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CASH-FLOW TESTING AS A MANAGEMENT TOOL

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- Was the year-end process useful or a necessary evil?
- How realistic were the assumptions used?
- How much was pure guesswork?
- What were the lessons learned from the exercise?

MR. KENNETH W. HARTWELL: We have a distinguished panel here: Donna Claire, Frank Buck, and Michael Reardon. Our recorder is Greg Juneja, who works with me at Sun Life of Canada. I'm Ken Hartwell and I'll be moderating this session. For lack of a company representative – as you will find when I introduce each speaker, none of these three distinguished people currently works for an insurance company – I thought I would make a few brief introductory remarks of my own, first responding to the question, "Was the year-end process useful or a necessary evil?" We certainly found it to be very useful.

Sun Life of Canada has been doing cash-flow testing since 1978, but this recent process forced us to involve more people and to begin to strip away some of the mystery that tended to surround the process in our company. That's my own personal feeling, anyway. I also feel that we have quite a long way to go, particularly in terms of educating nonactuarial management as to the lessons that are to be learned. As I said, we started in 1978, and I think it's worth highlighting the fact that we still feel that we have a way to go.

One specific development worth mentioning is that, through my contacts with them, I get the impression that our investment people became team members in this exercise this past go-around, as opposed to mere providers of information. We also found that because we set out to make an honest attempt to develop a user-friendly actuarial memorandum (the users being the board of directors and senior management), the way we approached that task gave us something of a "fresh start," because it seemed to us that the entire process at Sun Life was tending to become somewhat mechanical.

What were the lessons learned? I think I've just touched on one of them. The other thing we have learned is that we need to pay more attention to the consistency of assumptions up-front. In a few cases we discovered at a late stage that the assumptions used for various business segments were not completely consistent. The next lesson is that we are determined to actually complete the process before December 31 next time. We set out to do so, having based our work on both assets and liabilities as of September 30, but inevitably it all took longer than we planned. We didn't finish until the middle of January, which did put an unnecessary strain on the people who were involved with year-end work. The other area I've already touched on in terms of a lesson is the dissemination of results internally.

Now I'm going to introduce Donna Claire. Donna engages in general insurance consulting with a focus on asset/liability management, corporate modeling, and valuation issues. She is a member of the American Academy of Actuaries Committee on Life Insurance and the Committee on Life Insurance Financial Reporting (COLIFR), and she is active on several of the task forces connected with those bodies. She is currently chairing the COLIFR task force on practice notes and is chair of the COLIFR NAIC subcommittee. Ms. Claire has authored several articles and study notes on valuation issues and has been a frequent speaker at professional meetings.

MS. DONNA R. CLAIRE: Was the cash-flow-testing process useful? My answer to that one is a "Yes, but . . ."

The first time I was involved in cash-flow testing was in the early 1980s. The company I was working for was just entering the lottery annuity business in a big way. This company understood the importance of managing its assets against its liabilities, especially when relatively high rates were being guaranteed for 20 years. Cash flows were generated for liabilities and different assets. After careful consultation between the investment people and several actuaries, of which I admit I was one, the investment department determined that backing a substantial part of the liability with "low coupon" residential mortgages was a good idea, because the expected payouts on the mortgages were quite close to the guaranteed annuity payouts, even if interest rates changed a little bit. Remember, this was the early 1980s. It turned out that the "low coupon" mortgages were 15% residential mortgages. Within two years over half these mortgages had prepaid, and the interest rates to reinvest the money in had dropped substantially. So yes, the process was useful, especially after the fact, to explain to management why what was expected to be a profitable block of business had now locked in losses through the next decade. In fairness to all involved, including myself, this process pointed out the need to look beyond the present environment, and try to anticipate what could happen in the future. One will never be 100% right, but at least one can learn not to repeat mistakes.

Back to the question of whether the process is useful. By definition at this point, the process must be useful to management, since it needs the information. A number of outsiders are now requesting to see the results of asset adequacy testing, including the regulators and various rating agencies. However, in my work as a consultant to both the industry and to regulators, it is clear that not everyone has bought into the importance of the cash-flow-testing tool. Ken's company has the advantage that it did start in Canada. It has a large office in Canada, and the people there are a little bit ahead of us in terms of cash-flow testing. Sometimes management either rubber stamps, or does not even look at, any asset adequacy reports before they are sent to regulators or others.

One of the major problems seems to be when the results of the testing contain some unfavorable information. There are some actuaries who have it so ingrained in them that management would not like to see bad results, that they work very hard tweaking the assumptions in order for the results to look acceptable before they are presented to management. On the other hand, management may put great pressure on the actuary to change something in order for the results to look good. I think it is very important for the actuary to feel comfortable about all the assumptions that go

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into the cash-flow testing, and the most important information he or she can give to management is what area is causing any problems, be it interest crediting strategy, product design, investment strategy, and so on, so management can act on any areas of potential problems. To merely change assumptions in order for the results to look good is doing a disservice to the company and to the actuary. The actuary is legally liable for the opinions and reports he or she signs. One of the things I tell actuaries I work with is that one test of reasonableness is, how stupid would you look if parts of your report were quoted by Joe Belth in his newsletter? The Joe Belth standard is probably as high as any current professional standard in the U.S.

The discussion gets into the next question, "How realistic were the assumptions used?" Some actuaries may use assumptions based strictly on pricing work, and the current official "management" assumptions for such things as expenses, lapses, mortality, and morbidity. A reasonable cross-check on such assumptions is to compare these numbers with what is in the annual statement. For example, if the management estimate of expenses is \$250,000 a year, but the expenses that show up in the annual statement are \$10 million a year, this should alert the actuary to do further investigation. Sensitivity tests should be done comparing the official company position on certain assumptions to the level that appears in the annual statement. This is one area that a number of regulators are exploring further.

