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# 2001 Valuation Actuary Symposium

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#### Session 20PD

#### Risk-Based Capital

**Moderator:** Alastair G. Longley-Cook

**Panelists:** Robert A. Brown  
Lori L. Helge  
James F. Reiskyt

*Summary: This panel discussion provides an overview of current risk-based capital (RBC) requirements of life insurer, as well as insight into topical issues and potential changes to RBC.*

*Items covered include:*

- *Recap of RBC law and RBC calculation rules*
- *Tax impact on the factors*
- *Common stock issue*
- *C-3 testing*
- *Proposed C-3 testing for Variable Annuity Guaranteed Living Benefits (VAGLB)*
- *Liquidity risk issue*
- *Revisions to health factors (this topic is covered in greater depth at a separate session)*

**MR. ALASTAIR G. LONGLEY-COOK:** We'll spend some time on the history of and current risk-based capital requirements for life insurers. We'll spend a lot of time on the topical issues, such as what's happening now and what you can expect to see coming down the pike on risk-based capital requirements.

I was recently with Aetna, and since January 2001, I moved to Tillinghast-Towers Perrin. I'm going to moderate this session, mainly because I chair what used to be known as the American Academy of Actuaries's Life Risk-Based Capital Committee. Recently, due to a restructuring, it has been renamed the Life Capital Adequacy Subcommittee, but it is basically the same people continuing to do the same work.

We have three highly qualified people to talk about what's going on in the risk-based capital area. Lori Helge is the consulting actuary with Tillinghast in the Chicago office. Her focus has been on asset/liability modeling for the life and annuity products, including actuarial appraisals, embedded values, and cash-flow testing. Her familiarity with RBC formulas comes from its application in calculating target surplus for an appraisal.

Jim Reiskytl is vice president of tax and financial planning at Northwestern Mutual in Milwaukee. He has been with the company since 1961. Jim has served on the Society of Actuaries Board as vice president, treasurer and secretary and is a member of numerous Society committees. He is also secretary and treasurer of the Academy. Notably, with regard to our subject, he has been an active member of the Capital Adequacy Subcommittee and the driving force behind the RBC changes that he will be discussing.

Bob Brown is assistant vice president and actuary of CIGNA Retirement and Investment Services in Hartford. He has been an active member of that same subcommittee since 1995, and he currently chairs its C-3 subgroup. Bob has been a consistent attendee at NAIC meetings over the years to help represent the committee's recommendations and stay abreast of regulatory concerns. With that, we will start off with Lori who will briefly introduce us to the subject and give us an idea of where RBC stands today.

**MS. LORI L. HELGE:** We're not going to spend a lot of time on the RBC law and calculation review because I'm going to assume that we all have some background in it and just need a refresher.

What is risk-based capital? It is the formula for a minimum level of capital. Probably the most important thing is that it's intended to reflect the company's size and risk characteristics. Maybe the most important word there is *intended*, and we'll hear a bit more about that later.

The components of the calculation are: C-0, affiliated asset risk; C-1, asset risk related to nonaffiliates, primary defaults, and fluctuations in market value; and C-2, insurance risk. C-3a and C-3b have been split. C-3a is interest rate risk, C-3b is health credit risk, and C-4a and C-4b are business risk.

The covariance adjustment comes into play because all these losses are unlikely to happen at the same time. Equation 1 is the formula that we're going to call risk-based capital. This is also known as the authorized control level.

$$\text{RBC} = 50\% * \text{C-0} + \text{C-4a} + \text{sqrt} ((\text{C-1} + \text{C-3a})^2 + \text{C-2}^2 + \text{C-3b}^2 + \text{C-4b}^2) \quad [\text{Equation 1}]$$

For C-0 and C-1 asset risk, a factor is applied to the stated value of each asset. Those factors vary by asset type and risk class. Then there is the size factor that reflects the risk of holding assets concentrated with a small number of issuers. If your investments are spread across a large number of issuers, it will reflect the benefits of diversification. Finally, there is a concentration adjustment that simply doubles the RBC factor for the ten largest asset exposures.

Now let's discuss some recent updates to C-1. First we have updates related to separate accounts with guarantees. There is currently a 30-basis-point factor applied to guaranteed indexed separate accounts, but this is under review. I think we're going to hear a little more about this later. Then, 100% of the C-1 RBC factors are applied to underlying assets for guaranteed nonindexed separate accounts. There are a couple of components for nonguaranteed separate accounts: 10% of surplus plus 10% of the Commissioners Reserve Valuation Method/Commissioners Annuity Reserve Valuation Method (CRVM/CARVM) adjustment (if the fund balance is less than the premium less withdrawals), plus 2% of the CRVM/CARVM adjustment (if the fund balance is greater than the premium less withdrawals).

For C-2 insurance risk, health has a factor applied to earned premium that varies by type of insurance plus the factor of claim reserves. Underwriting risk is reflected by an experience fluctuation risk, a component for premium rate guarantees beyond one year and a credit for managed care.

For life insurance, the factors are based on net amount at risk, and the factors are banded such that as there is more net amount at risk, the factors decrease. It reflects the lower level of risk and the larger block of business that a company has. Individual and group are considered separately and premium stabilization reserves are an offset.

For C-3 interest rate risk, there is a factor applied to reserves. Reserves are split by withdrawal risk and are based on surrender charge level, market-value adjustment, and type of product. So policies that are more likely to leave if interest rates change have a higher risk factor applied to them. There is credit for an unqualified Section 8 opinion. In fact, that would reduce the factors by one-third.

New C-3 testing is not optional. It's not something you can choose to do. If you meet the requirements, you have to do it. If you don't meet the requirements, you can't use that factor. C-3 testing is discussed in detail later in this manuscript.

Another newer component to the C-3 interest rate risk is related to separate account guaranteed living benefits. There is a factor applied to reserves for the base separate account plans, plus additional reserves for guaranteed living benefits. Each policy is assigned to a medium or high-risk category based on certain criteria. C-4 risk or business risk is simply a percentage of premium and a percentage of separate account liabilities.

