2004 Valuation Actuary Symposium*

Boston, MA
September 20–21, 2004

Session 13TS
Financial Reporting for Universal Life Refresher

Instructors: Jeffrey A. Beckley
John F. Bevacqua

Summary: If you are new to financial reporting, need a refresher or simply want to test your valuation expertise, there is nothing better than an example for YOU to work through.

MR. JEFFREY A. BECKLEY: I am the moderator and a panelist for this session. The other panelist today is John Bevacqua. John's a partner with Deloitte & Touche in its Hartford, Conn., office. The session today is on financial reporting for universal life (UL), and it's really a nuts-and-bolts working session. We did send out to everyone who had signed up data surrounding a UL product and asked you to work through it and try to calculate reserves. Just out of curiosity, did anyone really do that?

This is just a review of what we'll cover today. We'll review the UL product that we'll be looking at, as far as calculating statutory and GAAP reserves and deferred acquisition cost (DAC). We'll basically go through it in that process. The UL product is pretty much a standard product. The only load in the product is a $12.50 per policy fee. Interest is guaranteed at 4 percent. The guaranteed costs of insurance (COIs) are 2001 CSO male, nonsmoker and ultimate. The current COIs are reverse, select and ultimate COIs to the extent that they're 90 percent of the guarantee for the first 20 years and 50 percent thereafter.

We sent out a spreadsheet that included the three cells that we'll be testing, a description in more detail of the product structure—including the fact that it has a maturity date at age 120, attained age of 100—and the surrender charges. We also sent out all the pricing assumptions and COI rates (see appendix to session 13 TS). The product does have a secondary guarantee, which is a shadow-account-based

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

guarantee. It's basically the accumulation of the net premiums, less the accumulation of the guaranteed death benefit (GDB) charges. There's no premium load on premium received up to 120 percent of the GDB charges. Above that, there is an 80 percent load. The GDB charges are the current COIs times the specified amount. It's not times a net amount of risk; it's just times the specified amount. And the shadow account guarantee is 10 percent interest. We'll talk more about why some of those characteristics are there when we look at the shadow account.

The valuation basis is 2001 CSO, and we're dealing with male nonsmokers. What we sent you said "age near," and everything we're using says "age near." The valuation interest rate is 4.5 percent. If you remember, the guaranteed rate was 4 percent. We'll be dealing with just males, 35 and nonsmokers, and our valuation date is the end of 2004. We have three policies in force. The reason for having three is that each policy is meant to show certain aspects or issues around evaluation. When we talk about statutory reserves, there are really three primary regulations that impact it—the UL Model Regulation, the Valuation of Life Insurance Model Regulation and then finally, Actuarial Guideline (AG) 38. The Valuation Life Insurance is also XXX, in case anyone can't make that translation, and AG 38 is AXXX.

If you look first at the UL Model Reg, you start by calculating what's called the guaranteed maturity premium (GMP). This is calculated at issue. It's based on the guarantees in the policy, and it's the level premium that will mature the policy for the specified amount. So, if it's an Option B or Option 2, you're still solving for an endowment at the end that is equal to the original specified amount.

I'll go through the UL Model Reg. The first thing really is calculating the GMP. If you look at that, you can see that it's calculated to about 38 decimal places. If you've never used the tool within Excel that allows you to goal seek, you can actually use that to solve for the GMP in about half a second, once you have your spreadsheet set up. All I did was go in here and click tools and then goal seek. I want to set my account value, my guaranteed maturity fund (GMF), equal to 100,000 because it's a $100,000 policy. I want to do so by solving for this premium, and if I say okay, you can see what the premium is. That's the premium that will mature the policy at attained age 120 for $100,000, and that's the GMP.

I use that GMP to solve for the GMF. It's calculated at issue and assumes the GMP is paid, and it's based on the guarantees in the contract. That is the GMF, which is the account value of the contract. It's pretty straightforward. That's actually done at issue, and the GMFs and GMPs don't change unless there is some sort of structural change in the policy. So the GMF and the GMP, once they're calculated for a policy, remain. They can be calculated at issue.

Now we're valuing a policy. We'll go back and look at this first policy. It's a 35-year-old male, non-smoker, issued January 1 and it's being valued December 31, so it's at the end of the first year. That's there for reasons that we'll talk about in a little

bit. It's $100,000 face amount with a level death benefit option. This is our account value, and that's what's in the shadow account.

