

**1988 VALUATION ACTUARY
SYMPOSIUM PROCEEDINGS**

UNIVERSAL LIFE PLAN

MR. ROBERT C.W. HOWARD: First I need to describe what the product is like and how we invest the cash that is built up. Then I will talk briefly about valuation. Next I will digress a bit to discuss modeling in general before I get into the specific model structure for Universal Life (UL). Then I will point out some of the more interesting aspects of the results. Finally I will comment on some of the problems that I encountered and how I solved them.

DESCRIPTION OF PLAN

The specific features of the UL plan are not too important for modeling; however, one cannot model a plan in general. The plan must be known in full detail. I chose some of the features because they are representative of plans on the market. I chose others to make the modeling easier. The rest of the features are simply arbitrary.

Normally I like the version of UL that has a fixed death benefit, but I chose to use a fixed amount at risk because it was a little easier to model and the results would be virtually the same until the later durations. The front-end load of 8 percent of premium applies in all years that the policy is in force. The back-end load applies only during the first four years; after that, the balance of the UL account is paid out on surrender. The

interest credited is an average of the current short-term interest rate and a four-year moving average of five-year corporate bonds, all less 1 percent. By picking a specific formula such as this, I was able to let the model respond to a changing interest environment without any manual intervention.

The premium starts out near the amount that would be required in order to have level premiums for life. Since the premium is discretionary, one can't expect that all policyholders will continue to pay this amount. Some will pay more, but more will pay less as time passes. I assume that the average amount paid decreases by 20 percent after the first year, by 10 percent the second year and by 4 percent in all future years. Eventually the average premium will have to increase to keep the policies in force, but the durations at which this will occur are not in my simulation.

The entire first-year premium, before front-end load, goes to pay commission and related items: 5 percent in the next nine years and nothing thereafter. This expense factor is intended to cover the broker's commission, any bonuses, the salaries of staff supporting the distribution system, advertising, and any other matters related to the care and feeding of brokers. There are other expense factors that cover all administrative expenses.

INVESTMENT POLICY

Investment policy is not fancy, but it is well-suited to the plan design. Since the UL interest rate is the average of the short-term interest rate and a four-year moving average of five-year corporates, we invest the cash so that an amount equal to half of the liability is in short terms. Cash is then invested in five-year corporates so that the book value of the five-year corporates is equal to half the UL liability. If there is any cash left over, and there usually is, it is split between ten-year corporates and five-year mortgages.

To keep things simple, we assume that all securities were held until maturity.

Because there is a lot of money invested in short terms and because the line of business is quite young and growing fairly rapidly, cash to be invested is positive in all simulations. However, the model if needed will make a demand loan that bears a short-term interest rate.

I avoided using government securities in order to give a better yield. I might have considered using five-year mortgages instead of five-year corporates to improve yield, but the supply of mortgages is far from certain.

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VALUATION

Standards for valuing UL are not particularly well-covered in the CIA Recommendations for Financial Reporting. There are three calculations required to do the UL valuation.

1. Calculate the cash value for each policy. This is the UL account on each policy less the back-end load, if any. The cash value is also used as the tax reserve.
2. Calculate a retrospective reserve on each policy using the pricing assumptions. In this case the front-end load is not deducted, but the expense factors used in the profit testing are deducted. The reserve is accumulated on each policy so that at each valuation we need consider only what happened since the prior valuation.
3. Finally we calculate a more "traditional" reserve using conservative assumptions. The prospective reserve is calculated on only a sample of policies initially. For each policy in the sample, the prospective reserve is compared with the lesser of the cash value and the retrospective reserve. If the prospective reserve is always the least of the three, then we can decide to ignore it in further calculations, and our liability is the lesser of the cash value and the retrospective reserve. If the prospective reserve is very often greater than one of the other two, then we have to calculate the prospective reserve for all policies. The reserve is then determined by the following formula:

$Reserve = \max [\min (\text{cash value, retrospective reserve at pricing assumption}), \text{prospective reserve at conservative assumptions}]$.

The retrospective reserve is a little unusual. Unlike the prospective reserve, it is conservative to use a lower mortality rate and a higher interest rate (once the reserve is positive) because both tend to produce a larger reserve. Unlike reserving with a net premium valuation method, the retrospective and prospective reserving methods are not equivalent using the same assumptions.

