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Annuity Risk-Management Seminar. NAIC C3 Phase II Implications for RBC and Reserves

Track: Health

Moderator: Keith Floman

Panelists: John M. O'Sullivan
Peter H. Sun

Summary: Companies today in the annuity market, be it either in the fixed or variable product markets, are facing ever-changing economic conditions. The risks associated with these products are well known, and the techniques applied by many companies have helped mitigate these risks, and in many cases have helped to find ways to improve profitability. This seminar takes a detailed look at the subject of annuity risk management and how this can be applied to new product development as well as in-force product management.

Panelists discuss:

- *Requirements for risk-based capital (RBC) calculations*
- *The proposed Actuarial Guideline for Reserving*
- *The effect of hedging on capital requirements and reserving*
- *How to perform financial projections under the new requirements*
- *Alternate factor methods and scenario calibrations*
- *Practical examples of the proposed method*

Attendees gain an understanding of the methodology for determining RBC (C-3 Risk) for variable annuities with guarantees and how the same methodology is used to determine reserves. In addition, attendees learn how hedging can be used

The presentation materials can be downloaded at: http://handouts.soa.org/conted/cearchive/NewOrleans-May05/067_bk.pdf

to minimize the risk associated with these guarantees. Finally, an overview of modeling requirements and financial projection issues is presented.

MR. KEITH FLOMAN: We've heard for years now that C3 Phase II is coming. I think the expectation now is that this is the year. We'll probably see in a couple of weeks when the NAIC votes on C3 Phase II, but the momentum seems to be that this will be the year. C3 Phase II relates to required capital. VA CARVM relates to reserving. The two methodologies are intertwined. We'll talk about practical considerations for implementation, what changes we've seen during the last six months or so, and how you may approach it from a company standpoint for year-end 2005.

The theme is moving from a rules-based approach to a principles-based approach, which sounds good, but it's not that simple. We're moving from a rules-based approach, where you do this, this and this to a principles-based approach, where it seems that there may be fewer rules around it. We still have a 110-page document that tells you how to implement a principles-based approach, with supplements that give additional explanations. The move will not be a painless one, and I think one of the things we want to discuss today is how you can start moving the process forward and how you can alleviate some of the stress.

I'm Keith Floman. I'm from Ernst & Young. I'm one of the people leading the initiative around C3 Phase II. I've worked with a lot of companies around their modeling, around performance measurements, management reporting and risk management; so C3 Phase II fits in with a lot of these areas. My panel includes John O'Sullivan. John is from Trinity Consulting, which is a firm that he founded back in 2003. He has more than 30 years of experience in the industry. He has served as a marketing actuary, chief actuary and chief financial officer (CFO), and he played a prominent role in C3 Phase II and VA CARVM. He's been pretty involved and appeared at the Academy meeting earlier this month in Washington, D.C. John spoke extensively, along with a couple of other people. John brings some valuable experience.

Peter Sun has been with Millimen since 2000. He specializes in financial risk-management projections, modeling AOMs. Before Millimen he was at Allstate, where he did AOM work and product development. I'll turn it over to John.

MR. JOHN M. O'SULLIVAN: I have an ambitious agenda, so some of this I'll touch on a little bit lightly. I wanted to give you background and talk about the general approach in case some of you are not familiar with it. I mainly want to concentrate on the recent changes, which are in four areas, standard scenarios and then some advice from MOM about implementation.

To understand how we got here, you have to go back to AG 34, the GMDB reserve requirements. When the guaranteed living benefits came on board, the idea was to

get a bunch of actuaries together and figure out something that looks like AG 34 for guaranteed living benefits. The group was formed in January 1988. I joined the group in early 2000. Basically, we spent four or 4 1/2 years developing the proposal and answering questions only to have it tabled in favor of the modeling approach.

The need for a different approach was pretty evident from the work that we had done. We were dealing with something that was rule-based. As we were developing our proposal, more and more of these kinds of benefits came into play in the marketplace. We would have questions such as, "How does that fit with this quad M proposal that you're developing?" It became pretty obvious to everybody that you had this snowflake effect. There were nuances in product that affected the answer. We didn't really address the tail risk. We were talking about setting reserves at the 83rd percentile, whereas really you could have your worst cases far beyond there. Even if we had settled the reserve issue, the RBC issue would have been an open issue. The conclusion was that modeling makes sense.

What's the general approach for the modeling? You start with a bunch of stochastic investment scenarios, and they're done by calibration standards and other constraints, which we'll talk about a little bit later. Then we'll model something called the accumulated deficiency for each scenario using all of the projected income benefits and expenses, and then using crude and best estimate assumptions. There are some special considerations on revenue sharing, which we'll get into in a minute. We have a starting amount of assets that would include any kinds of hedging assets that we're holding. We would project the assets to the end of each future year, reflecting those income, benefits, expenses kind of things. Accumulated deficiency would be equal to the working reserve — usually it's the cash surrender value — less our projected assets, both at the end of the projection year. We would then go ahead for a particular scenario, determine greatest present value of accumulated deficiencies and that would be the additional amount that we would have to hold. Just as a footnote, there is just a bit of a difference between the reserves and the RBC. All the methodology is the same, but the reserves are before tax, and the RBC calculation is after tax. The reserves are CTE 65, so it's averaging the worst 35 percent. The RBC piece is averaging the worst 10 percent CTE 90.