So, when we go in to do the reserves, we start with the account value, $582.71. This is the actual fund value, and we're right at the end of the 12th month, so there's the actual fund value. On the valuation date, you start with the greater of the GMF or the account value, and you'll assume the GMP is paid. You use that to project forward to the end of the policy to determine what benefits will be payable under the contract. If we go back here, my actual fund value is $582. My GMF is higher than that, at $900. The GMF is greater, so I'll project forward using the GMF and assume the GMPs are paid. When I do that, if you think about it logically, I'm just giving the original projection of benefits, because the GMF is what I got. I'm projecting forward at the guarantees, assuming the GMP is paid, so I'll just get the original projection of benefits. But I actually did reproject it here and did get that.

FROM THE FLOOR: Is this due to the interest rate being the same for the guarantee and the valuation?

MR. BECKLEY: Actually, no, it's not. The reason it works is because at issue, we solve for the GMP, which is the premium that will mature for the face amount. At this point in time, we're projecting forward from that point in time, but the law says that you start with the greater of the GMF or the account value. The account value is lower, so we'll start with the GMF, which is the same point where we were when we did the original at-issue projection, because at the end of 12 months, the GMF was there and it will mature it. We actually don't have the same interest rate, and when we look at the second policy, that has some implications on what happens to reserves and stuff. It's not related to the interest rates. It's using the policy guarantees.

FROM THE FLOOR: It's the same as what you did at issue?

MR. BECKLEY: Right, it's the same as what I did at issue because it uses the policy guarantees. If we go back and look at what else the UL Model Reg says, the only reason you're making that projection is to see what benefits are guaranteed by the contract—what death benefit's guaranteed and what the endowment amount is. If the account value is greater, then the corridor will kick in and you'll have a death benefit, which in the later years is greater, resulting in different benefits. But if it's less, then you have the same pattern of basically a level $100,000 maturing for $100,000. When it's greater, then when you reproject, you get the corridor kicking in in later years, and you get a higher pattern of death benefits.

After you do that reprojection, then this is really what you do to calculate your reserve. Your reserve is R times the present value of future benefits, minus the present value of the net level premium, minus the unamortized expense allowance. It's all of that times R. The reason you reproject is to find out what your benefits

are, and then you take the present value of those benefits, using your evaluation assumptions.

The present value of the net level premium and the unamortized expense allowance are based on the plan at the time of issue, assuming that those GMPs are paid. R is a ratio of the account value divided by the GMF, and it can never be greater than one. So, if your account value is less than the GMF, then R is less than one. If the account value is greater than the GMF, then R is equal to one.

Let's go through and look at the steps. My actual fund value is $582.91. My R is that $582.91 divided by the GMF, $902.02, and that's about 64.6 percent. Here are my reprojected death benefits, and those actually come from this reprojection. In this case, they're just $100,000 all the way down. hanges the actual fund value is less, you just end up with the same projected death benefits.

For my valuation interest rate, valuation mortality, I'm just taking a monthly present value of benefits, and I end up back here. My present value of benefits is $17,828. At issue, I've calculated my present value benefits and my present value and my gross premiums, which are the present value of the GMPs really, and then my net premium. Really, I converted this to be basically an annuity of $1 by dividing by the GMP. So this is my net level premium. I've then calculated alpha and beta. The difference between the two, then, is my unamortized expense allowance at time zero.

When I go over here and actually calculate my reserve, what I'm using is R, which is the W19 there at the end, and that's the 64 percent. That's times the present value of the benefit, which is right here, and then minus the net level premium, minus the unamortized expense allowance, which is right here.

There are some things that are important to understand, and one is that the UL Model Reg doesn't define anything except the endpoints. There is no definition within the model reg of how you calculate interim reserves. It defines terminal reserves basically. So, there is more than one interpretation out there of how you do interim reserves. You can do something from first principles, or you can calculate terminals and then use means. We'll talk more about that in a little bit. But one of the things that you'll notice here in calculating this unamortized expense allowance is this number—clearly everyone would agree what it is. That is also true, I think, as you move to each year-end. You would agree what it is. But there's a pattern in between. I'm actually doing like a monthly amortization, and some people would probably disagree with the fact that you have that somewhat strange pattern of unamortized expense allowance. You might expect it to be like an interpolated number between the two or something. Don't get hung up on that. I wouldn't necessarily agree with this. It's just the way I set out my formula. It's just amortizing it as basically AX plus T over 12 or whatever, divided by A, and so you get this weird pattern because it's an annual premium being paid.

I'll jump to the second policy. You'll notice that it's the same as the first policy, except for the fact that the account value' is $13,786. In this case, we'll have an account value that is greater than the GMF at the end of the first year. We'll reproject using that account value instead of our GMF. We get this pattern of death benefits, which is $100,000 until the quarter kicks in. That makes a lot of difference, and, by the end, we have about $847,000 of death benefits.

