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DYNAMIC SOLVENCY TASK FORCE

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The Financial and Investment Management Practice Education Committee is developing a *Dynamic Solvency Handbook* for actuaries who are preparing solvency reports. The target completion date is December 31, 1994.

MR. PETER HEPOKOSKI: In September 1992, the American Academy of Actuaries Board of Directors released a position statement on insurer solvency. One of its recommendations was that insurance company management be required to obtain a written report every year on the company's surplus adequacy from an appropriately qualified actuary.

Subsequently, the Board of Governors of the Society of Actuaries commissioned a Dynamic Solvency Task Force (DSTF) to develop a plan for actuaries to have access to the research and educational materials necessary to prepare surplus adequacy reports. One of the DSTF's recommendations was the creation of the *Dynamic Solvency Handbook* (DSH). In the spring and summer of 1993, the Dynamic Solvency Handbook Task Force (DSHTF) was formed to produce the DSH. The DSHTF reports to the Financial and Investment Management Practice Education Committee which I chair.

The DSH is expected to be completed by December 31, 1994, although we anticipate that it will be in loose-leaf format so that subsequent changes and additions can be made efficiently.

We are planning sessions like this one for the 1994 spring SOA meetings so that we can keep you informed and receive your feedback.

Along the way we will need many more volunteers -- assistant editors, writers, reviewers, and proofreaders -- so please listen for where and how you can help.

The October 8, 1993 version of the DSH is a working draft. It is in outline form for the most part, although Section I is already in text form. Our speakers will talk in the order in which their assigned sections appear in the DSH.

Jim Reiskytl is from Northwestern Mutual. Jim was a member of the DSTF and for the past year has been the SOA Vice President for the Financial and Investment Management Practice Area. He is editor and a writer for Section I of the DSH.

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Allan Brender is from William M. Mercer in Toronto. Allan has experience with solvency reporting because Canada already has requirements in place. Allan is a writer for Section I.

Dan Kunesh, from Tillinghast in Chicago, is editor of Section II; Steve Reddy, from Morgan Stanley in New York, is editor of Section IV; Burt Jay, from Mutual of Omaha, is editor of Section VI; and Craig Reynolds, of Milliman and Robertson in Seattle, is editor of Section VII.

MR. JAMES F. REISKYTL: What exactly is this DSH and what is it not? This handbook is designed to be a resource to assist you in preparing a report for your life and health insurance company's management, providing a sensitivity analysis of the various contingencies that may be involved, and communicating a better understanding of the challenges to the future financial condition of your company.

The handbook is designed to describe the techniques, the methodologies, and the means of developing assumptions for the ranges of possible experience and economic conditions. Do not expect this to be a cookbook that gives you answers. However, the DSH will give you a range of possible approaches that should include all the applicable tools known to the profession at this point.

The handbook's focus will be on the nature and extent of analysis and sensitivity testing of potential future events that could have financial impact on the company. Simply put, this type of analysis attempts to answer (1) whether your company can weather most, if not all, possible future challenges, (2) which events are most likely to occur, and (3) what your company would do if such events were to happen. The handbook is designed to be a guide to help you help management understand the impact of actions they have taken and actions they might take in response to possible future events. We hope that this handbook, and particularly the report that will emerge from it, will lead to a better understanding of alternative courses of action by your management, so that you can optimize your risk/reward relationships and make better overall decisions for the company.

What isn't the DSH? It is not a standard of practice.

Let me define a couple of terms that I think will be useful as we discuss this handbook. The first is the DSTF's definition of *financial solvency*.

Financial solvency means that "the insurer's assets are adequate to carry out its business plan including making provisions for future commitments. It is quantified by demonstrating that the cash flow needs of the insurer will be met in each of n future periods, where n is dependent on the insurer's business characteristics, especially that relative to continuing materiality of the risks in force. Cash flow necessary to meet obligations may be met by premium income, investment income, and possibly, by raising cash from external sources. In addition, the minimum statutory reserves and risk-based capital requirements of the insurer must be satisfied at the end of each period, where the risk-based capital level determined by the circumstance of the

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insurer is a consideration insofar as affecting its ability to market products or obtain cash from external sources."

Behind all those words you see a focus that looks a lot like cash-flow testing. But cash-flow testing is not the only way you can go. We intend to interpret this more broadly.

Second is the definition of *financial condition*, a term used throughout the handbook. *Financial condition* refers to "the ability of the company's capital, surplus, and other items such as the asset valuation reserve [or any other form of capital] to adequately support that company's future operations over an unknown and unpredictable set of economic, operating, competitive and regulatory environments."

The definitions have similar characteristics, but the emphasis is a bit different. We would like your input on either of these, but particularly the latter one.

The DSH is intended to be dynamic. Its loose-leaf style will accommodate the addition of the latest in research and the latest in techniques.

Regarding this report to management, you might ask if it is required by law. The answer in the U.S. is no, and the answer in Canada is yes, so it depends on where you practice. Even though the report is not required in the United States, we hope that this handbook will encourage you to do more vigorous analysis of your own company's financial condition.

You might ask, is it to be performed and held to the same rigid standard as the appointed actuary's reserve opinion? The answer here is "no" in one sense and "yes" in another. It clearly is not intended that you run a few interest scenarios and follow a somewhat standardized approach. In fact, the report is intended to be quite flexible. The format will depend on your company, your analysis, and your particular challenges. The intent is not to create a probabilistic opinion on solvency, but to give a sensitivity analysis on the financial condition of the company.