MODELING - PRINCIPLES AND TIPS

Before I get into the specifics of my UL model, I have a few general things to say about modeling.

1. Cell - The Basic Unit

Most of the modeling that you do will be cell based. I define a cell to be a group of similar policies or investments. Once grouped into a cell, all of the component objects are treated as identical. They are also treated as infinitely divisible.

Insurance policies are rarely divided. People tend either to be living or dead; they don't die in fractions. It is possible in your modeling to treat policies as discreet objects rather than continuous ones, but the modeling is then much more complicated and expensive. You will need to use discreet policies when you are

trying to measure the risks associated with statistical fluctuations, but not in our present case.

New cells are added as required to represent new business or new investments. Most of the items for the financial statements are determined by summing across all the cells.

2. Choosing Representative Cells

You will want to choose enough cells so that the financial statements for your model look similar to the real statements. On the other hand, to limit the computer time required to run your model, you will want to restrict the number of cells.

For the insurance side of the model, I suggest you start by combining issue ages and dates near each other. You can sometimes combine similar plans like renewable term plans with different renewal periods. You may be able to get away with combining different types of limited-pay permanent insurance, but you have to be careful. The endowment plans that were sold in the days before the exempt status are the worst. I have found it difficult to have the maturities in particular look reasonable unless you use a lot of cells, and if the maturities are not reasonable, neither will be the reserve increase.

So how many cells are enough? Suppose your company has been around for somewhere between twenty and thirty years, and you have sold a variety of plans. Probably the minimum would be to distinguish two risk classes, six issue ages, twenty years of issue and four plans; that gives you 960 cells. On the investment side, you might be able to get away with ten different interest rates, five terms to maturity, three quality classes and two types of securities; 300 cells. If you have a lot of variety in either your insurance or investment portfolio, you might need several times this number of cells.

Obviously you will need to build an automated process to distill some in-force file into your set of model records. At best it is still a time-consuming job. I estimate that getting the right cells will occupy half the time spent in developing the model.

Here is an approach to follow to make sure that your model is depictive enough. Run the last complete calendar year through your model, and compare the results with your actual financial statements. The error between model and actual should be less than 2 percent for assets and liabilities; 5 percent for surplus; 2 percent for premium; 3 percent for investment income; and 10 percent for net income. If the differences between the model and actual are within these limits, then it is probably not going to be worthwhile for you to do any more work. If

you are outside some of these limits, you will probably need more cells or better algorithms.

3. Develop a Modeler's Mindset

Once we have established a model scenario, we know the future, at least the future contained in the scenario. But we must look only at the past. It is tempting to write an algorithm which increases premium rates as mortality gets worse, but will I be able to do this? In order to have credible mortality data, I am usually working at least two years behind the times.

4. Investment Section

Most actuaries do not have much experience in investments. We need to proceed cautiously. I recommend that you bombard your investment people with questions. Get lots of information not just on how the assets operate but also on how they decide what assets to purchase and when.

It is not enough to model the assets; we also need to model investment policy. You need algorithms in your model that will allow you to decide what investments to make under a wide variety of conditions in the capital markets and under the present state of balance or imbalance in the investment portfolio. If

your company's investment policy involves heavy trading or high-risk investments, you are in for a difficult job.

5. Timing of Cash Flows

You have to make a specific assumption about when each cash flow occurs. It is important to track this carefully if you are to keep your cash in balance.

Most of our models have cash flows occurring only at the beginning or end of the year. I don't recommend this. If you have to pick only one day of the year, July 1 is probably the best day to pick. The end or middle of each quarter would be better yet.

It can be a little tricky to make sure that all the cash flows occur in the proper sequence. In particular, you almost always will want to have investing cash at the end of the chain.

6. Simplifying

Simplifying is important because it can save you a lot of time and money, but be sure you do it wisely. If your simplification is ill-advised, you will end up not just having to do the job both the easy way and a harder way, but also it will take

time to uncover the fact that the reason your results aren't as good as you expected is because of your simplification.