Everybody has certain mental images that they have stored in their consciousness. This is my mental image for how we're taking care of the diversification. Under this new framework, we're measuring risk on an aggregate basis. We have diversification across time and investments. Different types of benefits will offset some risks. For example, consider a gained death benefit versus a max anniversary value. This is my mental image of how it goes, and it's really simple. What I have here (O'Sullivan Slide 7, page 3) is a universe of three contracts. I'm only dealing with a four-year horizon, and I'm showing for each contract the present value of accumulated deficiency at the end of each year. You can see contract A is a real winner. We start off with no excess assets above cash surrender value. We're

generating gains in each year, and they're increasing accumulated gains. In this particular situation, if we were to calculate a greatest present value of accumulated deficiency, it would be zero because we needed no additional assets.

Contract B is bad. It starts out with a gain and then we just have losses and losses and losses. Over the four-year horizon, the greatest loss is at duration 12. Then Contract C is one that starts out with losses. Then they turn to gains. My point here is that to do the aggregation you would add all of the values in the column. The greatest present value for this aggregate group of contracts is a lot less than the sum on a contract-by-contract basis of what the greatest present value would be.

This is a principles-based type of an approach, so I'm going to touch on the principles lightly. The objective is to quantify the amounts needed to meet contractual obligations in light of the risks to which the company is exposed. That's principle No. 1. Principle No. 2 describes the calculation. Hopefully I was faithful in paraphrasing what's in principle No. 2. It uses prudent best-estimate assumptions and aggregate calculations to allow financial offsets. It uses a projected total balance-sheet-type of approach.

Principle No. 3 talks about the assumptions that would be chosen. One of the things I find that's interesting is that principle three really talks about balance. Go ahead and get a prudent best estimate of what your risk is. It's not necessarily a very conservative answer. So, as you're adding conservatism in a grouping of contracts or in the choice of prudent best-estimate assumptions for each individual characteristic, when you put the whole thing together, you may have a distorted measure of risk. Conceptually, if you could go ahead and do modeling over all possible outcomes, you'd want a set of assumptions that basically net whatever the CTE amount is that you're calculating.

Principle No. 4 asks you to realize that models have limitations, and the objective is to quantify the risk that you're exposed to, not the risk that you have in your model. That leads us on to principle five, which is the golden rule: you shouldn't exploit foreknowledge. You know what the assumptions are. You know what the scenarios and the tail will look like, so don't go ahead and try to manipulate the answer to just reduce the amount. Thou shall not be in the system, I guess, is another way to say it. Those are the five principles, which take about a page and a half. Then, as Keith mentioned, there are about another 100 pages of guidance.

One of the areas that has changed has been the calibration standard. Going back, we had these stochastic investment scenarios. We had calibration standards that apply to U.S. diversified equity, so think in terms of Standard and Poor's (S&P) 500. For the other asset classes, there are not specific calibration standards. It's left up to the actuary to convince himself that what he's using is consistent with the calibrated equity returns. The principle to follow is that there's no free lunch. If you get more return, you have more risk. Nobody outperforms the market on a long-

term basis.

There were major revisions with the March 2005 report, and this is one of the four areas that I wanted to update you on. We removed four percentiles. We have had calibration points at fairly fine points on both the left-hand tail and the right-hand tail, like 0.5 of a percentile, 1 percentile, 99th percentile and 99.5. Those were discarded and more values were added for 20 years. The calibration standards are in terms of gross wealth ratios, so it's $1 accumulated during a period of time before any charges. In O'Sullivan Slide 12, page 4, we have the one-year, the five-year and the 10-year horizons and then the old versus the new. It shows the left tail, the under-performance end of things. I want to draw your attention to how much the 10-year horizon numbers have changed. At the 10 percent percentile, the old was 1.41, and that's been reduced to 1.16. You can see as the reduction in the calibration, the new calibration points over a five-year and progressively a 10-year and 20-year period is that the new calibration points — which were, I believe, produced by stochastic log volatility model as opposed to the old ones, which were an RSLN2 kind of model — go ahead and emphasize some points of under-performance. On the right tail, the calibration points have been greatly eased, or reduced. The 10-year, at the 90-percentile level, has gone from 5.55 down to 3.63. The net effect of these things is, besides emphasizing the under-performance, to give you more freedom as far as the models to use. So, you can use models other than RSLN2 and more easily meet the calibration standards with reasonable parameters.

O'Sullivan Slide 14, page 5, shows the corresponding gross returns. The gross wealth ratio is, as I said, $1 accumulates during a period of time. I can relate much better to looking at average annual effective returns. To put this into perspective, over a 20-year period of time, if we were looking at the 10 percent level, we're seeing at least 10 percent of the scenarios must have what turns out to be an average return, before any charges, of 3.78 percent. That will worsen the tail and the results quite a bit.

I chair the analysis subgroup, and we support both the reserve work group and a C3 Phase II. We try to model results for — I won't use the word typical, because I don't think there's any typical book of business — a hypothetical book of business. Basically, we took industry sales statistics during a 10-year period of time. We had some data about how people invested and what kinds of benefits were prevalent, and we basically constructed an in-force population representative over that period of time, with mortality lapses and adding in the new sales and things. That's how we ended up with our population. We had four guaranteed minimum death benefits (GMBD) types: return of premium, an annual ratchet or the max anniversary value, a 5 percent roll up and a combo, which is the greater of the max anniversary value or the 5 percent roll up GMDB.