In this report you are going to analyze the future. As actuaries we may think we have all the knowledge necessary. But I think you will need to rely heavily on other key people in the company and receive their support. You are going to have to access business plans and strategies. You are going to need help from others to identify what they consider to be the major threats to the organization and the company responses they will be capable of taking.

Truly this is not a cookbook. It goes much beyond that, and much beyond the effort required for the current reserve opinions. This analysis should be more analytical and less methodological. It relies on a broad understanding of the entire operation of the company, identification and analysis of specific risks and concerns of that company, and a substantial amount of actuarial judgment, both in selecting sensitivities and interpreting results. There will be cases involving issues not covered in the handbook, and you will have to deal with them as you would with any other challenge you face.

Finally, I would like to address the concerns, perhaps even anxiety, that some actuaries have, particularly in the U.S. Should this, and is this, report going to be provided

to regulators on a regular basis? If it is an internal, confidential report, which we believe it is intended to be, it ought to be more insightful and more valuable than if it would be available in a public arena, just as an auditor's report and an auditor's report to management have different levels of clarity and insightfulness.

The intent, although this has not been resolved, is that the report would not be provided to the regulator on a regular basis. Clearly, like all other papers, it will be available to the regulator as part of a financial condition review, particularly if you happen to have some problems meeting risk-based capital standards. And it will presumably be available when regulators come in to do a triennial exam.

Part of Section I of the handbook summarizes the fine discussion we had at SOA workshops last spring. I would like to highlight one point which has been reflected in my comments so far. There was an overwhelming belief at the workshops that this would be most effective if it is not required and if it is an internal, confidential report that is not probabilistic but instead focused on sensitivities and actuarial analysis. Some debates have occurred, and discussions have appeared in *The Financial Reporter*. If you have not seen them, I would encourage you to take a look. I think this is all a very healthy development.

MR. ALLAN BRENDER: This is the second year that life insurance company actuaries in Canada are required to carry out a Dynamic Solvency Testing (DST) study and to report the results to the company's board of directors. The technical details of DST as developed by the Canadian Institute of Actuaries Committee on Solvency Standards are very much like the technical details that are going to be contained in the DSH.

I want to discuss our reasons for developing DST and describe the legal and financial framework surrounding our work. I will also offer some observations on our experiences with DST.

The Canadian Institute of Actuaries began working on solvency as an issue separate from reserving back in 1983-84. At that time, consideration was being given to the introduction of a new statutory financial reporting standard in which the income statement would be a realistic, generally accepted accounting principles (GAAP) measurement of income. This change eventually came into effect in 1992. Having a single statement for both GAAP and statutory purposes means that the conservatism traditionally associated with statutory reserves is no longer necessarily in place as a form of solvency protection. Rather, the focus with respect to reserves is on proper measurement of income. In order to protect solvency, therefore, we needed new requirements with respect to the amount and structure of surplus.

The CIA decided that it could support the change in reporting standards only if it had procedures and standards of practice in place under which the actuary could assess the adequacy of the company surplus. So the CIA formed its Committee on Solvency Standards for Financial Institutions (CSSFI). The name also gives you an idea that we are looking at extending the actuary's work considerably beyond life insurance companies. Some of that, in fact, is under way.

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In early 1985, a federal insurance regulator was also circulating for comment, copies of a report which I had prepared for them proposing a minimum continuing capital and surplus requirement (MCCSR) – what U.S. actuaries would recognize as a risk-based capital requirement.

This requirement was adopted for Canadian life insurers beginning about 1990, first by CompCorp, the national guaranty fund, and lately by the federal regulator. The CSSFI wondered whether the MCCSR would be sufficient for the proper monitoring of surplus if we moved to this GAAP-like valuation. We quickly concluded that the formula-based MCCSR was insufficient for our purposes because it was insensitive to important differences between companies and took no account of a company's operating plans and strategies.

So we set out to develop a new technique which we called "dynamic solvency testing," much in the same form as is being presented in the SOA's handbook.

The CSSFI demonstrated DST at the 1988 Valuation Actuary Symposium. We constructed a model company and tested more than 20 scenarios. We role-played the actuary's presentation of the results of the study to the company's president.

This presentation was the beginning of a huge educational effort dealing with a new approach and a new way of thinking. Remember, at that time, it could still be said that no policyholder of a federally regulated Canadian insurer had ever lost a single cent due to the failure of the insurer. Thus, many people wondered why we were bothering with this huge and complicated task. Many actuaries were concerned about getting the resources to do the job. Many were concerned about the minimal set of scenarios being suggested for testing.

But we had one important advantage, namely, that Canadian actuaries were already used to looking at all aspects of their companies' operations, including the assets, when setting the valuation assumptions. Since 1978, our valuation methods have taken into account all events that influence a policy's values, including lapse rates, expenses and income taxes. Selection of the valuation interest assumption has required the actuary to look at the existing asset portfolio and to do cash-flow projections, taking into account the company's investment policy, to determine the expected future investment income.

Moreover, our techniques for selection of valuation assumptions focus on first determining expected values and then adjusting each assumption by an appropriate margin for adverse deviations. In selecting the appropriate level of margins, the actuary must assess, with respect to these different assumptions, the degree of risk to which the company is exposed. Therefore, actuarial practice in Canada had already put actuaries in the right mind-set to consider cash-flow projections, all important experience factors, and scenarios of possible future experience. The introduction of DST meant more work for the actuary, but it did not require a fundamental change in point of view.

In 1991, the CIA adopted its Standard of Practice on Dynamic Solvency Testing for Life Insurance Companies. This requires all actuaries of companies in Canada to carry out an annual DST study and report the results to the company's board of directors,

possibly through the audit committee. The first study was to be done in 1992, based upon year-end 1991 results. Therefore, most companies have now seen or are about to see their second annual DST report.