Once you have your formula-based RBC, you must calculate the other half, which is total adjusted capital (TAC). TAC is equal to capital and surplus, plus the asset valuation reserve (AVR), plus 50% of apportioned dividends, plus 50% of dividends not yet apportioned, plus subsidiary dividend liability, plus certain capital notes.

The RBC ratio is total adjusted capital to your capital divided by this formula-based RBC that we're calling the authorized control level (ACL). Based on the RBC rates, there are a number of things that can happen that we'll cover later.

Another test is the trend test. So even if your RBC ratio exceeds 200%, but is less than 250%, then you have to calculate the margin between the current year and the prior year and carry that decrease forward following the formula. If you trend below 190%, then you trigger the company action level.

So what does it all mean? The company action level means you have to submit an RBC plan to your state insurance commissioner. The regulatory action level adds the aspect that the commissioner shall issue an order specifying corrective action.

At the authorized control level, the commissioner may place the insurer under regulatory control. At the mandatory control level, the commissioner must place the insurer under regulatory control.

There are some other odds and ends from the RBC law. All RBC reports and plans are confidential. Those ratios are not meant to rank insurers. Insurers are not allowed to publicize their ratios. RBC information may not be used by the commissioner for ratemaking purposes. I'm now going to hand the discussion over to Jim.

**MR. JAMES F. REISKYTL:** We made two significant changes to RBC in the past year. One changes the treatment of common stock and its covariance. The other was to consider all the codification changes and what impact they might have on RBC and/or adjusted capital. The biggest single change is the deferred tax effect. I will be describing what it has done to the factors and to the total adjusted capital.

There were three RBC changes for unaffiliated common stock and affiliated noninsurance subsidiaries. All three changes were driven by the desire to improve the covariant treatment, which was already done in the health and the property/casualty RBC formulas. We want to make

sure that we picked up any unusual concentration of stock and/or that we measured the variability of different individual stocks as compared to that of Standard and Poor's (S&P). Therefore, three refinements were made.

The first refinement was to adjust the results for beta. The beta is the variance of the stock relative to the movement in the overall stock market. Beta is simply the weighted average of the individual stocks in your portfolio. This is already being done for stocks in the AVR. Therefore, it's something with which I presume many of you are familiar. It has been defined, and, for many companies, it is already being calculated. We have established a minimum of 22.5% and a maximum of 45%. These are somewhat arbitrary at 75% and 150%. If you choose not to do the beta calculation, you may use a fall-back position of 45% as your common stock factor.

The second change, the addition of a concentration factor, adjusts for the risks that aren't recognized by beta. We have had a concentration factor for all assets in risk-based capital, except for common stocks capped at 30%—the highest risk-based capital factor is that of common stock. We are going to increase the RBC factor for the five largest common stock holdings by 50%, which includes those held in investment subsidiaries. This is a very practical solution that avoids a lot of work otherwise required since the 30% factor was determined based on a common stock Standard and Poor's portfolio. Individual companies' portfolios often mimic Standard & Poor's distributions, but some might not.

The third change for unaffiliated common stock involves a covariance change. There are two supporting components to the major change: 1) changing covariance, which recognizes the independence of common stock from another asset default, and 2) interest rate risks. We must have at least one formula for this presentation to actuaries:

$$\text{current } (C-1) = (C-1)_{CS} + (C-1)_O \quad [\text{Equation 2}]$$

where,

$(C-1)_{CS}$  = unaffiliated common stock and certain affiliated noninsurance stock risks

$(C-1)_O$  = all other C-1 risks

The current C-1 risks are separated into two components—those of unaffiliated common stock and those of all other C-1 risk. Since these risks are assumed to be independent, we combined the C-1<sub>o</sub> (the piece that isn't common stock) with C-3<sub>a</sub> and squared the total. Next, we square the common stock risk component as well as each of the other risks C-risks. The final result is that the life formula is now consistent with that of property/casualty and of health RBC formulas. You don't have to put your common stock into your other subsidiaries any longer to avoid the higher life risk charges. The formula is shown in Equation 3:

$$\text{RBC} = C_o + (C-4)_a + \sqrt{\left\{ (C-1)_o + (C-3)_a \right\}^2 + (C-1)_{cs}^2 + (C-2)^2 + \dots} \quad [\text{Equation 3}]$$

I want to move on to a broad overview of the changes created by codification's recognition of deferred taxes.

Appropriate deferred tax recognition involved many, many discussions. We began with the basic concepts of taxes so as to have a common understanding, which was no small challenge. It included many discussions to help regulators understand what a deferred tax asset is, what a tax is, and how both affect the factors and capital. Of course, the limited way deferred taxes were recognized in codification only added to the challenge of trying to explain it to people. In fact, at Northwestern, we're still having some discussion about deferred taxes and what all these limitations mean in the tails of the distribution. We covered everything from the very conceptual, like what a deferred tax means and how it would change RBC, to how you round the final results. We decided on two significant digits for each factor as an actuarial decision.

We thought the easy part was what to do with total adjusted capital. Although it seemed easy, it got a lot of debate. We said we had to recognize deferred tax assets and deferred tax liabilities. The Codification Committee had set them up, so who were we to second-guess their decision? Many people thought they could second-guess the committee. They weren't concerned about deferred tax liabilities because they lowered total adjusted capital. They weren't as sure about

deferred tax assets being assets. Originally, after a lot of work, only the Life RBC Regulatory Committee agreed to recognize DTAs. Subsequently, the Property/Casualty and Health RBC Committees were told to either put in DTAs and DTLs or describe why they're inappropriate for your line of business, while being appropriate for life business. When faced with this issue, they quickly concluded that, although they didn't really like DTAs, unlike the DTLs, they didn't have a good rationale for not including them. After many, many conference calls, it was agreed that all RBC formulas would recognize both DTAs and DTLs. The story is not over quite yet because we received a recent charge to determine whether an RBC factor should be applied to the DTA to recognize its possible value fluctuations. Because we are just beginning to see them in the statutory blank (they've been in GAAP blanks for some time), it's too early to study their variance. Once DTAs and DTLs are audited, they might be more stable, or at least as stable as anything involving moving parts can be. At least they are more stable than they have been so far this initial year.