Then, to introduce the guaranteed living benefits, we took the 5 percent roll up

GMDB and tacked on to it 5 percent guaranteed minimum income benefit (GMIB), so we had a 5 percent package. We're assuming it's 100 percent invested in U.S. equities and diversified. One of the things that's always important to keep in mind when you look at results is that population, guarantees and basically assumptions will drive the results. With the same population, if you made different assumptions, you'd get different answers. The same thing is true with some of the nuances, such as the age that the roll up or ratcheting stops. If things like that change, they can dramatically change the answer.

To make a long story short, what I'm showing here are two things: additional reserve and additional asset requirements. We started this thing assuming we had assets that had cash surrender value. So the additional reserve is how much you have to put on top of the cash surrender value, measured as a percentage of the account value, to get to the required reserve on an aggregate basis for this block of business. The same is true for the additional asset requirements. It's how much you have to add on to the cash surrender value so that your total asset requirements get to what you need to meet the CTE 90 amount. We always ran three sets of numbers. We ran a baseline one, which was the no-shock kind of situation (O'Sullivan Slide 16, page 6). Then we did an initial shock of account value, up and down 20 percent. You can look at these things across the rows and it will and give you a sense about how dramatically the calibration standards have affected the results to both the reserve, which is on the order of a 50 percent increase for the additional piece and somewhat less for the AAR. Then you can also look down the rows, and it gives you an idea about the sensitivity of this thing to your starting in the money percentages.

We gave you a lot of additional guidance and documentation requirements. We have some regulators who sit in or actually are part of both work groups. There's been a healthy dialogue back and forth about how much guidance is needed with a principle-based approach. There are three areas — mortality, customer behavior and revenue sharing — where there are more guidance and documentation requirements. The gist of this thing is that there is a limited role for unsupported assumptions. To put more of a framework that's analytic in nature to say, "This is my experience," or, "This is my starting point if I don't have any experience," and then, "How do I adjust that for what's happening?" There is definite concern about under-reporting. Several regulators commented that they had looked at mortality studies that companies had done and had found flaws in them. If we had industry statistics on GMDB experience, it really would help our cause a lot.

The mortality framework, which is described in one of the appendices, basically says to start with where you have the experience with the business segments. Develop an expected mortality curve, use some sort of a credibility adjustment and you end up basically blending your experience with an appropriate statutory mortality table. Depending on how much credible experience you have, you're either closer or farther away from the appropriate statutory mortality table. Then there's guidance

about when you need to and when you can reflect further mortality improvements. With the alternative methodology — from the feedback that we've had is most companies won't use it other than as a checking or temporary device — you can adjust those factors for your own mortality. If you do adjust it for your own mortality, it's sort of like a one-way door. In the future then, you always have to adjust the GC factors in the alternative methodology based on your experience.

Behavior is an exception. There's a phrase that catches me, which states that an assumption is an assertion about future unknown experience. None of us can set ourselves up to know what the future is. It's difficult to predict behavior. It can change on you. It can have a significant impact, which argues for three things. One of them is that you need sensitivity testing to find out which ones are drivers and how sensitive the results are. The second thing is that the uncertainty means larger margins. Then, the concept is introduced, which Tim had mentioned in his presentation yesterday afternoon about valuation scenarios. This basically means that you want to look at the really bad scenarios and make sure your assumptions fit those scenarios.

So, that was some of the guidance. Again, the reports mentioned that there's a critical role for experience studies. Is it relevant? Is it credible? Then bear in mind that behavior can change as the level of sophistication increases. It's meant to represent a plausible range of behavior. You don't have to assume that everybody's 100 percent rational. No one would assume that you have total inertia. You have to find that balance in there as far as what's a plausible range of behavior. Then you can model behavior as either static or dynamic. Static would be the same assumption across all of your scenarios. Dynamic would be some sort of self-adjusting assumption, such as lapses and in-the-moneyness. If you're using a static assumption, you're basically saying this assumption doesn't matter across economic scenarios. So be careful when you use it, and you probably will end up having to add more of a margin because of that.

Revenue sharing is the fourth major change. Realize that it's different than the mortality of the behavior. It's negotiation by sophisticated parties. It's a business arrangement influenced by the self-interest of each party, the industry practice, the regulatory environment and the competitive landscape. One of the things that I would urge you to think about is that the regulatory environment is a wild card. If you look at all that's happened to the mutual fund industry during the last 18 months, the revenue-sharing environment can change on you. So bear that in mind when you're setting the assumption.

On the revenue sharing, there are some necessary conditions that Tim had covered in yesterday's presentation. Because I'm getting a little bit short on time, I won't cover that. On a revenue sharing, it's the responsibility of the actuary to figure out how much to put in and then to back it up with his rationale. Be careful here. There are specific requirements: to review the revenue-sharing agreements, verify

compliance with the requirements and document the rationale for the amount reflected. It's the responsibility of the actuary to list the considerations in the reports.

As for the draft RBC general instructions, some people get confused because they look at the Academy reports for RBC and they don't see the standard scenario. That's because the C3 Phase II group chose not to put it into that report because they don't support it. The Reserve Group doesn't support it either, but the regulators asked us to put it in that report. That's why you see one in the Reserve but not in the RBC. Basically, we determined the modeled amount. We determined something called the standard scenario RBC amount. You pick the higher of them, and that's the starting point for any smoothing or transition. Then we subtract the reported statutory reserves and we add a tax adjustment, which is floored at zero if you need a tax adjustment.