There are basically two ways to simplify. The first is to do it through the data. The fewer cells, the cheaper the model is to run. The other method is to simplify in the algorithms. Find a less complex way of programming what you need. I generally prefer to do the simplifying in the data if practicable.

Let me give you an example. You are considering what premium frequency to include in your model. You decide to use annual since it is the simplest. You are simplifying in the algorithms if you program so that everything is assumed to be annual. The data may or may not distinguish premium frequency. You are simplifying in the data if you program to accept whatever frequency you are told by the data, but you make sure that the data always indicate the frequency as annual.

Suppose you find that your model is not depictive enough, and you decide that you need to change the premium frequency or use multiple frequencies. If you simplified in the algorithms, you will need to reprogram and probably have to regenerate your data. If you simplified in the data, you do not have to reprogram. All you need is a single-file conversion to change the code from

annual to whatever else you want to try. If you find you need to use multiple frequencies, then you will have to regenerate the data, but again you don't have to reprogram. Simplifying in the data rather than the algorithms may take you a little more time initially, but it can save you a lot of time if it turns out that your first guess is wrong.

It will always cost you to make a model depictive. You can decide to do a lot of simplifying and gamble on the model being sufficiently depictive, but then you probably will need to add features to the model as you tune it. The other approach is to make a few simplifying assumptions and ensure that the model is depictive. Then you can later combine cells if you find that the model is more depictive than you require. The first approach will require more time for tuning the model, the second, more time for programming.

You will probably use a mix of the two strategies. It is important to know which strategy you are using and what the risks are.

If you find you are tight for time in the first year of your modeling, there is a shortcut you can take provided your management agrees that the model need not be as depictive as everyone might wish. You could decide to accept your first cut at making up model cells regardless of how poorly the results may depict your

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company's situation. (You will probably still want to scale the size of the model cells by a constant factor to bring one of reserves, premium, volume or policies into line with the actual.) Because the model is not depictive enough, the statements may not look a great deal like your company, but if the algorithms are well-done, and the data are at least reasonable, the model will respond properly and give you a good indication of sensitivities. Finding the sensitivities is, after all, the main purpose of the exercise. I recommend this approach only as a last resort; you will want to make the model more depictive the next year.

MODEL STRUCTURE

My model was written to run on an IBM PC/XT using STSC's APL. I have also run it on a timing IBM mainframe in APL2. It runs a little faster on the mainframe.

Incidentally, each scenario took about a minute to run on the PC/XT. If I had used a more realistic representation of the in-force business, I estimate that it would have taken five to ten minutes per scenario, provided I didn't run into WS FULL. This is faster than I had thought it might be.

1. Cash-Flow Timing

I assume that virtually all transactions occurred on January 1. Once all the insurance and investment cash flows are determined, the net cash is invested.

The only transactions that occur at any other times are the payment of taxes and transfers to the shareholder's fund, both of which occur on December 31. I put these two through on December 31. Otherwise, I would have had to set up a liability to offset the cash I was holding on the year-end.

2. **Representing UL policies**

I didn't have to spend a lot of time making the model depictive. I have only one plan to be concerned with, three issue ages and one cohort of issues each year. I require only four numbers to represent a year's business, the average-size policy for the year and the amount at risk in force for each of the three issue ages.

3. **Reserve Calculations**

I could not find any way of doing all of my reserve calculations in advance. They differ for each scenario and duration. Therefore, I put the reserve calculation into my program so that it's done after all the cash flows are processed each year. The program does a seriatim calculation carrying on from where it left off at the previous year-end.

4. **Handling Scenarios**

It is helpful to find a way to handle a variety of scenarios without having to make a manual intervention each time. I found a way, which works pretty well.

Anything that changes from one scenario to another is contained within a number of functions. For example, there is a function to produce the mortality rates, there is another one to produce interest rates. There are standard names and arguments for each of these. I did not want to have to change these functions for different scenarios.

Instead I made up a function with a different name but with the same syntax as the standard name. I then made up a three-dimensional character array. There was a plane for each scenario, the seven rows on each plane corresponded to the seven standard function names. The character string on a particular row was the name of the function to be invoked rather than the function with the standard name.

At the start of each scenario, I created the seven standard functions as local functions. The header of the local function had the standard function name, and then the single executable line of code following invoked the function required for that particular scenario.