The second more difficult decision is how do you adjust the risk-based capital formula? You have to start with what risks are taxable as income and as capital gains? You might ask: Why bother? The tax rates are the same, but they might vary in the future. The regulator wanted us to develop a flexible system that could easily be adjusted if tax treatments were to change. So we developed everything pretax. We'll be able to insert a tax rate for each RBC factor so as to get after-tax results. If they change the tax rates or they change the capital gain treatment, or whatever they do, you can adjust the tax rates accordingly. We won't have to go back and redo everything; we'll just redo the tax rates. It took a fair amount of work up front, but, in the long run, we hope it will shorten recognition of future tax changes. So the first thing we had to do was to determine an income or capital gain treatment for each RBC factor.

Deferred tax recognition changed almost all of the C-1 factors. To help you understand the changes, I'm going to go into a little detail. I'm also going to go back to the original development of the factors. The fixed-income factors in use today assumed a 50% tax recognition. Why? We didn't have deferred taxes, so one had to assume when a credit event loss

on a bond would be recognized. When would you sell the bond? We decided that it would be when a one-year delay before the bond was sold occurred, and when half of them would be sold. *Half* meant somewhere between zero and 100%—a precise determination.

Clearly a one-year delay no longer makes sense with codification's recognition of deferred taxes—it is immediate. Since the NAIC, unlike GAAP, doesn't fully reflect DTAs, then subjecting them to various limits suggests somewhat more than 50% and less than 100%. Again, we made a precise actuarial determination of 75%—halfway between the current 50% and full recognition.

We recognized the full tax impact of equities' losses. You might assume that you would only invest in common stock if you were to have substantial capital gains, on average, over most periods. Because stock dividends are less than 1%, the return will be in a positive position even under very unusual circumstances. In most cases, there will be significant unrealized gains when losses occur. Hence, full recognition is appropriate. As for real estate, no change was made because real estate had already been fully tax adjusted. By the way, one of the other efforts we made as we looked at taxes was to develop every tax factor done consistently. When we reviewed the current factors, we found that there were some differences in their development.

We were fortunate in developing the new RBC factors. Mike Zurcher from Lincoln National did some of the original work with Joe Dunn from Metropolitan. They could actually recreate the original studies that were done 10 or 15 years ago. We reran those studies with the new tax assumptions, and we assured the regulators that we would not change any of the other underlying experience factors. In other words, we did not change the number of asset bond defaults. We used the same assumptions that were used in the original work. All we did was change the tax assumptions. In fact, we went a little bit further because when we found some assumptions that were made that had nothing to do with the experience factors that could be refined to reflect current intent or structure, they were made. An example of this change was to recognize the current AVR structure contribution factors.

We found two things. First, the impact of going from 50% to 75% tax recognition and removing the one-year delay in recognition had an equivalent effect on the bond factors. I wouldn't have guessed that the one-year delay had as dramatic an impact as the change in the recognition of taxes from 50% to 75%, but it did. The other thing we found is that these RBC factors are very AVR dependent. If your financial statement does not have an AVR, and doesn't recognize it or its equivalent, the RBC factors double. What is AVR all about? It sets aside the investment risk premium each year. For example, if you have a Class 6 bond, you are paid extra interest over a riskless Treasury investment. They do not pay you extra interest because you're good looking but because of the risk. GAAP, of course ignores this to a large degree. I think statutory does it better with the AVR. It sets aside that investment risk premium each year in the reserve. As you report where adverse events occur, you have money to offset all or part of it. Obviously if one sets aside money for adverse events, you get different risk-based capital needs than if one assumes that nothing is set aside. In the latter case, the RBC factors needed are roughly double the current factors.

Here are the current and new bond factors. Note that for the higher class business, which is where most of our investments are, the impacts are very modest. The best impact is for a Class 6 bond, which is treated as an equity and shown at market value. In fact, Class 6 investments and common stock show the two single biggest changes moving from 30% to 20% RBC factors. When you combine this change with a covariance, one gets a large RBC impact for common stock.

The current C-2, C-3, and C-4 factors already had full tax recognition, so they continue to do so except for health insurance where we assumed zero taxes. Why do we give this treatment to health insurance? There are two primary reasons. We found that the health carriers tend not to have diversified portfolios like an HMO. All they have is health risks. We also found that the majority of potentially weakly capitalized companies, as identified by the RBC formula, are health companies. Furthermore, when we looked at these weakly capitalized companies, we found that most of these companies were paying no taxes. Here's an interesting aside. There are also some other very profitable companies with excellent RBC results that weren't paying taxes either. We'd like to figure out how to do that, but that has nothing to do with RBC.

The new maximum is 150% of the 30% (20% x 150% for common stock). Another change for the Asset Concentration Factor is the new minimum of .08% and the new maximum of 45%.

Since a company's actual tax position can vary significantly, we also recommended adding a new sensitivity test. This sensitivity test gives the regulator great control since it shows the results assuming no tax impact. The pretax RBC results are used. For total adjusted capital, you zero out the DTAs and DTLs or zero out only the DTAs and leave in the DTLs. In fact, because the regulator has all the pieces, they can use whatever tax assumption is appropriate. Of course, as the company becomes weakly capitalized, then the regulator can look at tax-sharing agreements, and lots of other specific details that can't be used in a generic, broad industry-type formula. The guideline for RBC sets criteria when a company is subject to regulatory review, and it is ultimately subject to takeover if that review and the subsequent changes do not improve the results. We have a sensitivity test that gives the regulator a powerful tool with which to look at individual companies. Why did you use the tax rate or 75% percent of it? The situation in any one company regarding the capital gain/loss carry-backs, carry-forwards, tax sharing and agreements, taxes paid, and so on, are very company-specific. We had no interest in creating a company-specific RBC calculation as a first-cut measurement tool. It's best to use this when the company is potentially weakly capitalized.

I included subsidiaries under the topic of new sensitivity test because we continue to recognize other RBC formulas. If none exist, we usually use the common stock factor or 100% of surplus—whatever is appropriate for such entities.