The form of the standard scenario is somewhat the same, although the details greatly differ between the RBC and the reserve. You start with some sort of statutory reserve. In this case for the RBC, it's the basic adjusted reserve, which I'll describe in a minute. Then you do an aggregate GPV component. What this does is, starting with the account value, you project your account value onto specified growth rates. You have a certain amount of revenue that you can recognize. You have experience assumptions, which drive your claim costs, and then you do a GPV kind of calculation on an aggregate amount.

Hedging and aggregate reinsurance is the third thing that gets reflected, but be careful because the hedges need to be liquidated within one year, and there's a limited credit for dynamic hedging. The statutory reserve is pretty much the same kind of thing — the greater of the modeled amounts or the standard scenario amounts. I'll skip over the details of the standard scenario reserves. It parallels the RBC calculation. It has a reserve component, a GPV component and a hedging reinsurance credit.

What I want to get to is that there have been a lot of revisions in a standard scenario. For a period last year, we were analyzing one a month. There's a new one that's out that has not really been adopted by the NAIC group, but I think it's dated April 17. It makes the results I'll show look a lot worse because the grow-back rates are far lower. Especially if you have any roll-up business, this will dramatically increase, I believe, what your requirements are. Again, there are ongoing discussions, and we all are staying tuned to see what happens at the June NAIC.

This is what happens with the additional reserve in the AAR, the model results. This is with the new calibration standards and the August of last year standard scenario specs. For the RBC part, it's not too bad because the model results come in somewhat above the standard scenario, at least this hypothetical population. The hypothetical population may not be representative of anybody's business. You can

see from this that when you're looking at the additional reserve, the standard scenario will come out a lot higher than what your modeled results are. The reason for that primarily is that the additional reserve under the standard scenario is no aggregation, so you have no offsetting of any kind of risk that you have. That can be very important.

I'd like to offer some quick thoughts and comments from MOM. For the grouping of the contracts, there are three questions to consider. Within the work groups, we touched on these and we never really included them in the reports. There are three good questions to ask yourself. Is the answer affected by your starting position? You'll shrink a whole bunch of in-force contracts down to maybe about 10 percent of the cells. The other is how stable is the grouping from one valuation to the other? I view this thing as a new paradigm. It's not just another requirement. We're all into learning. We're all into refining the answer. The more we do this, the better we'll get at it. Don't underestimate the time and the effort. Ordering any kind of an aggregate calculation gives you a lot of difficulties, so quality control as you put this stuff together is really important. The other thing, I think, is something that's buried under all this. We can handle a lot more responsibility, but we also implicitly have a lot of accountability. There are three reports that are food for thought. There's a Securities and Exchange Commission (SEC) report and two reports in the United Kingdom on Equitable U.K.'s failure.

As far as the adoption status goes for the reserves, there are standard scenario and accounting issues. We're looking at year-end 2006 maybe. I don't have a crystal ball. That's within the range of a prudent best-guess estimate, given what happened with quad N. But it looks like it could be year-end 2006. On the RBC, the outstanding issue there is standard scenario, and a lot will be told in the June NAIC meeting.

I've been concentrating on what the regulations, what the Academy's proposals, mean. Peter will take these concepts and apply them in a much broader context.

MR. PETER SUN: John has given us an excellent overview of the new requirements for C3 Phase II, and as you see, a lot of things have changed. As actuaries, we're used to calculating reserves and RBCs based on factors. You apply these factors and then you're done. Now, things have really changed. We have moved it to a principle-based approach. One thing that's good about the principle-based approach is it forces us to understand the principle. During the past year or so I've worked with several of my clients, and I have run into some of the considerations that clients think about when they are implementing C3 Phase II requirements and the new reserve requirements. What I want to get at is companies should now focus just to limit their scope to C3 Phase II and say, "This is just a reserve question. This is just a capital question." Instead, all these requirements should be placed into a broad scope of companies' risk-management strategies.

One thing you probably have heard is that a hedging strategy might be implemented to reduce the requirements of RBC and for all reserves. Now I can implement my hedges. Now I can answer the questions on reserve and RBC. But, once you have the hedges in place, you introduce implications for your income. How do you reflect your hedges in your income? Also on that front, I think a lot of companies that we're working for are stock companies and won't care about your quarterly GAAP income statement. After implementing a perfect hedge, that may actually increase your GAAP income volatility, and then you say, "Now what do I do? If I don't implement the hedge, I may be forced to have very high reserve or capital requirements. But if I implement a hedge, then I may see my GAAP income become very volatile." These are some of the considerations that companies have to think about before taking actions to manage their reserve and their risk requirements.

The process of actually implementing the requirements for C3 Phase II and the new reserve requirements is also a very good exercise for companies to get a better understanding of the business they are in, the kind of risks they are exposed to. I think the companies would gain a lot more if they took this view as opposed to just saying, "OK, these are just the statutory requirements. If I just jump through the hoops, then I'm done." This is what I want to talk about and to share with all of us.