Also in 1991, final touches were being put on our new Federal Insurance Companies Act which was passed by Parliament and went into effect in 1992. This legislation considerably broadened the role of the actuary; the valuation actuary was replaced by the appointed actuary, who is required, among other things, to make an annual report to the board of directors on the expected future financial condition of the company. The federal government's Superintendent of Financial Institutions has indicated that the major component of this financial condition report is the DST study.

This legislation also gives the actuary the power to require the company to provide any information necessary for the completion of the DST study. It provides the actuary immunity from legal suit in connection with the discharge of his or her responsibilities under the act, as long as the actuary has acted in good faith. I think most Canadian actuaries feel fortunate to be living in a society that is not very litigious and that offers them this immunity.

I would like to turn to our experience with DST. The DST report is intended primarily for management and the board of directors. It is a confidential document, so these reports are not in general circulation. Through my practice, I have seen a number of DST reports and have assisted in the preparation of several. I also have spoken to quite a few actuaries and regulators about DST work. Confidentiality must be respected, so most of my comments will be anecdotal in nature.

As I said earlier, DST was developed in an environment in which most insurance people did not perceive any imminent threat to the industry. Due to the structure of our financial markets and the types of financial instruments in use, Canadian insurers did not experience significant mismatch or C-3 problems when interest rates fluctuated wildly in the early 1980s. Junk bonds, the problem of the mid-1980s, were generally not part of Canadian insurers' portfolios. And problems with respect to mortgage loans and real estate did not emerge in Canada until the 1990s. So there was resistance to DST as it was being developed, with many people seeing it as costly, complicated, and unnecessary. In their minds, there were not any great threats to be checked.

Well, the CIAs timing appears to have been perfect, although I think it was accidental. The first DST reports appeared in 1992, just as the real estate crunch and the effects of the economic recession or depression hit. Boards of directors were often faced with declining surplus levels, and, in some cases, with companies in real financial difficulty. Suddenly, these boards had a DST report that discussed their company's sensitivities to various sources of risk. The report was just what they wanted and just what they needed.

In some cases, actuaries supplemented their testing with suggestions about changes in operating policies and procedures, backed up by projections that showed the favorable financial impact of these changes. I know of several companies where these suggestions were adopted and implemented. From this point of view, DST has been a great success.

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Another success has been the recognition by the managements of some insurers that the corporate model built by the actuary for purposes of DST gives them a valuable tool for corporate planning, surplus allocation and financial management. The chief operating officer for one of my clients realized this value even before the construction of the model. It was then under his auspices that the model was built. This made it much easier to obtain cooperation and the required information and data for the model from all parts of the company. The model became a company resource and not just the actuary's toy.

If the results of the DST study are to have credibility within the company, it is important to build confidence in the model on the part of management. One way to achieve this is to begin your projection from a previous historical point. For example, if you want to start projecting from year-end 1992 to see what happens in 1993 and beyond, begin your model with year-end 1991 instead. A close match of the projected first year results, i.e., 1992, with actual known results for 1992 should generate the necessary confidence. It will often take a lot of fine-tuning to obtain that close match, but my experience is that people feel, after going through the experience, that the results are worth the effort.

An important issue involving a DST report is its availability to regulators. As I have said, the primary audience is management and the board of directors. Our regulators expect the DST studies to be done annually. The reports do not have to be filed, but they will be viewed at during periodic on-site examinations. Regulators do have the power to request any relevant information when they deem it necessary to the proper conduct of their roles. I know they have requested DST reports in the case of companies on the watch list and have found these reports to be very valuable.

The regulators' task, particularly in dealing with senior management and the Board of Directors, is simplified because the actuary's concerns as expressed in the DST report often mirror their own. I understand that the regulators' treatment of one company with a weakened surplus position was favorably influenced by the fact that the company was able to present a DST that was very credible and according to which the five-year corporate plan demonstrated a steady and adequate recovery.

DST is intended to test a company's sensitivities to various sources of risk. It is not a solvency guarantee. Therefore, the actuary cannot be expected to sign a statement that gives such a guarantee. At present, the actuary's opinion in the annual statement of a Canadian company makes no reference to DST, although some companies do note in their published reports that a DST study was received by the board. We are in a phase-in period with respect to DST and financial condition reports. However, beginning in fiscal year 1995, the actuarial opinion will be required, in the case of a healthy company, to include the phrase: "the company's financial condition is satisfactory."

Things sound pretty rosy with respect to DST in Canada. Is this an accurate picture? Does the process really work? To be fair, the answer is mixed. It depends upon the actuary who is doing the work. The results will only be as good as the willingness of that actuary to ask hard questions. Not all actuaries are willing to be the bearers of bad news or to challenge firmly held but possibly erroneous assumptions of management. Unfortunately, I am aware of some DST studies in which I feel the actuaries

did not challenge or test some of management's most basic assumptions, thereby missing important sources of risk to those companies. In at least one case that I know of, a basic assumption was in error and caused serious consequences to the company; the actuary missed it.

If DST were in place in Canada five years ago, would it have prevented the two failures of life insurance companies that we have experienced? Perhaps, if the right questions had been asked and the tough scenarios projected, the potential difficulties might have been highlighted and corrective action taken. The CIA's Standard of Practice has not specified what scenarios are to be tested; a few are suggested but none are required. It is up to the actuary to know the company and to do a thorough and professional job. Therefore, the choice of appropriate scenarios is left to the actuary's professional judgment. The CIA has published a DST primer, similar to the DSH being prepared by the SOA, in order to give the actuary guidance in selecting scenarios. In the future, if there should be another failure, the actuary would be subject to professional review. If that review found that appropriate, hard questions had not been asked, this could be viewed as a contravention of our Standard of Practice, and the actuary could be exposed to professional discipline.