Larry Gorski of the Illinois Insurance Department tested the early quarterly financial results to make sure we weren't suddenly making what we had thought were weakly capitalized companies into companies no longer subject to regulatory review, and vice versa. The results, based on the first quarter, which are being updated each quarter as results come in, suggested that there were no changes in weakly capitalized companies. Hence, the results were acceptable. We had assumed we might have to recalibrate the formula when this work was done. That turned out to be unnecessary.

So we now have new pretax factors, tax factors, and after-tax RBC results and other major changes. The biggest change was to common stock and high-yield investments reflecting recognition of deferred tax assets and liabilities.

**MR. LONGLEY-COOK:** Jim makes it sound so simple and straightforward. You wouldn't believe the amount of work that went into all those changes.

**MR. ROBERT A. BROWN:** I only have three different things that I want to talk about in terms of things that are going on in life risk-based capital, and they have a whole lot in common. Tom Campbell said people were beaten to death at another session with the term nonformulaic. For those who have been in the session for that review, that's kind of the thrust of what I want to say about what's happening and what's changing with risk-based capital. Why is risk-based capital leading reserves in that direction?

The three things I want to talk about are first, the changes that were recently made, their implementation, and the rationale underlying the so-called C-3, Phase I, which were the changes that were made in terms of measuring interest rate revenue. Second, I'll follow that with the change that is being proposed at the December 2001 meeting of the NAIC. It deals with the capital requirement for separate accounts that guarantee an index of some sort. Third, we'll talk about C-3 Phase II, which covers fixed guarantees surrounding variable products. This applies to minimum death benefits, guaranteed living benefits, or whatever. In all instances, what is happening is there is a change of approach. With the original life risk-based capital formula, everything was very formulaic. You take a factor times your Class I bonds, and you take another factor times your GICs that have these surrender characteristics. You add them up to obtain your capital requirement. Much work was done on that, and the factors were not at all arbitrary. They were based on a great deal of testing and modeling specific assumptions. They wanted a formula that can be applied most often to elements in the annual statement or the supporting documents.

Once that was in place, and both the industry and the regulators had some experience with it, one of the rating agencies started saying things like, "Now that we have risk-based capital with rather heavy capital charges for credit risk, companies are replacing credit risk with interest rate risk."

The factors in the C-3a calculation reflected the surrender characteristics in effect in that they reflected the degree of optionality on the liability side. They certainly didn't pick up whether the company was doing their funding on an immunized basis or whether they were using a lot of mortgage-backed assets with bad convexity or whatever. That was the kind of thing that that particular rating agency was pointing out. The C-3 charge was quite low. I believe the C-1 charge was much bigger than the C-3 charge was for most companies. Some of the regulators came back to the Academy to ask whether there was a way to refine this part of the formula. Is there some way to refine this component to do better metrics on how much interest rate risk the company really is taking? This received a lot of discussion within the Life Risk-Based Capital Task Force (it's now called the Life Capital Adequacy Subcommittee).

Basically, we've captured the major differences in product design. We believe that eight, more detailed product categories instead of the three categories that were there seemed to add little refinement. The real areas where these factors might be off a good deal is if I am intentionally taking a duration mismatch. Say I'm selling a four-year GIC and using a ten-year bond to support it. Or, perhaps I am using assets that have poor convexity, such as residential-backed paper, to support a fixed liability of some kind.

There are so many different products and so many different ways to fund them that we don't know how to come up with some formula that really gets that. We think what could be done and what should be done is to actually test the interest-sensitive product against a variety of severe interest rate scenarios and use the results of that testing. Furthermore, times have changed since the original formula because now most companies are now required to do asset adequacy analysis anyway. We assume the kind of models that are needed to do this testing for companies that are selling interest-sensitive products now exist. At the time the original risk-based capital was done, that was not a fair assumption, so let's take advantage of that. Let's tell companies to examine that model to make sure that the parameters in the models still make sense under more severe scenarios. They must use that model, with appropriate adjustments, for these extreme scenarios. Run these scenarios, measure the results, and do this metric. That's how we're going to get the

capital requirement, but we're going to constrain it. Initially, it won't be more than double what it turned out to be by using the old way, and it won't be less than half of what it turned out to be by using the old way. However, do that testing within that range. We went through a fun exercise to figure out a way to come up with 50 different patterns of interest rates that we thought did a good job of capturing the entire universe. There were 12 that we don't think really do that great a job of putting a metric on it but that we think cover the universe in terms of severity. If you want to run fewer scenarios and get a somewhat conservative answer, you can do less work and use these 12. That was the original recommendation from the Academy to the regulators. This is how to improve this metric for interest-sensitive products.

There was a lot of concern on the part of the regulators. That means that the answer is going to depend on the assumptions that the particular actuary puts on it. Two identical companies would probably end up with somewhat different answers because we all know that no two actuaries would ever put in exactly the same policyholder behavior assumptions. It was finally decided, because of all those flaws, that this was a lot closer to a perfect answer than what we had before. If you wanted to refine it, this was a big step in the direction of refinement.

This was a major change in regulatory thinking with some reservations. There's a certain amount of wanting to try it and see what happens. That was one of the reasons for the range on the answers compared to the old results. Some believed that everybody is just going to report zero, so we needed to be sure that didn't happen. That was the recommendation and the way the discussion was going. Then, as companies started looking at this proposal, a number of them said that even running 12 scenarios for all our interest-sensitive products is going to be a great deal of work. We don't have a lot of interest-sensitive business, and we have really good capital ratios. If you made a lot of really bad assumptions about how the testing came out, we still wouldn't be at any of those regulatory control levels. Why are you putting us through all this work? So the regulators said that if you have a big concentration of interest-sensitive products, or if ramping up your standard factor by a factor of 7.5 would put you at a regulatory control level, then you must

do the scenarios. Otherwise, you're not allowed to base your capital on these scenarios. "No optionality" was the jargon used. There was concern that companies that were not required to use scenarios would try it both ways and take the lower of the two repayment methods. They certainly wouldn't want that. The result is that only about four dozen companies ended up not being exempt from doing the testing. It's true that these are the companies that have the greatest concentration of interest-sensitive products or for whom a worse result in the factor produced would be most likely to require regulatory scrutiny. In that sense, it's logical that it came out that way. It's still true that it changed the actual work or the actual capital requirements for very few companies. There was also an adjustment for callable assets, which probably had some effect, albeit not generally an important one, on a great many companies. That was a calculation on the callable assets. If those that are callable below carrying value in the statement got called, you would get less cash than what you were carrying them at. This was only for that type of assets that didn't get used in the testing. When we said that, the assumption was that most of them would get used in the testing. This was an adjustment only for assets of that sort supporting surplus or nontested products. This last minute tweak to the formula to exempt most companies meant the callable asset adjustment had a much broader impact than what was originally envisioned.

