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FORUM ON DYNAMIC SOLVENCY

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Discussion will give an overview on the following issues regarding solvency analysis: Will the actuary perform a financial condition analysis or provide an opinion on solvency? Will the analysis be for internal use only or for public reporting? Discussion will also include the following: progress on the *Dynamic Solvency Handbook* which is published by the Society of Actuaries, dynamic solvency research and the Canadian experience with solvency testing.

MR. JAMES F. REISKYTL: This session will begin with a discussion by Bill James and Shane Chalke of the actuary's future role and responsibility to set the stage for at least two possible major uses of this handbook. Should there be a required actuarial opinion on solvency or financial condition that our Canadian members may be moving toward, or shall the actuary develop an internal confidential analysis and report that our U.S. members may be moving toward? Both roles are currently evolving. Is the role of the actuary to be a team player, a policeman working with the regulator, or is working with the company most important? What is the actuary's function and responsibilities? Bill will speak first. Bill is a Canadian appointed actuary, and as such he has had the opportunity to prepare and report on dynamic solvency testing.

MR. WILLIAM E. JAMES: I'd like to describe dynamic solvency testing in Canada. I'll first discuss the context of our dynamic solvency testing work, briefly describe the process we follow, move on to our experience to date, and then conclude with a few comments on where we seem to be headed.

The year 1992 was a watershed year for Canadian life insurers. After many years of debate and hard work, a new insurance act came into effect with insurance accounting moving from a statutory to a generally accepted accounting principle (GAAP) basis. One feature of this new regime is a single set of financial statements which emphasize realistic income recognition and comparability between companies. Matters of solvency are addressed outside these statements in two ways. The first is an unpublished risk-based capital (RBC) measure, the minimum continuing capital and surplus requirement (MCCSR).

Early in the development of the Canadian GAAP package, the Canadian Institute of Actuaries Solvency Standards Committee concluded that this snapshot approach would not be sufficient to properly monitor surplus in the new valuation environment, primarily because it was insensitive to important differences between companies and took no account of a company's operating plans and strategies. Thus, Canadian Dynamic Solvency Testing was born.

The new Insurance Companies Act requires the appointed actuary to report annually to the Board of Directors or Audit Committee on the current and expected future financial position of the enterprise. The CIA fleshed out this requirement by adopting a Dynamic Solvency Testing Standard of Practice for appointed actuaries. The standard outlines its purpose, the nature of the investigation and the form and content of the required report. The standard currently describes a base scenario and suggested adverse scenarios for initial testing. The adverse scenarios covered are worsening mortality, morbidity, withdrawal rates, increasing and decreasing interest rates, both level and high new sales, sudden worsening of mortality and morbidity, and increasing asset default rates and operating expense levels.

Each scenario is defined in numeric form. For example, the expense scenario tests a 3% excess annual growth rate in unit expenses. The actuary is encouraged to vary the numeric values, develop additional scenarios, and test the interaction of multiple simultaneous adverse events.

Canadian actuaries have now had to complete at least two dynamic solvency testing investigations. What have we learned? The CIA Solvency Committee conducted a survey of appointed actuaries in January of this year and reported its findings at a CIA meeting in March. Most actuaries are satisfied with the purpose of the standard and it's clear that many have learned much from actually carrying out dynamic solvency testing investigations. I sense an enhanced appreciation of the subtlety and complexity of the various factors in play.

There was considerable feedback at the micro level where the specific numeric values of the suggested scenarios were questioned as being inadequate or inappropriate. Many expressed the view that company-specific scenarios provided the greatest benefit. Many actuaries suggested the need for a more comprehensive list of what issues should be considered. Others would address this by more numerous and detailed suggested and perhaps required scenarios.

The survey also asked whether more guidance was required. Responses varied considerably. Three camps were apparent. The first one said, "Get more specific so we know what's expected," with a heavy emphasis on expected. The emphasis here seems to be on an easier demonstration of compliance. The second view was, get less detailed, provide more in the way of objectives and broader descriptions of risks and how scenarios could evolve. Then finally the third group's feeling was stop bothering us. We have more than enough to do already.

There was considerable discussion on the subject of plausibility. A board of directors will appreciate qualitatively that a scenario is adverse, but then will ask, how plausible is it? A good question with no easy answer. Some actuaries believe we should attempt to quantify the likelihood of a scenario coming to pass. Others doubt our ability to accomplish this with any degree of precision, particularly if it becomes necessary to defend the view in a subsequent insolvency. This is clearly an issue requiring further research.

As an aside I might mention the need for stronger and more specific emphasis on asset defaults was commonly expressed. This is not surprising after the experience of the past five years, but in my view it demonstrates the difficulty of relying on more

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detailed guidance rather than broader principles. The importance of the C-1 risk is clearly apparent in hindsight, but I recall that, early in the 1980s, we placed much greater emphasis on the C-3 risk. Also the actual default experience of the late 1980s and early 1990s would likely have been viewed as implausible, using that loaded word. We're good at fleshing things out once we've observed a phenomenon. Are we equally good at anticipating the next thing that will jump up and bite us?

I'd like to comment on the issue of a required dynamic solvency testing opinion versus an internal financial condition analysis report to senior management. Canadian dynamic solvency testing was intended to initiate an open, frank and searching discussion of future threats to solvency at the board of directors' level, which is an internal process. However, many outside parties know that dynamic solvency testing work is being done and some already receive copies of the report. The federal regulator now requires each company to file annually a summary of the report's findings. External auditors receive a copy of the report because of the formalized process for communication between the actuary and the auditor. If a company is rated, the rating agencies also want to see the report. Thus, even though dynamic solvency testing may start out as an internal process, our experience is that it will not remain that way for long.

