huge RBC number. We're going to have to do something about it." The things that you could do are going to take a lot of time. Reinsurance would be one possible solution, at least for future business. It would be a very tough solution to get on in force, but the main problem with reinsurance is that there's essentially one provider. There are some other companies that are thinking about it. But it's not cheap, and it takes time to implement.

Another solution would be a hedging program. That definitely takes time to implement. You might have a three- to six-month period of time until you are ready to actively start hedging your block of business. The RBC requirement says that you can consider hedging in your model if it's a well-defined strategy and has been approved by your upper management. So you can't just say, "I'm sure in a couple of years we'll have the hedging strategy, so let's just assume it's a perfect hedging strategy and so, therefore, we don't have any risk and, therefore, our RBC is nothing." That's not going to cut it. It has to be a well-defined hedging strategy.

You can reduce RBC through some kind of a contract exchange program. Let's say that you come up with a result and you say, "Well, you know, if we can get people out of some of these very generous guarantees," maybe you can do something like that. There are all kinds of issues associated with that, including whether or not it is in the customer's best interest.

Mergers and acquisitions: Some companies are going to have a relatively small impact from this new RBC requirement; other companies are going to have a very big impact. Even the companies with a small impact have some excess capacity from an RBC standpoint, at least to swallow up some of the smaller companies. So it could be that you decide we're just going to exit this business, or we're going to sell it off to one of these bigger companies that can absorb it essentially with

almost no increase in RBC. So I can see this new requirement sparking another round of mergers and acquisitions in the variable annuity market.

Getting back to the hedging program, as I mentioned, it has to be a well-defined program. It can't just be something that you're theoretically going to do and it's going to be a perfect match for the benefits that you're going to pay. It has to be as real as possible, and it has to be precise. A hedging program is definitely a possible solution to get past some of the RBC problems. It often has a very large impact on your results.

There are some new tools that are emerging that are helping with hedging products. There are some consultants who are talking about this a fair amount. It's a more realistic solution than maybe it was a few years ago, but it's still evolving and still is a very difficult thing to do. It's not something that you're going to get done in a few weeks.

The main reason hedging has a big impact on your RBC C-3 Phase II results is that it trades the tail—the really bad scenarios where you pay a lot of benefits. It helps out in those scenarios in exchange for a mean cost. It's going to convert bad years into an additional cost of 40 basis points, or whatever the number happens to be. It turns out that that kind of a solution works well in the RBC calculation, because you're focusing on the worst 10 percent of the scenarios. You're really focusing on that tail. Anything that you can do to bring that tail in, even if it means making your average considerably worse, will help you considerably from an RBC standpoint. In fact, it could potentially pay for itself. Having to hold additional capital is a real cost to your company, since you have certain earnings requirements on capital. Yes, the capital earns something, but in today's environment it's usually pretty small.

What can you do about new business? We get a lot of calls about pricing new business. Are we incorporating RBC C-3 Phase II requirements into our pricing of new business? What's going to happen? Are charges going to go up? Where's the market going to go basically after RBC C-3 Phase II is implemented? With full recognition of the RBC, your pricing will probably be a conservative number. Just looking at these on a per-unit basis, a big piece of the RBC is the aggregation of all the business—your in-force, your new business. So if you sit down and you just do a model, it says for \$1 million of new sales, I'm going to have X amount of RBC. That's a conservative answer, because you have other aggregation that goes on with your in-force block of business.

As far as techniques are concerned, we're doing an integrated approach. Stochastics-on-stochastics is a difficult approach. If you're using stochastic modeling for pricing of new benefits, and you know that along the path of each of your stochastic scenarios you want to know what your RBC number is at each point in time, that is kind of a stochastic-on-stochastic exercise.

Another way to do it would be stochastic within a deterministic. If you are focused on GAAP earnings and you have a couple of stress test scenarios that you really like to see, it might not be so difficult to do the RBC modeling within a deterministic scenario. Or you can have interim RBC and Stat Reserve estimates. We typically populate a table within a model that has the access, how "in the money" is the benefit, and what's the contract duration. When you go down your stochastic scenarios, you just have to look up points from a table, rather than calculating them in a stochastic within a stochastic type of environment. So that's one way to get the new RBC requirement and the new reserve requirements into a pricing model.

Also, the base product features are not immaterial. It does make a difference as far as what you're doing in the base contract. It mentions the surrender charge pattern. It mentions trail commissions. There are some other features in the base contract that can have a big impact on your RBC. So you have to consider all of those also in your new business pricing.

