1986 CASUALTY LOSS

TRANSCRIPT

RESERVE SEMINAR

The following pages include the transcript and/or handout materials from the panel sessions and addresses presented at the 1986 Casualty Loss Reserve Seminar.

Special thanks are extended to the moderators, panelists and recorders of these sessions for the invaluable time and effort that they contributed to the editing and preparation of this volume.

1986 JOINT PROGRAM COMMITTEE
FOR THE CASUALTY LOSS RESERVE SEMINAR

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	Larry D. Johnson, Assoc. Vice President Nationwide Insurance Company
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Panel:	William N. Bartlett, Sr. Consulting Actuary Fred S. James & Co., Inc.
	Charles W. McConnell, Consulting Actuary Tillinghast/TPF&C
	James P. Streff, Consulting Actuary J. Streff & Associates
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	William J. Hibberd, Associate Actuary Royal Insurance Company
	Joanne S. Spalla, Director-Reserve Analysis Hartford Insurance Group

1986 CASUALTY LOSS RESERVE SEMINAR

OPENING REMARKS

Jerry A. Miccolis, Chairman
Casualty Loss Reserve Seminar

Phillip N. Ben-Zvi, President
Casualty Actuarial Society

OPENING ADDRESS

Honorable Norman F. Lent
U.S. House of Representatives

Monday, September 29, 1986

JERRY A. MICCOLIS: Good morning. Welcome to Crystal City and welcome to the Sixth Annual Casualty Loss Reserve Seminar. My name is Jerry Miccolis and I am Chairman of this year's Program Committee. As most of you know, the Casualty Loss Reserve Seminar is jointly sponsored by the Casualty Actuarial Society and the American Academy of Actuaries. The objective of this seminar from its beginning has been to provide a forum for the discussion of significant issues affecting property-casualty loss reserving, and to meet the continuing education requirements of actuaries and loss reserve specialists.

It has been a tradition each year to have the Presidents of each of the two sponsoring organizations address the seminar and this year we are pleased to continue with that tradition.

To my extreme right is Bart Munson, President of the American Academy of Actuaries. Bart will be speaking to us later today at our luncheon. This morning we are also honored to have with us Phil Ben-Zvi. Phil is Senior Vice President of Continental Insurance and current President of the Casualty Actuarial Society. Phil will be sharing with us his perspective on loss reserving and the Casualty Loss Reserve Seminar and also will be introducing our distinguished guest speaker this morning.

PHILIP N. BEN-ZVI: Good morning and welcome to our Sixth Annual Casualty Loss Reserve Seminar. As you can see from looking around you, we have a record-breaking attendance at this meeting. We hope to have approximately 600 people, which is far and away our largest attendance. The very fact that we have so many of you here at 8 o'clock in the morning is testimony to the importance of the subject of loss reserves. I think you will find the day and a half that you spend here a very, very worthwhile expenditure of your time. We have an outstanding faculty and we will be covering a wide variety of subjects. Both basic and advanced techniques of different areas of loss reserving will be covered as well as discussing many of the current issues that you are all very interested in.

Each year for the six years we have had hundreds of actuaries attend, hundreds of accountants, risk managers, legislators, regulators, brokers and all sorts of loss reserve groupies of every description. As you can see we have a standing room attendance today. The number of people has been so great at this meeting that we quickly overran the capacity of the hotel, or at least the block of rooms that we had set aside. I know some of you are commuting from surrounding hotels, and I think some people are even staying at the White House; it's gotten so hard to get rooms in Washington. (laughter)

The subject of loss reserves is an extremely important one to the casualty insurance industry. Loss reserves not only affect the statement of surplus and the statement of income, but they affect the tax liabilities, the pricing of insurance products, the decisions to insure or self-insure, and just about every single aspect of the business. To estimate or analyze loss reserves is a very, very complex art as well as a science. We will be discussing both the art and the science over the next day and a half. The

difficulty of estimating loss reserves accurately is probably second only to the difficulty of predicting the number of people who were going to attend the Casualty Loss Reserve Seminar and we have not done the greatest job in doing that. I do, however, want to assure any regulators who are present that the 40% underestimate of the number of attendees is not indicative of the industry's loss reserve position. (laughter)

I am really here today not to speak to you too much about loss reserves because we have a large number of people over the next day and a half who are more expert on the subject and who will do a far better job than I can begin to do. I am here, and I'm really honored to be here, to introduce our opening speaker, Congressman Norman Lent.

Congressman Lent is currently serving his eighth term in the U.S. House of Representatives and represents the Fourth District of New York, which is situated in Nassau County. After serving five terms as a New York Senator, Representative Lent was elected to his first term in Congress in 1970. A life-long resident of Nassau County, New York, he received his B.A. degree from Hofstra University in 1952 and attended Cornell University Law School, receiving his J.D. in 1957.

During his 16 years in Congress, Representative Lent has earned a reputation as a distinguished and hard-working legislator. Congressman Lent serves as the ranking Republican on the important House Energy and Commerce Committee and the Subcommittee on Oversight and Investigation. In this capacity, he has been a key player in crafting landmark environmental protection legislation such as "Superfund," the Resource Conservation and Recovery Act, and the Toxic Substances Control Act. Representative Lent also offered the first legislation in the House to establish a national drinking age of 21 in an effort to reduce the tragic highway accidents resulting from youthful drunken driving. Please join me in welcoming Congressman Norman Lent. (applause)

CONGRESSMAN NORMAN LENT: Thank you very much CHairman Jerry, President Phil and President Bart, ladies and gentlemen. I want to first of all thank the American Academy of Actuaries and the Casualty Actuarial Society for the opportunity to join you this morning and for bringing out this big crowd. I'm not used to this. Not too long ago the closest I came to this was when I was on a panel with Senator Kennedy. We had a big crowd, but I didn't think it was for me; of course, I thought it was for him. I was really excited because I was going to be a lowly Congressman on this panel with Ted Kennedy, and he showed up. In the back of the room he had about six fellows with walkie-talkies and little microphones in their ears, two beautiful blondes with clipboards, passing them notes and whispering things in his ear. Everybody in the place knew that he was a very important guy. He had a big limo outside. He kept looking at his watch and all his people kept looking at their watches. He had to catch a plane to a much bigger and more important meeting than the one we were at. Finally, they put him on after all the preliminaries were out of the way. He looked at his watch and was kind of exasperated and testy, and he said, "And ladies and gentlemen, there are four ways that we can absolutely balance the Federal

budget. Unfortunately, I have to catch a plane now, and I'm going to let Congressman Lent explain them to you." And with that he gets out and jumps in the limo with the two blondes and the entourage and they take off. (laughter)

I'm delighted to be here with a gang of people; many of whom are from outside the Beltway, which is a treat here in Washington. Welcome to Washington. I find that people from out-of-town sometimes like to hear a political joke or story. I like to tell this true story. I come from the south shore of Long Island, Nassau County, from a town called East Rockaway. I've been running for office in East Rockaway now for 26 years in the State Senate, now in the Congress, and I get -- actuarily speaking-- about 72.5% of the vote. Everybody knows me. Like a lot of politicians, on the Monday before Tuesday Election Day, I make a habit of going back to my roots. I go back there with my old campaign entourage. I have a big truck and the campaign band plays the campaign song. I have pretty girls with short skirts and pompoms passing out Lent literature. I have big signs all around the shopping mall and downtown East Rockaway that say, "Lent, Lent, Lent." In the middle of all of this last time around, a little old lady walked up to me and looked me up and down and said, "So which one are you?" I was so shocked because I didn't know that there was anyone left in this town who didn't know me. So I jumped off the back of the flat bed truck, I grabbed her by the arm, I pumped her arm, and I said, "Hi there, I'm Norm Lent, and I'm running for Congress, and I'm from East Rockaway too." She stepped back, looked me up and down and said "Well, you've got my vote. The guy we got down there now is a bum." It actually happened. So much for the advantages of being the incumbent. (laughter)

The subject of your seminar is certainly an important one. Most members of Congress are very concerned about the whole issue of liability insurance. Almost every day, like other members of the House and Senate, I suppose, I receive letters and read news articles about the difficulties our constituents face in getting liability insurance. Countless hearings have been held each year on this issue. Next to the budget and tax reform, and the exploits of Michael Deaver, I guess insurance is one of the hottest topics in this town.

During Congressional hearings we heard from many witnesses representing different points of view. We heard from the insureds of those who would like to, but can't, be insured. We heard from the insurers, from regulators, the trial bar and the so-called consumer groups. The one thing that all of these witnesses agree on is the nature of the problem; that is, there has been a sudden and drastic change in the availability and the affordability of liability insurance. Of course, then the agreement ends because we find these groups don't agree on the causes of the problem. The issue has become a priority even for President Reagan and Attorney General Meese. As you know, a policy group headed by Attorney General Meese looked at this issue and made a report that identified two principal causes: First, underpricing for insurance in the late 1970's and early 1980's, and second, the explosion of the tort liability and jury awards. Various other causes have also been suggested about this problem, including Ralph Nader's

"evil conspiracy theory" with everyone pointing the finger at everyone else.

When it comes to solutions, an incredible number and variety of bills have been designed to address the liability insurance problem and have been introduced in this Congress. In my view, we can look at all of these bills and perhaps 75-100 of them fall into one of three categories. First, there are those that are designed to address the insurance industry directly. Second, there are those that are designed to address liability lawsuits. Third, there are those that are designed to make it more attractive for individuals to pursue means other than traditional insurance markets to spread their risks.

Now, first addressing the insurance industry directly, we have already seen legislation in the House to appeal the McCarren-Ferguson law that traditionally keeps the Federal Government out of this whole issue of insurance, and leaves it to the several states -- the fifty states -- to regulate. Congressman Jim Florio, the Chairman of the Subcommittee that has jurisdiction over insurance, has indicated an interest in letting the Federal Government take over, preempt the states and do the whole job of regulating the insurance industry. Others have suggested that the Federal Government ought to attack the problem by letting the Federal Government be the insurer of last resort.

Before I give you my prediction on the fate of these bills, in the interest of truth in packaging, let me just summarize my record of accomplishment in predictions. I was the person to suggest that President Barry Goldwater would not seek a second term in office. (laughter) My chief investment counsel to all of my friends a few years ago, was to get heavily into the DeLorean car; advice that was apparently only take by the FBI. (laughter) So with that warning, a little truth in labeling goes with the following predictions.

With respect to repealing McCarran-Ferguson and imposing Government regulations, in my opinion, it isn't going to happen. I have heard no one tell Congress how things would be any different today in the liability insurance business if these two changes had been made, let's say, 10 years ago. Frankly, I don't know what magical properties the proponents of Federal regulation, for example, be any better than state regulation? Especially when you consider the long history of state experience in this area and the fact that state legislatures across the nation are responding to this problem.

Along with Federal regulations, some Congressmen urge that the Federal Government itself get into the insurance industry as the reinsurer of last resort. They even contend that the Federal Government can make money at being in the insurance business. This just doesn't make sense to most of us in the Congress. If private industry, motivated by the present scrutiny of the stockholders, cannot provide this insurance profitability, how does anyone expect the Government to get into the business and provide it profitably? Also, we can look at the situations where the Federal Government did get into the insurance business. Over the years we got into

swine flu, crop and flood insurance. The record indicates we lost money very badly on each of those occasions. When you look at the fact that there are only a few legislative days left to this session, I would say that this kind of legislation has no chance to pass this year. Of course there's always next year, and I would again predict that these will all be hot topics in the 100th Congress.

There is one piece of legislation that I hope will become law this Congress. That is the bill that I am co-sponsoring with Congressman Ron Wyden of Oregon; the Wyden-Lent Bill which is a risk retention or pooling bill. The bill passed the House just last week without any objection and the Senate passed very similar legislation by a vote of 96-1 last summer. Even as we speak, negotiations are going on between the House and Senate, on the staff level, to try to iron out the differences between those two bills. I suspect we will get a joint bill that can be passed by both the House and the Senate in the closing hours of this session and put before the President.

There is a provision in this bill that directly affects you, but first let me just back up a bit. My risk retention bill falls into what I consider the third category of legislation; that is, legislation designed to make it easier or more attractive for people to pursue different means of spreading risks. The Risk Retention Act does this by expanding on a 1981 existing product liability risk retention law to include all commercial liability insurance. The Act allows groups to issue insurance policies to similarly situated members in all states if the group is licensed in at least one state. In other words, once a group is licensed as an insurer in one state, it can then go out and issue policies nationwide without getting licenses in other states. For example, racing car drivers, or nurse-midwives, or termite exterminators are groups which have a little trouble these days getting liability coverage. These groups could form separate risk retention groups, but they could not comingle. You couldn't mix racing car drivers with the termite exterminators, but all racing car drivers, all termite exterminators, all nurse-midwives, for example, could pool together and form a risk retention group.

In exchange for this freedom from licensing requirements, the groups must, under the terms of this legislation, file feasibility studies showing rates and coverage with the state insurance commissioner or each state where they want to operate. They must also submit annual financial statements. Now here's where you come in. This statement must contain "a statement of opinion on loss and loss adjustment expense reserves made by (a) a member of the American Academy of Actuaries or (b) a qualified loss reserve specialist." So you see the Congress is very concerned about insolvency and the amount of government necessary to guard against it. I was therefore pleased to include a provision that taxes the private sector to help with this whole question of insolvency oversight. There were others who worked on this legislation that would rather have set up some sort of a government agency to administer this facet of the legislation.

Before I close let me leave you with a few observations about the Congress and this whole issue of insurance. Congress is influenced by perceptions

and emotions. I am afraid that many members of Congress perceive the insurance industry as one which is a sophisticated manipulator of numbers. Members also react based on their own experience with insurers. Think, just for a moment about your own personal experience with insurance companies, say with a homeowners or an automobile insurance policy. Put yourself then, if you can, in the shoes of a member of Congress. On the one hand you might believe that loss reserves are just made up of numbers for the purpose of manipulating income taxes and the like. On the other hand, you would expect insurance companies to be able to use their loss experience to accurately and adequately price insurance policies thereby avoiding these liability capacity crunches. Because many people believe that the insurance industry is very sophisticated in the use of numbers, it's difficult to accept the fact that the industry cannot tell us what impact the various types of legislation would have on insurance availability and affordability.

I also do not believe that members of Congress truly understand the difficulty of pricing liability insurance. I don't think more than a handful of members of the Congress could tell or would even know the difference between rates and prices. I realize that when you are faced with pricing a liability insurance policy you must do so without really knowing what that policy will actually cost, in terms of settlements, or judgments, or defense costs, out there in the future. Many people believe that you have the statistics available to predict, with absolute accuracy, what the claim experience will be in the future for policies that are issued today.

I understand that it may be difficult to rely on past loss experience as a predictor of future loss experience in view of the onslaught during the past decade of long latency diseases and the willingness of courts to liberally, very liberally in most cases, interpret policies, to find coverage. Unfortunately, many other members of Congress do not understand this, and I am afraid, truly afraid, that the insurance industry has not always done an effective job of educating members of Congress on these issues. For example, despite repeated requests, I have yet to see any numbers of even single case examples to demonstrate the effect of judicial interpretation in long latency disease cases, such as asbestos claims, on policy costs. The Congress hasn't really been told these costs or seen these numbers.

Many members of Congress believe that insurance data collection, at the Federal level, is therefore necessary. I am against this. Frankly, I believe such data collection legislation is dangerous on several counts. First, I understand that the data contemplated would require major changes in the methods of data collection used today in the insurance industry. Unfortunately, no one has told us what that might cost. Secondly, this sort of legislation means setting up another big monstrous, Federal bureaucracy to receive and analyze this data. Again, this has a cost and, while the proponents of data collection at the Federal level always try to play down what this cost might be, it seems to me that it could become very significant. Of course, what we need is industry input on these numbers as well.

Let me conclude by leaving you with this thought. The work you did is very, very important. But, communicating to Congress the nature of your work and the difficulties that you face is equally important. It is therefore most important for your industry to continue its efforts on Capitol Hill and in the fifty state capitols, to educate, and even cajole and pressure legislators to come to decisions which make sense and benefit, not just your industry, but the nation as a whole. Ladies and gentlemen, thank you very much for the privilege of being with you. (applause)

JERRY MICCOLIS: Thank you very much Congressman Lent.

I have two short announcements to make. First, I would like to correct an inadvertent omission from our program book. Patrick W. Kenny is a panelist on the Loss Reserve Standards Panel; panel numbers 2D and 3D. Pat Kenny is a partner with Peat, Marwick & Mitchell. He is also Chairman of the Insurance Companies Committee of the AICPA and a member of the NAIC Emerging Issues Task Force. Pat, we are very pleased to have you on our program and we sincerely apologize for the omission.

Second, please note that several of the sessions of this seminar are on a limited attendance, pre-registered basis. These sessions are identified as such in your program booklet, and admittance to these sessions have already been assigned on a first come, first served basis. Those of you admitted to these sessions have been notified by mail and should have received admittance tickets attached to your name tag with your registration package.

On page 11 of your program booklet you will find a schedule of the entire day-an-a-half's events at a glance.

We have added two sessions to this schedule to accommodate excess demand.

First, a repeat of session 1G "Managing A Loss Reserve Function" has been scheduled as Session 2H, beginning at 10:30 a.m. today. This happens to be a limited attendance workshop, so that attendees should have already been notified by mail and should have received an admittance ticket at registration.

This session will be held in the Jefferson room on the third floor.

Second, we have also added Session 3H which is a duplicate of Session 4D "Claims-Made Reserving".

Session 3H will begin at 1:30 this afternoon and will be held in room Regency C. Both 4D and 3H are open admittance and you are free, of course, to attend the one of your choice. However, I would encourage those of you who can conveniently switch to 3H to do so because 4D is currently oversubscribed.

One final item. Included in your registration package is an evaluation questionnaire. Please take a moment after each session you attend to fill

out this questionnaire at the seminar registration desk or mail it in to the address indicated.

These evaluations are of critical importance to the 1987 Program Committee which will be convening in a few short weeks to plan next year's seminar.

On behalf of this year's program committee I thank you very much for coming, and hope you all have a very enjoyable seminar.

1986 CASUALTY LOSS RESERVE SEMINAR

1C/5D - INTERMEDIATE TECHNIQUES I

Moderator: Gustave A. Krause, Consulting Actuary
Tillinghast/TPF&C

Panel: Jerome A. Degerness, Actuarial Officer
St. Paul Insurance Companies

Phillip O. Presley, Consulting Actuary
Presley & Associates, Inc.

Recorder: Debra Werland, Sr. Loss Reserve Analyst
USAA

Good morning and welcome to Intermediate Loss Reserve Techniques Session I. I am Gus Krause, and the other panelists and I are here to discuss with you three types of intermediate loss reserve techniques. This is the initial presentation of intermediate techniques at a Casualty Loss Reserve Seminar. We hope to provide you with some useful information, as well as relying on your discussion and questions to help provide the basis for establishing a good foundation for making intermediate loss reserve techniques part of the permanent agenda for these loss reserve seminars.

My co-panelists today include Phil Presley, a consulting actuary with Presley & Associates, who will be discussing expected loss techniques, most specifically the Bornhuetter-Ferguson technique for reserving. My other co-panelist is Jerry Degerness, actuarial officer with St. Paul, who will be discussing hindsight reserving techniques. I will then be discussing the use of report year statistics, focusing on the Fisher-Lange technique, and we will conclude with some time for questions and answers and audience discussion. I would like to have Jerry Degerness begin today's session.

JERRY DEGERNESS: A reserve analysts may be asked two questions: What should the reserve be? and what should it have been? Hindsight analyst focuses on the latter. I will cover various techniques which may be used, give an illustrative example, summarize the hindsight concept, touch on factors that influence hindsight tests and identify areas of application.

Unless otherwise specified, all my comments pertain to total reserves established using an accident year paid loss development technique.

Hindsight analysis can draw on the same reservoir of data, assumptions and methods available for prospective reserve analysis. The task is to put together pieces of a puzzle. In hindsight analysis, part of the puzzle already is in place. Depending on the reserving puzzle, the work which remains may be as difficult or less difficult than that which has been done.

Exhibit I, Pages 1-3

As background for illustration, I have put together an automobile liability reserve analysis using both the paid and incurred loss development methods. All loss development assumptions are trivial so as to place emphasis on the hindsight concept. The squared paid and incurred triangles are shown on pages 1 and 2, respectively, of Exhibit I.

A runoff test is the most basic hindsight reserving method. It compares reserves carried as of the accounting date with subsequent payments and remaining reserves as of the valuation date. Schedule O, parts 1 and 2 and Schedule P, part 2, are examples of runoff tests. A runoff test assumes that current estimates are correct. If the current estimates are not accurate for losses incurred on or before the date of the tested reserve, the runoff test will be distorted by the amount of inaccuracy. When all payments have been made on losses incurred prior to the accounting date, the runoff test is 100% accurate.

Required total reserves shown above the 1985 diagonal on Exhibit I, page 3, are runoff tests. For example, the $34.7 carried total reserve on accident year 1983 as of 1984 consisted of $8.7 in case reserves and $25.9 in IBNR. During 1985, $17.5 (Exhibit I, page 1) was paid on the 1984 accident year, case reserves were set at $5.7 and the reserve analysis shown on Exhibit I, page 3, indicated that $15.7 IBNR remains. Based on this hindsight, it appears the 1983 component of the 1984 reserve was deficient by $4.1. Note that the accident year format does not provide sufficient resolution to divide the deficiency between case and IBNR. Alternatively, a runoff test could have been constructed prior to doing the reserve analysis by using carried IBNR as the estimate.

It is desirable that published financial results reflect accurate reserves in total, by accident year, etc. However, an exhaustive evaluation of a difficult line may take more time than is available before financial statements must be published. Consequently, runoff tests based on published financial statements can be no more than reasonable rules of thumb which probably need fine tuning. Shortcomings of the runoff test may

be overcome by re-evaluating assumptions and developing estimates of what the reserve should have been as of the accounting date.

Reserve evaluations should include projections of how claims will be reported and paid. As development takes place, it is then possible to compare actual results with projections. The analyst then can enjoy instant "hindsight" evaluation of assumptions underlying previous analysis with no more than a review of current data.

Exhibit II, Page 1

Booked losses by calendar/accident year are shown in Exhibit II, page 1. Each subsequent booking is a hindsight on reportings in prior financial statements. Schedule P, Part 2, is a less detailed analogue to this format.

Exhibit II, Page 2

Hindsight and prospective estimates based on the 1985 analysis are summarized on page 2. Schedule P, Part 3 is similar, but does not provide prospective estimates even though it has been referred to as a prospective test[1].

Exhibit III, Page 1 and Page 2

Hindsight and prospective estimates expressed as percentages of estimated ultimates and earned premium are shown on Exhibit III, pages 1 and 2, respectively. Historical ratios provide insight as to the quality of past estimates and future projections. Reserve estimates, expressed as loss ratio components should be reconciled with rate adequacy, frequency and severity trends. Considering estimates in terms of ultimate incurred loss provides a perspective independent of loss ratios.

While these comments are general in nature, they are applicable to both loss and allocated loss adjustment expense reserves.

Projected development is shown below the diagonal on Exhibit III, page 3. If the reserves are perfect, there will be no development beyond the first valuation of each accident year. Payments will match reserve takedowns dollar for dollar and there will be no reserve left after the last payment is made. Actual experience should be tracked against the projections and variations analyzed and explained.

Unallocated loss expense reserves are determined by management philosophy and special studies to make assignment of future payments to loss periods. Statutory reporting requirements specify how actual payments are assigned

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[1]Salzmann, R. "Schedule P on a Calendar/Accident Year Basis." PCAS LIII, 1966, p.1.

to loss years[2]. Hindsight loses its meaning when payments can not be directly associated with specific claims and should not be considered a viable option in evaluating unallocated loss expense reserve needs.

HINDSIGHT CONCEPT: ATTACHMENT 2

Loss reserves are reported as "Unpaid Losses" on the liability side (page 3 and Part 3A) of the statutory balance sheet. The account provides for unpaid contractual obligations that exist as of the statement or "accounting" date. Since very little information beyond the accounting date is available when the statement is prepared, reserve estimates reported in financial statements are prospective in nature. Simply stated, a reserve provides for future payments on past losses.

Hindsight analysis preserves the "future payments on past losses" concept. However, data used is tabulated at a "valuation date" which is later than the "accounting date". In short, the hindsight concept requires than an analyst:

> Estimate reserves as of a given date (accounting date) with information gathered at a later date (valuation date).

ADVANTAGES OF HINDSIGHT: ATTACHMENT 3

More facts and fewer estimates give hindsight more credibility than prospective estimates. While hindsight opinions suffer from a timeliness disadvantage, current estimates often can be supported by analogy to hindsights on past reserves.

Calendar year incurred losses are equal to accident year ultimate incurred losses plus the change in reserve margin[3]. Hindsight analysis facilitates better understanding of reserve margin changes which leads to more accurate interpretations of underwriting experience.

Reserve considerations are different from one line of business to another and change with time. A reserve analyst should follow more than one method to insure all relevant considerations have been taken into account. Hindsight analysis helps insure that all underlying assumptions are fully understood.

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[2]Note (G) on 1985 Schedule P, Part 1

[3]Balcarek, R.J. "Effect of Reserve Margins in Calendar Year Results." PCAS LII, 1965, p.1.

Changing conditions may require a change in the method used to establish reserves[4], but before changing, hindsight evaluations should be reviewed carefully. New circumstances may not yet be evident in the data used for analysis. Transitions to claims-made or no-fault coverage are typical of situations where assumptions and conclusions must be structured differently for the exposure periods before and after the change. Hindsight analysis, like any other reserve method, is not a substitute for informed judgment.

Measures of financial strength are incomplete without reserve tests. Hindsight evaluations provide a strong indication of how inaccurate reserves may be. Past performance is a good indicator of how much uncertainty is embedded in the reserves. If past variations do not threaten surplus, the company probably is in good shape. If these variations threaten surplus, the company may be impaired.

Hindsight estimates can be used to indicate whether current reserves are reasonable. The classic illustration of this concept is displayed in Schedule P, part 3, which uses current estimates of incurred loss and payment history to compute hindsight reserve estimates. Both payments and reserves are shown as percentages of earned premium for the last five accident years at similar stages of development. The analyst can review trends and speculate as to current reserve conditions.

DISADVANTAGES OF HINDSIGHT: ATTACHMENT 4

Hindsights should be prepared and evaluated during non-critical reserving periods. Management is not likely to be very interested in what the reserves should have been when current results are about to be reported.

Hindsights probably will not be feasible unless they are made part of current reserve evaluations. Workpapers should be prepared with hindsights as part of the analysis. Otherwise, hindsights will be cost prohibitive and, even if they get done, may be unnecessarily difficult to relate to prospective reserving methods. Computerization can reduce the marginal effort to zero.

DATA REQUIREMENTS/FORMATS: ATTACHMENT 3

Exhibit IV

Hindsight methods generally depend on the same statistical, accounting and systems support mechanisms as other reserve methods. Formats depend on the type of hindsight. Consider the three runoff test formats shown on Exhibit IV. Total reserve runoff shown on page 1 displays subsequent payments, current case and current IBNR; it is a function of the accident date and accounting date. Case reserve runoff shown on page 2 displays subsequent payments and current case reserves; it is a function of the report date and accounting date. IBNR runoff shown on page 3 displays subsequent payments,

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[4]Fisher, W. H. and Lester, E. P. "Loss Reserve Testing in a Changing Environment." PCAS LXII, 1975, p. 154.

current case and current IBNR; it is a function of the accident date, report date and accounting date.

Inflation assumptions must be reflected in hindsight estimates as they are in prospective evaluations, but here again we have the luxury of more facts and less need for speculation. The same is true for trending considerations.

The numerical data should be accompanied by a well developed text describing exposure history, coverage history, history of claim practices and other operating considerations which rely upon loss reserve development. The text should be reviewed and updated during each analysis. Verbalizing the analysis improves chances for intelligent communication and understanding of results.

AREAS OF APPLICATION: ATTACHMENT 6

The most obvious area of application is in improving prospective methods. Retrospective scrutiny of assumptions as described above will inevitably weed out inconsistent and erroneous assumptions. Prospective tests will become more reliable and easier to explain with the benefit of hindsight analysis. In a sense, hindsight evaluations are to the reserve analyst what game films are to a football coach.

Hindsight analysis removes some of the mystery from the reserving process. It is easy to understand actual payments and it is rational to accept reserve methods which fold actual payments into methods used to provide prospective estimates.

Reserve standards should be realistic and there is no better way to establish what should be expected from the reserving process than to track how well various techniques perform. The analyst can also be evaluated in terms of whether his or her reserve decisions were reasonable given the information available when they were made.

Underwriting results can be more accurately stated if hindsight analysis is used to measure changes in calendar year reserve margins.

Hindsight evaluations are available, or can be derived, from published reserve information. Schedules O & P, SEC disclosure reports and A.M. Best's publications are sources that provide a good deal of insight into a company's reserve condition.

Hindsights are a reasonable way to critically review reserving practices, particularly if the review is conducted a year or two after the accounting date. Independent auditors, insurance department auditors and IRS agents should consider hindsight evaluations including, but not limited to, runoff tests of company reserves.

PITFALLS: ATTACHMENT 7

Hindsight analysis is a supplement to, not a replacement for, prospective reserve methods. It is tempting to assume that past adequacy implies current adequacy, but hindsight can be misleading. If current reserves are sufficiently deficient, a runoff test could indicate redundancy when the reserve being tested was actually deficient.

Hindsight analysis can confirm assumptions that are no longer correct. The analyst can hedge against such a mistake by carefully explaining all assumptions in writing and sharing them with underwriting, claim and accounting staff who may recognize operating facts which are incorrectly built into the assumptions. The analyst should not count on himself/herself to catch all mistakes in assumptions; the business is too complex for any one person to know and see everything pertinent.

NOTE: Due to recording difficulties a transcript of Mr. Presley's presentation is not available.

GUS KRAUSE: Thank's Phil.

The critical assumption in all reserving methods is that you either assume case reserves are adequate or you make an adjustment for the potential distortion if they are not. I will be focusing on a method that can be used to test the adequacy of case reserves. The genesis of this kind of testing goes back at least to a written article by Jeff Lang and Wayne Fisher in 1973 titled "Loss Reserve Testing: A Report Year Approach." The direction of the article was to develop the ability of the actuary or the loss reserve specialist to test the adequacy of the case reserves. In any analysis the case reserves and the payments represent the known data. The IBNR development on case reserves and all the other components of future development are unknown. The case values are the basis on which most projections are made. There are some methods like Bornhuetter-Ferguson which ignore to varying degrees the losses that have been reported and attempt to make independent estimates of IBNR. However, most conventional methods rely heavily on case reserves. At the end of Jerry's comments one of his last exhibits showed a runoff test we're data was organized by report year or recorded year which enables you to test with hindsight case reserves that existed at sometime in the past. Fisher and Lang presented a method using primarily paid loss data to provide a test of either current or prior case reserves. There is nothing particularly sacred about the use of paid loss data only. However, they did point out that by using that approach you do avoid the possible distortion of attempting to evaluate case reserves with data that includes case reserves. Theirs is a useful type of approach, but it is not mandatory that you rely solely on paid loss data. I am going to describe very briefly what they tried to do with the method and then talk about some of the qualitative aspects of the results of that method. First of all, Fisher and Lange ignored accident year. This fact distinguishes their methods from most other reserving methods. They ignored accident year and arranged their data by reported year or recorded year, that is, the year in which the value of a claim first goes on the company books. Some people refer to this point in time as report date; others call it recorded date. It is most important to arrange the data so that you have a closed group of claims. In other words, all claims that hit the books in 1985 are valuated over the future as one group. There are no new claims coming in. There are no claims disappearing from the database. With this approach you do not have the problems inherent in analyzing accident year data, with its associated IBNR claims. The objectives of this type of analysis are multipurpose. First of all, it measures case reserve adequacy from year to year. If you have a current evaluation and some hindsight evaluations you have an idea of how case reserve adequacy has changed in each year during the calendar year. On a more detailed basis the method allows you to observe the contribution to that adequacy and the changes in that adequacy for each report year. The method uses each report year separately as well as in total. And finally, the method allows you to test the sensitivity of your case reserve adequacy to the changes in assumptions that are made regarding certain variable such as the disposal or settlement pattern of claims and inflation or severity

trend. The data is arranged by report year and in a triangular format, identical to the accident year format. Basically, you keep track of claims reported in a given year, the subsequent payments and the subsequent case reserves carried on those claims until they are all settled. An important element in the Fisher-Lange approach is that they concentrate on both the incremental changes and cumulative values in payments and case reserves. You need to visualize triangles which are both paid to date as well as payments made incrementally during each year. The same configuration is used for paid or closed claim counts, depending on your own company terminology. Their method then projects or estimates the disposal pattern for claim counts; in other words, how fast will the claims be liquidated for a given report year. The authors chose a method of estimation which compares claims closed in each period to the beginning pending inventory count for each report year. If, for a given time interval the claim department typically closes 30% of the cases they start, then they will use that number. Like any fundamental reserve analysis you can't attempt to discern trends in these disposal ratios. The authors also examined the average paid claim or average closed claim by interval as the report years were closed out. They observed that the averages of the claims that were older, that is claims reported 5 years ago that were now being closed, tended to increase at a faster rate than the younger and newer claims. This phenomenon was debated rigorously by Dave Skernick in his review of their article. This kind of a trend or movement in a reserve statistic can be measured in a variety of ways. The incremental number of closed claims and the incremental average values to be paid were combined and loss projections were made. These losses were then accumulated and compared to the case reserves currently held for each report year as their test of current adequacy. They used a method which was more or less not influenced by the case reserve data itself in testing those case reserves. Hindsight analysis along the way described by Jerry may then be conducted on the adequacy level of past case reserves.

What you have is a matrix of what has been going on by report year and in total for the body of data in question. You can take that set of data and also test the sensitivity of those adequacy estimates to changes in your assumptions about claim disposal or rates of trend in the average cost statistics, say if you visualize a certain disposal pattern and severity trends of 8% per year for example. You simply change your disposal patterns, the severity trend or the inflationary rates, or both, and develop a new estimate of the adequacy. This exercise is very useful, for internally it tells you how sensitive your assumptions about case adequacy are going to be to either small or large changes in the underlying patterns and inflation rates. Some of the more qualitative aspects of the results of this process become very apparent. First of all, it provides you with a basis for feeding other reserving processes. As I mentioned at the outset, most reserve methods have either implicit or require explicit assumptions about case reserve adequacy. If you do not test the case reserve adequacy all you have are arbitrary assumptions. If you want to refine your reserving process, it is important that you try and develop some methods that start giving you some clues about case reserve adequacy. Analyzing report year or recorded year data is a big step in the right direction. The analysis gives you some insight into the financial effects due to

changes in case reserve adequacy. If your total estimates including IBNR and everything else have been drifting up or drifting down, this analysis enables you to see how much of that was attributable to changes in case reserve levels versus changes coming from estimates of the unknown portion of the reserve, the development portion. The indications and the results from testing report year data are extremely useful in dealing with the claim department. Every claim department in the industry has strengthened its reserves for each of the last 22 years. Claim departments are often not quantitatively oriented and there is a lot of pressure from outside the claim department on the claim department just like there is on the actuarial department. What ends up being recorded as case reserves and what ends up going into file evaluations may not have much to do with improved procedures. It is important that you deal with the claim department, they provide the primary data upon which you rely. The issue is to get a mutual effort between departments underway. This kind of data, report year data, the way claim departments manage their business; for the most part, they are not concerned with accident dates. They are concerned about new arising claims, and once they are on the books, a management process begins. The management process is usually insensitive to accident dates. Moreover, do not manage your companies by accident year, at least not as long as you file calendar year financial results. The methods I have described can be applied almost universally by line of business or subline and by geographical location. Claim departments are certainly interested if case reserve adequacy is changing, and the first question is going to be where is it changing, by line, by office, etc.

One of the pitfalls in the data, if you arrange it the way Fisher-Lange did with payment data and average closed claim amounts, you have to be careful on lines with significant partial payments. You must also decide how to handle reopened claims if there are a major number of them. You have to make sure that you are dealing with report date, the date that the first reserve or the first valuation of the claim hits the books. You want to try and avoid the so called pipeline flow of claims that were reported in December but not put on the books until January. It is not a major issue, but it is a lot cleaner if you start out with 1,000 claims, you always end up with 1,000 rather than 1,050 claims. Changes in the business are always going to affect this method like they affect any method. If for some reason the actual reporting pattern of the claims are changing or if your exposure is going haywire, you are going to have to account for those changes. The Fisher-Lange approach is not going to solve everybody's problems all at once.

We will now open the floor for questions.

QUESTION: I'd like to ask you about the partial payment part of Fisher-Lange. I don't recollect that there was any explanation of what to do about it. I have one suggestion I would like you to comment on it or someone else. Say you get a case in the first year and it has a partial payment of $5,000, and a reserve at the end of the year of $15,000. I would use that as a $20,000 reserve at the end of the year and forget about that partial payment. Then subsequently if there was another $3,000

partial payment in the second report year, I'd do the same thing. I would now consider that as a $23,000 reserve at the end of the second report year, thus keeping the discrete number the same.

MODERATOR RESPONSE: The observation was I didn't tell you how to do anything about partial payments. And the example was if you have a claim with partial payments, what about considering the partial payments just as part of what's called case reserve in the Fisher-Lang technique. That's a very acceptable way to handle it. Because short of getting rid of partial payment claims and treating them some other way, that's may [be one of the only ways you can leave them in the database. For the benefit of everyone Mr. Fowler was saying if you have a $5,000 partial payment and you're currently carrying a $15,000 reserve, you treat the whole $20,000 as what you were calling case reserves -- what we're testing. In other words, you don't really test that claim until its been paid in full. It just sits as open claim and it doesn't effect the payment part of the data in the analysis. That's a perfectly good way to do that.

QUESTION: INAUDIBLE.

PANEL RESPONSE: The question is, in a line where you move from adjuster reserving to factor reserving, is Fisher-Lange valuable? I think the answer is yes both in terms of the transition period as well as on an ongoing basis. It's clearly valuable on an ongoing basis. In other words, if you've got a whole triangle of development data after you've been on the factor system you can test those factor reserves the same way you'd test adjuster reserves. I think that you don't really confuse things too much even in the transition period. In fact, it may be very useful in the transition because depending on the magnitude of change in the reserve level initially when you move from adjuster estimates to factor reserves and how that change is distributed back by age of claim, Fisher-Lange allows you to analyze the case reserve levels, however they're set by age as well as in total. You can see if you have relatively inaccurate factor reserve assumptions by different ages. They might be great in total but terrible on the old claims and redundant on the younger claims or something like that. I think it does work and certainly the way they use it with staying with paid loss data. If you start trying to modify it too much you may run into some problems.

QUESTION: The Fisher-Lange technique where they're trying to establish the severity by the aging ... how do they treat partial payments?

PANEL RESPONSE: That was a problem area. I don't have the article with me. I'm not sure they really treated it because their example used a line where there weren't any. They identified it as a problem. And what you have to do is you either make the implicit assumption that historic partial payments throughout the triangle have the same effect everywhere or if that's not a safe assumption, then you need to get that partial payment data out somehow. Either treat it separately or at least ignore it in terms of the Fisher-Lange analysis per se. A suggestion was made yesterday that if you had a $15,000 claim reserve, and during the year you pay $5,000 and then at the end of the year you have $10,000 left in the reserve

portion, then treat the whole $15,000 as a case reserve for the purpose of the Fisher-Lange analysis. In other words, you don't let that payment enter the analysis at all, because you don't have a closed claim count to go along with it. This is also true if you extend the method into things like allocated expenses where fairly frequently you have lots of partial payments. The method doesn't work very well in those cases. Any other questions?

QUESTION: Are you reserving to just case reserves now? The Fisher-Lang would do some of that but I think not only look at the analysis but also look at the average size of reserves. I'd take your new reserves and get a measure of what the average new reserve has done. Has it gone up 5% a year, has it gone down, has it gone up and then gone down? Does that correspond to change in claim management or some type of management directive to the claim department. There are a lot of things that could effect it. Another thing that I would suggest would be looking at the average size of reserve by age of case. What is your distribution of reserves? The older they become the larger they tend to be or need to be if you have a distribution that looks like it makes sense at the various points in time, or doesn't make sense. I think just intuitively along with the Fisher-Lange or the report year approach, incurred development or paid development techniques can be applied. You can make some intuitive judgments with that. Also, it's very important to know the history of what has happened with the claim department. What have they been doing? What were the charged with? Were they overstaffed? Were they understaffed? Were they using attorneys? Were they being aggressive with their settlements or were they being liberal in the payments? What has happened historically?

QUESTION: The question is if you're trying to use exposures in these methods, how accurate are they for commercial lines such as GL and automobile? Exposures are always a problem. In automobile it's normally a little easier to pick them up because you are dealing with the physical, vehicle, or unit counts of some kind. In general liability we almost never end up with exposure counts unless you're dealing with a very, narrow specific class of business where all the exposure units are of a common base. Once you get into general liability things fall apart pretty quickly and you end up using policy count, or premium type surrogates for the exposure base.

I think that's a pretty good summary of what's there. I think you can look for everything that you can find that can measure exposure that is feasible and practical to bring to bear and do what you can with it. And hopefully whatever you're using has been estimated, recorded and interpreted accurately.

On changes in exposure we find several companies have fairly good records of what they've done to their prices. If you couple that up with your premium volume you can estimate it pretty well, and measure the exposure changed. At some point you've got to pick a base to start with. But that's one way to get around at least part of the issue in terms of how the exposures are moving and changing.

Where you have an auditable exposure I think one must look at the payment premium audit. Are they getting a lot of additional audits? Are they getting additional premiums and return premiums? I think that could also lend some insight.

In case of general liability I would tend to recommend using real caution on either a premium or exposure base. We all know what's happening to the market these days. Many of these changes are made to the individual risk level as opposed to a general pricing guideline for the line as a whole. I would say a real pitfall of any of the things that we've talked about here would be changes in pricing strategy which could have a very gigantic effect. I would caution against using those bases if at all possible.

Attachment 1

Methods/Variations

- Runoff
- Retrospective estimates
- Projection vs. actual
- IBNR
- Case reserves
- Allocated loss expense reserves
- Unallocated loss expense reserves

EXHIBIT I
AUTO LIABILITY Page 1

Paid Loss Development History

	PREMIUM	AY	AY+1	AY+2	AY+3	AY+4	AY+5
1980	$191.7	$71.7	$101.0	$120.4	$132.9	$140.8	$144.1
1981	$185.3	$69.3	$97.6	$116.3	$128.5	$136.0	
1982	$170.1	$63.6	$89.6	$106.8	$117.9		
1983	$173.0	$64.7	$91.2	$108.6			
1984	$170.4	$63.8	$89.8				
1985	$180.0	$67.4					
		1.408	1.192	1.104	1.059	1.024	
1980		1.408	1.192	1.104	1.059		
1981		1.408	1.192	1.104			
1982		1.408	1.192				
1983		1.408					
1984							
1985							
Average:		1.408	1.192	1.104	1.059	1.024	1.000

Paid Loss Development Projection (Cumulative)

	PREMIUM	AY	AY+1	AY+2	AY+3	AY+4	AY+5	Ultimate
1980	$191.7	$71.7	$101.0	$120.4	$132.9	$140.8	$144.1	$144.1
1981	$185.3	$69.3	$97.6	$116.3	$128.5	$136.0	$139.2	$139.2
1982	$170.1	$63.6	$89.6	$106.8	$117.9	$124.9	$127.8	$127.8
1983	$173.0	$64.7	$91.2	$108.6	$119.9	$127.0	$130.0	$130.0
1984	$170.4	$63.8	$89.8	$107.0	$118.2	$125.1	$128.1	$128.1
1985	$180.0	$67.4	$94.9	$113.1	$124.9	$132.2	$135.3	$135.3

Paid Loss Development Projection (Incremental)

	PREMIUM	AY	AY+1	AY+2	AY+3	AY+4	AY+5	Ultimate
1980	$191.7	$71.7	$29.3	$19.3	$12.6	$7.8	$3.3	$0.0
1981	$185.3	$69.3	$28.3	$18.7	$12.1	$7.6	$3.2	$0.0
1982	$170.1	$63.6	$26.0	$17.2	$11.1	$6.9	$2.9	$0.0
1983	$173.0	$64.7	$26.4	$17.5	$11.3	$7.0	$3.0	$0.0
1984	$170.4	$63.8	$26.1	$17.2	$11.2	$7.0	$2.9	$0.0
1985	$180.0	$67.4	$27.5	$18.2	$11.8	$7.3	$3.1	$0.0

Calendar Year Paid

1980	1981	1982	1983	1984	1985	1986	1987
$71.7	$98.6	$111.3	$122.0	$127.3	$132.9	$66.2	$42.6

1988	1989	1990	1991
$21.7	$10.3	$3.1	$0.0

EXHIBIT I
AUTO LIABILITY Page 2

Incurred Loss Development History

	PREMIUM	AY	AY+1	AY+2	AY+3	AY+4	AY+5
1980	$191.7	$86.4	$110.7	$126.7	$136.9	$142.4	$144.1
1981	$185.3	$83.5	$107.0	$122.4	$132.2	$137.6	
1982	$170.1	$76.6	$98.2	$112.4	$121.4		
1983	$173.0	$77.9	$99.9	$114.3			
1984	$170.4	$76.8	$98.4				
1985	$180.0	$81.1					
1980		1.282	1.144	1.080	1.041	1.012	
1981		1.282	1.144	1.080	1.041		
1982		1.282	1.144	1.080			
1983		1.282	1.144				
1984		1.282					
1985							
Average:		1.282	1.144	1.080	1.041	1.012	1.000

Incurred Loss Development Projection (Cumulative)

	PREMIUM	AY	AY+1	AY+2	AY+3	AY+4	AY+5	Ultimate
1980	$191.7	$86.4	$110.7	$126.7	$136.9	$142.4	$144.1	$144.1
1981	$185.3	$83.5	$107.0	$122.4	$132.2	$137.6	$139.2	$139.2
1982	$170.1	$76.6	$98.2	$112.4	$121.4	$126.3	$127.8	$127.8
1983	$173.0	$77.9	$99.9	$114.3	$123.5	$128.5	$130.0	$130.0
1984	$170.4	$76.8	$98.4	$112.6	$121.7	$126.6	$128.1	$128.1
1985	$180.0	$81.1	$104.0	$119.0	$128.5	$133.7	$135.3	$135.3

Incurred Loss Development Projection (Incremental)

	PREMIUM	AY	AY+1	AY+2	AY+3	AY+4	AY+5	Ultimate
1980	$191.7	$86.4	$24.3	$16.0	$10.2	$5.6	$1.7	$0.0
1981	$185.3	$83.5	$23.5	$15.4	$9.8	$5.4	$1.6	$0.0
1982	$170.1	$76.6	$21.6	$14.2	$9.0	$4.9	$1.5	$0.0
1983	$173.0	$77.9	$21.9	$14.4	$9.2	$5.0	$1.5	$0.0
1984	$170.4	$76.8	$21.6	$14.2	$9.0	$4.9	$1.5	$0.0
1985	$180.0	$81.1	$22.8	$15.0	$9.6	$5.2	$1.6	$0.0

Calendar Year Case Incurred

1980	1981	1982	1983	1984	1985	1986	1987
$86.4	$107.8	$116.1	$125.1	$128.3	$133.2	$52.8	$32.2

1988	1989	1990	1991
$16.0	$6.7	$1.6	$0.0

Carried Case Reserves (Incurred - Paid)

	PREMIUM	AY	AY+1	AY+2	AY+3	AY+4	AY+5
1980	$191.7	$14.7	$9.7	$6.3	$3.9	$1.7	$0.0
1981	$185.3	$14.2	$9.3	$6.1	$3.8	$1.6	
1982	$170.1	$13.0	$8.6	$5.6	$3.5		
1983	$173.0	$13.2	$8.7	$5.7			
1984	$170.4	$13.0	$8.6				
1985	$180.0	$13.8					

Implied Case Reserves (Incurred - Paid)

	PREMIUM	AY	AY+1	AY+2	AY+3	AY+4	AY+5
1980	$191.7	$14.7	$9.7	$6.3	$3.9	$1.7	$0.0
1981	$185.3	$14.2	$9.3	$6.1	$3.8	$1.6	$0.0
1982	$170.1	$13.0	$8.6	$5.6	$3.5	$1.5	$0.0
1983	$173.0	$13.2	$8.7	$5.7	$3.5	$1.5	$0.0
1984	$170.4	$13.0	$8.6	$5.6	$3.5	$1.5	($0.0)
1985	$180.0	$13.8	$9.1	$5.9	$3.7	$1.5	($0.0)

Carried IBNR

	PREMIUM	AY	AY+1	AY+2	AY+3	AY+4	AY+5
1980	$191.7	$57.5	$28.8	$15.3	$7.7	$1.9	$0.0
1981	$185.3	$55.6	$27.8	$14.8	$7.4	$1.9	
1982	$170.1	$51.0	$25.5	$13.6	$6.8		
1983	$173.0	$51.9	$25.9	$13.8			
1984	$170.4	$51.1	$25.6				
1985	$180.0	$54.0					
		30.0%	15.0%	8.0%	4.0%	1.0%	0.0%

(===== IBNR as a % of Earned Premium

Required IBNR

	PREMIUM	AY	AY+1	AY+2	AY+3	AY+4	AY+5
1980	$191.7	$57.7	$33.4	$17.4	$7.2	$1.7	$0.0
1981	$185.3	$55.7	$32.2	$16.8	$7.0	$1.6	$0.0
1982	$170.1	$51.2	$29.6	$15.4	$6.4	$1.5	$0.0
1983	$173.0	$52.0	$30.1	$15.7	$6.5	$1.5	$0.0
1984	$170.4	$51.3	$29.6	$15.5	$6.4	$1.5	$0.0
1985	$180.0	$54.2	$31.3	$16.3	$6.8	$1.6	$0.0

AY = 1983 Accounting Date = 1984

Carried Case	$8.7
Carried IBNR	$25.9
Carried Total Reserve	$34.7

Required Total Reserve (Paid Ultimate - Paid to Date)

	PREMIUM	AY	AY+1	AY+2	AY+3	AY+4	AY+5
1980	$191.7	$72.3	$43.0	$23.7	$11.1	$3.3	$0.0
1981	$185.3	$69.9	$41.6	$22.9	$10.7	$3.2	$0.0
1982	$170.1	$64.2	$38.2	$21.0	$9.9	$2.9	$0.0
1983	$173.0	$65.3	$38.8	$21.4	$10.0	$3.0	$0.0
1984	$170.4	$64.3	$38.3	$21.1	$9.9	$2.9	$0.0
1985	$180.0	$67.9	$40.4	$22.2	$10.5	$3.1	$0.0

Runoff of:

$38.8 =	
Subsequent Paid	$17.5
+ Case @ 1985	$5.7
+ Est. IBNR @ 1985	$15.7
	$38.8

Indicated Redundancy / (Deficiency) = ($4.1)

EXHIBIT II

AUTO LIABILITY

Page 1

Reported Losses by Calendar/Accident Year

	PREMIUM	AY	AY+1	AY+2	AY+3	AY+4	AY+5
1980	$191.7						
	Paid	$71.7	$101.0	$120.4	$132.9	$140.8	$144.1
	Case	$14.7	$9.7	$6.3	$3.9	$1.7	$0.0
	IBNR	$57.5	$28.8	$15.3	$7.7	$1.9	$0.0
Booked	Incurred	$143.9	$139.5	$142.0	$144.5	$144.3	$144.1
1981	$185.3						
	Paid	$69.3	$97.6	$116.3	$128.5	$136.0	
	Case	$14.2	$9.3	$6.1	$3.8	$1.6	
	IBNR	$55.6	$27.8	$14.8	$7.4	$1.9	
Booked	Incurred	$139.1	$134.8	$137.2	$139.7	$139.5	
1982	$170.1						
	Paid	$63.6	$89.6	$106.8	$117.9		
	Case	$13.0	$8.6	$5.6	$3.5		
	IBNR	$51.0	$25.5	$13.6	$6.8		
Booked	Incurred	$127.6	$123.7	$126.0	$128.2		
1983	$173.0						
	Paid	$64.7	$91.2	$108.6			
	Case	$13.2	$8.7	$5.7			
	IBNR	$51.9	$25.9	$13.8			
Booked	Incurred	$129.8	$125.8	$128.1			
1984	$170.4						
	Paid	$63.8	$89.8				
	Case	$13.0	$8.6				
	IBNR	$51.1	$25.6				
Booked	Incurred	$127.9	$124.0				
1985	$180.0						
	Paid	$67.4					
	Case	$13.8					
	IBNR	$54.0					
Booked	Incurred	$135.1					

EXHIBIT II

AUTO LIABILITY

Page 2

Current Valuation of Losses by Calendar/Accident Year

	PREMIUM	AY	AY+1	AY+2	AY+3	AY+4	AY+5
1980	$191.7						
	Paid	$71.7	$101.0	$120.4	$132.9	$140.8	$144.1
	Case	$14.7	$9.7	$6.3	$3.9	$1.7	$0.0
	IBNR	$57.7	$33.4	$17.4	$7.2	$1.7	$0.0
Estimate @ 12/85		$144.1	$144.1	$144.1	$144.1	$144.1	$144.1
1981	$185.3						
	Paid	$69.3	$97.6	$116.3	$128.5	$136.0	$139.2
	Case	$14.2	$9.3	$6.1	$3.8	$1.6	$0.0
	IBNR	$55.7	$32.2	$16.8	$7.0	$1.6	$0.0
Estimate @ 12/85		$139.2	$139.2	$139.2	$139.2	$139.2	$139.2
1982	$170.1						
	Paid	$63.6	$89.6	$106.8	$117.9	$124.9	$127.8
	Case	$13.0	$8.6	$5.6	$3.5	$1.5	$0.0
	IBNR	$51.2	$29.6	$15.4	$6.4	$1.5	$0.0
Estimate @ 12/85		$127.8	$127.8	$127.8	$127.8	$127.8	$127.8
1983	$173.0						
	Paid	$64.7	$91.2	$108.6	$119.9	$127.0	$130.0
	Case	$13.2	$8.7	$5.7	$3.5	$1.5	$0.0
	IBNR	$52.0	$30.1	$15.7	$6.5	$1.5	$0.0
Estimate @ 12/85		$130.0	$130.0	$130.0	$130.0	$130.0	$130.0
1984	$170.4						
	Paid	$63.8	$89.8	$107.0	$118.2	$125.1	$128.1
	Case	$13.0	$8.6	$5.6	$3.5	$1.5	($0.0)
	IBNR	$51.3	$29.6	$15.5	$6.4	$1.5	$0.0
Estimate @ 12/85		$128.1	$128.1	$128.1	$128.1	$128.1	$128.1
1985	$180.0						
	Paid	$67.4	$94.9	$113.1	$124.9	$132.2	$135.3
	Case	$13.8	$9.1	$5.9	$3.7	$1.5	($0.0)
	IBNR	$54.2	$31.3	$16.3	$6.8	$1.6	$0.0
Estimate @ 12/85		$135.3	$135.3	$135.3	$135.3	$135.3	$135.3

EXHIBIT III

AUTO LIABILITY

Page 1

As a % of Ultimate

	PREMIUM	AY	AY+1	AY+2	AY+3	AY+4	AY+5
1980	133.1%						
	Paid	49.8%	70.1%	83.6%	92.3%	97.7%	100.0%
	Case	10.2%	6.7%	4.4%	2.7%	1.1%	0.0%
	IBNR	40.0%	23.2%	12.1%	5.0%	1.1%	0.0%
	Incurred	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
1981	133.1%						
	Paid	49.8%	70.1%	83.6%	92.3%	97.7%	100.0%
	Case	10.2%	6.7%	4.4%	2.7%	1.1%	0.0%
	IBNR	40.0%	23.2%	12.1%	5.0%	1.1%	0.0%
	Incurred	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
1982	133.1%						
	Paid	49.8%	70.1%	83.6%	92.3%	97.7%	100.0%
	Case	10.2%	6.7%	4.4%	2.7%	1.2%	0.0%
	IBNR	40.0%	23.2%	12.1%	5.0%	1.2%	0.0%
	Incurred	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
1983	133.1%						
	Paid	49.8%	70.1%	83.6%	92.3%	97.7%	100.0%
	Case	10.2%	6.7%	4.4%	2.7%	1.2%	0.0%
	IBNR	40.0%	23.2%	12.1%	5.0%	1.1%	0.0%
	Incurred	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
1984	133.1%						
	Paid	49.8%	70.1%	83.6%	92.3%	97.7%	100.0%
	Case	10.2%	6.7%	4.4%	2.7%	1.1%	0.0%
	IBNR	40.0%	23.1%	12.1%	5.0%	1.1%	0.0%
	Incurred	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
1985	133.1%						
	Paid	49.8%	70.1%	83.6%	92.3%	97.7%	100.0%
	Case	10.2%	6.7%	4.4%	2.7%	1.1%	0.0%
	IBNR	40.0%	23.1%	12.1%	5.0%	1.1%	0.0%
	Incurred	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

As a % of Earned Premium

	PREMIUM	AY	AY+1	AY+2	AY+3	AY+4	AY+5
1980	100.0%						
	Paid	37.4%	52.7%	62.8%	69.3%	73.4%	75.1%
	Case	7.6%	5.0%	3.3%	2.0%	0.9%	0.0%
	IBNR	30.1%	17.4%	9.1%	3.8%	0.9%	0.0%
							*******
	Incurred	75.1%	75.1%	75.1%	75.1%	75.1%	75.1%
1981	100.0%						
	Paid	37.4%	52.7%	62.8%	69.3%	73.4%	75.1%
	Case	7.6%	5.0%	3.3%	2.0%	0.9%	0.0%
	IBNR	30.1%	17.4%	9.1%	3.8%	0.9%	0.0%
						*******	
	Incurred	75.1%	75.1%	75.1%	75.1%	75.1%	75.1%
1982	100.0%						
	Paid	37.4%	52.7%	62.8%	69.3%	73.4%	75.1%
	Case	7.6%	5.0%	3.3%	2.0%	0.9%	0.0%
	IBNR	30.1%	17.4%	9.1%	3.8%	0.9%	0.0%
					*******		
	Incurred	75.1%	75.1%	75.1%	75.1%	75.1%	75.1%
1983	100.0%						
	Paid	37.4%	52.7%	62.8%	69.3%	73.4%	75.1%
	Case	7.6%	5.0%	3.3%	2.0%	0.9%	0.0%
	IBNR	30.1%	17.4%	9.1%	3.8%	0.9%	0.0%
				*******			
	Incurred	75.1%	75.1%	75.1%	75.1%	75.1%	75.1%
1984	100.0%						
	Paid	37.4%	52.7%	62.8%	69.3%	73.4%	75.1%
	Case	7.6%	5.0%	3.3%	2.0%	0.9%	0.0%
	IBNR	30.1%	17.4%	9.1%	3.8%	0.9%	0.0%
			*******				
	Incurred	75.1%	75.1%	75.1%	75.1%	75.1%	75.1%
1985	100.0%						
	Paid	37.4%	52.7%	62.8%	69.3%	73.4%	75.1%
	Case	7.6%	5.0%	3.3%	2.0%	0.9%	0.0%
	IBNR	30.1%	17.4%	9.1%	3.8%	0.9%	0.0%
		*******					
	Incurred	75.1%	75.1%	75.1%	75.1%	75.1%	75.1%

EXHIBIT III

AUTO LIABILITY

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Projected Development

	PREMIUM	AY	AY+1	AY+2	AY+3	AY+4	AY+5
1980	$192						
	Paid	$72	$29	$19	$13	$8	$3
	Case	$15	($5)	($3)	($2)	($2)	($2)
	IBNR	$58	($24)	($16)	($10)	($6)	($2)
	Incurred	$144	$0	$0	$0	$0	$0
1981	$185						
	Paid	$69	$28	$19	$12	$8	$3
	Case	$14	($5)	($3)	($2)	($2)	($2)
	IBNR	$56	($24)	($15)	($10)	($5)	($2)
	Incurred	$139	$0	$0	$0	$0	$0
1982	$170						
	Paid	$64	$26	$17	$11	$7	$3
	Case	$13	($4)	($3)	($2)	($2)	($1)
	IBNR	$51	($22)	($14)	($9)	($5)	($1)
	Incurred	$128	$0	$0	$0	$0	$0
1983	$173						
	Paid	$65	$26	$17	$11	$7	$3
	Case	$13	($4)	($3)	($2)	($2)	($2)
	IBNR	$52	($22)	($14)	($9)	($5)	($1)
	Incurred	$130	$0	$0	$0	$0	$0
1984	$170						
	Paid	$64	$26	$17	$11	$7	$3
	Case	$13	($4)	($3)	($2)	($2)	($1)
	IBNR	$51	($22)	($14)	($9)	($5)	($1)
	Incurred	$128	$0	$0	$0	$0	$0
1985	$180						
	Paid	$67	$28	$18	$12	$7	$3
	Case	$14	($5)	($3)	($2)	($2)	($2)
	IBNR	$54	($23)	($15)	($10)	($5)	($2)
	Incurred	$135	$0	$0	$0	$0	$0

Attachment 2

Hindsight Concept

Estimate reserves as of a given date (accounting date) with information through a later date (valuation date).