Will the wider distribution inhibit full and complete internal discussion; that is will the report become sanitized? If this happens, will the benefits of the investigation be reduced? Second, a successful dynamic solvency testing process, I believe, depends on two elements, an investigation that is technically up to scratch, but just as important, a report that is understandable to the audience receiving it. The communications skills of the actuary are stretched as it is, but as the audience widens, can we adequately and acceptably minimize misunderstandings?

The question of a required opinion seems to be viewed in two ways. One focuses on the formalities, the pros and cons of a signed solvency opinion. There are presently no plans to require such a dynamic solvency testing opinion. By 1995, however, in the basic actuarial report of the published financial statements, the actuary will opine that the company's financial condition is satisfactory. It is my understanding that this does not refer specifically to the dynamic solvency testing investigation, but whether this distinction will have any practical effect is debatable. After all, on what does the actuary base this opinion? It's on the dynamic solvency testing investigation.

The second school of thought might be termed the realists. Semantics aside, whether we like it or not, an actuary's dynamic solvency testing report is interpreted as an opinion. One actuary commented that a common director's question is, "Your work is impressive and more than a little sobering, but in your judgment what does it mean?" It may be largely irrelevant whether a formal opinion is present or not.

As an aside, it might be of interest that Canadian legislation gives the actuary limited immunity from legal suit when he or she carries out the statutory dynamic solvency testing responsibilities and as long as the actuary acts in good faith. Only time and insolvencies will tell how efficacious this protection will prove.

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Another issue that sparked considerable discussion was how to appropriately factor in management action. For example, as interest rates decline would management reduce dividends and, if so, by how much and when? Some assumed no compensating actions are taken in order to emphasize the severity of the adverse event. Others argued such an extreme assumption is unrealistic and will detract from the credibility of the report. On the other hand, to assume extreme and immediate management action is equally unrealistic and could apparently negate the impact of the adverse event.

A number took the middle ground by estimating the degree and timeliness of corrective action, but others pointed out problems with this approach. The actuary needs a crystal ball or better put, judgment to select an appropriate response among the many possibilities. Some advised to clearly document what you assumed, but at times this is not terribly clever either. It's a brave actuary indeed that will state that management will require two years of adverse expense experience before they act, even if history has shown that this is the minimum expected time frame.

This question of corrective management response requires further research, particularly if comparability of dynamic solvency testing investigations between companies becomes an issue because outside bodies such as rating agencies have access to more than one company's report. Well, where is Canadian dynamic solvency testing headed?

The Solvency Committee is considering these and other matters but their current thinking is: make no major revision to the standard; clarify the language where misinterpretations are clearly evident (there was a lot of that); remove the suggested scenarios from the standard; add some form of guidance note or primer covering suggested numeric values, methodology, and things to consider; clarify the management action issue, and continue with the report-to-management approach with no formal opinion. That completes Canada.

I was asked to comment briefly on developments in the United Kingdom. A joint actuarial working party was formed a year ago with representatives from the government actuary's department and both the Faculty and Institute of Actuaries. Four separate working parties were struck: one on modified net premium valuations, one on alternatives to net premium valuations, one on RBC, and one on dynamic solvency testing. That sounds very familiar to Canadians.

On dynamic solvency testing the working party's mandate covers the same issues we in North America have considered. Meetings have been held, reports have been written, but general dynamic solvency testing is at an earlier stage in the U.K. than it is in Canada.

MR. REISKYTL: Shane Chalke, Vice President of the Society and past Chairperson of the Product Development Section, will now present his personal views on this issue and the handbook.

MR. SHANE A. CHALKE: My role is to provide an opinion, solely my own opinion, as to what's going on with the creation of the *Dynamic Solvency Handbook* and to

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comment on what I see as a couple of disturbing trends that might emanate from this, and where we have to really be on guard as actuaries.

I'm often accused of being against this. It's almost like if you stand up against the law that children must eat lunch every day, people accuse you of being for starvation. I'm concerned about some of the ramifications of this work and what happens to this work as it is extended into perhaps inappropriate arenas.

Let me first say I am very excited about the work that is being done. I think it will remarkably improve the state of science with regard to modeling of insurance companies. In fact, that's what our profession is really all about, whether you're doing financial reports, product development or asset/liability management or corporate finance. At its very essence, what we really do is model our institutions. Whether we're modeling subcomponents or whether we're modeling the whole building, when we get done, it's really the same kind of a process that we go through.

This work that's in progress, I believe, will spawn more fundamental research, more of a questioning light, and what kind of modeling we really ought to do. We followed a certain path with insurance company models. That path is very, very different than the way pension funds model their businesses and somewhat different than the way banks model their businesses. There are many different approaches. We followed one thoroughly constant approach toward modeling. I'm very much looking forward to seeing that questioned at a fundamental level. So I'm excited about the prospects of spawning some very fundamental research, and taking a step backward to see how we really ought to model this system that we call an insurance company. Should we be looking at alternative basic approaches to modeling? Should we be looking at chaos modeling, fractal analysis, use of neural networks? These are all things that are on the table currently being explored and will perhaps alter quite substantially the way we look at models entirely.

With that all said, I still feel that there are a couple of disturbing trends and what primarily gives me positive concern is the speed at which people begin to talk about the results of this sort of analysis going into regulators' hands. The reason I'm concerned about this is perhaps more scientific than political, although to be totally candid there's a political element to this as well. I have a not-very-naive view of the regulatory process. However, it's primarily scientific and that comes back to the nature of the way that we make modeling predictions in this industry. The models that we built are what I call traditionally productive, meaning that given a set of initial conditions and ongoing changes in the external environment, we are experts in predicting cause and effect. We are experts in showing what the likely result is of a set of external conditions.

"If it snows tomorrow, I'm not going to go to work." That's a conditional prediction. Taking as a given an external condition that it's going to snow and as a result of that external condition, I make the prediction. Well mechanically, I can trace through scientifically all the things that happen if it snows—what the driving is going to be like and all of that—and I can predict with some degree of accuracy that I'm not going to go to work. However, if I make the unconditional prediction that there's a 30% chance that I'm not going to go to work tomorrow, all of a sudden I'm a

weatherman. Rather than being an expert on the mechanics of the process, I'm now an expert on the external conditions. That's at the crux of what I find quite disturbing.