To give some examples, there are certain assumptions that at least one regulator has commented that he is investigating further in various reports filed by actuaries. The lapses assumed on deferred annuities is one area where there appears to be major divergence among actuaries. A number of the regulators have received the Society of Actuaries/Life Insurance Marketing Research Association (LIMRA) study on lapses for deferred annuities. If the assumption being used by an actuary is not in line with this report, which shows over 20% lapses in the year after the surrender charge period ends, there may be questions asked.

As I mentioned before, expenses are another area that is being investigated. There is a reason that the testing numbers and the annual statement numbers may diverge: the annual statement numbers also include acquisition expenses. However, the actuary should make sure the expense assumptions used in the testing are reasonable.

Asset assumptions are another interesting area. Many actuaries obtain these assumptions from their investment department or investment advisor. In the U.S., there may be blind reliance on the results. (In Canada, the actuary is required by the CIA to certify the reasonableness of these results.) This is one area where my "Joe Belth standard" may kick in. For example, one regulator read me a portion of a report where the year callable bonds got called was exactly the same whether the interest rates went up 300 basis points or down 300 basis points. This seems unreasonable. Without further explanation, I certainly would not want to be in a court of law trying to justify that assumption. Another area the regulators are interested in are collateralized mortgage obligations (CMOs) as witnessed by Mr. Larry Gorski's (of the Illinois Insurance Department) letter to valuation actuaries in 1992. The best advice here is to discuss with your investment people exactly what type of CMOs the company owns. The cash-flow assumptions on equity types of assets, such as common stock, real estate, and limited partnerships, is another difficult area. My general advice

is to ask many questions whenever the assumptions look weird. For example, in the current interest environment, any asset expected to earn over 10% needs a hard look. Another source of information is the annual statement. If the annual statement shows no earnings on an asset type during the year, but the assumption provided to the actuary is that it will earn 10%, the actuary should ask further questions. One of the more difficult calls, is what I call the moving hockey stick – the assumption is that the asset will earn nothing for two years, but then will start returning 20%. If you ask the same question two years from now, you might get the same answer – no earnings for another two years, followed by 20% earnings. If nothing else, these assumptions cry out for sensitivity tests on earnings to be done by the actuary.

Now that I have depressed you, you may be wondering where to get information such that your assumptions are not based on pure guesswork. One possible source is the Practice Notes, which were written by a task force of the Academy of Actuaries' COLIFR. These detail certain practices of other actuaries doing cash-flow testing. Other sources of information are investment banks and other investment services. Fitch, for example, has a very good series of pamphlets on CMOs. The other investment houses, such as Goldman Sachs and Morgan Stanley, also have good publications on various asset types. Another source of information is other actuaries, either inside or outside your company. Do not be afraid to ask questions. No one can be expected to know everything. The peer review process can be quite helpful.

There are a number of the lessons learned from the cash-flow-testing process. One is something I am sure everyone involved in the process has found: things take at least twice as long as expected. Therefore, it is important to leave an adequate time margin to cover the unexpected, in order for the actuary to do a reasonable job analyzing results. A related finding is that surprises are bad. With the current low interest rates, many actuaries found that assets were being called and prepaid quickly and high long-term guarantees in certain products could not be supported. Finding this out on February 28 and recommending higher reserves being posted at that time could be detrimental to the health and future employment of the actuary. Preliminary testing may point out areas of potential concern so that alternatives can be explored. A third lesson from the process is that many areas of the company need to cooperate in order to do a reasonable job. It is important for the actuary to network and be involved with areas such as the investment department, the expense area, and the reinsurance area. I think the most important lesson is that cash-flow testing may show a number of areas of potential problems, which, if management is aware of them, can be acted on before they become actual problems.

However, the current level of cash-flow testing is just a start. In many companies, it is just focusing on the reserve adequacy aspect, which is required by the regulators. Most companies do not plan on just managing the current block of business; they plan to issue new business as well. Therefore, management needs dynamic solvency testing as well.

Dynamic solvency testing is currently a requirement in Canada. There is a very good publication of the CIA called "Standard of Practice on Dynamic Solvency Testing for Life Insurance Companies," which is recommended reading. The U.S. appears to be heading toward solvency testing. The SOA recently released a paper on this subject,

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and there is a workshop being conducted on it. The advantage of solvency testing is that it includes all business, including the current surplus levels, and takes into account future management actions. This can be much more useful to management than a cash-flow projection that ignores these numbers.

MR. HARTWELL: Our next speaker is Frank Buck. Frank started his career in the U.K. where he obtained his Fellowship in 1973. It always makes me comfortable to have someone like Frank Buck with me, because I'm also an Fellow of the Institute of Actuaries (FIA). After six years in Canada, Frank moved to New York in 1984, and he's currently the partner in charge of the national life actuarial practice of Deloitte and Touche. In this capacity he has advised clients on cash-flow testing and has assisted in the audits of a number of major U.S. and Canadian companies by reviewing Regulation 126 filings and other cash-flow-testing reports.

MR. FRANK J. BUCK: When Ken asked me to speak, I wasn't quite sure if he was calling upon my vast experience or whether it was because I was English. As you heard from Ken, I have worked in England, Canada, and the U.S. Most people change jobs, I change countries as well.

I thought I'd start off talking about my personal involvement with asset/liability matching and cash-flow testing. In particular, I will discuss some practical problems that arose this year-end with some of my clients; the results, that is, what people actually did with the results when they got them; and finally, some implications and opportunities in this area.

To start off with my personal history in this field, in 1952 I read the famous paper on immunization theory written by the English actuary, Redington, as part of my Fellowship examinations in England. I was delighted to hear that in Ken's first job, he had to sit at the feet of Redington and clip articles out of newspapers that might be of interest to him. I hope he stayed with the financial newspapers and didn't get into some of the others that are in England these days.