In summary, we are in a learning mode with respect to DST in Canada. Many actuaries appear to be doing an excellent job. In many cases, models are being improved for the second study based upon lessons learned in the first year. Many companies and their boards have received these reports well and found them to be valuable. Our regulators are interested in companies being well-informed of the risks they face and strongly support DST. The models used for DST are turning out to have important uses for other purposes within many insurance companies.

I would like to add a few words about DST in the United Kingdom. A joint working party – we call it a task force on our continent – has been formed by the Institute of Actuaries and the Faculty of Actuaries, with strong support from the Government Actuary's Department. This working party is looking into new valuation methods, a risk-based capital requirement and DST. The working party will report at the joint Life Convention at Blackpool very soon. My understanding is that DST is one of the most promising items under consideration.

I think there is a lot of value in this process. It takes a lot of work to get going, as you will discover. I hope it proves as worthwhile for you in the U.S. as I think it has for us in Canada.

MR. DANIEL J. KUNESH: Section II of the DSH is entitled "Report Preparation Game Plan." It is designed to set the stage for the details in the subsequent sections.

Section II has four main parts. The first will outline a general DST strategy and the steps that will be required by the actuary. The remaining three will address issues, considerations and various strategies to control risk.

Section II supports DSTs overall purpose which is to present to management a comprehensive report assessing a company's financial condition. The report focuses on company sensitivity to various sources of risk, so the emphasis should be on risk and risk analysis.

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I would like to stress a couple of points. One is that early in the process, the actuary will need know the structure of the report and the basis for his or her conclusions. This may be difficult in many companies because it can be political.

Second, because this is proactive, the company's business plan needs to be considered – not only a single business plan, but alternative strategies. What will management do under various given conditions? It is advisable for the actuary to be involved with the rest of senior management in the development of that plan. Not only is the actuary going to be the author of this report, but the more members of senior management that are part of the process, the better the report will be.

Section II will give some guidance in the identification and evaluation of the risks that affect the company's operations. It will discuss methodology. Cash-flow testing is not the only DST method, so other available methods will be outlined. It also will provide guidance in the selection of sensitivity scenarios to test risk variability and severity.

The actuary must identify and review various management processes relevant to the insolvency risk. In analyzing how management will react to various threats of insolvency, the actuary will need to understand and identify the key risks and factors that threaten the solvency of the company. The two categories that will be addressed are operational and global or environmental. The actuary needs an understanding of the desire and ability of the company to control or avoid risk. How risk averse is the company? How willing is it to take risks during the projection period?

There are other considerations that impact surplus. New business is one. Unlike cash-flow testing for reserves, we need to take it into account here. The actuary should consider the effects of differing levels of new business. Other considerations include regulatory solvency standards, reinsurance laws and the possibility that the applicable accounting model may change in the next five years or so.

DST focuses on risk, so we need to be able to consider variations in a company's risk structure due to external causes. We should look at alternative business strategies, alternative levels of production, and their impact on surplus needs of the company. There are a number of practical issues to address, for example, the company's shareholder dividend policy, its need to service debt, its need to pay back surplus relief, or its need to overcome an expense overrun problem.

We hope to provide guidance for selecting a methodology for each line of business; it will not always be simply cash-flow testing. We also hope to identify determinants of risk variability, for example, covariance of risks between lines of business, or the impact of changes in underwriting practice or reinsurance. We also will address the interrelationship of assumptions, for example, lapses and interest rates.

Section II will address assets also. DST work will include all assets, not just the assets supporting reserves. We need to consider foreign currency risk. We need to consider when and how market values are to be taken into account. We need to consider various off-balance-sheet items.

We also intend to provide guidance in selecting alternative economic projection scenarios, as well as guidance in the difficult area of how to interpret the results that come out of testing.

Finally, this section should provide guidance to identify strategies to control or avoid excess risk. There are three areas of strategies. First, there are liability risk strategies, such as controlling the design of contracts and limiting options under contracts. Second, there are asset risk strategies such as diversification. Third, there are interest rate risk strategies.

As you can see, Section II sets the stage for the more detailed material in the subsequent sections of the handbook.

MR. STEPHEN D. REDDY: Section IV of the DSH deals with analysis of assets. This section will attempt to provide guidance on how to go about modeling assets and projecting their cash flows and investment returns. There are so many asset classes, each continually evolving, that it is difficult for one person to understand all the details and nuances. This section will attempt to address the important details of each asset class in one form or another.

Examples of questions that Section IV will help you answer are: What do you need to know about collateralized mortgage obligations (CMOs) to model them reasonably well? What kind of historical data is there on mortgage prepayment speed, and how can it be used to project future prepayments? What are the other relevant factors besides interest rate levels? What parameters are needed to model callable bonds? How do you compute market values for any particular asset class? What are pitfalls to be wary of?

To what extent can proxy assets be used? Can whole asset categories be modeled as a single asset? Over what intervals, such as monthly, quarterly, or annually, should assets be projected, and does it depend on the liability projection intervals? What steps should be taken to ensure that the beginning model asset portfolio accurately reflects the real portfolio? What steps should be taken to ensure that assets and liabilities are lined up correctly?