The models that we build look at external conditions very carefully. We look at interest rates and inflation. As a profession, we're almost obsessed with interest rates, which is very good now because this is a good time to be obsessed with interest rates. We must examine changes in the economy, such as corporate profits, default rates, tax law changes, regulatory changes, demographic changes, and changes in information technology and how they influence people's behavior. We brought all these things to play in our models, and the result is a set of conditional predictions. If interest rates move this way and if demographic trends continue in this fashion and if the tax law remains this way, then this set of conditions will produce this set of financial results.

I feel very comfortable in that role; however, we must recognize that these are conditional predictions. As soon as the work product that we develop is used to make absolute predictions (and when we talk about solvency and the likelihood of insolvency, we are solidly in the realm of absolute predictions) we are in the uncomfortable territory of being labeled as experts in the external conditions. For example, I feel comfortable relaying the financial impact of a 500-basis-point rise in interest rates. I feel very uncomfortable signing an opinion as to the likelihood that the interest rates go up 500 basis points. That's clearly in a realm that I don't want to be, particularly with a pen in my hand. However, this does not mean that I'm against such a report. I'm not against creating such a report. It's a question of what the report says and who gets the report.

Once this process finds its way into the regulatory venue, there is a very strong pressure toward unconditional prediction. The way this is generally solved in the regulatory venue is to have the regulators themselves or some consensus provide a safe harbor for what the external conditions are. We've seen this in the U.S. with Regulation 126. We've seen cash-flow testing essentially devolve in this country to a fairly uniform, safe harbor set of external conditions, and an enormous amount of information is lost when the process reaches that stage. I'm no expert in the way things work in the Canadian regulatory arena, but when I hear folks talk about it, I do hear some element of providing safe harbor specification or suggestions for the state of the external conditions. What happens is we end up with external conditions that are essentially the least common denominator type of consensus, either mandated by regulation or evolving from industry discussion. Then, at the end of the day, you end up with an opinion that speaks to absolute solvency concerns or an absolute prediction based on what generally is a fairly simplistic view of external risk factors. This trend, once you get into the regulatory arena toward specific scenarios or specified scenarios, carries further disadvantages. Companies are subject to varying risks. Companies are not homogeneous and different risks impact different companies in different ways, and there is no politically correct set of scenarios in order to learn information about a particular company.

The second thing that I find troublesome is that as soon as you get into the safe harbor approach, the specification of external conditions, there is a presumption of probability of occurrence and this presumption of probability of occurrence moves

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from the board room to the regulatory arena. We end up with the regulatory arena managing the very sophisticated and profound layers of risk that take place within insurance institutions themselves.

I feel very strongly that it should be management's decision to assess the landscape and to assess the external conditions. I also feel very strongly that reports that actuaries create should highlight the set of external conditions that are not solidly within actuarial expertise. For example, sometimes we fall into the realm of making implied predictions about interest rate movements, housing starts, economic indicators, and even behavior; these are the very critical assumptions that should be raised to senior management level, not the internal mechanics of how we process this data. I propose that actuaries provide conditionally predictive reports and provide unconditionally predictive reports only where we have singular expertise in the external conditions.

With that I am generally opposed to the idea of a required report, and I'll talk a little bit about another more subtle effect of what happens in the U.S. I will limit my commentary to the U.S., because our culture is unique. Our attitude toward the regulatory process is unique and our regulatory process is perhaps riddled with political corporatism at a bit higher level than other countries. However, once you move to a required report, such a report becomes a regulatory tool. It may not take many, many years, but it will certainly take longer than a year or two before actuaries will find themselves sequestered from the management decision process, because as soon as things as intimate to corporate culture as risk bearing, risk analysis and assessment about the external landscape, about the external environment become public information or regulatory information, management has great incentive to put a brick wall, a wall between that process supporting the regulatory structure and that process supporting internal strategic decision making. We've already seen this in the Regulation 126 arena, where the risk analysis that goes into corporate decision making in many, if not perhaps most companies (I certainly can't generalize about all companies) is distinctly separated from the regulatory support process. There's a wall driven between those.

It comes down to two views of the actuary's role. One is, as Jim used the term, the in-house cop versus the trusted adviser to management. Given practical realities, it is very, very difficult to blend those two roles, if not impossible in the U.S. economy, culture, and regulatory system. We've seen some evidence of this happening already. Once this moves into the regulatory arena, things tend to evolve to a least common-denominator-type analysis and management generally does not find immediate value from it. All of that has been kind of negative. Let me finish with the positives.

What ought to be the actuary's role with respect to risk analysis and solvency? I view the actuary as an extremely skilled, high-level business decision maker who is intimately involved in the corporate decision process. To be a trusted business adviser, you deal with the most intimate aspects of corporate strategy. I see actuaries advising senior management on the consequences of any combination of strategy and the external environment and commenting, as appropriate, together with other senior executives in the company on the likelihood of different external environments unfolding. That's a key difference from a hermetically sealed report.

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As an actuary, I want to be involved in strategy, business planning, and risk bearing. I want to deal with the most sophisticated and in-depth layers of company knowledge and that's where I really see actuaries being at the highest and best use and standing with the highest degree of pride. I know some of this is subtle concepts, but we have to look ahead to see where we're heading in terms of our vision of this profession.

Jim used the term in-house cop. I tend to think of the two views as being a hall monitor or being a teacher, and I certainly would prefer the teaching role over the hall monitor role. When I was in fourth grade I never liked the hall monitor very much. I know they are a bit controversial, but these are just my own opinions.

MR. REISKYTL: Actually we started out thinking we might have a debate on the public opinion versus internal analysis, but we found that generally actuaries seemed to agree on fundamental objectives. Perhaps someone here will disagree or present their views.