When I was still working in the U.S. in the early 1970s, there were a number of mismatching failures, which were interesting in themselves. There was one company that sold what was a very popular product in the U.K. back then, called a guaranteed income bond, and it worked as a combination of annuities. As always, it was taken as antidote to the then current tax treatment. It was like a single premium deferred annuity (SPDA) with income being paid out each year. The company sold a product, which repaid your capital after five years and paid you 7% in half-yearly installments during those five years. Surrender penalties started at 5% and graded up over that five-year period.

In the early 1970s in the U.K., interest rates rose considerably. A couple of years later, a company I worked for came out with a two-year product that paid 11%. Not surprisingly, there were significant lapses, and a sufficient number of policyholders in the original company cashed out their policies and switched over. It wouldn't have been too bad, had they invested wisely, but they had made the decision to try to maximize profits. In order to meet this, what is clearly a five-year bond, they had invested in 20-year mortgages. That was one of four companies that went under in the U.K. in the early 1970s, all caused through similar sorts of mismatching.

As a sort of counter to that, companies started matching fairly accurately and implemented asset/liability matching strategies. When I moved to Canada in 1978 and started working in both the Canadian and U.S. marketplaces, there were a number of articles being written about asset/liability matching. Many companies were beginning to take it to extremes and matched very closely in all their different segments. I'm not sure that worked very well either. They were losing out on lots of opportunities by doing that. They were cutting back on the risk of loss but also cutting back on the risk of profits as well.

I then got involved in your Regulation 126. As one of my tasks at an auditing firm, I have been reviewing Regulation 126 filings for a number of the large companies, three of the big five, plus many others, for the last three years. It's very interesting to see how those filings have developed over the years. Of course, we now have cash-flow testing, and as part of our audit procedures, we do review the cash-flow testing of our clients. That is clearly expanded this year to reviewing the whole of the NAIC cash-flow testing. I was very impressed with Ken's comment that his company was late with its work this year. His company had it done by mid-January. That was much earlier than anybody else, Ken, I can assure you. Most of us were scrambling by the end of February.

So, we've gone through this. We satisfy the regulators. We spend a great deal of money on software. Was it useful? Is it a useful exercise? I think it will be. I think some of the things that came out of last year's exercise were useful. Some things were very good. But not enough use is being made of it yet. It's still in the developmental stage.

I thought I would look at the scenarios that we have seen tested this year, and everyone has, of course, done the "New York seven." Some even went through a whole range of randomly generated scenarios. In fact, when I say some, I mean one of my clients did that. The vast majority decided to do a bit more than the basic seven or eight. Most do something like 12, maybe 15. Even some of the companies that have done fairly extensive scenario testing have really not done completely random scenario testing, but they've programmed future interest rates so they fall within the same sort of bounds that the "New York seven" fall within.

One thing I've seen very little of is sensitivity of other assumptions. Donna was saying earlier that the regulators are very interested in making certain that the cash flow is timed with the annual statements, and obviously that's important. But it's also important to make certain you're testing sensitivity. If you're seeing lapses of 10% and last year you had 15% lapses, at the very least you should have tested 15% to make certain that you know what implications that would have had. You may even be conservative. It may give you a better answer, but you need to test it.

No one, as far as I have seen, has considered a run-on-the-bank scenario. All our clients have assumed that they're going to stay around forever. All of them assumed that they work for a company that isn't going to receive bad publicity or be downgraded or whatever. Nobody considers what could happen if bad publicity does occur, and that has hurt a number of companies, as you've all seen.

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I want to go on to some practical problems. The first one is, what date should the work be done at? It sounds pretty basic and pretty simple, but many people wrestled with that significantly this year. Most companies use the September 30 date, but they're all well aware of Larry Gorski's letter to them in October or November of 1992 saying that, if you use anything other than year-end, you had to demonstrate all characteristics of the asset portfolio were equivalent to the ones that you would use. I'm not quite sure how many people satisfactorily answered Larry on that. Donna may have a better idea than I do, but very few clients made much of an attempt to roll that forward in a meaningful way.

I have one client who was very good, and its people regularly did their cash-flow testing on November 30 numbers with a roll forward to the year-end, and that is one out of maybe 40 clients that I've seen. I have one client that said that the only time that its assets and liabilities were adequately reviewed and audited was at the year-end, and as it couldn't do year-end 1992, it did year-end 1991, and hoped that the regulators would accept that.

We then have the issue of participating business. A number of mutual companies with participating business had to do cash-flow testing this year, and they all said, "Well, we've got the dividends. There's no problem. We're never going to have a problem, we've always got dividends." That's fine. I suppose that's a good argument, but most of them don't fully reflect the changes in current interest rates in their dividend formulas. Many pretend to, but they don't really. I think that some cash-flow testing is necessary for participating business. Maybe not as rigorously as some other lines, but companies are doing it.

The next area I think is very interesting is asset allocations. Back in the days of Regulation 126 filings, you only had to complete cash-flow testing for the annuity block and single premium whole life, so you could pick whatever assets you needed to make your point. I had one client who claimed that Regulation 126 was purely a public relations exercise for Bob Callahan. I think that Bob and the other regulators take things more seriously than that.

It's very important to make certain that you're not double-counting assets in cases where you don't have segregated assets. I had one client a few years ago that didn't allocate assets, but allocated investment income. It had two major product lines and several minor product lines. The two major product lines received their share of investment income. They needed so much, and the balance was allocated among the rest, a number of small product lines. Unfortunately, one year that balance was negative. That company is having some problems right now.

Another thing that Donna touched on was asset assumptions. Although actuaries can rely entirely on the investment professionals, I agree with her that it's very foolish to do that, without the actuary understanding the asset implications and without doing some sensitivity testing.