Before I go too much further with this saga, Alastair will give some actual results of the scenario work of those four dozen or so companies that were required to do it. Larry Gorski put this together. It is interesting because part of the discussion within the Academy and with the regulators indicated that if you let actuaries do these models and set the assumptions, they're all going to come out at the lowest possible result (Actuarial Standards of Practice notwithstanding). The results actually don't come out that way. One of the reasons for considering that kind of nonformulaic approach in other areas was because it has a little bit more credibility with the regulators now than when we went through the discussions a couple of years ago.

**MR. LONGLEY-COOK:** As Bob said, these results were put together by Larry Gorski of the Illinois Insurance Department and presented at the Spring Meeting of the Society of Actuaries. It's kind of interesting to see where the companies actually came out. Only 48 qualified, those were the ones who were allowed to do it. As Bob said, not all companies come out with an

indicated RBC for the cash-flow tested products of zero. Only 15 companies reported \$0 as the RBC for cash-flow-scenario-tested (CFST) products. The reserves on products with RBC based on CFST products were \$349 billion with an average of \$7.3 billion per company (see Table 1).

**TABLE 1**  
**C-3 RBC**  
**Results for 2000**  
**CFST Business: (CFST C-3 RBC)/Factor Based C-3 RBC)**

0	•	.75-.99	1
0-.24	15	1.0-1.49	3
.25-.49	1	1.5-1.99	1
.5-.74	11	2.85	1

One came out to be less than half of the old factors. The others are further up. As Bob said, what was very impressive to the regulators was that all those companies didn't somehow manage to manipulate the calculations to come out at zero.

**MR. BROWN:** In the interest of completeness of reporting, the Academy was subsequently asked whether there could be a way to make a refinement to the C-3a factors for everybody else because so few companies were being required to do the scenario testing, and there is still a feeling that the companies might be duration mismatching their GICs. Work is still in process. We might try to do something crude based directly on the asset adequacy work that is done as a part of asset adequacy analysis or something like that. I don't know yet. It is still early. However, out of 1,600 insurance companies, only 48 fell into this refined category. You can see why some of the regulators might wonder whether there is some middle ground? That's not the point of this session. Two other areas of interest with regard to capital came along. All of these areas have something in common, namely that we're talking about how the portfolio behaves compared to the liability that the portfolio is supposed to support. That's what C-3 always meant. The fact that common stock was originally put in C-1 is kind of peculiar because it's not really credit risk. It's bounciness in value. Separate accounts that guarantee an index make this offer to an institutional investor, "If you put your money with us, we will pay you the Standard and Poor's (S&P) 500 total return, plus 50 basis points, or we'll pay you the Lehman Index plus or something like that." This is a typical guaranteed separate account kind of product.

The original factor for risk-based capital for this type of guaranteed separate account was 0.3%, which is extremely low. People were thinking in terms of just guaranteeing the S&P 500 and buying Treasury Bills or commercial paper or something and taking a long S&P futures position. There's very little volatility risk and very little credit risk, so put in a factor that's equivalent to the risk on a high-quality bond and call it a day. More recently, some of the regulators noticed filings of guaranteed index type of products and started inquiring about how they were being funded and how companies were going to pay 50 basis points over the S&P and still make money. They found that the actual funding strategy often wasn't quite that passive. The actual funding strategy involved putting a good deal of the assets in a hedge fund or buying some below-investment-grade product. As such, they were doing something like futures or options or something to lock up the basic index. However, what they were doing with the underlying cash was sometimes (but not always) substantially more interesting than just that kind of passive strategy. The other way still works, and there are probably some products that still work the other way. They came to the Academy saying, "Tell us how to refine our formula." Think about that for a minute. How many kinds of indices might somebody want to guarantee, and how many ways of investing the underlying cash might they dream up? The permutations and combinations are mind-boggling. Furthermore, it's a product that probably only six or eight companies actually sell in any volume. It's not a product that every insurance company in America has on their books. Still, the kind of funding that we were being told about clearly was not consistent with a 0.3% capital factor. There clearly is more tracking error and more risk. It will not turn out as envisioned.

So how would you set a capital requirement? We had already crossed the bridge and determined that we don't have to do everything with just some factor. For a problem like this, we're trying to measure tracking error and what that's going to do to your statutory balance sheet on a year-to-year basis. We said, "You take the measured tracking error of your actual fund, your actual product, and your actual guarantee over 100 periods. You basically go through a way of measuring that tracking error, and that is what determines your capital requirements."

I don't want to spend a lot of time on this because I know that most of you don't have this product. In addition, this is an Academy proposal that will be discussed for the first time at the December 2001 NAIC meeting. The regulators have not officially even seen this until now. Some of them are aware of what we're doing and some aren't, but this seems to address the concern in a way that is relatively straightforward and doesn't try to come up with a general algebraic solution. Instead, it looks at the behavior of the assets alongside the liabilities. Let's use that information rather than just throwing it away or putting it on the side.

We did do a couple of things. If below investment grade debt is held in the cash portfolio, there is a special adjustment for that. The more interesting refinement concerns symmetry. A number of ways that I might fund a product like this do not give me a symmetric distribution of gains and losses and of positive and negative tracking error. I might have done something to specifically limit the downside. If I just measure standard deviation of the difference between portfolio behavior and liability behavior, I'm not going to get credit for that downside limitation. In other words, say I have a product where I often lose a little bit of money and, once in a while, I make a whole lot of money. The times I make a lot of money will give me a really high standard deviation, even though I have a relatively low downside risk. So we are looking at tracking error on the downside only. If I have a positive month, count zero; if I have a negative month, I count the loss and then work from there. That seems to deal well with an asymmetric type of funding strategy and the hedged type of funding strategy. It also picks up the actual effectiveness of that strategy in practice, and it works pretty well except you have to be careful when you try to annualize monthly results. Taking a monthly mean times 12 is not the right answer. My e-mail address is [bob.brown@cigna.com](mailto:bob.brown@cigna.com). I'll be glad to send you the paper in advance.