MR. ROBERT E. WILCOX: Having not that many months ago changed sides of the fence on this issue, it's interesting to see it from the perspective of a regulator rather than in my previous role as a consulting actuary advising companies. I'd like to go back to the statement from the Academy and point out some of the important concepts that are there that we need to take a look at. First, the actuary needs to have a stronger role in the solvency-testing process. It is fine to advise management, but if the actuary's loyalties are entirely to management and the policyholder be damned, have we really performed the role that we ought to perform?

When the Employee Retirement Income Security Act (ERISA) was passed, Congress said that the enrolled actuary had a specific responsibility to the participants in the pension plan that overrode any responsibility that they may have to the plan sponsor. I think that this is a concept that perhaps we need to look at further. When we as the appointed actuary of the insurance company see the company taking actions that are hazardous to their policyholders and the public, do we have a responsibility to simply tell management what might happen if it snows in July? I think that we have a bigger responsibility than that, and we need to strengthen the role of our profession in the process of testing for solvency. If we don't do that, someone else is going to step in that role. We'll be reduced to the level of mechanics; mechanics don't really consider the big picture and say—well, we told you what would happen if it snowed in July. It's your job to decide if that makes the companies hazardous. I don't think actuaries can abdicate that kind of role. Somewhere in there, there needs to be an appropriate link between the actuarial responsibility and the regulatory responsibility. Each may have a role in the difficult job of taking that potentially hazardous company to the judge and saying "We need a rehab order or we need a liquidation order because this company is in hazardous condition." We need the actuary to play a more important role in that regard.

Then somehow this has to be linked back to what now is a rather ineffective and misunderstood level of the guarantee mechanism that we have in place. It is a patchwork system that is different from jurisdiction to jurisdiction. The policyholder not only doesn't understand it, but we tell him that he's not supposed to understand it. In fact, he's not even supposed to be told about it. We need to do something

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about the guarantee fund mechanism that creates a closer link to the risks associated with each company which in turn involves the role of the appointed actuary. I think it's fine to say that we can move away from regulatory responsibility, but in fact we can't because somebody has to do that job, and it's our profession that has the expertise to do it and to do it right. We must figure out a way to step up to that responsibility and somehow create an appropriate link between what we do with dynamic solvency testing, and what regulators have to do in taking action relative to the outcomes of that effort.

MR. CHALKE: I would like to question one of your axioms in a friendly manner. The statement that an actuary's total loyalty to company management results in a policyholders "be-damned attitude" I would suggest is an historical and perhaps sophistic view of market economies. Total loyalty to management means that you buy into management's goals and by and large in America, company managements are long-term greedy—not short-term greedy. To place the regulator in a role of preempting perhaps an inappropriate span or view of company management cuts across the grain of history because history shows us that the regulatory process is not longer sighted than the management process, but in fact the reverse. The regulatory process tends to be more shortsighted than the market economy process. Hence, I think we come at it from different angles.

MR. W. PAUL MCCROSSAN: I want to provide a bit of a counterbalance to what Shane has said, but he has made some very valid points. First, to give you a bit of background, as a member of Parliament I wrote the section of the report of the Finance Committee calling for the appointed actuary's report and the dynamic solvency testing. I was also involved in helping to develop the CIA response.

Shane raised a couple of interesting arguments. One is that if the actuary is the internal cop, which is not a phrase I like, but it is one that he used, there will be a great incentive for management to "put up a brick wall," I think were the words he used. We try to deal with the lack of management cooperation directly in Canada because it was seen as a likely outcome if we didn't deal with it; therefore the law prescribes that the appointed actuary has the right to all information and explanations necessary to perform his job. In fact, it's a criminal offense to withhold that information. That may be a very big stick, but it's there and it's embedded in the law.

My second point is much the same as that of the previous speaker. If the internal appointed actuary doesn't fulfill this function because his overwhelming mandate is to support the management team, I'd argue that the only direction that regulators can take to cover themselves is to impose an outside actuarial auditor, such as we have on the accounting side. We examined these alternatives in depth in Canada and decided that we would be worse off in terms of financial regulations if we had as our model outside actuarial auditors versus inside actuarial auditors. Therefore, our approach was to require the appointed actuary to be objective, not independent. The test of whether the person is acting according to actuarial standards is, does he or she approach the job objectively, rather than independently as might be required for an external auditor?

Maybe I could just give one example of how this could work. It involves a U.S. company operating on a branch basis in Canada. The company deliberately chose to

mismatch about 85% of its assets and liabilities by currency. Typically Canada has had a higher interest rate than that of the U.S., so if you assume currency stability, then it is advantageous to cover U.S.-denominated liabilities with Canadian-denominated assets because you can make money. It seems to me that that's an acceptable risk for management to take as long as they measure what happens if things go wrong. A particular company for which I'm an appointed actuary caught themselves with an almost complete currency mismatch during our random crisis on the constitutional reform when the dollar plunged from 0.88-0.78 in about nine months. As an appointed actuary it is my job to blow the whistle by saying, "You're not holding enough assets in Canada to protect your Canadian policyholders." For three years I just observed that the mismatch occurred, and each year I said, "If the dollar falls below 0.79 I'm coming for more capital." The moment it hits 0.79, we know that management has been forewarned. They took the risk. They had to come up with more capital.

That's how the system works. I think it works with a prewarning of what might happen, monitoring what is actually happening, and taking action once a critical threshold arises. It seems to me that it's in management's interest to be prewarned about the risk so they can decide whether they want to take the risk or not.

MR. REISKYTL: Please save the rest of your comments for later and continue to reflect on what you have heard. What does it mean to me? What is my role on the management team? My responsibility? Am I also to assist the regulator?