There are some big changes in the assumptions I saw this year for CMOs and various other things. There were also big changes in some of the joint venture returns and on some of the other esoteric investments. Clearly those sorts of differences should have been tested. If you expect a certain rate of prepayment, you should at least be

testing that your liability portfolio can stand the rate of prepayments being greater. It's surprising how often this year I heard from actuaries the comment, "We didn't know we had so many CMOs; we didn't have knowledge of what portion of our portfolio was in CMOs." Many investment people have bought things that the actuaries knew nothing about, so I think it's very important to understand just what your company has, what is out there, and what you are letting yourself in for.

The next thing is having got the results, what do we do with them? What action do you take as far as setting up extra reserves is concerned, and how do you make this whole process more useful as a management tool, which is really the main purpose of this presentation? Extra reserves is an interesting topic, and clients have ranged all over the place on what they've done. Suddenly one company insisted on putting up sufficient reserves so it met all of the scenarios that it tested. Many others failed just one scenario, usually the 300 basis point immediate drop, so that is considered an unlikely scenario. That is not going to happen and let's ignore it. I had one person who said, his method was to take the seven results, throw out the best, throw out the worst and take an average of the rest and see what he had left. I'm not sure what that does for you, either. I also had one situation where somebody actually failed three of the seven scenarios and argued that he didn't have to put up extra reserves. He argued that because he was not a New York-based company, he could get away with not putting up extra reserves. We had a whole range of results.

The next stage is reporting results to management. The reports can vary from, "Whew, we passed," to some sort of meaningful answer showing that, if interest rates do certain things, then this results. The reports can have the situation that your company will find itself vulnerable to rising interest rates. I've seen that sort of situation. That gives management a chance to look at those answers and say, "What do we do about it? Do we change our investment policy? Do we have a product opportunity? Can we go out and do other things?" So far, most of the reports to management have been more of the former sort, which is really not getting any useful information to them, just telling them that we don't have to put up extra reserves. I think in time these results will be useful. There is much useful information that should be reported to management.

One thing I've observed, and this comes from four years of reviewing Regulation 126 filings and one year of reviewing expanded cash-flow testing, is that the scenario where interest rates were assumed to be level tends to be either the best or one of the best. And sure, too, you would think that, if you tested interest rates rising and you got less surplus, that if you had interest rates falling, you might get more surplus. But the results don't seem to bear that out. I'd be interested in your thoughts as to why that could possibly be. I think that some of it may be that we have been somewhat conservative in our assumptions, maybe conservative in our dynamic lapse assumptions, but the level interest rate scenario used is, certainly, if not the best, close to the top.

Finally, to really make this useful as a management tool, you need to bring in the new business assumption. You need to be able to demonstrate what you have there is a representation of the whole company, that the expenses for the total business do time with the annual statement expenses and everything else is sensible. In some situations you could have a mismatch that could give some alarming answers, but if

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you had the right strategy with new business, you may well find that you can take advantage of that in the future.

So, we have the possibilities of the results giving some investment guidance, or some investment opportunities. I've certainly seen product opportunities. I've seen portfolios that were invested too short so that the company could sell some short liabilities to match the existing portfolio and invest long to match the existing liabilities. You can come up with some fairly attractive products if that comes about.

I've also seen the potential dangers of mismatching. A five-year liability, funded by 20-year mortgages is clearly a danger. But I also believe there is a danger in matching exactly as well. Although I believe everybody should know what their matched position is, the investment field people should be able to deviate from that in order to maximize profits. They should know what the position is so they can get back there if they really need to at any point in time. Now we've got some implications.

If you believe my theory that there is an anomaly in the results from the level interest rate scenario and that product pricing is always done assuming level interest rates or if not level interest rates, interest rates that may be graded down gradually over time, then we should probably start pricing the products with some variable interest rates in there as well and variable scenarios. I've heard of one or two companies doing it. I've never actually seen it yet. Clearly there are many situations with future changes in interest rates that are going to damage the profitability in companies that have set certain profitability goals, whether it's return on investment, or percent of premium or a spread. Normally, they do make the sorts of profits they expect, very often because the assets behave differently from what they're expecting.

I've performed appraisals and reviewed a number of appraisals, and until maybe a year ago, I never saw anything in an appraisal other than a level interest rate scenario. You had different discount rates built in, but the actual profitability was always done assuming current interest rates. Three or four years ago in reviewing an appraisal of a life company for a potential bidder, it was obvious to me that, if interest rates had gone up, the resulting surplus was going to be \$150 million lower. It is important for the potential acquirer to know that information. He knew that, if he bought this company and interest rates rose, and if he didn't do anything, there would be less profits coming out of this business in the future. He would not make as much money out of this as he thought. He also had the opportunity, as he was somebody in the investment world who you certainly would have heard of, to make his own decision to decide whether he could change the portfolio enough to make it worthwhile. It so happened this deal did not go through.

I have a brief summary of my thoughts on cash-flow testing, and of what I thought of the year-end. My initial thought is it's a good start, and I think it's a potentially very useful exercise, it really is. It improves investment knowledge, and as Ken said, there's much greater liaison between the actuaries and the investment people now than he's seen before. In the U.K., 20% of actuaries get involved in investment management in some form or another, either as investment managers or stockbrokers or analysts or whatever. In fact, I spent my last two years in the U.K. as the fixed-interest investment manager for the largest mutual fund company in the U.K. There it's automatic, I suppose, that the actuaries and investment managers talk together.

They're often one and the same person. When I moved to Canada, things were behind the U.K., but certainly they were beginning to talk to each other. When I moved to the U.S., I found that you had the actuary over here and the investment manager over there, and they tried not to speak to each other, unless they really had to.

I think both sides are going to gain from that knowledge. There are potential investment opportunities the way the product portfolio is structured that occasionally allow the investment manager to come out with something that improves the current yield while you're selling new business. There's clearly an opportunity for a new product to take advantage of the current situations by helping the portfolio get back into balance and improve the company's real profitability. I'm very hopeful that within three or four years we will have good cash-flow-testing reports that are useful to management, and that this meeting will seem very strange. No one will understand why we were struggling at this point in time.