So when we calculate our present value of benefits, then, at the end of 12 months, we have present value benefits of $27,000 instead of the $17,000 that we had before. That means that instead of getting a zero reserve, we get a reserve of approximately $10,000 because our net level premium doesn't change. Our unamortized expense allowance doesn't change. The only thing that changed is our present value future benefits.

Now if you think about the first policy, you may say, "Why are we getting zero reserve?" Well, we're at the end of the first year. With the Commissioners' Reserve Valuation Method (CRVM) reserves, what should you get? You should get zero. That's one reason why you end up with a zero reserve. If we were at some later point, we wouldn't have zero reserves, but at the end of the first year, under CRVM, we do.

The second thing I wanted to point out was we have an account value that is $13,700 or $13,800, and on the other policy, we have an account value of about $600, so our account value is about $13,200 higher. Our GMF at this point is $900, so this number is almost $13,000 higher than GMF, too. But, our reserve only went from zero to $10,000. So, even though the account value is somewhere around $13,000 higher, the reserve is only $10,000 higher. The primary reason for that is related to the question that the gentleman asked earlier about the difference in the interest rates. Our projection is guaranteed at 4 percent, but we're discounting back at 4.5 percent because that's our valuation interest rate. That results in a smaller reserve relative to the increase in the account value. Obviously, at the end of time, they'll all come together.

Let me cover a couple more points. There's also a section in the UL Model Reg that requires you to establish alternative minimum reserves (AMRs). This is kind of equivalent to a deficiency reserve—or maybe it's exactly equivalent to a deficiency reserve. But you have to calculate an AMR if the GMP is less than the valuation net premium. If we go back and look, our GMP was $1,120 and our net premium was $930, if you use beta, so we don't have to establish an AMR. But if we did, you basically substitute the GMP in for the net premium, and you can use minimum standards for mortality. If you wanted to, for example, you could use the select and ultimate table, and then see if your AMR is higher than your actual reserve. We won't go through that today because it didn't turn out that we had an AMR.

The second thing is that there are ambiguities with regard to the model reg and what you do for non-year-end. I think this is probably where there is a lot of

divergence of practice, and I don't think there is necessarily a right answer. If you're doing your calculations and you're halfway through the year, how do you calculate your r factor? To me it makes sense that if you can, you do an exact calculation to the nearest month or whatever to calculate your r factor. However, I am aware of companies that use beginning or end of the year GMF for an interpolated number.

Depending on how you calculate your GMFs, you can actually end up with deferred premiums, even though that seems strange in a UL. It's really a function of how you do your GMF calculations; it's not a function of how the policy is paid. For example, if in your GMFs you assume that there are monthly premiums, but then you are calculating mean reserves, then you should set up deferred premiums. Likewise, if you're assuming annual premiums in your GMFs and you calculate mid-terminals, you should set up unearned. It's really a function of how you calculate your GMFs. If we have time when I'm done and John's done, we can get into that in more detail. But for right now, I'll try not to get bogged down in that.

Let's talk about the valuation of life insurance policies as interpreted by AG 38. Some people would say that AG 38 doesn't really interpret the valuation of life insurance policies, but establishes a whole different approach. That aside, it really applies to Uls with secondary guarantees. This product has a secondary guarantee, so we need to go through that calculation.

If you look at AG 38, it has a series of steps in it. Under example 8, which tells you how to interpret XXX, the first step is to determine the minimum gross premium. The minimum gross premium is the premium paid at the beginning of the policy year, assuming that the shadow account value is zero at the beginning of the year. It's the premium paid at the beginning of the year that'll keep it in force exactly to the end of the year with zero value in the shadow fund. You do that every year.

With AXXX, the first step is to calculate the premium that will result in the shadow account being zero at the end of every year. At zero, at the end of every policy year, the premium is $93.94, $99.00, etc. Basically, it's just the present value of the GDB costs taken at the items that are making that up. In other words, it's using the 10 percent interest, among other things. That's Step One.

Step Two says that you go through and calculate basic reserves under the valuation of liabilities using the minimum premiums in Step One. Eventually, you get out here to get the reserves. The reason it was set up this way is that if you're familiar with XXX, you calculate the ratio of your gross premiums and the ratio of your mortality rates, your valuation mortality rates, and that defines your segments. The way it's set up, the ratios are exactly equal to each other so that, depending on how you want to do it, either you can have every one-year period be a segment or you can say that it's all one long segment because of the fact that within the valuation of life policies, you can make your tolerance 1 percent higher or 1 percent lower.