We're taking 1.65 times the measured, modified standard deviation on top of the measured annualized mean as the RBC factor, to get approximately a 95<sup>th</sup> percentile type of answer (the metric that all of the life RBC is currently aimed at).

Again, what we've done here is to go away from what data is in the Blue Book and what factor we should apply. Instead, we use an actual measurement of asset and liability dynamics to get a capital requirement that makes sense.

Now we get to C-3 Phase II. Many of today's variable annuity products will have some kind of a minimum death benefit. In the granddaddy product, it was "if you die while you still have the money in the variable annuity, and if the value of your account at that time is less than your cost, the insurance company will at least bring it up to what you put into the contract so your estate won't bear any loss." Subsequent to that, it became a little fancier and guaranteed a minimum rate of return or some kind of a ratchet or various versions of that. More recently, we've seen the so-called guaranteed living benefit that says if you hold this to maturity, you can annuitize and get at least this monthly income out of it. In effect, this is a guarantee on a minimum of the fund performance that you're going to get if you hold the contract full term. It might be an income benefit, or it might be a lump-sum benefit or some variation of that. We've recently heard about a new kind of death benefit. There's a risk if the market goes up too much because there's going to be a whole lot of income tax to be paid on my death. I need an extra death benefit if stocks perform very well, in addition to a death benefit if stocks perform very badly. I don't know if there is a standard name for that product.

We have a whole family of these products. They are different than that guaranteed index product we were talking about before because it's not a matter of here's what you'll get. It's about setting limits on how bad the result will be in some sense. Most times you wouldn't expect the guarantee to pay off, but it will pay off under extreme market circumstances. Many of you probably heard the discussions about reserving for the guaranteed living benefit, or the so-called Quad M. Reserving for minimum death benefits is something that has been all done up and codified and is in Actuarial Guideline 34. It has been a done deal for quite some time, but there has been an increased emphasis on a need for a good capital requirement on these products. That's because the more that people look at the work on reserving the living benefit, the more they can see that, at the 83<sup>rd</sup> percentile, under most circumstances, the additional reserve you need for the guarantee comes out to zero. This is sort of a disappointing result to the regulator because you've issued a guarantee of value. You're charging for that guarantee of value, so shouldn't you be reserving something? In this case, the bulk of the pay-off is further out on the probability tail than that; that's why it's coming out that way. That is the terrain that risk-based capital is supposed to be dealing with, not reserves. While we need a stronger capital

requirement, no wonder we're not comfortable with reserves; it's really because we're not comfortable with the capital requirement.

I chaired a subgroup on Phase II. In Phase II we need to take a scenario-type modeling approach, but we need to look at all of these products together—the ones with the death benefit, the ones with the living benefit, and the ones with the new kind of death benefit. One of the many reasons is because sometimes they don't behave in similar ways. What's a good scenario for one product might be a bad scenario for another and vice versa. I don't know which way the stock market is going to go, but I know it's going to do the same for all my products. Therefore, I need to look at how this is going to work as a complete aggregated thing rather than doing a different calculation for each product. We don't know a formulaic way to achieve this result. We think that scenario testing is the right way to do it, and we don't know any other way to do it. From a modeling difficulty point of view, our impression is that maybe some of the burdens that we were hearing about with regard to modeling Phase I might be less severe in terms of Phase II. Some of the things that we were hearing were that certain types of fixed assets are extremely difficult to model through a whole bunch of scenarios. Whereas here we're talking about grouping mutual funds or funding vehicles into categories and then representing each category by an appropriate distribution function with appropriate parameters. That is much less work than some sort of asset-by-asset modeling like you might have to do with highly structured mortgage-backed assets and things like that. We think that might make more sense. More significantly, we don't know of any other way to do it. At least for now, we're saying this is what we think is the right way to do it.

The metric that we're using is interesting, and it's a point that is entirely consistent with what we did on Phase I on the interest rate risk metric. It differed from what the Canadian Institute does in its modeling, and it's an important difference, but it comes down to an important difference in terms of the way the reserving laws work in the two countries. Under any one of these scenarios, I look at my statutory surplus each year, meaning I look at how much cash I have, and I look at my reserve requirement and I pick the worst place. If I'm running this scenario for 40 years, I pick the worst year on a present-valued-back basis, and that's the capital requirement that goes with that particular scenario.

The Canadians just look at how much cash they need to cover all the guarantees in the end. Then they set reserves at a percentile that's lower than capital. Why don't we do that? Because standard valuation law doesn't work that way. Maybe it should, and maybe it will some day. The Academy is saying, we ought to be moving more in that nonformulaic direction, but it's not the law today. Statutory solvency has always been the focus of life risk-based capital. As long as CARVM and CRVM determine how the reserves will be set, then that's what we need to be measuring in terms of statutory solvency as well. It turns out that doing that introduces a substantially higher capital requirement at any given conditional tail expectation (CTE) at any given percentile. I'll get to CTE later. The metric that you get using this year-by-year floor against the reserves comes up being a much sterner test, and you can see why. On one way, all I have to do is have enough cash in the end. The other way, I have a hit on statutory surplus that year it counts—even if I dig back out later on. It's a much more stringent test. We get a much different answer, but it's because we have a much different reserve law. Driving towards the same objective, it makes sense that we have a different answer.