I think John has given us a very good overview. The basic approaches are you can have stochastic scenario testing and alternative factor methods. The alternative factor method is really meant for companies that have not really had a very good monitoring system to handle the complexities of the guarantees that they see in variable annuities, and it is really quite limited. It is really only applicable to a GMBD, and it can't really reflect the benefits of your hedges and things like that. But really, this new requirement is really pushing companies to have a better understanding and a have a very good model in place to reflect the complexities and the risks inherent in the variable annuity business.

Very quickly, CTE 90 after tax surplus is really just the reserve, plus capital. The difference between CTE 90 and CTE 65 is the additional capital. Usually I would see CTE 90 to be higher than CTE 65, so if you think about the companies, they would have to put one pot of money up front. You can cut the pot of money into a reserve and capital. You can cut it either way, but the company has to fork over this whole pot of money. So I would just focus on CTE 90.

For the scenarios, you can use your self-generated scenarios and you can use the prepackaged scenarios. What I found is that for companies that are new to this game, it's probably easier to start out with the prepackaged scenarios. You can just decompose your assets into the asset classes in the prescribed scenarios and then you'd be done. The advantage of actually self-generating scenarios is that through this process you can develop internal expertise in understanding the scenario-generation process and an understanding of what kind of scenarios you might be

running into in reality.

What does this really mean? If you are the CFO or CEO of your company, I guess there will be a few questions you'll be asking yourself and asking your actuary. Things like, how much capital in the reserve is really needed? That's really a year-end question. Also, you would think, how do I implement these requirements and what can I do to reduce the requirements? How much effort do I need to spend to get there? Because we are going to a principle-based approach, now we will have a lot of projections and analyses. That would have higher requirements for hardware. It's not just the software requirements, because you have to run through a lot of scenarios and things like that. So, that's also a consideration. For the capital and reserve requirements, companies should not just focus on the year-end. Of course, at year-end you have to report and you have to be audited. Companies should also think about what will happen several years down the road. That will be a question of projection. That will be a question of looking forward. What kind of strategies can I take in the future to manage the reserves? Just focusing on the year-end will not be enough.

I'll come back on the projection scenarios. Of course, the advantage of the prescribed scenarios is that they're very easy to use. Also, if you use those scenarios correctly, then people will not really question the validity of your scenarios, unlike the self-generated scenarios. You really have to specify and meet all these validation standards. But certain common indices do not directly exist in the prescribed scenarios. For a situation like that, what I often do is to combine the return for different asset categories and just back out an index that I would like to see. When I'm doing this, I need to be sure that all those scenarios are lined up. I can't just use scenario No. 1 from asset class one and scenario No. 10 from asset class two and then do my algebra. They all have to be lined up. Of course, you can self-generate the scenarios. I have seen people who are trying to do that. They seem to generate quite a few questions. Once you have questions, you have a better understanding. But if you are really time-challenged, the questions might be better answered later when things are not as crazy.

When you're projecting it out, the in-force can be seriatim or grouped. I personally would prefer seriatim in-force, just like John showed in his presentation. In the grouping method, when you're adding these things together, you can actually distort the results quite a bit if you're not extremely careful. As actuaries, we are used to the idea of grouping the data. We use the models all the time. We group by age, for example. Often the data that we see are linear, so once you group it, you don't really disturb the results so much. For variable-annuity guarantees, by nature those guarantees are non-linear and if you are grouping these things not in a very fine and very careful way, the results can be off quite a bit. I think the purpose of the regulations about grouping are really that the actuary should be comfortable that grouping does not materially distort the results. How I see that is, how can you be sure that you're not materially distorting the results? You don't really know until

you really go there. Then why do you even need grouping? Grouping is something that is embedded in RBC and the reserve calculations.

Also, consider if you have a hedge program and you have a valuation program. Let's say you do risk-neutral valuation of your in-force to find out how much your embedded options are worth. While you're doing that, it's almost always necessary to run your in-force on a seriatim basis. Seriatim processing is almost like biting the bullet, but I think that has a lot of benefit for companies to gain. Of course, when you're doing seriatim processing, you will need a lot of computing power and you'll have to arrange your computing power in a way that is expandable and all these things. These are all the considerations that people have to think about.

What I mean by financial projection is instead of just focusing on the year-end result, you have to think about what happens in the future. You need to project out your capital on a reserve requirement down the road — two years down the road, five years down the road — so that upper management can prepare and come up with a strategy to integrate these requirements. Often what companies want to do will be something like let's have a huge range of scenarios and you can calculate the RBC and the reserve requirements along each path and at each time node. By doing that, you can have a distribution of your requirements. You know what kind of exposure you might have. Also, you might be able to uncover situations where you'll say, "Here, these kind of scenarios really are giving us the worst kind of results," and things like that. The problem with this approach is if you have thousands of scenarios and you look at that, you can easily get information overload.

An alternative is that some companies are using representative, or a limited number of, selected scenarios. There's a stochastic scenario. You use select and easy-to-understand scenarios that tend to highlight the risk in the business. It is easier to implement. You don't have to run thousands of scenarios, stochastic on stochastic, and all these things. You just run 10 scenarios, max. The only downside is that because you have your preconceptions of these scenarios, you might miss the worst of the scenarios. What I found that the companies found very useful was the New York seven type of scenarios. Your actual return is very flat. It is up and down. It is up. It is down. Often those New York seven types move things around. Along that path, that often reveals a lot of the characteristics and risk embedded in the block of business.