MR. HARTWELL: Just a brief comment before I introduce our final speaker, Michael Reardon. I'm going to reinforce something. You made a comment, Frank, about sensitivity of other assumptions, and I wanted to just say that I think there's been an overconcentration in the U.S. on the C-3 risk. If we take the example of default assumptions, I know from speaking to some of our own product actuaries that there's been a tendency to understate the default risk in pricing in many companies. The Canadian Institute of Actuaries in its standard of practice on dynamic solvency testing stipulates a required scenario that is to double the default rate in your cash-flow testing. When we did our dynamic solvency testing last year, we deliberately also looked at triple the default rate. You would be astonished at what that does to a company. I'll just leave with that thought, that one should be mindful of the C-1 risk as well as the C-3 risk.

Michael Reardon has been very patient. He waited until the end, which is not an easy thing to do. Like Donna Claire, Michael is an FSA and a member of the American Academy of Actuaries. He is a consultant at Tillinghast in the Hartford, Connecticut office. Since joining Tillinghast in 1988, Michael Reardon has been involved in consulting projects relating to product design and profitability and asset/liability analysis. In addition, he has been involved extensively in the development and support of Tillinghast Actuarial Software (TAS).

MR. MICHAEL R. REARDON: The title of this panel discussion would seem to imply that there is a belief that the tremendous efforts exerted in complying with cash-flow-testing requirements should yield something more for the company than just the warm feeling of knowing that we've helped the regulators do the best job they can. After all of the poking and prodding and analysis of how our products behave or more likely how they should behave, it would seem that we should have a basis for a diagnosis that should help us and guide us in our future management of the business.

In examining this idea, I would like to first look into some of the theories and methodologies that companies employ in their management process, and they do exist. Then we can consider the cash-flow-testing exercise and how it might fit into the process of managing the business. And finally after inflating cash-flow testing to the

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status of a wonder drug, we should let some of the air out by recognizing where cash-flow testing falls short and what limitations we do have in cash-flow testing.

Management is a somewhat vague concept, similar to the term "wealthy taxpayer," that can take on very different meanings, depending on who's speaking. Even "cash-flow testing as a management tool" is open to a fair degree of interpretation. The manager who views his role as making his underlings appear busy may see it as a tool to keep his subordinates off of his back for two months, thereby freeing him up for other vital management pursuits such as measuring whether his parking space is closer to the elevator than the marketing vice-president's.

To the more enlightened manager, like the many who are attending this presentation, management is synonymous with leadership. While leadership itself is a many faceted concept, one aspect of leadership is the enunciation and implementation of corporate strategy.

Corporate strategy can be and has been defined in many different ways. The traditional view of strategy is the matching of a corporation's resources to its opportunities. Perhaps you see an opportunity in a variable products market, but you have a distribution system such that you don't think you can take advantage of that, or you are interested in the annuity market but don't have the capital required, or perhaps you have an interest in the overseas market, but your company has a president who thinks the ECU (European currency unit) is where you go after you have bypass surgery.

An article in the recent issue of the *Harvard Business Review*, which was written by Gary Hamel and C. K. Prahalad, describes strategy as setting goals beyond which the company can reasonably be expected to reach, which is somewhat of an alternate viewpoint from the prior one. They give the examples, Toyota versus General Motors and CNN versus CBS. These are instances where a company that clearly didn't have the resources to compete with the firm that would be considered number one in its field was able, through varying techniques, to make great inroads and in some cases or aspects surpass the other company.

About 13 years ago, James Quinn, who is a professor of business at Dartmouth University, published some research revealing that the way that many companies actually are managed is not through adherence to a rigid, predetermined plan, but through a series of adjustments over time to emerging circumstances and opportunities. He called this procedure "logical incrementalism" and described several reasons why this may be a very effective approach.

One of the benefits of incrementalism is the ability to respond to uncertainty. And if there is one lesson from cash-flow testing that might be universally agreed upon, it is that there is no possible way to anticipate how a company, the industry or even a group of policyholders will react to future events. I suppose a second universal lesson might be that there's no possible way to anticipate how your computer is going to respond to a 5000 record model. That may be a different session.

Incrementalism inherently allows for future decisions to be made based on all that is known at the time that the decision is required. As an outgrowth of that, strategy

modification is very easy since the strategy from the beginning was to modify and react as circumstances dictated. While this may seem to be somewhat obvious, strategy for many companies is more often synonymous with long-range planning, five years or more, and often involves ideas like staying the course, which Quinn would say is not how companies really are managed or how they really should be managed.

We can assume that a corporate strategy should answer the following three questions:

- What are our objectives?
- How do we measure success?
- How will our objectives be achieved?

Corporate objectives will vary from industry to industry and company to company. Potential objectives for a life insurance company might be growth, profit and expense control. These happen to also be my personal goals.

If we focus on the profit objective, the next question becomes how to measure success? Financial theory says that profit must be measured in terms of return versus risk. The calculation of return on a block of life insurance business is a fairly well-developed concept and given a stream of future financial projections, actuaries are reasonably comfortable developing a number of measures of return. The uncertainty, and in this case risk and uncertainty are essentially the same, is that the financial results cannot be determined with certainty or many would say, even with a semblance of certainty. This is where the work performed in complying with cash-flow-testing requirements can be used in implementing your corporate strategy. The concepts of risk versus return as developed in financial theory are based on concepts such as net present values, variances, standard deviations, things that flow very naturally from asset/liability scenario testing.

The extensive work performed in cash-flow testing for year-end, both the practical work of gathering the data and constructing the models, then the theoretical work involved in understanding the different assets that your company holds and understanding how the cash flows from those assets will interact with and influence the cash flows arising from your liabilities, can translate directly to a rational approach to analyzing and implementing a corporate strategy. Two important arenas in which this can be applied are in the management of in-force business and in the product development process.