The next four speakers are editors of the various chapters in the *Dynamic Solvency Handbook*: Dan Kunesh, Chapter 2, "Game Plan: Issues and Strategies"; Mike Hughes, Chapter 3, "Liability Modeling"; Craig Reynolds, Chapter 7, "Life and Annuity Company and Policyowner Behavior"; and Maria Thomson will cover two chapters: "Pension" and "Strengthening Surplus." One comment before they begin. Earlier we had another lengthy discussion/debate, which we could have here also if we had the time and that is, what does management really want? Is this just another thing to do? Is this another cookbook-type exercise—crank it out, fill up a lot of paper with data and assume everything looks fine? Clearly, that's not our intention. Although we were not unanimous in our responses, we clearly seemed to agree on a common core of what most managements are looking for and that is an analysis of potential risks and rewards, what you can do about them, the company's alternatives, and possible actions to mitigate or eliminate adverse events—along the line of many of the things Paul just finished discussing in his warning—with little if any emphasis on an opinion. Perhaps an opinion must be one part of this effort—we will see how it works in Canada.

The goal of this handbook is to give you, the actuary, the tools needed to provide management with the most useful financial condition analysis developed primarily on a statutory basis. The tools could easily be adapted to GAAP or an internal system based on the needs of your management. I also want to make it crystal clear that our intent is not to design or create a cookbook. We don't want you to just follow the instructions, crank out a few scenarios and put out a prototype report. If that's what you expected, you'll be disappointed. Every company, to some degree, is unique—the challenges, the issues, the products, the risks you face, and your analysis or report must reflect what is of interest and greatest value. To emphasize this, we

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have changed the name of the handbook to *Analysis of Dynamic Financial Condition* from its former title *Dynamic Solvency Handbook*. Perhaps we'll have time to discuss this further in the comment period later.

Your next speakers are: Dan Kunesh, Mike Hughes, currently chair of the Society's Financial Investment Management Practice Education Committee, Craig Reynolds, and Maria Thomson. Each are very well qualified to chair parts of this handbook.

MR. DANIEL J. KUNESH: Let me make one introductory remark. Sometimes I fear that we as actuaries overvalue our skills and think of ourselves as the "conscience" of our organizations—that can be extremely dangerous. It may lead regulators to assign this responsibility to us, concluding that because we have the ability, we should have the responsibility of providing regulatory assurance of corporate health.

Instead, it is the regulator who is responsible for regulation of insurance companies, not the actuary. Second, it is the board of directors and senior management who are fiscally responsible for the presentation of financial condition in the financial statements. The actuary offers special skills to assist in the process but is not solely responsible.

The regulators protect themselves by legislating immunity from lawsuits. Actuaries do not have immunity from lawsuits. Accordingly, I feel it would be difficult to find many actuaries in the U.S. willing to assume the responsibility of being their company's corporate conscience.

One of the reasons I joined this group was to help reinforce those who felt that our end product should be a report to management, not an opinion made available to regulators only under examination situations or when companies are in troubled situations. The report is intended to provide sensitivity analysis of a company's exposure to ruin due to its risk structure in a series of plausible environmental scenarios.

Section II is intended to provide a generalized game plan for the preparation of such a management report. It is a general statement that outlines key issues, considerations, and strategies. I would first like to acknowledge my co-authors—Jeff Beckley of Beckley & Associates of Indianapolis, Doug Doll of Tillinghast in Atlanta, Selig Ehrlich of the Travelers, Les Rehbeli of the Prudential in Toronto, Steve Strommen of the Northwestern Mutual in Milwaukee, and Lee Tang of Transamerica in Los Angeles.

Section II is really intended to provide direction to the actuary who prepares the management report; as Jim indicated, the section is not a cookbook. In other words, it is intended to provide guidance about how the process should work.

Section II states that the actuary needs to be very familiar with the company, its direction, its goals, and most importantly, its business plan. The actuary must clearly understand the company's risk structure. If the business plan is going to be an important facet of the study, as it should, then perhaps the actuary should also be involved in its preparation.

Others need to be involved in this process. Ownership of the document needs to be taken by the actuary and by senior management. Senior management should be involved in the establishment of scenarios and in feasible or likely variations in the business plan. Variations in business plan might involve: production levels, plans to expand the operations, plans to enter new markets, acquire or divest blocks of business, and expense levels.

Section II will provide guidance on what a report might look like, the level of detail that should be included, suggested disclosures, and perhaps the nature and basis of your interpretive conclusions. It will define scope issues, such as how long into the future you should project, the risks you should consider, the lines of business to be included and, of course, the limitations of your work.

Section II will also define matters and requirements concerning asset allocations, investment strategy, liability projections and so forth. Data requirements will discuss accessibility, reliability, and limitations of data. It will define minimum capital requirements such as NAIC RBC and its impact. It will also discuss the time and expense budget required to put the study together.

Section II will also address a number of major issues such as: (1) an assessment of the likely realization of key business assumptions. The company may wish to study five or six different variations in their business plans. Most managements would require some assessment of the likelihood that these variations will take place. (2) Most importantly, the section will identify the key operational and environmental risks that can threaten the financial condition of the organization and its current pricing structure.

Examples of operational risks are decrements—mortality, morbidity, lapses and so forth. Others are asset related—liquidity, credit quality, run-on-the-bank risks. Operational risks are generally within the control of the company's senior management. These are different than environmental risks, such as changes in the economy or in the financial markets, the legal environment, the governmental environment, demographic trends, etc. Environmental risks are seldom within the control of the company, but their impact on your work product needs to be considered.

We will also explore determinants of risk variability. Two classes will be explored: (1) product/liability-related determinants like the guarantee structure of products, competitiveness of products, the markets you're in, distribution channels, reinsurance, underwriting and external forces like AIDS, and (2) asset-related determinants, such as the concentration of risk in given sectors of the country, the quality of a company's investment portfolio, and its investment/reinvestment strategy. We also will look at the desire and ability of a company to control risks and offer suggestions on alternative risk-control measures. We will call for an assessment of the company's flexibility in meeting changes in its current capital requirements, whether they be related to NAIC RBC or internal capital standards.