RESULTS

To give you an idea of how UL responds to various conditions, we have to start with what happened in the base scenario. Net income rose quite steeply through the period

of the scenario. Liabilities also grew rapidly: liabilities at the end of the scenario were more than four times those at the start. Surplus, however, was quite flat.

The most important thing to remember is that this is a very young line of business. It was first put on the market at the beginning of 1983. We started out with \$7 million of capital in 1983; at the end of 1987, we have been able to maintain that \$7 million by fairly slow growth through the formative years. The more rapid growth in the next five years causes a ratio of surplus to liabilities to fall off rapidly. Obviously there is a significant new-business strain. We should expect the results to be quite sensitive to the growth rate.

Investment income has little sensitivity to rising and falling interest rates. The risk of changing interest rates has been passed on to the policyholder almost entirely. UL could be made to pass other risks on to the policyholders provided that:

1. We have early warning of changes in experience.
2. The competition will permit.

The following table shows net income for the base scenario and four of the adverse scenarios.

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	UL - Net Income (in millions)				
	<u>1988</u>	<u>1989</u>	<u>1990</u>	<u>1991</u>	<u>1992</u>
Base	-0.18	0.08	0.40	1.00	1.67
Mortality	-0.29	-0.20	-0.14	0.11	1.39
Withdrawal	-0.29	-0.05	0.20	0.64	1.08
Double Sales	-0.23	-0.02	0.27	0.81	1.39
Expenses	-0.24	-0.07	0.14	0.60	1.08

The mortality scenario is clearly the worst until the risk-charge rates are changed at the beginning of 1992; then that scenario recovers easily. The high withdrawal and high expense scenarios are the worst in 1992. In neither of these two cases were the risk-charge rates changed to compensate for the adverse experience.

Note that:

1. The heavy withdrawal scenario is tied for the worst.
2. The heavy mortality scenario recovers quickly once the risk charge rates are changed.

Now I want to explain what happens to free surplus, that is, the excess of surplus over the Canadian Life and Health Insurance Association (CLHIA) requirement.

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The following table shows the CLHIA excess for the same scenarios. The increasing mortality scenario is clearly the worst and withdrawal is actually the best.

	UL - CLHIA Excess (in millions)					
	<u>1987</u>	<u>1988</u>	<u>1989</u>	<u>1990</u>	<u>1991</u>	<u>1992</u>
Base	1.39	.00	-1.06	-1.72	-1.83	-1.33
Mortality	1.39	-.11	-1.46	-2.65	-3.64	-3.42
Withdrawal	1.39	.24	- .54	- .96	- .91	- .39
Double Sales	1.39	-.13	-1.39	-2.35	-2.91	-3.02
Expenses	1.39	-.06	-1.27	-2.19	-2.70	-2.78

In the case of mortality, we tend to forget about the bad years once we have taken rate action to correct the adverse trends in experience. But surplus is not so forgiving. The rate action taken did nothing to recover past losses. Weathering a storm does not give us the experience we need to better handle the next storm; it merely makes us more vulnerable.

The reason that the surplus looks so good with high withdrawals is that the reserves and required surplus grow less rapidly, thus less of the initial capital is used up.

PROBLEMS AND SOLUTIONS

One of my problems was a mistake in calculating the UL reserve. I accumulated the reserve using the pricing assumptions. In fact I was using the experience mortality rates rather than the expected rates from the pricing. This caused any extra claims to be absorbed by the reserve change. I didn't notice it at first because I thought that the UL would be fairly responsive to changes in experience. But I had lost my modeler's mindset. I wouldn't know actual death claims at the time that I was calculating the next reserve. Once I distinguished between pricing expected and actual, the results were more reasonable.

I had a problem in dealing with defaults of securities. I found this particularly complex. In tracking down my problems, I found how useful the statement of Change in Financial Position is. Whenever cash was not in balance, I knew that I had a problem somewhere. I eventually tracked it down by changing the model so that I was running with only one security. I was then able to do the calculations by hand as well as by machine and find out exactly where they differed.