If we adopt Quinn's approach to strategic management, we will regularly revisit our approach to management of in-force business. And rather than blindly following the assumptions that we laid out at the time that we designed the product, we will incorporate information that wasn't available at the time of the development of the product but is available now and bring that into our management process. As an example, we're going to trot out that old favorite, the SPDA, and we're going to look at a single year's block of SPDAs that were issued in 1988. This block was priced to achieve a 14% return on investment. At this point, as management we are going to take a look at this block of business and decide whether the strategies laid out that we have been following to this point should be continued in the future or whether we should modify them in some way. Some of the aspects of the product are it's a

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single premium product; it has a decreasing surrender charge; it has a 4% guaranteed rate, which may seem a little bit high by today's standards but certainly wasn't at that time; and it is a book value annuity where the interest rate is set at the end of each policy year.

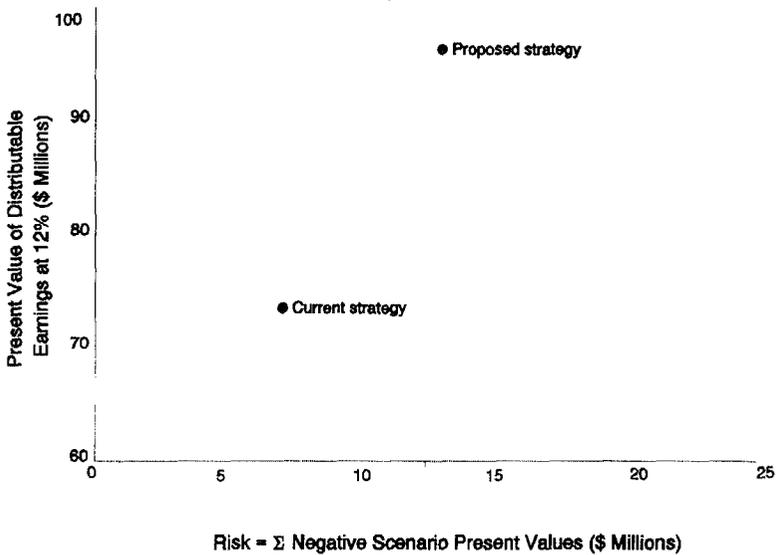
In 1988, when we decided to launch this product, we analyzed it and adopted the following investment strategy. Given a normal upward-sloping yield curve, we were going to invest in these five-year maturities, the CMO, the A-rated bond, and the BAA bond, and with an inverted yield curve we were going to shorten the investments. Our crediting strategy was to take our asset yield, subtract 200 basis points from that, and credit that as long as it was within a 50 basis point corridor around the competition. But under no circumstances would we ever let the spread drop to less than 50 basis points below our asset yield. We defined our competitor rate as a function of the five-year Treasury and the one-year rolling average of the five-year Treasury.

At the time of development, July 1988, the following were the Treasury yields, which seem like a long time ago given today's interest rates. The 90-day rate was earning about 7% at that time, and the 10-year rate was earning 9% at the time. The way that we priced this product was to generate a set of 100 interest rate scenarios, project the product over all of these 100, and analyze the risk and return. In generating the interest rates, we assumed that the interest rates would have a mean reversion factor that would draw them back to the initial rates, the 7% and the 9%.

In our 1993 management review, we're going to touch upon the investment strategy. We're going to compare that current strategy that I just described to a proposed strategy which based on the current environment would extend our investments out to 10-year maturities. Even though 1988 was five years ago, our assets should be maturing unless our planned amortization class (PAC) broke its collar and came back sooner, but we will assume for these purposes that we are going to be reinvesting a block of assets this year.

The current interest rate environment in April 1993 is that the 90-day Treasuries are at 2.75%, and the 10-year Treasuries are at 6%. Once again in our 100 interest rate scenarios, we are going to assume that there is a mean reversion function pulling rates back to these initial rates. If we take the results of those 100 scenarios and plot them in a risk-return environment space, we see what appears in Chart 1. Our return is the present value of distributable earnings at a 12% discount rate, and our risk function attempts to capture both the likelihood of that present value being negative, and if it is negative, the magnitude of the negative number. Based on these results the proposed strategy has a significantly higher return for marginally higher risk. So at this point, the management is beginning to be swayed to adopting the proposed strategy. But a voice from the wilderness decides that maybe the mean reversion to the current yield curve is not really an appropriate assumption. To back up this claim, we go to the experts.

CHART 1
1993 Management Analysis



Barron's ran a survey on December 28, 1992, of 13 economists' predictions of the movements of interest rates between December 1992 and December 1993. Of the 13, 11 predicted that short-term rates would rise by the end of 1993, and two predicted that there would be no change at all in the short-term rates. As we move out on the yield curve, we find less of a consensus with six of the 13 predicting an increase in the 5-year Treasury yield, three predicting a decrease, one predicting no change, and two having no comment on the 5-year rates. As for the 30-year rate, eight believed it would be higher at the end of 1993, and five believed it would be lower at the end of 1993. A study was done by Wall Street stock analysts to determine whether there was any value in the information that the experts provide. The results of that study was the information from any single analyst is of little or no value, but the consensus of a group of analysts actually does provide value beyond that of throwing darts at a board. If we move to the consensus, which would be the average of the 13, then we would predict a flattening of the yield curve, with the short-term rates rising, while the long-term rates remaining somewhat level. I think most people believe there will be a flattening of the yield curve.