Of the different benefit types, the roll-ups seem to get hit harder than the annual ratchets. The roll-ups typically are lower frequency, higher severity kind of impact than the ratchets, which are higher frequency, but lower severity. When you're concentrating on that tail, it's the really high-impact scenarios that really hurt you. So that's why a 5 percent roll-up is going to be hurt more than a maximum anniversary type benefit. Chart 1 shows some sample numbers. But as John said, these are not going to be your numbers, because this is just an example contract. It's on a per-year basis. When you do this on your in force, they're going to be less than this, but it gives you a flavor for what the different benefits are for new benefit types.

Chart 2 shows guaranteed minimum income benefits (GMIBs) and guaranteed minimum death benefits (GMDBs). When you incorporate a GMIB into your results, it depends on the relationship on the charge that you have for the GMIB versus what the benefits are. You can see in this example, though, if you compare to the prior chart, that the roll-ups are really heavily hit now when you incorporate in this GMIB benefit. They are meant to be middle of the road type products.

Chart 3 details asset allocation requirements. That is what I typically advise most of my clients to consider when they talk about ways to reduce their RBC on new products. It is a very good solution for reducing RBC. Most of the numbers that you have seen are S&P 500, though that's not really where your mix of business comes out. But if you have a 50 percent equity, 50 percent bond type requirement where you have a couple of classifications of assets, and you say that no more than 50 percent of the account value can be in this class, you go from a 5 percent down to an 83 basis points of account value type RBC requirements. An interesting feature is when you get to the very far right side of this. With 100 percent bond and zero percent equity, since I do have a 5 percent roll-up in this, my bond funds aren't

keeping up with that 5 percent roll-up. So my capital actually perks back up a little bit.

A lot of companies came out with higher charges a few months back as their response to RBC firming up among other things. I personally don't think that's necessarily the best solution. When it comes time in the modeling to pay benefits, you just have to pay back that higher charge that you've been assessing. With Chart 4, you can see a threefold increase in the charge resulted in a modest decrease in capital. But it's not as big as you would probably hope. So the higher charge doesn't hurt. But I don't think it's as powerful as an asset allocation requirement, for instance.

You can always go the route of less generous products. On Chart 5, look at a 5 percent versus a 4 percent versus a 3 percent roll-up, and it's a big difference. The capital for a 3 percent is less than half what it is for a 5 percent. Obviously, there are marketing issues with all of these decisions, but a less generous benefit is definitely one way to go on your new business.

Now we'll look at some other GAAP implications of the guarantees on variable annuities. There's a Statement of Position (SOP) 03-1, which has been finalized and is out there. It applies to both GMDBs and GMIBs, and is effective for fiscal years beginning after Dec. 15, 2003.

According to this SOP, you have to decide whether you have a significant amount of mortality risk in your contract. There's a presumption that says the contracts with significant mortality risk with an additional insurance benefit could significantly respond to capital market volatility. They're basically saying that we kind of think this, but we could go the other way also. They're saying that those types of contracts should be within this SOP. So that pretty much says all variable annuity GMDBs are going to be included in this, because that's the definition of a variable annuity GMDB. I think, though, that it would be hard pressed to say that certain variable annuities would not be included in this. Maybe return on premium death benefit, especially if you have an older block of business that just had return of premium and is so far out of the money that there's really no chance that it's going to be back in the money. Those kinds of things would not have significant mortality risk.

Paragraph 25 in the SOP, the assessment, compares the present value of expected excess payments to the present value of expected assessments. Excess payments include GMBD paid over account value released at the time of death, and expected assessments include such things as M&E charges, policy fees, surrender charges and revenue sharing. It refers to "over a full range of scenarios," and that's pretty much all the guidance that it gives you on scenarios. It's not very specific on what you should be doing from a scenario standpoint.

This is one of those places where it's probably best to talk to your auditor to see what they're going to recommend. They probably have opinions on this. One audit firm is apparently advising that the mean of the scenarios that you use should equal the same rate that you're using for deferred acquisition cost (DAC) amortization purposes. So if you're using an 8 percent DAC rate, the mean should at least be 8 percent. They are suggesting that you take the mean of the excess payments also when you do this SOP-type calculation. But other people could have different approaches. It could be that some are going to suggest deterministic scenarios. Some are going to suggest taking an 85th percentile. It's probably a good time to have a conversation with your auditor about that.