What is the best way to model the incidence and cost of defaults? How does it vary by asset class? What are the risk-based capital (RBC) factors by asset class, and what will they likely be for derivatives or other items not currently addressed? How does one model foreign assets, or assets that may involve foreign exchange risk or foreign interest rate risk? How does one model the London interbank offered rate (LIBOR)? How are the movements in these rates correlated to U.S. Treasury rates?

What is the best way to express spreads of corporate bonds over Treasuries? How should spreads that are tight or wide by historical standards be adjusted going forward, if at all? To what extent does the liquidity of an asset need to be factored in? How does it affect market values, or the resale value of assets that need to be disposed of? What are the proper statutory and tax accounting methodologies for various asset classes, particularly emerging classes such as CMOs and derivative instruments?

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One area that may be specifically excluded from Section IV is that of option-adjusted pricing techniques. While such techniques are useful in managing asset portfolios, they do not necessarily shed light on the scenarios that cause problems or the timing of the problems.

Most of the material in Section IV will be equally applicable to the valuation actuary's cash-flow testing process, so actuaries should already be asking and addressing these various questions. But the material here will be a resource that should enable them to do a better job.

In summary, we intend that Section IV provide a reference for any aspect of modeling assets that may confront the actuary performing solvency analysis. We welcome any comments on the planned content of the section. Please let us know if you are interested in being a contributor to this part of the handbook.

MR. BURTON D. JAY: I am the editor of the Health Insurance Liability Section of the DSH. I also am chairman of the Health Financial Issues Task Force (HFITF), formed early in 1993, which is responsible for identifying gaps in research, educational materials and practice development with respect to health risks and DST. I have recruited a small working group from the HFITF to help me as editor of the health section of the handbook.

The structure of the handbook is evolving, but the health insurance material is currently in Section VI. The title of Section VI is "Analysis of Behavior -- Health Insurance." There are similar sections for life insurance and pensions.

The purpose of this section is to describe various company and policyholder behavior patterns or practices that may have an effect on the financial results of health insurance products. This section is intended to address group and individual long-term disability income, long-term care, major medical, medicare supplement, and other limited-benefit health insurance products. The relationship between actions or decision strategies and the financial elements of these products are addressed.

There are some effects on cash flows and level of sales from alternative strategies or actions of management that are unique, or at least a little bit different, for health coverages. For example, many, if not most, health insurance products involve repricing in renewal periods if or when experience deteriorates. A company wishing to be more competitive might choose to enter the market with initial prices below competition. Steep rate increases in renewal years may then be necessary, due both to the wearing off of initial selection and the normal increases in claim costs with increasing attained age, in order to achieve overall profit objectives. The steeper rate increase pattern relative to competitors may cause increases in renewal lapse rates, resulting in antiselection, as a higher percentage of impaired lives choose to pay the increased premium and the healthy lives leave. This effect would necessitate even steeper rate increases to achieve the desired profit level. In fact, this spiral might become so severe that the desired rate increases will be denied by regulators, in which case the company must accept future losses or cancel the remaining group if this is permitted.

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There are other examples where economic scenarios defined by factors other than interest rates influence health insurance policyholder behavior and future liability flows. For example, increases in unemployment rates may increase utilization of disability products, and increases in inflation rates may increase claim costs of medical reimbursement policies.

Perhaps the biggest issue for companies selling medical reimbursement coverage is the effect of the potential major changes in health care in the U.S. A new federal program may mean that individual medical lines of business could disappear entirely in two or three years. Or, in the absence of the federal program, a state-by-state program could cause a gradual disappearance of major medical lines.

These are examples of the areas that will be addressed in the health section of the DSH. I expect the authors we recruit will flesh out the outline you see by a considerable amount. If any of you have an interest in working in the health area of this project and like to write, please give me a call.

MR. CRAIG W. REYNOLDS: My involvement is with the section of the handbook titled "Life Insurance Business – Company Behavior and Policyholder Behavior." I come from the Life Practice Education Committee, which is a committee charged with identifying and developing educational resources for practicing life actuaries. DST was one area in which we saw a large need, so I have been loaned to the DSH project.

My section of the handbook is going to cover all aspects of company behavior and policyholder behavior, which are areas that in cash-flow testing have given practicing actuaries some of the most difficulty in identifying and selecting appropriate assumptions.

In the area of company behavior, we will be covering such things as: credited rate strategies; renewal pricing strategies, including such things as setting renewal premiums on indeterminate premium products; investment and disinvestment strategies, although these will be covered to some extent in other sections; dividend strategies and policies for participating companies; new business assumptions – how to select them and how to identify them; and, general issues related to management.

The last category is the most nebulous and will give us some of the most difficulty because it is relatively broad. It includes such things as general management philosophy toward risk; general direction of the company – whether it is an agent-directed company, product-directed company, or something else; incentive compensation; stockholder dividends; and, policyholder dividends. Management issues will probably give most practicing actuaries a great deal of difficulty in DST, because much of that information is unknown and unknowable because companies change business plans so frequently. This is one area where, as practicing actuaries, we will have to work closely with the management of our companies to get the best sense of likely behavior patterns under different scenarios.

I do not believe this is a process where an actuary will meet once with management, get an outline of how they will behave, go off and do the work, and then prepare and turn in a report. This has to be an interactive process of several meetings, outlining

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possible consequences, testing, and revisiting and perhaps changing assumptions as to how management would behave in particular situations.

Under the heading of policyholder behavior, we will cover influences on policyholder behavior, such as distribution system, type of product, and type of company. We will address all kinds of policyholder behavior including disintermediation lapse, related mortality antiselection, and policyholder loan activity. We will cover some of the methods frequently available and frequently used for modeling policyholder behavior, and some of the sources available for getting data such as disintermediation lapse assumptions.