Now within that valuation of liabilities, the reserve is the greater of the segment and reserve or the unitary reserve. If you set every segment equal to one-year segments, if you think about it, you'll just get one-year term or you get zero reserves at the end of every year. I'll actually set it up as one long segment because otherwise, my unitary reserves would be greater anyway. The unitary reserve does rule, and I'll explain why I use one segment in just a minute. If you calculate unitary reserves, what you end up with is zero reserve at this point in time as a basic reserve. Because once again, in CRVM, you would expect that you would end up with a zero reserve. If I continue forward, you can see that the reserve does increase, but it's not very big, really.

Then I have to calculate deficiency reserves. The reason that I want it to be one segment is that the law also says that you can use x factors, and you can only use x factors during the first segment. So if I define my first segment to be that, then I can apply the x factor during the whole first segment. I solved for an x factor at this point in time, which would work. Your x factor must be the present value of your actual expected mortality, assuming no improvement. It must be less than your x factor modified mortality, the present value of that. Second, for each of the next five years, it must be greater, not just on a present value basis.

In doing the deficiency reserves, I've also brought in the select mortality because you're allowed to do that, even though I'm using the ultimate mortality to do my basic reserves. To calculate the deficiencies, you're allowed to bring in the select mortality. So I have two things working for me—I have select mortality coming in, and I have an x factor of 58 percent.

Here are my present values of my deficiency mortality and my present value, my expected mortality. This is higher, so I'm passing. For the ratio on a year-to-year basis, for the first five years, at least, I'm passing because it's always greater than one. It gets really tight, but it is passing.

Then to calculate my deficiency reserve, I substitute in my required premiums, which I calculated over here—the minimum premiums, the $93 and the $99, etc.—and I do end up with a fairly substantial deficiency reserve. If I had done a good job of designing this product, I probably could have eliminated that. But I didn't, so I do end up with a fairly substantial deficiency reserve. Step Two is to calculate within AG 38 the basic reserve, which is zero, and my deficiency reserve, which is $3,440.

Step Three is to determine the amount of actual premiums paid in excess of the minimum gross premium. It specifically says for a product with a shadow account, it's the amount that's in the shadow fund. The amount in the shadow fund for this account was given as $176.26. So, that's Step Three. It's not given, but it's just whatever is in the shadow account.

Step Four is to calculate the single payment that will fully fund the shadow account, assuming that minimum premiums have been paid to date, which means that the

shadow account at that point in time is zero. You solve for the premium necessary to fully fund a single premium. That's being done right here, and right here is the amount. The reason that that amount is so high is because, if you recall, there's an 80 percent load on premium in excess of 120 percent of the GDB COI. A lot of products that are coming through the market now have something similar to this because they're trying to maximize the single premium that has to be paid at that point in time. They're doing it with loads. If you've attended any sessions in which they've been talking about modifying AG 38, because of some of the things that are going on in the industry, and what some products are doing to get around holding the reserves, this is one of the things that they're talking about.

I'm not going to get into today whether it's right or wrong. This is basically what the letter of the law says. If you read AG 38, it says that you, as an actuary, are supposed to follow the spirit. Whether or not this follows the spirit is something we could debate probably for the rest of the session. But this is what is going on out there, so that's why it's set up this way. What that means is that for the final phase of Step Four, I'm supposed to calculate the ratio of the actual premium in excess, compared to the premium necessary to fund it, and that gets me to a ratio of approximately less than 1 percent.

Step Five is to calculate the net single premium on the valuation date, but you can use any table and any select factors authorized to do that. I'm calculating the net single premium of future benefits using the select and ultimate table and the 4.5 percent interest, and that's $17,500. Step Six is to calculate the net amount of additional premiums. That's the ratio from Step Four times the difference of the net single premium and the basic and deficiency reserves I've already calculated. So that's the net single premium right here, minus my basic reserve, which was zero, and my deficiency reserve was $3,000, so it ends up being this minus this, which is about 14,000 times 0.85 percent, so I end up with $120.

Then you're instructed to calculate a reduced deficiency reserve, which is the original deficiency reserve times one minus the ratio. That's Step Seven. Step Eight gets you to the actual reserve that you're supposed to hold. The actual reserve before any reductions is the net amount of the additional reserve here, plus any basic and deficiency reserve. 'Then you only owe the net single premium. That's what this first item is.

Then you calculate what's called the effective surrender charge, which is not the true surrender charge. It's maxed out at the surrender charge that would actually apply. We only have $582 of account value, and we have the $1,600 surrender charge. But our effective surrender charge is just what would take the surrender value to zero, so it's $582. We deduct that from this, and we end up with our actual reserve after the reduction for the surrender charge. If that's less than what we got in Step Two, we stop and hold what we got in Step Two, which would be this deficiency reserve and the zero.