I would certainly recommend that you include a statement of Change in Financial Position when you do your modeling. Since you are going to have both insurance and investments and probably will be less experienced in the investment side, a help like this statement can be invaluable. It is amazing how much you can find out about bugs in the

program by adjusting the input data so that you are able to look at one or two types of cells at a time.

CONCLUSION

Modeling can be a humbling experience. Why do we model? Usually it is because the world is so complex that we don't dare rely on intuition. In modeling you admit to yourself and others that you are not smart enough to grasp how all the pieces interact.

After you have done a fair bit of modeling, you are bound to see some results that you think can't possibly be right. You will spend a lot of time looking for bugs in your program, only to realize that it isn't a bug at all. Eventually you will rationalize why the results are as they are. The rationalization will probably be something that you will think you should have known when preparing the model, but the thought never occurred to you.

When you gain this new insight, you will be tempted to think that you are pretty smart after all. Resist the temptation! Your model will have much more to teach you if you are willing to learn. As I said, modeling is a humbling experience.

In closing I would like to leave you with a proverb that has something to say about how not to use a model:

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"A fool finds no pleasure in understanding:
but delights in airing his own opinions." (Proverbs 18:2)

Rather, use your model to gain an understanding of how the real world operates. And then you can "substitute facts for appearances and demonstrations for impressions."

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The chief executive officer (CEO) and valuation actuary (VA) of Solvent Stock Life are about to have another meeting. (NOTE: This was a dramatization presented at the 1988 Valuation Actuary Symposium). They're going to discuss the first draft of the valuation actuary's solvency report. (This report, entitled "Solvent Stock Life Insurance Company: Illustrative Report on Solvency Testing," was included in the Symposium handout materials. It was developed by a subcommittee of the Canadian Institute of Actuaries Solvency Standards Committee, September 7, 1988).

CEO [looking up as actuary enters office]

Have a seat. I read through your report last night. It took me all evening. I went through your summary again a couple of times this morning. I will say this for your report: What it lacks in optimism, it certainly makes up for in comprehensiveness.

I have a few questions for you. The numbers are a little changed from what I saw before. Are you sure the work is okay?

VA

Yes. In the checking we found a few minor problems. In fact we uncovered two little glitches after this draft was printed, but none of the numbers that I included in this report would change materially. I'm pleased with the work. We submitted it to careful scrutiny, both by the actuaries and divisional management, over the past couple of

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months. We found no major errors in logic, in programming, or in the data. I think it speaks well for the actuarial staff throughout the company.

CEO

I'm sure you are right, but I hope you will pardon me if I don't appear appreciative. I can't bring myself to characterize this as "good" work. The results that you show on page 2 of your report are *still* terrible. There is a continual decline in the surplus ratio. And on page 3 you show three of the prescribed scenarios having us as insolvent.

VA

No, we aren't insolvent in any of the scenarios. We just don't have any free surplus. We are required by the formula to have more surplus than we have. The Office of the Superintendent of Financial Institutions (OSFI) may step in and put some restrictions on what we do, but we're not insolvent.

CEO [angrily]

Call it what you will! There's no way I'm going to sit still while Ottawa comes in and takes this company out of my hands.

[Pause to cool down]

Exactly what do I infer from your projections?

VA

I think the most significant things for you to note are these:

1. There is no immediate threat to the company's solvency. Even the most pessimistic scenario has a surplus ratio of over 100 percent for the next couple of years.
2. If current conditions continue, then fulfilling our present business plan will result in a weakened company, in terms of surplus ratio.
3. There are many possible futures, none of them highly likely, which could put the company in a serious position at the end of five years if corrective action is not taken.
4. There are actions that we could take over the next couple of years, which would strengthen the company under the most likely scenario and lessen the effect of adverse trends.

CEO

What actions?

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VA

I think the most important would be to withdraw the Term-to-100 plan and see if we can find an economical reinsurance arrangement to decrease the risk on existing business.

Second, we could cut back on shareholder dividends.

CEO [interrupting]

Easy for you to say!

VA

I'm not suggesting that it is a particularly palatable alternative. Scenario testing is a tool for exploring alternatives. I'm laying out the alternatives, but the decision is yours.

Another alternative is that there may be some way we can control the amount of strain in the annuity line, or we could raise capital. I don't have a specific recommendation to make at the moment. I need to study it further.