Attachment 3

Advantages Of Hindsight

- More facts, fewer estimates
- Accurate interpretation of underwriting results
- Increase understanding of assumptions
- Improve prospective estimation methods
- Measure of financial strength
- Confirm estimates are/were reasonable

Attachment 4

Disadvantages Of Hindsight

- Too late to go on the books
- Too much work
  (takes time from prospective evaluations)

Attachment 5

Data Requirements And Formats

- Generally the same as for prospective tests
- Total reserve
- Calendar year
- Accident year
- Loss
- Loss espense
- Salvage & subrogation
- Exposure
- Premium
- Test all assumptions
- Written explanation of results

AUTO LIABILITY

Development Through (months):		Total Reserve as of: 1980	1981	1982	1983	1984	1985
		$1,000.0	$1,100.0	$1,210.0	$1,331.0	$1,464.1	$1,610.5
12	Paid	$500.0	$550.0	$605.0	$665.5	$732.1	$805.3
	Case	$400.0	$440.0	$484.0	$532.4	$585.6	$644.2
	IBNR	$150.0	$165.0	$181.5	$199.7	$219.6	$241.6
	Booked	$1,050.0	$1,155.0	$1,270.5	$1,397.6	$1,537.3	$1,691.0
	Development						
24	Paid	$750.0	$825.0	$907.5	$998.3	$1,098.1	
	Case	$200.0	$220.0	$242.0	$266.2	$292.8	
	IBNR	$100.0	$110.0	$121.0	$133.1	$146.4	
	Booked	$1,050.0	$1,155.0	$1,270.5	$1,397.6	$1,537.3	
	Development						
36	Paid	$850.0	$935.0	$1,028.5	$1,131.4		
	Case	$100.0	$110.0	$121.0	$133.1		
	IBNR	$50.0	$55.0	$60.5	$66.6		
	Booked	$1,000.0	$1,100.0	$1,210.0	$1,331.0		
	Development						
48	Paid	$900.0	$990.0	$1,089.0			
	Case	$50.0	$55.0	$60.5			
	IBNR	$25.0	$27.5	$30.3			
	Booked	$975.0	$1,072.5	$1,179.8			
	Development						
60	Paid	$925.0	$1,017.5				
	Case	$50.0	$55.0				
	IBNR	$0.0	$0.0				
	Booked	$975.0	$1,072.5				
	Development						
72	Paid	$975.0					
	Case	$0.0					
	IBNR	$0.0					
	Booked	$975.0					
	Development						

AUTO LIABILITY

Development Through (months):		Case Reserve as of: 1980	1981	1982	1983	1984	1985
		$700.0	$770.0	$847.0	$931.7	$1,024.9	$1,127.4
12	Paid	$350.0	$385.0	$423.5	$465.9	$512.4	$563.7
	Case	$280.0	$308.0	$338.8	$372.7	$409.9	$450.9
	Booked Development	$630.0	$693.0	$762.3	$838.5	$922.4	$1,014.6
24	Paid	$525.0	$577.5	$635.3	$698.8	$768.7	
	Case	$140.0	$154.0	$169.4	$186.3	$205.0	
	Booked Development	$665.0	$731.5	$804.7	$885.1	$973.6	
36	Paid	$595.0	$654.5	$720.0	$791.9		
	Case	$70.0	$77.0	$84.7	$93.2		
	Booked Development	$665.0	$731.5	$804.7	$885.1		
48	Paid	$630.0	$693.0	$762.3			
	Case	$35.0	$38.5	$42.4			
	Booked Development	$665.0	$731.5	$804.7			
60	Paid	$647.5	$712.3				
	Case	$35.0	$38.5				
	Booked Development	$682.5	$750.8				
72	Paid	$682.5					
	Case	$0.0					
	Booked Development	$682.5					

AUTO LIABILITY

Development Through (months):		IBNR Reserve as of: 1980	1981	1982	1983	1984	1985
		$300.0	$330.0	$363.0	$399.3	$439.2	$483.2
12	Paid	$150.0	$165.0	$181.5	$199.7	$219.6	$241.6
	Case	$120.0	$132.0	$145.2	$159.7	$175.7	$193.3
	IBNR	$150.0	$165.0	$181.5	$199.7	$219.6	$241.6
	Booked Development	$420.0	$462.0	$508.2	$559.0	$614.9	$676.4
24	Paid	$225.0	$247.5	$272.3	$299.5	$329.4	
	Case	$60.0	$66.0	$72.6	$79.9	$87.8	
	IBNR	$100.0	$110.0	$121.0	$133.1	$146.4	
	Booked Development	$385.0	$423.5	$465.9	$512.4	$563.7	
36	Paid	$255.0	$280.5	$308.6	$339.4		
	Case	$30.0	$33.0	$36.3	$39.9		
	IBNR	$50.0	$55.0	$60.5	$66.6		
	Booked Development	$335.0	$368.5	$405.4	$445.9		
48	Paid	$270.0	$297.0	$326.7			
	Case	$15.0	$16.5	$18.2			
	IBNR	$25.0	$27.5	$30.3			
	Booked Development	$310.0	$341.0	$375.1			
60	Paid	$277.5	$305.3				
	Case	$15.0	$16.5				
	IBNR	$0.0	$0.0				
	Booked Development	$292.5	$321.8				
72	Paid	$292.5					
	Case	$0.0					
	IBNR	$0.0					
	Booked Development	$292.5					

Attachment 6

Useful Areas Of Application

- Improve current methods
- Demonstrate reserve needs
- Develop reserve standards
- Management information
- Public information
- State regulation
- IRS

Attachment 7

Pitfalls

- Supplements prospective methods (does not replace)
- Confirms assumptions that no longer work
- Justifies inappropriate methods

1986 CASUALTY LOSS RESERVE SEMINAR

1D/2G - FEDERAL INCOME TAX DEVELOPMENTS

Moderator: Stephen C. Eldrige, Partner
Ernst & Whinney

Panel: Stephen W. Broadie, Senior Counsel, Taxation and Finance
Alliance of American Insurers

Natwar Gandhi, Group Director-Tax Policy
U.S. General Accounting Office

Martin M. Rosenbaum, Vice President
The Chubb Corp.

NATWAR GHANDI:

It is to my amusement when somebody calls me a doctor. And since I used to be a professor I'm also amused when somebody calls me a professor and I'm reminded of a story. There was this particularly bitter New York senatorial election fight between Senator Daniel Patrick Moynihan and James Buckley, then known as the "other Buckley." At this conference James Buckley kept referring to Moynihan as doctor and professor, saying that Professor Moynihan did this, Professor Moynhian did that. And when Senator Moynhihan heard about that he said ha, ha, now the mudslinging has started.

Good morning, I'm indeed pleased to be here this morning and I bring greetings to you from the General Accounting Office, one part of the federal government which is still alive and working, even in these days of Gramm-Rudman. Alive, well, and kicking as some insurance lobbyists would say. My involvement in taxation of insurance companies began several years ago. Back when I used to have a lot of hair on my head. Only now I know why no one else at GAO wanted to touch insurance taxation. In my work as an accountant I have seen many complex and rewarding things, this takes the cake.

In 1981 we submitted a report on taxation of life insurance companies. Soon after that, Senator Dole, now the Majority Leader, then Chairman of Senate Finance Committee, asked GAO to study taxation of property and casualty companies and last year we issued a report. The industry's response was universally negative. We were told that our analysis was

elegant, facts correct, conclusions consistent, but recommendations all wrong. They told this not only to us but to everybody else in town. And they told it in no uncertain terms. When the insurance industry wants to tell someone off, it certainly knows how to do it. You people out there in Northbrook, Illinois should not worry. You are in good hands with your insurance lobbyist in this town. I have never seen more aggressive lobbyist nor well paid lobbyist as I have seen in the insurance business in this town. For my part, all I can say is that I changed my gears and bought some more life insurance.

We were not very long into our study of the industry when we became aware of the cyclical pattern of industry's profitabiilty and such exotic terms as cashflow underwriting, investment gains, and combined ratios. We also discovered that within a PC company, the underwriting and investment people were not talking with each other, and that nobody was talking with actuaries. Something very funny happened except that it was not funny at all. Companies rolled up huge underwriting losses, however, in spite of these losses the industry has been operating quite successfully over the last 10 years, depending upon whose estimates are used. The industry has made within $52-79 billion in net gains over the 10 year period ending in 1985. We further found that over the same period the amount of the federal income tax paid by the industry was neglible. Over the same 10 year period the industry had negative federal income taxes of about $1,600 million. As I said, I never want to underestimate the ingenuity of an insurance tax

planner. I believe that the revelation of the neglible tax paid by industry, in the light of its substantial earnings, had probably more to do with what the Congress did than any recommendations.

In our report we identified two provisions of the code which we felt were inappropriate even though they conformed to the NAIC accounting. Of course, I'm referring to the lack of consideration given the time value of money in establishing deductions and mismatching of aquisition expenses with the premium income. Consequently, we recommended that loss reserves be discounted in calculation of the reserve deduction and that acquisition costs be allocated over the life of the policy. We also drew attention to the special PAL account for mutual companies. We questioned the propriety of continuing that account and later recommended its repeal.

Our discounting recommendation was based entirely on a company by company basis. Undoubtedly we were influenced by the previously expressed opposition to the use of any type of industry wide averages in the taxation of life insurance industry. It remains to be seen which of the two methods, company-by-company, or industry wide, will be the most practical and equitable. Our recommendations relating to the allocation of acquisition expenses did not engender as much opposition as the reserve discounting recommendation. While initially opposed it was gradually accepted by the industry, both the House and Senate tax reform proposals include an industry approved revenue offset provision which would correct

the mismatch in a somewhat different manner than what we had anticipated. The recommendation on PAL accounts have generally been accepted by the industry and Congress which repeated it.

In conclusion, the GAO has addressed a number of aspects of the financial operations of the P/C industry and made recommendations to the Congress for changing the Tax Code. All of our recommendations have been accepted and are included in the House Senate Conference Agreement. Based on our past experience I believe we will continue study the taxation of the P/C industry. We're not going to throw away our Best's Aggregate and Averages just yet. A final note Mr. Chairman. May I take this opportunity to thank the members of the profession, many of whom are attending this conference, who have been most cooperative in educating a bureaucrat and a professor like me, which is not an easy thing to do. When professors become bureaucrats, watch out, it's a dangerous combination. There is no revolving door. Whatever I know about the mysteries of the P/C industry, and believe me, I found it quite mysterious. I learned it all from my actuary friends for whom I have very high regard. Thank you Mr. Chairman, thank you ladies and gentlemen.

STEVE BROADIE: Thank you all. I want to say that since I've been in Washington for the past 2 years, it's certainly been a great pleasure to work with Nat Gandhi and his people at GAO. We found Nat always willing to listen to the industry's viewpoint. Even at times when he felt that we

were completely wrong, and also at times when we felt that he was likewise incorrect. But if Nat had hair back when he started to talk with the industry, I just want to mention that mine was brown when I began to deal with Nat.

I'm with the Alliance of American Insurers. We're a trade association of about 175 mostly mutual property and casualty insurance companies, of which you may be aware. About two years ago I was in the Alliance's home office as a tax attorney in Chicago. And one day our president suggested that I might want to go to our Washington office, it seemed there was a small tax bill in the offing and property/casualty tax revisions were proposed, and I might want to come to Washington and help take care of that. As you'll hear in my remarks and in Marty Rosenbaum's also, you'll find out exactly how well I succeeded. Which is not particularly well. I might add, however, that the industry did not fare as badly as it could have. There were a couple of very onerous provisions floating around which were not included in the bill, one of them was a special alternative minimum tax on property and casualty companies that the House passed, but fortunately was rejected by the Senate and the conferees. The other was the Treasury's proposal of QRA loss reserve discounting, which would essentially put the industry on the cash method of accounting for loss reserves. I want to say that Nat and the GAO were quite influential in helping to defeat this proposal. Also influential was the paper prepared by the American Academy of Actuaries which showed that in some situations, when a company has zero

or negative economic income, the QRA method still produces tax payments. And to any of you out there who may have helped in the preparation of that paper, it certainly was appreciated.

For the rest of my time here, I'd like to get into the nuts and bolts of the tax reform bill's discounting provisions. I do this with a little trepidation since I'm a tax attorney talking to a group of actuaries. With that apology let's begin.

What will happen under the new bill is that a company's loss reserves are going to be reduced to present value for tax purposes. This is to make up for the investment income that accrues on the reserve until the time it is paid. The annual additions to the reserve as it builds up will be deductible in the years in which these additions occur. The new law changes the deduction for loss reserves from the current deduction, which is essentially unpaid losses at the end of the taxable year minus unpaid losses at the end of the prior taxable year, to <u>discounted</u> unpaid losses at the end of the taxable year minus discounted unpaid losses at the end of the prior taxable year. A couple of other points should be included here. First of all, loss adjustment expense reserves will be considered to be unpaid losses for this purpose. Loss adjustment expense reserves will be discounted in exactly the same fashion as loss reserves will be. Secondly, the new law will not <u>directly</u> affect annual statement accounting, except to the extent that it requires companies to pay more taxes. Certainly there

may be attempts in the future to include tax discounting in annual statement accounting. The NAIC has indicated that it will strongly oppose any such efforts, and we in the Alliance certainly support the NAIC in this regard.

The scope of discounting requires all lines, as defined in Schedules P and O, to be discounted for all accident years. The multiple peril lines that are aggregated in Schedule P will be aggregated for discounting purposes. But other than that, all lines will be discounted for all accident years beginning in 1987. This raises a problem. On the current annual statement, the current Schedule P reserves for accident years that are more than 10 years old are aggregated in what will be, for the 1985 annual statement, a line labeled "prior to 1976." We're told that there are some companies that do not have records of what accident years those reserves may pertain to. I don't know if any of your companies may have that problem. Nevertheless I do believe that the Treasury is going to insist that all reserves be allocated to a particular accident year, because the Schedule P discounting proposal assumes that you can go back at least 15 years and identify those reserves.

The methodology for discounting is going to follow the GAO's methodology very closely. The bill requires a company to use the following factors. It has to determine its undiscounted unpaid losses, then it has to determine the applicable interest rate by which to discount those losses.

Finally it has to determine the applicable loss payment pattern over which it will apply the interest rate to discount those losses.

The easiest one of these to determine is obviously going to be undiscounted unpaid losses. What a company state in its annual statement will be its undiscounted, unpaid losses. One question is, what happens if a company is already discounting its annual statement reserves? It occurs in some lines occasionally, and some states require it for some lines. If it is possible to tell by looking at the annual statement how the company did its discounting, if for each accident year for each line discount the annual statement discloses what the discount rate was, what the payout pattern was, etc., then the company will be allowed to gross up those reserves back to their full undiscounted value and rediscount them for tax purposes. However, if there isn't sufficient data in the annual statement to explain how the statement reserves were discounted, then the company is not going to be allowed to gross them back up and it will have to discount the discounted reserves for tax purposes. There's also a caveat that applies to the grossed up reserves. Under no circumstances can the amount used for tax discounting be greater than the amount used for annual statement discounting. That is, if for some reason the annual statement reserve is discounted at a greater discount rate than the reserve, the tax reserve will apply for tax purposes, rather than the annual statement reserve.

Now we get to the question of determining the applicable interest rate by which a company discounts these reserves. First of all, this discount rate must be calculated for each accident year. This means that as you get farther into discounting, as you get several years into discounting, you're going to have a number of different discount rates pertaining to each accident year's reserves. By the time you get 15 years into discounting you're going to be using 15 different discount rates. The discount rate itself is going to be 100% of a number that is called the mid-term applicable federal rate. This rate is determined under Section 1274 of the Internal Revenue Code. It is a market rate of return on trades of government obligations that have between three and nine years remaining to maturity. This rate is promulgated by the Treasury for every month. There's a different mid-term AFR for every month. The average rate will be based on annual compounding. The rate will be calculated as a 60-month moving average of prior applicable federal rates. What this means is, for example, for 1989 the Treasury is going to go back and look at rates in 1986, 1987, and 1988 and compute the average of those applicable federal rates. And that will be applied to 1989 accident year reserves.

QUESTION: Will a company know in advance then? Or is this going to be something like the mutual company add-on tax where you find out after the fact what rates are, or will you know before time?

ANSWER: Hopefully a company will know, either in advance or right at the beginning of that particular accident year, what the discount rate will be for that year. For example, let's take 1988. The so-called base period over which the 60 month average is determined will begin in August of 1986. By the beginning of 1988 you will have the last five months of '86 and all 12 months of '87. And companies, I'm sure, will be keeping a close watch on what the AFR is doing and may be able to compute their own averages. But certainly I would think the Treasury will promulgate the rate early in 1988. We're not assured of that but I would certainly think that that's what they're going to do. At least through most of 1988 you should know what the discount rate for the 1988 reserves is going to be.

As I just mentioned, the base period begins with August of 1986, with the applicable federal rate that is in effect for August of 1986. As I recall that's somewhere around 7-1/2%. For 1988 you will have had a 17 month historical period over which to determine the AFR. For 1989 you'll have a 29 month period, etc. until a full 60 months have elapsed from the beginning of the applicable accident year. For reserves for accident years 1987 and earlier, the period for computation in the AFR will be 5 months long. It will begin with August of 1986 and end at the end of 1986. By the beginning of next year you should know what the discount rate for the '87 reserve and all prior accident years will be. And it's looking like it's going to be somewhere in that 7-7-1/2% range. One point that I did not mention, earlier that I meant to mention, and you may wonder about it

when I talk about accident years prior to 1987, is the way in which discounting is going to be initiated. Both the beginning and the ending reserves applicable to all accident years will be discounted in 1987. 12/31/86 reserves will be discounted as of 1/1/87, and 12/31/87 reserves will be discounted. There's a concept called "fresh start" which applies to the opening discount which I will deal with a little bit later. One of the things that is inherent in this method of determining a discount rate is that it may not really bear any relationship to the type of earnings that a company is getting on its investments at a particular time. The moving average is always going to trail somewhat what interest rates are doing. As a matter of fact, if you went back three or four years, you'd find out that a 60-month moving average of the mid-term AFR was somewhere around 11-12%. The moving average is going to hurt companies as the interest rate moves down. It will probably help companies as the interest rate moves back up. But again, this is an artificial concept, and it's not necessarily going to bear any relationship to what a company is actually earning. I may add that also that it is different from what the GAO proposed. The GAO essentially wanted to take a look at each company's own rate of return on investment earnings. But this rate was chosen by the Senate Finance Committee, and in particular the conference committee, because they felt that it was some reasonable approximation of what companies are actually going to earn. That's enough on discount rates and now we're going to move to the difficult stuff, which is how loss payment patterns are determined.

As we go into this you may want to follow the exhibit that's labeled "Exhibit 1, Schedule P Discounting." I'm not going to get into that immediately, but you may want to have that handy. Loss payment patterns are going to be determined by line. The basic pattern essentially is a 3 year development, in other words the accident year and the 3 prior accident years which I labeled "ay + 1", "ay + 2", and "ay + 3" for Schedule O, and the accident year and the 10 prior accident years for Schedule P. There are exceptions to this which can stretch out Schedule P discounting at least as far as 15 years, which I'll get to in a minute. Payout patterns will be computed either by the Treasury using aggregate industry data or by a company using its own most recently available annual statement. The Treasury will compute payment patterns during what are called "determination years". The first determination year will be in 1987. The second determination year will be 5 years later, in 1992. The third determination year will be in 1997, etc., they'll follow each other on a 5 year basis. The loss payment patterns that are promulgated in a determination year will apply to all reserves of all accident years in that determination period, in other words, for accident year 1987 and the 4 following accident years. For example, the payment patterns the Treasury promulgates next year will apply to accident years 1987 through 1991. Through a special rule they'll also apply to pre-1987 accident year reserves. Then, when the second determination year comes up in 1992, the Treasury will be promulgating a new series of payment patterns for each

line, and these will apply to accident years 1992-1996. This process will be repeated as each determination year comes up.

QUESTION: And therefore the 5 year period will not be changed. In other words, you don't go to a different payment pattern for 5 years hence, you continue with the same thing?

ANSWER: That's correct. The payment pattern for your 1989 accident year reserve is going to remain constant all the way until you finish running off that reserve. Payment patterns will change in the next determination year, 1992, but that just changes the pattern for the 1992 through 1996 accident years, it doesn't affect the ones for '87 through '91 and earlier than that. The result here is that while following all sorts of different interest rates, you're also going to be following at one time several different sets of payment patterns at one time.

QUESTION: We have a new word known as vintage.

ANSWER: That's correct.

The data that Treasury is going to use to promulgate the aggregate industry payment patterns will be Best's Aggregates and Averages for the final year that's available before the determination year. For 1987 that will be Best's Aggregates and Averages for 1985; for 1992 that will be aggregates

and averages for '90, and so on. Essentially Treasury is going to look at the Aggregates and Averages as though it is an annual statement for the entire industry for one year in computing this data. The Conference Report also leaves room for the Treasury to expand the period of Schedule P and Schedule O discounting, if Schedules P and O are expanded in the future by the NAIC.

As I mentioned earlier, companies will also have an election to use their own data in computing their own payment patterns. This election can only be made during a determination year, and applies for that year and the next four accident years. A company will use in that case its most recent annual statement. Companies will essentially go through the same process as the Treasury does in computing their payout patterns. The statute appears to require, however, that such a company must compute different payment patterns for each accident year, using the most recent annual statement available at the beginning of that year. And if a company elects to use its own experience, it must use its own experience for all lines, for all accident years that are within that determination period. In other words, if it makes the election in '87, it's going to have to use its own data for accident years 1987-1991 and the earlier accident years. And it's going to have to do that for all lines. The election is irrevocable unless for some reason the Secretary of the Treasury grants an exemption. If in 1992, the next determination year, a company that has used its own data in 1987 decides that it wants to use the industry aggregates, then presumably

it will be allowed to do so. The language isn't quite clear on that but I think that that's what is intended. There is one exception to a company's ability to use its own data. This is an exception that climbed into the conference report at the very last minute, and one that I don't feel is particularly justified. There is what I call a "90% rule" that will affect small companies. If a company finds that its reserves for a particular line during a determination year are smaller than the reserves for that line for 90% of the companies in the rest of the industry, its data will be determined by the Treasury not to be credible and it will have to use the industry average payout pattern with respect to that line. We're assuming, without clear language in the conference report, that the company would still be allowed to use its own data with respect to all other lines.

Now we can get into the chart for a minute and look at the way in which Schedule P will be discounted. The method the bill provides is a so called "differencing" method. I believe that is the term that GAO gave to it. Essentially what you need to look at first is the chart at the top of the page which takes data right from the annual statement. I would add that this is data that I picked from a 1983 annual statement for a particular company for the line workers' compensation, which means also that I had to create the last two years of the pattern because Schedule P didn't go back that far in 1983. As we'll see in comparing the two exhibits, the way in which the last two years of the payout pattern are computed can have a drastic effect on how large the discount is. First look at 1985 -- here

there was $121,000 paid during the year aggregate incurred losses and loss adjustment expenses of $382,000. Thirty-two percent of the ultimate losses were paid in that year. Let's assume that the Treasury is looking at this as aggregate industry data. The Treasury will then conclude that the applicable claim payout pattern for this particular line will assume that 32% of the claim dollars ultimately paid are paid in the accident year. Then Treasury will go back and look at 1984. We see that a total of 56% of the accident year '84 reservers had been paid by the end of 1985. Treasury creates this new year called "accident year + one", ("AY + 1") the first year after the accident year, and concludes that at the end of the current year 56.11% of the losses attributable to accident year '84 have been paid. In doing that it also concludes then that 56% - 32%, or 24% of the losses, will be paid in AY + 1.

QUESTION: Is this supposed to represent our company's experience or is this suppose to be some industry?

ANSWER: Actually it's an artificial construct where basically it's being assumed that all lines are paid out at the same rate all the time. And, if that were true, and if each company had a payout pattern that followed this, then this would be accurate. But there's no attempt being made to match this to actual experience. And even when a company computes its own payout pattern on its own Schedule P, it's not necessarily going to reflect the way that the losses for accident year, say, 1981 will actually occur.

It's essentially sort of a sacrifice of accuracy for ease in computation. The Treasury didn't want to go through and have to audit all the companies on their own loss payment patterns and most companies didn't want to have to do that either. But I think essentially you're correct. This is not necessarily accurate, but it's probably a reasonable assumption. The Treasury is going to go through all of Schedule P. For AY + 2, for example, you've got 69% of the losses for accident year 1983 paid at the end of the current year, and Treasury will conclude that 13% of the losses will be paid in AY + 2. That runs all the way through this development until, for example, we get down to AY + 9, in which 3.28% of the losses have been paid. Here's where the first computational rule for Schedule P comes in. Because there is no data in Schedule P for individual accident years going back farther than accident year plus nine, the bill tells the Treasury to compare the amount that is left to be paid at the end of (which is treated as being paid in AY + 10). Compare that amount with the amount paid in accident year plus nine. Here, the amount actually paid in AY + 9 is calculated to be 3.28%. The amount left unpaid is 7.60%. If, under the computational rule, the amount left to be paid after AY + 9 is smaller than the amount treated as paid in AY + 9, then all of the unpaid amount is aggregated into AY + 10 and the payout pattern ends. However, if, as in this case, the amount left to be paid in AY + 10, which is 7.6%, is greater than the amount payable in AY + 9, which is 3.28%, the amount paid in AY + 9 is attributed to each following year, until the reserve is completely developed. For example, here in the assumed runoff column, it's computed

that 3.28% is paid in AY + 10, 3.28% is paid in AY + 10, and since 1.04% is all that is left to be paid in AY + 12 that's treated as paid in that accident year and the pattern ends. Now we get into calculation of the actual discount factors.

QUESTION: What happens if the amount treated as paid in accident year plus 9 is negative?

ANSWER: There is another special computational rule that applies to that. What happens then is that you're supposed to go back to AY + 7 and AY + 8 and take an average of amount treated as paid for the three years. And if the average is positive, then you apply that average to the years following AY + 9. If that average is still negative, then you go back to AY + 6. If the average of those four is still negative, you go back one year further until you come up with a positive average.

QUESTION: One of my clients asked me an even harder question. What happens if you have a negative in year 2, 3, or 4 and in going through the bill and the managers' report, I don't seem to see an answer to that. Do you have one?

ANSWER: The best answer I know of right now is -- that problem is simply not provided for in the bill and it is certainly a real one because a number of companies have complained about that. I think that is something

that's just going to have to dealt with in regulations. We don't know how that's going to be dealt with.

Now if you'll go down to the formula for the calculation of discount factors. First of all, I've made a mistake there. The column should say "for AY + 9", and I've got "for AY + 10". This gets into the calculation of the actual factor that is applied to the undiscounted reserve in order to produce the discount reserve for a particular accident year. And let's also assume that we're in determination year 1987, AY + 9 is going to be 1978. Let me also add that losses are assumed to be paid in the middle of the year under the bill. The payment pattern shows you that you're going to pay 3.28% of the total in six months; 3.28% in a year and a half, and 1.04% in 2-1/2 years. In calculating the discount factor you're going to multiply the 3.28% by the 6-month discount factor. And I've used here a 7% interest rate, which I figured would be a relatively accurate approximation. Then you multiply the 3.28% you're going to pay in a year-and-a-half by the discount factor for 7% for 18 months. And then the 1.04% you're going to pay in 2-1/2 years for the discount factor for 7% for 2-1/2 years. Divide the sum of those three numbers by the total left unpaid and you come up with your discount factor which in this case is .9227. This means that you'd multiply your undiscounted reserve for 1978 by .9227 in order to arrive at your discounted reserve. Don't ask me to explain how that works, but I believe it does.

Due to another sentence that was slipped into the conference report at the tail end of the conference, another one that the industry had no input into, if you actually have reserves for AY + 15 or earlier years, you must use the half year discount factor at that particular interest rate to continue to discount as long as you still have reserves. I believe, although I'm not sure, that the effect of that is to produce an extra half year of discounting on the reserve you have unpaid at the end of the computed payout pattern. It was something that we were very displeased to find in the Conference Report.

If you'd turn now to the second page and Case 2. I did this for a couple of reasons. One is that it shows, because I had to create two different sets of data for the last two years of the Schedule P pattern, the dramatic effect that relatively small differences in the payout pattern can produce under this type of a rule. For example, under the first case on page one, I've got 92.4% paid out at the end of the accident year plus nine. Here for Case 2 I've got 88% paid out at the end of accident year plus 9. Even more importantly than that, for page one we've got 3% plus being paid in accident year plus nine. And for Case 2 we've got about .32% being paid for accident year plus nine. The reason this produces a dramatic effect is because of the first computational rule under the bill. First of all, applying the first rule, we compare 11.69%, which is the amount that the bill would treat as being paid in AY + 10, with .32% for AY + 9, and that's obviously smaller. Then, we apply the AY + 9 payment to all future

accident years, going out to AY + 15. When we get to AY + 15, we've got almost 10% of the total reserve left over. The second computational rule tells us that if we have reserves left unpaid after AY + 15 we treat them as though they are paid in AY + 15 for purposes of the payment pattern computation. Ten percent of the total reserve under this development gets lumped into AY + 15. If you'll compare the discount factors for the second case with the discount factors for the first case, you'll see that there's a much deeper discount produced by the second case than by the first case, sometimes as much as 20% for some accident years.

Now to Schedule O which is probably even more difficult. I'll try to make it as short as I can. There is a problem with using Schedule O on a line-by-line basis and just using one annual statement's worth of data, which the Treasury still intends to do. First of all, the industry aggregate data is not going to pick up Part II of Schedule O, which deals with loss adjustment expenses, because that is not available in Aggregates and Averages. The industry average that the Treasury uses for everybody is going to use just Part I of Schedule O. However, if you make an individual company election to use your own data, since you have Part II on your own annual statement, you're going to be required to use both Parts I and Part II in computing your payout pattern. Schedule O, Parts I and II also does not tell you how much you paid in 1985 for an accident year 1984 reserve. And it doesn't tell you what the aggregate incurred loss for accident year '84 was at the end of 1985. You only know how much you paid in 1985, and

you only know how much is left in the reserve at the end of 1985. Thus it becomes more difficult to compute this type of payment pattern, but it can still be done. For example, looking at the first table here, and I'm using both Part I and Part II, total losses are $67,000; for accident year '85 minus salvage and subrogation, you come up with a net paid loss figure of $62,000. You have a total reserve left at the end of the year of $11,739. And in the middle set of columns here, by adding the two, you end up with the total incurred loss for accident year '85 of approximately $74,000. The ratio of the paid to the incurred there is 84%, and so the Treasury will treat, for this particular line, 84% of the claims as paid in the accident year. Going back one year to accident year '84, you know that you paid out about $9,500 in 1985. And you have about $4,000 worth of salvage and subrogation recovered in 1985. You paid a net in '85 of $5,300. You unpaid losses at the beginning of 1985 for accident year '84 were $5,935. The result is that in 1985 you've paid out 90% of the incurred losses at the beginning of 1985 for accident year '84. The Treasury will consider that you paid out 84% of your total losses in the first accident year, and you paid out 90% of what was left over from accident year 1984 plus in 1985. Under this type of development you have 15.8% or so of your total reserves left over at the beginning of AY + 1 (1985) and you paid 90% of them in that year. The Treasury is going to treat 90% of 15.86%, or 14.31%, the incremental paid, as what was actually paid in AY + 1. That gives you a development of 84% paid in the first year and 14% paid in the first year after the accident year. That's all you need to know, because

there is a special Schedule O computational rule which tells you to take the amount of the reserve left over after the end of accident year plus one and split it equally between AY + 2 and AY + 3. In this case you have 1.54% left over, and you treat .77% as paid in AY + 2 and .77% as paid in AY + 3. Then you compute the discount factor in exactly the same fashion as you did for Schedule P.

MARTIN ROSENBAUM:

Good morning. This is a hard act to follow. I originally thought this Seminar was a tax seminar but every speaker before me talked about hair. It's a sensitive subject for me. I guess I'll have to tell you that I lost mine because of these continuing changes in the tax law; abuse by the Treasury, the Internal Revenue agents that audit my employer, by my wife and my bosses, not necessarily in this order. But not because of

Professor Gandhi, and not because of actuaries as I don't understand what they're doing anyhow.

Steven had the difficult part. My assignment is to run through the other provisons that affect the P&C industy.

Let us start with provisions applicable to all corporations. Through June 30, 1987 the top corporate tax rate will remain at 46% as under existing law. Thereafter the top rate will drop to 34%, creating a melded annual 1987 calendar year top rate of 40%. For 1988 and subsequent years the top rate is scheduled to be 34%. The 1988 rate for $50,000 or less is 15%; between $50,000-$75,000 it is 25%; it's 34% on taxable income over $75,000. But an additional 5% tax, or $11,750 if less, is imposed on income between $100,000-$335,000, so that corporations having taxable income of $335,000 or more will pay a flat tax of 34%. (We hope that each company in this industry will be able to show that kind of income.) The capital gains tax will be at 34%, not the present 28%, and this will also be true for the year 1987.

It is likely that the top rate will stay at 40%. You may never see the 34%. Representative Rostenkowski predicted that to reduce the national debt tax rates will have to be increased. It just isn't possible to increase individual tax rates soon, but corporations, as you know, don't vote. Besides, retaining the 40% corporate rate does not qualify as an increase in the tax rate; it is only a postponement of the effective date of the 34% top corporate rate. So, the President will be able to keep his promise not to increase taxes. This is just one scenario; there are others.

Turning now to specific provisions applicable to the P&C industry, we have to say thank you to Dr. Gandhi who made such an eloquent case in his GAO

report for correcting what was felt to be a mismatching of income and expenses. Under present law acquisition expenses are deductible when paid or when the liability for them arises, while premium income is spread over the life of the policy. To correct this situation, we are going to be subject to an adjustment to taxable income whereby a portion of the deduction for acquisition expenses is deferred. The deferral is accomplished by a simple method, also known as "revenue offset," borrowed from Canada. Under this method only 80% of the unearned premium becomes deductible. To be more specific, starting with taxable years beginning after December 31, 1986, 20% of the fluctuation in the unearned premium reserves at the beginning and end of the taxable year is brought into income, provided the year-end unearned premium reserve exceeds the beginning of the year unearned premium reserve, as is the case for a growing company. If there is a decline in the year-end unearned premium reserve, there will be a deduction from income. In addition, there is still another adjustment, namely, 20% of the unearned premium reserve at December 31, 1986 (which is also the beginning of the year reserve for 1987) will be brought into income over a six-year period. To actuaries, I am told it means 3-1/3% annually through 1992.

What is the definition of "unearned premiums?" It is the unearned premium reserve that appears in the P&C blank, with certain exceptions. Life insurance reserves as defined in Section 816(b) of the Internal Revenue Code are excluded. This makes sense because they are already discounted. The special statutory unearned premium reserve mandated under state law for title insurers, often spread over a seven year period, and which in

prior Revenue Ruling 84-107 was held to be a contingent liability rather than an unearned premium reserve and therefore nondeductible for tax purposes, will remain nondeductible as an unearned premium reserve. It follows that this unearned premium reserve will be excluded from the provisions requiring an adjustment to the deduction for unearned premiums. Instead, for tax purposes, this statutory unearned premium reserve will be reclassified as an IBNR loss reserve and thus will be deductible over the prescribed statutory period pursuant to the rules for the discounting of P&C loss reserves.

Unearned premiums in the case of insurance against default in the payment of principal or interest relating to securities with a maturity of five years or more get more favorable treatment. Instead of 20% of the increase in unearned premium reserves becoming nondeductible, only 10% becomes nondeductible. The 10% of the beginning unearned premium reserve will also have to be spread over six years. This means 1-2/3% per annum through 1992. There are no other exceptions.

Question: Several of my clients have raised questions with respect to retropective rate credits. Are they included in unearned premiums, or how are we supposed to treat them?

They are going to be included. The staff of the tax writing committees were made aware of this problem,but were unwilling to make any adjustment. Retropsective return premiums will be included, even though from a conceptual point of view acquisition expenses have really nothing to do with them. Perhaps, some company or someone will come forward with a brilliant idea for separating these retros from the unearned premium reserve in the Annual Convention Statement.

Finally, the Act provides for what is called anti-tax avoidance rules. Any company that ceases to be a P&C insurance company prior to the expiration of the six-year period over which the nondeductible portion of the beginning unearned premium reserve has to be spread, must bring the remaining balance into income in the taxable year prior to the year in which it terminates its P&C status. Presumably, this provision would be effective for a P&C company that suddenly qualified as a life insurer. On the other hand, these anti-tax avoidance rules do not apply in the case of a successor company subject to Section 381(c)(22) of the Code. This could involve a corporate reorganization that resulted in the carryover of the old company's tax characteristics to the new, such as in a merger. Since the requirement for spreading 20% of the unearned premium reserve at the beginning of the year 1987 is also carried over to the successor company, there is no need for an anti-tax avoidance provision.

Even in good years, P&C insurance companies paid very little tax because of their investments in tax-exempts, meaning state and municipal bonds, and their holdings in U.S. corporate stocks which are eligible for the 85% dividends received deduction. This has been annoying to the U.S. Treasury. Besides, Treasury staff were very much aware of "proration" under the life company tax provisions. So now we have Section 1022 of the 1986 Act. It should make the people in the Treasury very, very happy.

In determining a P&C company's income subject to tax, the deduction for losses incurred, effective for taxable years commencing after December 31, 1986, will be reduced by 15% of tax-exempt income. As indicated, tax-exempt income includes interest earned on state and municipal obligations,

described in Section 103 of the Code, and the 80% dividends received deduction. It used to be the 85% dividends received deduction, but starting in 1987 the deduction will be reduced to 80%. Tax-exempt income from investments purchased prior to August 8, 1986 will not be subject to this adjustment.

Disallowing a portion of the deduction for "losses incurred" is equivalent to including tax-exempt income in taxable income. It is a device for sidestepping a constitutional challenge. The same approach was taken when life companies were made subject to "proration."

The law and the Committee Reports are silent on what happens in a given taxable year when 15% of tax-exempt income is greater than "losses incurred."

As with proration applicable to life companies, there are detailed "see-through" rules for dividends received from affiliates ordinarily eligible for the 100% dividends received deduction. To the extent such dividends are attributable to tax-exempt income that has not previously been prorated, the dividends, or a portion thereof, become subject to 15% proration. Thus, it makes it impossible for an insurer to avoid proration by placing all of its portfolio investments in a wholly-owned subsidiary with which it files a consolidated return, followed by a distribution of all of the subsidiary's income, tax-free, to the insurance company.

A transfer among affiliated companies of tax-exempt bonds after August 7, 1986 is treated as an acquistion after August 7.

Mutuals are going to be taxed the same as stock companies. In fact, the sections of the Code now dealing with mutuals (the 820 series) are going to be eliminated and mutuals are going to be taxed under Section 831. To accomplish this result, the mutuals' so-called PAL Account is eliminated.

As you know, under current law mutual property and casualty insurance companies are permitted a deduction for contributions to "a protection against loss account" (PAL). The deduction which is made solely to determine a P&C mutual's taxable income, in general, equals 1% of the underwriting losses incurred in the year plus 25% of the statutory underwriting gain for the year. Contributions to the PAL account are reversed and taken into income after five years, although a smidgen may be deferred permanently. To the extent that the company has net operating losses, they will reduce or may even eliminate the PAL account. This seems to be the case with most mutuals. The theory behind the PAL account was that mutuals could not augment their "surplus available to policyholders" by selling shares of stock like stock companies, even when additional surplus was required in the event of a catastrophic loss. However, our legislators now think that the PAL account really has not served its purpose. Most mutuals, as I understand it, are not too upset about loosing the PAL deduction.

PAL account contributions will no longer be made, effective with taxable years beginning after December 31, 1986. The Conferees, unlike the House and Senate Committees, let the provisions of the present law stand that prescribe how the balance of the account is restored to income.

Further, the present law providing for special exemptions, rates and deductions for small mutual companies is repealed. The reason given is that they are too complex.

Under the 1986 Tax Reform Act <u>both stock and mutual P&C companies</u> (not only mutuals as heretofore) <u>with net written premiums, or direct written premiums if greater, of less than $350,000 will be completely exempt</u>

from tax. Companies with premiums greater than $350,000, but less than $1.2 million, can elect to be taxed only on taxable investment income. Companies under common ownership will be treated as one. The ownership test will be 50% of stock to determine eligibility for the tax benefits. This, of course, is to make it impossible for a group that has 10 sister companies, and each company has income of $350,000, not to pay any tax whatsoever. The effective date is any taxable year beginning after December 31, 1986.

There has also been some talk about limiting the deduction for policyholders' dividends of mutuals. No such provision was enacted for P&C mutuals, even though limitations exist for life insurance mutuals. Mutuals and stock companies are good friends in the P&C industry. They're not at each other's throat as they seem to be in the life area. Nonetheless, the Treasury is instructed to make a study of the subject of policyholders' dividends. This Treasury study would also encompass the effect of the "alternative minimum tax" on P&C companies, and further examine revenue targets of both stock and mutual P&C companies. The Secretary of the Treasury is instructed to conduct the study and report back no later than January 1, 1989. This is much too early. Only the 1987 return will have been filed by that date. It is common knowledge that most companies have very large net operating loss carryovers and, hence, there is not going to be much tax collected, even though the net operating losses are expected to be absorbed by 1989. Thereafter, I would think the industry will be paying substantial income taxes and not only in the form of the alternative minimum tax. It would look better for the industry if this study could be completed at a later date. (This is a commercial for the benefit of Dr.

Gandhi, who I am sure will be consulted.)

Let me just mention briefly that certain organizations which previously were not taxed will now be subject to tax. The most important group are the Blue Cross and Blue Shield organizations. Although they have become subject to tax, they are given certain special deductions and transitional relief. New organizations, provided they meet certain conditions, such as open enrollment and coverage of preexisting medical conditions in the case of health insurance, are also eligible for certain beneficial tax provisions.

The foreign provisions are extensive and very complex. This is the only way to describe them. I shall just deal with the taxation of controlled foreign corporations that are insurance companies; but it is impossible to cover all details because of time constraints. There are two types: captives and foreign insurance companies ordinarily owned by U.S. insurance companies.

"Captives" are foreign insurance companies whose stock is owned by manufacturing and commercial entities. They are usually located in tax-haven countries, such as Bermuda, and are not taxed by the country in which they are incorporated. The captives insure their stockholders or affiliated companies. If a captive is classified as an "association" or "industry" captive, it means that not a single U.S. shareholder owns 10% or more of its stock. Under the 1954 Code, the so-called Subpart F rules do not apply to a less than 10% U.S. shareholder and, therefore, tainted income, called Subpart F income, of the captive is not taxed to such U.S. shareholder. Instead, the general rules regarding the taxation of foreign corporations apply, namely, that the income of a foreign corporation is not taxable by

the I.R.S. until such income is received by a U.S. shareholder in the form of dividends or when shares of stock of the foreign corporation are sold. This was the way an "association captive" could avoid the 1954 Code rules that taxed to a 10% shareholder his proportionate share of all insurance income from related persons' risks other than risks from the country of incorporation.

The 1986 Tax Reform Act, effective with taxable years after December 31, 1986, will tax all "related person insurance income" from whatever source other than from the country of incorporation (say, nil, if Bermuda) to any U.S. shareholder regardless of the percentage of stock he owns. Related person insurance income refers to underwriting as well as investment income arising from policies covering a primary insured who is a shareholder or related or affiliated with such shareholder. There are exceptions. They refer to less than 20% ownership by or income from persons who are primary insureds and stockholders or related to stockholders of the captive. Also, an election to be taxed as a U.S. branch of a foreign corporation will avoid the special "related person insurance income" rule. Good night, tax-haven captives, no more tax advantage!

There is an interesting development concerning the U.S. excise tax. As you know, all U.S. source premiums placed with non-admitted foreign insurers are subject to the 4% premium tax if direct premiums. The rate is 1% for reinsurance. The income tax treaty with Barbados eliminates the excise tax. The treaty with Bermuda would do the same. However, the Bermuda treaty still has to be ratified. U.S. reinsurers, as well as Representative Rostenkowski, are opposed to ratification of the Bermuda treaty. Moreover, the Tax Reform Act provides for a study by the Treasury to determine whether U.S. reinsurers are at a competitive disadvantage vis-a-vis foreign reinsurers

by reason of income tax treaties that eliminate the U.S. excise tax.

Turning to U.S. controlled foreign corporations engaged in the conduct of an insurance business covering unrelated risks and hence not "captives," prior to the 1986 Tax Act U.S. shareholders owning 10% or more of the stock were taxed on underwriting and investment income arising from U.S. source risks only, except if U.S. source premiums were 5% or less of total premiums. This de minimis rule is repealed by TRA of 1986. Moreover, a proportionate share of all investment income without exception, as well as all income from insurance underwriting, except that from the country of incorporation, will become subject to U.S. income tax in the hands of a 10% or more U.S. stockholder of the controlled foreign corporation. Mind you, these are foreign corporations, say, incorporated in a member country of the European Economic Community, far away from Bermuda, doing a legitimate business and taxed at a higher rate by the foreign countries than is the U.S. rate.

U.S.-owned foreign insurance companies have been singled out for punitive legislation. The only other industry which has experienced a similar kind of punitive legislation are the banks, but to a lesser degree.

STEPHEN ELDRIDGE:

Thank you Martin, you are right on time there. Since the session started about 15 minutes late, I just made the assumption that we're going over into the coffee break for 15 minutes. We'll continue with Steve talking a little bit about the Alternative Minimum Tax. If regular taxes were not enough for you, there was a specific provision to get General Electric and General Dynamics. And it may have picked up a few other companies along the way.

STEVE BROADIE: Before we get started on the minimum tax, there are a couple of other things I would like to talk about. You may have thought you were done with discounting and heaved a sigh of relief. But not quite. There are a couple of other provisions I want to mention to you very briefly. The first is that there's a special rule in the bill for international insurance and reinsurance shown separately in Schedule O, on a separate line. If international insurance or reinsurance is aggregated in the particular lines to which they apply, then there's no problem. You use the payout patterns as we've mentioned. For example, if you're reinsuring workers' compensation, you use the workers' compensation line in Schedule P. However, if you have stated reinsurance separately in Schedule O, the Treasury will compute a special composite industry payout pattern for Schedule P. That will be applied to all separately stated reinsurance, and will also be applied to all separately stated international business. And the reason for this is basically to provide a little bit of a break for reinsurers. It was felt, and the industry certainly felt this way, that the burden of discounting would hit reinsurers disprotionately. Using this gross Schedule P approach will provide a little bit shorter payout pattern than they would have if they were using their own experience. The second thing is the concept of "a fresh start". I mentioned a little bit earlier that the way discounting will begin in 1987 is that the beginning and ending reserves for 1987 will be discounted. That causes a problem with respect to the beginning discount. Because if that discount, for example, were to be taken back into income, and then given back to you as a

deduction over the years before the reserves were paid out. Then obviously there's going to be a large revenue hit right at the beginning in 1987. Since the life industry had fought for and won a so-called "fresh start approach" successfully in 1984, the property/casualty industry decided to do the same thing, and we were successful. What the fresh start means essentially is that that the beginning discount on the 1987 reserve is forgiven. What this produces, in essence, a double deduction. For example, if your reserve was $100 at 12/31/86, it might be discounted down to $80 at 1/1/87. After the beginning of 1987, that $20 discount is going to come back to you as a deduction over the years during which that tax reserve builds back up to $100. There are obviously some possibilities for abuse here that the committee saw. And so they decided that "reserve strengthening" in 1986, both for prior accident years and to some extent for the 1986 accident year, should not be taken into account for fresh start purposes. It will probably still be deductible in 1986, but will be excluded from fresh start treatment. Now, you may ask, what is reserve strengthening? Well, here is the bad news. Reserve strengthening for accident years before 1986 is essentially any increase in the reserve for that accident year, net of the payments that you've made in 1986. For example, if you had a $100 reserve for accident year '85 at the end of '85, and you pay $20 in 1986, dropping it to $80, and then you strengthen that reserve by $20, bringing it back up to $100, that $20 reserve strengthening will not be allowed to you for purposes of computing the fresh start. For accident year 1986, there's a statement in the conference report, which is

the only place reserve strengthening is defined. Any change in "non-interest rate assumptions" will be considered to be reserve strengthening. Now we don't really know what that means. But it does indicate that there is something that you can do to your 1986 accident year reserves in 1986 that the Treasury will consider to be reserve strengthening and disallow for purposes of the fresh start. Also, all unspecified or unallocated additions to loss reserves will be considered to be reserve strengthening.