If we go to the second policy and go through the exact same steps, because it has a lot higher account value, we actually end up with the same pattern of premiums. But when we go over here, we end up with our actual reserve after the reduction, the full reduction for the surrender charge of $1,650. We end up with $4,045 here, though our AXXX reserve is actually higher than our reserve that we would get for just XXX under the basic reserve, which is zero still back here and the $3,400. We end up with an increased basic reserve and a reduced deficiency reserve. Our increased basic reserve went from zero to $1,150, and our deficiency reserve went down from $3,400, but our grand total is the $4,000 here. All that is compared back to what we calculated under the UL Model Reg, and you hold the greater of the two.

There are a couple of things in this that may not seem logical. I'm not sure why they were set up this way. I believe that the reason that you calculate a reduced deficiency reserve and an increased basic reserve is for tax purposes because your deficiency reserve is not taxable. That's just my guess. I don't know. If anyone out there has intimate knowledge that can be shared, that would be fine. The second is that subtracting the effective surrender charge may not make a lot of sense. But if you go through this calculation and you don't look at it in the steps, but look at it conceptually, it's a way to bring an estimated expense allowance into the equation, which really isn't there if you end up with overfunded products. For the UL, unlike say single-premium whole life, if someone pays a single premium into a UL, you still get to keep that expense allowance and run it off over time. So my guess, and this is just a guess, is that this was an attempt to do the same sort of thing for highly funded UL products where the AXXX reserve comes into play.

With that, I'll turn it over to John, who will go through the GAAP implications on this product.

MR. JOHN F.BEVACQUA: I want to spend a fair amount of time focusing on the new Standard of Practice (SOP) 03-1, which does have implications for UL contracts. But we'll try to touch on some of the basics of FAS 97, particularly walking through some of the DAC mechanics and so forth. I'd also like to point out that these examples are just illustrative. Sort of a phenomenon of the SOP is that there probably have been a number of different ways of interpreting the provisions. Many different organizations and auditing firms actually come to different conclusions as to the exact, appropriate mechanics of how to go about applying it. To that end, I'd encourage you not to take this as gospel. Hopefully, this will be helpful to understanding some of the basics, but there might be some areas in which you might need to have some discussions with others. I'll try my best to point those out along the way.

UL contracts are governed by FAS 97, although FAS 60 is certainly noteworthy. FAS 60 really contains the language that defines a DAC and what attributes the expense must meet to qualify for deferability. As I mentioned, I also will touch on SOP 03-1, which was originally designed to address some accounting issues around guaranteed minimum death benefits (GMDBs) on variable annuities, but certainly

has broadened in scope in terms of some of the things that are discussed. As we'll see, some of the provisions do affect UL contracts.

Under FAS 97, the basic account value or the reserve held for a UL contract is the account balance, non-actuarially determined balance, basically a straightforward byproduct of the policy mechanics. The SOP did identify the need for other reserves beyond this, to the extent there might be some other balance beyond the account balance that is higher than the account balance and available in cash. This would primarily be related to some institutional-type products that might have some embedded guarantees associated with them. But for our purposes today, it probably does not really apply here. For shadow products, this does not mean that a shadow account would be held as a separate liability. I'll walk through the mechanics of how secondary guarantees are accrued under the SOP.

First of all, DAC, defined in FAS 60, must be primarily related to and vary with the production of new business. That's the basic criteria that must be met to qualify for deferability. Not all acquisition costs, therefore, are deferrable. There might be certain ones that do not vary with business production and that may not qualify as a result of that. So, there's a lot of work in terms of looking at actual expenses and breaking them down to make sure they meet this criteria.

Under FAS 97, these expenses are capitalized and amortized in proportion to the gross profits of the contract. They are subjected to a truing and unlocking so that to the extent that, from time to time, actual experience emerges and differs from what was initially assumed, that actual experience is used to replace prior assumptions. To the extent that management has a different view as to what the future hanges y gross profits (EGPs) will be, those changes should be reflected and modified in the schedule, and the corresponding DAC effect should then flow through earnings in the current period.

I'll just walk through some basic mechanics of the DAC calculation. The first thing I should point out is that DAC is generally calculated at a product issue, your cohort level. To the extent that you have similar contracts that are issued in the same common issue year or have a similar set of characteristics, those will generally be combined, and a DAC balance will be calculated in the aggregate for that group of contracts. So in this example, we're only dealing with three specific contracts. We've broken them apart by issue year, and we have two contracts that were issued in 2004 and one in 2003.

So following the mechanics that were laid out in the information that was sent out, for 2004 I made a simple assumption that the assumptions provided were, in fact, what actually happened in 2004. The point here is that when you're calculating your end-of-year 2004 DAC balance, you should reflect in calendar year 2004, the actual EGP that did, in fact, happen.