To compute the actual reserve that you're going to hold, you're going to calculate this ratio: present value of excess payments divided by present value of expected assessments including actual. You're going to do this over the entire life of the contract. And you're typically going to do this on the same division of business as you would for DAC unlocking. If you do your DAC for issue year and product, that's probably the same grouping that you're going to use for this SOP calculation. You look at what kind of charges you have had over time and actual, what kind of excess benefits you have paid, and you project forward from the valuation date. You take this entire stream and you take the present value of the excess payments divided by the present value of the total assessments, and you come up with this factor.

In Paragraph 27, they talk about the need to revise estimates. This is essentially DAC unlocking. You have to use actual experience over time, and you do it in a manner of keeping your actual experience the same. If mortality is much worse or if the market has dropped and you're expecting lower revenue and higher death benefits in the future, you need to take account of that on a periodic basis. Again, there's some ambiguity there as far as how significant it has to be before you have to do this. So there are a number of decision points that you have to face when applying this SOP.

To finally compute the liability, you take the current benefit ratio, which is the present value of excess divided by the value of revenue, and multiply it by cumulative assessments—the charges that you've had over time, less the cumulative excess payments, plus credited interest. To a large extent, it's similar to a DAC-type process where you are here. You're figuring out a ratio and then you're going to build up a reserve and then let it run off in proportion to a revenue stream instead of an expected gross profit stream, but it's similar to a DAC-type calculation.

Paragraph 29 says that any change in reserve that you have due to this calculation we just did should feed into your DAC process. So you now have a new expense to feed into your DAC process and, therefore, you're probably going to be amortizing your DAC a little faster. They have an example in the SOP, which many of you have probably seen by now. It has a calculation in the back that you can look at. GMIBs

receive essentially the same treatment. It's really not all that significant of a difference versus the GMDBs.

Let's talk for a minute about FAS133. It seems like the latest talk about FAS133 centers on modified coinsurance (MODCO) reinsurance type topics, but it applies to certain guarantees on variable annuities. It applies to the GMABs. It applies to GMWBs. It also applies to the period-certain portion of the guaranteed payout annuity floor, though there's not a lot of that business out there.

The requirement is that you have to treat the option that's embedded in the contract. You have to market to market, which involves bifurcating the contract. You divide it up into the host contract and then the option—the embedded derivative piece. If the embedded derivative has value at time zero, then you push down the reserve on the host contract so that at time zero it equals the premium that the person has paid. You'd have to come back to be equal to the premium paid by the individual.

In computing the value of this embedded derivative, again, there's a lot of ambiguity. Some people would say that you absolutely have to take a Wall Street approach, where you're truly reflecting implied volatility and risk-free interest rates all the time, and it has to be updated very frequently. There are some other shortcuts that you could take, some kind of Black-Scholes method, if you have a relatively simple benefit, a GMAB, for instance.

Most of you would probably have to do them for most benefits. It would involve some stochastic modeling. Again, do you have to use pure Wall Street pricing assumptions, or can you take a longer view of volatility and interest rates? There seems to be some flexibility there. Companies are doing different things to perform these valuations.

We're going to have a little bit of time here for questions.

**FROM THE FLOOR:** First, I want to mention one of the bigger issues that I think is still surrounding this: the regulators are trying to figure out how to audit this. All I'd offer for the group to think about is to watch this space. It will be really interesting to see what they do.

My question is what the time zero value is. Is it zero by definition? Or is it equal to the starting reserve less the starting cash value?

**MR. LAMSON:** It's the latter, or the reverse of that.

**FROM THE FLOOR:** I might have said it backwards.

**MR. LAMSON:** Yeah.

**FROM THE FLOOR:** So the minimum floor of these things isn't zero.

**MR. LAMSON:** No, because we're starting with assets greater than the initial cash value.

**FROM THE FLOOR:** OK, that sounds just a little different than what I remember it as.

**MR. LAMSON:** Well, Bob, you remember the discussion about starting with lots and lots of assets?

**FROM THE FLOOR:** The difference between modified CTE and CTE? That's what I'm thinking about. At one point, the group was leaning toward modified CTE, which would put a floor of zero on each scenario. And then we went to the idea that we put the time zero value in there, which originally people were thinking it was zero, but now that sounds like it's not.

**MR. LAMSON:** Well, we were at a modified MCTE and then we had to put in the adjustment to eliminate the ratchet effect if there's lots of assets, more assets than you really need. If you allow negative losses, if you will, put a floor on it. The mathematics, I believe, work out this way. As long as you limit the negative losses, that is to say gains, to be not greater than the beginning assets, less cash surrender value that does the same thing as establish that floor.

**MR. HILL:** When you come down to it, the theory all sounds good, but then where is this actually going to flow through the annual statement? Or what is this going to do? Those specific questions are the trouble.