To leave some time for questions, I'm going to go extremely briefly through the minimum tax. If you'd turn to the last page of the handout, I also want to correct an error. There is a line called "book income" stretching across to Case 2 where I neglected to include a calculation. Basically the only preference in the new minimum tax that is really going to hit P&C companies is something that's called the "business unreported profits" preference. Essentially what that is is 50% of the excess of your book income, which for stock companies will generally be, although not always, GAPP income, and for mutual companies will almost always be your statutory net income after policyholder dividends, over alternative minimum taxable income, calculated before this preference. And in Case 2 here, I've made a mistake. I have $300,000 of book income and $100,000 of taxable income. The actual amount of the "BURP" preference is $100,000, not $150,000. And the sum of alternative minimum taxable income and the BURP preference is $200,000. That should be carried down through the various subtractions in that column. These two cases illustrate a situation wherein the first

case, for example, a company has a $100,000 underwriting loss and $300,000 worth of investment income. It has decided it can "zero out" for tax purposes by having $100,000 of that investment income be taxable and $200,000 be tax exempt. That company would, in this circumstances, be hit by the minimum tax. It would have a minimum tax liability of $12,000 and a regular tax liability of zero. And therefore it would pay the minimum tax. The minimum tax is a tax of 20% on your minimum taxable income. The result is compared to the regular tax, which in this case is zero. To the extent the minimum tax is greater than the regular tax you pay the minimum tax.

In the second case, I've assumed that this company with the same mix of investment income broke even on underwriting. In this cast it's $300,000 of investment income. It's got $100,000 of taxable income and it paid a tax of $34,000. And if the calculations were done correctly here you would see that the minimum tax calculation would be $34,500; the regular tax is $34,000. You end up paying $34,000 as regular tax and $500 as minimum tax.

STEVE ELDRIDGE: We'll take some questions now from the panel. I'm sure you have hundreds. And if you don't ask them the panel will feel hurt.

QUESTION: What will the discount rate be for 1987?

STEVE BROADIE: We don't know that yet because the AFR for '87 and all prior accident years is going to be the average mid-term AFR for the last 5

months of this year. We don't know yet what the number is going to be. It's probably going to be somewhere between 7-7-1/2%.

[Question, Inaudible].

It's added to AMT income. Yes, the alternative minimum taxable income, not the taxable income. And you take AMT, the alternative minimum taxable income times the special rate, 20%. Then you take your AMT credits which are ... in effect, this is kind of contemplated. The combination of your AMT NOL is a different net operating loss for AMT purposes than there is for regular purposes. I say you're AMT-NOL which differs from your regular NOL, plus your AMT foreign tax credit, which differs from your regular tax credit; plus your AMT investment credit. The sum of those 3 times cannot reduce the alternative minimum taxable income down to a low 90%. They cannot reduce more than 90% of that figure.

[Question, Inaudible].

For example, in taking taxable income you have already adjusted for such items. For example, certain types of special purpose state and local bonds, that income is a preference. You would have already added that to taxable income. Now you take the difference between book income and that adjusted figure and that gets added.

[Question, Inaudible].

I would think at whatever point you discontinue to be an insurance company, even just go out of business. That you will have to bring in any income. But of course, in bankruptcy or insolvency there may not be any money to pay. I don't know what the preferences are.

Would the reserve turn around at that point?

The unearned premium reserve would runoff, so the small amount ... it's really only a timing difference so it should net itself out.

You did have a beginning reserve and you may pick up the rest but you're only bringing into income 80% of the reserve. But you only pickup into income then the 80% that ... you're only then left with 80% deduction of the 80% reserve as of 1/1/87. You'd pickup into income at that moment a lower amount. I think they net each other out.

[Question, Inaudible].

There isn't any language that I know of that pertains to it. My guess is that it will probably be no. I would imagine that the whole group would have to make the election. But I don't know. I don't really have anything to back me up except just a gut feeling.

If companies continue not to discount their reserves ... what happens is they have to pay taxes on income before that income is recognized.

What kind of adjustment will get the NAIC or the accountants to allow for "prepaid taxes" as an asset account.

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Exhibit I - Schedule P Discounting, Case 1

Line: workers compensation Statement Year: 1985

Schedule P Data

Acc. Year	(Column 6) Loss & L.A.E. Payments	(Column 11) Loss & L.A.E. Incurred	Cumul. Paid Ratio
Prior	2,511,831	2,648,580	--
1976	226,500	245,117	92.40%
1977	228,341	256,192	89.13%
1978	229,281	262,114	87.47%
1979	222,218	255,835	86.86%
1980	196,796	233,738	84.20%
1981	225,755	280,228	80.56%
1982	230,827	305,539	75.55%
1983	234,992	339,808	69.15%
1984	181,246	323,019	56.11%
1985	121,626	382,175	31.82%
Total	4,609,413	5,532,345	

Discount Factors at 7.00% Interest

Acc. Year	Cumul. Paid	Increm. Paid	Assumed Runoff	7.00% Disc. Factor	Undisc. Unpaid	Disc. Unpaid	7.00% Factor to Age	Discount Factor
AY	31.82%	31.82%			68.18%	56.18%	1.00000	0.82407
AY+1	56.11%	24.29%		0.96674	43.89%	34.99%	1.07000	0.79729
AY+2	69.15%	13.04%		0.90349	30.85%	23.95%	1.14490	0.77643
AY+3	75.55%	6.39%		0.84439	24.45%	19.01%	1.22504	0.77754
AY+4	80.56%	5.01%		0.78914	19.44%	15.12%	1.31080	0.77976
AY+5	84.20%	3.63%		0.73752	15.80%	12.46%	1.40255	0.78834
AY+6	86.86%	2.66%		0.68927	13.14%	10.58%	1.50073	0.80482
AY+7	87.47%	0.61%		0.64418	12.53%	10.68%	1.60578	0.85266
AY+8	89.13%	1.66%		0.60203	10.87%	9.72%	1.71819	0.89377
AY+9	92.40%	3.28%		0.56265	7.60%	7.01%	1.83846	0.92265
AY+10			3.28%	0.52584	4.32%	4.11%	1.96715	0.95146
AY+11			3.28%	0.49144	1.04%	1.01%	2.10485	0.96674
AY+12			1.04%	0.45929	0.00%	0.00%	2.25219	0.96674
Total		92.40%	7.60%					

Calculation of Discount Factors

$$\text{for AY+9} = \frac{(3.28 \times .96674) + (3.28 \times .90349) + (1.04 \times .84439)}{3.28 + 3.28 + 1.04}$$

$$= \frac{7.01252}{7.6}$$

$$= .9227$$

(All calculations performed using Coopers & Lybrand loss reserve discounting software. Used with permission of Coopers & Lybrand.)

Exhibit I - Schedule P Discounting, Case 2

Line: workers compensation Statement Year: 1985

Schedule P Data

Acc. Year	(Column 6) Loss & L.A.E. Payments	(Column 11) Loss & L.A.E. Incurred	Cumul. Paid Ratio
Prior	2,511,831	2,648,580	--
1976	222,560	252,009	88.31%
1977	230,811	262,300	88.00%
1978	229,281	262,114	87.47%
1979	222,218	255,835	86.86%
1980	196,796	233,738	84.20%
1981	225,755	280,228	80.56%
1982	230,827	305,539	75.55%
1983	234,992	339,808	69.15%
1984	181,246	323,019	56.11%
1985	121,626	382,175	31.82%
Total	4,607,943	5,545,345	

Discount Factors at 7.00% Interest

Acc. Year	Cumul. Paid	Increm. Paid	Assumed Runoff	7.00% Disc. Factor	Undisc. Unpaid	Disc. Unpaid	7.00% Factor to Age	Discount Factor
AY	31.82%	31.82%			68.18%	54.54%	1.00000	0.80004
AY+1	56.11%	24.29%		0.96674	43.89%	33.24%	1.07000	0.75734
AY+2	69.15%	13.04%		0.90349	30.85%	22.08%	1.14490	0.71561
AY+3	75.55%	6.39%		0.84439	24.45%	17.00%	1.22504	0.69545
AY+4	80.56%	5.01%		0.78914	19.44%	13.01%	1.31080	0.66926
AY+5	84.20%	3.63%		0.73752	15.80%	10.16%	1.40255	0.64292
AY+6	86.86%	2.66%		0.68927	13.14%	8.12%	1.50073	0.61766
AY+7	87.47%	0.61%		0.64418	12.53%	8.05%	1.60578	0.64259
AY+8	88.00%	0.52%		0.60203	12.00%	8.07%	1.71819	0.67251
AY+9	88.31%	0.32%		0.56265	11.69%	8.31%	1.83846	0.71099
AY+10			0.32%	0.52584	11.37%	8.56%	1.96715	0.75307
AY+11			0.32%	0.49144	11.05%	8.83%	2.10485	0.79918
AY+12			0.32%	0.45929	10.73%	0.12%	2.25219	0.84979
AY+13			0.32%	0.42924	10.41%	9.43%	2.40985	0.90543
AY+14			0.32%	0.40116	10.09%	9.75%	2.57853	0.96674
AY+15			10.09%	0.37492	0.00%	0.00%	2.75903	0.96674
Total		88.31%	11.69%					

Exhibit II - Schedule O Discounting

Line: auto physical damage Statement Year: 1985

Schedule O Data (000 Omitted):

	Paid During 1985		Salvage and Subrogation		Unpaid 12/31/85	
	A.Y. 1985 (Column 2)	A.Y. 1984 (Column 3)	A.Y. 1985 (Column 5)	A.Y. 1984 (Column 6	A.Y. 1985 (Column 10)	A.Y. 1984 (Column 11)
Loss	60,110	8,206	5,513	4,138	10,479	386
L.A.E.	7,685	1,289	0	0	1,260	192
Total	67,795	9,495	5,513	4,138	11,739	578

	A.Y. 1985	A.Y. 1984
Paid during 1985	67,795	9,495
Salvage & Subrogation	5,513	4,138
Net Paid	62,282	5,357
Unpaid at 12-31-85	11,739	578
Statement Discount	0	0
Total	74,021	5,935
Ratio Net Paid to Total	84.14%	90.26%

Acc. Year	Beginning Unpaid	Disposal Rate	Incremental Paid	Cumulative Paid	Ending Unpaid
AY	100.00%	84.14%	84.14%	84.14%	15.86%
AY+1	15.86%	90.26%	14.31%	98.46%	1.54%
AY+2	1.54%	50.00%	0.77%	99.23%	0.77%
AY+3	0.77%	100.00%	0.77%	100.00%	0.00%

Acc. Year	Increm. Paid	7.00% Discount Factor	Undisc. Unpaid	Disc. Unpaid	7.00% Factor to Age	Discount Factor
AY	84.14%		15.86%	15.19%	1.00000	0.95770
AY+1	14.31%	0.96674	1.54%	1.44%	1.07000	0.93511
AY+2	0.77%	0.90349	0.77%	0.74%	1.14490	0.96674
AY+3	0.77%	0.84439	0.00%	0.00%	1.22504	0.96674

Exhibit III

Business untaxed reported profits - alternative minimum tax

	Case I	Case II
Underwriting income (after dividends)	(100,000)	0
Taxable investment income	100,000	100,000
Tax-exempt investment income	200,000	200,000
Taxable income	0	100,000
Regular tax (at 34%)	0	34,000
Book income	200,000	300,000
minus alternative minimum taxable income (assume no other preferences)	- 0	-100,000
	200,000	200,000
	.5	.5
Business untaxed reported profits preference (BURP)	100,000	100,000
Plus alternative minimum taxable income before BURP preference	0	100,000
Alternative minimum taxable income after BURP	100,000	200,000
Exemption amount	- 40,000	- 27,500*
Alternative minimum taxable income (after exemption)	60,000	172,500
AMT rate (20%)	.2	.2
Temporary alternative minimum tax	12,000	34,500
Regular tax	- 0	- 34,000
Net alternative minimum tax	12,000	500
Total tax liability	12,000	34,500

*Exemption amount is reduced by $0.25 for each $1.00 by which alternative minimum taxable income exceeds $150,000.

FEDERAL INCOME TAX DEVELOPMENTS

Sessions 1D/2G

A Summary of the Tax Reform Process
(or, "Did Anyone get the License Number of the Truck That Just Hit Us?")

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September 29, 1986

I. Beginnings

A. Property/casualty ("P/C") industry a target of tax reform since 1982. Reasons include:

1. Perception of low effective tax rate.

2. Specific questions concerning:

a. Treatment of loss reserves - Treasury has argued for years that full current deduction of reserves established to pay claims in future taxable years is improper. Industry strongly argued need to protect statutory accounting to preserve company solvency.

b. Treatment of acquisition expenses - under current law, expenses immediately deductible while income (earned premium) recognized pro rata over period of policy. Argument made that income and expenses are not properly matched.

c. Use of tax-exempt income

i. Companies with underwriting losses and investment income could theoretically earn economic income while paying little or no tax by offsetting underwriting losses with taxable investment income and receiving rest of investment income from tax-exempt sources (interest from state and local government bonds and deductible portion of stock dividends received).

ii. Companies consolidating with non-insurers could pass on tax losses to the non-insurance parent while earning economic income.

d. Other issues - mutual companies' protection against loss ("PAL") account and deductibility of mutual P/C policyholder dividends.

B. Early attacks

1. Senate Finance Committee under chairman Dole (R-KS) holds hearings in 1982.

2. Dole fails in 1983 TEFRA markup in attempt to require discounting of loss and loss adjustment expenses for Schedule P lines.

3. Dole asks General Accounting Office ("GAO") to study property/casualty taxation.

4. In House Ways and Means Committee, Representative Pete Stark (D-CA) finishes life insurance tax rewrite in 1984, ready to begin on P/C industry.

II. Preliminaries to tax reform

A. Treasury I proposal - November, 1984

1. Recommends "qualified reserve account" ("QRA") loss reserve discounting.

a. Intended to treat insurers as self-insurers for tax purposes -- economically equivalent to allowing insurers to deduct claim liabilities only when they are paid.

b. Pre-tax discounting method -- insurer discounts reserve to its present value using pre-tax discount rate. No deductions allowed for additions to reserves as they build over time. (Insurer could set initial reserve higher, but would eventually have to pay tax it deferred with interest. Plus reserves were limited to excess of premiums over acquisition expenses on a per-policy basis.)

c. Method could tax insurers when they have no or negative economic income.

d. Would have raised nearly $15 billion over first five years, according to Treasury estimates.

2. Recommends disallowance of part of mutual property/casualty company policyholder dividends (similar to method applied to mutual life insurers by Internal Revenue Code Section 809), as well as repeal of PAL account. Also advocates repeal of small mutual company exclusions and deductions and taxation of workers compensation benefits.

B. GAO report - March, 1985

1. GAO discounting - recommends use of after-tax discount rate, allows companies to deduct additions to reserves as they build up in later taxable years.

a. Result is full deduction for amount of claim, but deduction is spread over the time during which the reserve is held.

2. Recommends that deduction for acquisition expenses be amortized over lifetime of policy to which they relate. Also recommends abolition of PAL account.

C. "Reagan I" (or Treasury II) - May, 1985

1. Amends QRA discounting, but retains fundamentals. Allows insurers to discount full reserves initially, but requires payment of deferred taxes with interest. Revenue estimate revised downward to approximately $6 billion over 1986-1990, but with upwards of $2.4 billion per year raised by 1990.

2. Reaffirms other Treasury I proposals.

III. The tax reform process

A. As House Ways and Means Committee begins to draft tax reform bill, two things are apparent:

1. P/C industry has discredited QRA, and

2. Industry will be required to pay substantially more in taxes. $4.8 billion over 1986-1990 becomes the House revenue target.

B. Initial industry offer -- "revenue offset"

1. Includes 20% of annual increase in unearned premium reserve in taxable income. Also includes 20% of existing unearned premium reserve (as of 12-31-85) in taxable income at 4%/year over following five years.

2. Industry chose this because:

   a. Felt it would raise the revenue required;

   b. 20% figure chosen because acquisition expenses generally equal about 20% of unearned premiums. Thus, it dealt with the perceived acquisition expense problem;

   c. Leaves loss reserves and tax-exempt income alone.

C. Ways and Means response (included in final House bill), raising $5.6 billion when adjusted for 1987-1991:

   1. Revenue offset;

   2. Inclusion of 10% of tax-exempt income (referred to as "proration") in taxable income (increasing to 15% in 1988). Amendment in committee debate excludes income from bonds and stocks bought before November 15, 1985;

   3. Special alternative minimum tax on property/casualty companies, to take effect in 1988.

      a. Taxable income could be no less than 20/36 of statutory net income after policyholder dividends (line 18B). At House bill's 36% corporate rate, effect would generally be a minimum tax of 20% of line 18B. Pre-1988 net operating losses ("NOLs") could not be used against minimum tax liability.

      b. Provision intended by Representative Stark as "hammer" to force P/C industry to negotiate about discounting before 1988 (at which time the industry could replace this minimum tax with discounting).

   4. Elimination of PAL account, Treasury studies of discounting and mutual policyholder dividends, expanded small company provisions.

   5. Industry strongly opposed House property/casualty provisions, especially disallowance of NOLs and taxation of tax-exempt income.

D. Industry discounting proposal to Senate Finance Committee, estimated to raise $6 billion over 1987-1991:

1. Essentially modified GAO (pre-tax) discounting, with:

a. 5% discount rate;

b. Claim payout period determined by Treasury using industry aggregate data, with election for companies to use their own data. Schedule P reserves would not be discounted after 10 years, Schedule O reserves after 3 years;

c. Both beginning and ending reserves would be discounted in first year of discounting (1987). Beginning discount would not be taken into income (so-called "fresh start");

d. Reinsurers would use a claim payout period that would be an aggregate of the industry's Schedule P experience, rather than being forced to use their own experience. Intended to ease burden of discounting on reinsurers.

2. Discounting proposal used to replace proration, special minimum tax and Treasury studies in House bill. Included revenue offset (with 10-year phase-in on 12-31-86 unearned premium reserve), elimination of PAL account and House small company provisions.

E. Final Senate provision - total revenue raised $5.8 billion over 1987-1991:

1. Revenue offset with 7-1/2-year phase-in;

2. Discounting with:

a. Discount rate of 5% for 1987, followed by 75% of the mid-term "applicable federal rate" ("AFR") prescribed in Internal Revenue Code Section 1274. The rate used would be

an average of the prior 60 months' mid-term AFR.

b. Claim payout patterns for Schedule P would be capped at 15 years, rather than 10, for some extremely long-tailed lines (such as workers compensation and medical malpractice).

3. Repeal of PAL account and smaller small company deductions than House bill.

4. Senate's 20% corporate minimum tax, applying to all industries, included 50% of excess of "book" income (probably GAAP income for stock P/C companies and line 18B for mutuals) over minimum taxable income. Included tax-exempt income for purposes of minimum tax.

5. Industry unhappy about increased discount rate - historic rate of investment return on total assets averages 60-65% of 5-year moving average of mid-term AFR. But industry supports package, on whole, in attempt to encourage Senate conferees to resist House P/C provisions in conference.

F. Conference committee negotiations

1. Central issue becomes conferees' need to raise $120 billion in corporate revenues to provide extra relief for middle income individuals, keep individual and corporate rates low and keep bill revenue-neutral.

2. Political atmosphere also unfavorable for P/C industry, as liability crisis and availability and affordability problems affect feelings on Capitol Hill.

3. House conferees make "compromise" offer raising $8.4 billion from industry over 1987-1991 -- adding to Senate bill proration at 15%, discount rate of 100% of AFR, disallowance of "fresh

start" to extent companies have existing NOLs, and other onerous provisions.

3. Senate offer in response, raising $6.4 billion over 1987-1991 and supported by most of industry, adds 15% proration to Senate bill.

4. Final provisions roughly split the revenue difference between House and Senate offers -- raising approximately $7-7.5 billion over 1987-1991. They are:

   a. Revenue offset with 6-year phase-in;

   b. 15% proration effective 1-1-87, excluding tax-exempt income from bonds and stocks bought on or before August 7, 1986;

   c. Senate discounting, with 100% of AFR as discount rate. (At time of printing, unclear whether 5% rate will apply for 1987, or whether 60-month rolling average will be used to calculate AFR.);

   d. Repeal of PAL account;

   e. Treasury study of mutual policyholder dividends, with report date of 1-1-88;

   f. Senate small company provisions; and

   g. "Book" income replaced with "earnings and profits" in 1990 and later years for purpose of Senate minimum tax.

IV. Conclusion - not good, but not as bad as it could have been.

A. Cons

1. Revenue produced is much larger than either House or Senate bills alone would have produced.

2. Industry must learn to live with discounting.

3. Uncertain impact on investment policy -- proration and book-tax preference in corporate minimum tax may affect industry investment in tax-exempts.

B. Pros

1. QRA has been defeated and discredited (for now, at least).

2. Permanent solution has been attained (for now, at least).

3. Use of current NOLs and consolidation have been preserved.

C. Outlook for future -- look out for Gramm-Rudman and need for further revenue. Treasury study makes mutual P/C policyholder dividends an obvious target, and Treasury is still convinced that QRA is proper. But thorough rewriting of P/C taxation in 1986 should provide protection in the future.

1986 Casualty Loss Reserve Seminar
September 29, 1986

Outline of Tax Changes - H.R. 3838

I - Corporate tax rates

1. Ordinary
2. Capital Gains
3. Effective Dates

II - Acquisition Expenses

1. Annual adjustment - 20% of fluctuation of Unearned Premium Reserves at beginning and end of taxable year

2. 20% of beginning reserve (at 12-31-86) spread over six years

3. Definition of Unearned Premium Reserve

4. Special Provisions

    a. Life reserves
    b. Title insurance
    c. Insurance against default in the payment of principal or interest on securities with a maturity of five years or more

5. Anti-tax avoidance rule

6. Effective date

III - Treatment of Tax-Exempt Income

1. Description of Provision
2. Effective Dates

IV - Repeal of PAL Account

1. Explanation of PAL Account
2. Provisions of Bill
3. Effective Dates

V - Special Treatment of Small Companies

1. Reason for change
2. Provisions of Bill
3. Inclusion of both stock and mutuals

VI - Current Law Tax-Exempt Organization Engaged in P&C Insurance Activities

Very general mention

VII - Foreign Provisions (tentative)

1. Foreign Tax Credit Limitation

   a. Asset allocation required for purposes of interest and G&A expense allocation on affiliated company basis - special problem for P&C companies

2. Taxation of U.S. Shareholders of Foreign Corporations

   a. Captives - short history and present taxation - change in definition CFC and U.S. shareholder

   b.(i) Taxation of income of CFC from risks other than from country of incorporation

   (ii) Prior years' losses ignored

   (iii) Taxation of investment income

   c. Excise tax - Barbados and Bermuda treaties

   d. Effect of b on CFC insurer owned by U.S. insurance company

   e. Substitution of subjective test exempting CFC from Subpart F if "not availed of to reduce taxes" by objective test and its effect on P&C foreign insurers

Martin M. Rosenbaum
September 19, 1986

1986 CASUALTY LOSS RESERVE SEMINAR

1F - REINSURANCE RESERVING: ASSUMING COMPANY PERSPECTIVES

Moderator: Patricia A. Furst, Vice President & Actuary
American Re-Insurance Co.

Emanuel Pinto, Actuary
Metropolitan Reinsurance Co.

Mary E. Hennessey, Consulting Actuary
Tillinghast/TPF&C

PATRICIA FURST:

I am Pat Furst, Vice President and Corporate Actuary for American Reinsurance Company, and I am going to be the moderator for this panel.

This morning our panel is going to be discussing some of the particular reserving problems that are faced by reinsurance companies. These problems are due both to the lack of credible and homogeneous data and also just to the very nature of the reinsurance business itself.

We will also be discussing some techniques that are used by reinsurers and consultants in dealing with some of these problems.

Before I introduce the first panelist, I want to set the tone for what is to come by reviewing with you the results of the 1985 edition of the Loss Development Study that's produced by the Reinsurance Association of America. This study is conducted every other year.

The intent of this study is to reinforce awareness of loss development patterns for reinsurance companies that write casualty excess reinsurance business, as well as for primary companies that are writing high deductible business or umbrella business.

This latest edition contains tables showing unadjusted loss development statistics for 21 member companies of the Reinsurance Association as well as two other contributing companies. The data is limited to incurred loss and allocated loss adjustment expense excluding IBNR. It's for casualty excess business only and it is for the following lines of business: auto liability, general liability, medical malpractice and workers' compensation.

(Slide 1) This first slide that I am showing represents the ratio of cumulative incurred losses to ultimate incurred losses at the end of various report years. (in the back of the room there was a package of handouts, which includes all of these graphs.)

The horizontal or the X axis represents report years one through nine. And in this case report year one is defined as being at the end of the particular accident year. So if you are discussing accident year 1976, for example, report year one represents an evaluation of incurred losses as of December 31, 1976. While for the same accident year report year nine would represent an evaluation of incurred losses as of December 31, 1984.

The vertical or Y axis represents the cumulative percentage of incurred losses that are known as of various report year periods.

As you can see from this graph auto liability is the fastest reporting line of the three lines that are displayed here. As of report year one (the end of the accident year), roughly 35 percent of the losses are known. By report year three 75 percent of the losses are known. And by report year

six 90 percent of the losses are known. And it develops rather quickly afterwards.

In contrast, workers' compensation and general liability are very slow developing lines. You can see that by the end of the report year nine less than 65 percent of the losses are known.

The general liability data that is displayed here excludes asbestos losses, at least those asbestos losses that could be identified. There were some companies that were not able to segregate that data.

(Slide 2) The next slide, however, illustrates the affect that asbestos losses are having on the development patterns for some reinsurers. Fourteen of the twenty-three companies that participated in the study were able to segregate their asbestos losses from other general liability losses.

As a result, you can see that the loss emergence pattern is significantly different for GL including asbestos versus GL excluding asbestos.

The general liability data that was shown in the first slide and that is in the first handout also excluded medical malpractice losses, at least those that could be identified. There were some companies that were not able to segregate medical malpractice losses prior to 1'975. And so, those were in the data on the first slide.

(Slide 3) Again, a sample of 14 of the 23 companies were able to segregate their medical malpractice losses for all years. And this is the resulting loss development pattern for medical malpractice.

(Slide 4) The next slide shows comparable data for Schedule P, not otherwise classified lines.

Every time that this Reinsurance Association study is done, which is every two years, comparisons are made with prior years to see how the data has changed and whether there are any trends.

In recent years it has been observed that there is a general deterioration in loss development patterns. In other words, the loss development factors that measure the change in incurred losses from one report year to the next are getting larger.

It shows that any previous estimates were overly optimistic. The next three slides and the next three handouts in your package just illustrate this. (Slide 5) This slide shows a comparison for auto liability from the 1976, 1980, and 1984 reports of the Reinsurance Association. As you can see 1980 showed a deterioration in loss development patterns over 1976.

And in the same way the 1984 study showed a further deterioration from the 1980 study.

(Slide 6) For general liability, the effect is much more dramatic. (Slide 7) Workers compensation on the other hand, is starting to show some stability in the last few years.

The next section of the Reinsurance Association Report illustrates the significant differences between the experience of primary companies and reinsurers. This is mainly due to the retention feature of excess of loss reinsurance. The retention results or causes a time delay in reporting of information to reinsurers. It also causes different loss development for reinsurers as you'll be hearing later. (Slide 8) For auto liability you can see that for primary companies at the end of the first year 80% of the losses are known, whereas for reinsurers only about 35%. By the end of 8 years they're pretty much even. (Slide 9) For general liability at the end of the first year primary companies know roughly 45-47% of their losses whereas reinsurers know less than 5%. Even at the end of 8 years reinsurers still know only about 25% of their losses whereas primary companies know about 95%.

(Slide 10) Medical malpractice shows similar trends, as well as workers' compensation. (Slide 11) The last few slides illustrate some of the reasons why the Reinsurance Association includes a whole list of caveats in their reports. The biggest caveat is that the data in the study represents pooled experience for a group of 23 companies. And this group of 23 companies is very diverse, the types of business that they write are very diverse. They write different classes of business, some write over high retentions, some over low. They make use of different types of retrocessional coverages. They write in different geographical areas. Some of them are brokered companies, some direct; they have different proportions of treaty and facultative business. And they have different claims handling practices. Remember that all the data here represents case losses so it includes additional case reserves to the extent that companies do book additional case reserves. Therefore you have to use extreme caution before you use any of this data or apply it to a particular company's situation. In order to provide an indication of what the deviations and variations among the companies might be, an analysis was done of a few of the larger reinsurers data. Confidence intervals were calculated as compared to the average and you can see that these slides show the average or the mean experience of all the companies in the group as well as the 50 and 75% confidence intervals. (Slide 12) There's a chart for auto liability as well as workers' compensation, where you see a great variation. (Slide 13) (Some companies discount, some companies don't.) (Slide 14) And general liability excluding asbestos.

Before I introduce the first speaker, I'd like to remind you that the views and opinions you hear this morning are our own. They don't necessarily represent the views of the Casualty Actuarial Society or the American Academy of Actuaries, or of our own employers. Also, I'd like to ask all of you to hold your questions until the end. I understand that even though we've gotten a late start we'll be allowed to extend the session until about 10:15. We've tried to allow plenty of time for questions. I think it might be easier if you'll hold them to the very end.

EMANUEL PINTO:

Thank you Pat. Good morning all. My comments are pretty much going to follow the outline that was included in my handout. The first areas I want to talk about have to do with grouping the experience that you have for reserving purposes. In general, the various items I'm going to touch on are practical considerations, areas where reinsurance reserving is somehow distinct from what one would expect from their experiences with primary reserving. Experience needs to be grouped somewhat differently in reinsurance reserving then in primary reserving, I'll give a couple of examples. The first thing is the experience basis. It's very important to be aware of what the experience basis is that you're dealing with, whether it's accident year experience, calendar year experience or policy year experience. These may go under different names. You may see something called "pool year" or "syndicate year" when in fact it is policy year experience. You often have to just investigate what it is and find out what the experience basis is. If you assume it's accident year experience when it's indeed policy year experience, the methods that you apply to your data will lead to erroneous conclusions and estimates. Another area relating to how one should group their experience has to do with the annual statement line of business. In reinsurance it often times is less practical and less meaningful to group experience according to annual statement line of business. Many types of reinsurance coverage span several annual statement lines of business. One example would be a catastrophe cover. In that case you're looking at an accumulation of losses from a particular occurrence and it may span an entire book of business of a primary company, or an entire property book of business, so you could have losses arising from homeowners, commercial fire and multiperil policies. To try and segregate the experience on your catcovers by annual statement line of business would not be very meaningful. There are many other examples of reinsurance coverages that span several annual statement lines of business. As an alternative for reserving purposes, the experience can be grouped in ways that are somewhat more meaningful in the context of the reinsurance business. A basic goal is to create homogenous subgroups or groups of experience that are somewhat similar to each other. That's much harder to do in reinsurance than it is with primary business. Catcovers would be one example of these reinsurance categories or alternative groupings. Property pro rata business would be another example, casualty working excess would be another example. What I mean by what is meant by casualty working excess is as follows: Excess refers to

business being written on an excess of loss basis, casualty means you're dealing with casualty coverages, and the word working refers to business written at a level where there's an expectation that there will be some frequency of loss as opposed to a very high layer of coverage or a casualty clash cover, where the expectation of a loss is quite remote. From a company perspective, you could look at the different types of coverages that are written and attempt to combine them in such groupings as I have mentioned. You should end up with more similar types of coverages than if you were to try and group the experience by annual statement line of business.

The next point is the broad versus narrow definition of IBNR. Again, this is just a point that one should be aware of what they're dealing with. For anybody who might not be familiar with this, the narrow definition of IBNR refers to claims that had not been reported as of a particular statement date but had occurred by that statement date. The broad definition of IBNR would include those unreported claims as well as the development on known claims. It may not be possible in reinsurance to set up separate provisions for the narrow IBNR or the pure IBNR and the additional portion arising from the development on known claims, because you may not have the individual claim detail for certain of your reinsurance coverage. For example, on times of property pro rata business, if what's reported to you by experience period is just successive evaluations of your incurred losses, you don't know how much of those changes arose from new reportings, and how much arose from development on known claims.

There is a substantial delay in the reporting of accounts to a reinsurer from a ceding company. For example, let's say reports are meant to be reported on a quarterly basis. When you come to year end in all likelihood you won't have received the fourth quarter account. And in many cases you may not have even received the 3rd quarter account. This has to do with the fact that it takes the ceding company time to close their quarter, to settle out their books and come up with their final numbers and see how their experience affects the reinsurance covers, and then report that experience to the reinsurer. It's often times going through a broker, if you're dealing in the broker market, so that's another step that results in additional delay. Foreign business is even worst in this regard; the delays can be very substantial beyond one or two quarters. When you have a situation like this, a method of treating it is to essentially set up predicted amounts, estimated accounts reserves which are estimates for those accounts that haven't yet come in. Let's say you're at year end and the fourth quarter account hasn't come in. It's not just the losses that haven't come in, the premium report hasn't come in as well so you want to predict your premiums for the quarter, and also predict the accident quarter losses that you would expect to arise from that premium. This is rather important because if you don't do this, in the subsequent periods when the reports do come in, let's say first or second quarter of the next year when you do get those reports for the prior year, and you find out

about that experience that relates back to the earlier quarter, if you haven't set up any sort of reserve for it, it's going to appear as adverse development in your statements. The losses would come in and would get assigned back to the earlier period and simply increase the loss amount for that period. If you have an estimated accounts reserve set up, when they come in the reserve can come down and you don't get that sort of adverse development.

One area that's always somewhat sticky is reserving for catastrophies. Let's say you have a large windstorm in the 3rd quarter and your 3rd quarter closing comes along. A hurricane in Florida or Texas -- how much do you put up for that event. Since you haven't gotten any losses reported yet, you would need some sort of a reserve. You know about the event so it's not truly IBNR but you would want to reserve for that event. It's very tough to do and I don't have any great answers on this one. From my own experience I've undershot some and I've overshot some others. A couple ideas -- the AIA puts out very shortly after a catastrophic event, an estimate of industry wide insured losses. Now if you've had over the years some experience with these catastrophies, with the benefit of hindsight, comparing the developed ultimate losses that occurred from a particular catastrophe from what this initial estimate of industry wide insured losses was may give you some feeling for what share of those total industry wide losses you have. For example, for Hurricane Alisha in 1983, the AIA figure was $700 million. Let's say a particular company a couple of years later saw that they had $7 million of losses from that hurricane. In that case they had 1% of the AIA's estimate of the industry wide insured losses. The AIA comes out with this very quickly. It's usually a matter of a week or two after it happens. It will show up usually in the Journal of Commerce or if you miss it you can always call them. Their estimates of industry wide insured loss aren't to be taken as gospel. But at least it's a process that they attempt to do consistently and given the lack of alternatives it's one thing to look at. A company's particular book of business may be such that it would have 1% within a hurricane in Florida but if the hurricane were in Texas, you'd only have .50%. You can also work with your claims department and your underwriting departments. The underwriters would have written a number of these covers and would know windstorm exposures. If it's another type of event they may have an idea of which coverage or particular treaties or what certificates might be exposed to loss from a particular catastrophic event. Your claims person may have had experience with different types of catastrophies in the past and he or she may recall where losses showed up in the book for prior events. In general they may have ideas to assist in coming up with a preliminary estimate. From there, you just have to track it quarter by quarter and make reasonable adjustments.

In reinsurance there's a very limited amount of data available to work with in the reserving process. Reinsurers are heavily dependent on the information that's supplied by the ceding company. Where I work at

Metropolitan, we participate in the broker market. The information comes in many different forms, both due to the fact that it is coming from different ceding companies as well as flowing through different brokers. The experience that comes in itself requires some interpretation and also does not always give you everything you'd like to see. There's also very limited industry wide data. Pat discussed the RAA data, that's one source. The Best Casualty Loss Reserve Development is a volume put out by Bests. It gives some information on reserve levels held by certain professional reinsurers who report experience in Schedule P. That's an additional source. But, by and large, compared to the primary industry where Iceland may be putting out trend factors and development factors by state, by line and all sorts of other industry information is available, there's an incredibly limited amount of information in reinsurance. As I mentioned, you're dependent on the information that's supplied to you on individual covers. And you often times don't have a whole lot of leverage to demand the information that you would like to see to properly reserve the cover. If you have 2% of some particular treaty in the broker market and you go to your broker and say we'd like to see claim counts by line of business by accident year, by year of report, they're more likely to replace your 2% than get you that information.

Often times you may want to look at individual treaties separately. Break out a large or unusual treaty, or a number of treaties. It's important to keep aware of what the nature of the coverage is that the treaty covers. For example there may be certain contract peculiarities such as an aggregate deductible or a loss corridor. What I mean by an aggregate deductible is that of the losses that would otherwise flow to the treaty that would be covered under the treaty, maybe the first $15 million of those losses would not affect the treaty. There would effectively be an aggregate deductible of $15 million. After that $15 million is exhausted then losses would start to flow to the treaty. And obviously that would have a big impact on how you viewed experience for that cover. Another example is a loss corridor. For example, it may be agreed that if the loss ratio goes above 100% that the ceding company would then take back the losses until the loss ratio goes to 115 at which point the reinsurer would again participate in the losses. That also obviously would affect the reserving. You're dealing in a situation where you may have manuscripted policies that may each have their unique characteristics.

Loss development is fundamental to the reserving process. Pat reviewed a lot of the features of the RAA Study so I won't dwell on it. It's pretty striking how long the development pattern is. When I first saw it I found it pretty incredible that after one year you have 5% of your losses and after 2 years 15% of your losses. It creates a lot of variability in the reserving process. Particularly if you have to try and apply those development patterns in your early years of development. One aspect of the RAA Study is that it combines business written at various retentions. It's excess casualty business but it would include business excess of $25,000 as

well as business excess of $1 million. Those would all be grouped together in the various patterns that Pat showed you. Dan Gogel and I wrote a paper that tried to explore how the loss development varied as a function of retention. We found that it varied very substantially. The paper can be found in the call paper book from the San Diego program. Included in that paper we developed paid and reported loss development factors by retention for losses in excess of $25,000-$1 million for various casualty lines of business. We also dealt with layers. If you have $100,000 excess of $100,000, you can derive a loss development factor for that type of coverage also.

In summary, bringing some of these thoughts together, in reinsurance you're dealing with very heterogenous underlying experience when compared with primary business. For example, in private passenger automobile, you have a large number of very similar exposures. In reinsurance you're dealing with different types of coverage, different types of ceding companies and different experience bases. It's more difficult to come up with solid homogenous subgroups for reserving. You also have very rapidly changing conditions. The rate levels in the reinsurance market changed tremendously over the last couple of years, say from 1984 to 1986. At the same time you've got changes in areas of social inflation, the propensity to sue. And now you've got moving in the other direction various tort reform actions in different states. A number of states are putting a cap on non-compensatory damages and making a number of other changes that affect the exposure of the coverage being written. You've got all of your economic changes. And then as Pat mentioned even your loss development patterns as long as they are themselves changing over time. From year to year the loss development patterns have been changing in the RAA information. The loss development patterns are extremely long tailed as Pat pointed out. All of these things together make for a highly variable situation, and a highly variable reserving process. There's a great deal of uncertainty and it's not the type of situation when after the fact with the benefit of hindsight you're extremely disappointed if you find that you were 5%, 10% or even 20% off.

One last point I wanted to close with was that this greater level of uncertainty and a higher variability can tend to create stronger pressures within a company for more optimistic assumptions, optimistic estimates in an attempt to show more favorable results. Given all the inherent technical difficulties of the reserving process itself it's really all the more important that the loss reserving be approached objectively. Thank you.

PAT FURST:

The second speaker this morning is going to be Mary Hennessy. Mary is a principal with Tillinghast/TPF&C in Philadelphia. She's been there since 1979. Prior to that, Mary was with Crum & Foster Insurance Company.

MARY HENNESSEY:

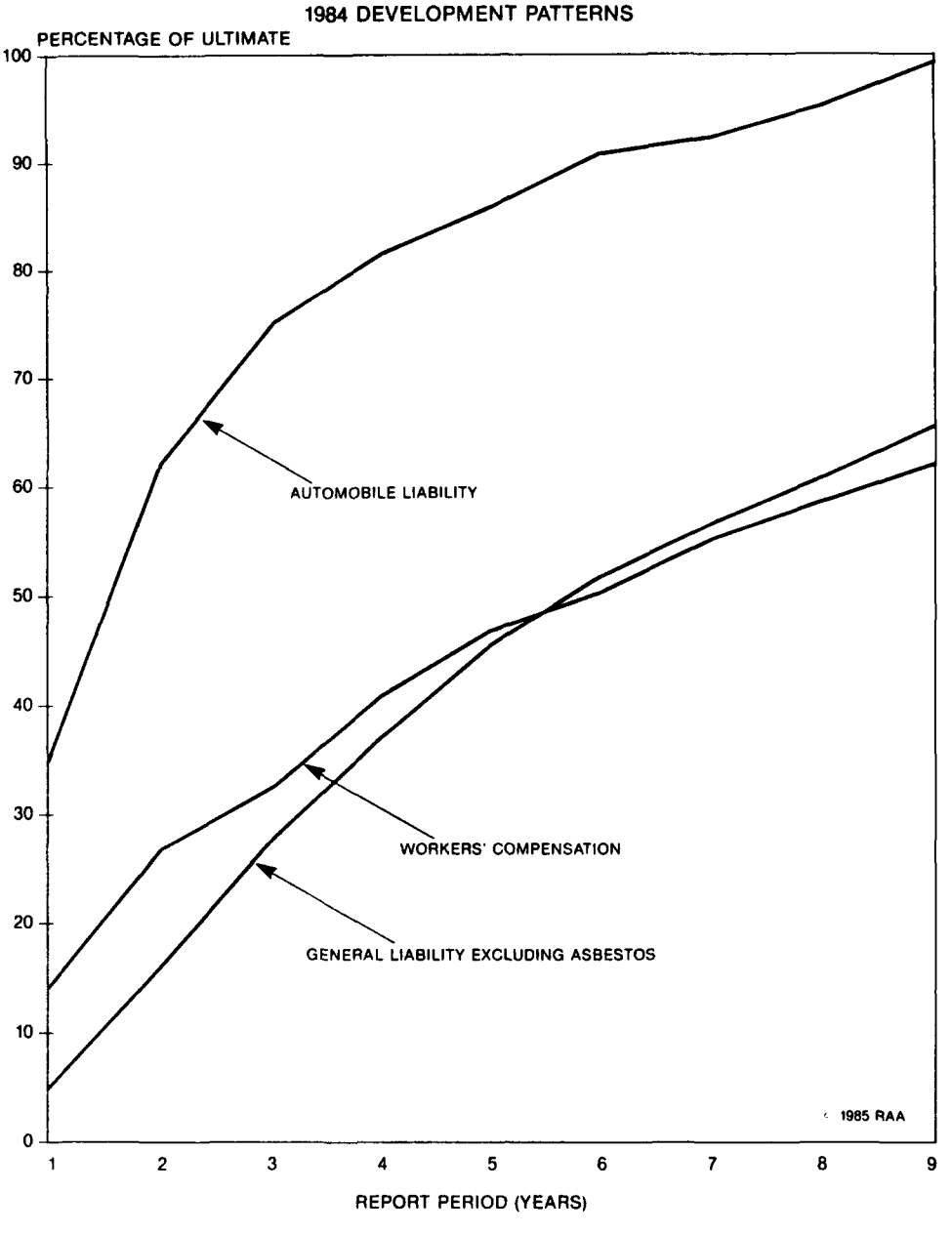
Due to transcription problems, Ms. Hennessy's remarks are not available. However, a copy of the slides forming the basis of her presentation are included in this section.

Session 1F

REINSURANCE RESERVING: ASSUMING COMPANY PERSPECTIVES

MODERATOR: PATRICIA A. FURST
VICE PRESIDENT AND ACTUARY
AMERICAN RE-INSURANCE COMPANY

Exhibit A-1


1984 DEVELOPMENT PATTERNS
PERCENTAGE OF ULTIMATE
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WORKERS' COMPENSATION
GENERAL LIABILITY EXCLUDING ASBESTOS
© 1985 RAA
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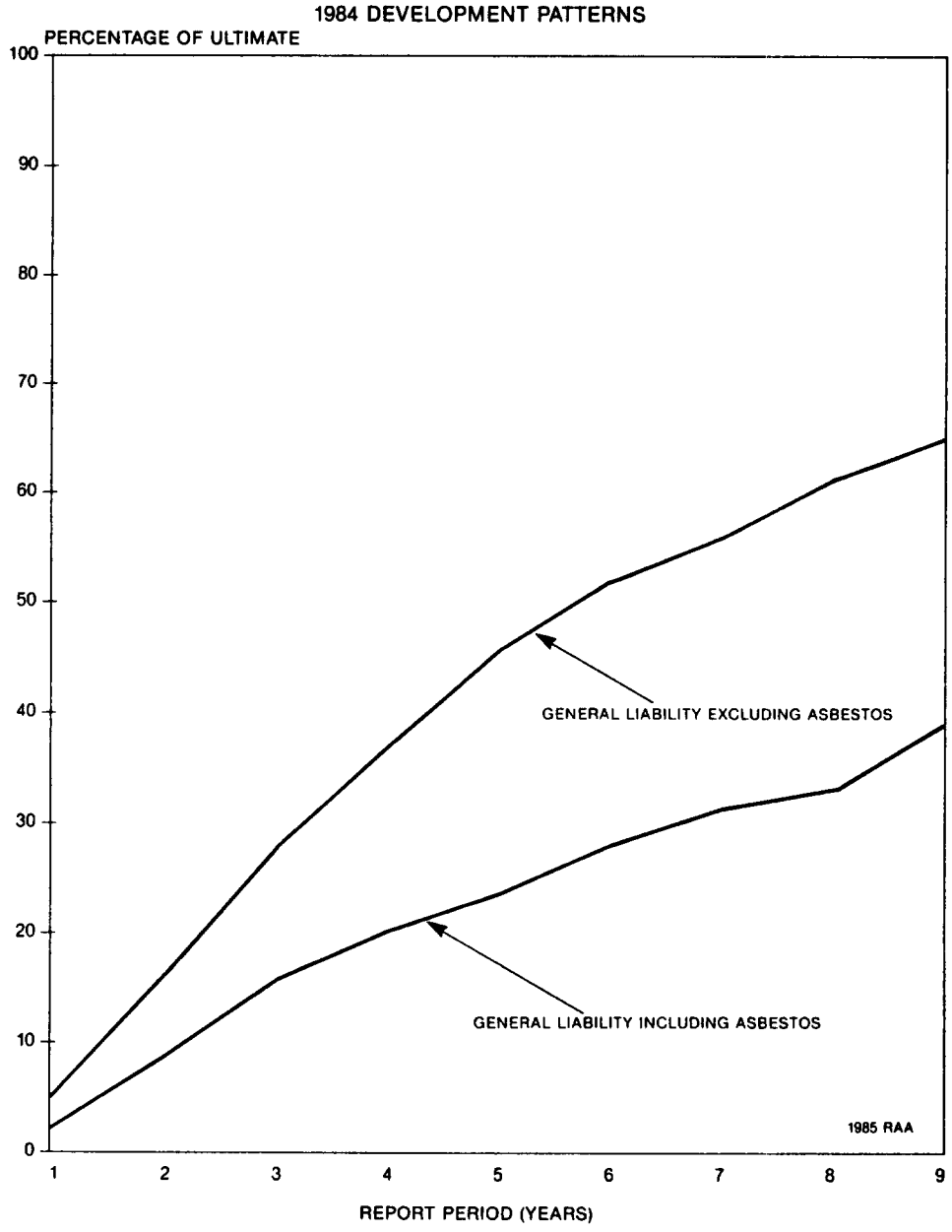
REPORT PERIOD (YEARS)

Exhibit A-2


1984 DEVELOPMENT PATTERNS
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GENERAL LIABILITY INCLUDING ASBESTOS
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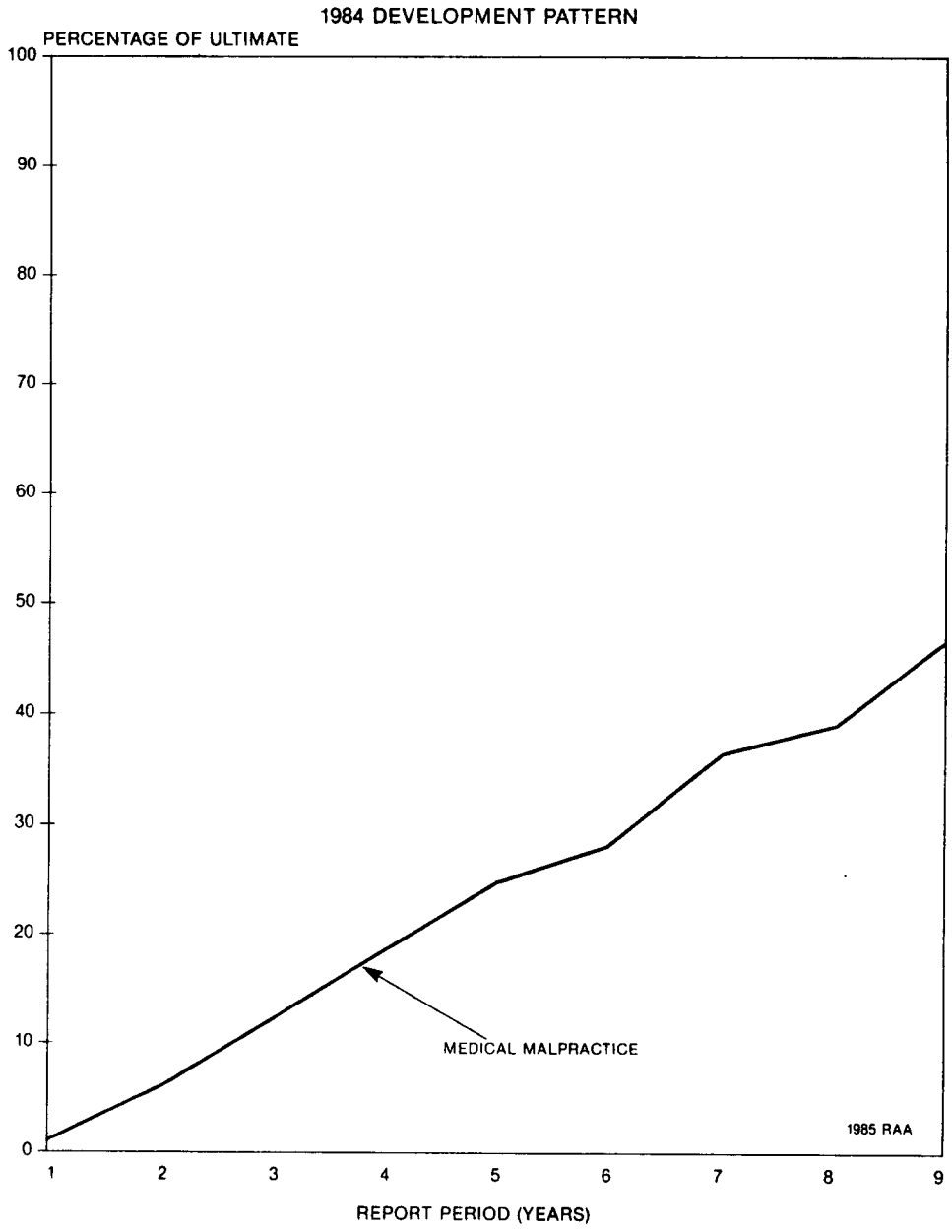
REPORT PERIOD (YEARS)

Exhibit A-3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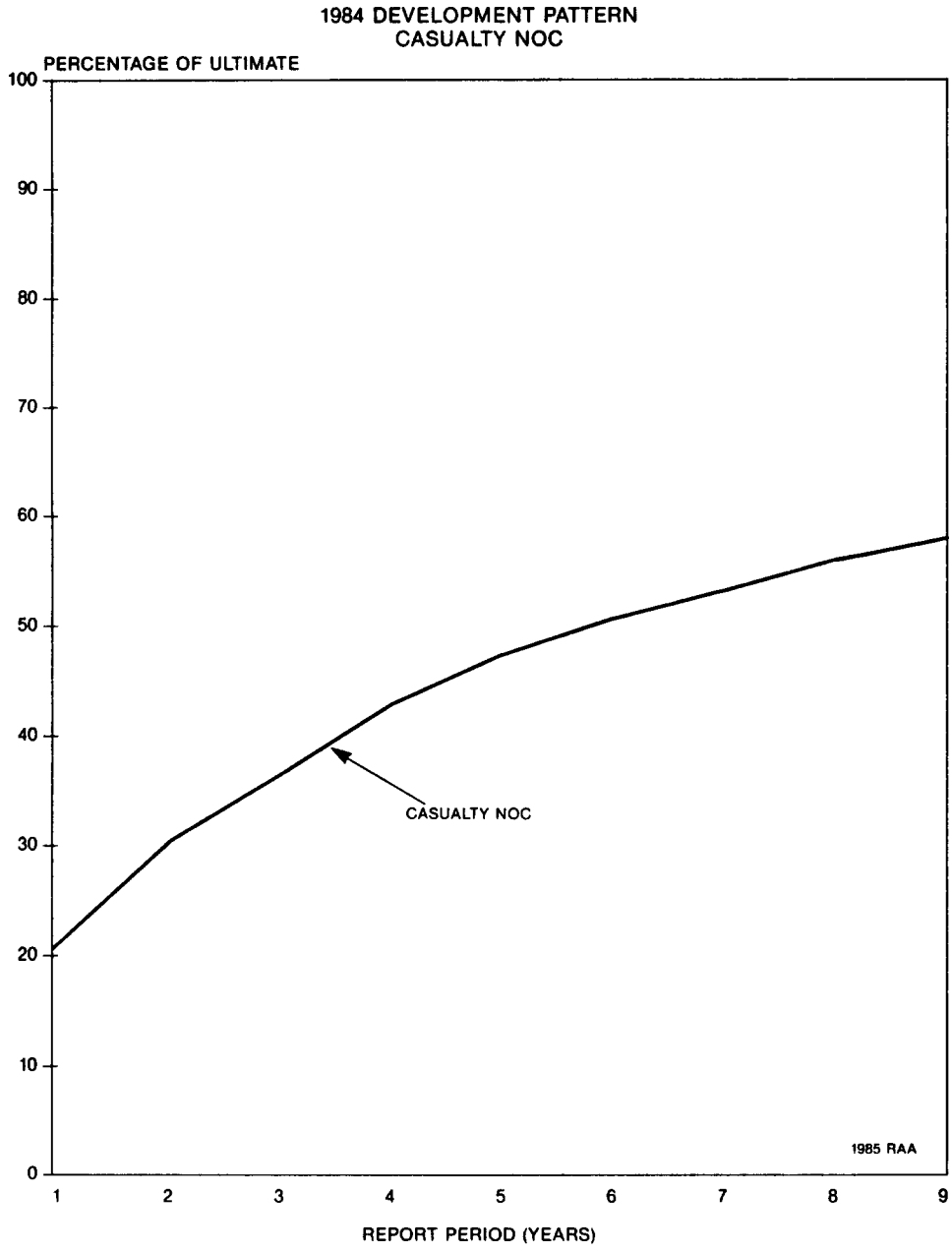
REPORT PERIOD (YEARS)
MEDICAL MALPRACTICE
1985 RAA