There is one thing that we liked that the CIA did. We had not run across it before, and we think the use of CTE is very appropriate. For these products, the bulk of the losses are way out on the probability curve. It's entirely possible that, at times, even the 95<sup>th</sup> percentile might come out to zero. At issue it might come out to zero, but if the market goes down, it might not. As such, the Canadians decided that all the losses that occur way out on the tail characteristic mean that it makes more sense to use CTE. What is the expected loss given that there is a loss? In other words, I will take the mean of the losses throughout the entire tail, rather than just looking at one point at the 95<sup>th</sup> percentile. So we might be recommending the use of a 90<sup>th</sup> percentile CTE (although there is no Academy recommendation to the NAIC on this yet). In other words, we'd be averaging all of the loss numbers from 90 forward and taking the average of those as the metric. Canadians currently are using the 95<sup>th</sup> CTE, but they don't have flooring against the reserves each year. Some testing that one of the members of my group did on one product in his company said that the 90<sup>th</sup> CTE with the floor produces substantially higher capital requirements than the 95<sup>th</sup> CTE without the floor. I don't know whether that is or is not generally true. I believe it might be, but I don't know. We need to do more testing on that.

There is another minor point and one that continues to be something that we haven't totally nailed down. The typical guaranteed income product tends to be constructed so that you will get a certain minimum income. The definition says that if the fund earns a certain amount, and then you apply these purchase rates, it will come out in a certain way. It tends to be fairly attractive looking in terms of the rate of growth that it's seeming to guarantee on the fund. However, the purchase rates tend to be pretty conservative so that some of that relatively aggressive growth guarantee is offset by relatively conservative purchase rate assumptions. But the actual margin in the purchase rate is going to depend on what interest rates are at the time the person annuitizes. I would have a certain margin at that purchase rate or you can assume that, on average, it would be a certain amount. But at any one particular time in real time, you might have a lot more margin than that or a lot less margin than that. They don't average out because of the stuff all being out on the tail. If things came out on average, I might very well have a zero, but if rates were down at that time, I might have a loss. Saying I'll do it, based on the average, would say that, under this scenario, the losses are zero and that's not a fair expected value under that scenario. We need to have some way of reflecting that there is some dispersion around that expected interest rate at the time of annuitization. If interest rates are down, that annuity will look more attractive to the annuitant because fixed annuities will be more expensive at that time.

There are many "How do I do this?" questions such as "How do I deal with 20,000 contracts in force with different fund mixes, durations, and ages?", and "How should I group them?" One of the things we've wrestled with throughout Phase I and Phase II is to what degree should the risk-based capital instructions specifically say you must do it in this manner? To what degree should they say it's up to the actuary to find a way, to test that way, and to make sure that it's represented fairly? Our group has increasingly favored the latter, while I've tried to be vigilant to avoid a trap. The trap is we can't think of any earthly way anybody could do it, so we say it's up to the actuary. We must think of something that is doable and professionally responsible, or we can't go forward. We don't believe that just because we thought of a way that it's the only way that should be permitted. We're thinking in terms of a practice note, an appendix, or Frequently Asked Questions that say, "Here are some approaches that might be used." We're not saying, "You must use that approach," because there are probably some better approaches that we haven't thought of, and there are some proprietary models out there that might be very good, but

we can't dictate to somebody. You must use this model that somebody has for sale. We can't do that. The manner in which policies are grouped and exactly how many scenarios is enough, and similar items are probably going to be something the actuary has to determine.

We are definitely going to have to require an actuarial certification. Exactly what that should say and include is still up for grabs. Some regulators feel that if we are going to allow the actuary to use his or her conservative best-estimate assumptions for lapse, mortality, and expense, they need some kind of benchmark or measure to help get a sense of the overall result. This might include a couple of standard scenarios to run and measure and a standard sensitivity analysis.

The assumption setting is subject to the actuarial standards of practice, of course. In addition, there might be a requirement that if you change your assumptions or model you have to report that change and its financial impact. If the regulator saw that without the change you would have been at a regulatory action level, they can inquire about what led to the conclusion that the new assumption was more appropriate.

There is a great deal of concern about pressure on the valuation actuaries to figure out some way to pass this year. How can that pressure be avoided without dictating assumptions or without saying you can never change assumptions, which is clearly the wrong answer right now? Take, for example, annuitization rates when the guarantees were in the money. The living benefits haven't been sold long enough. It's probable that none of them have ever gotten there yet. Who knows what annuitization rates will be? I don't think it's good to say that whatever you use for your assumptions this year, you must use forever. It's not right to assume everybody is annuitized. You need some sort of a feedback loop or some way of refining it over time. It needs to be responsible, and it needs to be disciplined. This is the dilemma that we're trying to kind of deal with and talk about. It might be some kind of sensitivity test. The assumptions that really change my answer a lot when I tweak it just a little might be a part of that process.

Let's talk about the effective date of Phase I. As I talked about, it is already effective as of 2000. Now we are exploring if there's something that can be done to refine the results for the exempt companies. Something might be coming of that, but it's not close yet. The guaranteed index

proposal is going to be presented at the December NAIC meeting, and it is proposed with an effective date of December 2002. This has not been discussed with the regulators yet. They have not put it out for exposure to get any feedback, so it's still relatively early in the process. On the other hand, it's a relatively contained kind of change, and we believe it doesn't affect very many companies. It seems to address the regulatory concerns, and it seems to be a good solution to the problem, so I think there's a pretty good chance that that will happen within the planned time frame, with a few tweaks.

Phase II is about all the guaranteed living benefits and guaranteed death benefits and running a whole bunch of scenarios and doing 90 CTE and all that. Again, our recommendation to the NAIC has not been written. We hope to have a recommendation to the NAIC at the March meeting. I think it will be a lot like what I was telling you here. We are going to recommend it, for an effective date of December 2002, but it is a much more complicated thing. It affects a good many more companies. The regulators are likely to have a lot more questions about it. It's a lot more all-encompassing in many respects, so it wouldn't surprise me a lot if something like this happened a year later or something like that. On the other hand, now that we understand better, we realize that reserves that are properly calculated give us very small numbers. The issue is capital. There's a lot of this stuff out there. The market is down a lot from when a lot of these contracts were written, so the regulators aren't going to want to drag their feet on this too long. I wouldn't discount the possibility that it might go in for year-end 2002. We'll just have to see.