Unfortunately, as many of you know and experienced during cash-flow testing work, there is a lot of information out there on some of these topics, but there are many areas in which we are not informed and the handbook is likely to be very thin. One area worth mentioning is disintermediation lapse. There is not a lot of data out there on what companies have experienced. Some SOA research projects are either going on now or have been recently completed on that topic. To the extent it is practical and appropriate, we will reference those studies or perhaps include them as part of the handbook.

To calculate levels of disintermediation lapse, many companies first attempt to model the interest rate the competition will be crediting on their interest-sensitive business. This is another area that might sound simple, but it is actually difficult to do, given the variety of competitors and the various crediting strategies they employ.

The last behavior that I will mention that is difficult to model is management action. In fact, we cannot know what management will do in every situation. We can know what they say they will do. The handbook will discuss possible actions they might take, and how to take them into account and plan for them.

There has been a great deal of material published on many of these topics already. Rather than create things from scratch, we will be trying to pull together as much of that material as we can into our handbook. This is true for the other section editors as well.

The issue of personal liability is something that concerns many actuaries with whom I have spoken. While this is called a dynamic solvency testing process, it might better be known as a dynamic sensitivity testing process. We will be testing how the company may respond under different scenarios and projecting how the results might occur. The results are intended to be illustrative and indicative, but will not be guaranteed. In no event will an actuary be asked to opine on the eventual solvency of the company. We all want to avoid that.

And, as already mentioned, this is not going to be a standard of practice. Because of my sensitivity to this issue, I am going to work hard in my section to make it clear that we are mentioning possible approaches to these modeling phenomena and possible sources for assumptions. We will clearly state that these are not the only approaches or sources.

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There has been a fair amount of work performed so far to prepare these outlines. But this work pales in comparison to the amount of work that remains to be done in gathering the materials and writing the actual handbook. We welcome any volunteers. If anybody is interested in working on my section in particular, contact me and I will be happy to talk to you.

MR. HEPOKOSKI: I want to mention the two sections of the DSH that have not been discussed directly.

Section III deals with liability modeling issues. Although solvency testing does not automatically mean modeling, modeling is likely to be a primary method for many companies. Because many liability modeling issues are generic, we will cover them in a single section rather than spread them throughout Sections V, VI and VII and encounter a lot of duplication. Section III will cover modeling principles, considerations, techniques, and validation.

Section V deals with pension product liabilities and corresponds to the health and life sections that Burt and Craig discussed.

I would like to acknowledge all of the contributors to the DSH so far. Besides our six speakers, they are Bob Stein, Mike Hughes, Henry Winslow, Maria Thomson and Jay Stiefel.

MR. ROBERT H. DREYER: I am chair of the Smaller Insurance Company Section. My concerns that I express are echoed by the Section Council, and I speak for them also.

We have not defined a "smaller" company, because we do not want to limit our membership in any way. But I point out that one out of every five life insurance actuaries works for a company with five or fewer actuaries. And by "actuary" I mean member of the SOA. So we are a significant body that needs to be considered.

I came with some prepared remarks, but several of my concerns have been set aside by listening to the speakers. I am still concerned, however, that the AAA position paper said "management should be required." Neither the SOA nor the AAA can require management to do anything. That vacuum could very easily be filled by the regulators, or, if not by them, by the Financial Accounting Standards Board, the Securities and Exchange Commission, or some other federal agency. It behooves us, since we are apparently moving in a slightly different direction from the AAA position, to get together with the AAA and come to some understanding on this issue.

I also am concerned about the term "available to regulators." If the regulators do not find something that is available to them, it is going to become a requirement. If you do not believe me, you were not around 20 years ago when we helped the American Institute of Certified Public Accountants give birth to GAAP accounting. They said, "The Internal Revenue Service will never tax you on GAAP earnings." Now we are paying a tax on deferred acquisition costs.

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I urge the group to consider these points, not just from the smaller-company perspective, but from the all-companies perspective. I have already helped Burt Jay identify some smaller-company actuaries in the health field. If any of the other handbook editors feels underrepresented with smaller-company actuaries, please contact me directly, and the Section Council will help you find volunteers.

MS. DONNA R. CLAIRE: Echoing the last speaker, if the regulators are not pressing the issue, exactly how is the AAA or anybody else going to force management to provide the resources necessary for this report to be done? Canada faced it and made it a law.

Consider that we had the Committee on Valuation and Related Areas in the early 1980s, and a lot of actuaries thought it was a wonderful idea to do valuation actuary type work. However, before it was required in New York, only approximately 5% of the companies had the resources and were doing cash-flow testing.

MR. BRENDER: In Canada, most companies are federal companies, and the law I talked about is the law with respect to federal companies. There are provincially chartered companies, particularly in Quebec, and they are not required to do DST by their law, although the regulators would like to see them do it. I know Quebec companies that have done it just because the profession has said the actuary has to do it. Some of them have even said in their glossy statements that the board received a report from the actuary as required by the Canadian Institute of Actuaries. So it is possible. It depends on the spirit of management.

MR. G. THOMAS MITCHELL: One follow-up on the appointed actuary report: It was to be available to the regulators "on request," and at least one state said "Send them all in."

I have a couple of comments or questions on the definition of financial insolvency. First, the definition of cash flow includes future premium income but not sale of assets. There is no clear indication that a carefully considered program that says that in a disintermediation crisis you would sell assets at market value is included in that definition. On the surface, it appears that a variation on a Ponzi scheme supported by future premiums might qualify under the cash-flow testing. For an individual annuity disintermediation crisis, there may be literally no investment strategy that would not involve selling assets.