Up above, we have the basic projection of the account balances, and down below is where we actually do the calculation of our EGPs. I presented the gross profits using a traditional FAS 97 presentation framework, where we first calculate an investment gain component of the EGPs, which is the excess of the earned interest over the credited interest; a mortality gain component, the excess of the COIs over the incurred mortality costs; an expense gain, the excess of loads collected over actual maintenance expenses; and then finally surrender gains, or the surrender fees that were collected upon contract termination.

The summation of these will result in your EGP stream. This is all pre-SOP. Toward the end of my presentation, I'll circle back and show how the SOP actually gets fed back into the DAC calculation, but for right now, I just want to cover some of the basics. This is what a normal schedule showing EGPs would look like for a policy. Jumping ahead, this is what a DAC schedule may look like for a life insurance contract. The first column here would be those expenses that are DAC. We have some coming through over the first 10 years. In the specifications of this product, we had a commission schedule that was grading to an ultimate commission rate of 2 percent, if I recall correctly, in year 10 and later. The general convention in GAAP is to take the excess commission over the ultimate commission rate and capitalize that amount as a DAC. As a result, all these expenses appearing here will be capitalized in DAC as they actually occur. You also include estimates of future acquisition costs in accruing today's DAC balance as well, and we'll see in a second exactly how that occurs.

The next column here will be the EGPs on this contract. We just showed you how those were determined. We then calculate the DAC balance by first coming up here and deriving what is called an amortization ratio. The amortization ratio is the ratio of the present value of all your DAC, which is basically the DAC appearing in column C. These are all discounted at the accredited interest rate. Second, we take the present value of our EGPs, which are the numbers appearing in column D, and then the ratio of those two present values is called the amortization ratio. That's effectively the percentage of our EGPs that we need to be using each year to amortize off our DAC asset. DAC is basically defined as using an iterative formula, where the DAC at the end of the year is equal to the DAC at the beginning of the year, plus any new DAC or deferrable acquisition costs arising in that year, accrued with interest, less the amortization ratio, times the current year's EGPs. So if everything is working correctly, ultimately this DAC should go down to zero over the expected lifetime of the contract. This is the basic convention of how a FAS 97 DAC amortization schedule normally would work.

Now I'll jump ahead to the SOP. The first step in applying the SOP is really to determine whether a contract meets the definition of a life insurance contract or an investment contract. That's generally done by looking at the extent to which the insurance benefits are extensive in the contract or more than nominal or more than remote. I forgot the exact language of the SOP, But basically a comparison is made to the insurance benefits paid relative to the total assessments under the contract.

UL generally will be pretty much a slam dunk, that it will be a life insurance contract, so then you move on to Step Two. Step Two then would involve determining whether a reserve needs to be set up for the contract. That determination is made by applying what is called the gain/loss test. The gain/loss test basically requires us to look separately at just the insurance benefit function within the contract and determine whether we have mortality gains followed by mortality losses. If that is the case, then that means we need to establish an additional reserve above and beyond the account balance to accrue effectively for those future losses by deferring some of those current gains and then establishing a reserve in a manner that we'll see in a second.

These reserves are accrued using a percentage of total assessments in the contract. You look at all the fees that are collected on the contract and, in the case of a fixed account product, you'll include any kind of spread gain as a part of your total assessments and basically accrue for this reserve in proportion to the total assessments under the contract. I have an example to walk you through exactly how that's done, but first, I just want to let you know how I went about doing this analysis.

The SOP requires that these determinations be made across the range of scenarios. This was originally stemming from the fact that it was really focusing a lot on variable annuities and the need to look at things in a stochastic manner to be able to identify the true costs of the guarantees. Although it doesn't say "stochastic," it talks about a range of scenarios. For purposes of today's illustration, I've defined five different interest rate scenarios to create a range of results over which we will then calculate our reserves. These are basically drops of interest rates, 200 and 100 basis points, over different time horizons, one in which it remains level and then, the other side, an increasing interest rate scenario.

So the first step, as I mentioned before, is to go through this gain/loss test to see whether we have mortality gains followed by mortality losses. At this point, I should pause and note that for UL contracts with secondary guarantees, you actually have to apply the test separately for the secondary guarantees and the base contract itself. You must see whether you have gains followed by losses on each piece and whether there is, in fact, a need to accrue a reserve for each piece separately.

As a result, we first tried to see whether we had gains followed by losses on the base contract. The first part of defining whether we had gains was to identify the assessments that we would receive as a result of that insurance benefit function. For the base insurance function, that was really the COIs. so, we basically gathered what the COIs would look like, and we hanges y COIs across each of the five different scenarios. Then I just basically took an average across the five scenarios to come up with the COI stream that was related to the basic insurance contract.