CEO

With these earnings, how can I raise capital?

VA [shrug]

Finally, we could work harder than we are at expense control. We tend to get into a big flap about expenses every few years. I think tighter controls on an ongoing basis would be more productive.

CEO

Let's go through your overview.

I have a few questions I'd like to ask. On page 1, how likely are these three classes of projections?

VA

Every single one of them is virtually impossible. You have to think of the scenarios as representing a family of possible outcomes, which would, at the end of five years, give financial statements that are roughly equivalent to those of a specific scenario. This is just a wild guess, but I suppose that the base scenario would represent a family of possibilities that might, in total, be 25 percent likely. There probably isn't a 20 percent chance that anything as bad as one of the adverse scenarios would actually occur.

In any event, the probabilities aren't too important. The purpose of the exercise is to look at sensitivities rather than looking at the absolute numbers.

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CEO

You say your model is sufficiently representative. How good is it? What's the range of error for the 1992 surplus ratios?

VA

If the conditions in one of the scenarios actually occurred, I'm fairly confident that the surplus ratio would be within about 20 percent of what the model says.

CEO

Twenty percent sounds like quite a bit.

VA

Not when you consider it's a five-year projection. A lot can happen in five years. Of course, if any of the assumptions are different, the results could change substantially.

CEO

On page 2, you show trends in profit and surplus. Profits are flat, surplus increases by about one-quarter, and required surplus is almost double. Why is the pattern so different?

VA

As I mentioned on the next page, the new business strain is quite significant. It is not just the statutory strain that we have to worry about. There is also the strain implied by the fact that required surplus goes up, too. It may be that this is a deficiency in the formula, but it is too early to say.

CEO

At the end of the first section on page 3, you said, "Any concerns shown by the base scenario projection can be dealt with in a normal planning cycle this year." Considering how rapidly the surplus ratio falls, that sounds awfully optimistic. Do you really think we can keep the surplus ratio where it is now?

VA

It may not be possible to keep the surplus ratio up quite that high, but there are a number of things that we can do to keep it from falling so far. I mentioned those later in the report.

CEO

I would like to go into those in detail, but perhaps it can wait until later.

How many of these scenarios on page 3 do we have to pass?

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VA

We don't have to pass any! That's not the purpose of the scenarios. The purpose of the scenarios is merely to look for areas of sensitivity. In each of them only one of the parameters is changed in order to find out how significant an effect it has on surplus. Nor are all the scenarios intended to be adverse. The one with flat sales is usually going to be a positive scenario, and also one of the two interest-rate scenarios is likely to be a positive one.

CEO

On pages 4 and 6 you mentioned Term-to-100. I know you aren't a fan of Term-to-100. How did you let a money loser like that slip by you?

VA

It is not a question of being a fan. And it may prove not to be a money loser. The expected profit is still okay; it's higher than with many of the other plans. However, Term-to-100 has a much higher new business strain, and it's far riskier than anything else we sell.

To me it comes down to this: is it worthwhile to forego probable profit in order to avoid certain strain? And it isn't just the strain at issue. Since the premiums are

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guaranteed, under most of the adverse scenarios, there is a huge reserve strengthening required for Term-to-100.

CEO

You say on page 5 that at first glance it gives a gloomy impression. I have glanced at it many times, and it's still gloomy. If the board of directors sees this, they will want my head on a platter. Does this *have* to go to the board?

VA

Yes.

CEO

When?

VA

It is due in two weeks.

CEO

You're going to have to change the base scenario before it goes to the board so that it doesn't seem so gloomy.

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VA

Well, that depends on what kind of change you want. Are you looking for cosmetics or correctives? By cosmetics, I mean changes in appearance without any change in substance. Professional ethics don't leave much room for cosmetics.

CEO

I don't want to step on any professional toes. What I'm looking for is a corrective.

VA

That's not really possible either because the base scenario has to reflect our present business plan. If you want to have a real change in the base scenario, then you have to make a real change in the business plan.

CEO

Who will present this to the board?

VA

It's my responsibility.

CEO

Can we get the board to give it just a cursory glance saying that it's just a formality and not terribly important?

VA

Do you think it isn't important?

CEO

Well, no, not anymore. [Pause]

Can we leave out the prescribed and additional scenarios?