What really drives the C3 Phase II and what really drives the reserves? From what I have seen, the drivers are really two things. One is the product features and the second is whether you implement a hedging strategy. Certain products or features can be dominant in the C3 Phase II calculation. When I was analyzing some of the C3 Phase II capital requirements and the reserve requirements, I found that companies are under the impression that if you have a very good hedging program, then your reserve would be largely reduced. But for certain kinds of products that's

not really happening. Why? It's because those products have features that are prone to produce very high reserve and capital requirements. Some examples are a sudden drop in the surrender charge schedule. For example, you have your surrender charge schedules and often you have seven, six, five, four, three, two, one, a very smooth surrender charge schedule. But if you have a surrender charge schedule like seven, six, six, zero, at the point where you have the large drop, that drop tends to overwhelm whatever you do on the RBC requirement and on the reserve requirement. That single surrender charge drop overwhelms whatever you're doing to mitigate the requirements. Other examples are high per policy expenses. If you have a smaller-size policy, you may not be able to reduce your C3 Phase II amounts very much either.

When you have these products, you can have many product features. I think it's a good idea to test those product features individually. Then you remove this product feature and see what the requirements for C3 Phase II are so you can have a better understanding of your impact.

Hedging reduces the capital and the reserve requirements. I understand it using a graph like this (Sun Slide 11, page 4). Without hedging, you can see you average out the tail. Then you have a large requirement. With hedging, the distribution is very much concentrated. You'll still have the tail, but the tail will be along here. You can see that's better than here. So that's my understanding of how hedging would be able to reduce the tail risk.

To take advantage of hedging, a clearly defined hedging strategy must be followed. In my opinion, you need to document what you do there very well and be able to support it. One interesting issue would be how many hedging credits you can take and reflect in the reserve and then capital calculation. Up to several months ago, we had been hearing 85 percent. But now I think the idea is really that you can take as much as you can justify. So that gives us a lot stricter requirement on documentation and validation and to be able to cover your assumptions. Here are some examples of CTE 90 without hedging (Sun Slide 13, Page 5). This is a new issue of $1 billion of various GMBD designs. I have common designs of return on premium, annual ratcheting, 5 percent roll-up and things like this. Then here I have this market movement. One thing that is clear is that the requirements are very sensitive to the market movement. If you have a market drop of 20 percent, you can see your RBC requirements more than doubled from the baseline. If you have an up market, things are not that sensitive. Now, this example is when we have 80 percent hedging credits (Sun Slide 14, page 5). Compare this to what we had on the previous slide. You can see the baseline requirements do not change so dramatically. But if you look at when the market is down 20 percent, you can see the requirement is not really as severe. So I see the protection for hedging is quite significant in the down scenarios.

You can see that hedging is quite useful in reducing the requirements of the reserve

and the capital. Before you implement a hedging strategy, there are several questions you need to ask yourself. Should I implement a static hedging strategy? That is, you go out and buy a bunch of instruments to hedge, and then you walk out and you're done. Or you can implement a dynamic hedging strategy, where you're constantly monitoring the market movement and adjusting your hedge position. We all have advantages and disadvantages. Maybe you can implement a hybrid hedging strategy. You can say, "For the long term, we are using a dynamic hedging strategy. For the short term we are using a static hedging strategy." You can combine some of the benefits. If things don't turn out too well, then you get double whammy.

Another very important dimension is here, the income statement volatility as long as you have implemented hedges. Let's say you buy a bunch of derivatives to hedge your portfolio. Then on the liability side you do not have a lot of variation on the reserve and capital requirements, but on the asset side because your hedging instrument is required to be marked to market, and when the market moves, your asset value will move correspondingly. On the liability side, you have things that are stable. On the asset side you have things that move up and down, so that actually creates income statement volatility if you have a hedge in the program. This is true for statutory. On a GAAP basis this is also true. It is also true for things that are subject to SOP 02-1. For policies with GMDB and GMIB, which are subject to SOP 02-1, then SOP 02-1 would tend to move slowly following the market movement because of the K factors in the process. Your hedge instrument is marked to market; therefore on the hedge side you can have a lot of hedge gains and losses that immediately hit your income statement. On the GAAP side, GMWB type of things are a lot better because these are FAS 133 products. The liabilities and the assets move together.

I conclude my presentation here by again coming back to what I said at the beginning of my presentation. Companies should think about the C3 Phase II requirements not just as an isolated issue, but should place that in a broad context of corporate risk management. Companies can avoid a lot of risks and reap the benefits.

MR. FLOMAN: I think the first thing we need to think about when considering what we're talking about here is what are we trying to accomplish? What is the need to your organization? C-3 Phase II, as a principle-based approach, is meant to reflect the actual risk associated with the business, the risk-based capital that you're holding. This movement toward a principle-based approach is meant to reflect what's my exposure to downside risk and what kind of capital do I need to hold to going to be solvent down the road? That's what you need to keep in t this process is that we're really trying to measure what the profile ts and what our exposure is. There are two pieces. There's risk-based capital and then there's what your target surplus will be. What do I need to hold? What do I want to hold? And how can I convince the rating agencies that

M.E.: I think he said FAS 133, but could you please confirm that?

what I'm holding is sufficient to maintain a rating?