Then we will discuss a series of practical considerations. One (mentioned earlier) relates to the need to do sensitivity testing of the business plan. Another is the need to select meaningful scenarios that measure risk. I believe actuaries are in the best position to select appropriate scenarios that measure the volatility of a company's

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financial results. We're in the best position to identify the most significant risks facing the company, and accordingly, we should be in the best position to select appropriate alternative scenarios.

Most actuaries will likely use a deterministic approach of selecting and testing scenarios. Actuaries also need to quantify changes to existing demands on surplus under the various scenarios selected. These demands include shareholder and upstream dividends. What impact will that have? What impact will financial reinsurance have? Surplus notes? Debt retirement? Debt servicing costs?

Section II will offer an array of methods that can be followed in making projections. Of course, the best known to actuaries today are various simulation techniques (e.g., cash-flow testing), but we will also discuss gross-premium valuations, premium-margin analysis and loss-development methods, and indicate when each might be beneficial or most likely to be used.

Finally, we will provide guidance on how to evaluate results and how to provide feedback. This is a very important and difficult topic for actuaries, especially those who have recently gone through the valuation actuary process and are preparing opinions and memorandums. They know how difficult it is to say what you really want to say. Section II will discuss communications strategy. We'll talk about what happens if you get negative or unacceptable results, and we'll outline action strategies. One strategy is to revisit/revise existing business plan parameters. If capital is threatened, do you look for ways to raise additional capital? Do you consider alternative risk control strategies?

Four types of risk control strategies will be considered. One involves liability risk strategies such as product redesign or perhaps revised marketing strategies. A second involves asset/interest-rate-risk strategies, like improved diversification, reduced holding of vulnerable assets or an improved program to balance liquidity needs. A third comprises management information strategies. These include asset segmentation and procedures to get more accurate data on a consistent basis. Finally, there are organizational strategies like joint ventures, mergers and divestitures.

As you can see, Section II covers a broad array of topics. It is designed to set the stage for the detail included in all remaining sections.

MR. MICHAEL A. HUGHES: I think you will find Chapters 1 and 2 to be two of the most insightful chapters of the handbook. The other sections will deal with many specifics that are likely to be of interest to you.

You've all heard about the guy selling ice to Eskimos. I'm here giving advice on liability modeling to a group of actuaries. I'm not quite sure how Jim talked me into that.

Just a quick thought on the role of the actuary in this process. I also have concerns about the actuary serving two masters, namely management and the regulatory community. I think that the status quo might actually be working rather well because there is a mechanism through RBC for the regulatory community to get plugged into the business planning and management process when capital levels become a

concern. I think that at that point it's possible for the regulatory community to bring in their own actuarial expertise and ask for some of this analysis. In fact, some of the more proactive regulators are already doing this.

Over the course of a year, I do a few audits and some cash flow work and other types of financial projections, so I see many different models and various different modeling techniques. It might help if I give you some brief thoughts in that area. The technological developments have been tremendous over the last few years. We have tremendous capabilities for creating, modifying, and updating models that we didn't have just a few years ago. We can build thousand-cell models covering 50 different plans and update them with relative ease, or we can compress them into smaller sizes or expand them if we need to; we have tremendous tools. Sometimes I'm a little concerned that we may be becoming slaves to our models and not really acting as the master. I think we may need to rethink the way we're interacting with these models. I also have a bit of concern that sometimes, by using a brute force modeling technique, we're losing some insights and knowledge that may have been gained about the business if we had used more creative techniques.

I share Shane's concern about the need for additional research and understanding of behavior models. I also think we need to spend a little more time validating our models. We spend so much time building and running models, but often we're not comfortable or sure that the numbers that come out make sense. With that in mind, we've taken an approach that I think will support all types of financial modeling exercises related to liabilities.

Generally we've tried to avoid addressing basic modeling issues. We have very good writers on liability modeling, but we recognize that there's just a half a dozen of us with limited time, so we're not going to reshape the whole direction of the actuarial profession. We're focusing on the special considerations that relate to solvency testing—doing new things and maybe doing them in a little bit different way than we've been doing them in the past. How big a model do we need? How accurate do we need to be? How might it differ from a cash-flow testing model? What assumptions are appropriate?

What we really want to do is stimulate the thought process. You know your company best. You know how to model it, and we want to get your thinking so you can do the best job possible. Furthermore, there is a whole body of knowledge out there on liabilities because we've been modeling them for over 100 years. We're not writing an encyclopedia, but we would like to make you aware of the latest available information and provide good references.

Perhaps in this section more than any other, your input is critical. Probably everyone in this room could contribute useful insights to liability modeling. We'd love to have feedback and support. I share Shane's concern that we might need to rethink the way we have done some of our modeling.

With that in mind, the first part of our chapter deals with basic modeling concepts. We don't get into step-by-step procedures, but do revisit some basic tenets: the need for consistency, validity, and choosing models that are appropriate for the circumstances.

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As a profession we sometimes tend to be too detail-oriented, and at times that mind set might point us in the wrong direction. For this type of analysis, we need to have something that's sufficiently accurate that can run in real time, not actuarial time so that you can respond quickly to management—three months from now as it sometimes takes for cash-flow testing.

We need to challenge the models we're using. Perhaps we can come up with a spreadsheet model that gives 90% accuracy of a full-blown 2,000-cell model that runs instantly. In fact, we might give it to the CEO to let him get some insights by using it himself. That's something that Compaq computer is able to do. It has been a very successful, fast-moving company throughout the last decade. They developed their own financial condition analysis using spreadsheets for financial and contingency planning purposes.

An important area in building models is validation—we could do it better.

Assumptions will be touched on. I think a major failure with respect to cash-flow testing has been ineffective communication of the assumptions and results to management. I'm sure all of you know that if you create a 500-page actuarial memorandum, no one is going to read it.