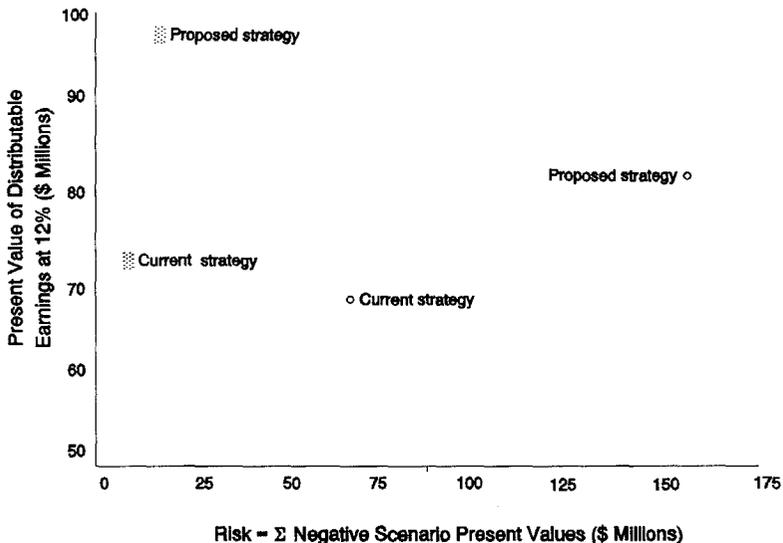
Incorporating that idea of the flattening of the yield curve with just the idea that rates are a little bit low by historical standards, I reran my 100 interest rate scenarios with nothing different from the first set other than my mean reversion is now to a 5% rate for the 90-day Treasury and a 6.75% rate for the ten-year Treasury.

The results are fairly dramatic as you will see when you do this (Chart 2). Frank talked about using this in the product development process, which we have done as well, and it's amazing sometimes, the effect of such movements in certain seemingly innocuous assumptions. With this new interest rate assumption, I would be much

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less likely to make the jump to the proposed strategy. The rise in the short-term rates is going to probably hurt you as it will decrease the market value of your longer maturity assets and cause problems.

CHART 2
1993 Management Analysis



I think we have really just now pointed out one of the limitations in cash-flow testing, and that is the difficulty in coming up with reasonable assumptions and the obvious and dramatic difference in the results when you modify those assumptions. That could be seen as an example of the power of cash-flow testing as well as the limitations of cash-flow testing, but it certainly means that cash-flow testing performed by somebody who is not familiar with or aware of the effect of some of these assumptions is certainly less valuable than that of an experienced practitioner. The other limitations are that it is very difficult in modeling to capture value that we hope is being added by the investment expertise of our investment departments. It's also very difficult to project active management strategies when we talk about strategies that involve matching of duration and convexity. Those often require rebalancing, which is very difficult in my experience to incorporate into computer projections. Predicting policyholder behavior is very difficult as well.

In conclusion, I believe it would be a mistake to view cash-flow testing as a hoop that we are required to jump through. Although it probably raises more questions than it answers, it can provide valuable insight that will help us in our management as we encounter the next unanticipated bend in the road.

MR. SELIG EHRlich: Rather than a question I'll be responding to the anomaly mentioned by Frank, that the level scenario always seems to be the best. The logical answer that I've found is simply that it's the only one that doesn't trigger the options

that we've included in our products, but I will add there was one situation that I came across where the level scenario was not the best, which really intrigued me. There the answer that I got was that it's the only one where we can't manage our margins as much as we'd like to. If rates actually stayed level, we couldn't raise our margins the way we plan to, and if they do anything else, then nobody will know what we're doing. So, maybe that's not a bad answer.

MS. REGINA LISA LEFKOWITZ: Can anyone expand or comment on defining passing the test? There have been many tests suggested, and passing is an interesting issue.

MS. CLAIRE: That's a great question. I think the answer right now is no. However, the Society of Actuaries and Academy of Actuaries are doing a survey. The results will be published. I have received the first 98 responses. As far as I could tell, you use at least six out of seven of the basic seven, and if you're failing one, normally you do further testing. Talking to regulators, they're all over the lot so far. For example, New York will say, "Nothing says you have to pass all seven." However, if you speak to regulators from other states, they say that you do have to pass all.

MR. HARTWELL: I'm sure that that's a question that is on everyone's mind. I wonder whether Michael has anything he wants to add.

MR. REARDON: No, I don't see the answer to that question being six out of seven or seven out of eight. I think the answer is going to be that a certain amount of professionalism and expertise is required of the actuary, and the actuary is going to have to make the decision based on all the available information.

MR. BUCK: I'm going to reach for this one, although I think I may have covered it in my presentation. One company put up extra reserves so that it would pass all of the New York tests. Very few that fail one bother to do anything other than just say, "Well, we failed one, but it's a highly unlikely scenario, and if interest rates do drop by 300 basis points, we'll have the opportunity to make various different practical assumptions at the time, which may be different from the assumptions we're making now." It's all over the place. No one is really doing anything. Those who failed more than two, depending on where their domicile is, felt they had to take some sort of action or not. The majority did very little this year. I think they're waiting for guidance. They've done the tests. They're saying they're okay. The actuaries have signed in blood, they're convinced they haven't got a problem, and we have to see what the regulators do when they come back and then review the results.

MR. CHARLES E. MOES, JR.: Mr. Buck, you mentioned that with respect to participating products, the companies have the option of cutting dividends. It seems to me as a practical matter that, if done, that might touch off some interesting assumptions as to policyholder behavior that Mr. Reardon has mentioned. Have you seen any or have you had any experience with any practical examples of this policyholder behavior, and could you elaborate on that a bit?

MR. BUCK: Many of the mutual clients said that their dividend formula followed their experience. They said that, but I'm not sure that they exactly followed it in practice. You're right. If they're going to assume that they're going to cut dividends, then very

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clearly there is going to be an impact on policyholder behavior. There will be an increase in lapses, that will certainly happen. I hope that those I reviewed use assumptions that were reasonably conservative in that situation. You do have a big buffer with the dividends. If American Mutual Company decided to cut its dividend to zero, it doesn't have a significant impact on the policyholder behavior. But the company may be more profitable doing that than it would be by continuing business. It depends what the answer is.