Exhibit D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REPORT PERIOD (YEARS)

Exhibit B-1

1976, 1980 AND 1984 DEVELOPMENT PATTERNS
AUTOMOBILE LIABILITY

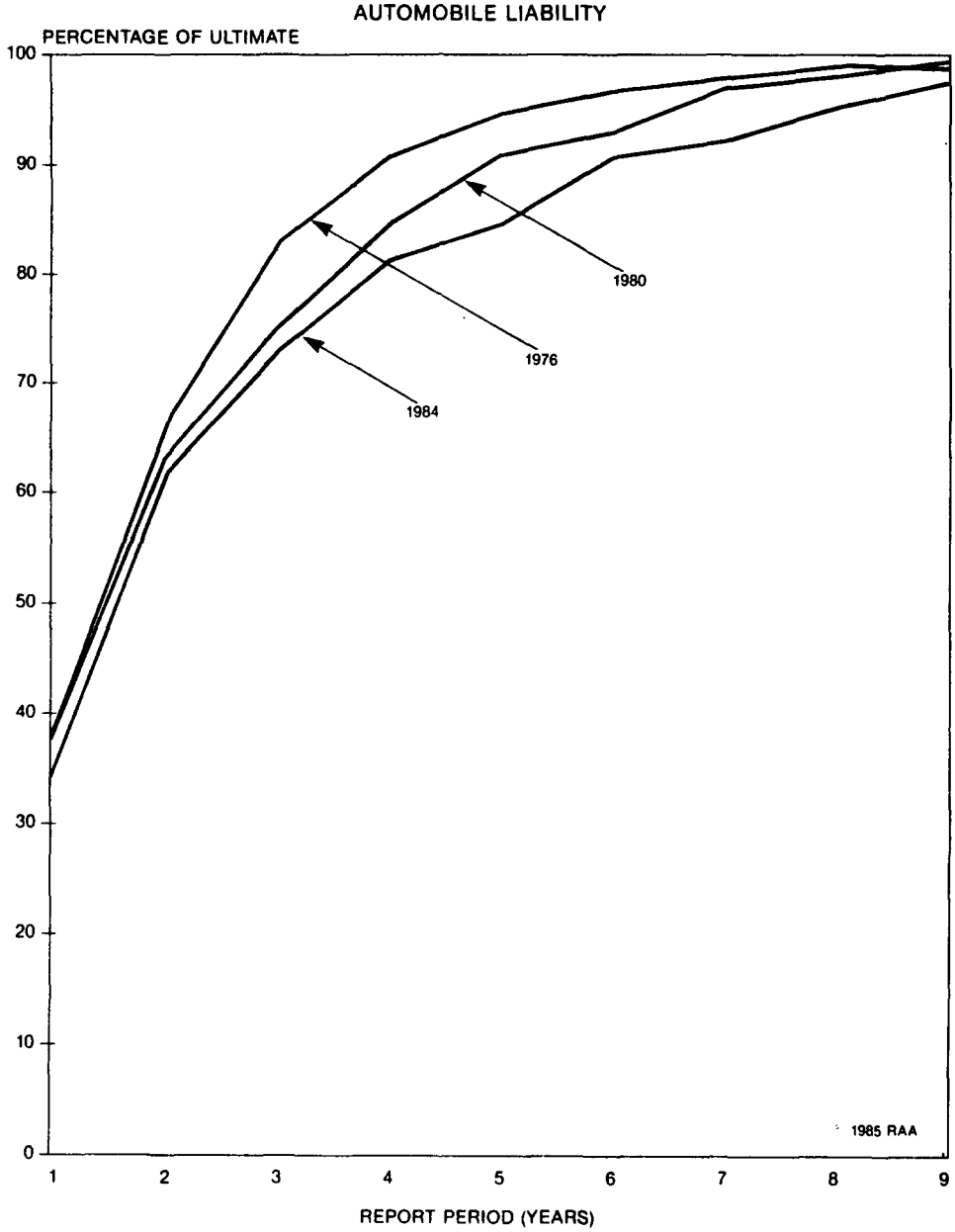


Exhibit B-2

1976, 1980 AND 1984 DEVELOPMENT PATTERNS
GENERAL LIABILITY EXCLUDING ASBESTOS

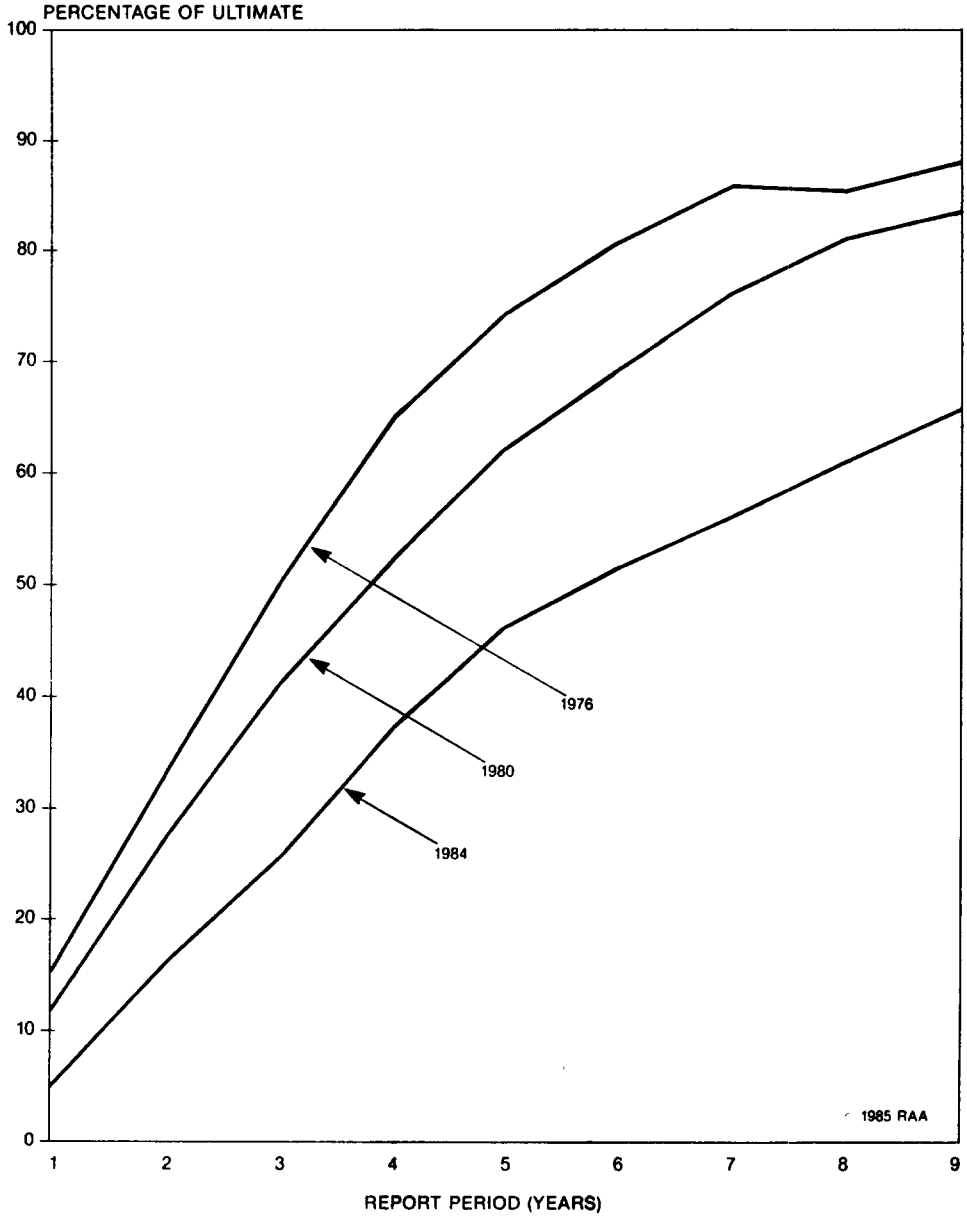


Exhibit B-3

1976, 1980 AND 1984 DEVELOPMENT PATTERNS
WORKERS' COMPENSATION

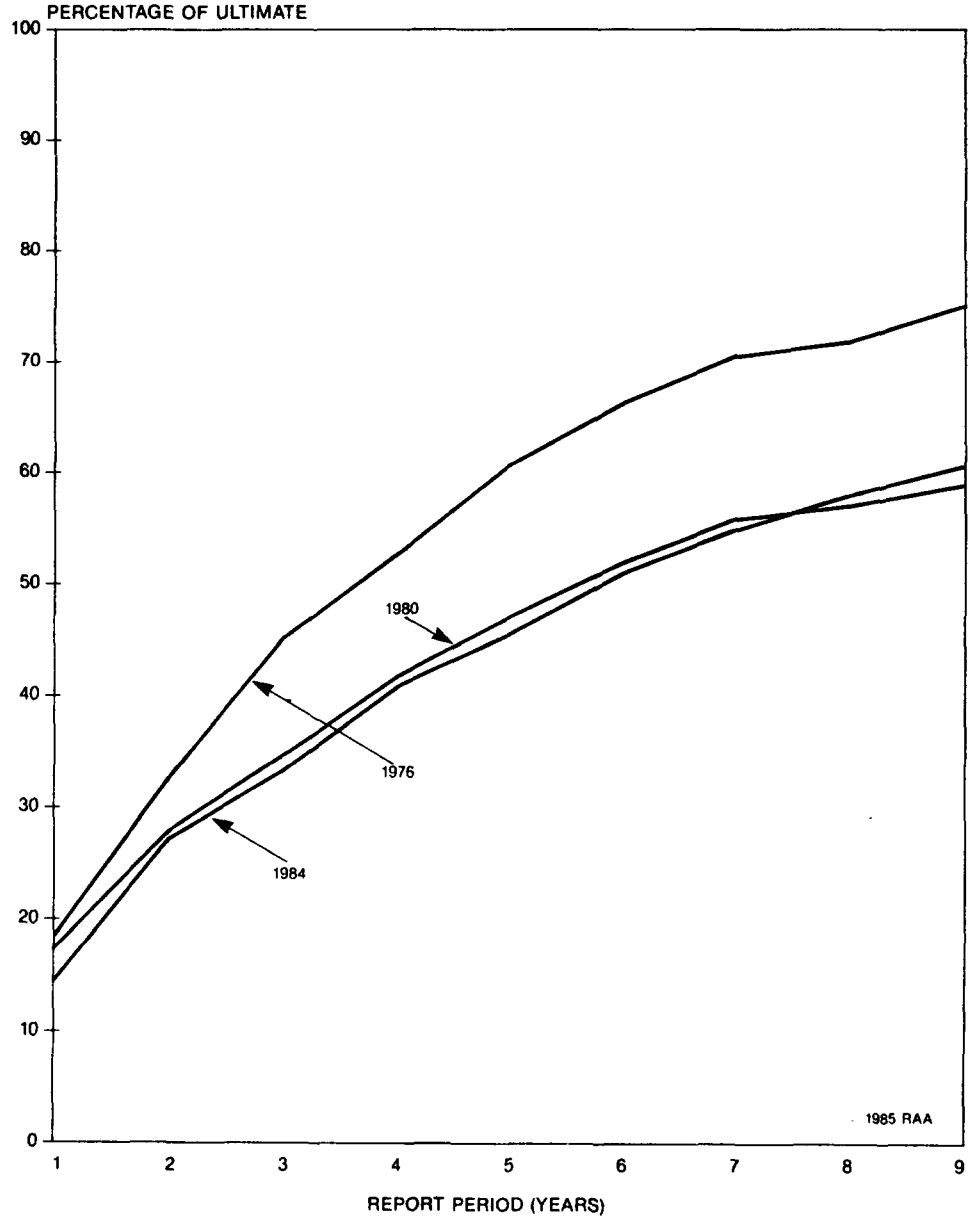
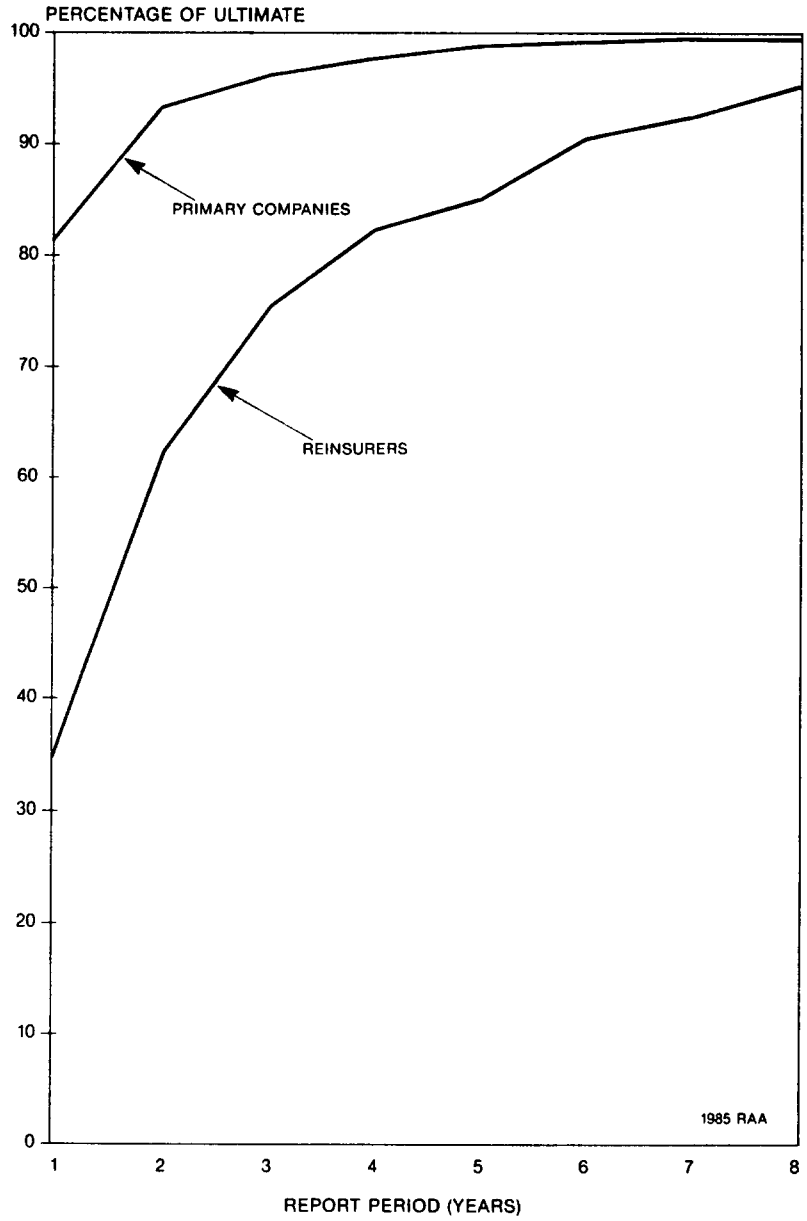


Exhibit C-1

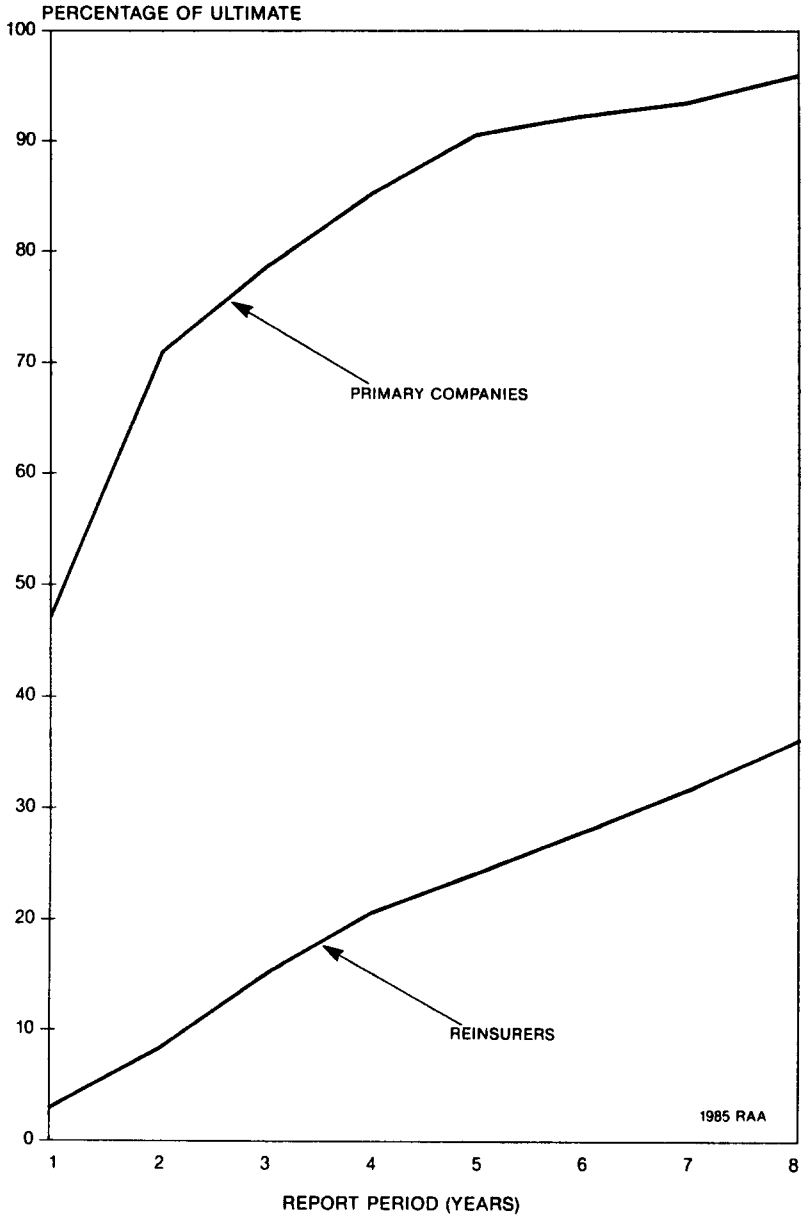
REINSURER VS. PRIMARY DEVELOPMENT PATTERNS
AUTOMOBILE LIABILITY



Primary Companies Data Source: A M Best Company

Exhibit C-2

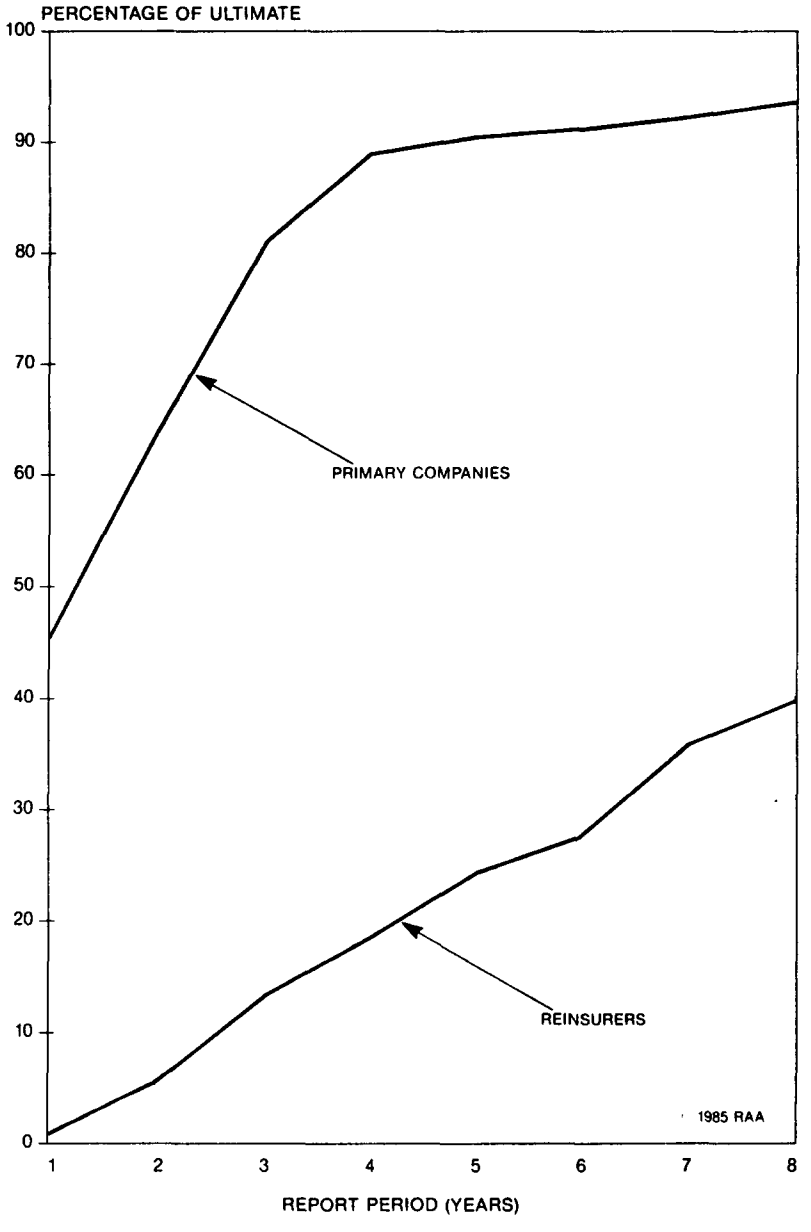
REINSURER VS. PRIMARY DEVELOPMENT PATTERNS
GENERAL LIABILITY INCLUDING ASBESTOS



Primary Companies Data Source: A M. Best Company

Exhibit C-3

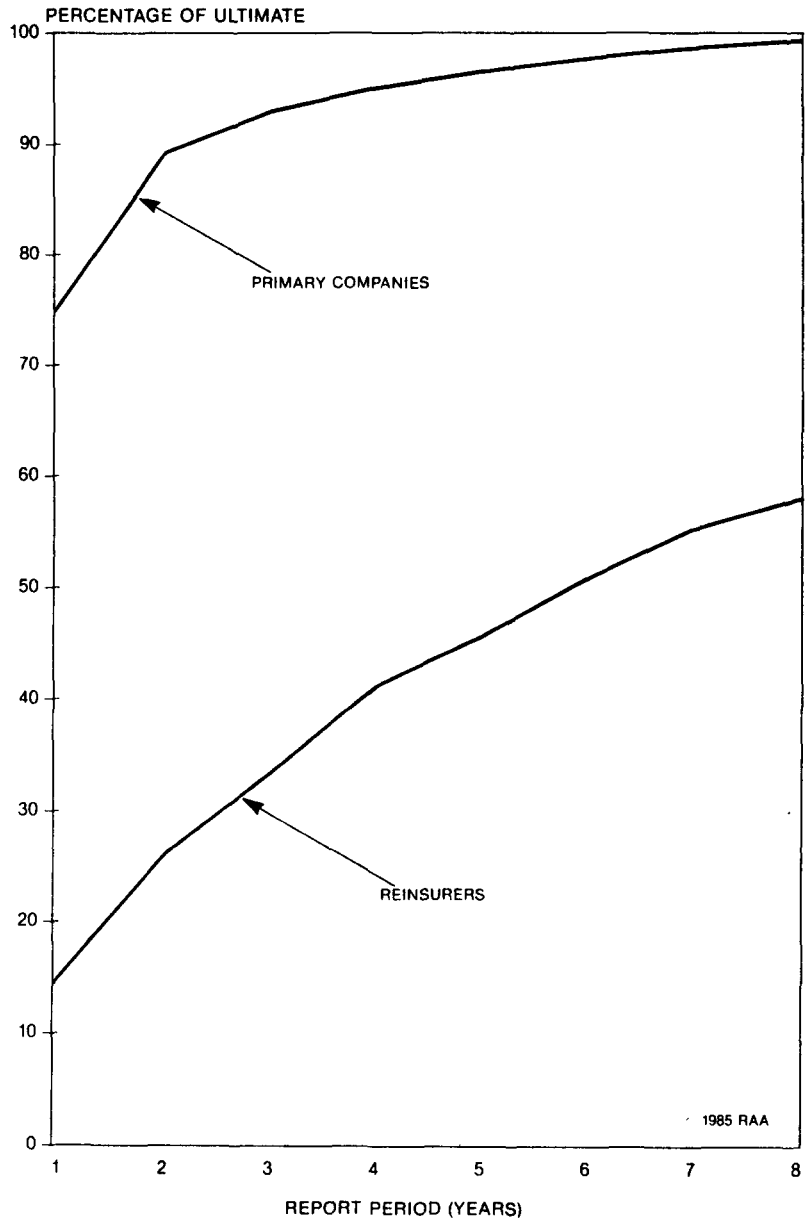
REINSURER VS. PRIMARY DEVELOPMENT PATTERNS
MEDICAL MALPRACTICE



Primary Companies Data Source: A M Best Company

Exhibit C-4

REINSURER VS. PRIMARY DEVELOPMENT PATTERNS
WORKERS' COMPENSATION



Primary Companies Data Source A M Best Company

Exhibit E-1

COMPANY VARIATION
IN DEVELOPMENT PATTERNS

AUTOMOBILE LIABILITY

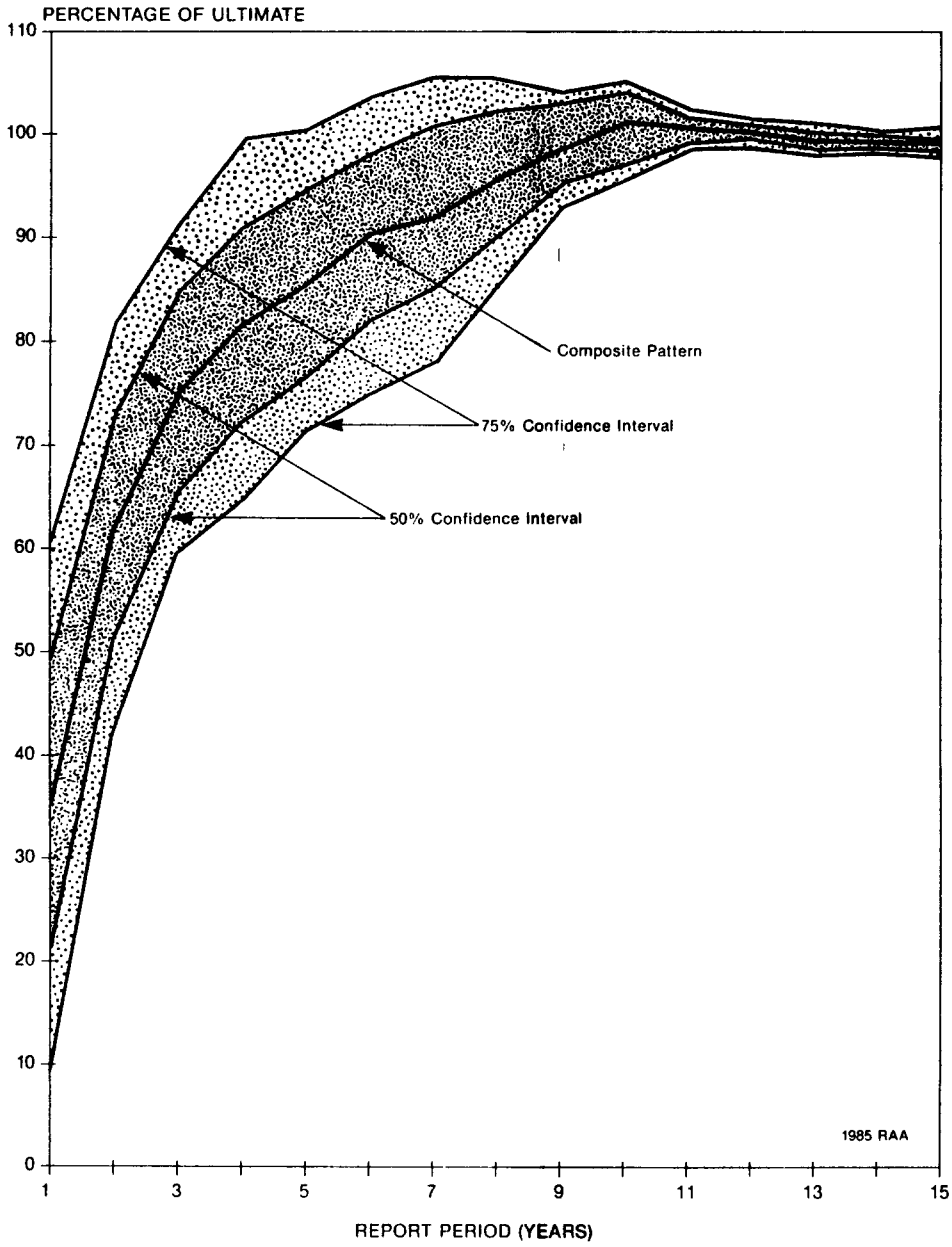


Exhibit E-2

COMPANY VARIATION
IN DEVELOPMENT PATTERNS

WORKERS' COMPENSATION

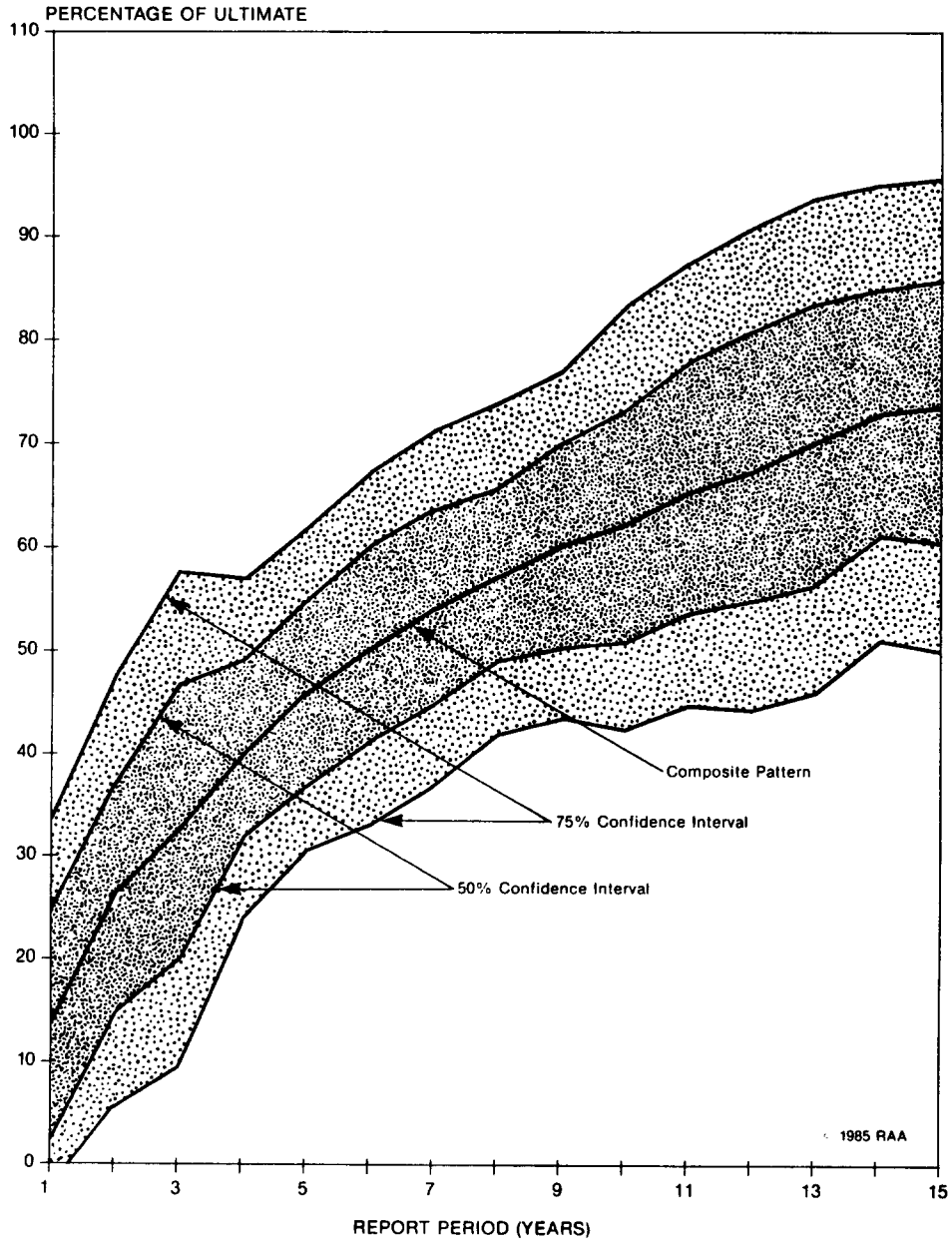


Exhibit E-2

COMPANY VARIATION
IN DEVELOPMENT PATTERNS

WORKERS' COMPENSATION

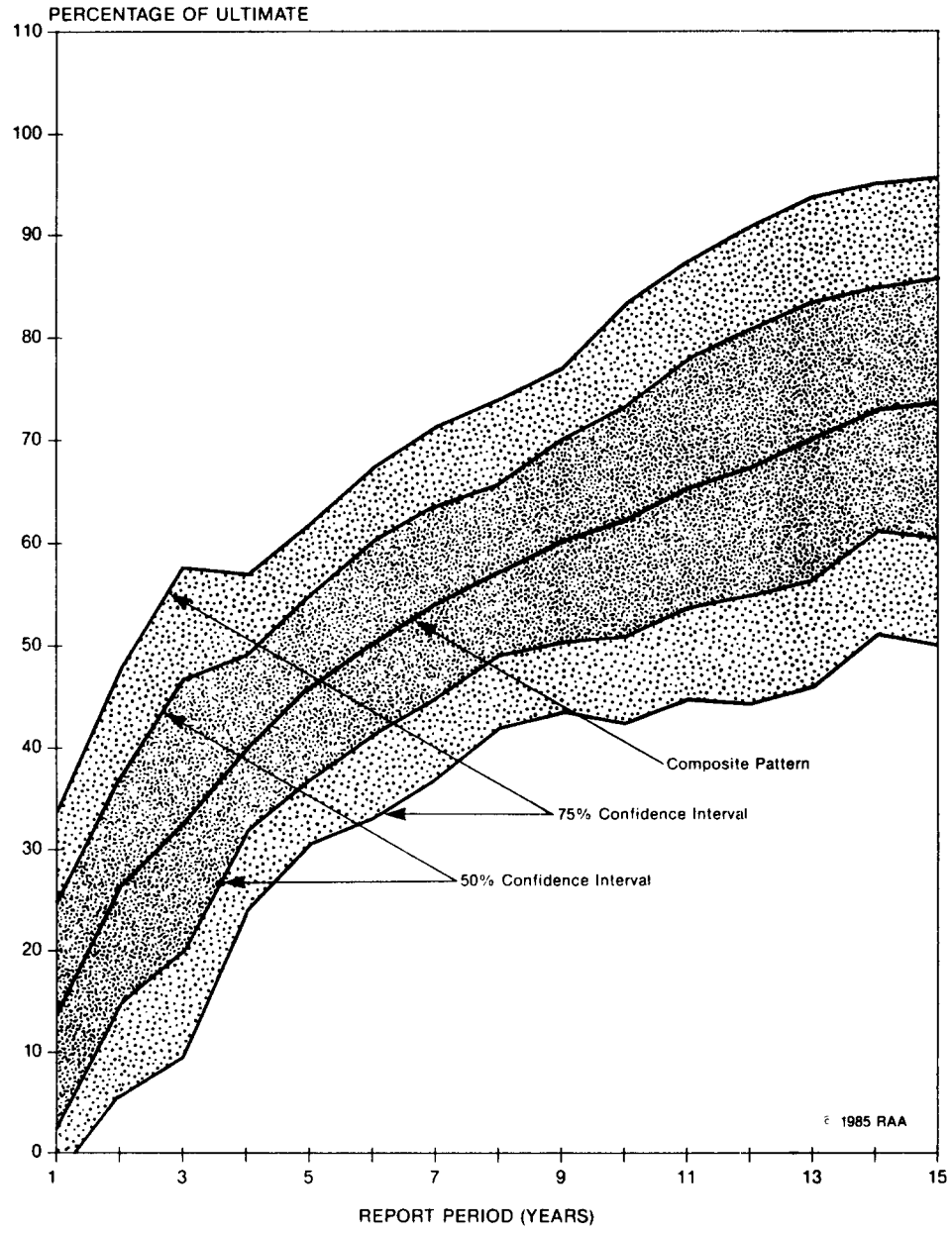


Exhibit E-3

COMPANY VARIATION
IN DEVELOPMENT PATTERNS

GENERAL LIABILITY—EXCLUDING ASBESTOS

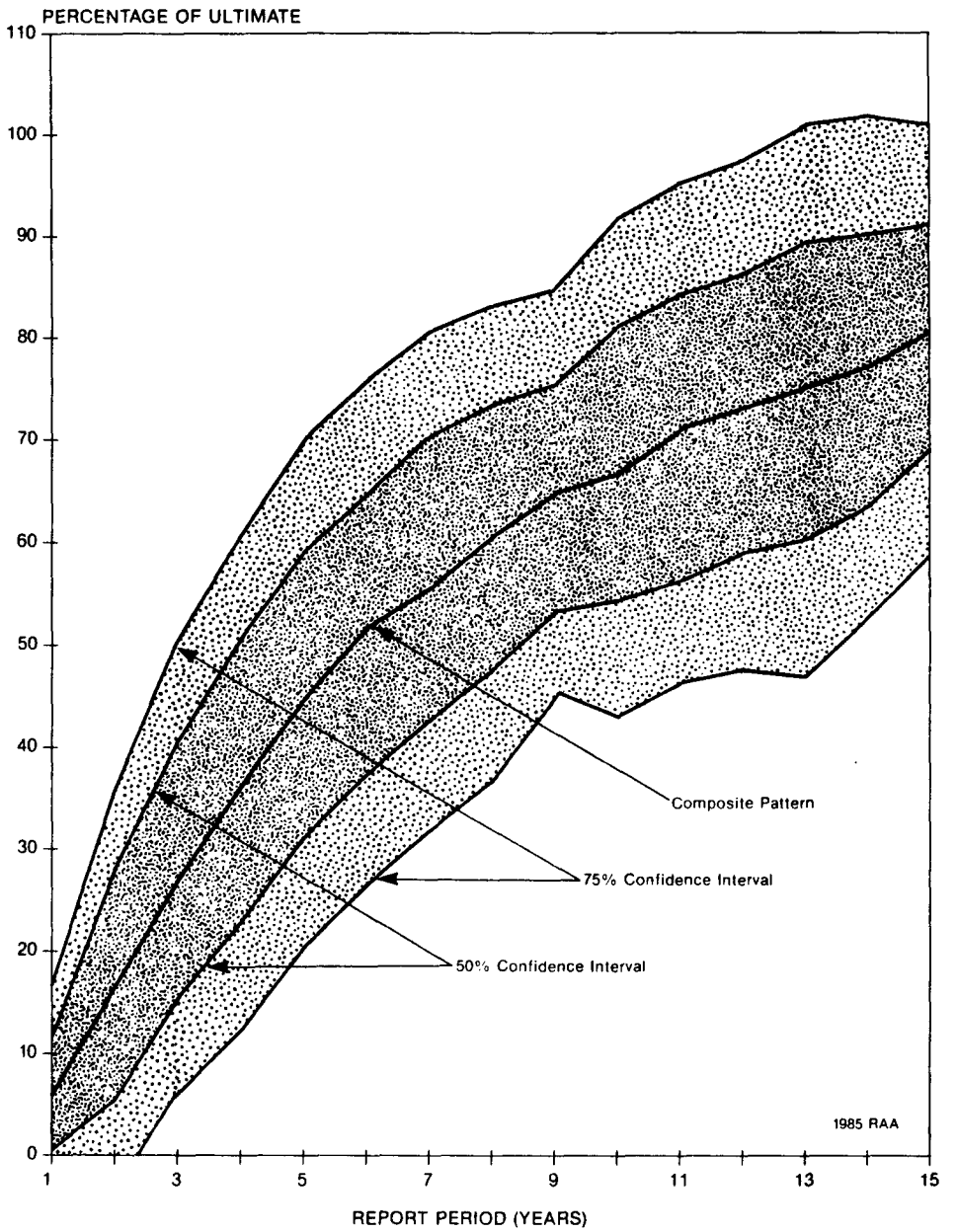
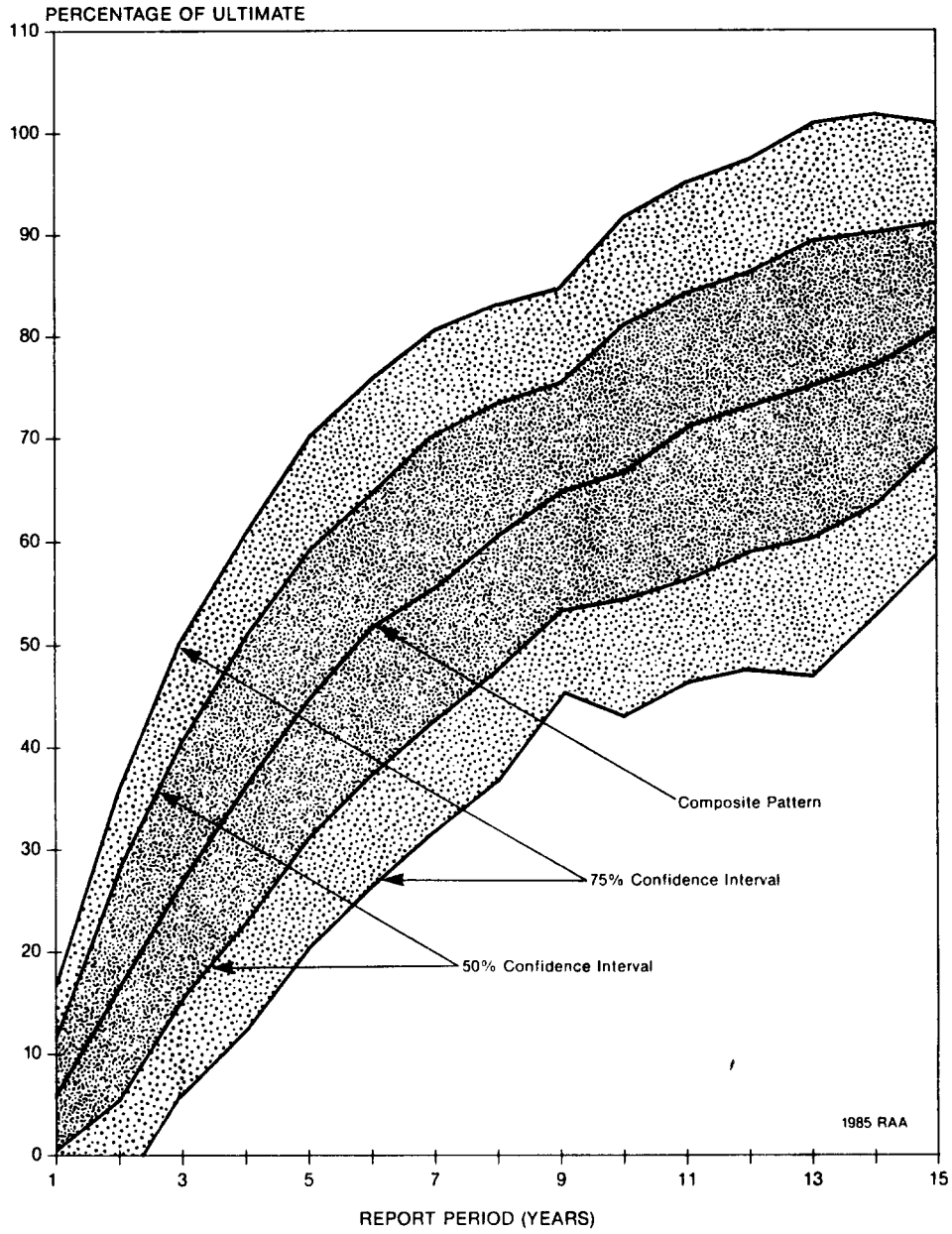


Exhibit E-3

COMPANY VARIATION
IN DEVELOPMENT PATTERNS

GENERAL LIABILITY—EXCLUDING ASBESTOS



REINSURANCE RESERVING:

Assuming Company Perspectives

Emanuel Pinto

September 29, 1986

REINSURANCE RESERVING:

Assuming Company Perspectives

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September 29, 1986

Reinsurance Reserving: Assuming Company Perspectives

I) REINSURANCE RESERVING - PRACTICAL CONSIDERATIONS

A) EXPERIENCE BASIS

1) ACCIDENT YEAR
2) CALENDAR YEAR
3) POLICY YEAR

B) ANNUAL STATEMENT LINE OF BUSINESS VS. REINSURANCE CATEGORIES

E.G. Catastrophe Covers
Property Pro-Rata
Casualty Working Excess

C) BROAD VS. NARROW DEFINITION OF IBNR

D) REPORTING DELAY - ESTIMATED ACCOUNTS

E) CATASTROPHES

F) DATA AVAILABILITY

G) CONTRACT PECULIARITIES - E.G. AGGREGATE DEDUCTIBLE
LOSS CORRIDOR

H) EXCESS LOSS DEVELOPMENT

1) RAA LOSS DEVELOPMENT STUDY
2) PINTO/GOGOL

II) SUMMARY - REINSURANCE RESERVING

A) HETEROGENEOUS UNDERLYING EXPERIENCE

B) RAPIDLY CHANGING CONDITIONS

C) LONGER TAILED LIABILITIES

D) HIGHLY VARIABLE

E) POLITICAL PRESSURES

PRESENTATION BY MARY R. HENNESSY, FCAS

Due to transcription problems, Ms. Hennessy's remarks are not available. However, a copy of the slides forming the basis for her presentation are included on the following pages.

SESSION 1F

Reinsurance Reserving: Assuming Company Perspectives

Mary R. Hennessy
Tillinghast/TPF&C

TWO CARDINAL PRINCIPLES

1. Know a few good techniques
2. Use common sense

FIRST PRINCIPLE:
KNOW A FEW GOOD TECHNIQUES

Be Cognizant of:

- Data limitations, e.g.
  - Non-homogeneous
  - Non-credible
  - Non-existent
- Limitations in methods
- "Long tail" and volatility
- External data available

SECOND PRINCIPLE: USE COMMON SENSE

Must Integrate:

- Macro and micro assessments
- "Qualitative" information with quantitative data

MACRO

- Position in market
- Experience in market

vs.

MICRO

- Our own experience to date
- Prior experience of business we are writing

Qualitative Information	Supports	Quantitative Analysis
• Type of business		• Expected premiums
• Sources of business		• Anticipated expenses
• Inherent profitability potential		• Projected loss ratio

GATHERING QUALITATIVE INFORMATION

1. Analyze type of business
2. Assess sources of business
3. Evaluate inherent profitability of business

1. ANALYZE TYPE OF BUSINESS

- Layer
- Ceding company characteristics
- Expected loss characteristics of products/lines
  - Geographic variations
  - Product variations (E&S vs. specialty vs. "pure vanilla")
- Impact of loss limiting items like
  - "Reunderwriting"
  - Aggregate deductibles

2. ASSESS SOURCES OF BUSINESS

- Ceding company track record
- MGA's
- Brokers

3. EVALUATE INHERENT PROFITABILITY OF BUSINESS

- External rate adequacy
- Special treaty/risk characteristics
- Expense considerations
- Other

QUANTITATIVE ANALYSIS

- Data
- Methodologies
- Caveats

DATA

- Simplest categorization - 6 categories
  - Property
  - Casualty
  - Combined

  } Pro Rata vs. Excess

- Additional complexity
  - Specialty coverages
  - Layers
  - And so forth

- Knowing your data is a requirement for choosing the best methods

METHODOLOGIES

- Premium development
  - When necessary
  - How accomplished
- Loss development: a number of methods should be tested. Some are:

Method	Commonly Tested For
Incurred development	Longer-tailed lines
Paid loss development	Shorter-tailed lines
Bornhuetter-Ferguson	Immature data
Loss ratio estimation	New line

CAVEATS

- Don't treat the data lightly
- Don't use projection techniques blindly

"DON'T TREAT THE DATA LIGHTLY"

- Look for large treaties
- Separate unusual treaties
- Test the category definitions
- Test the treaty assignment process
- Test the triangle generation program

DON'T USE PROJECTION TECHNIQUES BLINDLY

- Check ultimate premium projections vs. plan
- Test implied ultimate loss ratios

EXAMPLE: "BLIND" USE OF PROJECTION TECHNIQUES

Underwriting Year	LDF Used to Project Losses	Implied Loss Ratio	Current "Hindsight" Loss Ratio Estimates
1979	3.32	107%	115%
1980	4.32	324%	300%
1981	5.84	226%	310%
1982	19.86	16%	400%+

Edited transcript of the question-and-answer session

QUESTION "You all discussed the need for adjusting the RAA data before using it with our own companies. Can you be specific? What adjustments should we make? Can the RAA auto liability data be split into personal and commercial? Which would have larger development? What is the average retention in the RAA data? How much does loss development increase as the retention increases? Does the RAA data recognize differences between facultative and treaty? How can claims made experience be adjusted for use with claims paid liability?"

RESPONSES "I wish I could answer your questions. The RAA study is put out every 2 years, and it contains little detail on the aggregated losses it provides. The study does list the companies that participate. There is no way to separate the data for private passenger from that for commercial auto. The 1987 RAA study, to be based on 1986 data, will attempt to separate, for the first time, facultative from treaty. I believe they also hope to separate claims-made experience from occurrence experience. I have used the RAA data to estimate relativities, but I would not use the factors unadjusted. The RAA study will provide somewhat more information in the future, but we must remember that the data is the aggregate from books of business quite different from each other.

When we compared the RAA's General Liability data with our own experience excess of $250,000, we found the development factors matched up pretty well out through 99 months, they diverged beyond that point, with the RAA data showing greater development than our own.

QUESTION: "Have you any words of wisdom for those trying to reserve pro rata business if there is often no data by accident year, and one must rely on calendar year losses ?"

RESPONSES: "We have found that we usually can get accident year data, it should be only in exceptional cases that you receive only the opening reserve your payments during the year, and your closing reserve, with no information about accident year. In such situations, I think you might look into the cancellation provisions for that piece of business. You would want to know about the kind of runoff that would follow cancellation, and about the return of the loss portfolio or of the unearned premium. In any case, getting accident year loss ratios from calendar year data requires a number of rather shaky assumptions.

Another reason to look at the original contract provisions is that today's market may allow you to demand better data. We have sometimes found that the ceding company can and will provide data not called for in the original contract. A lot depends on the leverage you have with the ceding company. The problem of inadequate data or non-existent data is half the reason why this presentation was developed.

1986 CASUALTY LOSS RESERVE SEMINAR

2A/3A BASIC TECHNIQUES I & II

Faculty: Floyd R. Radach, Vice President & Actuary
Mead Reinsurance Corp.

Gail A. Mendelssohn, Consulting Actuary
Tillinghast/TPF&C

2B/3B BASIC TECHNIQUES I & II

Faculty: William G. McGovern, Asst. Actuary
The Travelers Insurance Co.

Rebecca A. Moody, Asst. Vice President & Associate Actuary
C & F Underwriters Group

3C/4C BASIC TECHNIQUES I & II

Faculty: Roger M. Hayne, Consulting Actuary
Milliman & Robertson, Inc.

Michael R. Larsen, Sr. Loss Reserve Actuary
St. Paul Fire & Marine Insurance Co.

The following is a summary of the remarks presented by the panelists at the Basic Techniques I and II sessions.

Our objective this morning is to acquaint you with some very basic techniques for projecting the indicated reserve level required for the book of business that you've already earned. We're going to deal with a very nice set of data, so it is quite well behaved compared to data you would encounter as an actual practitioner in the day-to-day world of estimating loss reserves. However, you will get an overview of the very basic considerations of loss reserving. It will provide a springboard to then consider the more difficult and involved questions you get in the day-to-day practice of estimating loss reserves. We also hope that those who are not in a position of estimating loss reserves will develop an understanding of what your actuary or your loss reserve specialist should be considering as they estimate the reserves that should be carried by your company.

With that in mind, I'd like to begin by taking a look at the outline of the subjects that we intend to cover during this session and the next, Techniques II. In Techniques I, Part A, we have structured it to cover three basic approaches to estimating loss reserves. There are two of them that will deal with loss amounts. Those are the paid development method, and the incurred development method. Then we will cover a third method that deals with average values, which is separating the losses into the frequency and severity considerations. Part B covers loss adjustment expense. If you make separate estimates of the reserves that should be carried for loss adjustment expense, we have a couple of different techniques for determining the appropriate reserve levels for the loss adjustment expense. In Techniques II we intend to deal with some of the instances where the data is not as well behaved as what we'll start out with. We certainly can't treat all of the adjustments that might be appropriate, but we're going to look at a few common ones. The first adjustment has to do with the closing ratio on your paid claims, and the adjustments that you might make to recognize a changing close ratio before you arrive at your conclusions. Secondly, we'll look at a change in the case reserving process which alters the historical pattern. In Part B, we'll look at reported claims versus closed claims, and some of the inferences we might be able to draw from this data. We'll move on to a modification of the average value projection where we discuss frequency, severity, and pure premium. The third item will be tail factors, estimating that portion of the loss distribution where you might not have sufficient, or even any, information or where a greater element of judgment must be applied. Finally, we'll conclude with what should be part of any reserve estimate, and that is to establish some benchmarks which you can use to monitor the development on a period-to-period basis as you go forward, and what to learn from those deviations from the estimates developed in your analysis.