My second point relates to risk-based capital. It appears to me that, even if you did not need it for marketing or the other reasons mentioned in that definition, if you do not have enough RBC, a regulator is going to take the keys. Let me give a numerical example. Suppose I had a RBC requirement of \$10,000,000. I do some studies that show that in bad times I might lose \$12,000,000. My company has capital of \$14,000,000. I say, "Fine, I am all set." If I then go through such a period, lose \$12,000,000, have \$2,000,000 left, and the regulator takes the keys (i.e., restrict new business or revoke licenses . . . put a stop to business), people will be unhappy. So do I need \$12,000,000, or do I need \$12,000,000 plus \$10,000,000 – in other words, a double count? It seems to be a paradox.

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MR. HEPOKOSKI: DST is meant to reflect what management actions or strategies are likely to take place in the various stress situations you may look at. Regarding your first point about selling assets, if that is the action that would take place, and it certainly would be in a lot of scenarios, that should be part of the testing.

Regarding your second point, management response to deteriorating surplus would presumably involve some plan of action, or at least some change in business plans, and you should attempt to reflect that in your testing.

MR. ROBERT P. DECARO: Our company is structured for internal reporting purposes on a segmented basis, and we have several intersegment and intercompany loans. Should there be a capital requirement for these loans?

MR. REISKYTL: Rather than provide an answer to that question, I will offer a general reaction. The goal of the SOA is to avoid dealing with what the government, the CIA, or the AAA may require per se. Our goal is to provide you with tools, research and knowledge, so that you can do the work. We hope this handbook will be very useful both for U.S. and Canadian actuaries.

Questions such as "Are we required to do this?" or "What may happen here?" are valid, but they put us in a different vein than we intend. Our intent is to provide you and management with a resource that will be useful in this process. Whether the handbook becomes a standard of practice or whether DST becomes required by regulators are separate issues, even though it may be difficult to separate them. But I hope we can focus in 1994 on the resources that already exist and prioritize the areas where we need more information, such as with some of the policyholder behavior assumptions that Craig mentioned.

It is natural to want to get into detail. But I want to make it clear where our focus is. I think the AAA position has evolved and emerged a lot closer to this approach. I want to make the distinction that the SOA's effort is geared to the underlying research and support for you.

Will everybody do DST? No, not every company is going to do it. Somebody quipped "You know we are only going to do it if we have to." The intent is that you see DST, in whole or in part, as a useful element in a good management process.

This is an ambitious undertaking. It is like everything the actuary has ever done, and thought of, all put into one handbook. We will try to sort it out and produce the most valuable handbook for you. The key is you -- your analysis, your understanding, and what you can bring to this process.

MR. BRENDER: I have one comment about the question about having enough surplus to satisfy the risk-based capital requirement five years from now. That is the whole point of doing a DST study. The point is not to satisfy your regulator. It is to get information so that you and your management can find out what can happen, so that everyone is better informed. That is what sensitivity testing is about. That is what this is about.

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MR. JAY: We are putting together something that we believe represents good practice for an actuary to provide to his management. But if management is not willing to dedicate or pay for the resources to do this, there is no way that the profession can say that the actuary has to do it anyway. It is something we ought to encourage, but there is nothing currently being talked about that will require it to be done over the objection of the people that you are working for.

MR. REYNOLDS: We do not know if, how or when this will ever become a requirement. We do not know who will require it, or if it will occur at all. Frankly, although I have not polled our panel, I suspect we are less than unanimous as to whether or not it should be required.

I have talked to people who viewed their year-end valuation actuary work as a meaningless exercise that management did not really care about. It was, in their view, irrelevant. It did not consider new business. It did not consider assets backing surplus.

Many have expressed an interest in extending the valuation actuary work into something that is more meaningful for continued planning for the business. In that sense, I suspect that many companies, but perhaps not all or even a majority, will be doing something like this process. Even if the requirement never comes into being, a handbook like this might be useful for those people.

MR. HARRY D. GARBER: The AAA position was adopted over a year ago. It has changed over time. The AAA is not going to keep adopting new positions. You should look at what is being done more than at what is being said.

I think the AAA views this as a real opportunity for the actuarial profession, for companies, and for regulators. You need to find that intersection of activity that will be beneficial to all three parties. I am chairman of the AAA committee that will be working with the American Council of Life Insurance and with the casualty trade associations to try to find that intersection with the companies. We will be working with the regulators in the same way.

I think the end result will be much like what Allan described in Canada, where the regulators review the report during their quinquennial examination, and they review the reports of companies on their watch list.

The value to the companies, frankly, as they start to pay all the assessments from the guaranty funds for the two big insolvencies and some of the smaller ones, is assuring that companies are run in a prudent fashion. This may be a burden on the well-run companies, but, to the extent that it prevents them from having to pay for not-so-well-run companies, it will be considered to be of value.

I think we need to work this through. Unless it can be a plus for everybody – the companies, the regulators and the actuarial profession – it is just not going to fly. What the actuaries have to contribute is the value added of what they can do. But all the work that is being outlined and being done is great for our profession, regardless of how this turns out with respect to companies and regulators.

MR. YANG CHUN CHANG: It does not hurt to reiterate the distinction between professional responsibility for the actuary and what is required by law. And there also should be a distinction between what the actuary is required to do and what management is required to do. One of the surest ways of not getting into management is to usurp management prerogative.