**FROM THE FLOOR:** I have a couple of technical questions. I'm with Nationwide Life. With regards to the Academy's proposal on reserving, first, would fund revenue be permitted to be included in the valuation? That's something that's not yet permitted to be used under CARVM today, but it's a substantial part of revenues to the insurance company.

Second, by looking at the examples, it didn't appear that you were using fully loaded expenses. I haven't seen anybody in the industry that could manage those levels of expenses. So is the anticipation that you would use fully loaded current experience expenses, or something that's more akin to direct maintenance?

**MR. O'SULLIVAN:** On the first one, the assumptions that one would use on the RBC are the same as one would use on the variable annuity. They're company-specific types of experience assumptions. One would get credit for the mutual fund re-allowance. And one would also have to take off the mutual fund fees from the gross annual returns that you would get out of your model.

With respect to whether these are fully loaded expenses, the idea is to have more than marginal expenses. We didn't use the words "fully allocated" because that seemed to lose meaning as we got into the discussions, but it's more than marginal.

I would agree with your comments that the RBC product looked a bit light as far as the expenses. It was \$85 on \$100,000, which would turn into 8.5 basis points, plus five, which gives you 13.5. I think for most people it would probably be closer to 30 basis points that you would expect to see there.

**FROM THE FLOOR:** I have a last question with respect to why the group chose to go to stochastic methodology for reserving, given the existence of reserve adequacy opinions and the practical limitations that I expect are going to affect many companies?

**MR. LAMSON:** It's actually the stated position of the American Academy that reserve requirements should move toward stochastic scenario techniques in determining those reserves. In general, it's regarded as a better way to go for reserves. A lot of people consider CARVM to be a vestige of the past from a time when we didn't have the capabilities that we have today. It uses unrealistic assumptions and very severe requirements, effectively treating it as if you had all your contracts surrendered at any particular point in time. So that's why we did that.

Another reason we're doing it right now is because the results are there, or are going to be there for risk-based capital. So why not piggyback off that without doing substantially more work? That's really the idea. Like John said, it really turns it around. Instead of computing formula reserves and then determining whether that's adequate, this could almost eliminate the need for asset adequacy analysis, perhaps by setting the reserves this way in the first place.

**MR. MIKE DUBOIS:** I'm from Mass Mutual. My first question is with respect to the results that you were showing. I've got a better understanding of what I saw on the charts earlier. But one thing that appears to be happening, and this may just be an artifact of what was being done, is that it looked like the reserves could potentially turn out to be less than CARVM while the total requirements are more. Has there been any reaction from the regulators to that?

As a second comment, I was wondering about the relationship between the roll-up benefits and the maximum account value benefits. Is there any relationship between what we're seeing for capital requirements and the charges that companies have been making for these types of benefits? I don't recall seeing charges quite as varied for roll-up benefits versus maximum account value benefits as these numbers would potentially indicate.

**MR. HILL:** Let me do it in reverse order. One of the things with the roll-up benefit is it's quite sensitive to what you're using as far as caps and things of that nature. So it's a little bit harder to compare than the MAVs. But I would agree with you that until people started to focus in on the tails, and until people started using calibrated stochastic models, I think the tail tended to get underestimated.

With respect to your other point about the regulators, sometimes it's less and sometimes it's more. The September report clearly points out that it's not always reserve increase for people. It could result in lower reserves.

**MR. LAMSON:** I would encourage people to take a look at our September Report. An awful lot of us had a presumption that this whole process was going to raise reserves, and RBC costs are going to go through the roof. Now, obviously, if you get way "in the money," 40 percent "in the money" or something, both reserves and capital requirements go up. But really, if you look at the Appendix C that John referred to earlier, it's pretty reassuring that at least the 60 CTE and 65 CTE reserves are about equal to CARVM reserves. And for many of the cells in our results, the total asset requirement is about equal to the CARVM reserves. So, these don't really look to be very draconian, if you will, to use a word that's been overused recently.

**FROM THE FLOOR:** It sounds like the requirements are converging between the reserves and the RBC, where you got reserves using a certain CTE and RBC required in the higher CTE. Let's just say you had a block of business that required a reserve of a billion dollars, and that's the number that you come up with your CTE. And then your total including RBC is a billion fifty million. So you've got \$50 million of additional RBC. Most companies, I think, try and run to an RBC ratio of higher than 100 percent. They'll run to an RBC ratio of 250 or 300 or whatever. Would the expectation be that that \$50 million of excess be multiplied by a factor of 2 or 2.5 or 3? The framework of thinking these days is that you have a denominator of acquired RBC, a numerator of total capital and you divide it out and come to a ratio. Is the expectation that that RBC is multiplied by a factor?