Before beginning the first part of this session, I would like to remind the audience that the views that are expressed here are those of the presenters. They're not necessarily consistent with those of the Casualty Actuarial Society, or the American Academy of Actuaries -- our standard disclaimer.

I would like to offer a few preliminary comments on how you should approach a loss reserve problem.

Before you start into analysis of numbers, there are some basic steps that you should go through in preparation for looking at actual numerical data. The first and most important is that you reconcile or balance your data to some external source. If you start out blindly applying numeric techniques and the data is not really what you think it is, you've headed down a blind alley and you've wasted valuable time. It's a very important step in the loss reserving process. Balance and reconcile the data so that you feel comfortable with it, and know that it represents what you intended. Secondly, there are some things you ought to know about the data that you are analyzing. What is the mix of business? Has it changed over the period that you're going to be analyzing? If it has changed, what are some of the probable impacts? Consider things such as coverage within auto liability. Have there been some changes in coverage such as enacting no fault legislation? What about the policy limits? Have policy limits been changing over the period that you're going to be analyzing? If so, what sort of impact will it have? You should also consider changes in marketing, underwriting, and claims processing. If they have changed, what kind of impact is it likely to have? Any unusual events, such as coded catastrophes or unusually large claims? A very important part of any reserve analysis is to be aware of anything atypical in the data that you are analyzing. These are upfront questions that you need to consider before you start your reserve analysis, because the answers may require adjusting your data before you begin. Finally, be sure the statistics that you're going to be looking at -- claim count, loss amounts -- are exactly what you think they are. For example, do claim counts include claims closed without payment? Or do they exclude claims of that particular type? If you think you're looking at direct results, are you really looking at the result after the recovery from reinsurance? You should run through a basic checklist of these things to be sure that, before you begin any sort of numeric analysis, you have exactly the data you intended to have.

You also should have some knowledge of the trends that existed over the period that your data covers. Those would be such things as inflationary trends, regulatory trends, social trends. You need to recognize if the trends would have had any impact on your data patterns. And finally, you must also recognize that no numeric method will work in every situation. That's why you need to know a variety of methods. You should be able to dissect your data in a variety of different ways and, hopefully, through the questioning process, bring those methods together so you can make your final judgment as to the indicated reserve.

With that in mind, let's look at Exhibit 1.

The first method that we're going to look at is cumulative paid losses. Let me just spend a minute to orient you to the exhibit. We are displaying the information by accident year. That's the date of occurrence for the loss that's being recorded here. The numbers across the top -- 12, 24, 36, 48, etc. relate to evaluation points. In this case they are months. We're looking at the value of the paid losses at each of those ending months. In the case of 1980, for example, there were $3,361,000 worth of claims paid

during 1980 on claims that occurred in 1980. Twelve months later at 24 months, that body of claims had grown, either through additional payments or payments on additional claims, to $5,991,000. In similar fashion, you can walk across the accident year 1980 until we get to 84 months of evaluation where we have $9,759,000 worth of paid losses. For the 7 year period that we're reviewing, this establishes a historical development pattern for paid losses under the auto liability coverage. Based on this pattern, we will estimate the ultimate loss liability for each of the accident years.

The second part of the exhibit, "Development Factors", relates to 6 of those years. What's happening in each of those columns is an aging process. The column headed by 1.7825 represents the aging process as you go from 24 months to 12 months. The 1.7825 is simply the ratio of 5991 from above and 3361. In other words, the paid losses for the accident year 1980 grew by 78.25% in an ensuing 12 month period. In similar fashion, we step through a year, evaluation by evaluation, to calculate loss development factors. Moving across with the same accident year, the 1.2253 is the ratio of 7341 to the 5991 at 24 months for the 1980 accident year, and it represents the percentage change from the prior evaluation.

Having done that for each of the 6 accident years that would be applicable here, you're in a position to look at the historical pattern for each of these ages. What has happened as a body of claims has moved from 12 months to 24 months in claim settlement and in additional claim reporting? One can scan the set of loss development factors and gather an impression as to whether you've got a stable situation, and if there seems to be any sort of trend that exists in the loss development pattern.

Before considering that, however, let me talk a little bit about what actuaries might traditionally do to a set of loss development factors. That's the next exhibit, Exhibit 2.

There were several averages that were displayed on Exhibit 1. Three of them might require a little extra explanation. The first is what we call a truncated average. Typically it would be applied when you've got a large enough set of aging factors where you can afford to throw out outlyers -- high values and low values--before you average. The truncated average is nothing more than eliminating the lowest value in the set, and the highest value in the set, then calculating an arithmetic average. The inverse average is one where you take the reciprocal of each loss development factor. Calculate the arithmetic average and then take the reciprocal of that average to bring it back to the form of the factors that you began

with. The reason for using the inverse average is that it tends to dampen outlyers. It's another way to deal with the outlyer problem, since the reciprocal of an outlyer doesn't have as much leverage effect as it would if you just averaged the factors directly. It might be an alternative to consider if you can't afford to throw information away. The third is what we call a weighted average. In calculating a weighted average, the practitioner has to exercise a bit of judgment in deciding how he wishes to weight the individual factors that are going to go into the average. The decision is function of the reason for wanting to weight the factors and

the preferences of the individual as to how he or she wishes to accomplish it. In our example, the weights are 1, 4, 9, 16, and so forth. They are the squares of the integers counting from the oldest years going forward. This approach was selected to give greater weight to the more recent years, since there seemed to be an inherent trend in the data on the prior exhibit.

Going back to the first exhibit on the cumulative paid losses, there are 3 other averages on here that I haven't discussed. The "Average", the third one down, is nothing more than the straight arithmetic average where we add up the factors and divide by 6, in the case of the first column. The "4 Average" is to take the four most recent observations, add those up and divide by 4. The final one, the "Weighted 4 Average" uses those same 4 points, but applies the judgmental weights to each factor based on the year it comes from to calculate the average.

The next step in the process is to look at the individual averages and determine whether or not there is much variation. If there is substantial variation in the averages, then you should ask yourself what is causing it. Can I explain the variation? Your answer should play a role in the selection of the loss development factor that you're going to use.

I will skip over that reasoning at this point and move on to the "selected factor". This is nothing more than taking each of the age categories individually and selecting one of the averages for that category that is representative of what you expect future development in the category to be. In the first column, our selected factor is 1.8118, which means that we expect paid losses to increase approximately 81% as they age from 12 to 24 months. Why was the weighted average selected? Notice that in the 12 to 24 month column of development factors, the more recent ones tend to be larger than the older ones. The weighting process takes this into consideration, and 1.8118 is probably closer to future 12 to 24 development factors than say, 1.7951. However, you might have selected 1.8184. The selection process involves a lot of judgment, and no two people will necessarily select the same set of factors. For each age category, you select the factor that matches your expectations of future development.

Now we come to an even harder selection: What do we expect to happen after 84 months? A common solution, and the one used here, is to use the ratio of known case incurred losses to paid losses as the factor to apply to the paid losses out in the tail of the triangle. We are assuming that the claims person has estimated perfectly what is still out there in the form of an unpaid loss. Later on we'll introduce some considerations that might allow you to refine that factor.

In the final line on this exhibit, we have cumulative selected factors. This is a shortcut method to bring you to the result rather than completely filling in the loss triangle cell by cell. The 3.1665 is the product of each of those selected factors. It takes you from a 12 month evaluation to the ultimate loss payout. Just multiply each of those selected factors successively and you should get 3.1665. As you progress across, you simply throw away the most recent value. The next cumulative factor is 1.7477 which is the product of 1.2347 all the way out to 1.0546. It is intended to apply to the 1985 accident year which must go from a 24 month evaluation to an ultimate loss payout.

Turn to Exhibit 4 so we can see the results of the paid development method. Column (1), labeled Paid-To-Date, is nothing more than the diagonal on that paid loss development triangle. It is the cumulative amount that has been paid as of 12/31/86, for each of those accident years. The selected factors are the cumulative factors that were at the bottom of Exhibit 1 and they bring that accident year to its ultimate settlement value. The product of those two columns gives us the estimated ultimate loss liability for each of the accident years, creating a total of $110 million for the ultimate estimated loss payout for all claims that occurred in these years for the auto liability line. If you were to sum the paid- to-date amounts, they total about $75 million. Based on the paid loss development, the indicated reserve is $110 minus $75 or approximately $35 million.

The second technique is shown on Exhibit 3. Take just a few minutes to review the exhibit. The layout is the same as the paid loss triangle we started with, where you have aging in terms of months across the top, and accident years down the column. The basic difference here is in the data. It is known case incurred losses which adds the case reserves to the paid dollars. You're looking at the total known claim file inventory at this point at various ages of evaluation. From here on, the procedure is the same. We contruct a set of historical loss development factors, which again are the ratios of the data at various sequential points in the aging process. The 1.1669 is the aging from 24 months to 12 months. It's the ratio of 9781 to 8382. In like fashion, you'll do this for all of the other pairs that exist in the triangle.

Once you've completed the calculation of the loss development factors you're ready to calculate the averages for the various ages. The columns of factors and the averages again should be examined for any inherent trend. Can you explain the differences between the weighted average and the unweighted average? If one is higher or lower, what is it saying about your data? If it is something new, something that you did not expect when you began your reserve analysis, it might suggest that you need to stop and reevaluate. Ask yourself, "Is there something else going on in this book that I'm not aware of?"

Finally you make a selection of the age-to-age factors. This set ranges from 16% for the 12 to 24 month aging process, all the way across to a factor of 1 for 72 to 84 months. Note here that the 1.0546 that we had in the prior exhibit is not applicable because the case reserves are in our data at 84 months. Since we've assumed that the case reserves are adequate, there isn't any necessity for a loss development factor beyond 84 months, at least in this hypothetical example we're examining.

Going back to the summary exhibit, Exhibit 4, we calculate the estimated ultimate loss liability using the incurred losses and the incurred loss development factors. Column (4), Incurred to Date, is nothing more than the last diagonal of Exhibit 3 your incurred loss triangle. This is the status of each year as of 12/31/86. The cumulative selected factor for data at that age will allow you to project the ultimate loss payout. Summing Column (6) gives us an estimated ultimate loss liability for all years of approximately $103 million. We have a difference of about $8 million in the two different reserving estimates, or two different techniques, which suggests that there is something going on in the data that we have not yet identified. This is an indication that you may need to do some research to find out what might be influencing the spread in the estimates. We'll discuss this later in Techniques II.

A necessary part of using any technique is to have its implicit assumptions well in mind before you apply it, and, at least mentally, to determine whether or not you have a reasonable application. If you don't have a reasonable application, it doesn't necessarily mean that you won't use the technique but it might suggest that you have to adjust the data before you apply the technique.

Exhibit 5 is a review of the various assumptions inherent in development analysis. Some of these apply only to the paid development and some apply to the incurred. I'll try to give you some indication which they apply to as we walk through them. The first assumption is that claim settlement patterns are unchanging. This is essentially an assumption applicable to the paid loss development technqiue. One particular problem might be an increasing delay in the payment of claims, but you can also encounter a speed up in payment. Trends in the development factors down the columns might be an indication that this is occurring. But you are assuming that that payment pattern is relatively static over the inventory period that you're analyzing. If not, you'd better be thinking about some kind of adjustment.

The second assumption is that the case reserving practices and philosophy are unchanging. This is more applicable to the incurred development technique, since it includes the case reserve. For example, you could have a conscious effort to improve case reserving adequacy, or you could go the opposite way on that, too. Introduction of new reserving procedures may influence the timing for a case reserve being established on the books. This would affect the final answer if not recognized and adjusted for.

Thirdly, no changes in claim processing. These changes could either happen in handling the claim itself or in automated data processing, such as something that the computer has allowed you to do differently than what you've done in the past. It might not necessarily change the data but it could well change your evaluation of the claim inventory at a particular point in time.

The fourth assumption here is that the policy limits should have no impact on the loss development. Of course, if you arrive at the conclusion that they do, an adjustment might be needed.

The next assumption is that loss development is un affected by changing loss cost trends. At the beginning of my comments, I mentioned being aware of the trends. Those trends do tend to affect the settlement of the loss at the time of settlement. You need to be aware of any changes in those loss cost trends.

The assumption that there is no change in the mix of business is an important one in case your data is net and your reinsurance coverage changes. You need to know the kind of reinsurance protection you had on the book in the past. What's happening to the long tail exposure? There's a lot of historic information that suggests that the length of tail is ever increasing and you'd best be up on what's happening to that aspect of your loss development triangle. Finally you have the introduction of new or revised coverages. For example, there is a lot going on in the industry today with respect to the general liability coverage, with tort reforms, and the social environment that affects the level of awards or judgments. These things will probably have an impact on that loss development triangle.

"No cyclicity in loss development" means that the traditional underwriting cycles have not had any impact on the evaluation of the losses at different points in time. This could very well be the case, but you need to remember that the method assumes no cyclicity when you apply the technique.

Finally, no data anomalies. These would be of the nature of an unusually large loss, a catastrophe. Depending on whether the line is a liability or a property coverage, data anomalies assume different forms, but what we are talking about is anything unusual. One other aspect of the unusual that you should keep in mind is that it might be the absence of the unusual that's causing a distortion, such as fewer large losses than normal. A data anomaly can go either way, and you should look at it in that sense.

That's a summarization of the two methods of projection of estimated loss liability using total loss dollars. We will now cover a more refined technique that breaks the loss components up into its two pieces of frequency and severity.

(Exhibit 6.)

We have looked at development projections of total loss dollars. In the first case, paid losses were projected to what we think ultimately the final paid value will be. In the second, we looked at the incurred value which would include the paid plus the reserve, and we calculated a total ultimate loss liability from both of those projections. The method that we are going to cover now determines the total ultimate loss liability, but it's going to get there in two pieces.

It is called the average value projection. It is often referred to as the frequency versus severity estimate. It requires two separate estimates. The first is an estimate of the ultimate claim count or frequency, and the second is a projection of the average cost per claim which we call the

severity. The product of the ultimate number of claims times the ultimate average cost will then get you the ultimate total dollars. We're getting to the same endpoint, just in two separate pieces. The one thing to keep in mind in doing the average value projection is that you need to have claim count data available by accident year, and you've got to have a history of it. If the systems that you're working with don't have it, you're not going to be able to do a frequency-severity analysis. You might want to consider getting some claim count information if you're in a startup mode, or changing some systems.

Exhibit 7 shows a familiar looking development triangle, but here we're looking at claim counts. We have chosen to use reported claims to estimate the ultimate number of claims. When you are projecting claim counts you are looking for a measure of exposure that will track with losses over time. Reported claims might not be the best choice for certain lines of business. In the case of auto liability, typically a reported claim will eventually close with a payment, and you usually don't have problems with delays or lags in reporting, which you might have in medical malpractice. In medical malpractice there is a significant potential for delayed reporting of claims, and a significant potential for claims closing without

any payment. Often a claim will be reported, but it never goes to court, it never gets settled, it just closes without payment. So for medical malpractice, reported claims might not be the best exposure basis but claims closed with payment might be better. Our examples here are for the auto liability line, and we think the reported claims should be alright.

This development procedure is basically the same approach previously described for the paid losses and the incurred losses. We're looking at the number of reported claims by accident year and tracking how it ages over time. Similarly, we calculate age-to-age development factors for each of the accident years and look at the truncated average, the inverse average, the weighted average, the 4 year average. We should mention that there are many other averages that you can use, such as a 3 year average. You could do a few other things, but in our example, these are the only averages that we are using.

Here again, for each of the age-to-age intervals we select a development factor, and then cumulate the development factors. Notice in our example we are including a tail factor, meaning the 84 to ultimate factor, of 1. We're saying that at 84 months after the accident year, you should have all of your claims reported to you, and there is no development beyond 84 months.

Again, we cumulate our selected factors. To get the ultimate number of reported claims, you take your last diagonal of the upper triangle, and multiply it by the appropriate cumulative factor to yield the estimated ultimate number of claims by accident year. It is not shown on Exhibit 7 but that's the first exercise.

Now we are going to attack the other half of the exercise, which is to come up with an estimate of the average cost of each of these claims, the average severity. We start off by building a development triangle which is actually an average paid loss per ultimate claim, as on Exhibit 8. What does that mean? You go to Exhibit 1, which was your paid loss amounts at each of the age intervals, and you divide your paid losses by the ultimate number of claims that we just came up with from the prior exhibit. You now have a progression of the average claim size changing through time for each of the accident years. Those are shown above the line on Exhibit 8.

The procedure that we are going to be using is completing the lower half of the triangle. You see a lot of numbers below the line. That's the goal that we're seeking. We're seeking to complete the bottom half of the triangle and get the estimated ultimate average claim cost.

Let me explain how the triangle on Exhibit 8 is calculated. If you were to take from Exhibit 7 the 1980 number of claims at 84 months, which is 2,858, multiplied by the cumulative selected development factor, which is 1, then we're saying there will ultimately be 2,858 claims for 1980. Then you take $3,361,000 from Exhibit 1 and divide it by that 2,858. That gives you $1,176. Similarly, you move over in Exhibit 1 and take paid losses as of 24 months for 1980, which is $5,991,000 and divide that by 2,858 to give you $2,096. Move across the page in that fashion.

Looking at 1986 on Exhibit 7 there are 1,604 claims reported as of 12 months, and down the bottom of the page, the cumulative selected development factor is 2.0272 for 12 to ultimate. Multiply 1,604 by the development factor of 2.0272 and that results in 3,252 claims. We're predicting that for 1986 there will ultimately be 3,252 claims. Take the paid losses from Exhibit 1 of $6,962,000, divide by your estimate for the ultimate number of claims for 1986, which I said was 3,252, and that comes out to be $2,141 which is the average cost for each claim in 1986 as of 12 months on Exhibit 8. The trick is to first estimate your ultimate number of claims for each year. Then, go back to your paid development triangle, and at each valuation point for each accident year, divide each total amount of paid losses at each valuation point by the ultimate number of claims for the accident year in question.

As I mentioned, the goal now is to get the ultimate average cost for each claim. The procedure that we're going to use here is a little bit different, compared to the development procedure that we used for the paid and the incurred total dollars, in which we moved across the page and got age-to-age development factors. Here we're going to look down each column of this triangle at our known data, and try to determine what kind of trends exist in each of these average paid loss amounts. Down at the bottom of the page, below where it says "exponential trend", we have a broad trend, a base trend, a selected, and an "R" squared. We will talk about each of those and I'll try to explain to you what they are, starting with the raw trend.

The first column is the average paid loss as of 12 months of age for the particular accident year. If we look down the column, we try to see if there is any trend from 1980 up to 1986 in that average cost. What we're going to do is fit a curve through those points. We're not going to go into curve fitting in detail here. In any statistics book there are formulas for fitting curves. We use the least squares technique, and we fit an exponential curve. In other words, using the curve fitting formula, we have tracked the changes in the average claim value from 1980 through 1986 and come up with an average trend amount for that particular point of development.

Flip over to Exhibit 9 for a moment. It shows how this was done.

On the top half of the page, we have taken from the triangle on Exhibit 8 that column that has the average losses at 36 months. We fit a curve through those points: the 2,568, the 2,824, the 2,991, the 3,629, and the 4,710. We fit a curve and we come up with a formula that comes closest to reproducing those points. The forumula that you see is 2,104 times "e" to the .146X. Once again, you can go to a statistics book for this. We're not going to discuss procedures for coming up with this formula. If you apply the formula it yields the fitted points shown in the second column. For example, the 2,436 was derived by using the formula with x=1. And the whole column under the fitted development up there was projected from the formula. It looks like a fairly reasonable fit. It's coming up with a trend in average severity of 15.8%. In other words, the average paid loss is changing by 15.8% a year from 1980 through 1984, for claims that are 36 months old.

I'm going to jump ahead for a quick moment to Exhibit 10. There's another way of looking at raw trends. It's sometimes helpful in your analysis to look at the trends in what we call incremental loss payments within each development period. An incremental loss payment is the difference in the

cumulative amounts at successive developments. From Exhibit 8, what was the average value as of 12 months? What was the average value as of 24 months? What we're looking at here on Exhibit 10 is the average value for claims between 0 and 12 months of development, and then the average paid loss for the period between 12 and 24 months. Not cumulative as of 24 months, but the change from 12 months to 24. Sometimes this will point out changes occurring in your paid losses. It may show when changes in the cumulative averages have occurred.

Looking down to the trend factors under the 24 to 36 column, you notice the trend factor of 1.174. Once again, this is the raw trend that we come up with by fitting an exponential curve. Notice that 1.174 for the average incremental paid loss from 24 to 36 months is larger than what we came up with for the cumulative average paid loss on Exhibit 9, which was 15.8%. There's a little bit of a disparity there. We have to make a decision. What do we really think is the trend for the average paid loss at that period of time? Is it 15.8%, or are claims changing by 17.4%? It's a judgment pick in this case. One thing to keep in mind is that the cumulative trends tend to be more stable, and the incremental trends a bit more variable because they are more responsive to change. For the purposes of this example, I've chosen the 15.8% cumulative raw trend as of 36 months. I've chosen to stick with the stability aspect, but I wanted to point out another way of looking at this trend.

Back on Exhibit 8, you see the raw trend that we just came up with for the 36 month evaluation of 1.158. We do the same thing for all the other ages. I want to point out one other statistic that's shown here before we go on to the base trend and the selected trend. That's the "R" squared. In statistics books this is called the coefficient of determination. It tells us that approximately 92% of the variation from year-to-year can be explained by the trend that we calculated in our exponential formula. In other words, the formula that we came up with explains about 92% of the trend. That's a high number. If you came up with 10%, you'd question whether or not your formula was really a good formula for fitting the data you're working with.

Now you have raw trends for each of the ages 12, 24, 36, 48, and 60. You'll notice you have no raw trend for 72 and 84 months of age. This is very easily explained. For the 84 months of age, you've got 1 point and you can't project a line from 1 point. We can't come up with the raw trend. For 72 months, we've got 2 points. The fewer points that you have, the more difficult it is to come up with a formula that accurately predicts the line. We can't come up with raw trends for either of those two valuations.

We have another means of looking at trend and this is known as the base trend. It is a trend developed from all of the raw trends. It's a weighted average of the raw trends from the 12, 24, 36, 48, and 60 columns.

What we're doing here is coming up with a weighting procedure which gives more weight to the data that we're more confident in. As I mentioned before, the fewer points that you have to fit a curve, the less confident you should be in that curve. The more points that you have to fit the curve, the more confident you can be. For age 12, we had 7 years of data, or 7 datapoints with which to come up with the raw trend. We're going to give a heavier weight to that trend than we are to the one at 60 months where there are only 3 points. How you weight it is a judgment call. The procedure we're using here is to weight it by the number of data points. The 1.125 was the raw trend factor at 12 months, based on 7 points of data, so we're going to give it a weight of 7 squared, which is 49. The next point over there is 1.153. That was the trend as of 24 months, which had 6 datapoints so we're going to give that a weight of 6 squared which is 36, and so forth. Notice our 36 month valuation, the 15.8%, had 5 datapoints, so we're going to give it a weight of 25. You add up all the weights times the respective raw trend factors, divide by the sum of all the weights, and you come up with an overall base trend of 13.5%.

In other words, we're saying overall, across all ages for all accident years, the average paid losses are changing by 13.5% a year. That's a broader based trend factor than the raw trend factor. Now we've got to come up with what we are going to actually use. We've got two indications and what do we want to select? On Exhibit 9, we see that our selected factor is merely a weight of the raw and the base trends, which means, to the extent that I don't believe the raw trend, I will believe the broad based trend.

We're weighting the raw trend and the base trend by deciding how credible the raw trend is. For example, with our 36 month valuation 15.8% was our raw trend. It had 5 datapoints so we will give it a weight of 5 squared, or 25. We will give full credibility to 7 data points. We're saying that to be fully credible you had to have 7 datapoints. If there are 7 datapoints, we will believe the raw trend. Any fewer points we will weight. Full weight is 7 points, which gives us 7 squared, or 49, in our denominator. Our raw trend is getting 5 squared or a weight of 25. The complement of 25 is a weight of 24, which is 49 minus 25. The weights add up to the total which is 49. The 24 is the weight given to the 13.5% base trend. Our selected trend amount for the 36 months of development is 14.7% a year.

Refer back to Exhibit 8. You can see the 14.7% under the Column 36. That's what we're selecting for the trend in average paid loss amounts at 36 months of development. Across the page our selection procedure is the weighted average between raw and base trends.

Now the task is to use these trend indications to fill out the bottom of this triangle. Refer to Exhibit 11. We're going to make our projections now. We'll follow through the example with the 36 month age of development, since we're getting familiar with those numbers. On Exhibit 11, the first column is the incremental payments between 24 and 36 months from Exhibit 10. In other words, it is the change in the average paid loss from 24 to 36 months for each of the accident years that we know this value. The numbers here are 472 for 1980 through 902 for 1984. The first year that we don't have an average paid claim cost between 24 and 36 months is the 1984 accident year, since it is only 24 months old.

We want to predict what is going to happen in the average paid claim cost from 24 months to 36 months as a first step. We're going to predict this by using our selected trend value for 24 to 36 months. Basically, we take the historical incremental payments that we know about, the 1980 through 1984 months, and adjust them using the trend factor to what we estimate these costs would have been in 1985 dollars -- 1980 dollars are different than 1985 dollars. I'm going to use the trend to calculate the incremental payment for 1980 from 24 to 36 months in terms of 1985 dollars. To get from 1980 up to 1985 dollars, we have to have 5 years of trend, 5 years of having claims increased by 14.7% a year. You take that 1.147 to the fifth power times that $472, and it translates to $937 in 1985 dollars. Similarly, for 1984, between 24 and 36 months the average claim cost was $902. What would it be in terms of 1985 dollars? With only one year of trend, that $902 would be $1,035 in 1985 dollars. You do this respectively for each of the years that you know about, then average these 5 estimates of the 12 to 24 incremental paid claim cost in 1985 dollars.

What we are saying is that, based on history adjusted to 1985 dollars, we estimate that the 1985 average incremental cost between 24 and 36 months should be $932. It's just an average of the adjusted costs. At the bottom of the page, look at the 1985 accident year. We know that the average paid loss as of 24 months was $4,048 from Exhibit 8. Now we just figured out that the change from 24 to 36 months should be $932, so our estimate of the average claim as of 36 months will be $4,048 plus $932, or $4,980.

Let me try to step you through the calculation for 1986. First of all, 1986 is only 12 months old. We first need to go through this same procedure for incremental payments from 12 months to 24 months, using the appropriate trend from Exhibit 8 for 12 to 24 months, in this case 14.8% a year, to come up with the 12 to 24 month incremental payment in terms of 1986 dollars. It's not shown here and maybe it should be for clarity. We get the 12 to 24 month increment, add that to the the 1986 12 month actual

number, and now we've got a 1986 cumulative average paid as of 24 months of $4,187. Now we go from 24 to 36 months -- we've just done that for 1985. The only problem is, we did it in terms of 1985 dollars instead of 1986 dollars. We just take our $932 and trend it one more year. The $932 is really going to be $1,069 in 1986. The change in the average paid claim between 24 and 36 months is estimated to be $1,069 in 1986. Therefore, the total 1986 average claim as of 36 months will be $5,256 which is merely adding the increment from 24 to 36 months of $1,069 to $4,187. Going back to Exhibit 8, you step your way across the triangle in this fashion. Eventually doing this will fill out the remainder of your triangle. You can see the numbers that we just came up with -- the $4,980 and the $5,256 under the Column 36. Continuing to step your way across the page, you then fill out the rest of the triangle.

One more thing that we have to do is get from 84 months out to ultimate as we did when we were looking at Exhibit 1, cumulative paid losses. We have selected for this procedure the same tail factor of 1.0546. We take our average claim cost from 84 months to ultimate by multiplying it by 1.0546 and that will get us our ultimate average paid loss.

Looking at Exhibit 12, we see the results of this. Column (1) is the estimated ultimate cost per claim for each accident year from Exhibit 8. Column (2) is our estimated ultimate claim count, which we calculated from Exhibit 7. The product of the two, the number of claims times the average cost per claim, gives you the estimated ultimate total dollars of loss by accident year. Totaling the years gives $111,183,000 total dollars. To get the indicated reserve that you should carry, subtract the dollars of losses that you have paid-to-date. In other words, this $111,183,000 is ultimately the amount we expect to pay, but we have already paid $75,094,000 so you have to set a reserve for about $36 million of future payments, using this estimate.

Exhibit 13 is a comparison of the results of the three methods that we have just completed. The paid projection was the first projection. There's our $110,000 total for all years. The incurred projection totals to $102,000. Then Column (3) is the average value projection that we just did, which totals $111,000. The incurred projection in this case came up with the lowest result. The average value projection came up with the highest result, but it is not a rule that this is the ranking that these methods will always produce. However, in this case, that's how it turned out. There's about a $9 million difference between procedures. It is now a matter of trying to find out where the differences are or what the reasons are for the differences.

What I'd like to do is discuss a few of the assumptions inherent in this average cost per claim analysis. These are on Exhibit 14. Some of the assumptions are similar to the assumptions for the paid and the incurred methods, but we'll briefly mention them.

The first assumption is that claim costs are changing at a constant rate. It is important, whenever you're doing any trend analysis, that this be the case. You might have some problems with surges in inflation, and you'd want to be aware of that, in predicting your future trend. In the case of workers' compensation, if there's been a one shot benefit level change, you might see a surge in the average size of losses when that benefit change comes into play. What you might want to do in that case is adjust your data to a common benefit level. If benefits for 1980 are different than benefits in 1986, you would put all of your historical average claim cost data on the same benefit level by indexing the benefit level changes. As previously mentioned, the data in our example is nice, clean, well behaved data, but typically you don't have such nice clean data in the real world. And you typically have to make adjustments so that your projections make sense.

The second assumption is that past claim cost changes are an indicator of future changes. This is a fairly major assumption and you make it anytime you're using the past to predict the future. The sample problems listed here -- the changes in economic conditions, coverage changes, diminished policy defenses -- would make your past not necessarily representative of your future and you'd want to adjust for these changes to the extent possible.

The third assumption is that claim settlement patterns are unchanging. We have a simple way of testing to see if you've got changes in settlement patterns. Looking at Exhibit 15, we check the relationship of closed claims to reported claims to see if you're having changes in settlements. In this case we've chosen to look at claims as of 12 months but you would probably examine this at various ages. It shows closed claims ratioed to reported claims. The average for the 6 years is 56.5% but 1986 is coming up with 69%, which is evidence of a shift taking place. You are closing claims sooner than in the past. We will cover how to adjust for changing settlement patterns in Techniques II.

Going back to Exhibit 14, another assumption is that claim count reporting patterns are constant. If you don't have constant reporting patterns you may want to use an alternate exposure base other than reported claims. We previously mentioned using claims that are closed with payment. In the case of auto physical damage, if your reporting pattern is not stable, you might want to use the number of insured carriers, or the number of earned car years as your exposure base.

The fifth assumption is that policy limits have no impact on trends. This was also an assumption under the paid and the incurred procedures. The sample problems would be increasing frequency of full policy limit claims, or changing policy limits. If you're writing higher policy limits, for example, you probably will have a higher average loss per claim. So increasing average costs per claim might not be indicative of a change in trend, but of writing higher limits. You need to be aware of the cause for the increase in the average size of claims. You probably want to talk to the underwriters to see if they are writing things a little differently than in the past. Here again, the idea is to be able to make your past most representative of the future.

The next key assumption is that there are no changes in the mix of business. This is similar to the impact of changes in policy limits. Some problems you might encounter would be the introduction of no-fault, changes in reinsurance, shift in risk severity, change in deductibles or self-insured retention. Once again, you want to be close to the underwriters to see if they're targeting a different mix of business. You would also want to segregate your data by kind of business so you will be able to adjust the data more easily when you have a change in mix.

Last of all is the assumption that there are no data anomalies such as catastrophic or unusual claims. The easiest method to adjust for this is to remove these claims from your history.

That basically explains the paid development procedure, the incurred development procedure, and the average severity development procedure. Does anyone have any questions?

[Question, Inaudible].

You want to concentrate on the 1986 result on Exhibit 12, right? We will need to go back to Exhibits 7 and 8. Let's start with Exhibit 8 and do the estimated ultimate cost per claim first. The first number on Exhibit 12 that you're questioning is the $7,406 estimated ultimate cost per claim.

On Exhibit 8 we step our way incrementally from the $2,141 at 12 months to $4,187 at 24 months, then 36, then 36 to 48 and onward using the trend analysis, to get to the $7,023 average paid loss per claim for 1986 at 84 months. Again that's as of 84 months, and we are assuming that there will be still be some development beyond 84 months. The development beyond 84 months is included by using a tail factor to ultimate. In this example it is the same tail factor that we used in the paid loss development procedure which was the 1.0546. I believe the $7,023 times the 1.0546 gives you $7,046, which is our estimated ultimate average cost per claim for 1986.

From Exhibit 7, we now need to come up with the estimated ultimate number of claims. Right now, as of 12 months, for 1986 we know there are 1,604 claims reported. From our age to age development selection, the cumulative selected factor is 2.0272. That is the development in the number of claims from 12 months to ultimate. If you take the 1,604 times the 2.0272 you should come up with an ultimate number of claims of 3,252. That's shown in Column (2) on Exhibit 12. The product of those two gives us an estimate of the ultimate incurred losses for accident year 1986.

[Question] Can you use different indicated ultimate losses for the different accident years, or do you have to pick a method and use it for everything?

No, you do not, and probably should not, use the results of a single method to determine all of your accident year ultimates. The way to approach it is to do these three methods, and several others also which will depend on the line of business, the amount of data available and your time constraints, look at the results of each technique, and select the accident year estimates year by year using the entire set of results. For a particular year, the estimate that you select does not even have to come from the set of results produced by the formula methods. You can select a compromise of several methods, or even a value outside the range of the estimates if you have some additional information that your data did not include or that the various techniques do not incorporate. This information could be that there has been some huge loss reported since your data was compiled, or that one of your branches did not process all their claims for the period, or that a judicial decision has provided unforeseen coverage so additional or larger claims will be filed.

We will now discuss several methods for determining reserves for allocated loss adjustment expenses (ALAE). Refer to Exhibits 34-39.

On Exhibit 34 we have the familiar triangle format, but instead of loss dollars, we are looking at a triangle made up of cumulative paid allocated loss adjustment expenses by accident year at year end valuations. The same procedure used for the paid loss development is used here. You project age-to-age factors, calculate various average factors, select a set of factors, and then cumulate your selected factors. The tail factor is treated differently here. Since most companies do not set case ALAE reserves, we can't use the ratio of incurred to paid. This tail factor is just a repeat of the 72 to 84 factor of 1.1080. On Exhibit 35, we calculate the ultimate values and the ALAE reserves. Column (1) is our most recent diagonal of data -- ALAE paid to date. Apply the selected

cumulative factors to the appropriate accident year at the appropriate age to get our estimated ultimate ALAE projections for each year, totaling $7.3 million. When you subtract the allocated loss adjustment expenses paid to date from this total, you have the amount that you should carry as your reserve for the allocated loss adjustment expenses. It is fairly straightforward and very similar to the paid development procedure.

Another approach to calculating the reserve for allocated loss adjustment expenses is to assume that ALAE is related to losses. Rather than project the actual allocated loss adjustment expense, we use ratios of paid allocated loss adjustment expenses ratioed to paid losses, as on Exhibit 36. Using the same development procedure, project these ratios to an ultimate value. Exhibit 37 shows how to use the ratios to calculate a reserve. Column (1) is our current diagonal of ratios of paid allocated loss adjustment expenses divided by paid losses. Column (2) is our selected cumulative development factors to develop the ratio to the ultimate ratio in Column (3) which is the ratio of paid allocated loss adjustment expense to paid losses at ultimate payouts for both pieces. When you apply the ultimate ratio to your estimate of ultimate losses, which you derived from some other means, you get an estimate of ultimate allocated loss adjustment expenses. And here again, by subtracting the allocated loss adjustment expense paid-to-date, you obtain the unpaid allocated loss adjustment expense, which is displayed in Column (7).

Both of these ALAE methods are similar to the loss methods that we did earlier. The first one projected the loss expenses directly and it assumes that loss expenses are incurred independently of losses. This is useful if there has been a change in claim settlement practices that affects expenses, such as a management decision to use staff attorneys instead of outside counsel. Since the second method projects ALAE as a function of losses, it is useful where expense data is more sparse than loss data or if there has been change in loss volume or frequency of claims. One word of caution, since this method ties ALAE to losses, any errors in loss projections will affect the accuracy of the ALAE reserves.

(Techniques II.)

Refer to Exhibit 13. Earlier we discussed these 3 projection techniques. They produced estimates of ultimate liability of $110 million, $103 million, and $111 million. Obviously there is a little disparity among the results, with a range of approximately $9 million. This is a preliminary indication that something is happening in the data that you have not yet recognized. You need to do some additional analysis to determine what might be affecting or distorting the estimates. We all know that, theoretically, there is only one answer and if everything were perfect, all of the techniques should develop the same answer. Of course, we also recognize that we are dealing with statistical phenomena and some variance will be pure statistical variation.

This session will review some of the more common shifts in loss data and provide some techniques for adjusting the data to smooth out the variances in the results. The first one that we will discuss is a change in the closing pattern. Refer to Exhibit 15. For the past 6 years we have closed 56.5% of the claims reported in the first 12 months, but in 1986 we have closed 69%. This indicates a changing settlement pattern that may affect the payment pattern and it violates one of our inherent assumptions. Exhibit 16 is a development triangle of cumulative closed claims. It is the same historical triangle development that we have been using for losses and ALAE. The bottom triangle is a set of ratios to test if that change in pattern has affected all evaluation points. It is the ratio of the closed claim counts to the estimated ultimate number of claims. An earlier exhibit, Exhibit 7, estimated the number of ultimate reported claim counts in the section on the technique using frequency and severity. Using those ultimates from Exhibit 7 as a denominator for each of the accident years, we ratio the number closed at each of the points of evaluation. The values in that bottom triangle are the percent of total claims that have been closed at each of those evaluation points. Refer to 1980 at the 12 months evaluation. This says that as of 12 months, 23% of all claims that will be reported were closed. At the 84 month evaluation, essentially 99% of the claims are closed. Looking at each of these values for a fixed age, you see an apparent change in pattern. For example, in the 12 month column, 1980 through 1983 essentially shows only minor statistical variation. There is no apparent pattern, no apparent trend, and they average about 25%. But as you look at 1984, 1985, and 1986, it becomes rather apparent that the ratios have increased and you can infer that there must have been some change in the underlying claim settlement process. The question is, does it have an impact in the historical loss development factors that we calculated in our earlier technique? Since ratios at subsequent evaluations are not significantly different from the average, it probably has not affected later development.

The next step is to adjust the data to see what, if any, impact it has on your estimate. At the bottom of the page, the average closed claim ratio for 1980-1985 has been calculated for you. It shows the magnitude of the difference between the current value and the average value. How do you adjust for it? Exhibit 17 describes the adjustment for one evaluation point, data as of 12 months. It may be appropriate to consider a similar adjustment for all the valuation points, if it looks like the change in

pattern has affected them, and this technique would apply to any of the other valuation points as well. What we're going to do is adjust the claim settlement pattern to the 1986 value of 34%. Using 1983 as an example, at 12 months it had a closed ratio of 25.76%. We want to adjust it to the 1986 level of 34% closed at 12 months. In the 1983 accident year, the percent of claims that were closed at 24 months is 78.7%, and the percent of claims that were closed at 12 months is 25.76%. The subtracted difference says that approximately 45% of those claims that will ultimately be reported in 1983, were closed in the interval from 12 months to 24 months. In Step 2, we can see what the speed up has been. Approximately, 8.25% more of the claims were closed in the 1986 year than were closed in 1983. In Step 3, 8.25% divided by the percent closed in the interval from 12-24 is 18.3%. In other words, about 18% more claims moved into that first evaluation from the second.

We need to relate this shift in claims to loss dollars. The assumption we make is that claim settlement takes place in a uniform fashion throughout that 12-24 month period. If 18% more claims are closed, the comparable amount of dollars would move over to the 12 month evaluation point. Steps 4 and 5 calculate the dollar shift. Referring back to Exhibit 1, there was $4.9 million paid as of 12 months for accident year 1983, and $8.86 million paid as of 24 months. In the year from 12 to 24, approximately $4 million was paid. In order to restate 1983 in terms of the 1986 settlement patterns, we need to move 18.3% of the $4 million to the 12 month evaluation. That's what you see in Step 5.

On a restated basis, $4,626,000 is the 12 month evaluation of paid losses for the 1983 accident year. Do the same thing for each of the other accident years. Exhibit 18 has the adjusted paid losses at the 12 month evaluation for all the accident years. The next step is to recalculate the 12 to 24 development factors which are shown in the second column. Now we redo the averaging process from Exhibit 1 for the new 12 to 24 factors. We recalculate the average factor, the weighted average, etc., and then we reselect the appropriate 12 to 24 development factor. In this case, we select 1.79, as opposed to the factor based on unadjusted data that we previously used of 1.8118. In effect, the adjustment has reduced the paid loss development factor about 6%, simply due to a change in the closure rate. Since the lower factor is cumulated, this 6% difference is rolled forward into the cumulative factor. The revised cumulative factor becomes 3.0742, compared to the previous number of 3.1665. What does this mean in terms of your ultimate and estimated liability? The only year that hasn't aged from 12 months to 24 months is 1986 so it is the only one to be adjusted. On Exhibit 19, the 12 month paid losses for 1986 of $6,962,000 are multiplied by that adjusted selected development factor of 3.0742, to produce a revised estimate of the 1986 ultimate loss liability of $21,430,000. This is a reduction of $642,000 from the estimate developed previously.

This is an example of how a closure pattern can distort your analysis, and it illustrates how knowing the inherent assumptions in your analysis and what's happening to your data is very critical to the loss analysis. Don't be misled, all adjustments don't necessarily bring things down. Adjustments may raise your estimates.

In the next set of exhibits, we're going to adjust the results from the average value technique for the closure rate change. It should be a simple extension to take the implication of that adjustment, and adjust the average value, or the frequency-severity, results. On Exhibit 20, we start with the adjusted 12 month paid losses. Using those adjusted losses, we recalculate the average loss per ultimate claim as of 12 months, and then recalculate the trends.

You see the trend has changed a little. It is now 9.7% compared to the unadjusted trend of 12.5% for the 12 month evaluations. The R squared value is still .91.

To complete the average value technique, we take the 1986 value as of 12 months, which was $2,141, and go through the adjustment discussed earlier to bring it to an ultimate severity. The ultimate value that should be produced using those procedures should be $7,304, shown on Exhibit 21. Multiply it by the estimated number of claims that were developed earlier, and that produces a revised estimate of the ultimate loss liability of $23.7 million, which is a modest decrease over the ultimate projected liability that this technique previously produced.

This has shown the impact of one common problem, a change in closing pattern, on two of the basic reserving techniques, and how to adjust for it.

In the second part of this session, we will look at a different phenomenon. Again, it is fairly common in insurance data. For various reasons, sometimes because of a change in management personnel, sometimes because of introducing new capabilities in a claims function or sometimes because of a change in company operations, there may be a change in the claim settlement process. If the claim settlement process is not constant over the historical development period, it can have a significant impact on your projected ultimate losses.

Consider here a scenario of a management change in 1985. The first thing the new manager of the claims function did is look at all of the claims that were reported in a particular time frame and then look the case reserve on them over at a period of time. The manager of the claims function decided that the losses as initially estimated were grossly redundant. The manager knew enough not to tell the claims handlers to hold down case reserves, so he decided to come up with a different rule which could possibly dampen the impact, while still reducing the initial estimates. The rule was not to set up a case reserve until the claim handler had enough information to set a reserve that would be within 10% of the ultimate value. This is something that you as a reserve specialist have to be aware of, and then you need to test to see whether or not it did have an impact.

Exhibit 22 shows the case outstanding as of 12 months. This is simply the difference between the data on Exhibit 1 and Exhibit 2. The difference between the paid losses and the known case incurred losses is the case outstanding. For this particular analysis, we're just going to use the case outstanding as of 12 months. We also need to pick up the estimated to

ultimate claim count as developed in the averaging techniques. Taking the ratio between those two, we calculate the average case reserve as of the 12 month evaluation point for each of those 7 accident years. Looking at the resulting values of average case reserves as of 12 months, you see a rather nice and well-behaved increasing trend through 1985. In 1986, for some reason, the average case value has dropped. This certainly suggests that maybe the rule of not establishing a reserve until you can be within 10% has had some temporary impact. We're going to assume that this is due to that particular rule and we're going to look at an adjustment to deal with this change in the claim processing environment. In order to determine the adjustment, we need to fit an exponential curve and find the trend in average values from 1980 to 1985. We can see from the coefficient of the determination that we have explained all but 4% of the variation. From the formula we can calculate the fitted value for 1986, and see that it should have been $3,388.00. This is an estimate of the average case reserve value that we should have had, if that nice pattern had continued through 1986.

On Exhibit 23, we start with this value of $3,388.00 and develop a re-estimate of ultimate liability due to this change in claims processing. Taking the product of the $3,388 and the estimate of ultimate claims from previous exhibits, we see that the case outstanding should have been $11 million as of 12 months. Adding in paid as of 12 months from Exhibit 1 of $6 million, we get an adjusted estimate for the 1986 accident year known case incurred losses as 12 months of $17,980,000. What we're interested in, however, is what the ultimate liability is. To calculate that, we must apply the loss development factor from Exhibit 2 to bring it to its ultimate value which is $21,855,000. This increases the estimate by $1,725,000.

Exhibit 24 summarizes the results of the three adjustments. The straighforward mechanical application of the techniques produced the first row of estimates for 1986, which had a range of approximately $4 million. The adjustments have squeezed that range now down to about 50% of what it was, slightly in excess of $2 million. Have we totally explained all of the changes in the data and the vilation of assumptions? Should we be looking at it further or are you now in a position to make your estimate of what the ultimate liability should be for the company? At this point in the program, we want to discuss some other techniques to refine the estimates further, and to discuss techniques for estimating tail factors.

Earlier we looked at the development of reported claims in doing the average value method. We said that sometimes reported claims might not be the best measure of exposure to loss. We suggested that possibly looking at cumulative closed claims -- closed with payment--might be another means of looking at the total number of ultimate claims. On Exhibit 25 is another development triangle, but in this case, we are developing closed claims. The development procedure is the same. We come up with our selected development factors for the closed claims, project ultimate closed claims. Exhibit 26 compares the projections to ultimate of reported claims and closed claims. Notice that in most cases the closed claim development procedure is coming up with generally higher estimates of the total ultimate number of claims. This would indicate some change in either the reporting pattern or the settlement pattern over time.

On Exhibit 27 we have reported and closed claim frequency, which is the number of claims per 1,000 insured car years by accident year. The first column is the reported ultimate claims divided by the car years and the second column is the closed claims divided by the number of car years. This is a little different picture. Fitting exponential trend curves, we show very minimal raw trend -- actually a slight .4% decrease -- in the frequency for the reported claim frequency and .6% increase for the closed claim frequency. However, for 1985 to 1986 the one year rate of change in frequency is an increase of 18% and 33%, respectively.

On Exhibit 28 is a comparison of the incremental average paid losses per ultimate claim using reported and closed claims, for the period from zero to 12 months. We're taking the paid loses from 0 to 12 months by accident year divided by the reported ultimate number of claims and the ultimate closed claims. Note that the first column is the same as the first column on Exhibit 10. Here again, we calculate the exponential trends. Recall that the trend for 0-12 months on Exhibit 10 was 12.5%. The closed claim average paid losses produce a raw trend of 11.3%. The trends from 1980 through 1986 are not too different from the overall trend. However, if you look at the actual change in average paid loss from 1985 to 1986 between the reported and the closed claim methods, you see quite a bit of inconsistency. The one year change from '85 to '86 is a decrease of 3% and 14%, respectively, for the two calculations of the average paid losses. This again is an indication that current development patterns are different from historical patterns.

Before determining which of the estimated ultimate claim projections is more reasonable, the reported or the closed claims, I would suggest talking to the claims department and see if there has been an effort to speed up claim settlements or if anything else may have change in the settlement process. At this point you need to determine what is going on and how it is impacting the reserves and how to adjust for it.

At this point you may have very little confidence in your claim count information. You may not be comfortable with either set of estimated ultimate claims, but you still want to use your average value method. The solution is to use a pure premium trend analysis instead of a severity trend analysis. In a pure premium trend analysis, you use as your exposure base the exposure base that you would use in pricing. In this case, for auto liability we use insured car years for pricing. When you take losses divided by exposures, in this case the number of car years, you are calculating a pure premium. Exhibit 29 shows paid pure premium as of 12 months per insured car year, which is paid losses as of 12 months divided by insured car years per 1,000. Fitting our exponential curve to these values produces a raw trend indication of about 12%, with a fairly high confidence level of 97%. The 1985 to 1986 change in this pure premium is 14%. This is somewhat more consistent than what we were seeing in the frequency and severity analyses. The next step is to use the average value methodology but applying it to the pure premium values. You calculate the average ultimate pure premium and multiply it by the insured car years, which produces the estimated ultimate liability. The pure premium approach is another method of getting around a change in settlement pattern.

The next adjustment that we want to discuss is the calculation of the tail factor. The tail factor, as you recall from Exhibit 1, was the means of geeting us from our last valuation point of 84 months to what will ultimately be developed. In the paid development procedures we've used a tail factor of 1.0546. To calculate it, we converted paid losses to incurred by taking the known case incurred losses at the 84 month valuation and dividing them by the 84 month valuation of the paid losses. The known case incurred losses include both the paid and the remaining case reserve amount. We have said, for the sake of the examples thus far, that we were going to rely on the estimate of the incurred losses at 84 months to be the value at ultimate. Exhibit 30 shows the ratio of the incurred losses divided by the paid losses at each point in time and it indicats a 5.46% increase needs to be applied to the paid losses as of '84 to get them up to the incurred level.

There are a couple of weaknesses in using this kind of an analysis. The first weakness is that it is based on only one accident year or one observation. You're relying solely on 1980 experience to detemine what the future paid development will be from 84 months to ultimate for all future years. The second weakness in this method is that the case reserves aren't always a reliable measure of the future paid loss development especially when you're dealing with long tail lines such as auto liability, and auto liability has a shorter tail, in general, than medical malpractice or general liability. In the really long tail lines, you have significant development beyond 84 months even on the case reserves, so relying on the reserves at that point in time may understate your results.

The adjustment in Exhibit 30 converts paid losses to incurred losses at age 48 months, instead of at age 84 months, to get our ultimate value. You start with the little mini-triangle that we have formed with accident years 80-83 from ages 48-84 of development with the ratios of incurred losses to paid losses. Notice that for accident year 1980 at 84 months our value is 1.0546, which was the ratio of incurred losses to paid losses for that one year that we used before. We next average the ratios of incurred losses to paid losses in each column, and also calculate a weighted average, and then select a ratio of incurred to paid losses in each column. Line (2) contains the cumulative incurred development factors from Exhibit 3 for the points 48 to 84 months. To get a cumulative adjusted paid factor, we multiply our selected ratio on Line (1) times the cumulative incurred factor on Line (2), resulting in a new series of cumulative paid factors to apply to our paid losses.

What have we done here? Instead of just relying on 1.0546 as our development from '84 to ultimate, we've used data on earlier ages to get a better estimate of what the paid losses will ultimately be on an incurred basis. We are circumventing the weaknesses of that 1.0546 by using more accident years than just the 1980. However, we're still faced with the problem of relying on incurred losses. We're still relying on the case reserves being correct at 84 months.

Exhibit 31 is an approach that gets around that weakness of relying on incurred losses. The top of the exhibit is the set of selected paid development factors from Exhibit 1. We subtract 1 from each factor, 1.8118 becomes just .8118, then fit a curve through the selected factors minus 1, and come up with the formula that patterns the way those development

factors are behaving. That least squares fitted exponential formula is shown in the middle of the page. Now, instead of using the ratio of incurred to paid losses at 84 months, we can project the paid factors at development points beyond 84 by applying the formula. The bottom of the page displays the fitted factors. We cumulate those fitted factors, and get cumulative fitted factors. Now, instead of the 1.0546 tail factor, the cumulative fitted factor is 1.0383. This method will not always give you a lower tail factor. In this example, it worked out that way. What we've done here is circumvent using incurred losses. We've just taken our actual paid loss development pattern and we have used a formula to determine the ultimate tail factor without looking at any incurred losses.

Exhibit 32 compares the 3 tail factors, and the resulting cumulative factors for a few accident years. Option #1 was convering to incurred losses at 84 months, which was the procedure that we used in Exhibit 1. Option #2 was the first adjustment in which we converted to incurred loss at 48 months. You can se the cumulative development factors for each of those accident years under that adjustment. Option #3 was our formula method in which we modeled the paid development factors and calculated indicated tail factors. Option #1 and Option #2 resulted in significantly lower development factors than Option #1. Once again, it's just the way this example works out. These adjustments do not always result in lower development factors.

The final topic is completing the triangle. Just to set the stage for the next exhibit, refer to Exhibit 1. We're looking here at the cumulative paid loss triangle. Using the selected development factors that are down at the bottom, not the cumulative ones but the selected ones, we will complete the rest of the triangle. In the case of the 1986 accident year, we'll be using 1.8118 to apply to the $6,962,000 to get a projected 1986 24 month entry. This is your estimate of 1986 year. In like fashion, we will use the 1.2347 to calculate the next entry for the 1986 as well as the 1985 accident year. Similarly, we move across the exhibit to complete the triangle. Exhibit 33 shows that, having done it, you have completed the triangle to form a square.

The purpose for completing the triangle is to provide a means of checking your projection as the data comes in, instead of waiting until 84 months, which is 6 years away for 1986. This is the very practical way of evaluating the accuracy of your estimates from the various techniques. Using 1987 diagonal, we see that we expect the 1986 accident year to have $12.6 million in cumulative paid losses at the end of 1987, and 1985 to have $13 million, and 1984 to have $14.4 million, and so on. What this says is that if the paid development factors are perfectly accurate in projecting your reserve estimates, those will be the values that you see at 12/31/87. Another way of using this data is to sum the diagonals above the line, the 1986 diagonal, and sum the diagonal below the line, the 1987 diagonal. The difference between the sums is the amount of paid losses that you expect in calendar year 1987, for these 7 accident years. In this case, your calendar year projection for paid losses in 1987 for these 7 accident years is $12,003,000.