The DSH outline is very impressive. It seems to be a long list of everything that actuaries would ever do. It is so overwhelming and the plate is so big that I do not know whether the most intelligent among us can really get his or her arms around this. I wonder whether the DSHTF would consider trying to extract some essence out of all this -- finding the points that are the most critical. I do not think the sensitivity is equal for all the items we are talking about. Perhaps this is one area where actuaries really need some help.

In terms of solvency, is it possible to spend some time looking for points of no return? By this I mean, at some point, perhaps well before insolvency, there are things that might be identified as those which management, even in its best wisdom, can no longer do anything about. I do not pretend to know how to approach this, but I think it is worthwhile for the task force to consider.

MR. SELIG EHRLICH: I would like to hear about the horizon over which you are thinking of doing the projections. In Section II are the words "over several years into the future" and "variations in the company's business plan over a fairly short time horizon." Clearly, a big leap in this work is the inclusion of a company's business plan and new business. But that brings with it all sorts of practical considerations. Having been involved in the planning process in several companies, I know that once you go out a few years, the companies themselves question the validity of the underlying data and assumptions. What horizon do you envision -- at most two years or at most five or ten years?

MR. KUNESH: I think to some degree it varies by line of business. In my mind, it is more in the three- to five-year range, unless at the end of the period you have a negative trend, in which case you may wish to explore subsequent alternatives that might reverse the negative trend.

MR. BRENDER: We have tended to strongly suggest five years as a norm. The reasons are, first, it seems to be consistent with planning horizons. Second, it takes time in real life for scenarios to emerge. When the mortality starts going bad, it is going to take a while to realize what is going on, and it is going to take a while to determine your action with respect to pricing and dividends. When it comes to policyholder dividends, there can be delays in implementing cuts. To test strategies that you could implement to correct things often takes you out to years four and five. So we suggest you look at something like a five-year horizon to get a meaningful sense of what is going on.

MR. REDDY: Even though you may be going insolvent, getting there within five years may be very unlikely. But an advantage to the five-year horizon is that, if there are problems somewhere down the road, they are likely to start to show up within the five-year period. So it has the practical advantage of catching the beginnings of some problems that may get much worse just beyond five years.

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MS. CLAIRE: I had the unique opportunity to provide a peer review of somebody's cash-flow testing in a deposition. It was a case where the company would be insolvent in the next two years or so under all seven scenarios. Arguably the reserves were OK in four of the seven scenarios after 20 years. The problem was the company could not get there.

The issue in this case was whether the actuary did or did not do the dynamic solvency testing. If we have this handbook that lists all these wonderful things that we should have looked at, and the company does go insolvent, and the lawyers get hold of this handbook, we are in real trouble in the U.S. I do not think U.S. actuaries really focus in on our legal liability. It is different in Canada. Canada is a lot more reasonable.

MR. ROBERT J. JOHANSEN: It has taken nearly 80 years to develop the probable cause of the Titanic sinking. I hope we can do better in finding a way to foresee and prevent life insurance company floundering.

The SOA's Life Practice Research Committee recently established two project oversight groups (POGs). They have the not-very-informative names of Actuarial Modeling 1 and Actuarial Modeling 2. I am chair of Actuarial Modeling 1; Actuarial Modeling 2 is not yet staffed. Actuarial Modeling 1 is going to take a somewhat different approach to modeling. We are looking at a stochastic modeling horizon of five years. We are going to try to develop a series of various econometric factors. We currently have several actuaries and an economist on our POG. I am hoping to get an academic economist to help us with the econometric series analysis. We do not want to reinvent the wheel, and I feel the academic community has quite a bit to contribute.

We are going to develop relationships between econometric series and will probably introduce some demographic factors. While we may introduce some relationships like those in the A.D. Wilkie Paper "A Stochastic Investment Model for Actuarial Use" (1986, *Transactions of the Faculty of Actuaries*, Volume 39, page 341), we are not necessarily going to follow that paper's approach. We will supply to Actuarial Modeling 2 a whole series of factors, which they will then use to specify designs for one or more life company models.

As we go along I will try to keep those who are interested informed. This project is potentially very important, and we need all the help we can get.

MR. REISKYTL: That leads into the subject of other DST research underway. The question about horizon period was interesting because that is one that we may put out for further exploration. Clearly, when we say five years, we do not want to be like the U.S. government, and ignore anything that happens beyond that point. That can produce the wrong answer. Do not walk out of the room saying "Well, if you make it for five years and then fall off the cliff in the sixth year, that is OK." That clearly was not the intent.

Among other research efforts, Godfrey Perrott is heading a team looking at developing economic scenarios. Do not think that all you have to do is pick up the interest rates and you have an economic forecast. There is a lot more to it.

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We really want to know from you what kind of help you need. We will try to focus the handbook on the most useful information for you.

MR. JOHANSEN: When I said five years, I did not mean that we were going to ignore everything beyond that. Our current thinking, and it is subject to change without notice, is that a stochastic model is probably not worth much beyond five years. If you want to see what would happen after five years, then we think you should use deterministic models with a number of scenarios that seem possible or probable.

Incidentally, we are going to introduce something that I think is a bit novel. Some of the recent insolvencies occurred because economic and other factors were suddenly outside the envelope of expected values. So we are going to introduce a shock factor, where something terrible happens, for example, interest rates suddenly shoot up by 10% or 15%, to see what happens with the model. It looks like it is going to be a lot of fun.

MR. HEPOKOSKI: At the risk of being too repetitious, I want to remind you that the DSH project can use more volunteers. Contact any one of us or Judy Strachan in the SOA office.