VA

No.

CEO

Well, it wouldn't help anyhow. The base is bad enough.

Now, about your opinion on page 7, you mention a discussion with me in the last paragraph. When are we going to have the discussion, and when are you going to tell me about the implications?

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VA

I wanted to discuss the report in general first. I'll make an appointment with you for a later discussion.

CEO

What's the audience for this opinion?

VA

Just the company management and the board. It's not intended to be a public document.

CEO

But this is the most positive part of your whole report. Why not include it in the annual report to shareholders?

VA

I think it would be difficult for the public to interpret the opinion correctly. Besides, do you want to establish the precedent of having the solvency opinion in the annual report? What if the opinion doesn't come out so positive?

CEO

No, I guess we'd better leave it out.

Can you take the word *immediate* out of the first sentence of the last paragraph? It could be interpreted as a very short time frame.

VA

I can't make it open-ended. If the company were to go under, I would be the first one to be sued.

CEO

You're not the only one with a stake in the company staying solvent.

Let's leave the report to the board for a moment. We will come back to it later. I asked you to review the models with people in the various divisions. Did you find any soft spots?

VA

The models aren't all equally sophisticated, but I think they're all acceptable.

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CEO

I didn't understand all the details, but it seemed to me that the group area is modeling differently from the rest. Is the group model okay?

VA

It's a little hard to tell. Every time I ask Phil about it, he says "Phone Bridgewater."

CEO

What?

VA

Sorry. That's an in-joke.

The model that group uses is pretty well-suited to that department because all the business is yearly renewable term. Group can model in bulk and then focus on the spread. That would be much more difficult for the other lines of business. Group's approach will be in trouble if there is a major discontinuity such as introducing a major new product or a change in risk classification or in taxes. These "unusual" events are becoming almost routine. I still think that the long-term disability reserves could have been done better by other methods, but it probably wouldn't have had much impact on surplus.

CEO

So you're content with the group model?

VA

Yes.

CEO

I'm still concerned about the drop in the surplus ratio. I feel like I'm presiding over the demise of the company. I keep wondering when I'm going to hear the regulators knock on the door.

Speaking of the regulators, you don't have to give this to OSFI do you?

VA

There hasn't been a request so far from OSFI, but they know we're doing the work. There's nothing to stop them from asking for the report, and we couldn't refuse if they did.

CEO

Do the auditors have to see it?

VALUATION ACTUARY SYMPOSIUM, 1988

VA

I can't say on "have to," but I'm sure that they will want to. They're in the driver's seat on this one.

CEO

And the rating agencies?

VA

Same thing there.

CEO

What about the CLHIA guarantee fund?

VA

They don't have the authority to ask for the report. I think we can refuse them, but of course, they could make supplying the report a condition of membership in the fund.

CEO [pondering for a moment]

What if we were to change the business plan?

VA

Well, I'd have to redo all the work. The results have to reflect the business plan.

CEO [seeing a glimmer of hope]

Have you seen any scenarios that are realistic and keep the surplus ratio up?

VA

It is hard to hold the ratio at its current level, but I can get considerable improvement from the base scenario.

CEO

I've been looking at this report the wrong way. This isn't a report for the board at all. It's a report for the planning group's meeting in three weeks. We can't have a report going to the board based on a business plan that's eleven months old.

Here's what we are going to do: we'll devote a full day of the planning meeting to this document and to coming up with a business plan that will leave us in a much healthier condition. After we've finalized a new business plan, I want you to redo your report. Then you can present your report at the same board meeting that I present the planning document.

VALUATION ACTUARY SYMPOSIUM, 1988

VA

The board schedule calls for me to make a report in two weeks.

CEO

I am sure the chairman will agree to revise the schedule.

VA

I am not sure that I'll have time to get everything redone after the planning meeting and before the following board meeting.

CEO

There isn't much choice. In another year, we can work at co-ordinating the two jobs a little better.

I'd like you to work with your model as much as you can over the next three weeks.

But forget about the adverse scenarios! Look for practical changes in the business plan that can put us in better shape. If you find any particularly good ones, let me know right away. In any case, I want you to report back to me a week before the planning meeting on the best options you find.