Looking at the values that you've projected, you're now in a position to evaluate your estimates of ultimate relative to what actually comes in by evaluating the differences between actual and projected in the diagonals. The pattern of the differences may suggest a particular bias in your

methodology. For example, you may find that you have underestimated the more recent years and overestimated the prior years.

The bottom part of the exhibit completes the triangle for incurred losses. This includes the case reserve in the tracking process. You may find that paid loss projections are relatively accurate, but incurred losses aren't. This would imply a change in case reserving practices. If incurred losses track fairly well, but paid doesn't, perhaps there is a change in the payment patterns, or the settlement procedures. Completing the triangle and evaluating the differences is a good way to see if you are violating any assumptions.

[Question] If you believe that more than one thing is affecting the reserves simultaneously, is there some technique for isolating one problem and treating it, while analyzing the other factors?

Often what happens when you fragment your data in more than one way at a time is you end up with data so small that the statistical variation will outweigh the adjustment you're trying to do, but it is a function on the size of your database.

[Question, Inaudible].

The upfront payments, if I understand the question, would be part of the allocated loss adjustment expense. Allocated loss adjustment expense are those expenses that are specifically related to unique claims.

If your company sets case reserves for expenses then you should also apply the incurred development technique to your incurred ALAE. You should also evaluate the ALAE for changes in claims handling. You may need to separately evaluate the different kinds of expenses.

[Question, Inaudible].

You've got to keep a close watch on things. If you use outside adjusters, and they were billing you every six months, but now they are billing you monthly, you will see a speed up in ALAE payments. You may need to apply one of the adjustments to your historical ALAE data, like those presented for losses, in order to reflect the changing payment pattern.

An extension of this question is using data that is the sum of loss payments and allocated loss adjustment expense. Particularly in a reinsurance environment, you can't always separate your data into the two components. This means that if there is a change in the pattern of expense payments, it may throw your estimate off.

[Question, Inaudible].

If you are seeing a pattern of increasing development factors down the column, you may want to opt for the weighted average, if you know what's taking place and you know that the weighted values make sense. You would use a weighting procedure, similar to the one presented here, which gives heavier weight to the more recent factor. But again, the selection of weights is strictly judgment call.

Are there any other questions? We thank you, and we'll adjourn for your next session.

1986 CASUALTY LOSS RESERVE SEMINAR

2A/2B/3C LOSS RESERVE TECHNIQUES I

3A/3B/4C LOSS RESERVE TECHNIQUES II

1986 LOSS RESERVE SEMINAR

BASIC TECHNIQUES I & II

OUTLINE

I. TECHNIQUES I

A. BASIC METHODS FOR LOSSES

1. PAID DEVELOPMENT FACTOR
2. INCURRED DEVELOPMENT
3. AVERAGE VALUE PROJECTION

B. BASIC METHODS FOR LAE

1. PAID DEVELOPMENT
2. RATIOS TO LOSSES

II. TECHNIQUES II

A. ADJUSTMENTS FOR COMMON PROBLEMS

1. CHANGE IN CLOSE RATIO
2. CHANGE IN CASE RESERVING ADEQUACY

B. OTHER ANALYSES

1. REPORTED CLAIMS VERSUS CLOSED CLAIMS
2. FREQUENCY, SEVERITY, & PURE PREMIUM
3. TAIL FACTORS
4. MONITORING RESULTS

EZ Insurance Company — Exhibit 1

Cumulative Paid Losses

Automobile Liability

Accident Year	Months of Development 12	24	36	48	60	72	84
1980	$3,361	$ 5,991	$ 7,341	$ 8,259	$ 8,916	$ 9,408	$ 9,759
1981	3,780	6,671	8,156	9,205	9,990	10,508	
1982	4,212	7,541	9,351	10,639	11,536		
1983	4,901	8,864	10,987	12,458			
1984	5,708	10,268	12,699				
1985	6,093	11,172					
1986	6,962						
Development Factors							
1980	1.7825	1.2253	1.1251	1.0795	1.0552	1.0373	
1981	1.7648	1.2226	1.1286	1.0853	1.0519		
1982	1.7904	1.2400	1.1377	1.0843			
1983	1.8086	1.2395	1.1339				
1984	1.7989	1.2368					
1985	1.8336						
1986							
Tr Avg	1.7951	1.2339	1.1313	1.0843			
In Avg	1.7962	1.2328	1.1313	1.0830	1.0535	1.0373	
Avg	1.7965	1.2328	1.1313	1.0830	1.0536	1.0373	
Wt Avg	1.8118	1.2369	1.1340	1.0842	1.0526	1.0373	
4 Avg	1.8079	1.2347	1.1313				
Wt 4 Avg	1.8184	1.2376	1.1340				
Selected Factor	1.8118	1.2347	1.1340	1.0830	1.0536	1.0373	1.0546
Cumulative Selected Factor	3.1665	1.7477	1.4155	1.2482	1.1525	1.0939	1.0546

Note: Loss amounts in thousands of dollars.

EXHIBIT 2

AVERAGING TECHNIQUES

TRUNCATED (TR) AVERAGE:	ELIMINATING THE HIGHEST AND LOWEST VALUES
INVERSE (IN) AVERAGE:	STRAIGHT AVERAGE OF THE RECIPROCALS OF THE DEVELOPMENT FACTORS
WEIGHTED (WT) AVERAGE:	AVERAGE CALCULATED GIVING PROGRESSIVELY GREATER WEIGHT TO THE MOST RECENT YEARS' EXPERIENCE

EZ Insurance Company — Exhibit 3

Incurred Losses

Automobile Liability

Accident Year	Months of Development 12	24	36	48	60	72	84
1980	$ 8,382	$ 9,781	$10,110	$10,219	$10,268	$10,280	$10,292
1981	9,337	10,847	11,092	11,192	11,235	11,250	
1982	10,540	12,205	12,551	12,690	12,725		
1983	11,875	13,832	14,238	14,413			
1984	13,343	15,542	16,066				
1985	14,469	16,776					
1986	16,561						
	Development Factors						
1980	1.1669	1.0336	1.0108	1.0048	1.0012	1.0012	
1981	1.1617	1.0226	1.0090	1.0038	1.0013		
1982	1.1580	1.0283	1.0111	1.0028			
1983	1.1648	1.0294	1.0123				
1984	1.1648	1.0337					
1985	1.1594						
1986							
Tr Avg	1.1627	1.0304	1.0110	1.0038			
In Avg	1.1626	1.0295	1.0108	1.0038	1.0012	1.0012	
Avg	1.1626	1.0295	1.0108	1.0038	1.0013	1.0012	
Wt Avg	1.1619	1.0308	1.0115	1.0032	1.0013	1.0012	
4 Avg	1.1618	1.0285	1.0108				
Wt 4 Avg	1.1617	1.0313	1.0115				
Selected Factor	1.1618	1.0285	1.0108	1.0038	1.0013	1.0012	1.0000
Cumulative Selected Factor	1.2155	1.0462	1.0172	1.0063	1.0025	1.0012	1.0000

Note: Loss amounts in thousands of dollars.

EZ Insurance Company — Exhibit 4

DEVELOPMENT FACTOR METHOD ESTIMATES

AUTOMOBILE LIABILITY

	Paid Loss Development			Incurred Loss Development		
	(1)	(2)	(3)	(4)	(5)	(6)
Accident Year	Paid to Date	Selected Factor	Estimated Ultimate	Incurred to Date	Selected Factor	Estimated Ultimate
1980	$ 9,759	1.0546	$10,292	$10,292	1.0000	$10,292
1981	10,508	1.0939	11,495	11,250	1.0012	11,264
1982	11,536	1.1525	13,295	12,725	1.0025	12,757
1983	12,458	1.2482	15,550	14,413	1.0063	14,504
1984	12,699	1.4155	17,975	16,066	1.0172	16,342
1985	11,172	1.7477	19,525	16,776	1.0462	17,551
1986	6,962	3.1665	22,045	16,561	1.2155	20,130
Total	$75,094		$110,177			$102,840

Notes:
1. Amounts in thousands of dollars.
2. Col. (3) = Col. (1) X Col. (2).
3. Col. (6) = Col. (4) X Col. (5).

EXHIBIT 5

KEY ASSUMPTIONS AND POTENTIAL PROBLEMS INHERENT IN DEVELOPMENT FACTOR ANALYSES

ASSUMPTIONS	SAMPLE PROBLEMS
CLAIM SETTLEMENT PATTERNS UNCHANGING	• INCREASING DELAYS IN CLAIM CLOSING RATES
CASE RESERVING PRACTICES & PHILOSOPHIES UNCHANGING	• CONSCIOUS EFFORT TO IMPROVE CASE RESERVING ADEQUACY • INTRODUCTION OF NEW CASE RESERVING PROCEDURES
NO CLAIM PROCESSING CHANGES	• CHANGE IN DATA PROCESSING • REVISED CLAIM PAYMENT RECORDING PROCEDURES
POLICY LIMITS HAVE NO IMPACT ON LOSS DEVELOPMENT	• INCREASING FREQUENCY OF FULL POLICY LIMIT CLAIMS • CHANGING POLICY LIMITS
LOSS DEVELOPMENT UNAFFECTED BY CHANGING LOSS COST TRENDS	• SURGES IN INFLATION • INCREASED LITIGATION • DIMINISHED POLICY DEFENSES
NO CHANGES IN MIX OF BUSINESS	• CHANGES IN REINSURANCE COVERAGES • INCREASED "LONG-TAIL" EXPOSURE • INTRODUCTION OF NEW OR REVISED COVERAGES
NO CYCLICITY IN LOSS DEVELOPMENT	• CLAIM SETTLEMENT OR RESERVING IMPACTED BY BUSINESS OR UNDERWRITING CYCLES
NO DATA ANOMALIES	• CATASTROPHIC OR UNUSUAL LOSSES REFLECTED IN LOSS EXPERIENCE • UNUSUAL CLAIM SETTLEMENT/ REPORTING DELAYS

EXHIBIT 6

AVERAGE VALUE PROJECTIONS
VS.
DEVELOPMENT ESTIMATES

DEVELOPMENT PROJECTIONS - FOCUS ONLY ON TOTAL DOLLARS OF LOSSES, EITHER PAID OR INCURRED

AVERAGE VALUE PROJECTIONS - OFTEN REFERRED TO AS FREQUENCY/SEVERITY ESTIMATES

AVERAGE VALUE PROJECTIONS REQUIRE SEPARATE ESTIMATES OF:

(A) ULTIMATE CLAIM COUNTS (CLAIM FREQUENCY) AND

(B) ULTIMATE AVERAGE COST PER CLAIM (CLAIM SEVERITY)

THE PRODUCT OF (A) x (B) YIELDS ULTIMATE LOSSES

EZ Insurance Company — Exhibit 7

Cumulative Reported Claims

Automobile Liability

Accident Year	Months of Development 12	24	36	48	60	72	84
1980	1,432	2,724	2,800	2,832	2,844	2,858	2,858
1981	1,428	2,772	2,850	2,866	2,870	2,888	
1982	1,710	3,032	3,086	3,094	3,110		
1983	1,358	2,780	2,990	3,000			
1984	1,210	2,518	2,656				
1985	1,488	2,604					
1986	1,604						
Development Factors							
1980	1.9022	1.0279	1.0114	1.0042	1.0049	1.0000	
1981	1.9412	1.0281	1.0056	1.0014	1.0063		
1982	1.7731	1.0178	1.0026	1.0052			
1983	2.0471	1.0755	1.0033				
1984	2.0810	1.0548					
1985	1.7500						
1986							
Tr Avg	1.9159	1.0369	1.0045	1.0042			
In Avg	1.9076	1.0404	1.0057	1.0036	1.0056	1.0000	
Avg	1.9158	1.0408	1.0057	1.0036	1.0056	1.0000	
Wt Avg	1.9055	1.0523	1.0037	1.0040	1.0060	1.0000	
4 Avg	1.9128	1.0441	1.0057				
Wt 4 Avg	1.8897	1.0552	1.0037				
Selected Factor	1.9128	1.0441	1.0057	1.0036	1.0056	1.0000	1.0000
Cumulative Selected Factor	2.0272	1.0598	1.0150	1.0092	1.0056	1.0000	1.0000

EXHIBIT 8

EZ INSURANCE COMPANY

CUMULATIVE AVERAGE PAID LOSS PER ULTIMATE CLAIM

AUTOMOBILE LIABILITY

ACCIDENT YEAR	MONTHS OF DEVELOPMENT 12	24	36	48	60	72	84
1980	$1,176	$2,096	$2,568	$2,889	$3,119	$3,291	$3,414
1981	1,309	2,310	2,824	3,187	3,459	3,638	3,778
1982	1,347	2,412	2,991	3,403	3,690	3,902	4,061
1983	1,619	2,928	3,629	4,115	4,447	4,688	4,868
1984	2,117	3,808	4,710	5,241	5,615	5,888	6,093
1985	2,208	4,048	4,980	5,579	6,000	6,310	6,542
1986	2,141	4,187	5,256	5,933	6,407	6,759	7,023

EXPONENTIAL TREND							
RAW	1.125	1.153	1.158	1.119	1.087	--	--
BASE	1.135	1.135	1.135	1.135	1.135	1.135	1.135
SELECTED	1.125	1.148	1.147	1.130	1.126	1.135	1.135
R-SQUARE	0.91	0.95	0.92	0.95	0.98	--	--

NOTES:

1. THE TRENDS SHOWN ARE APPROXIMATE ONLY.
2. AVERAGES BELOW THE LINE ARE PROJECTED AMOUNTS.
3. DEVELOPMENT BEYOND 84 MONTHS PROJECTED AT 5.46%.

EZ INSURANCE COMPANY EXHIBIT 9

CUMULATIVE AVERAGE PAID LOSS

AUTOMOBILE LIABILITY

ACCIDENT YEAR	36 MONTHS OF DEVELOPMENT ACTUAL	FITTED
1980	$2,568	$2,436
1981	2,824	2,820
1982	2,991	3,265
1983	3,629	3,779
1984	4,710	4,375

RAW:

LEAST SQUARES FIT EXPONENTIAL CURVE EQUATION: $2104\,e^{.146x}$

FITTED ANNUAL TREND FACTOR: $e^{.146} = 1.158$

I.E. +15.8% PER YEAR

BASE:

WEIGHTED AVERAGE OF THE RAW TREND FACTORS FOR EACH COLUMN:

$$\frac{49\text{x}1.125 + 36\text{x}1.153 + 25\text{x}1.158 + 16\text{x}1.119 + 9\text{x}1.087}{135} = 1.135$$

SELECTED:

WEIGHTED AVERAGE OF THE RAW TREND FOR EACH COLUMN AND THE BASE TREND:

$$\frac{25\text{x}1.158 + 24\text{x}1.135}{49} = 1.147$$

I.E. +14.7% PER YEAR

EZ Insurance Company — Exhibit 10

Incremental Average Paid Loss per Ultimate Claim

Automobile Liability

Months of Development

Accident Year	0-12	12-24	24-36	36-48	48-60	60-72	72-84
1980	$1,176	$ 920	$ 472	$ 321	$ 230	$ 172	$ 123
1981	1,309	1,001	514	363	272	179	
1982	1,347	1,065	579	412	287		
1983	1,619	1,309	701	486			
1984	2,117	1,691	902				
1985	2,208	1,840					
1986	2,141						
Exponential Trend							
Raw	1.125	1.162	1.174	1.147	1.117	--	--
R-Square	0.91	0.95	0.96	0.99	0.92	--	--

Note: The trends shown are approximate only.

EXHIBIT 11

EZ INSURANCE COMPANY

AUTOMOBILE LIABILITY

ACCIDENT YEAR	AVERAGE PAYMENT BETWEEN 24&36 MOS.	ADJUSTMENT TO 1985 LEVELS	ADJUSTED COSTS
1980	$472	1.147^5	$ 937
1981	514	1.147^4	890
1982	579	1.147^3	874
1983	701	1.147^2	922
1984	902	1.147	1,035
		AVERAGE:	$ 932

ACCIDENT YEAR	CUM. AVG. PAID AS OF 24 MONTHS	EST. PAID BETWEEN 24 & 36 MOS.	EST. CUM. AVG. PAID AS OF 36 MONTHS
1985	$4,048	$932 X 1.000 = $ 932	$4,980
1986	4,187	932 X 1.147 = 1,069	5,256

EXHIBIT 12

EZ INSURANCE COMPANY

AVERAGE LOSS PER CLAIM METHOD ESTIMATES

AUTOMOBILE LIABILITY

ACCIDENT YEAR	(1) ESTIMATED ULTIMATE COST PER CLAIM	(2) ESTIMATED ULTIMATE CLAIM COUNT	(3) AVERAGE VALUE PROJECTION
1980	$3,600	2,858	$10,289
1981	3,984	2,888	11,506
1982	4,283	3,127	13,393
1983	5,134	3,028	15,546
1984	6,426	2,696	17,324
1985	6,899	2,760	19,041
1986	7,406	3,252	24,084
TOTAL			$111,183

NOTES:
1. COLUMN (3) IS IN THOUSANDS.
2. ULTIMATE CLAIM COUNTS ESTIMATED USING THE DEVELOPMENT FACTOR METHOD APPLIED TO REPORTED COUNTS.

EXHIBIT 13

EZ INSURANCE COMPANY

PROJECTED ULTIMATE LOSSES

AUTOMOBILE LIABILITY

ACCIDENT YEAR	PAID PROJECTION	INCURRED PROJECTION	AVERAGE VALUE PROJECTION
1980	$10,292	$10,292	$10,289
1981	11,495	11,264	11,506
1982	13,295	12,757	13,393
1983	15,550	14,504	15,546
1984	17,975	16,342	17,324
1985	19,525	17,551	19,041
1986	22,045	20,130	24,084
TOTAL	$110,177	$102,840	$111,183

NOTE: AMOUNTS IN THOUSANDS OF DOLLARS.

EXHIBIT 14

KEY ASSUMPTIONS AND POTENTIAL PROBLEMS INHERENT IN AVERAGE COST PER CLAIM ANALYSES

ASSUMPTIONS	SAMPLE PROBLEMS
CLAIM COSTS ARE CHANGING AT A CONSTANT RATE	• SURGES IN INFLATION • ONE SHOT BENEFIT CHANGES
PAST CLAIM COST CHANGES ARE AN INDICATOR OF FUTURE CHANGES	• CHANGES IN ECONOMIC CONDITIONS • COVERAGE CHANGES • DIMINISHED POLICY DEFENSES
CLAIM SETTLEMENT PATTERNS UNCHANGING	• INCREASED USE OF PARTIAL INTERIM PAYMENTS • MORE AGGRESSIVE DEFENSE
CLAIM COUNT REPORTING PATTERNS ARE CONSTANT	• CHANGES IN CLAIM COUNT DEFINITIONS
POLICY LIMITS HAVE NO IMPACT ON TRENDS	• INCREASING FREQUENCY OF FULL POLICY LIMITS CLAIMS • CHANGING POLICY LIMITS
NO CHANGES IN MIX OF BUSINESS	• INTRODUCTION OF NO-FAULT COVERAGES • CHANGES IN REINSURANCE COVERAGES • SHIFTS IN RISK SEVERITY • CHANGE IN DEDUCTIBLES OR SIRs
NO DATA ANOMALIES	• CATASTROPHIC OR UNUSUAL CLAIMS

EXHIBIT 15

EZ INSURANCE COMPANY

AUTOMOBILE LIABILITY

ACCIDENT YEAR	REPORTED CLAIMS @ 12 MONTHS	CLOSED CLAIMS @ 12 MONTHS	CLOSED %
1980	1,432	658	45.9%
1981	1,428	826	57.8
1982	1,710	782	45.7
1983	1,358	780	57.4
1984	1,210	917	75.8
1985	1,488	911	61.2
1980-85	8,626	4,874	56.5%
1986	1,604	1,106	69.0%

EZ Insurance Company — Exhibit 16

Cumulative Closed Claims
Automobile Liability

Accident Year	Months of Development 12	24	36	48	60	72	84
1980	658	2,250	2,585	2,687	2,745	2,802	2,824
1981	826	2,131	2,559	2,706	2,795	2,845	
1982	782	2,308	2,738	2,957	3,049		
1983	780	2,146	2,665	2,832			
1984	917	1,980	2,368				
1985	911	1,978					
1986	1,106						

Ratio of Claims Closed to Projected Ultimate Claims

1980	.2302	.7873	.9045	.9402	.9605	.9804	.9881
1981	.2860	.7379	.8861	.9370	.9678	.9851	
1982	.2501	.7381	.8756	.9456	.9751		
1983	.2576	.7087	.8801	.9353			
1984	.3401	.7344	.8783				
1985	.3301	.7146					
1986	.3401						
Average Closed Claims Ratio	.2906	.7368	.8849	.9395	.9678	.9828	.9881

EXHIBIT 17

EZ INSURANCE COMPANY

ADJUSTING HISTORICAL 12 MONTH
CUMULATIVE PAYMENTS DATA
TO 1986 CLOSED CLAIMS RATIO

STEP 1: CALCULATE CHANGE IN CLOSED CLAIMS RATIOS BETWEEN 12 AND 24 MONTHS.

Ex: 1983 .7087 - .2576 = .4511

STEP 2: CALCULATE DIFFERENCE IN 12 MONTH CLOSED CLAIMS RATIOS FROM THE 1986 LEVEL.

Ex: 1983 .3401 - .2576 = .0825

STEP 3: CALCULATE INDICATED ADJUSTMENT.

Ex: 1983 $\frac{.0825}{.4511} = .1829$

STEP 4: CALCULATE LOSS PAYMENTS BETWEEN 12 AND 24 MONTHS.
Ex: 1983 $8,864 - $4,901 = $3,963

STEP 5: ADJUST* HISTORICAL 12 MONTH LOSS PAYMENTS TO 1986 CLOSED CLAIMS RATIO LEVEL.

Ex: 1983 ($3,963 x .1829) + $4,901 = $5,626

*ASSUMES A LINEAR RELATIONSHIP BETWEEN LOSS PAYMENTS AND CLOSED CLAIMS RATIOS.

EXHIBIT 18

EZ INSURANCE COMPANY

ADJUSTED HISTORICAL 12 MONTH
LOSS PAYMENT EXPERIENCE

ACCIDENT YEAR	ADJUSTED 12 MONTH PAYMENTS (000)	ADJUSTED 12 TO 24 MONTH DEVELOPMENT FACTORS
1980	$3,880	1.5441
1981	4,126	1.6168
1982	4,826	1.5626
1983	5,626	1.5755
1984	5,708	1.7989
1985	6,225	1.7947
1986	6,962	

AVG	1.6488
WT AVG	1.7237
4 AVG	1.6829
WT 4 AVG	1.7590
SELECTED FACTOR	1.7590
CUMULATIVE SELECTED FACTOR	3.0742

EXHIBIT 19

EZ INSURANCE COMPANY

1986 PAID PROJECTIONS ADJUSTED FOR CHANGES IN 12 MONTH CLOSED CLAIMS RATIOS

1986 ACCIDENT YEAR CUMULATIVE PAYMENTS AS OF 12 MONTHS	$6,962
ADJUSTED SELECTED DEVELOPMENT FACTOR	3.0742
REVISED ULTIMATE LOSS ESTIMATE (000)	$21,403
UNADJUSTED ULTIMATE LOSS ESTIMATE (000)	$22,045
CHANGE IN ESTIMATE (000)	$-642

EXHIBIT 20

EZ INSURANCE COMPANY

ADJUSTED HISTORICAL 12 MONTH
LOSS PAYMENT EXPERIENCE

ACCIDENT YEAR	ADJUSTED 12 MONTH PAYMENTS (000)	ADJUSTED AVERAGE LOSS PER ULTIMATE CLAIM AS OF 12 MONTHS
1980	$3,880	$1,358
1981	4,126	1,429
1982	4,826	1,543
1983	5,626	1,858
1984	5,708	2,117
1985	6,225	2,250
1986	6,962	2,141

EXPONENTIAL TREND	
RAW	1.097
BASE	1.125
R-SQUARE	0.91

EXHIBIT 21

EZ INSURANCE COMPANY

1986 AVERAGE VALUE PROJECTIONS
ADJUSTED FOR CHANGES IN 12 MONTH
CLOSED CLAIMS RATIOS

1986 ACCIDENT YEAR ADJUSTED ULTIMATE COST PER CLAIM	$7,304
ESTIMATED ULTIMATE CLAIM COUNT	3,252
REVISED ULTIMATE LOSS ESTIMATE (000)	$23,753
UNADJUSTED ULTIMATE LOSS ESTIMATE (000)	$24,084
CHANGE IN ESTIMATE (000)	$-331

EZ Insurance Company — Exhibit 22

Case Outstanding Losses

Automobile Liability

Accident Year	Case Outstanding as of 12 Months (000)	Estimated Ultimate Claim Count	Case Outstanding Per Ultimate Claim as of 12 Months
1980	$5,021	2,858	$1,757
1981	5,557	2,888	1,924
1982	6,328	3,127	2,024
1983	6,974	3,028	2,303
1984	7,635	2,696	2,832
1985	8,376	2,760	3,035
1986	9,599	3,252	2,952

Exponential Trend 1980-1985	
Raw	1.122
R-Square	0.96
Fitted Value 1986	$3,388

EXHIBIT 23

EZ INSURANCE COMPANY

1986 INCURRED PROJECTIONS ADJUSTED FOR CHANGES IN CASE RESERVING DURING 1986

1986 ACCIDENT YEAR FITTED CASE OUTSTANDING PER ULTIMATE CLAIM AS OF 12 MONTHS	$3,388
ESTIMATED ULTIMATE CLAIM COUNT	3,252
1986 FITTED CASE OUTSTANDING LOSSES AS OF 12 MONTHS (000)	$11,018
CUMULATIVE PAYMENTS AS OF 12 MONTHS (000)	$6,962
1986 FITTED REPORTED INCURRED AS OF 12 MONTHS (000)	$17,980
SELECTED DEVELOPMENT FACTOR	1.2155
REVISED ULTIMATE LOSS ESTIMATE (000)	$21,855
UNADJUSTED ULTIMATE LOSS ESTIMATE (000)	$20,130
CHANGE IN ESTIMATE (000)	+$1,725

EXHIBIT 24

EZ INSURANCE COMPANY

PROJECTED ULTIMATE LOSSES

AUTOMOBILE LIABILITY

1986 ACCIDENT YEAR

	PAID PROJECTION	INCURRED PROJECTION	AVERAGE VALUE PROJECTION
UNADJUSTED	$22,045	$20,130	$24,084
ADJUSTED	21,403	21,855	23,753

NOTE: AMOUNTS IN THOUSANDS OF DOLLARS.

EZ Insurance Company — Exhibit 25

Cumulative Closed Claims

Automobile Liability

Months of Development

Accident Year	12	24	36	48	60	72	84
1980	658	2,250	2,585	2,687	2,745	2,802	2,824
1981	826	2,131	2,559	2,706	2,795	2,845	
1982	782	2,308	2,738	2,957	3,049		
1983	780	2,146	2,665	2,832			
1984	917	1,980	2,368				
1985	911	1,978					
1986	1,106						

Development Factors

1980	3.4195	1.1489	1.0395	1.0216	1.0208	1.0079	
1981	2.5799	1.2008	1.0574	1.0329	1.0179		
1982	2.9514	1.1863	1.0800	1.0311			
1983	2.7513	1.2418	1.0627				
1984	2.1592	1.1960					
1985	2.1712						
1986							
Tr Avg	2.6135	1.1944	1.0601	1.0311			
In Avg	2.6019	1.1940	1.0597	1.0285	1.0193	1.0079	
Avg	2.6721	1.1948	1.0599	1.0285	1.0194	1.0079	
Wt Avg	2.3787	1.2072	1.0664	1.0309	1.0185	1.0079	
4 Avg	2.5083	1.2062	1.0599				
Wt 4 Avg	2.2710	1.2086	1.0664				
Selected Factor	2.3787	1.2072	1.0664	1.0309	1.0194	1.0079	1.0120
Cumulative Selected Factor	3.2826	1.3800	1.1431	1.0719	1.0398	1.0200	1.0120

EXHIBIT 26

EZ INSURANCE COMPANY

ESTIMATED ULTIMATE EXPOSURE

AUTOMOBILE LIABILITY

ACCIDENT YEAR	REPORTED CLAIM DEVELOPMENT	CLOSED CLAIM DEVELOPMENT	INSURED CAR YEARS (000)
1980	2,858	2,858	100
1981	2,888	2,902	102
1982	3,127	3,170	98
1983	3,028	3,036	103
1984	2,696	2,707	105
1985	2,760	2,730	105
1986	3,252	3,631	105

NOTE: CAR YEARS ARE IN THOUSANDS.

EXHIBIT 27

EZ INSURANCE COMPANY

ESTIMATED CLAIM FREQUENCY
PER 1,000 INSURED CAR YEARS

AUTOMOBILE LIABILITY

ACCIDENT YEAR		REPORTED CLAIM ULTIMATE FREQUENCY		CLOSED CLAIM ULTIMATE FREQUENCY
1980		2.858		2.858
1981		2.831		2.845
1982		3.191		3.235
1983		2.940		2.948
1984		2.568		2.578
1985		2.629		2.600
1986	18%	3.097	33%	3.458

EXPONENTIAL TREND		
RAW	0.996	1.006
R-SQUARE	0.01	0.01

EZ INSURANCE COMPANY

INCREMENTAL AVERAGE PAID LOSS PER ULTIMATE CLAIM

AUTOMOBILE LIABILITY

ACCIDENT YEAR		REPORTED CLAIM AVG PAID LOSS @ 12 MONTHS		CLOSED CLAIM AVG PAID LOSS @ 12 MONTHS
1980		1,176		1,176
1981		1,309		1,303
1982		1,347		1,350
1983		1,619		1,615
1984		2,117		2,108
1985		2,208		2,232
1986	-3%	2,141	-14%	1,918

EXPONENTIAL TREND		
RAW	1.125	1.113
R-SQUARE	0.91	0.83

EXHIBIT 29

EZ INSURANCE COMPANY

INCREMENTAL PURE PREMIUM TREND ANALYSIS

AUTOMOBILE LIABILITY

ACCIDENT YEAR		PAID PURE PREM @ 12 MONTHS PER INSURED CAR YEAR*
1980		$34
1981		37
1982		43
1983		48
1984		54
1985		58
1986	+14%	66

*(PAID LOSS @ 12 MONTHS)/(INSURED CAR YEARS)

EXPONENTIAL TREND	
RAW	1.119
R-SQUARE	0.97

EXHIBIT 30

EZ INSURANCE COMPANY

RATIO OF INCURRED LOSSES TO PAID LOSSES

AUTOMOBILE LIABILITY

ACCIDENT YEAR	MONTHS OF DEVELOPMENT 48	60	72	84
1980	1.2373	1.1516	1.0927	1.0546
1981	1.2159	1.1246	1.0706	
1982	1.1928	1.1031		
1983	1.1569			
AVERAGE	1.2007	1.1264	1.0817	1.0546
WT. AVERAGE	1.1782	1.1127	1.0750	1.0546
(1) SELECTED RATIO	1.1782	1.1127	1.0750	1.0546
(2) CUMULATIVE INCURRED FACTOR	1.0063	1.0025	1.0012	1.0000
(3) CUMULATIVE PAID FACTOR (1) x (2)	1.1856	1.1155	1.0763	1.0546

EXHIBIT 31

EZ INSURANCE COMPANY

MODELED PAID LOSS DEVELOPMENT TAIL FACTOR

	DEVELOPMENT PERIOD					
	12 TO 24	24 TO 36	36 TO 48	48 TO 60	60 TO 72	72 TO 84
SELECTED FACTOR	1.8118	1.2347	1.1340	1.0830	1.0536	1.0373

LEAST SQUARES FIT EXPONENTIAL DEVELOPMENT FUNCTION:

$$1 + .970e^{-.048x}$$

X = START OF DEVELOPMENT PERIOD

	84 TO 96	96 TO 108	108 TO 120	120 TO 132	132 TO 144	144 TO ULT
FITTED FACTOR	1.0167	1.0093	1.0052	1.0029	1.0016	1.0021
CUMULATIVE FITTED FACTOR	1.0383	1.0213	1.0118	1.0066	1.0037	1.0021

EXHIBIT 32

EZ INSURANCE COMPANY

COMPARISON OF CUMULATIVE
PAID LOSS DEVELOPMENT FACTORS
USING THREE TAIL FACTOR ALTERNATIVES

ACCIDENT YEAR	OPTION #1 CONVERT TO INCURRED AT 84 MONTHS	OPTION #2 CONVERT TO INCURRED AT 48 MONTHS	OPTION #3 MODELED LATE PAYOUT PATTERN
1980	1.0546	1.0546	1.0383
1981	1.0939	1.0763	1.0770
1982	1.1525	1.1155	1.1348
1983	1.2482	1.1856	1.2289

NOTE: OPTION #1 CORRESPONDS TO EXHIBIT 1 SELECTIONS.

EZ Insurance Company

Exhibit 33

SQUARING THE TRIANGLE

Automobile Liability

Cumulative Paid Losses

AY	12	24	36	48	60	72	84	ULT
1980	$3,361	$ 5,991	$ 7,341	$ 8,259	$ 8,916	$ 9,408	$ 9,759	$10,292
1981	3,780	6,671	8,156	9,205	9,990	10,508	10,900	11,495
1982	4,212	7,541	9,351	10,639	11,536	12,154	12,607	13,295
1983	4,901	8,864	10,987	12,458	13,492	14,215	14,745	15,550
1984	5,708	10,268	12,699	14,400	15,596	16,432	17,045	17,975
1985	6,093	11,172	13,794	15,462	16,941	17,849	18,515	19,525
1986	6,962	12,614	15,574	17,661	19,127	20,152	20,904	22,045
Selected Factor	1.8118	1.2347	1.1340	1.0830	1.0536	1.0373	1.0546	-

Cumulative Incurred Losses

1980	$ 8,382	$ 9,781	$10,110	$10,219	$10,268	$10,280	$10,292	$10,292
1981	9,337	10,847	11,092	11,192	11,235	11,250	11,264	11,264
1982	10,540	12,205	12,551	12,690	12,725	12,742	12,757	12,757
1983	11,875	13,832	14,238	14,413	14,468	14,487	14,504	14,504
1984	13,343	15,542	16,066	16,240	16,301	16,322	16,342	16,342
1985	14,469	16,776	17,254	17,440	17,507	17,529	17,551	17,551
1986	16,561	19,241	19,789	20,003	20,079	20,106	20,130	20,130
Selected Factor	1.1618	1.0285	1.0108	1.0038	1.0013	1.0012	1.0000	-

EZ Insurance Company — Exhibit 34

CUMULATIVE PAID ALAE

Automobile Liability

Months of Development

Accident Year	12	24	36	48	60	72	84
1980	71	166	286	416	527	611	677
1981	83	189	313	458	584	672	
1982	93	213	361	523	657		
1983	103	226	394	581			
1984	108	245	437				
1985	128	280					
1986	132						

Development Factors

1980	2.3380	1.7229	1.4545	1.2668	1.1594	1.1080	
1981	2.2771	1.6561	1.4633	1.2751	1.1507		
1982	2.2903	1.6948	1.4488	1.2562			
1983	2.1942	1.7434	1.4746				
1984	2.2685	1.7837					
1985	2.1875						
1986							
Tr Avg	2.2575	1.7204	1.4589	1.2668	1.1550	1.1080	
In Avg	2.2580	1.7191	1.4602	1.2660	1.1550	1.1080	
Avg	2.2593	1.7202	1.4603	1.2661	1.1550	1.1080	
Wt Avg	2.2267	1.7470	1.4647	1.2624	1.1524	1.1080	
4 Avg	2.2351	1.7195	1.4603				
Wt 4 Avg	2.2161	1.7555	1.4647				
Selected Factor	2.2267	1.7470	1.4647	1.2661	1.1550	1.1080	1.1080
Cumulative Selected Factor	10.2290	4.5938	2.6295	1.7953	1.4180	1.2277	1.1080

Note: ALAE amounts in thousands of dollars.

EZ INSURANCE COMPANY

EXHIBIT 35

ESTIMATED ALAE RESERVES

DEVELOPMENT FACTOR METHOD

ACCIDENT YEAR	(1) ALAE PAID TO DATE	(2) SELECTED FACTOR	(3) ESTIMATED ULTIMATE	(4) UNPAID ALAE
1980	$ 677	1.1080	$ 750	$ 73
1981	672	1.2277	825	153
1982	657	1.4180	932	275
1983	581	1.7953	1,043	462
1984	437	2.6295	1,149	712
1985	280	4.5938	1,286	1,006
1986	132	10.2290	1,350	1,218
TOTAL	$3,436		$7,335	$3,899

NOTES: 1. AMOUNTS IN THOUSANDS OF DOLLARS.
2. COL. (3) = COL. (1) x COL. (2).
3. COL. (4) = COL. (3) - COL. (1).

EZ Insurance Company — Exhibit 36

Ratio of Cumulative Paid ALAE to Paid Losses

Automobile Liability

Months of Development

Accident Year	12	24	36	48	60	72	84
1980	2.11	2.77	3.90	5.04	5.91	6.49	6.94
1981	2.20	2.83	3.84	4.98	5.85	6.40	
1982	2.21	2.82	3.86	4.92	5.70		
1983	2.10	2.55	3.59	4.66			
1984	1.89	2.39	3.44				
1985	2.10	2.51					
1986	1.90						

Development Factors

1980	1.3117	1.4061	1.2929	1.1735	1.0988	1.0682	
1981	1.2903	1.3546	1.2965	1.1749	1.0940		
1982	1.2793	1.3668	1.2734	1.1585			
1983	1.2132	1.4065	1.3005				
1984	1.2611	1.4422					
1985	1.1930						
1986							
Tr Avg	1.2609	1.3931	1.2947	1.1735	1.0964	1.0682	
In Avg	1.2567	1.3945	1.2907	1.1689	1.0964	1.0682	
Avg	1.2581	1.3952	1.2908	1.1690	1.0964	1.0682	
Wt Avg	1.2294	1.4124	1.2916	1.1643	1.0949	1.0682	
4 Avg	1.2366	1.3925	1.2908				
Wt 4 Avg	1.2190	1.4185	1.2916				
Selected Factor	1.2366	1.4185	1.2916	1.1690	1.0964	1.0682	1.0682
Cumulative Selected Factor	3.3134	2.6795	1.8889	1.4625	1.2510	1.1411	1.0682

EZ INSURANCE COMPANY

EXHIBIT 37

ESTIMATED ALAE RESERVES

PROJECTED ULTIMATE METHOD

ACCIDENT YEAR	(1) CURRENT RATIO	(2) SELECTED FACTOR	(3) ULTIMATE RATIO	(4) ULTIMATE LOSSES	(5) ULTIMATE ALAE	(6) ALAE PAID TO DATE	(7) UNPAID ALAE
1980	6.94%	1.0682	7.41%	$10,291	$ 763	$ 677	$ 86
1981	6.40	1.1411	7.30	11,421	833	672	161
1982	5.70	1.2510	7.12	13,148	937	657	280
1983	4.66	1.4625	6.82	15,200	1,037	581	456
1984	3.44	1.8889	6.50	17,214	1,119	437	682
1985	2.51	2.6795	6.72	18,706	1,256	280	976
1986	1.90	3.3134	6.28	22,086	1,387	132	1,255
TOTAL					$7,332	$3,436	$3,896

NOTES:
1. LOSS AND ALAE AMOUNTS IN THOUSANDS OF DOLLARS.
2. COL. (3) = COL. (1) X COL. (2).
3. COL. (4) IS FROM RESULTS OF LOSS PROJECTIONS.
4. COL. (5) = COL. (3) X COL. (4).
5. COL. (7) = COL. (5) - COL. (6).

EZ Insurance Company — Exhibit 38

Incremental Paid Losses and ALAE

Automobile Liability

Accident Year	Months of Development						
	12	24	36	48	60	72	84
Incremental Paid Losses							
1980	3,361	2,630	1,350	918	657	492	351
1981	3,780	2,891	1,485	1,049	785	518	
1982	4,212	3,329	1,810	1,288	897		
1983	4,901	3,963	2,123	1,471			
1984	5,708	4,560	2,431				
1985	6,093	5,079					
1986	6,962						
Incremental Paid ALAE							
1980	71	95	120	130	111	84	66
1981	83	106	124	145	126	88	
1982	93	120	148	162	134		
1983	103	123	168	187			
1984	108	137	192				
1985	128	152					
1986	132						
Ratio of ALAE to Losses							
1980	2.11	3.61	8.89	14.16	16.89	17.07	18.80
1981	2.20	3.67	8.35	13.82	16.05	16.99	
1982	2.21	3.60	8.18	12.58	14.94		
1983	2.10	3.10	7.91	12.71			
1984	1.89	3.00	7.90				
1985	2.10	2.99					
1986	1.90						
Selected	2	3	8	13	16	17	19

EZ INSURANCE COMPANY

EXHIBIT 39

ESTIMATED ALAE RESERVES

ACCIDENT YEAR INCREMENTAL PAID TO PAID METHOD

ACCIDENT YEAR a	PERCENT OF ULTIMATE LOSSES PAID	INCREMENTAL PAYOUT	RATIO OF PAID ALAE TO PAID LOSSES	WEIGHTED PAID ALAE RATIO
12 MONTHS	32%	32%	2%	7%
24 MONTHS	57	25	3	10
36 MONTHS	71	14	8	14
48 MONTHS	80	9	13	17
60 MONTHS	87	7	16	18
72 MONTHS	91	4	17	20
84 MONTHS	95	4	19	21
ULTIMATE	100	5	22	22

ACCIDENT YEAR	UNPAID LOSSES	RATIO	UNPAID ALAE
1980	$ 532	22%	$ 117
1981	914	21	189
1982	1,612	20	315
1983	2,742	18	502
1984	4,515	17	752
1985	7,534	14	1,042
1986	15,124	10	1,490
TOTAL			$4,407

1986 CASUALTY LOSS RESERVE SEMINAR

2C/6D - INTERMEDIATE TECHNIQUES II

Moderator: Sheldon Rosenberg, Vice President & Actuary
Continental Insurance Co.

Panel: Nolan E. Asch, Vice President & Actuary
S C O R Reinsurance

Aaron Halpert, Senior Consultant
Peat Marwick Mitchell & Co.

SHELDON ROSENBERG: This session is designed to pick up from Intermediate Techniques I without much overlap and we think we'll accomplish that. We hope to cover a lot of ground today. I'll review with you briefly some of the issues we intend to address, and I'll try to set the stage as quickly as possible given the amount of material we intend to cover.

My name is Sheldon Rosenberg and I serve as Vice President and Actuary at Continental Insurance Co. Joining me on my left is Nolan Asch and to my far left is Aaron Halpert. Nolan is currently Vice President and Actuary at SCOR Reinsurance Co. with responsibility for both loss reserving and pricing. From 1973 through 1979 Nolan held a variety of actuarial positions with C. G. Aetna now part of Cigna. From 1979 through 1982 he was Pricing Officer for Security Insurance Group and from 1982 through 1984 he served as Vice President of Worldwide Casualty Underwriting for AFIA Worldwide Insurance. That was prior to joining SCOR in 1984. Nolan is a Fellow of the Casualty Actuarial Society and a member of the American Academy of Actuaries. He holds a B.S. Degree from Columbia University and a M.B.A. from Tulane.

Aaron Halpert, on my far left, is a Manager of the Casualty Actuarial Consulting Group of Peat Marwick Mitchell & Co. In this capacity Aaron has had extensive experience in evaluating loss reserves in support of financial audits and in pre-acquisition evaluations. Prior to joining Peat Marwick & Mitchell, Aaron was an Assistant Manager with the Insurance Services Office. Aaron holds a B.S. Degree in Mathematics from Brooklyn College and received his A.C.A.S. designation from the Casualty Actuarial Society in 1983, and is a member of the American Academy of Actuaries.

As I mentioned earlier we hope to cover a lot of ground. We have outlined six issues with respect to loss reserving that we hope to address. Time may not allow us to cover all of these issues, but we'll hope by pacing the session we will get through them all. The six issues in the order that we intend to address them are as follows: 1) The need to segment and realign data in setting loss reserves, 2) Testing loss reserve models against actual results; 3) Fitting and interpolation techniques; 4) Tail factor estimation techniques; 5) Earned but not reported premium estimation and; 6) Expected loss ratio techniques. At your places you will find a copy of the overheads that we plan to put up during the talks. They are labeled 1-1, 1-2, etc. for the first issue, and then the second issue will begin with 2-1, etc. That should correspond to the six issues in the order that we hope to address them. If I may I'm going to ask Nolan Asch to begin our discussion with his thoughts on segmenting data.

NOLAN ASCH: Thank you Shelly. Good morning. I would like to begin the section on segmenting and realigning data with a very simple loss reserving situation. The situation relates to a firm that has always written the same portfolio of business. It has always set its IBNR reserves using traditional actuarial triangular loss development techniques. Slide 1-1

shows the history for this firm. If only the real world were like this. It is a very stable pattern with very stable resultant IBNR. Its total premium volume is also stable throughout the exercise; I wanted to get a little bit of a reaction. This is a perfect situation of a firm that never has any variation in its loss development. The IBNR using triangular techniques is almost transparent. That's shown right down here in the IBNR formula. You have a first to ultimate development factor of 3.0. Every year starts out at 1. It doesn't matter in this whether its thousands, millions or billions of dollars that you're talking about -- the scale is going to be the same. The factors are perfect and we're in a perfectly stable world. We have required IBNR of 3.5 million, billion, thousand, what ever you'd like. We're also at calendar period December 1984.

On Slide 1-2 one more calendar year has passed. A year of the world has gone on and we add more diagonal of entries into our database. We're still in a perfect world. Everything is perfect. After viewing this slide I'd like you to think about it in a real world situation and what your opinion is as to the proper IBNR at 12/31/85.

We then go to the next year of development on Slide 1-3. We have now gone all the way through to the end of 1986. Now we're up to today and I want to draw your attention to a slight typographical error that was made here. That 1.6 was really meant to be 1.5. We may go back to that later; it's not as trivial as it looks. Whether it's 1.5 or 1.6, I'd like to see a show of hands from all of our brave reserving actuaries or reserving analysts as to how many people think the reserve should stay at 3.5 units through 1985 and 1986.

Lo and behold I've fooled you. Now we're going to look at Slide 1-4, which shows that we do not really have one homogenous portfolio. We have a portfolio made up of two different subsets. These two subsets might be called short tailed business and long tailed business. I'm calling them Subset A and Subset B. What I didn't tell you up until this point is that up until 1984 the company constantly wrote 50% Subset A business and 50% Subset B business. In 1985 and 1986 it changed its portfolio to 100% Subset A business; but the loss development hasn't had time to reflect any of that. The portfolio has changed but the loss development hasn't. That little typographical error was the subject of a debate we were having when putting together this presentation about whether we should say that that development was really 1.5 or 1.6. If the development followed the new portfolio pattern perfectly it would go to 1.6. That would be the only hint that anyone doing the traditional retrospective -- I'll emphasize the word retrospective again -- IBNR technique would have that anything was changing at all. But on a prospective basis you see that you really have Subset A business and Subset B business. We call it automobile and general liability. This one is really a primary example and the loss development factor of 3 and 2 you had before really was a result of a 50/50 averaging of two different loss development factors. As is often said the whole is

no more than the sum of its parts. Again, simple IBNR techniques. Now that you know that you really have two portfolios and you know the changing distribution of business among them, the traditional method would give you exactly the same IBNR result. The segregating data method which would break up your portfolio into two subsets, look at it, weight it by the amount of either losses or exposures - I don't want to say premiums that are in these two subsets - results in a situation where in 12/85 you have a 28.5% higher IBNR reserve appropriately. And at the end of 1986 you have a 50% higher IBNR reserve, appropriately. I've mislead you intentionally. Let's look at another example on Slide 1-5 that shows a slightly different version of the same story. We again have two subsets of data. Suppose one of the subsets was extremely long-tail business. We can call this business medical malpractice or products liability; we could call it reinsurance just to keep it simple. The other subset we can call primary or basic primary auto liability. Here's a situation of a company with the same data -- mathematically it would work out, and it has the same combined loss development factors. In this cast the company has historically written 90% of Subset D business and 10% of Subset C. Then they change in 1985 and 1986 to writing just 80% of Subset D business and 20% of Subset C - not a major shift in the distribution of business. But given the variability in the loss development factors (I've tricked this to work out nicely and smooth), you get exactly the same indicated increases in the IBNR reserve.

The point I'm trying to clearly and strongly dramatize here is that it is fine to do triangulations. In the basic techniques session you learned how to set up loss development triangles and how to go through the exercise. That's all very good. But another thing I'm trying to make a point of very strongly is that you need to go beyond that. In going beyond that I'm talking about segmenting your database along certain dimensions. By the way, just to give you more of a shock, let's look at this same example and assume that the company didn't go from 90% Subset D business to 80% or from 10% Subset C business to 20%. Let's say it went suddenly from 10% Subset C business to 100% Subset C business in 1985. Any brave souls care to venture a guess as to what the IBNR reserves should be at year end 1985? Any voters for going from 4.5 to at least 6? 7? 8? 9? 10? 11? If you're into calculations you'll find that the IBNR reserve should be 12.5 million or billion. And if you run the calculations through 1986 the appropriate IBNR should be $19.25 million or billion. The point I'm trying to get at is that as a practical matter, we have some pretty interesting and extreme cases. We have people suddenly shifting distributions of business, suddenly writing something very different.

I will just give you one real example of the recent past. Any lost reserve analyst for one of the primary firms who rushed headlong into reinsurance and E&S business in the late 1970's and early 1980's would, I think as a certainty, have uncovered some very disturbing trends had he or she taken this approach of segmenting the data. I don't want to name any particular examples but there were some examples of people not realizing just how

extreme their loss development had changed when they went into the reinsurance or excess and surplus lines from a nice simple stable property primary area. But to me it is a basic and simple dimension to loss reserve analysis for firms of any size and operation. What I'm dramatizing here is the importance to loss reserve specialists to look forward as well as backward when establishing IBNR reserves. From a retrospective analysis there is absolutely nothing wrong with the $3.5 million outcome of the first example. My point was to show you how, even under ideal theoretical conditions, you absolutely need to understand any changes in the nature of your portfolio. Naturally the more sudden and massive the shift in your portfolio, the more important such dichotomies become. Slide 1-5 illustrates that the greater the development pattern variance between the subsets, the more important and sensitive your results are to even a minor shift in the distribution of your portfolio. Up to now I have tried to demonstrate to you to the value of segmenting your data instead of looking at your loss triangles for a whole portfolio or a whole line of business. You might take something you thought was homogenous and break it down into a finer detail to see if something is going on.

Let's go from the theoretical to the practical. Slide 1-6 has what I would call an axiom. "Always, always", in my opinion, search for subdivisions related to possible causes for variable loss development. I'd also underline the word causes. What we're really after are causes. When you're looking at loss development you're looking at effects; you are looking at the outcomes or the symptoms of the disease. You're not really identifying the cause of the disease. Let me make it clear right now that I'm not advocating subdividing your data along all of the dimensions shown on Slide 1-7 simultaneously. You can't subdivide data in all sorts of detail. The only constraints you have of course are your data processing capabilities, your imagination and credibility constraints. Without those 3 things to worry about you could get data by policy if you had good enough data processing capabilities and credibility constraints were done away with. There are many, many different dimensions that you could analyze. This is just a very, very, sketchy outline of some of the subdivisions that one could deal with. What I'm trying to get you to do is to go back to your company and think a little creatively. If you're a personal auto writer, and I think some of you do this, there may be one or two states which represent maybe 10 or 15% of your country-wide volume. Instead of looking at triangles of auto liability country-wide, the company writing a great deal of auto would probably want to look at, if it's a west coast company, maybe California personal auto. If it's an east coast company, maybe New York experience. The point is, you have to go back and look in dimensions that are appropriate for you, for your company.

Another possible dimension one could go along is production sources. There's a real differentiation I think, between loss development pattern for the same business, whether it's produced by MGA's, agents, brokers, or by direct writers. A number of you, especially the large companies, have

very substantial portfolios in many of these distribution sources; you might find something very interesting. Again, I'm not trying to simultaneously subdivide data in 8 dimensions. But what I want to get you thinking about is, know your company. Or if you don't know your company, I guess the real message of this little sermon is that you had best get to know what's going on inside your company outside of the loss reserve area.

Another area you might want to look at is by subline. I went all the way to Z before but I'll just name some of the ones that I think are more interesting rather than give a long slide. For automobile, you might want to look at non-standard auto versus standard auto. For General Liability, you might want to think about your legal liability, composite rated risks, municipalities, day care centers, special association programs, large accounts or national accounts department. Your umbrella business, or products liability. In Workers' Compensation you might want to subdivide by hazard group or by governing class. You might want to subdivide by Jones Act or USL&H policies or Wet Casualty policies from other Workers' Compensation policies. You might very much want to look at trucking as a separate and unique area.

Another area that I want to digress to specifically concerns aggregate limits policies. I'm going to give a little talk about that as an aside just to take one dimension and think about what you might do. With the implementation of the new ISO CGL program, for some of you as a practical matter coming along in 1987, both the claims made and occurrence forms of this policy will transform to aggregate limits policies. That means that some excess and umbrella policies related to these primaries might become aggregate excess of loss contracts. Loss reserving for these situations can be treacherous. By nature, one expects no losses at all until the aggregate deductible is exhausted. This may take quite a long time depending on the risk and the aggregate underlying policy limits. Once the deductible is exhausted, the excess losses tend to mount rapidly within the layer.

Let us imagine a risk that develops $1 million a year in ultimate aggregate losses each policy year over a 10-year period, at $100,000 per year. If under the new CGL reinsurance becomes $500,000 aggregate excess of 500,000 aggregate, then there are no reinsurance losses for the first 5 years and then $100,000 of reinsurance losses in years 6-10, generating a total limit loss of $500,000. If the policy remains $500,000 excess of $500,000 per occurrence - the traditional approach, no reinsurance losses would ever develop. However, in the earlier said case the reinsurance loss development would show nothing for 5 years. Without being aware of the policy changes and appropriately segregating your data, the loss reserve analyst would completely miss this emerging liability. That will encourage 5 years of underpricing as well as underreserving the product. If it was a $750,000 aggregate deductible, there would be 7.5 years of ignorance. The

lower the attachment point the more important the impact of moving from a per occurrence coverage to aggregate coverage.