With respect to communicating assumptions, we should find some common frame of reference. Perhaps we could tie our work back to pricing, cash-flow testing or business planning assumptions and indicate the major deviations in those assumptions.

We will discuss taxes because they are not always modeled accurately in cash-flow testing models; ditto for expenses. We need to think about the nature of expenses, the real cost drivers and so forth. There are also some obligations that are liabilities but not product-related liabilities such as: debt obligations, equity obligations, off-balance-sheet items, litigation risks, and so forth.

We welcome feedback, especially any additional references.

MR. CRAIG W. REYNOLDS: I'm editing Chapter 7 which is the analysis of company and policyholder behavior as it relates to life insurance and annuities. The authors who have contributed thus far are listed at the beginning of the chapter. There are a couple of others who have subsequently written some material that will be included in the next release.

The first slide summarizes the basic philosophy that I have tried to espouse to my writers. First, we assume a basic level of knowledge. For anyone involved in life company operations, it's likely that they have at least a primitive idea of these topics. We will concentrate on things that aren't widely known or used.

Next, we're going to focus on policyholder and company behavior, with an emphasis on behavior. We're not going to get into the details of modeling as addressed in Mike's section. We will talk about things on the asset side like investment or disinvestment, but we're not going to talk about modeling assets. We will discuss

how companies decide upon which assets to purchase and how to reflect that in dynamic solvency testing or analysis of dynamic financial condition.

We will try to avoid the words "should, must, shall, etc." We're trying very hard not to make this a standard of practice. Wherever possible we're trying to outline things that could be done, things that might be done, things you might want to think about, but in no way are we going to try to mandate anything.

I will briefly mention the contents of our section. First, is a broad overview like many of you have seen in study notes and various other sources, of some of the factors influencing policyholder behavior including things like mode of distribution, product design, etc.

Second, we'll talk about some of the factors influencing company behavior, the flip side of the coin, including some of the things that have been talked about earlier, like philosophy towards risk, capital structure, etc.

Next we'll be talking about interest crediting, renewal pricing and dividends. These are addressed elsewhere in the chapter, but our focus here is from a company viewpoint. How might the interest crediting strategy change under changing economic conditions? How might premium resets change under changing conditions? Right now we have interest crediting, renewal pricing, and dividends as three separate sections of the book, but after reviewing it, just before it went to press, I decided that these are really three aspects of the same topic, but they are just for different types of products. We'll probably be merging those together to eliminate some redundancies and have some separate follow-up on the individual topics.

We'll be talking about lapses, premium persistency and policy loans, and other things that are within the policyholder's behavior domain, but not on the base case assumptions. We'll assume that everyone knows how to do experience studies on lapse rates, etc. To the extent that it's appropriate to include these topics, Mike will cover it. We'll be focusing on the dynamic aspects of those behaviors, things that you might have had to consider for the first time in doing valuation actuary work.

Annuity and settlement options are not in this draft, but we will be adding some information such as how to select appropriate assumptions for rate of election of options. This is often skipped or ignored in valuation actuary work.

As I mentioned, we'll talk about investment and disinvestment strategies, but we're not going to talk about basic types of assets. Rather we will discuss the best ways to get strategic information from your management. Management in the U.S. is quite willing to tell you if they plan to buy this type of asset if they can get this spread, call feature, and duration or weighted average life. It's harder to find out how that strategy might change if interest rates went up, interest rates went down, default rates went up, etc. We'll be talking about that issue.

We'll also be addressing new business. That's one big difference between analysis of dynamic financial condition and valuation actuary work. This is one area where it's easy to contrast this handbook with the Canadian standards. The last time I looked, the Canadian standard of practice referred to three or four prescribed levels of new

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business that you were supposed to assume. One was business plan level; one was double the rate of growth; one was half the rate of growth; and one was flat. We'll be suggesting that it's important to test variations in your business plan and describe what you might think about when deciding what variations are appropriate. We will also discuss what you need to think about in order to make sure that your business plan or your sales assumptions are consistent with the rest of your assumptions. Certainly if you test high sales growth versus low, since expenses are usually tied to the amount of new business and in-force business, you must make sure they are internally consistent.

We'll address reinsurance to a certain extent. Again, our focus is on how company strategies for reinsurance might change under different economic conditions.

Sometimes it's hard to draw a line between policyholder behavior and company behavior because they interrelate so much. Originally we had two distinct sections: policyholder behavior and company behavior. On further discussion, we concluded they are very interrelated. For example, we'll talk about repricing in terms of what drives company repricing motivations and then talk about how that action will impact policyholder behavior.

I want to warn you of a few things that are going to change. First the missing sections will be added. It will also be reorganized.

We're going to try to make it more specific wherever we can. Currently, there's much general discussion of things you need to think about in assumption selection. There's not much in there yet in terms of what resources are available to assist you in setting assumptions. A good example is dynamic lapse formulas. We talk a great deal about what you need to think about in setting an assumption, but we don't talk very much about things that are out there that might help you. For example, the Society has done a study on annuity lapse patterns.

We're going to try to incorporate any feedback we get at these sessions. Two other things are very important. One is, we're going to add references. One of my authors has done a partial reference list, but the others have not. Second, while this document is not a standard, we have to point out where there are relevant actuarial standards. We're going to go back and review all standards and make sure that they are referenced!

To briefly summarize, let me give a few examples of what's in and what's not. Considerations in setting a dynamic lapse assumption are in. However, there is no discussion of base-case lapse assumptions or recommendations as to what dynamic assumptions should be. We'll talk about investment strategy. We won't talk about how to model assets. We'll talk about factors to consider in setting a new business model. There will not be any mandated sales patterns (or any mandated anything).

In the area of reinsurance, we'll talk about how reinsurance behavior might change with time, and how reinsurance might be used in particular situations, but we're not going to teach you how reinsurance works. That is either covered in one of the earlier sections or assumed to be part of your fundamental knowledge.