MR. ROBERT F. DAVIS: This last year was my first real experience with cash-flow testing. I did not do it personally, but I supervised it, and I provided much of the reserve data. For two years I've been listening to discussions of it and also going to seminars, never really understanding it and fearing the day when it would come. I feel that we're really not doing any asset adequacy analysis at all. What we're really doing is testing adequacy of our reserves. I think you'd accomplish the same thing by just using different assumptions for your reserves and deciding the risk of each assumption. Whatever you assume for an interest scenario on the investment side, you should be assuming the same thing on the reserve liability side. If you do that, your liabilities change instantly, so I really feel that the correct terminology should be reserve adequacy analysis. If you're going to do asset adequacy analysis, you should be using the total assets that are available to fund the liabilities. The reserves may be inadequate, but your assets, if you're permitted to use all of them, may be plenty adequate. So I don't understand requiring assets and liabilities to be exactly equal at the starting point if you're really trying to measure adequacy of reserves. I think the terminology is wrong.

MS. CLAIRE: That gets to the point that a few of us have touched on, that solvency testing is probably the way that eventually we're going to go. Legitimately, the first step was the actuary really had only an opinion on the reserves. That was the reason why that is the starting point. However, you're right that, unless you look at the entire picture, you're probably not giving your management enough information.

MR. REARDON: I agree with the comment that was made earlier on this as to the reason for the level scenario generally looking the best. This points up another management use for the cash-flow testing, and that is to test-destruct, if you will. Run as many imaginative scenarios as you can, and then see what things do the worst to your company. It's a lot more cost effective than having it actually happen to your company.

MR. PHILLIP A. EISENBERG: Frank, you used an example of somebody saying that in a 3% down scenario he would do something different so that he didn't have to set up extra reserves. Why isn't what he would do a different part of his scenario?

MR. BUCK: It should have been! That's the argument I used with Bob Callahan, anyway.

MR. LESLIE W. G. TUTT: I'm very interested in all the remarks made, and I found them most valuable. Reference was made to immunization, and I agree wholeheartedly with the remark that one needs to be extremely careful when considering immunization because one of the functions, as I see it, in an insurance company, is to make profits, and immunization can be rather restrictive in that area. I was reminded

that the application of immunization theory, when applied to pension schemes, can have the effect of restricting investments to short investments, which is so unreasonable that it does point to the fact that immunization can be rather fallacious in some of its characteristics. But getting on from that, as you probably appreciate, in England projected cash flows nowadays form a very important role in my office in the field of profit testing. This is the way in which future bonuses on with profit business are determined. Projected cash-flow techniques are now used, and I imagine you use them here as well. In that connection, I assume, although I don't know of course, that here you have similar regulations to what we have in England where, for example, it is necessary to have mismatching reserves and resilience reserves. A fall in interest rates can eat into the distributable surplus by making the meeting of resilience reserves so much more difficult. I don't know whether you find that the same here.

Going on from that to pension schemes, I personally am often asked to project cash flows for pension schemes and I just wonder what you do here when you have similar sorts of things? For example, do you consider that the pension scheme is, say, currently 80% in equities and 20% in gilt-edged stocks? Do you consider that the equities reflect an equity index in distribution; and do you consider the current dividends on that distribution; and do you consider future capital growth on that distribution; and what do you do, for example, with regard to overseas investments? British companies, as we all know, invest widely overseas. If you have a great deal of money invested in overseas property, how do you forecast in your cash-flow predictions the interest income from those overseas properties and overseas securities? Do you give individual attention to the distribution of assets, or do you just take an overall rate of return?

MR. HARTWELL: You've raised many questions. I think while I'm collecting my thoughts, I should explain to our American audience that the word *scheme* in pension scheme does not mean anything criminal! Frank, would you like to start off?

MR. BUCK: I'll try anyway. Let's start with the last one first, overseas investments. The U.S. has overseas investments, but typically a U.S. company has to have sufficient assets in the U.S. to meet its U.S. liabilities, so it would be testing those underlying assets rather than the overseas investments. Typically, it would be using its overseas investments for its overseas liabilities and could be doing cash-flow testing in other jurisdictions, if that's necessary.

I do very little in the way of pension work, so I'm just guessing here that the U.S. companies have a far greater proportion of their investments in fixed-interest securities than the U.K. companies do. The sort of things that are 80% equities and 20% fixed interest would not be allowed here. The regulators are nervous at anything that approaches those levels. Equities are normally a much smaller part of the portfolio. You don't need to rely on such tremendous growth in equities and the sort of return you get from equities in the U.K. in order to meet your projections here.

And the last one, which was your first point, was in the falling interest rate scenario, the pressure on the reserves could be so great that you have to cut your bonuses or dividends, and that is probably true here. One difference between the U.K. and the U.S. is of course, that the U.S. is very heavily regulated. The U.K. is not so regulated

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except that now that you're in the European community, you have a whole series of extra reserves you have to meet to satisfy Europe, which you probably didn't have to satisfy before you were part of that community. I'm sure that falling interest rates could put a similar pressure on companies here, but probably not to the same extent, it's really not leveraged as much as in the U.K.

MS. CLAIRE: Just one quick point. The interest maintenance reserve (IMR) and asset valuation reserve (AVR) will eventually provide some cushions for interest rate changes in the U.S.

MR. REARDON: Just a quick comment on how I understood the last portion of your comments. While it's true that equities don't make up a huge part of U.S. life insurance portfolios, the idea of assets that are difficult to project is a factor that definitely must be addressed. In particular, there was a company that we did cash-flow testing on where I would say 15-20% of their assets that were backing their actual reserve liabilities were equities or restructured mortgage pass-throughs that were so complicated as to be almost impossible for us to model. We do try to address those assets individually, but the question of what assumptions do you use on assets that aren't necessarily tied directly to these interest rates that you're testing or have other features that are difficult to model certainly is applicable in the U.S. as well.