The other major variable to worry about is the size of risk of the exposures involved. If aggregate deductibles can be characterized as the bad news for loss reserves, then aggregate limits may well be the good news for loss reserves. Also, remember aggregate limits will now apply for the new CGL for both primary insurers and reinsurers on both the claims made on the occurrence forms. Once the aggregate limit is reached, then barring legal expense, there's no more potential for future losses. In the example previously stated, the incurred loss pattern which you would see is on Slide 1-8. Knowing the nature of the coverage, the IBNR for losses should be zero after year 10 and should always be capped at a maximum of $500,000 for ultimate losses from inception. If these policies are not grouped and analyzed separately, all sorts of overstatements and understatements are possible. In the example here, to try and maybe clarify it a little better, the primary company would not have a problem. But, the reinsurance company would have 5 years of no losses. Then 5 years of losses like we see on Slide 1-8. First they would underreserve if they didn't understand what was going on. Then they'd look at this pattern and say "Oh my God, we've got a problem" and set up in year 10 a nice IBNR reserve, when in reality as of year 10 they have no more possible future liability. You would have underreserving years 0 through 5, overreserving somewhere between year 6 and 10. And if you never adjusted after year 10 you would always be overreserved because your triangles would always generate some IBNR, when there really should be no IBNR after that.

I think what I've tried to uncover here is that it might be interesting to subdivide your data and segregate it. You might want to talk to people outside the reserving area, such as underwriters, pricing actuaries and management. There's always a dilemma though in segregating your data and that is: how small can I allow my homogeneous subsets of data to become before they're too small to be credible? That's always the question. If things get too small, you lose a lot of the credibility in the database. I happen to confess a very strong bias on this point. Whereas some people would simply not subdivide data beyond a certain point assuming no data displayed is credible, I am usually relentless in subdividing data into the smallest unique and homogenous subsets for analysis. Later on I reserve the right to ignore what I see as being "not credible." I try and make certain that I look first.

There are several reasons why I have this bias. In my experience, countless times a small subset of premiums in a portfolio ultimately generate a very large percentage of losses, and with a very different loss development pattern than the rest of the portfolio. It's the needle in the haystack, but you've got to find the needle. Many times a small portfolio will show a more stable, predictable and unique loss development pattern year after year than a far larger portfolio. Early in my career I remember

a portfolio of auto business in one state whose premium always hovered around $150,000. It was not credible by standard actuarial techniques. Yet, year after year for decades it produced a 40% loss ratio with a constant loss development pattern. Later learned the true cause: the selection and professionalism of our local agent. If we aggregated 10 years of experience it would be deemed highly credible. However, we never deemed it credible. In my experience this phenomenon is repeated time after time over the years. When loss experience is bad, managements that are not disciplined will shout "credibility" at their actuaries. When loss experience is good they forget all about credibility issues. In my judgment credibility is one of the most abused words that non actuarial insurance executives use in debates with actuaries. It's not a rigorous response but I sometimes have retorted that the losses are perfectly credible to the claimants who demand and receive payment.

There is logic behind stating that a handful of extremely large losses can distort your database and results; this is the exclude large losses argument. I say yes there are certainly times and places where you should exclude large losses from your database. However, these losses should be out of the ordinary order of magnitude, not predictable as to frequency, and exceed normal policy limits. Often we find firms excluding losses above X dollars as large losses where they write thousands of policies every year for higher limits than X, suffer a goodly number of losses of this size every year, and often can predict with some degree of accuracy the number of claims and/or dollar amount of the loss in excess of the threshold. People may be deceiving themselves by excluding these "large losses from their IBNR formulae and treating them separately. The higher formula IBNR outcomes generated from keeping these large losses may not be pleasant but they might be more accurate predictions of ultimate loss depending on circumstances.

SHELDON ROSENBERG: Fortunately we have a little more time left to go to the next 5 issues. We rehearsed this, too. The second issue we intend to address is testing our models against the actual results.

NOLAN ASCH: Topic 2 - Testing your model against actual results. Feedback is a necessary element of any information system. Once you're finished with your reserve analysis and your IBNR reserves are established, how can you test your methods and/or decisions to see if your methodology and/or result was sound. In many lines of insurance it may be many years before all estimates, or even the majority in dollar terms, translate into final closed paid claims. In my opinion, you must seek IBNR tests that avoid circular reasoning. I first became aware of the problem in late 1985.

Suppose Firm A decides to establish the appropriate IBNR reserve and increases their reserve dramatically. Firm B, facing the same liability estimating problems decides not to. It's not that uncommon a decision. Using the loss reserve test of the NAIC (IRIS), Schedule O and P of the

annual statement, the SEC test on 10K, or any other standard test. Firm A, the one that put up the proper reserves would test out to have less adequate loss reserves than Firm B, simply because they decided to increase their loss reserves appropriately in 1985, all other things being equal. In this plausible case, in my opinion, precisely the opposite conclusion should be drawn.

The test I'm going to illustrate here does not use IBNR to test IBNR. It is not overly difficult to establish. It can be used on either an accident year, policy year, or underwriting year basis - I've used underwriting year here. You can perform it on any appropriate subset of the data you choose. (Here I happen to choose one firm's actual facultative casualty reinsurance portfolio.) It can be used both retrospectively and prospectively. The data can be adjusted by the user in any way he sees fit for large losses, unusual years, industry cycles, inflation, frequency trend, or any other variable. The simple premise is that any loss prediction method must predict paid and case outstanding losses and the pattern at which they emerge. This technique merely compares theoretically predicted losses, excluding IBNR reserves, to actual historical losses excluding IBNR reserves retrospectively, and makes detailed predictions of future years incurred losses. Both this history and later future predictions can be compared to actual outcomes to test either intuitively or scientifically the method's outcome. Is it consistently too high or too low? Is its accuracy variable over the years. Is one year out of tune with all others? If so, why? Is it unbiased? A number of techniques, including the standard triangular loss development techniques, easily fit into this model. You have predictions of ultimate losses for each year and a chosen detailed pattern of loss development. All you need to do is compare these quantities to the actual historical losses excluding IBNR retrospectively. The future forecasts are sometimes frightening but they bring you face to face with exactly what you must accomplish to have an ultimately accurate calendar year IBNR reserve.

Slide 2.1 is an example using some live data. We start out with the cumulative inception to date incurred losses at 12/85 by underwriting year for a reinsurance firm's facultative casualty portfolio. These losses are excluding IBNR. It isn't written there but you should underline that thought - there's no IBNR in here. These losses are paid plus case reserves. Slide 2 shows the ultimate factors used to establish the firm's actual December 1985 IBNR reserve. The column labeled inverse percentage is the inverse of the cumulative loss development factor. If the second cumulative to ultimate factor is 2, (and it's almost exactly 2 - it's 1.9733), then we're saying that the inverse, or 50% of the ultimate losses for any underwriting year are expected to materialize after 2 years have elapsed. Also, make note for future reference as we are going to go through a number of related slides here: Column 3 is the cumulative inverse percentage; the last column is the incremental. That's the percentage that

shows up in the first year of development, the second, the third, the fourth, the fifth, etc.)

Slide 2-3 combines the incurred losses for each year with the IBNR. When I say IBNR here, I mean the ultimate IBNR using our actual losses and those actual loss development factors we just had in the last slide. We then take the case incurred losses to date, plus the IBNR, and we have ultimate IBNR, and we have your ultimate estimated losses.

Slide 2-4 goes one step further and compares the ultimate losses from Slide 2-3 with the premium. I didn't get into a concept which will be talked about by Aaron later: Column 2 should be ultimate premium. In a reinsurance company that's a big distinction. The ultimate premium is used to generate what's called an ultimate loss ratio. Very important, these ultimate loss ratios are derived from the formula. They are not derived from judgment, nor from assumption, nor are they forced. A company looking at these ultimate loss ratios would be very satisfied with their facultative casualty reinsurance operation for 1980 and prior. They did fantastically well.

Slide 2-5 shows one of the first predictions we make. At the time, it was a prediction of the actual losses excluding IBNR for the 1984 underwriting year as of year end 1985. The prediction, very simply, is the ultimate 1984 underwriting year losses times the percentage that your model says will have emerged after two years, which is about a 1/2. We have predicted that the 1984 underwriting year case incurred as of 12/85 from this model would be 11,553,712. You now can compare the actual historical losses to your models prediction. Looking back at Slide 2-1 shows the actual emergence was $6,067,682. The model that developed that IBNR predicted $11 million.

Slides 2.6 compares the actual calendar year and case incurred losses with the model's predictions Has the model been consistently biased? Is it always too high or always too low? The difference does show up. The theoretical predictions have been running higher than the actual emergence, which makes me happy. You see, not uncommonly, one of the biggest variances, as usually is the case, is in the most recent year. This is always the most difficult year to predict no matter what method you try to attack it with.

Slide 2-7 gives the exact same type of comparison. This time we're comparing theoretical underwriting year inception to date case incurred losses to actual case incurred losses. The grand totals are exactly the same because the portfolio is exactly the same. The theoretical result is the same. Now you can see some variances in the way things are happening by underwriting year. Note that in no case is the theoretical result less than the actual except in 1985, which is really a straw man. You have a nice consistent pattern of the actual historical losses being less than

your theoretical models prediction. So far we've only looked backwards; I like to look forward. I'm kind of biased that way - I like to look forward. But can we look forward? Can we use this model to make advance predictions of future calendar years emergence of losses? The answer is yes.

Slide 2-8 gives you a very simple example of how that can go. On Slide 2-2 we saw incremental expected loss development of 12.62% of ultimate in the third year. If the loss development pattern of the model is correct and the 1984 year ultimate losses will be 22,797,380 (which is what your model has predicted), and the IBNR based on these factors is correct, then the model clearly predicts exactly $2,877,029 in incremental case incurred losses excluding IBNR during the 1986 calendar year for the 1984 underwriting year. The same exercise for every underwriting year can generate predictions for the 1986 calendar year or any future calendar year through the year 2,000 or as far as you want to go, in its totality.

The next part of our discussion is going to concern interpreting and analyzing the results of the model. We have seen actual inception to date losses of 93,490,000 and theoretical losses of 107,932,000. The numerical difference is not significant. What is significant is the percentage difference. We are saying that if we had used the model's loss development factors to calculate IBNR, then the actual loss history of the company would have generated an indication of a possible redundancy of 15.4%. Either that's correct or there is another explanation which is possible- the actual emergence is going slower than your model says.

Let's look at Slide 2-10. In both cases suppose the actual first year losses are 1. The second to ultimate factor of 2 that I've used throughout here is sound, generating a prediction that 50% of the ultimate losses are apparent after 2 years. I have two different approaches I could take to set the first to ultimate factor (which is always the toughest part._ In case 1, I use a first to ultimate factor of 10. In Case 2, I use a first to ultimate factor of 3. Obviously in Case 1, I'm being far more conservative. Given the situation with actual losses of 1, a loss development of 10 or 3, ultimate predicted losses of 10 and 3 for the two cases and the resultant, the inverse factor, then I am predicting incurred losses for the first year of $1.00 under both models. Obviously this is not an ideal situation.

We go to Slide 2-11 and we see the situation resolving itself. After 2 years we now have actual losses of 2. We have a consensus loss development factor of 2 that we're very happy with. The predicted ultimate losses of both models now converge as they should to around 4. Now you're getting the situation that you would hope to get. Case 1 is looking too conservative and Case 2 is looking too liberal.

Slide 2-12 illustrates this point a different way. The second year actual incremental losses are $1.00. The second year cumulative inverse factor is 50%. The incremental factor given this model now is forced, because we used 1/10th in Case 1 and 1/3 in Case 2. Now the weakness of the test in year 1 is disappearing because the models have to start facing reality as they always do in this system. The second year incremental is 40% and predicts incremental 2nd year losses of $4. Case 2 is predicting incremental losses of $0.50. Here, once again you're seeing that it turns out that the Case 1 situation is too conservative and the Case 2 situation is too liberal. Will the model quickly respond to appropriately to emergency and large IBNR inadequacies?

Let's go to Slide 2-13. What if the 2nd year losses had emerged as $4.00 instead of $2.00? Obviously we're having much more loss development here. While Case 1 was too conservative before, we are now dealing with a tougher loss development situation. The actual losses didn't come out the way we just said they did - they came out much worse. It looks as if the Case 1 situation was actually appropriate; it's right on target. Case 2 however, turns out to be 1/8th of its apparent proper value for the 2nd year of loss development.

Let's go to Slide 2-14 and really scare some people. What if the actual losses turned out to be 8? This is a situation of loss development bad enough to make even the first model look too liberal. It can't happen. The indication here is that even Case 1 is testing out only as 1/2 adequate based on year 2 emergence while Case 2 is testing out as 1/16th adequate based on year 2 emergence. Here I want to really caution everyone against overreacting to the results of these tests. They can be very shocking, especially if you're looking at one calendar year or one underwriting year only. We're looking at 1 years data and emergence. If for many calendar years, for many underwriting years, repeatedly over time these models persist repeatedly in one direction, then I think a bias in your model is being indicated.

I will now summarize what I call the Golden Rule in using this particular type of test. The greater the percentage by which your theoretical models predicted case incurred loss consistently exceeds the actual observed loss over a credible time period, the greater your model's indicated reserve redundancy. Conversely, the greater the percentage by which your actual losses historically exceed your theoretical model's predicted losses consistently over a credible time period, the greater the indicated inadequacy of your model's reserve values.

There is a stated caveat surrounding any use of this model in the first year of loss development. I wouldn't place a great deal of confidence in what I see in the first year and wouldn't react to it. The slides bring into focus concretely how this method can be applied to real world situations. Here I can trace how my historical losses by underwriting year

or by calendar year, compare to my chosen model. I also can compare past calendar year losses to the models theoretical predictions. Most I can compare the entire inception to date losses for the portfolio to my model's predictions. Also, I can predict a prior future years incurred losses and test them versus actual, and we can do this in real time. For example, we can do this in 1986 when you have to set the 1986 reserve, to test your formula for the 1986 reserve.

I've often compared setting accurate ultimate IBNR reserves for long tail business to successfully launching a rocket to the moon. This technique allows midflight corrections that are essential. You are never going to accurately predict the losses for reinsurance that will be out there in 25 years. What this model will allow you to do is look at your actual emergence, compare it to the model you are using for the IBNR and say, should we make a correction up or down? Where are we missing it? What's going awry? It also will highlight systematic or unsystematic discrepancies between your model and the real world result you're trying to predict. Also, this IBNR model is going to be objective, and you should be able to ask yourself for any IBNR model, how am I going to test this model against something tangible without any circular reasoning. If you have no answer to that question, I submit your IBNR reserving system has no effective feedback, monitoring or self correction system. That would be a significant flaw or drawback to me in any IBNR system.

SHELDON ROSENBERG: Okay, thank you Nolan. I'm going to give you a chance to rest a little bit and turn the microphone over to Aaron to discuss fitting and interpolation techniques to treat intermediate data points when your historical data is annual.

AARON HALPERT: Thank you Shelly. As Shelly has mentioned the next topic on our agenda is fitting and interpolation techniques. In the basic session you have learned how development factors are calculated and applied in the general loss development scheme. Usually these factors are calculated and applied to experience evaluated at year end. Yet the loss reserve analyst will often be called upon to evaluate his or her company's loss reserves at interim points, such as, at the end of the 2nd quarter. How is this situation handled?

One way to evaluate reserves as of June 30th, is to reconstruct your database so that evaluations of each exposure period, (whether it be report year or accident year) end on June 30th. In other words you would have a 6 month evaluation, an 18 month evaluation and so on. Often though, such a reconstruction of the data will not be readily available. Perhaps the only additional data available beyond the year end experience is the current June 30th evaluation of incurred losses for each accident year. In this situation, interpolation techniques are very useful.

As an example of this technique, consider the development factors on Slide 3-1. The loss development factors in Column No. 2 were calculated from Workers' Compensation, accident year experience compiled by the Reinsurance Association of America. To facilitate curve fitting these cumulative loss development factors have been converted in Column 3 to the implied percent reported by inverting each factor. These figures indicate that for example, at the end of 12 months, approximately 15% of an accident year's ultimate losses have been reported. We can plot the percent reported at each evaluation, as indicated by the squares on Slide 3-2. The X axis here is the maturity level and the Y axis tracks the percent of ultimate loss reported at each of the maturity levels. The percent reported figures on Slide 3-1 were fitted to a logarithmic curve to yield the smooth progression on Slide 3-3.

On Slide 3-3 the development factors in Column 2 are the original factors; Column 3 is the actual percent reported. Column 4 represents the smoothed version using the logarithmic curve. The equation for that curve, by the way, is at the bottom of the slide. It should be noted that for evaluation points prior to 12 months, when some of the losses have not yet been incurred, this curve would not be appropriate. This curve serves only as a technique to interpolate between given points. If we can go to Slide 3-4 we see the regression statistics. For those of you familiar with these regression statistics, you can see the fit is quite good.

This smoothed curve now allows us to interpolate between year end points. For example, Slide 3-3 shows that at 18 months the curve indicates that approximately 21.3% of ultimate losses have been reported. Stated in terms of development factors, this implies a cumulative loss development factor of 4.6019. Note that up to this point we have used nothing more than the year end data. Specifically we haven't used the June 30th evaluation--the most recent evaluation at all. What can we do with the additional six months of experience?

Consider Slide 3.5. The losses other than those appearing on the last diagonal are the RAA experience that we talked about earlier. The last diagonal represents a hypothetical additional six months of experience through June 30th. We are now in a position to compare the expected development which is derived from the smoothed curve with the actual six month development. When this comparison indicates a significant variance similar to the issue that Nolan had raised a minute ago, then additional analysis would be necessary. Slide 3-6 shows that in the example we drew up, the comparison yields favorable results. In other words, the actual development tracks closely with what would have been expected by using the curve fitted to year end experience. The expected development factors are therefore modified only slightly, yielding the revised development factors in Column 7. These factors can now be used and applied to determine the indicated reserves as of June 30th. In other words, these cumulative

development factors can now be applied to the incurred losses for each accident year as of June 30th.

To summarize, we have used existing development information derived solely from year end experience to evaluate reserves at an interim period. I should point out that as part of the year end analysis we have to select an appropriate tail factor, i.e., a factor to estimate development beyond the most mature experience available. How this is done is the subject of our next discussion. Let me preview that discussion by noting that the smoothed curve we have selected here to interpolate was only one of many possibilities. After we stop for a few moments for some questions on the topics we already presented, we'll discuss some of these other possibilities.

SHELDON ROSENBERG: We're going to return in just a moment to our fourth issue tail factor estimation. Does anybody want to raise any questions from the first three issues addressed?

QUESTION: My name is John Burvelle. I'm from Tillinghast in Bermuda. I would like to ask a question of Nolan. You were talking about reserving in cases where you have aggregate limits. Do you collect ceding company information on reinsurance coverage of aggregate limits in order to reserve for them?

NOLAN ASCH: The examples are all facultative. Facultative yes, treaty no.

JOHN BURVELLE: So you go to the ceding company and insist on tying your information to aggregate limits in order to assess your ultimate liability?

NOLAN ASCH: When we have facultative, of course, it's a one-on-one off transaction. We know precisely what sort of coverage we're offering. In a facultative submission it's very clear, each and every submission, we're blessed with some real good data processing, I think. We've got a little check mark -- aggregate limits, yes/no. When someone says it's an aggregate limit situation and someone says claims made; we go claims made, yes/no. And again, we're prepared to develop databases along those dimensions. Another thing that's important even in the treaty side. We have written a number of treaties. Very few when compared to many other reinsurers. But we have written a number of treaties with aggregate deductibles. In some cases those treaties are extremely large and stand alone. I don't need a database. I know treaty "X" where we might have millions of dollars in premiums and millions of dollars of ultimate losses is an aggregate treaty, excess of an aggregate deductible. In some cases these treaties come with warranties. There will be no claims presented for 2 years, or 4 years, or 8 years. I look at it contractually in certain treaties. I think the industry has a number of treaties out there that are very, very large. Tens of millions of dollars per treaty where you can analyze it that way.

JOHN BURVELLE: You mention about excluding large losses. I wonder if you might just expound on that a little bit. How would you determine the size of the large losses to be excluded from development patterns? And how do you handle these losses and potential development?

NOLAN ASCH: In my opinion I think that it is done far too frequently. The way I would decide would be, let's take a million dollars as an example. If you're a company that's excluding all losses over a million dollars, severity is large. How many policies have you written year after year for a million dollars limits or higher? If the answer is none then you're right in taking out those million dollar losses. The answer if you write thousands of policies every year for a million dollars of losses, is that I don't know that it's really so unusual to have a million dollar loss. I'll go further. You should also say: how many claims have I had each and every year for a million dollars or more. If you have dozens of these large claims, (and some of the giant companies do have dozens of claims for a million dollars every year), then the frequency of those claims is fairly well behaved. I think in many cases companies can predict the occurrence of those claims but because of their magnitude they may still be considered unusual. I guess that would be my response. What to do with large losses once you take them out was your other question. I'd say it's a wide open field. My favorite approach to that is take those dollars of large losses, let's say in excess of a million, and try to get as large a history or as large a database as you can, like the last 10 years of the company. I would then trend and develop those 2 million, 3 million, 4 million losses as if you were rating a policy, come up with how many dollars of excess losses over a million you've had on average over 10 years, and compare that to something like premiums or policies or some exposure base. Suppose on average my excess losses have been about 2% of the premium every year for the last 8 years. Then I would see an IBNR of 2% of premium as appropriate for that sort of thing.

SHELDON ROSENBERG: We can return at the end of the second group of issues and take questions on all six. Don't feel constrained that you have to ask your question now. I'm going to move on to the fourth issue we hope to address, a natural follow-up to interpolation techniques which is tail factor estimation. If Aaron will lead that off.

AARON HALPERT: So far we have discussed how curve fitting techniques allow us to interpolate between development factors so we can evaluate reserves at mid-term. The curve fitting techniques are also very useful to extrapolate from available loss development experience. For example, how does one calculate a tail factor - a factor to develop losses beyond the point after which no historical experience for the company is available? The logarithmic curves we discussed earlier are not readily available or applicable in this situation. Remember that in the prior discussion we already had a projection of what the tail factor should be by assuming we

knew what percent of ultimate losses would be reported as of 84 months. We're now in a situation where perhaps the only data you have is up to 96 months and we're not sure what the development will be beyond 96 months. To pursue this a little further let's turn to the RAA data that we spoke about earlier.

Suppose that the available development information allows us to calculate development factors for 12-24 months, from 24-36 months, etc. up to the 96 month period. These factors are illustrated on Slide 4-1. Assume for the moment that we have no development experience beyond the 96 months, and we wish to estimate a 96 to ultimate development factor. In a recent paper published in the proceedings of the CAS, Richard Sherman introduces the concept of an inverse power curve of the form "1 + at -b". In Slide 4-2 "LDF" represents the link ratio necessary to develop losses from time period "t" to time period "t + 1". The parameters "A" and "B" are coefficients that are estimated in the regression analysis. One of the reasons that the inverse power curve is selected as a usable curve is that it possesses a characteristic which is essential to obtaining close approximations to actual loss development factors. Consider on Slide 4-3 what happens when we divide the excess portion of a link ratio by the excess portion of the preceding link ratio. (By the excess portion I mean, in other words, if the link ratio is 1.2, I'm talking about the .2). This is commonly referred to as a "decay ratio." Normally this decay ratio will approach unity as the time interval increases. Loss development data often possesses this characteristic.

On Slide 4-4, the inverse power curve was fitted to the RAA factors discussed earlier. In particular, this curve was fitted to the 2nd, 3rd, 4th, 5th and 6th factors in the column marked "actual." These were the points that were used in the fitting. Note that the 12-24 point was not included in the fitting process. While I went through several iterations to come up with the best curve, normally one finds that the earlier development is unlike the pattern one sees in the tail. Generally you would find a better curve fitting, and the regression statistics would be somewhat better by not using the first, or the first and the second points in trying to extrapolate to a tail factor. As you can see the fitted factors indicate that development will continue to be positive even beyond 420 months or 35 years. That's indicated by the .50 of 1% development in the later time period.

If we now accumulate the factors, because remember all the link ratios are one year development factors, then the true strength of this curve is illustrated by observing the similarity on Slide 4-5 between the fitted and the actual tail. Remember that we used no RAA experience beyond 96 months to fit the data. But now if we take a look at what the 96 to ultimate factor is based on the actual experience (the RAA experience, by the way, is probably one of the sole sources of having experience that goes so far beyond the normal tail period), we see that the curve in fact predicts a

tail that's quite consistent with the actual tail from the RAA experience. While the RAA data provides the medium to test the goodness of the fit. In most cases faced by actuaries or reserve analysts, development data beyond 5 or commonly at most 10 years will generally not be available. However, as we have seen, regression analysis can be used to estimate the tail even when only limited data is available.

SHELDON ROSENBERG: The fifth topic we would like to talk about is development of a different kind. Here we're going to discuss development of premiums rather than development of losses. Again, Aaron is going to lead off the discussion.

AARON HALPERT: Consider the next slide 5.1. While this may appear to look very much like a loss triangle, as the title implies, the figures are actually premiums. Yet, as you can see, premiums for this company appear to develop over time in much the same way as losses develop. In fact, if we take a look at Slide 5-2 you see rather stable premium development patterns going all the way out to 60-72 months. This type of development pattern is particularly common for reinsurers for two reasons. First, there are significant accounting lags between the time the premium is first written by the ceding company and the time the premium is reported to the reinsurer. Secondly, reinsurance statistics are normally maintained on an underwriting year basis. Premiums for underwriting year 1985 for example, would include all premiums related to treaties incepting during 1985.

Consider a treaty that is incepted on December 1, 1985. The seeded premiums that will ultimately be tied to that treaty may not even have been written by the ceding company at year end 1985. Reinsurers handle the accounting for these unreported premiums in many ways. Some reinsurers will only book as written premiums those premiums that have actually been reported by the ceding companies as of the statement date. Others will accrue for unreported premiums in the same manner that they accrue unreported losses. This accrual is estimated using projection techniques and now get to the techniques used to project ultimate losses.

As you can see on Slide 5-3 the projection indicates that ultimately approximately $2.4 million in premiums will be written by the insurer for underwriting year 1985, but only $918,000 have been reported by the ceding companies to date. Note that only 45% of the ultimate premiums for underwriting year 1985 have been earned at year end. There are two issues here. One is the projection of what the ultimate written premium will be. The second is what percent of that ultimate written has actually been earned at year end 1985. This percentage, the 45% will vary depending on the distribution of inception dates for a particular company's treaties.

Why do we have to talk about premium accounting? The choice of premium accounting will have a direct bearing on the company's loss reserves. What do I mean by that? Well consider the loss triangle associated with the

premium triangle we just talked about. The losses are on Slide 5.4, and the associated factors are on Slide 5.5. There are no strange things going on here. This is a normal loss projection process. In fact, if we take a look at Slide 5-6, we see that the projection of ultimate losses for underwriting year 1985, for example, totals to $1,498,000. The issue we have to face here, however, is that a portion of this $1.5 million of loss is associated with premiums that have not yet been written, or perhaps not yet been reported to the reinsurer as of year end 1985. Therefore, if the company has decided not to book any of this projected premium, then it follows that the losses that are associated with this premium should also not be reflected in the company's loss reserves.

How do we handle the experience to decompose the pieces into what should or should not be reflected in the company's loss reserves? An approach that can be used to properly match the premium and losses would be to estimate the anticipated loss ratio on an ultimate basis when all the losses have been incurred and all the premiums have been collected. In our example, the projected ultimate 1985 loss ratio is 62.7%. Remember that the denominator in this case, $2.4 million is a projection at 12/31/85 of the ultimate premium that will be earned. This loss ratio could then be applied to reported earned premiums of $918,000, resulting in an ultimate loss figure of approximately $570,000. The IBNR reserve in this case would then be the $576,000 less the amount reported to date of $40,000, giving an IBNR reserve of $536,000. The point I'm trying to make is that the company only books $918,000 in premiums; it would be inappropriate to reflect the full $1.5 million of losses in its loss reserve. Alternatively, if the company chooses to book an estimate of the unreported premium as earned premium, then the ultimate loss ratio we discussed earlier would be applied to the total booked premium to derive the loss reserves. Clearly, if the company is anticipating a combined ratio of less than 100% on the latest underwriting year, the net effect of booking both the premiums and the losses is to increase the company's underwriting profit. As the reinsurance industry has been experiencing an improvement in their underwriting results, this practice of booking anticipated unreported premium has become more prevalent and therefore, one must be tuned into this when reviewing the loss reserves.

SHELDON ROSENBERG: The final issue we hope to address is a discussion of expected loss ratio techniques, and I think it will be from a somewhat critical point of view. We'll start with Nolan on that.

NOLAN ASCH: Thank you Shelly. Yes, I titled this My problem with expected loss ratio IBNR methods. I've got two big problems with expected loss ratio IBNR methods. And before I continue let me modify it a bit by interjecting something. In the first year of loss reserve estimation, particularly for an excess of loss reinsurer, one faces probably an impossible dream to try and correctly predict IBNR on an ultimate basis. The use of the expected loss ratio techniques there, in my opinion, is

probably as good as any other method. Not that the technique is good, but because there is no better method available.

I guess the thrust of my discussion is to say that except for that situation, I have problems with expected loss ratio IBNR methods. My first problem is that they're only as accurate as the assumed predicted loss ratio. My second problem, which is a little less obvious but I think may be even more critical, is that in my opinion these formulas tend to move the IBNR in the wrong direction. What I mean by that is in the case of worsening loss experience the IBNR in the early stages of development will tend to go down when it should go up. Whereas, in the case of improving loss experience, the IBNR goes up when it should go down.

Let us invent a portfolio with only two subsets, A and B. They are of equal size premium and ultimate losses. They ultimately have exactly the same loss development pattern. In the early years of development, first year only, you agree to set an IBNR reserve equal to 100% of premium minus inception to date case incurred losses; you're using an expected loss ratio of 100. Slide 6-1 shows Subset A experience. Here you can see it's the same situation as I had in my earlier discussion -- 1, 1.5 and 3. A nice stable development pattern, everything going the same -- premiums the same size. For year 4, which is the year you're reserving for by your expected loss ratio technique, you only see incurred losses of 0.5. Your IBNR based upon your expected loss ratio technique is premiums times expected loss ratio (which I made 1.0 to make it simple) minus the actual incurred losses. Since the actual incurred losses were only 0.5, you have IBNR of 2.5. However, the hindsight IBNR making, the assumption (perhaps a big one) that the first to ultimate loss development factor of 3.0 is appropriate, probably should be 1.

Now let's go on to the Slide 6-2 which talks about Subset B. Subset B is just like Subset A except Subset B happens to have more losses starting out in the beginning of year 4. The simple expected loss ratio IBNR of 1.5. The hindsight IBNR if the loss development pattern proves itself out (and we spent the whole first section saying that you should not necessarily believe that - but let us assume that you're doing your homework and you know what's in your portfolio and what's not, what has changed over the years and what hasn't - this time everything is stable), would be 3. On Slide 6-3 and we summarize what we've done so far. I've made it work out that the IBNR whether by formula or in hindsight are equal. Even though B hindsight techniques subsets A and B are inappropriately reserved, the total portfolio turns out to be appropriately reserved. It didn't have to work out this way, but I made this case work out this way. Even in this case, I think there's been some harm done. The harm that's been done is that you've misrepresented or misestimated the profitability of Subset A versus Subset B. You've probably given the wrong signal completely. The profitability of Subset A, Line A, Branch A, Production Source A, Manager A, Subcompany A -- anything that you want to call it is greatly

underestimated while that of Subset B is greatly overestimated. The firm under this scenario might be encouraged to grow in Subset B, and shrink in Subset A when exactly the opposite course may be the clear rational strategy.

Let's go on to Slide 6-4 and imagine the same sort of situation; actual accounts or portfolio of equal premium volume. In this case we assume Subset B has initial losses of 2.5 instead of 1.5. The formula IBNR would be 0.5. Now we have the real extreme case that I worry about using the 100% ultimate loss ratio, the IBNR now is 3.0 - 2.5 or 0.5. If we believe our hindsight loss development technique, the appropriate IBNR is 5. You now have a discrepancy taking hold. There is no signal given out under the expected loss ratio technique that the appropriate ultimate loss ratio this year could and will be 7.5 divided by 3. By that I mean incurred losses of 2.5, and future losses of 5. That's an ultimate loss ratio of 250%. Even if you were brave enough to bring that to anyone's attention, you're going to have a hard argument on your hands. My assertion is that the higher the first year incurred losses are the lower the IBNR becomes under this structure. And to me, no matter what, the higher this number is the less I like it, in any situation. That's one viewpoint on the whole subject of expected loss ratio IBNR methods.

Let's go on to look at reported results and see how you may be distorting them. On Slide 6-5 we again have two portfolios of equal premium volume; IBNR is earned premium minus incurred losses. Assume an ultimate loss ratio of 100%. Again, the loss developments are identical. We have the same classes of business, the same portfolios -- no tricks this time-- nothing beneath the surface of water. Portfolio A starts out with incurred losses of 20 and IBNR of 80 for 100% in year one. Portfolio B starts out with incurred losses of 50 and IBNR of 50. In year 2, you can see Portfolio A and B also ending up with 100% loss ratios, even though the incurred losses for Portfolio B are really looking to be deteriorating versus Portfolio A. Now, referencing back the 2.0 development factor that I used in the beginning, let's assume losses double again to reach their ultimate evaluation on Slide 6-6, Portfolio A ended up with a 60% loss ratio, but the published financials gave it a 100% for 2 years. Portfolio B ended up at 150% and the published financials gave it 100% for the first 2 years. I think we can see how these methods could understate the ultimate profitability of Portfolio A and overstate the ultimate profitability of Portfolio B.

The issue I think I'm bringing to light here, and I mentioned it before is that the accuracy of the IBNR reserves really is a reflection of the accuracy of the expected ultimate loss ratio. There has to be some method for realistically testing the reasonableness of that assumption. Once doubted, the ultimate loss ratio, if you use these methods, has to be revisited or revised, or another methodology employed. We're all bedeviled by the difficulty of establishing IBNR reserves (i.e., predicting ultimate

losses, for long tail lines of business), particularly in the first years of development. Again, I find this approach of expected loss ratios as good as the next in the very first year for long tailed situations. However, once data becomes more mature I find this method generally inferior to traditional triangular loss development techniques, or, as I described earlier, the mathematical curve fitting techniques, that Aaron described so well in his presentations.

Let's look at our final Slide 6-7. This one brings to light the point that I just mentioned. We've been assuming an ultimate loss ratio of 100%; most of these methods aren't always that conservative. Here we have a situation where they're assuming the ultimate loss ratio will be 67%. You get into situations, and I've seen then though we didn't have any here, but if this number gets high enough, for example if that number goes over 2 with 2/3 of premiums minus incurred losses being IBNR you'd actually have an indication for a negative IBNR. I think it begins to get at some of the weaknesses. Let's modify my criticism again of expected loss ratio techniques. That's expected loss ratio, not expectations where you're relating it to exposures or policies, or Bornhuetter-Ferguson where you're not going off the loss ratios. Where you do go off the loss ratio I think that these methods are susceptible to these types of criticisms.

SHELDON ROSENBERG: We're going to take questions on any of the six issues. But let me first share an observation with you. I think Nolan correctly points out that the most difficult part of the loss reserve analysis is trying to project the ultimate losses for the most recent exposure period. For example, if you're doing an accident year analysis it would be accident year 1985. The problem only becomes compounded if you take the problem presented earlier where you're trying to project what your reserves should be, at June 30, 1986, for example, in which case you would be projecting accident year 1986 based on six months experience. I think again Nolan pointed out some of the weaknesses of assuming, for example, that you can project accident year 1986 as of six months simply by saying that that will run off at a 60 or 100% loss ratio. Obviously some of the considerations you would have to take into account is what type of rate level activity has occurred at the company. Is it safe to say that the expected loss ratio for 1986 should be very different than it was for 1985 and prior. The points that Nolan made are well taken. You may end up running in the opposite direction than what your incurred experience tells you should. Nevertheless, you're still faced with that inevitable question. You have six months of incurred experience which perhaps if you just projected using historical development factors gets you to one level. If you use the expected loss ratio it gets you to a very different level and what do you do? I thought it would be worthwhile to interject that one additional application that you may find very useful by splitting the incurred losses historically into counts, number of claims, and averages. You'll find that the projection of ultimate counts tends to be a lot more stable than the projection of ultimate dollars. It's the averages that tend to produce a

lot of the variance and fluctuation in the answers. If you take, for example, your reported counts as of six months, you'll find that in many cases could be a very good indicator of what the ultimate counts are going to be. If you're forced then to choose what average claim size should be applied to those accounts, you could take a look at such things as trends in prior years average claim cost and most recent projections of inflation factors to get a separate indication of what your expected ultimate losses should be for that six month period. That gives you a third answer, and in many cases a way to somehow mediate between the answer you're getting by strictly applying a projection factor to your reported losses, and on the other hand just assuming that it's going to run off at some preconceived or predetermined loss ratio.

We'll take questions if anyone has them. I just wanted to make an observation on the second issue we discussed and Nolan has talked about, namely testing your model against actual results. We found a nice technique is to ask what development is implied in our loss development factors? What's going to emerge in the next quarter? We go through the exercise of predicting that in advance, and then doing a comparison to what actually occurs and then trying to understand any differences that appear.

Are there any questions from the audience?

QUESTION: I'd like to address my question to Aaron. One of my observations on Slide 5.2, which was on the earned premium development factors, was that your selections appeared conservative. Maybe I'm missing something here. If the combined loss ratio is close to 1.0 or greater than 1.0, then it would appear that your selections are optimistic. I wonder if you'd like to comment.

AARON HALPERT: There's really a lot more to this story here than one sees on a triangle. Maybe it's even more true on the premium side than it is on the loss side. You have such issues as premium audits; companies changing their patterns in how ceding companies report to reinsurers; changing your ceding company population. Generally, while I agree with you that in times when loss ratios are significantly in excess of 100% this may be optimistic. I think it's generally wise not to react to factors less than .5% or so on premiums unless there is some specific program that you can tie into. Some companies can do this. They know, for example, that the agents or the brokers will not submit final submissions on premiums beyond 48 months or 60 months (so that you could actually pickup a predetermined additional premium.) Where your only evidence is some of the sketchy numbers you've seen and they hover around 1, I think it would be prudent to use a 1 as a projection factor there.

I was asking my question because of an experience I had recently. It was with an insurer with loss ratios in excess of 250%. And in that case the premiums had to be looked at very carefully.

QUESTION: I have a question on properly reserving the excess of aggregate situation.

NOLAN ASCH: I think the only suggestion that I think is almost inevitable to do it properly would be to go to the contracts to take a look at the actual contractual agreement to see exactly what sort of coverage you're giving. Are you talking excess or primary? Then I think you need to see exactly what sort of excess coverage you're giving. Then you need to do a rate making type of analysis so as to predict the aggregate losses that are going to happen to the underlying carrier. As a matter of fact I've done that in several cases in certain treaty negotiations. That takes more data than you get a lot of the time but you have to sort of insist upon. If I'm going to be in excess of $10 million in the aggregate, I've got to see those losses from zero dollars and see exactly what sort of aggregate losses are going to happen. Then I'm able to see how those things happen over time. I guess that's my advice. And it's a warning not to lump especially big cases in with everything else.

QUESTION: I'd like to start with a question for Aaron on tail factor estimation where he mentioned earlier the choice of points was not easy that he was going to fit to. He did not use the 12-24 value in his fitting technique and I wanted to know why? What reason he would think that it would be inappropriate to do that?

AARON HALPERT: I alluded to it a little bit earlier. If you look at the cumulative incurred losses, or the link ratios themselves over a number of periods of time, you tend to see that the 12-24, sometimes even the 24-36 month evaluation, does not follow the general progression that one sees in the later evaluations. More directly, when you try to fit a curve such as the inverse power curve to all of the points you'll see that what you're trying to do is force the fit and you pay the price for it when you look at the regression statistics.

ACCDT YEAR		($000 OR $M OR$B)		
1981	1.0	1.5	3.0	3.0
1982	1.0	1.5	3.0	
1983	1.0	1.5		
1984	1.0			

1ST TO ULTIMATE: 3.0

2ND TO ULTIMATE: 2.0

IBNR AS OF 12/84
(3.0-1) (1.0)+(2.0-1) (1.5) = 2.0 + 1.5 = 3.5

ACCDT YEAR	($000 OR $M OR $B)				
1981	1.0	1.5	3.0	3.0	3.0
1982	1.0	1.5	3.0	3.0	
1983	1.0	1.5	3.0		
1984	1.0	1.5			
1985	1.0				

ACCDT YEAR	($000 OR $M OR $B)					
1981	1.0	1.5	3.0	3.0	3.0	3.0
1982	1.0	1.5	3.0	3.0	3.0	
1983	1.0	1.5	3.0	3.0		
1984	1.0	1.5	3.0			
1985	1.0	1.6				
1986	1.0					

	LDF FOR SUBSET A	LDF FOR SUBSET B	COMBINED LDF
1ST TO ULTIMATE	4.0	2.0	3.0
2ND TO ULTIMATE	2.5	1.5	2.0

IBNR RESERVE AS OF:	TRADITIONAL METHOD	SEGREGATING DATA	% DIFFERENCE
12/84	3.5	3.5	0%
12/85	3.5	4.5	+ 28.5%
12/86	3.5	5.25	+ 50.0%

	LDF FOR SUBSET C	LDF FOR SUBSET D	COMBINED LDF
1ST TO ULTIMATE	12.0	2.0	3.0
2ND TO ULTIMATE	6.5	1.5	2.0

IBNR RESERVE AS OF:	TRADITIONAL METHOD	SEGREGATING DATA	% DIFFERENCE
12/84	3.5	3.5	0%
12/85	3.5	4.5	+ 28.5%
12/86	3.5	5.25	+ 50.0%

ALWAYS SEARCH FOR

SUBDIVISIONS RELATED TO

POSSIBLE CAUSES FOR

VARIABLE LOSS DEVELOPMENT

MAJOR SUBDIVISIONS OF DATA

PRIMARY: (BY LINE)

1. BUSINESS WITHIN CERTAIN STATES
2. BY PRODUCTION SOURCE
3. BY SUB LINE

REINSURANCE: (BY LINE)

1. BY ATTACHMENT POINT
2. BY PRODUCTION SOURCE
3. BY SUB LINE

CUM. INCURRED LOSSES

YEAR 6	YEAR 7	YEAR 8	YEAR 9	YEAR 10
$100,000	$200,000	$300,000	$400,000	$500,000

CUM. ITD INCURRED LOSSES AS AT 12/85	U/W YEAR
$ 2,314,248	1975
$ 6,708,207	1976
$ 3,071,247	1977
$11,292,736	1978
$ 7,910,927	1979
$ 7,156,216	1980
$20,175,598	1981
$11,155,306	1982
$16,459,863	1983
$ 6,067,682	1984
$ 1,178,145	1985

)EVELOPMENT FACTOR	CUM FACTOR	CUM IBNR FACTOR	INVRSE %	INC LDF %
1st	3.7572	2.7572	0.2662	0.2662
2nd	1.9733	0.9733	0.5068	0.2406
3rd	1.5798	0.5798	0.6330	0.1262
4th	1.3300	0.3300	0.7519	0.1189
5th	1.1867	0.1867	0.8426	0.0908
6th	1.1867	0.1867	0.8426	0.0000
7th	1.1092	0.1092	0.9016	0.0589
8th	1.0344	0.0344	0.9667	0.0651
9th	1.0050	0.0050	0.9950	0.0283
10th	1.0000	0.0000	1.0000	0.0050

	Case INCURRED LOSSES	ULT IBNR	ULT EST LOSSES
1985	$1,178,145	$10,265,933	
1984	$6,067,682	$16,729,698	$22,797,380
1983	$16,459,863	$16,019,876	$32,479,739
1982	$11,155,306	$6,467,319	$17,622,624
1981	$20,175,598	$6,657,586	$26,833,184
1980	$7,156,216	$1,336,310	$8,492,526
1979	$7,910,927	$1,477,241	$9,388,168
1978	$11,292,736	$1,232,965	$12,525,700
1977	$3,071,247	$105,786	$3,177,033
1976	$6,708,207	$33,541	$6,741,748
1975	$2,314,248	$11,571	$2,325,819

	ULT EST LOSSES	PREMIUM	ULR
1984	$22,797,380	$20,724,891	110.00%
1983	$32,479,739	$20,272,121	160.22%
1982	$17,622,624	$21,440,724	82.19%
1981	$26,833,184	$21,333,921	125.78%
1980	$8,492,526	$20,558,819	41.31%
1979	$9,388,168	$24,303,530	38.63%
1978	$12,525,700	$24,632,985	50.85%
1977	$3,177,033	$15,927,449	19.95%
1976	$6,741,748	$10,154,847	66.39%
1975	$2,325,819	$7,887,234	29.49%

1984 UW YEAR

CASE INCURRED AS OF 12/85

$22,797,380 x 0.5068 = $11,553,712

TOTAL	THEORETICAL CAL YR CASE INCURRED	ACT CAL YR CASE INCURRED	DIFFERENCE
1975	$619,033	$0	$619,033
1976	$2,353,993	$1,662,678	$691,315
1977	$2,761,369	$3,686,881	($925,512)
1978	$5,225,800	$3,043,225	$2,182,575
1979	$6,926,217	$6,201,606	$724,611
1980	$7,090,057	$8,541,510	($1,451,453)
1981	$12,284,835	$6,822,368	$5,462,467
1982	$15,020,534	$9,949,000	$5,071,534
1983	$18,826,185	$10,858,127	$7,968,058
1984	$21,215,576	$18,359,541	$2,856,035
1985	$15,608,422	$24,365,236	($8,756,814)
GRAND TOTAL	$107,932,022	$93,490,172	$14,441,850

	THEORETICAL UW YR INCEPTION-TO-DATE CASE INCURRED	ACTUAL UW YR INCEPTION-TO DATE CASE INCURRED	DIFFERENCE
1975	$2,325,819	$2,314,248	$11,571
1976	$6,741,748	$6,708,207	$33,541
1977	$3,161,227	$3,071,247	$89,980
1978	$12,108,632	$11,292,736	$815,896
1979	$8,464,045	$7,910,927	$553,118
1980	$7,156,216	$7,156,216	$0
1981	$22,610,946	$20,175,598	$2,435,348
1982	$13,250,272	$11,155,306	$2,094,966
1983	$20,560,015	$16,459,863	$4,100,152
1984	$11,553,102	$6,067,682	$5,485,421
1985	$0	$1,178,145	($1,178,145)
GRAND TOTAL	$107,932,022	$93,490,172	$14,441,850

1984 UW YEAR

EMERGENCE IN 1986

$22,797,380 x 0.1262 = $2,877,029

ACTUAL INCEPTION TO DATE	
CASE INCURRED	$93,490,172
THEORETICAL INCEPTION TO DATE	
CASE INCURRED	$107,932,022
DIFFERENCE	15.4%

	ACTUAL LOSSES	LDF CHOSEN	ULT LOSSES	RESULTANT IBNR RESERVE	INVERSE FACTOR	PREDICTED INCURRED LOSSES FOR FIRST YEAR
CASE 1 -						
1985 YR.	$1	10	$10	$9	1/10	$1
CASE 2 -						
1985 YR.	$1	3	$ 3	$2	1/3	$1

	ACTUAL LOSSES	LDF CHOSEN	REVISED ULT PREDICTIONS	ORIGINAL ULT PREDICTION
ASE 1 -				
.985 YR.	$2	2.0	4	10
ASE 2 -				
.985 YR.	$2	2.0	4	3

	ACTUAL INCM. LOSSES	SECOND YEAR INVRSE CUM.FACTOR	SECOND YEAR INCMNTL. INV. %
CASE 1 -	$1	50%	(50% - 10%) = 40%
CASE 2 -	$1	50%	(50% - 33.33%) = 16.67%

	PREDICTED ULT LOSSES	MODEL'S PREDICTED INCM. LOSSES IN SECOND YEAR
CASE 1 -	$10	$4
CASE 2 -	$ 3	$0.50

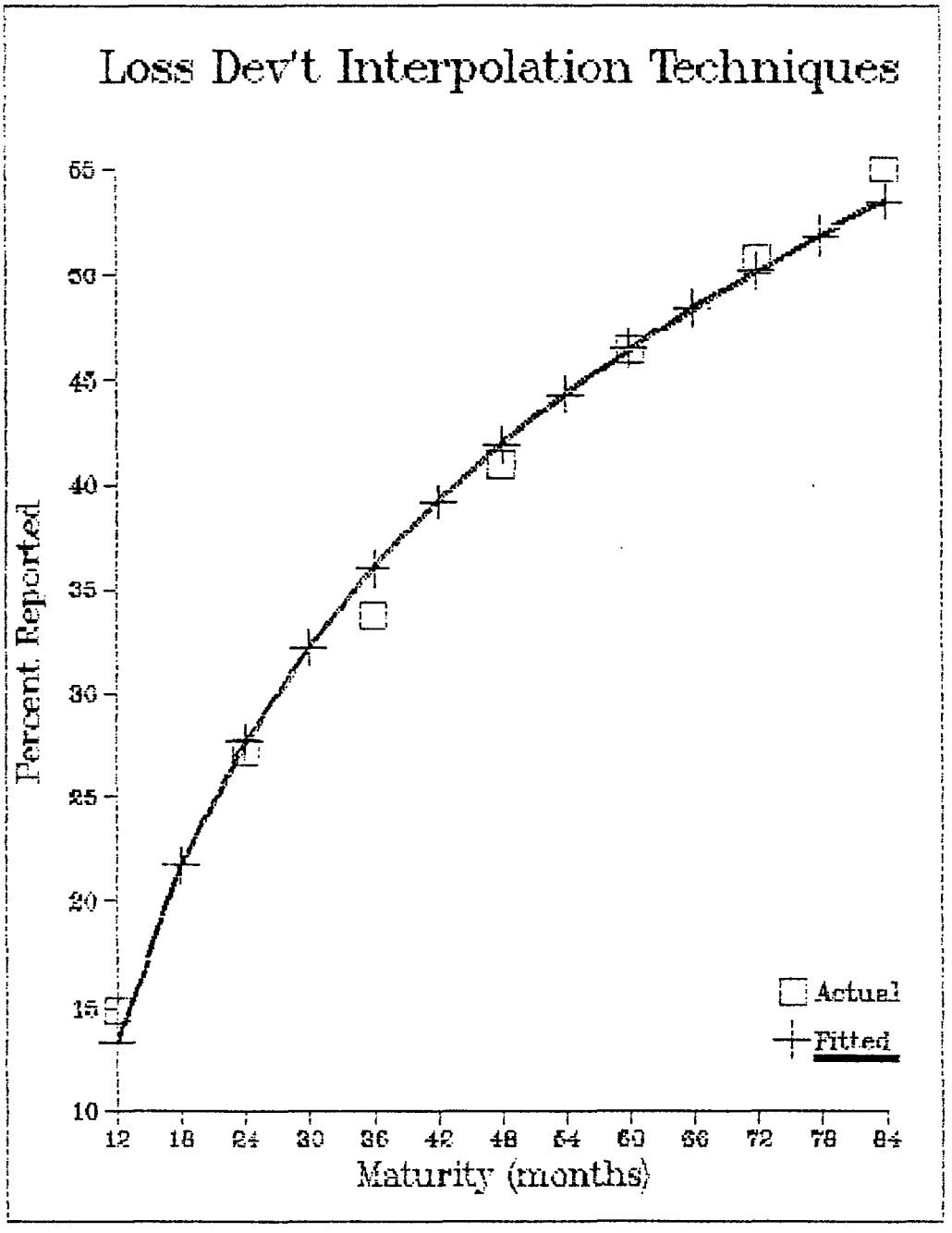
	SECOND YR ACTUAL INCREMENTAL	PREDICTED THEORETICAL	RATIO
CASE 1	$4	$4	1.00
CASE 2	$4	$0.50	.125

	SECOND YR ACTUAL INCREMENTAL	PREDICTED THEORETICAL	RATIO
CASE 1	$8	$4	.50
CASE 2	$8	$0.50	.0667

LOSS DEVELOPMENT INTERPOLATION TECHNIQUES

WORKERS COMPENSATION EXCESS LOSSES

(1)	(2)	(3)
MATURITY (IN MONTHS)	RAA LOSS DEVELOPMENT FACTOR	ACTUAL PER-CENT REPORTED [1.0/(2)]
12	6.7204	14.88%
18		
24	3.6724	27.23%
30		
36	2.9682	33.69%
42		
48	2.4414	40.96%
54		
60	2.1496	46.52%
66		
72	1.9677	50.82%
78		
84	1.8188	54.98%


Loss Dev't Interpolation Techniques
Percent Reported
55
50
45
40
35
30
25
20
15
10
12
18
24
30
36
42
48
54
60
66
72
78
84
Maturity (months)
Actual
Fitted

LOSS DEVELOPMENT INTERPOLATION TECHNIQUES
WORKERS COMPENSATION EXCESS LOSSES

(1)	(2)	(3)	(4)	(5)	(6)
MATURITY (IN MONTHS)	RAA LOSS DEVELOPMENT FACTOR	ACTUAL PERCENT REPORTED [1.0/(2)]	FITTED PERCENT REPORTED*	INTERPOLATED LOSS DEVELOPMENT FACTOR [1.0/(4)]	SIX MONTH DEVELOPMENT FACTOR
12	6.7204	14.88%	13.39%		
18			21.73%	4.6019	1.4603
24	3.6724	27.23%	27.65%		
30			32.24%	3.1020	1.1839
36	2.9682	33.69%	35.99%		
42			39.16%	2.5538	1.1623
48	2.4414	40.96%	41.90%		
54			44.33%	2.2560	1.0822
60	2.1496	46.52%	46.49%		
66			48.45%	2.0638	1.0416
72	1.9677	50.82%	50.24%		
78			51.89%	1.9271	1.0211
84	1.8188	54.98%	53.42%		

* $Y = A + B (LN\ X)$

PERCENT REPORTED = A + B [LN (MONTHS OF MATURITY)]

REGRESSION OUTPUT

A	-0.37721831
STD ERR OF Y EST	0.015064422
R SQUARED	0.990558691
NO. OF OBSERVATIONS	7
DEGREES OF FREEDOM	5
B	20.57%
STD ERR OF COEF.	0.90%