The next step would then be to identify the basic death benefits associated with the contract, other than those related to the secondary guarantees. So, we looked at those death benefits associated with points in time at which the secondary guarantee is effectively in the money. Even if the account value were zero, the life insurance is still in force, and we're expecting to pay out some death benefits.

These reflect the points in time at which we actually have a positive shadow account value that's allowing us to sustain our life insurance. Those will be deemed to be death benefits associated with a secondary guarantee versus those that are not that will be related to the base contract.

So now that we've made that separation, the gain/loss test for the base contract is pretty straightforward in that we then compare the COI charges to those non-secondary-guarantee-related death benefits to determine that differential over time. In the early years, we do have gains. Then, when you get into the later years, they are actually followed by losses. We have a condition here where we do have gains followed by losses, meaning that we have to put up an additional reserve.

I should also point out here that some companies that have COI schedules that have like a reverse, select and ultimate design to them, have actually attempted to pre-SOP mitigate this by putting up an unearned revenue reserve and capitalizing those high COIs and kind of amortizing them more ratively over the contract.

There is a bit of difference in opinion within the Big Four, and even from company to company, as to exactly whether companies should be continuing to use ultimate reinvestment rates (URRs) or whether to replace these with the SOP mechanics. Basically the emerging guidance seems to be saying that we should be dealing with this on a facts and circumstances basis from situation to situation. So this is just one more example of how there is a little bit of difference in practice.

That covers the basic mechanics of doing the gain/loss test on the base contract. On the secondary guarantee portion, first, we have already broken out the death benefit part by looking at the death benefits that are payable when we have a positive shadow account but a zero account value. Then we have to identify a fee for the secondary guarantee. The rules in the emerging guidance basically say that to the extent there's an explicit fee that is identifiable associated with this benefit, that is what is used in the test. To the extent there is not, you either have to go through and compare this product to some other contracts that otherwise are identical—except not having the secondary guarantee—look at the differences in the fees and then somehow impute that difference to be the fee associated with the secondary guarantee. If that's not available or there is not a situation that can apply, you would then potentially have to revert to pricing documentation as a way to look at exactly how the actuary intended to fund for this secondary guarantee and use that as the basis of doing this comparison.

In my example, because there is no explicit charge for the secondary guarantee, I've made the assumption that the pricing actuary had intended to fund for this using a 10-basis-point portion of the spread to cover for the secondary guarantee. In that situation, we compare that 10 basis points to the secondary guarantee benefit, and as you'll see—it's probably not surprising, when given the timing—we do have gains followed by losses, meaning that we will have to establish a reserve for the secondary guarantee in addition to the base contract.

The next step is to calculate the reserve. We know that we need it, and now we have to calculate it. As I mentioned earlier, the calculation requires basing an accrual on the total assessments of the contract and calculating what's called the benefit ratio. You kind of think of it as being equivalent to an amortization ratio, except that in this case, instead of accruing a DAC balance, we're actually accruing a reserve for a mortality component. This is done just as we had done before—going back to the issue date of the contract, taking the present value of the excess payments of the insurance benefits that were accruing and the present value of the total assessments, and taking the ratio of the two to come up with a benefit ratio and then accruing the reserve accordingly.

In our spreadsheet example, I'll walk you through exactly how that was done. For the issue year 2004 contracts, from scenario to scenario, we actually captured the total assessments which, in this example, included the COIs, plus the loads received, plus the spread earnings received on the insurance contract. We took the average across all the five scenarios, and this is effectively the total assessment stream that we'll be using to accrue the reserve.

FROM THE FLOOR: Do you use those interest rates in the COI in the shadow fund values? Where did you put those interest rates?

MR. BEVACQUA: I assumed that they would manage to a 150-basis-point spread, which would only break down in a situation where the interest rate guarantee came into play. The way that would play out is, you have different account values emerging because of different credited rates. That will affect the COIs and and so forth.

I put those not into the shadow fund values, but I actually put those interest rates into a projection of future account balances. Then we made sure that we had a parallel shadow account on the side, so that we knew, if we had an account value of zero, whether we would actually have a death benefit that would sustain for some period of time thereafter.

MR. BECKLEY: The way the product is set up, the shadow account earns 10 percent, no matter what happens.

MR. BEVACQUA: Basically, the only way that the COIs at all affect anything that we're doing under GAAP is in making sure that we continue to project a death

benefit that's in force under the terms of the contract and capture and accrue for those death benefits as they're expected to occur. The shadow account value, in and of itself, is not at all directly brought into the analysis of or the determination of a reserve.