MS. MARIA N. THOMSON: Up until a few weeks ago, I was the co-editor of the "Pension" chapter, which is Chapter 5, and I'm going to read heavily from the outline.

I think Craig did a good job of defining the sorts of things that are going to be in the product chapters versus the things that are not going into them. We're all basically working from the same game plan. Our group has spent much time trying to figure out how to organize the pension chapter to be useful to, say, a corporate actuary. We got away from the company behavior versus policy behavior breakdowns because it didn't seem to make much sense. We have a different kind of organization.

The first part that we're going to talk about is drivers influencing the group pension business. What are the things that make group pension go? The introduction says, "for each driver, three items will be discussed: the definition of the driver, how it generally impacts the pension plan's behavior, and how the driver also impacts the company either directly or through the client's behavior. The following drivers will be discussed: reality and perceptions of the insurance industry and specific companies, investment environment, ability/desire to control investments, competition, economic environment, longevity, government regulations, and demographics.

Then we talk about the potential reactions to these drivers. What we have done is pick out three key contract types that we will initially focus on: participating, indexed protection benefit contracts; nonparticipating, single-premium contracts; and nonparticipating, defined-contribution guaranteed investment contracts. We will focus our discussion initially on these three generic contract types and then later will add additional product types.

Some examples of the kinds of reactions to the various drivers are layoffs, early retirements, and asset/liability mismatching.

In the next section we talk about the protections that are available to the company. In this section we're talking about product-specific protections for the three major contracts. Some examples might be reserves that you set up, termination penalties, and underwriting rules.

Finally, we talk about the general protections that are available to the corporation as a whole. This might be such things as: primary protections such as good product design and other protections like diversification or sound asset management. We're also going to provide some insolvency examples such as the Executive Life and Mutual Benefit situations, and perhaps some case studies of contractual and underwriting flaws that bring real life situations into this effort.

What we're also thinking about doing is putting the product specific material in Sections 2 and 3 into a table for a quick reference to make it very easy for a corporate actuary to refer to it for drivers: for this type of product, these are the drivers, possible reactions, and protections that should be considered. We haven't explored thoroughly how we can mechanically do this yet. Any feedback on the organization of this chapter and its content are welcome.

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Next I will address Chapter 8, which is "Strengthening Surplus." This chapter is an afterthought. I have only two authors who are real busy but who haven't gotten very far yet. Volunteers are desired.

The introduction to Chapter 8 says, "As part of the dynamic, financial condition analysis process, the actuary may determine that under certain scenarios it would be necessary or desirable for the company to increase surplus by raising capital from outside sources. The actuary may wish to include in the dynamic analysis report some discussion of financing alternatives. This chapter describes some reasons for expenditure of surplus and some vehicles for raising external capital and characteristics that the actuary may wish to consider." We're also going to discuss when certain financing options become unavailable at various stages of surplus deterioration.

The current thinking is that we will have a discussion on use of the surplus; how would you spend surplus planned and unplanned. Then, we'll have a discussion of the method of analysis of surplus expenditures. Next, we will talk about capital markets, and how to raise money in a capital market; there is preferred and common stock financing, surplus notes, upstream debt/borrowing. This section also identifies issues that will not be addressed. We're not going to address how much capital is enough or which financing vehicle is best in a given situation. We're going to try to give you enough information so you can make your own determination; we'll give you sort of a general background as to different types of financing vehicles and provide you with a bibliography that you can pursue in greater depth if you'd like.

My other author is a reinsurance expert who will be talking about how one improves one's capital position via reinsurance. His topics are: how reinsurance raises capital, income and balance sheet impact, tax issues, benefits of reinsurance, reinsurance versus other capital sources, forms of reinsurance (we probably won't be getting into too much detail on that), sources of reinsurance, and some practical considerations.

MR. REISKYTL: I'll make two other comments. First, this material is built on statutory reporting because that's the basis for solvency. However, that should not limit your ability to apply the techniques to your own internal measures or, for example, GAAP if you prefer.

My second comment is on future research. Donna Claire is here, and she and Alan Brender are about to finish a draft on key issues involved in Dynamic Solvency Testing. Donna, do you wish to briefly comment on what you're doing?

MS. DONNA R. CLAIRE: What we're trying to do is figure out what has already been done so we don't have to reinvent the wheel, and then we want to figure out what still needs to be done so we know where we will have to do more research.

MR. REISKYTL: Their report will cover such things as: credibility, reliability, validation and how long the study period should be. I believe the Canadian focus is five years. That, however, means different things to different people, such as what do you do at the end of five years? The time frame of this report is very important. Most would agree that one can't make predictions, with any degree of accuracy, for more than a short period. Yet one must also be aware of possible longer-term effects if things continue as they are.

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A second major research effort is on development of economic scenarios. You can't just pick six interest rates. Many more assumptions are needed to define an economic scenario. Godfrey Perrott is chairing this effort. Robert Fillingham is working on the third project: his "Report on Actual Insolvencies." He's looking at companies that haven't learned from insolvencies so they can do a better job if possible in preparing management and companies for future risks. Are there other projects you would like us to pursue?

The danger of providing anything that requires reading 121 pages is that people will set it aside and not look at it. I hope you will read all of it, or if not, at least the parts you are most interested in and give us your comments, suggestions, and share your experience data. If you do, it will be more useful for all. Look at the other sections we did not describe. There is an excellent summary. Also as mentioned earlier, if you have done some work, if you have some studies of policyholder behavior or whatever that could be useful to others, and you're willing to share them, please do so. We'll give you credit for it, if desired, in the handbook. Looking ahead, our goal is to have the first handbook completed for the annual Society meeting in October, but that doesn't mean it will be the final product. There will be some parts that need further work—new research to be done, new developments, etc. As you use it, new needs will arise or be clarified. The new Society Foundation creates an opportunity to produce in-depth, funded research to support this effort.