**MR. LONGLEY-COOK:** As you can see, there are a lot of changes in the RBC approach, and to the formula itself. If it goes forward, much more responsibility will be placed on the actuary for assumptions of methodology and there will be some sophisticated modeling required. This is a responsibility that doesn't just get buried in the actuarial memorandum and looked at every three years. It affects the company's capital or the RBC requirement every year. In some situations, it may put companies in action level status based on that actuary's assumptions.

**MR. DAVID L. BRAUN:** This is for Bob Brown. Can you explain how the impact of a derivatives-based hedge strategy on a guaranteed minimum income benefit (GMIB) would be reflected in its capital requirement?

**MR. BROWN:** We have discussed this quite a bit in our group and also with the people who have been involved at the CIA. We all agree that if you're using a hedge strategy, derivative-based or reinsurance or whatever, that it should be a part of the modeling. We're also very much aware that many times there are ways in which that hedge strategy will not function as perfectly in practice as you're likely to model it out. Some examples would be basis risk or gap risk on futures, if trading in the future contract might be suspended at a time when you need to adjust your position. What should be said about that and exactly what degree of direction should be applied there? Where those risks exist, full credit for the hedge should not be granted.

Therefore, that would suggest that I have to do my modeling (or at least some of my modeling) with and without the hedge so that I can say how much my hedge is worth. I would probably cut the credit for the hedge by an amount that reflects those risks in some appropriate way. *Some appropriate way*, of course, is the trick phrase in all of that. We're going to try to outline some general principles, concerns, and guidelines. We might start limiting credit to a lower level than we think could ultimately be justified until people have a chance to prove it out with experience. This is something that needs more work.

**MR. LARRY J. BRUNING:** In Phase II, they were also going to consider whether they would relax the "one-half of current factors" minimum. Is that going to be set in stone now?

**MR. BROWN:** It hasn't really gotten a lot of discussion recently. When we address this thing about making refinements for the nonexempt companies, we might circle back around with the range. For exempt companies, we might also circle back around to reconsider the questions of "optionality" and whether companies should be allowed to do the scenario testing even though they're exempt. Once you take the bite of the apple, you can never go back again to limit the gaming potential. Nothing is in the works for year-end 2002. It's too late for 2001, for sure. If you look at Alastair's statistics, you'll see that not very many companies were affected by either end of the range. Given the small number of companies that it affects, I don't think there's very much of a push on that.

**FROM THE FLOOR:** Would equity-indexed annuities be in this recommendation?

**MR. BROWN:** There was certainly a desire to put them in, and initially, we tentatively scoped them in. The kind of modeling that we're talking about here is modeling the various kinds of mutual funds as well as these limits at which the guarantees enter in. This ends up being quite a lot different than the way I would need to model the typical equity-indexed annuity, based on the way it's typically funded. Equity funded products didn't work very well. It was likely to just create a second project that would slow this down. On the other hand, the approach that we're now recommending for the guaranteed index seems like an approach that maybe could fairly well be generalized. That may be the direction that is eventually pursued for equity index, but I'm just kind of speculating here. It's certainly recognized that something needs to be done for equity-indexed annuities. The Academy has the charge to eventually come up with something. We still haven't officially nailed down the scope of Phase II to decide whether this is in or out. My personal feeling is it ought to be out, but we ought to go in that other direction.

**MR. LONGLEY-COOK:** While you're thinking about that, I'll just draw your attention to the last topic on the agenda. What's going on on the health side? I'm not going to go through the recommendations of the Disability Insurance Working Group of the Joint Task Force in any great detail. I mentioned the reorganization of the task force that Bob and Jim had served on for so long. One of the initiatives of the Life Practice Council of the Academy is for us to think a little bit more proactively than just reacting to the NAIC. I think we are doing that in many ways in terms of the way these recommendations are headed. There are other areas that we're talking about. One is operational risk. There are no standards for this in the insurance industry other than the formulaic one in C-4. This is becoming a requirement in the banking industry. The Basal Accord now requires an RBC factor for operational risk in the banking industry. That is a formula, but you can get that reduced if you can prove that you have an effective risk management program. You can show that you deserve a lower factor based on your own internal

experience. When you think about some of the big failures in the life insurance industry or property/casualty industry, you could argue that those failures were due to operational risk, risks that were largely operational in nature. So it's something to think about. Please provide input to the Academy task forces about the approaches that are being proposed here. They will change the way we do our work and the way the industry is regulated, so your input is very important.

**MR. REISKYTL:** I'd just like to add three comments. One is that, fortunately, beauty is in the eye of the beholder. As for C-3, the fact that there are very few companies that were picked up is a very desirable result. Remember that this formula is not designed to be used to decide how much capital your company should have. It's really designed to be used to determine when your company gets taken over. The C-3 concern was not whether we are doing it accurately, although that's a desirable thing to always accomplish. It was about whether we were missing a number of companies that have much higher risk than the formula was picking up. I think the demonstration, from my perspective, suggests that there weren't many and for those that were, we have a distribution of results. One's perspective depends on how one looks at things.

The second item is I think there is a lot of nonformulaic RBC talk. You won't hear me say that too often, but you will hear me say it for these guarantees on these products. Why? I think we tend to think in absolute worlds, but the world isn't often absolute. We're dealing here with products and features where, arguably, the reserve is zero; the risk-based capital is zero and we have very large risks with very low probabilities of their occurrence to grapple with them. When you grapple with this type of guarantee, I think you have to go to some type of stochastic approach, but that isn't saying there's anything wrong with the formulaic approach for most other risks. It's perfectly fine, except when we don't have the underpinnings. Sometimes we don't know for sure exactly what the underpinnings are. In these situations, you have to go to this type of structure. I hope no one leaves here with the idea that we're going to throw out all the current RBC and go to some super-duper stochastic run and that will take care of all of our problems.

Thirdly, this stochastic approach is simply another way to determine the formula to use. Under most of the current RBC factors is a stochastic analysis to establish the appropriate numbers. Similarly, one determines the result for say five or nine representative funds. One cannot model every fund as there are more funds than common stock. All other fund RBC factors will be estimated based on their similarities to these funds or the common characteristics. Hence, these stochastically determined results become the “formula” to be used for all the funds, and then they are aggregated in some way. So, in my view, we still have a RBC formula for all of its components.