So, in terms of then taking the total assessments and the basic death benefit, and applying a reserve, as I mentioned before, the first thing we do is calculate a benefit ratio, which is basically the ratio of the present value of the basic incurred death benefits appearing in column J, divided by the present value of the total assessments appearing in column H. In this case, it's 11.47 percent. All this, just as we did with DAC, is done with a credited interest rate in the contract. And then we accrue the reserve based on that benefit ratio, the total assessments and the death benefits.

Another thing worth pointing out is that, just as with DAC, this is a dynamic process. We true up actual results in place of prior estimates, just as we did with DAC. So, the 2004 results should correspond to actual assessments and actual death benefits paid. So those will be used to factor into an updated reserve from period to period as we march forward and also to update our assumptions of what the future will be from time to time as well.

Generally the guidance says the reserves should be calculated at the same level of aggregation that we're using to calculate DAC. The expectation normally would be that you'll be doing an issue–year–product–oriented type calculation for the SOP reserve, following the view that's been established within the enterprise around how DAC is calculated. So this will not be a seriatim policy by policy calculation—unlike what Jeff was going through on the statutory side—but actually will be more of an aggregated calculation in which we'll be summing up multiple contracts, taking the total assessments across those contracts, and taking the total death benefits that have occurred and are expected to occur under these contracts and then calculating, across those contracts, one benefit ratio and one reserve calculation.

One other critical point is that the reserve is floored at zero. That's really where the aggregation issue comes into play because there are all kinds of questions as to what we do, policy to policy, or do you do it at some higher level? In many cases, it wouldn't make that much of a difference, but where it really does make a difference is if you have a zero floor and you're doing it seriatim versus doing it at a higher level of aggregation. There's a potential of getting very different answers because of the netting effect of the negative reserve.

I mentioned about the truing up and unlocking. That would apply just as it was for DAC. We went through the mechanics of the liability and mentioned that it did have a zero floor. The EGPs used in DAC now actually have to reflect the existence of this SOP reserve. So what we now need to do is go back to our EGPs, add in the change in SOP reserve as a part of EGPs and, in addition to that, also include the interest earned on the notional assets that are backing that reserve. So we simply took our

pre-SOP EGP that we had walked through before, and we added in the change in SOP reserve, an additional expense item; brought in the interest on the SOP reserve as an additional form of income; and then basically did the addition to come up with our modified EGPs. Using the same deferrable acquisition cost, we then come up with an updated schedule.

Now the interesting thing is the length of time it often takes to be able to identify the gains followed by losses. What we have been seeing at Deloitte is that a lot of our clients end up having a lot of these things happening at points in time that are pretty far out in the future. This has required a lot of companies to take a fresh look at their amortization periods that they've been using historically for DAC and try to think through how to reconcile these two things. Do we go back to our DAC calculations and extend our amortization ratio to reflect this new SOP, or is there some other method that we can use to mitigate these issues? So it's a very real issue, and a lot of companies are taking a hard look at it right now. I suspect different companies will come to different conclusions on that.

This summarizes my overview of DAC and the SOP. I think we'll open the floor to questions on any of the material that Jeff covered or some of the GAAP material we just covered.

FROM THE FLOOR: How did you get around the circularity issues when you were doing this last part?

MR. BEVACQUA: I'm not sure in this example we actually had a circularity issue. That's a great point. There is some circularity that comes up if you have an unearned revenue reserve on the contract. In this contract we did not have any front-end loads or things to that effect, so we didn't have to establish another revenue reserve. Where the circularity comes in is that the total assessments actually have to include changes in the unearned revenue reserve as a part of total assessment. Those assessments are then used to calculate the SOP reserve. Changes in the SOP reserve are part of your EGPs. EGPs are used to amortize or accrue your URR. So you get this circularity that I'm not quite sure was intended. For those of you who have been dealing with this issue, there was a great article in the most recent *Financial Reporter* that talked about how you can overcome that circularity. That is a very real issue if you do have URRs and have any SOP come into effect.

FROM THE FLOOR: I'd like to thank Jeff and John for putting this together and just to point out that we did something new at this session. I'm on the program committee, and we wanted to do something to give everyone real data to actually work through a problem. They went through a lot of numbers and, in some cases, you may not have been able to see very clearly. Our hope is that if you're able to work with a real problem, it's good for you if you're coming into GAAP or statutory for the very first time. But it's also good for your students as a learning tool.

Again, we were dealing with the basics of statutory and GAAP. They skipped over a lot of the subtle issues. There will be some of those, but again, it's really focused on a new actuary who has to deal with Model Reg-stat for you for the very first time—and for GAAP, for a UL contract and for no lapse guarantees in UL contracts for the first time—and must understand some of the consequences.

Chart 1