Traditionally what we've seen is that companies hold a percentage of risk-based capital — 200 percent, say, for a particular rating from the rating agencies — and that becomes what your target is from a capital standpoint. From what we've heard from some of the rating agencies, the move from a risk-based capital standpoint will coincide with a move from the rating agencies to move more toward this type of approach. Where you're not holding a percentage of capital, but you're proving to the rating agencies that what you're holding is sufficient to cover your risk for your portfolio. It's not product-specific. It's company-portfolio specific. Again, it's risk-related. It's not formula-driven. It's modeling intensive, and you must be able to show and to prove that the capital you're holding is supported by your assumptions.

My agenda is to go through what's your approach going to be, what are the residual effects and how does hedging fit in? Then I'll talk about setting a game plan. What will my basic approach be? Am I looking at C3 Phase II as a compliance exercise, or will this be more of a framework that you're implementing to manage your business? I think the first thing you really need to ask yourself is what's our approach going to be as an organization? How do we look at C3 Phase II capital and reserving? As a compliance exercise, it could be that you do it at the end of the year. You have this push at year-end, during which you work 24 hours a day for two weeks, you get your numbers in and you're done. Your benefit is that you haven't spent your whole year working on these models, and the drawback is you don't get much. The learnings from the process are limited.

The alternative approach is, "OK, let's build this initiative into a year-round process, where we're leveraging what we're using for C3 Phase II with our parts of the business where we're using our models for management decisions. We're using our models for embedded values and for pricing, where it's all integrated and you don't have this model off to the side that does your C3 Phase II. The benefits are you're constantly evolving. But you're also proving to outside parties that we believe in these models, and we're using it for management decisions. It's not just a compliance exercise, but these models and the results of these models are integrated throughout our organization. The drawback is that it takes time. It's an evolving process, so you need to spend a lot of time and investment in people and in hardware and in time.

Now I want to talk about the residual effects, RBC requirements or whatever. We talked about what the requirements are, but we didn't really talk about what does it mean in relation to today? In C3 Phase II, I think some people consider that it probably means that there's a large increase. That's not necessarily the case, depending on the mix of business that you have, the product features, market conditions, the amount of additional capital from where you are today could be minimal or could be less. It could be substantially more. You need to go through the exercises. I don't think there are many shortcuts to determining what your capital

requirements could be. I think you really need to do some listening to understand what the risk characteristics are of your business. Beyond what my capital requirements are today, there are some residual effects related to pricing, related to capital forecasting, related to what am I going to do from a hedging perspective? From a product pricing perspective, product profitability is driven in part by what kind of capital you need to support these products. The new framework for calculating capital changes, how profits will emerge from your products over time. You need to be able to reflect this in your pricing methodology.

In conjunction with changing pricing methodology, you need to think about how can I change product features to better manage the risk exposure? How can you introduce products as a mix of business that complements each other from a company standpoint? Pricing will change, and you need to have a modeling infrastructure that supports the type of pricing that you may need to be doing. Peter touched on capital forecasting. You calculate your capital today, and you come up with a ratio of capital to reserves. What will it be next year? What will it be the year after? Can you assume that it will be level? How do you plug that into business planning? How do you plug that into embedded value? You need to consider what the base scenario is that you're looking at and consider, how's my capital going to change based on what that base scenario is going to do? It won't be static over time. It will change.

Then you come to hedging. What do I do? I think there's a lot of push right now around variable annuities to get hedging in place. We need hedging to reduce capital requirements. You need to think about how the hedging fits in with your overall business strategies. You need to think about what are the implications of C3 Phase II from an RBC standpoint? How much do I need to hold and what are the benefits I'll get for hedging? What's my risk profile? How can hedging affect our risk profile? From a process standpoint, once you have a hedging program, how do you reflect it in your model and how do you get credit for it? Your hedge credit will only go as far as your models will allow or how you can demonstrate that your hedge program actually reduces your tail risk. That's really the purpose of including hedging in C3 Phase II — what's my risk exposure, and how does hedging affect what that risk exposure is?

One of the considerations — and there's been a lot of discussion about this recently — has been the currently proposed scenario requirements and how hedging has been reflected in the standard scenario. The current requirement says you can only reflect currently existing hedges within your standard scenario calculations. So any hedge program you have in place will not get credit within the standard scenario for RBC. You don't only need to think about your hedging program in terms of what does it do to reduce my risk exposure? It introduces another variable, which is how do I get credit for this? It doesn't necessarily lead to making the best decisions from a risk-reduction standpoint, and that's part of the discussion going on now around the standard scenario. The limitations around reflecting hedging are onerous and do

not reward the right behavior.

As for complications on hedging, obviously we've talked about nested stochastic processing. How will you reflect hedging in your models? How will you generate scenarios that are consistent with what's required under hedging? You need the ability to generate risk-neutral scenarios within your real-world C3 Phase II scenarios. The hedging process is pretty complicated. As far as from a modeling exercise, how will I reflect hedging within my models? How will I get those hedge cash flows? How will I mirror what I'm actually doing from a hedging perspective within a C3 Phase II model, and how many scenarios do I need to run to best do that? These are all questions you need to ask. Run time becomes a huge issue with nested stochastic processing. There are a lot of things you need to consider.