**MR. LAMSON:** That's a tough one. I think somebody posed that question to Bob Brown, who is the head of the RBC piece of this. I think his answer was, well, nobody told them they had to double it.

**FROM THE FLOOR:** So many folks think of it that way right now.

**MR. LAMSON:** Absolutely.

**FROM THE FLOOR:** You think of anomalous results if you had your billion fifty of total, you have got to have higher reserves, so less RBC, so less of a multiplier, unless you move to a new paradigm of thinking about RBC.

**MR. HILL:** Another thing is that, unlike a lot of the other RBC components, this is not being factor-driven. So it probably has a higher degree of precision on it. I believe also that this was going to be exempted from the RBC trend test, which would be sort of a coupling with what you're saying.

**MR. LAMSON:** The other thing is that your RBC is the excess of the total asset requirement over your reserves. While the reserves have a minimum, they don't have a maximum that I know of. So the more you put in reserves, the smaller your RBC is going to be.

Chart 1

## What Can be Done about New Business?

- Different Benefit Types

100% S&P 500, At Issue				
	ROP GMDB	5% Roll-up GMDB	Max Anni GMDB	Greater of 5% Roll-up/MAV
90 CTE	1.09%	4.85%	1.22%	5.00%
65 CTE	0.31%	1.45%	0.35%	1.51%
Percentiles				
99.0%	2.24%	7.72%	2.41%	7.77%
95.0%	0.00%	1.15%	0.00%	1.34%
90.0%	0.00%	0.00%	0.00%	0.00%
83.3%	0.00%	0.00%	0.00%	0.00%
50.0%	0.00%	0.00%	0.00%	0.00%

9/11/03

Chart 2

## What Can be Done about New Business?

- Different Benefit Types – GMIB / GMDB

100% S&P 500, At Issue				
	ROP GMDB/GMIB	5% Roll-up GMDB/GMIB	Max Anni GMDB/GMIB	Greater of 5% Roll-up/MAV
90 CTE	1.23%	8.94%	2.87%	9.31%
65 CTE	0.35%	2.63%	0.82%	2.73%
Percentiles				
99.0%	2.16%	13.46%	4.49%	14.87%
95.0%	0.00%	2.03%	0.00%	2.37%
90.0%	0.00%	0.00%	0.00%	0.00%
83.3%	0.00%	0.00%	0.00%	0.00%
50.0%	0.00%	0.00%	0.00%	0.00%

9/11/03

Chart 3

# What Can be Done about New Business?

- Asset Allocation Requirement

Greater of 5% Roll-up and MAV	100% Equity 0% Bond	75% Equity 25% Bond	50% Equity 50% Bond	25% Equity 75% Bond	0% Equity 100% Bond
90 CTE	5.00%	2.20%	0.83%	0.27%	0.77%
65 CTE	1.51%	0.63%	0.24%	0.08%	0.22%
Percentiles					
99.0%	7.77%	3.92%	1.78%	0.61%	1.02%
95.0%	1.34%	0.00%	0.00%	0.00%	0.00%
90.0%	0.00%	0.00%	0.00%	0.00%	0.00%
83.3%	0.00%	0.00%	0.00%	0.00%	0.00%
50.0%	0.00%	0.00%	0.00%	0.00%	0.00%

9/11/03

Chart 4

# What Can be Done about New Business?

- Higher Charge

Greater of 5% Roll-up and MAV	25 bps charge	50 bps charge	75 bps charge
90 CTE	5.00%	4.34%	3.73%
65 CTE	1.51%	1.26%	1.06%
Percentiles			
99.0%	7.77%	7.21%	6.63%
95.0%	1.34%	0.45%	0.00%
90.0%	0.00%	0.00%	0.00%
83.3%	0.00%	0.00%	0.00%
50.0%	0.00%	0.00%	0.00%

9/11/03

Chart 5

# What Can be Done about New Business?

- Higher Charge

Greater of 5% Roll-up and MAV	25 bps charge	50 bps charge	75 bps charge
90 CTE	5.00%	4.34%	3.73%
65 CTE	1.51%	1.26%	1.06%
Percentiles			
99.0%	7.77%	7.21%	6.63%
95.0%	1.34%	0.45%	0.00%
90.0%	0.00%	0.00%	0.00%
83.3%	0.00%	0.00%	0.00%
50.0%	0.00%	0.00%	0.00%