From a need standpoint, we're talking about a modeling initiative. You need to ask what can you currently do, what do you need to do, what are the gaps? Try to figure out if my current modeling infrastructure is appropriate for doing these calculations, or do I need to invest, build out and hire people? It comes back to the question of how does this process fit into my overall company framework? Start getting a game plan together. If you don't have a game plan now, it's time to start getting one. There are timing considerations from a game plan perspective. Will this be a year-end exercise, when I'm using year-end in-force, or will it be an exercise that I do prior to year-end with potentially some true-ups at year-end to get you to your final C3 Phase II number? Another game plan consideration is, will I use the economy scenarios or will I use homegrown scenarios?

Here are some sample steps in completing C3 Phase II calculations. I stole some of Jim Lamson's 29 steps from the Academy's meeting that we had earlier in the year. I think I've cut it down to 15 or 20, but it could be 50 if you blow out some of these steps. It's a pretty big initiative. Get ready early. I don't know if now would be considered early, but start getting your processes in place. Start building your models, determining your methodology, developing your assumptions and analyzing how your assumptions work in the tail scenarios. For a lot of the modeling exercises that we do, we're thinking about assumptions from a best-estimate standpoint or how these assumptions work over the whole range of possibilities. The key for measuring tail risk is how do my assumptions work in those tail scenarios? Does a best-estimate assumption under a baseline scenario make sense in an extreme scenario? You need to look carefully at what's happening in those tail scenarios and ensure that your assumptions make sense and are supportable. If you're not reflecting policyholder behavior that's changing as economic scenarios deteriorate, it's worth investigating what's the sensitivity of that?

Fund mapping is very important. What's the risk/return profile of your funds and how will you do the mapping? You could have 30 funds that you're mapping into five. Is that appropriate because that will change the tail distribution? It will affect what's happening in those tail scenarios.

Documentation and certification — this is the part that actuaries love. Embedded in this whole process is the need to document and support your assumptions, and document and support your results. This is an exercise to prove to the regulators, to the rating agencies and to management that you understand what's happening within your business and that you can support the assumptions. You understand what's happening within the scenarios. You understand what's happening in different products and how they're responding, how your products interact. Documentation plays an integral role in a process like this.

Peer review is not a requirement of C3 Phase II, but it's encouraged. Peer review is gaining momentum. It's a requirement in Canada. It's a requirement in Mexico now. There's momentum around peer review, and it's a valuable process in that you're getting an external party to challenge your methodology, your assumptions and your results.

In closing, I'd offer a reminder that this is a big event. People are watching. It's an opportunity. We think it's the wave of the future, so the advice is to embrace it and make it part of your overall company culture. I'll end there and open the floor for comments.

MR. DAVID F. TAUBER: I'm from Keefe Bruyette & Woods Inc. This is to John. You guys were all talking about the aggregation and the potential impact on the reserves. Has the working group done any analysis on what the impact would be if regulators came back and said put in aggregation into reserve and maybe take out the standard scenario?

MR. O'SULLIVAN: Yes. What we've done is we have produced some documents. Part of it is in the March 2005 BARWG report that's on the Academy Web site. We've been trying to convince the regulators that maybe instead of focusing on aggregation versus no aggregation, we could have some limited amount of aggregation. We show in the report on the Academy Web site what it would look like for full aggregation and limited aggregation. The other caveat is that what we're showing may not be typical for you, but it does show what the numbers are. We're trying things where we would alternate some of the lapse rates on the guaranteed living benefits when they were out of the money. We had some aggregation over five years, full aggregation, and things like that. But the jury's out as far as which way the regulators will go, whether they'll accept the contract by contract.

I think they've recognized that it's a very different measure of risk. There's a viewpoint that the proper way to set the reserve is contract by contract, which gets you into this other question. Is it really geography that we're talking about? Or as Keith and Peter mentioned, maybe the thing you're looking at is the CTE 90 amount as the total amount, and then it's just geography. Is it geography, or is the reserve something special as far as go ahead and determine two of them independently?

FROM THE FLOOR: Rich Mathis, Kemper Investors. My question is about the capital requirements that the rating agencies might really require. You mentioned in your last presentation that maybe 100 percent of whatever the capital requirement is enough.

MR. FLOMAN: One of the things we've heard is a CTE measure, where capital is based on a 90 CTE. The rating agencies may ask, "What's your 98 CTE or 99 CTE?" Then maybe make a basis off of that — looking farther out into your tail risk to see what your exposure is and potentially asking companies for sensitivities off of their C3 Phase II calculations to get a better handle of what the risk exposure is.

MR. SUN: Historically, the risk-based capital requirements are 150 percent, 200 percent of whatever you calculate. Now I think things have changed a little bit. These requirements are not really linear, so all of these percentages do not make a whole lot of sense in this world. What makes more sense is you have these models and as you examine the model and look at the tails.

MR. FLOMAN: I also think the more support, the more you can prove to the rating agencies that the information that you're presenting, that your results are well documented and well thought out, the better answer you'll get from them.

MR. O'SULLIVAN: I agree. But at the same time, the rating agencies have to get up to speed if they'll be doing the more dynamic way of doing this and not just formulistic.

MR. FLOMAN: They'll be relying heavily on the people who are doing the work.

MR. O'SULLIVAN: I think each of us said don't underestimate the time and effort required. How many would say that they're at the early stage in this work? How many think they have this thing very manageable if in fact the RBC is adopted for this year-end? Then everybody else falls into the other category, which is still working on this thing. I would go ahead and emphasize the fact that the more time you get, the better the answer is, so you always keep pushing at it.