LOSS DEVELOPMENT INTERPOLATION TECHNIQUES
WORKERS COMPENSATION EXCESS LOSSES

ACCIDENT YEAR	12	24	36
1976	18,533	33,477	44,213
1977	22,910	39,152	44,457
1978	21,407	30,898	39,592
1979	18,076	30,422	38,351
1980	16,890	25,258	32,539
1981	20,190	36,544	43,304
1982	22,824	42,965	53,777
1983	21,270	38,156	44,833 *
1984	38,610	57,336 *	

ACCIDENT YEAR	48	60	72	84
1976	55,806	62,824	72,202	75,735
1977	51,685	58,672	63,776	70,533
1978	46,482	49,324	54,648	59,994
1979	48,939	54,191	58,754	59,812 *
1980	37,417	47,348	48,768 *	
1981	52,472	57,194 *		
1982	62,919 *			
1983				
1984				

* JUNE 30, 1985 EVALUATION

(1)	(2)	(3)	(4)
EVALUATION	EXPECTED DEVELOPMENT	ACTUAL DEVELOPMENT	SELECTED DEVELOPMENT
12 TO 18	1.4603	1.4850	1.4727
24 TO 30	1.1839	1.1750	1.1794
36 TO 42	1.1623	1.1700	1.1661
48 TO 54	1.0822	1.0900	1.0861
60 TO 66	1.0416	1.0300	1.0358
72 TO 78	1.0211	1.0180	1.0195

(5)	(6)	(7)
EVALUATION	INITIAL DEVELOPMENT FACTOR	REVISED DEVELOPMENT FACTOR
18 TO ULTIMATE	4.6019	4.5634
30 TO ULTIMATE	3.1020	3.1137
42 TO ULTIMATE	2.5538	2.5453
54 TO ULTIMATE	2.2560	2.2479
66 TO ULTIMATE	2.0638	2.0753
78 TO ULTIMATE	1.9271	1.9300

REINSURANCE ASSOCIATION OF AMERICA

WORKERS COMPENSATION

DEVELOPMENT PERIOD	ACTUAL DEVELOPMENT FACTORS
12 to 24	1.830
24 to 36	1.237
36 to 48	1.216
48 to 60	1.136
60 to 72	1.092
72 to 84	1.082
84 to 96	1.057

$$LDF\ (t: t+1) = 1 + at^{-b}$$

$$\frac{LDF\ (t+1 : t+2) - 1.0}{LDF\ (t : t+1) - 1.0} = \frac{a\ (t+1)^{-b}}{at^{-b}}$$

$$= (1 + 1/t)^{-b}$$

REINSURANCE ASSOCIATION OF AMERICA

WORKERS COMPENSATION

DEVELOPMENT PERIOD	ACTUAL DEVELOPMENT FACTORS	FITTED DEVELOPMENT FACTORS
24 to 36	1.237	1.273
36 to 48	1.216	1.181
48 to 60	1.136	1.130
60 to 72	1.092	1.098
72 to 84	1.082	1.077
84 to 96	1.057	1.062
96 to 108		1.051
108 to 120		1.043
120 to 132		1.036
132 to 144		1.032
144 to 156		1.028
156 to 168		1.024
168 to 180		1.022
408 to 420		1.005
420 to 432		1.005

DEVELOPMENT TO ULTIMATE

	TAIL FACTOR ACTUAL	FITTED
84 TO ULTIMATE	1.819	1.836
96 TO ULTIMATE	1.721	1.729
.		
.		
.		
.		
144 TO ULTIMATE	1.469	1.475

EARNED PREMIUM DEVELOPMENT

UNDERWRITING YEAR	12	24	36	48	60	72
1980	829	2,109	2,510	2,513	2,519	2,522*
1981	987	2,102	2,388	2,425	2,413	
1982	882	2,322	2,366	2,481		
1983	991	2,936	2,933			
1984	981	2,702				
1985	918					

EARNED PREMIUM DEVELOPMENT FACTORS

	12 TO 24	24 TO 36	36 TO 48	48 TO 60	60 TO 72
	2.544	1.190	1.001	1.002	1.001
	2.130	1.136	1.015	0.995	
	2.633	1.019	1.049		
	2.963	0.999			
	2.754				
AVERAGE	2.605	1.086	1.022	0.999	1.001
SELECTED	2.605	1.000	1.000	1.000	1.000

UNDERWRITING YEAR	EARNED PREMIUM REPORTED TO DATE	DEVELOPMENT FACTOR	ULTIMATE WRITTEN PREMIUM
1980	2522	1.000	2522
1981	2413	1.000	2413
1982	2481	1.000	2481
1983	2933	1.000	2933
1984	2702	1.000	2702
1985	918	2.605	2391

UNDERWRITING YEAR	ULTIMATE WRITTEN PREMIUM	PERCENT EARNED @12/85	ULTIMATE PREMIUM EARNED @12/85
1980	2522	100%	2522
1981	2413	100%	2413
1982	2481	100%	2481
1983	2933	100%	2933
1984	2702	100%	2702
1985	918	45%	1076

LOSS DEVELOPMENT

UNDERWRITING YEAR	12	24	36	48	60	72
1980	101	310	435	639	745	862 *
1981	28	262	391	478	604	
1982	28	247	621	943		
1983	77	368	797			
1984	58	429				
1985	40					

LOSS DEVELOPMENT FACTORS

	12 TO 24	24 TO 36	36 TO 48
	3.069	1.403	1.469
	9.357	1.492	1.223
	8.821	2.514	1.519
	4.779	2.166	
	7.397		
AVERAGE	6.685	1.894	1.403
SELECTED	6.685	1.894	1.403
CUMULATIVE	37.456	5.603	2.959

	48 TO 60	60 TO 72	72 TO ULT.
	1.166	1.157	
	1.264		
AVERAGE	1.215	1.157	
SELECTED	1.215	1.157	1.500
CUMULATIVE	2.108	1.736	1.500

UNDERWRITING YEAR	LOSSES INCURRED TO DATE	DEVELOPMENT FACTOR	ULTIMATE LOSSES
1980	862	1.500	1293
1981	604	1.736	1048
1982	943	2.108	1988
1983	797	2.959	2358
1984	429	5.603	2404
1985	40	37.456	1498

UNDERWRITING YEAR	ULTIMATE LOSSES	ULTIMATE WRITTEN PREMIUM	ULTIMATE LOSS RATIO
1980	1293	2522	51.3%
1981	1048	2413	43.4%
1982	1988	2481	80.1%
1983	2358	2933	80.4%
1984	2404	2702	89.0%
1985	1498	2391	62.7%

COMMON APPROPRIATE HINDSIGHT LDF'S

1ST TO ULT. 3.0

2ND TO ULT. 2.0

SUBSET A

YEAR	INCURRED LOSSES			PREMIUMS
1	1.0	1.5	3.0	3.0
2	1.0	1.5	3.0	3.0
3	1.0	1.5		3.0
4	0.5			3.0

IBNR FOR YEAR 4: IBNR = 3.0 - 0.5 = 2.5

HINDSIGHT IBNR = (2.0) (.5) = 1.0

COMMON APPROPRIATE HINDSIGHT LDF'S

1ST TO ULT. 3.0

2ND TO ULT. 2.0

SUBSET B

YEAR		INCURRED LOSSES		PREMIUMS
1	1.0	1.5	3.0	3.0
2	1.0	1.5	3.0	3.0
3	1.0	1.5		3.0
4	1.5			3.0

IBNR FOR YEAR 4: IBNR = 3.0 - 1.5 = 1.5

HINDSIGHT IBNR = (2.0) (1.5) = 3.0

TOTAL YEAR 4 IBNR:

	A	B	TOTAL
FORMULA	2.5	1.5	4.0
HINDSIGHT	1.0	3.0	4.0

SUBSET B

YEAR	INCURRED LOSSES			PREMIUMS
1	1.0	1.5	3.0	3.0
2	1.0	1.5	3.0	3.0
3	1.0	1.5		3.0
4	2.5			3.0

IBNR FOR YEAR 4: IBNR = 3.0 - 2.5 = 0.5

HINDSIGHT IBNR = (2.0) (2.5) = 5.0

YEAR 1

	EP	IL	IBNR	PUBLISHED LOSS RATIO
PORTFOLIO A	100	20	80	100%
PORTFOLIO B	100	50	50	100%

YEAR 2

	EP	IL	IBNR	PUBLISHED LOSS RATIO
PORTFOLIO A	100	30	70	100%
PORTFOLIO B	100	75	25	100%

FINAL YEAR

	EP	FINAL IL	FINAL LR	YEAR 1 & YEAR 2 PUBLISHED LOSS RATIO
PORTFOLIO A	100	60	60%	100%
PORTFOLIO B	100	150	150%	100%

COMMON APPROPRIATE HINDSIGHT LDF'S

1ST TO ULT. 3.0

2ND TO ULT. 2.0

YEAR	INCURRED LOSSES			PREMIUMS
1	1.0	1.5	3.0	3.0
2	1.0	1.5	3.0	3.0
3	1.0	1.5		3.0
4	0.5			3.0

IBNR FOR YEAR 4: IBNR = 3.0 (2/3) - 0.5 = 1.5

HINDSIGHT IBNR = (2.0) (0.5) = 1.0

1986 CASUALTY LOSS RESERVE SEMINAR

2D/3D - LOSS RESERVE STANDARDS

Moderator: David G. Hartman, Sr. Vice President & Actuary
Chubb Group of Insurance Companies

W. James MacGinnitie, Consulting Actuary
Tillinghast/TPF&C

Patrick W. Kenny, Partner
Peat Marwick Mitchell & Co.

Thomas E. Murrin, Executive Consultant
Coopers & Lybrand

DAVE HARTMAN: Welcome to the session on Loss Reserve Standards. I am Dave Hartman, moderator of this panel. Last year I was privileged to moderate a panel with the same title where three panelists representing security analysts, state regulators, and company actuaries discussed various standards to which loss reserves can be held. This year we will discuss a different facet of the word "standards" and focus on standards of practice.

When Stan Hughey was President of the American Academy of Actuaries last year, he identified four characteristics of a profession. First, a profession has a basic body of knowledge which serves as a basis of education. Within the casualty actuarial profession, mastery of this education is measured by the CAS examinations. Second, a profession has a system of continuing education. That would include meetings such as this. Third, a profession has standards of practice and a code of ethics, similar to the Guides to Professional Conduct of the actuarial profession. Fourth, a profession has a method of discipline to enforce the standards and Guides. Both the American Academy of Actuaries and the Casualty Actuarial Society have discipline committees.

The actuarial profession does not yet have a codified set of standards of practice, but work has bugun on that by the Interim Actuarial Standards Board (IASB).

Our first panelist today is an accountant. While accounting is not the oldest profession in the world, it has bee around longer than the actuarial profession. Our first panelist today will discuss standards of practice within the accounting profession. Our next panelist will bring us up to date on the activities of the IASB. Then our third panelist will give the perspective of a practicing actuary on standards of practice.

Before I introduce them, let me make a couple of comments regarding the format of this session. First, I have asked each of the three panelists to speak for ten to fifteen minutes on their particular area. Then we will allow them an opportunity to ask questions of one another and then we will be open to questions from you in the audience.

Second, I have been asked to state that the views expressed are the views of the individuals and not necessarily the views of the American Academy of Actuaries or the Casualty Actuarial Society, or the employers of the speakers.

Our first speaker is Patrick W. Kenny. Pat is a partner with Peat, Marwick, Mitchell & Company with over twenty years of experience serving insurance claims in the United States, continental Europe, the United Kingdom and the Middle East. Pat's experience includes life and property/casualty insurance as well as reinsurance. Pat joined Peat, Marwick in 1966 and was elected to Partnership in 1974. He transferred to the Hartford office in 1981 to assume engagement partner responsibility for

the audit of Aetna Life & Casualty Company., He is a member of the Peat, Marwick International Insurance Committee is is the Director of Insurance Professional Practice. He is the newly elected Chairman of the AICPA Insurance Companies Committee and a member of the NAIC Emerging Issues Task Force.

Pat has received a Bachelor of Business of Administration degree from the University of Notre Dame and an A.M. degree from the University of Missouri. Please welcome Pat, whose name was inexplicably left off of the program.

PAT KENNY: It is a pleasure to be here to talk about standards and the development of standards as it has occurred within the accounting profession. Clearly every profession must set high standards for the quality of its work because the people who will be relying upon that work are generally unable to judge its quality for themselves. The accounting profession is subject to two specific bodies of standards in the performance of their work. These standards are "accounting standards" and "auditing standards".

Accounting standards are promulgated and codified by the Financial Accounting Standards Board. These are the standards which underlie the preparation of financial statements. They have broad applicability in that every company must adhere to their standards in issuing financial reports. They are promulgated through a process which includes the identification of issues for which the staff of the FASB would then undertake a research project. Research projects result in drafts of statements which are given a period of exposure followed by a public hearing which then culminates in a standard. The period of gestation from beginning to end generally takes anywhere from two to four years. For example, FAS #60, which governs accounting by insurance enterprises, took approximately two years to be issued.

Auditing standards are guidelines for the performing of professionally responsible audits. They define a minimum level of quality that every professional auditor is expected to adhere to by their clients and the public. They must be unwavering over a wide spectrum of auditing engagements and must be able to stand the test of time. Auditing standards then dictate how, as independent accountants, we do the work we do while accounting standards guide in the preparation of financial statements upon which we perform our audits or other professional services.

For purposes of the panel today it would be appropriate to review the history of the development of those standards with an in-depth review of auditing standards including a brief overview as to what each standard entails. By way of background, you should be aware that every Certified Public Accountant (CPA) who is in either public or private practice is generally a member of the AICPA.

The AICPA's membership consists of over 200,000 certified public accountants. The AICPA provides a broad range of services to its members in such areas as Continuing Professional Education, Technical Accounting and Auditing Assistance, Auditing Standards, Ethical Standards, etc. The ultimate authority over the AICPA is vested in a council of approximately 250 members. The Institute's resources are administered and policies set by its 21 member Board of Directors, of which three are non-Institute members who represent the public. The overriding factor governing the CPA, however, is the Code of Professional Ethics of the American Institute of CPAs, which covers both the profession's responsibility to the public and the CPA's responsibility to his clients and colleagues.

The Financial Accounting Standards Board is a board appointed by the Financial Accounting Foundation. The Board was created in the mid 1970's to be an independent

body, both financially and philosophically, from the AICPA. Prior to its creation, accounting rulemaking was contained within the AICPA, first within the Accounting Research Committee and then the Accounting Principles Board. The FASB is an attempt by the financial community including CPA's to make accounting standards the product of an independent deliberative process not subject to any client pressure. To date, the FASB has issues approximately 90 standards.

Auditing Standards are, on the other hand, standards which are promulgated entirely within the AICPA by a senior technical committee. From the years 1939 to 1972 that committee was called The Committee on Auditing Procedures and issued 54 pronouncements, which at that time were called Statements on Auditing Procedures. The Committee on Auditing Procedures was replaced in 1972 by the Auditing Standards Executive Committee, and in 1978 the Auditing Standards Board was formed to replace the Executive Committee is is the body now responsible for the promulgation of Auditing Standards and Procedures to be observed by members of the American Institute of CPA's in accordance with the Institute's rules of conduct. The pronouncements which were issued from 1939 to 1972 were codified and became Statements on Auditing Standards. Subsequent to 1972, in excess of 50 standards have been issued. Collectively, these statements on auditing standards are referred to as Generally Accepted Auditing Standards.

I would now like to review some of the standards in detail. The standards promulgated and codified as SAS #1 are what was first known as Generally Accepted Auditing Standards. These are the basic standards from which all others promulgate. They are basically divided into three categories:

o General Standards,
o Standards of Field Work, and
Standards of Reporting

General Standards are three in number and include requirements that the auditors have adequate technical training and proficiency, that he have an independent mental attitude relating to the assignments, and finally, that he exercise due care in the performance of this examination and preparation of his reports. To give you anb example of how independence works, as a partner in an accounting firm I'm not allowed nor is my wife allowed to hold securities in any organization for which we perform an audit. I was elected to the partnership back in 1974 and at that point in time, as a result of a prior employment, my wife had one share of Taft Broadcasting. Let me explain to you that it was easier for me to write a letter to the Sr. Partner suggesting we resign that account, than it was to convince my wife to sell that one share of Taft Broadcasting. But in fact that was part of the standards that govern the auditing profession. These standards are "personal" in nature and apply to the auditor himself as opposed to the conduct of field work or reporting.

Three standards of field work cover planning and supervising the audit, evaluating internal control, and obtaining audit evidence. These standards deal with how an auditor goes about the mechanics of doing his audit and documents the work he performs.

The four standards of reporting govern the form and content of the auditor's report. The report of the independent auditor shall state whether the financial statements are presented in accordance with generally accepted accounting principles, have been consistently applied and there is reasonably adequate disclosure. Once an auditor has formed his opinion then this report shall either contain an expression of an opinion on the financial statements or an assertion to the effect that an opinion cannot be expressed.

Let's look at examples of how specific auditing and accounting standards have impacted the work of the auditor. I've taken two examples of accounting standards and auditing standards and will try and illustrate their influence. First, let's look at two accounting standards with which you are familiar and their impact. It's not my intention to discuss these standards in detail but more to the point, their sphere of influence on the work of the auditors.

FAS #60 deals with the accounting principles governing the preparation of financial statements by insurance enterprise. This standard dictates what shall be classified as short duration or long duration contracts, disclosures about reserves, etc. You are all familiar with this standard. It lays the ground work for how an insurance company prepares its statements. This particular standard is a codification of previously issued literatures such as the stock life audit guide, S.O.P. #78-6 and others. As an auditor, the primary concerns are going to be adherence by an insurance company to the principles contained in FAS #60 for example, relating to reserves and deferred acquisition costs, consistency of that adherence (e.g., did the Company change its principles relating to discounting loss reserves) and then finally, the adequacy of the Company's disclosure (e.g., contingent or real liabilities associated with reinsurance or fronting arrangements). Once the auditor has formed his opinion, then he must so state.

In the case of an opinion on an insurance company, we have the added situation wherein the financial statements may be in accordance with statutory or GAAP accounting principles and should so indicate. Obviously, any change in accounting with a material impact will be referred to in the auditor's report.

Let's look at another standard of a more specific nature - FAS #87 Employer's Accounting for Pensions. This standard runs to a very specific accounting application, namely the determination of annual pension expense by an employer in connection with a defined benefit pension plan. It dictates methodology, treatments of overfunding, gains and losses, etc. It is detailed and specific and it deals only with pensions. An auditor will approach FAS #87 slightly differently than FAS #60. FAS #60 is pervasive while FAS #87 is singular in focus. Materiality of amounts, effect on income of changes under FAS #87 and related disclosure will be his focus. Potential impacts on his opinion will be in the areas of changes in methodology or assumptions involving material amounts.

In both cases (FAS #60 and FAS #87) the auditor's ultimate responsibility culminates in his opinion on the financial statements taken as a whole. Auditors are fond of saying we are responsible for only one page in the Company's annual report and that is our accountant's report or auditor's opinion.

Let's now look at two standards that affect the work in a very different way. First of all, there is SAS #17, Illegal and Questionable Acts. This SAS was developed by the Auditing Standards Executive Committee in order to give the auditor some guidance in performing his audit in light of an increasing awareness by the public, the SEC and other regulators in the occurrence and existence of questionable and illegal acts. This standard gestated in the late 1970's in a post Watergate, disclosure prone, Foreign Corrupt Practices Act environment wherein there were daily public chest-beating and corporation after corporation tried to outdo its predecessor in depth of disclosure and juiciness of details. SAS #17 was an attempt to define the audit and disclosure responsibilities. It's sometimes referred to as the "put the auditor between a rock and a hard spot standard."

For example, we still are required to make inquiries of senior management of a company as to whether or not there have been any questionable or illegal payments. I can remember the first time I made that inquiry of the president of a Dutch company when I was in the Netherlands, and he looked at me and he said, "Yes, I've made two." Immediately I scratched my head and I figured well I had to ask the question but now he's given me the answer, what am I going to do with it. He said let me explain what they were, the first was my salary and the second was your fee. There is still some vestige to this particular standard.

Since the Foreign Corrupt Practices Act still exists and still has no materiality guidelines, vestiges of this standard will remain, including inquiries of senior management as to whether they have made any questionable or illegal payments (of course that is other than their salaries and auditors' fees). Clearly, as you can see, this is a standard of field work and dictates the responsibility of the auditor for the procedures he must undertake and how he should report the results of his work.

The second auditing standard I would like to explore is SAS #49 entitled "Letters to Underwriters". This SAS sets forth examples of procedures an auditor can and should undertake in giving "comfort" to an underwriter in connection with an offering of securities. More importantly, it states the type of items upon which an auditor can give comfort and the form that comfort can take. This standard is primarily a reporting standard in that it sets forth specific language that should be used in these letters. This standard is one like SAS #11 dealing with the work of other experts such as actuaries and lawyers and others which have been developed in response to and in unison with these other professions. Accountants must rely on the work of other professionals and in turn must be responsive to their needs e.g., lawyers in connection with comfort letters.

I've been asked to comment on my impressions as to the standard setting process both as to responsiveness and timeliness of response. I think the Auditing Standards Board has been responsive to problems the auditor has met in his day-to-day professional life. However, the auditing profession

has been beset by one serious problem which has plagued it for the last two decades and that is a lack of understanding by the general public as to the role of the auditor. This lack of understanding has resulted in a number of lawsuits against auditors as well as drawing the attention of people like Congressman Dingell who investigates spectacular "audit failures". Auditors have become "deep pockets" in business failures, I think, because the public attaches a higher level of responsibility than the auditor contemplates in the "attest function". Until such time as the profession has clearly and distinctly communicated its as well as management's role related to financial statements it will continue to be on the defensive. Standards are necessary but public perception is a greater need for the auditor at this time.

Since the Financial Accounting Standards Board was created in the mid-70's, I think it has been responsive to the long-term goals of financial statements. They have developed frameworks upon which financial statements should be derived. They have generally moved the direction to which financial statements are going. For example, right now I'm sure you all have detected that there has been a decided movement on the part of the FASB within the last two years to move from an income statement oriented financial statement emphasis to a balance sheet oriented financial statement emphasis. You see that in the exposure draft which is out on taxes and in the exposure draft in which they issued on public utilities. You see that in the position they're taking relative to the life insurance issues which are before them right now.

The FASB has been responsive to the long term nature and goals of financial statements. Where they have been less responsive is to immediate practice problems. In an effort to try and solve that they have set up what is called the Emerging Issues Task Force. Unfortunately I think many of these solutions may tend to be $1.00 short and a day late. It is a constant struggle on the part of the accounting standard promulgators to try and keep up what is going on in practice while at the same time being mindful of the long term goal of financial statements. I think the FASB is doing a good job. I just think they need to be a little quicker and a little more responsive in the information that they're giving out.

DAVE HARTMAN: Thank you very much, Pat. Our next speaker is Tom Murrin, who is a very experienced actuary. Tom has been working as an actuary for about 40 years. He's had experience in rating bureaus, in insurance companies, and now as a consultant with Coopers & Lybrand. Tom is the past president of both the Casualty Actuarial Society, and the American Academy of Actuaries. He currently is Chairman of the Casualty Actuarial Society Discipline Committee. But the key reason that we've asked Tom to be here today is that he is a member of the Interim Actuarial Standards Board - a group that is wrestling with standards for the entire actuarial profession (casualty, life, pensions). Let's please welcome Tom Murrin.

TOM MURNIN: Thank you very much. It is a pleasure always to join my friends and colleagues in the Casualty Actuarial Society on any topic of common interest. My part of the discussion today will focus on the relation ship of loss reserve standards to the more general topic of standards of practice as they are evolving in the actuarial profession. I will refer to actuarial disciplines other than casualty/property in relation to prior and current activities of the American Academy of Actuaries and its delegation to the Interim Actuarial Standards Board the responsibility for continuing the development of standards of practice. My remarks may be familiar to many of you, but this panel presents the opportunity to relate past historical developments within the Academy and its committees as respects standards of practice to the establishment of the Interim Actuarial Standards Board.

The Interim Actuarial Standards Board was created by the Academy as a transitional precursor of an Actuarial Standards Board which would become a free standing organization independent of any of the existing actuarial organizations, with the responsibility for the development and promulgation of standards of practice for all actuarial disciplines, including casualty, health, life and pensions. In effect it takes over one of the important functions carried out principally by the American Academy of Actuaries.

After many years of study by task forces and committees with major contributions by senior actuaries practicing in the various disciplines, the Academy Board approved the appointment of the Interim Actuarial Standard Board in the Spring of 1985.

Without reviewing all of the arguments pro and con which were discussed at great length at many actuarial meetings, locally and within the national organizations, the Academy Board did come to the conclusion that a restructuring of the standards setting process was desirable.

A few basic reasons can be summarized as follows:

1. The public responsibilities of the profession have increased greatly as has public attention to certain important areas, particularly actuarial liabilities in the financial statements of both property/casualty and life insurance companies as well as other organizations. Hence, it has become increasingly important, indeed vital, to codify generally accepted standards of practice. Recent events, such as many terminations of defined benefit plans to recover assets, the Baldwin United financial collapse, etc., indicate an intense public and regulatory interest in activities in which the actuary plans a critical role.

2. It is in the public interest as well as in the professional

interest of actuaries that standards be written by the profession and not by others outside the profession, such as regulators, which can and is happening.

3. Previously, committess of the Academy have been operational for over ten years in addressing the issue of standards in many of the disciplines and have done a marvelous job. However, the increased importance of standards setting requires a better managed and effectively organized and consistent approach across all disciplines to promptly respond to needs.

The establishment of the Interim Actuarial Standards Board permits a prompt restructuring of the process to gain experience for a two or three year period to be of assistance in setting the framework and responsibilities of an independent actuarial standards board, including ultimately, necessary staffing and funding.

Among the responsibilities delegated to the Interim Actuarial Standards Board by the Academy are the following:

1. Prescribe its own operating procedures.

2. Establish committees, subcommittees and task forces.

3. Appoint individuals to the committees.

4. Authorize exposure of proposed standards.

5. Recommend to the Board of the Academy adoption of specific standards.

For more details of the responsibilities of IASB I recommend you read and become familiar with the half page description of the areas of responsibility for the Interim Board on page 13 of the 1986 Academy Yearbook. The most important of these were to identify the need for standards in all areas of actuarial practice, to review current standards of practice to determine whether revisions or amendments are needed and generally to direct development of standards of practice in all actuarial disciplines. The nine member Board represents a cross section of actuarial disciplines; by speciality, there are three life, two pension, two casualty, one health, and one academic member. It is a well rounded and well experienced group of individuals.

Among the nine members are three Past Presidents of the Academy, two Past Presidents of the Society of Actuaries, two Past Presidents of the Casualty Actuarial Society, one Past President of the Conference of Actuaries in Public Practice, as well as its current President. Ron Bornhuetter, a Past President of the Casualty Actuarial Society and the Academy is Chairman of IASB, replacing the original Chairman, John Fibiger, who relinquished the assignment when nominated as President-Elect of the Academy

The IASB has five operating committees representing the various areas of actuarial practice, including a specialty committee. Since the Academy has been providing most of the functions assumed by the IASB, and had existing committees working on a number of active projects, transfer of

all or part of the functions of some Academy committees to IASB involve the appointment of the individuals working on these committees to staff the operating committees of IASB.

In approaching the promulgation of standards of practice, the Board will generally opt for broad statements of principles rather than writing actuarial cookbooks. Essentially a two tiered approach with a subset of the second for certain special applications will be followed initially. The top layer will be a statement of general standards of practice in an area which would include broad principles and underlying concepts. The next level would be recommended practices, perhaps paralleling existing opinions. While the Board might be inclined to stop at this level a third tier can be required which would be labeled as "compliance requirements" to deal with specific detailed issues created by outside agencies such as the Internal Revenue Service, NAIC, FASB, etc., which have specific requirements written in some areas. These would be interpretations of various types of regulatory requirements imposed upon actuaries, some of which might even be inconsistent with general standards of practice enunciated in other areas.

I believe that this development within the actuarial profession is an important undertaking as the public interest, that is, all the publics that the profession services, becomes increasingly involved in the activities of the profession with many regulatory and legal overtones to that interest.

The IASB has met quarterly since its inception, and has established a regular schedule of meetings on the second Friday of each quarter with the expectation that a number of these meetings will carry-over to the following Saturday. Several exposure drafts to Academy members have already been released, and others are in final stages of preparation. Those released include:

1. "Recommendations Concerning Non-Guarantteed Elements in Life Insurance and Annuity Contracts"

2. "Actuarial Standards of Practice Relating to Continuing Care Retirement Communities"

3. "Actuarial Guidelines for Compliance with Statement of Financial Accounting Standards Number 87"

Since it is newly established, the work of the committee has not been limited to dealing with specific standards. Much of the work of the committee has centered around developing its operating procedures and reviewing the existing literature dealing with standards. It is clear to the committee that existing standards do not follow a common format, and the committee expects to recommend a common format with which future standards will comply, as well as existing standards when they are rewritten.

In addition, the IASB has reviewed the existence of or need for common principles underlying the various disciplines of actuarial work. Certain of these principles are under review by other actuarial bodies (e.g., Valuation Principles are being reviewed by a committee of the Society of Actuaries), while others may need to be developed by the

standards setting body itself.

The IASB will also be considering the need for research which will review existing literature on actuarial principles and attempt to develop a common foundation for all actuarial specialties out of existing practices.

As respects property/casualty matters, interpretive opinion 8-B is under review and the current opinion will be updated and expanded in the future. It was originally promulgated in 1978 and currently does not address the issue of reserve discounting. For this and other reasons it needs to be updated and promulgated quickly.

As I mentioned earlier, various Academy Committees and/or task forces dealt with standards of practice particularly in the area of financial reporting for pensions and life insurance.

Recommendation 8 in its entirety deals with the Statement of Actuarial Opinion for filing Casualty Insurance Company Statutory Annual Statements.

The IASB is in a transitional phase now, assuming responsibility from all the various committees by disciplines that are in the process of working on certain topics, examples of which you have seen in exposure drafts mailed to all Academy members. Our work is rapidly being organized and critical issues will be addressed by the multi-disciplined membership of the IASB who work with and review the work products of the various operating committees. In effect, this will give more consistency to the treatment of subject matters across disciplines as well as putting strong emphasis on prioritizing tasks and being certain that the effect of development in one area on another is not inadvertently overlooked.

I believe we have made strong progress in our first year of operation and our regular quarterly meetings do achieve very good progress.

However, I am not suggesting that the existence of the Actuarial Standards Board is going to revolutionize things or change practices overnight because Standards of Actuarial Practice of the various disciplines are widely understood and accepted within the profession. The immediate challenge is to codify and update as many as possible in a short timeframe.

The Board therefore hopefully will continue to pull together all of the standards writing in progress in a number of different committees. Since past efforts had committees organized by disciplinary specialty, significant gaps could occur and in some cases actually did. The responsibility for seeing that standards get written where or when needed and not overlooked is important.

In conclusion from a casualty standpoint, standards of practice are recorded in the literature and Proceedings of our Society, in semi-annual meeting seminars and in the Annual Loss Reserve Seminars. Not only do these enhance the body of knowledge but they also reaffirm the importance of adherence to sound standards of practice and the necessity of clearly documenting and fully disclosing the use of them in the actuaries' work products.

Thank you for your attention.

DAVE HARTMAN: Thank you very much Tom. Let me just underscore the one point that Tom made at the end of his presentation. And that is that standards do exist within the actuarial profession, but they do need more work as far as codifying them. We appreciate the work of Tom and the other members of the FASB as they undertake this very significant challenge. I know that they appreciate the fact that the accounting profession has provided a model from which the actuarial profession can work.

Our third panelist today is Jim MacGinnitie, who is going to have a difficult task because he will be talking about the future. From the point of view of a practicing actuary and the way some of these standards may impact the work of an actuary, he will discuss how some of these standards may impact our work. Jim, too, has had a multi-faceted background. He has taught as a professor of Actuarial Sciences at the University of Michigan. He currently heads, as Managing Director, the Tillinghast Division of TPF&C.[1] We're very pleased to have Jim here and look forward to his insights about what the future is going to bring as one who faces the realities of standards of practice, codified or not, on a daily basis.

JIM MACGINNITIE: Thanks Dave. My remarks this morning relate to the consequences from the development of standards from the viewpoint of the practicing actuary. I'd like to organize them in three major topics. First, questions relating to data. Secondly, questions relating to discipline and errors and omissions claims. And finally, the inherent tension between the scientific and legalistic approach to standards.

First, with respect to data, I think you will find a much greater involvement by the practicing actuary in questions of data sufficiency and reliability. The guides already specify that your opinion should be based on data which is sufficient and reliable. In my experience we find that most difficult situations, you can put your own definition on difficult, involve data problems. Bad data is hard to define but you know it when you see it. I think most of you, as practicing actuaries and loss reserve specialists, have undoubtedly seen some bad data in the course of your careers. If you haven't, you're going to, I can assure you, because there's a lot of it out there. We often encounter data that can't be balanced or in which allocations have been made to the incorrect accident or report period. We find data that is filled with distorting transactions or sometimes it's very good data except for a single distorting transaction

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[1]Jim is a past president of the Casualty Actuarial Society and is currently a member of the Board of Governors' of the Society of Actuaries and a Vice President of the American Academy of Actuaries.

which is enough to throw the whole thing off. You have to work at uncovering that.

Of course, there's the ambiguous presence of the distorting influence. Most commonly it is the claim department which has finally woken up and is now setting adequate loss reserves. Therefore, all the developments that you've seen on past are inappropriate to extrapolate into the future because you will overreserve you. How many of you know of an overreserved company? More than one. They just don't happen that often and yet that representation about distorting influences occurs with considerable frequency in my practice, and I suspect in that of many of you.

We, also, encounter something that I'll refer to as misrepresented data, where they tell you it represents a certain set of transactions or a line of business, or whatever, and in fact it does not. It is often very difficult to determine that. In the worst case, it's been done fraudulently. And it is difficult to uncover a well conceived and well executed fraud as Pat and the AICPA will tell you.

I suppose the data question is perhaps more a problem for a consultant. But I submit that it's not unknown to those in the company ranks. Perhaps a fairly common form of it in company ranks is what I call the "bottom drawer problem in the claim department," where a whole set of unprocessed transactions that have been suppressed in order to achieve a certain foregone conclusion in what the loss reserves ought to be. As an aside, I would suggest that the regulators in the audience or who subsequently read these remarks should seriously consider pulling the licenses of companies that cannot produce acceptable quality data. The difficult situations that I've been involved in where companies have subsequently had to go into rehabilitation or liquidation have almost invariably had an inadequate ability to produce quality data. It is a clear early warning sign and it is seldom that you find somebody who can't produce good data who has really such a sure thing that he's really profitable and really solvent. In any case, he ought to be able to get around to good data.

Bob Winters, who was recently elected President or Chairman of the CEO of the Prudential, said when I used to do the valuation that getting the in force right was the entire job. Anybody can apply the factors to the in force. You have got to get that in force right. I submit that getting the data right if not the entire job is, at least a very important part of getting the reserves right. A consequence of greater emphasis on standards is going to be greater emphasis on the part of the loss reserve specialists on the quality of that data.

The second area I would like to touch on is a consequence of the increased emphasis on standards as leading to greater exposure to discipline and to errors and omissions claims. The basic problem here is that standards, as accountants have executed them, and as actuaries, have started to formulate

them, are written in terms of thou shalt, rather than thou shalt not. It is interesting to note that accountants and doctors have skyrocketing errors and omissions and malpractice problems which have occasioned availability difficulties and political situations around the country, where, as lawyers have a much more manageable situation with respect to their E&O experience.

Lawyers may have a bit of a current problem but I submit that if you look at the long-term trends in the two coverages, you will find that lawyers E&O is less expensive and has got a lower trend. If you look at the kinds of claims that are generated for lawyers, you find that there are things like land title, where there are both a retrospective test, namely to the title "survive a challenge", and some fairly well established abstracting procedures that a lawyer should go through in working on real estate situations. They also involve things like dates, court appearances, filing deadlines, and statutes of limitations which are pretty clear as to what has to be done. For example, thou shalt get thy claim filed by a certain date, or thou shalt be in court by a certain date. Finally the Securities and Exchange Commission work where again, the SEC has promulgated all kinds of thou shalt, aided and abetted in a symbiotic relationship by the accounting profession. Lawyers generally, however, with those exceptions have taken a view toward professional standards of thou shalt not. If you look at their cannons of legal ethics and the guides and so forth, it is almost entirely a set of what thou shalt not do. That's fairly easy to stay away from the shall nots". It is much more difficult to conform to a long list of thou shalts.

In our own case, as we've developed our professional standards, promulgated manuals and so forth, our attorneys have been very strong in their advice to us that we couch those standards in terms of thou shalt consider or take into account, and that we avoid saying thou shalt in such a way that it can later be used against us as a standard that we failed to meet. In which case, we are culpable and there is an omission situation.

I think it is also interesting to note that the Academy of Actuaries has its own errors and omissions problem. It is unable in the current marketplace to acquire a suitable coverage. The reason given is because it is involved in standards setting. And because it has a discipline process which is part and parcel of the standards process. It doesn't do much good to set standards if you don't hold people accountable to them.

The third area is a little more abstract, but it is one that concerns me as we move forward. That is the tension that I perceive between the legalistic and the scientific approach is to our professional activities. I think that one result of the increased emphasis on standards is that we are going to have a greater emphasis on process and technique, and perhaps less on result. This is, in part, because of the long standing tie between the actuarial and the accounting profession. We asked an accountant to

come talk to us about the way they set standards. We seem in many ways to be aping the Financial Accounting Standard Board as we set up the Actuarial Standards Board. I hope that we don't pursue this too far.

There's an interesting little article that appeared in Fortune a few years ago. It's an interview with a professor at Rice University. He is a professor of economics and accounting which is an interesting combination in and of itself. Professor Robert Sterling likened the accountants to astrologers. He says that they have all of these very artificial rules that tell you what the value of something should be for the purpose of putting together a balance sheet. Those values sometimes don't have a whole lot to do with reality. The true tests are the transactions that occur in the marketplace, particularly takeover bids when somebody will bid 2 or 3 times book value in order to acquire a company. He says that's much more like astronomy, where instead of saying where Mars ought to be, you simply look in the sky and find out where it is and go about your business. I hope that, in the end, we as actuaries will continue to think as ourselves more as astronomers than astrologers and will continue to be concerned with the result and not become obsessed or fixated on the process or technique. But it's not going to be easy.

Our own education and examination process is in many ways aimed at that process or technique. We teach our students how to develop pure premiums. We teach them how to develop loss reserves. The examination process is much more aimed at that "how to" than it is at the quality of the assumptions that underlie any of those techniques, or at the selection process that one has to go through in order to determine which technique is appropriate in the circumstances. Those don't make easy examination questions, they're difficult to specify, so the exam process tends to emphasize technique rather than result.

We're engaged in the process of establishing reserves for the economic consequences of contingent events. In pricing it's even worst I suppose, the event hasn't even occurred. Even here in reserving the event giving rise to the claim has already occurred, but the financial consequences of that event remain contingent upon many future events. They're contingent upon whether an injured party dies, remains disabled or recovers. They're contingent upon the injured party's selection of legal representation, whether it's of high quality or not so high quality. (Quality has several definitions.) They're contingent upon what a judge permits to occur in certain kinds of cases, what a particular jury decides, a whole host of things. Those are yet to happen at the time we establish the loss reserve. Yet, we have to go ahead and set it. It is that estimating process that makes it so difficult to get the accurate value and drives us to place emphasis on the technique or the process by that answer was derived.

Both Pat Kenney and Congressman Lent talked a little bit about the public's perception of this process. The public thinks that we are all very exact

and we do this with a great deal of sophistication. Of course, we all know a little better than that. Yet because we're trying to get at the answer of what's going to happen in the future, we keep trying to refine our techniques and do a better job. Of course, one difficulty is that there is a retrospective test. You can tell several years down the road what the answer should have been. What it should have been at the time it was set is something that we seldom pause to look at.

Something that is worthy of notice is that economists seldom catch the turning points. I submit that in our business catching the turning points is perhaps the most important thing that we're trying to and one that we have the greatest difficulty doing. The straightforward, steady-state extrapolations are pretty easy, turning points are difficult. Securities and financial analysts are another group that everybody knows that prognosis. They may or may not be scientific but we are certainly not going to hold these people responsible for their predictions retrospectively the way we seem to want to do with our own loss reserve estimates. Politicians, I'll leave you to fill in the blank.

The first two of these, the economist and the financial analyst, often give fairly detailed backup to their predictions. In the past, I think that's what actuarial standards have encouraged. As the guides to professional conduct state there should be enough detail in the actuary's report that another professional practicing in the same field can reach an objective assessment of his conclusions. The actuarial standards in the past have emphasized that to the point where most of us filed pretty detailed reports to support our recommendations and one company even makes a detailed actuarial report available to its shareholders and distributes it widely. We've had that kind of emphasis and we've avoided the constraint on the choice of method and assumptions. I think that's been healthy and has been recognized in the scientific basis of the profession. One of the last interpretations says there should be no inflexible guidelines and the emphasis should remain on professional judgment. That's certainly the way that I hope it stays.

In closing I would just observe that this tension between the process and technique, on the one hand, and the result on the other, between the legalistic and the scientific is a healthy one. It's one that as actuaries in the casualty field we're perhaps uniquely exposed to, at least, in the form that we have to deal with it. I sincerely hope that the Actuarial Standards Board will do a good job of maintaining the appropriate balance between these competing forces so that we as practitioners will be able to continue to exercise our sound professional judgment. Thank you.

DAVE HARTMAN: Thank you very much Jim. Initially we'll have our panelists ask questions of one another. I'll repeat them into the microphone and maybe the person who the question is directed to can come up here to respond. Then later when I ask for questions from the floor if you

can identify yourself by name, I'll repeat your question. Again, we'll have people come to the podium to respond. Any questions of one another first of all?

A question from Tom to Pat about the conflict between legalistic and scientific within the accounting profession.

PAT: I wrote down the words when Jim was speaking and I think I have the right, that is that nobody ever goes back and says that you evaluate what the reserve should have been at the time that they were set. Now everybody says "Well, they have developed differently. Did you come to the right conclusion based on the information available? That's the biggest problem I think the auditing profession has today. We're trying to form judgments relative to information available to us at the time we form that judgment. I think that where we run into our biggest perception problem with the public and our biggest problem related to what I think Jim was alluding to that when subsequent information becomes available, business failures can occur. Business failures are translated as audit failures, Then, because accounting firms in spite of our difficulty getting coverage, do have insurance coverage, they become the deep pockets associated with the transaction. I think we're involved in the same determination--legalistic versus practical at the time.

JIM: It seems to me that part of the problem that's going on is that there is some difficulty with the basic accounting model. The basic accounting model says that on December 31st, you should close up the books and decide whether you made a profit or a loss. In the casualty business we don't really know. It's going to be a few years in some lines, and a few months in even the best of them. Before enough information is available to reach a supportable conclusion. I think accountants have the same kind of problem with inventories, and work in process. You're going to be able to sell it for what it cost you to make it and sell enough of it to amortize the R&P over the life that you assumed. That model gets so strained when you get to a line of business like medical malpractice. The real difficulty here maybe with the underlying model and not with the accuracy of the determinations that anybody makes when they make those early estimates.

PAT: I don't disagree with you at all Jim. I think what happens is the same thing that probably happens in your profession. Whereas you would love to tell company management that you're not in the position to tell him whether or not you're pricing on a particular line of business was adequate and you'll be able to tell him that 5 years ago, He'll say, -- "Well, that's great Jim, but I was talking to Walt Fitzgibbon out there and he said he could give me that information in 3 years. I'll go over to Walt and get it from him. I think that is the problem, unfortunately, and I think it's obviously the most significant problem. Accountants have difficulty coming to grips with a concept of what do you mean, you didn't

know what it cost you when you sold the product. That just goes against our grain and that is right at the basic nature of the insurance industry. We haven't developed an accounting model to deal with it. We're unable to come to grips with loss reserve discounting because although we might be able to intellectually accept that, we're not able to accept on the other side that we ought to put our assets at market value. We just haven't built the right accountability. Maybe you guys could build it for us, the right accounting model for the industry.

DAVE HARTMAN: Questions from the floor?

PAUL LISCORD: A question to Tom on how do you write standards to guide people from misapplying techniques?

TOM MURRIN: That would be a good assignment for the Casualty Operating Committee. But very seriously Paul, if standards of practice are well known, and codified and in existence, the misapplication shouldn't be difficult to detect by the reviewer, the client or, the sponsor. You don't write a standard of how to add two and two, or how to use a calculator. If someone understands techniques and methodologies well enough to use them and something's wrong or they're misapplied, the person is either careless or over his head in what he's doing. To some of Jim's remarks earlier, you can't write a standard for every step of a process. But you should have standards out there where methods, assumptions, and techniques are all well understood, codified and promulgated. If somebody puts a car in reverse and he's supposed to go forward, that's not the problem of the manufacturer. It has always happened. It's happened probably in every profession including medicine that led to fairly tragic results. But no profession is free from that and it will be with us forever I think. I know that's not very responsive but it's always out there and one that we have to be aware of. Other questions?

KEVIN CLINTON: A question to Jim about the role and ranges of estimates when it comes to standards.

JIM MACGINITIE:

Ranges is a fun topic. A couple of things that come to mind. One is it drives the accountants crazy. Especially if you say that there's no point within the range it's more likely than any other. Which you and I both know is a pretty unrealistic scenario. That we almost always have some kind of unimodal distribution where there's one point that is more likely than all the rest. Secondly, I think we, as actuaries, have under-appreciated the width of the range. I've seen reports that have 67% confidence intervals, 95% confidence intervals on lines of business that is in my opinion they've got very little business being applied to. I had an interesting experience with ranges a few month ago in an entirely non- insurance setting. A management professor came into a class I was in and there were 30 or 40 of us. He had a list of 10 questions and he said -- I want you all to write down the answer to these 10 questions and I want you

to give me a range, not a point estimate, but a range of answers which is designed to be 90% sure of containing the correct answer. Then he proceeded to ask us these 10 questions. The questions included the year in which Beowoll was written and the square miles in Canada. They all had numerical answers and were all things that none of us could be expected to know off the top of our heads. He tabulated the answers. Given that we were all to write down 90% confidence intervals, we should have captured the correct answer 9 out of 10 times. In fact, the highest score in the class was 8. The mean was 3-1/2 and the mode was 3. I've been dying for chance to use that on my colleagues, like you, to demonstrate the fact that we inherently take a much tighter view of what's an acceptable range than is realistic. I ask most of you to think back in your own personal experience, if you had tried to set 90% confidence intervals, or even 67%, you would have had an answer that fell outside of that far more often than 1/3 or 10% of the time. Do I see any heads nodding up and down out there? I think that's one of the problems with setting ranges; the ranges are going to be unacceptably wide. For the purposes of the accounting model that Pat and I were just arguing about, the accounting model can't tolerate that wide of a range because it basically says we have to express no opinion. We cannot express an opinion on those financial statements. While I think range work is desirable and needs to progress and will. I think the standards boards of the accounting and actuarial professions are going to have a great deal of difficulty dealing with what I perceive to be the real world.

DAVE HARTMAN: Other questions?

WENDY JOHNSON: How do we develop a new accounting model?

JIM MACGINITIE: Obviously one of the things that has a great deal of appeal is the old participating model that life insurance companies ran for so long and some workers' compensation companies did. You start with a known redundant premium and you pay dividends based on actual experience, furthermore you do this more than 6 months or after the surpluses emerge. There's a model in London used by Lloyds, that uses a 3-year runoff, which for the kind of business they write on non-marine, anyway is grossly inadequate time period. But again, that's another start of the kind of thing that you can do. The third is that is kind of explicit in Schedule P and some part of Schedule O; an accident year approach that you keep track of the results by accident year. It takes a little bit of manipulation to go back and restate year after year results. There are securities analysts from time to time keep score of the runoff. And of course, some people don't like the results of that so they engage in distorting transactions. Those are ways that seem to me are not inappropriate. It's entirely possible that the standard setting process will place a greater emphasis on at least disclosure of what the accident year components recommendations are. I don't think we've got the muscle economically to say we're not going to keep books on an annual basis and every December 31st total it up.

But I do think you can have something better than Band-Aid and less than perfection in terms of a solution.

PAT KENNEY: I guess I would agree with your answer, Jim. I think what's happened is you have these different users of financial information that require this periodic reporting including the regulators. They can be the taxing authorities who want tax dollars, or it could be the investment community. It was basically the investment community in 1967 which drove the property liability industry to come up with a better answer than they were giving the public for statutory information. At that point in time they did not have any idea to the problems associated with long tail that we're encountering today and the fact that the periodic measurement process as defined at that point and time and as currently interpreted really doesn't get to the heart of the nature of the business. But I think what's going to happen is that things like the SEC Reserve Disclosure Requirements, additional information related to market values of securities, trend techniques associated with these reserve disclosures, and imputation of information by investment analysts, are going to all cause additional information to be presented along with the historical accounting model. This will allow people to draw a different conclusion relative to the results of the information that's being presented. I think the accounting model itself may change but it will change slowly as people like the FASB understand that the current accounting model is not serving the needs totally of the industry. I agree with you 100% that this is going to be a slow process in occurring.

DAVE HARTMAN: It's interesting to me to note that last year Jay Cushman, representing the security analysts, had as part of his presentation, Honor thy database". A key need pointed out again today. One last question perhaps?

MIKE WALTERS: A question to Pat on how high is up?

PAT KENNEY: I guess the advice I would give would be to follow some of the words that Jim talked about earlier. Part of the problem that the accounting profession has is that we go out and set these standards and rules, and they come home to haunt us in many cases. For example, Jim was talking before about ranges. The reason accountants go crazy at ranges is because we have a standard called FAS #5 which says that if a range is from 5 to 10 and no number between 5 and 10 is any better, then the company can use 5. Well the company uses 5 and what happens is somebody comes along and says well clearly you should have known Mr. Accountant that 5 wasn't really a good number. You should have opted for 8, 9, or 10. The reason you should have done that is that they'll look at information which has occurred subsequent to that balance sheet date and they'll say clearly it indicates that had you had your head screwed on straight you would have done something other than 5. I think if you get yourself into the same category they're going to come to you. They're going to say -- we could

understand the accountants accepting 5. What the hell do they know? They're not as smart as you actuaries, and you guys clearly should have come up with a better number between 5 and 10.

DAVE HARTMAN: A question from Tom to Pat regarding the conflict between the legalistic and scientific approaches in accounting.

PAT KENNEY: I think Jim's point is right on. I put up a slide that said competent evidential matter and due care as being two of the standards attributable to the auditing profession. I think those are the standards that so often trip us up because, oftentimes, when you have a business failure, people then perceive that there must have been an audit failure associated with that business failure. The accountants get sued and in the course of those lawsuits, accountants get put on the stand and asked questions. Questions like: Isn't it normal in your profession, or shouldn't you have done this. Or doesn't the standards of your field work require that you do ABC? I think what's happened, and Jim wasn't too far off the base when he is that there is this compilation of literature which defines ground rules, road maps, etc, for accountants which really to some extent have put us within a box. The accounting profession, as I said before, has trouble conveying to the public what it is we do and what it is we say about what we've done and what responsibility we take for what we've done and what we've said about what we do. Having said all of that we then have gone off and done some self examination. We have appointed committees, the most recent of which is the Anderson Committee which has tried to deal with this concept of what the perception of the public is and how good a job the auditor has done in communicating what he is doing to the public. It has recently come out six months ago with something called an Attestation Standard. It is a new standard that really says -- get away from that two paragraph opinion you do. I know we're not supposing to be doing this but when you're off giving loss reserve opinions there are specific standards that you should follow with specific words that you should use. This is a long winded answer to say that I think we have put a lot bricks and mortar in terms of professional literature into places which basically when you look around, somebody is going to say -- my God we don't have a door to this place anymore. We've built ourself into a corner. I'm afraid if I could give you any advice at all. Pat I guess my advice would be not to build the same sort of literary bricks and mortars around yourself that puts you into this legalistic format that then will push you back to what is it that we should be doing and saying. Having said all of that, before I give this microphone up and let Jim get back on it. We still don't like the ranges that you give on loss reserve estimates.

JIM MACGINNITIE: Pat, just an item of clarification. I don't have much difficulty with auditing standards. Thou shalt check all of these things. To put it in actuarial terms if you're going to look at reserves I think it is perfectly appropriate to say before you conclude that there's been no change in the adequacy of the reserves, you need to look at the average

outstandings and disposal rates. If you don't do that you can't use that conclusion. My concern is more in the accounting standards when people use to have lots of different ways of handling foreign currencies. Everybody said that's inconsistent, so here is one way you have to follow the foreign currency translation rules, FAS '87, which those of you who have anything to do with pension work are probably familiar. Actuaries used to think there were lot's of different ways to do pension cost calculation and the accountants didn't like that lack of consistency. It is that proscription of method in the accounting rather than the auditing that I'm concerned about, and hopeful that we won't push too far.

A question to Pat on discounting.

PAT KENNEY: First, I'll give you some background. The Insurance Companies Committee of the AICPA put forth a paper on discounting approximately three years ago. That got up to ACS&C who said "Wait a minute now, we don't want to deal with discounting of property liability reserve because that's piecemeal approach and we really want to deal with the concept of discounting in general as it effects the accounting model in the preparation of financial statements. We're going to take this paper on discounting of property liability reserves and put it on a shelf. They then set up a task force to deal with the concept of discounting. This task force is the one that has the four accountants and one actuary whom we know on it. They have brought forth a draft paper which attempts to do two things. First, it attempts to deal with the generic discussion of discounting and when discounting may be appropriate in financial statements. Second, it has some recommendations relative to when discounting for property liability insurance reserves may be appropriate. The task force met with the insurance company's committee in June. After all the blood was scraped off the wall, etc. the task force has produced another draft which they discussed about a week and a half ago. They now are in the process of releasing that draft for discussion at the ACSEC meeting at the end of October. I'm just guessing that the draft does support discounting of property liability reserves. If ACSEC supports that it will then forward it to the FASB in the form of a discussion memorandum. Then, having said all of that, and now having three or four years elapse in the process, the FASB can do one of two things. It can say yes we will take that on as a project the same as they did with the life issues. If they take it on as project, they then review it and their staff drafts what would be potentially an amendment to FASB 60. This is in a timeframe of up to three years given the pressure which will probably come, that Jack Byrne alluded to at lunch and the accounting profession on the industry as a result of the current tax act. I would say that they probably won't move that fast. I would guess that what you will see, maybe by the end of '87, something from FASB, but I would not expect it until '88. I would suspect though, and this is a personal opinion, that you might see practice moving in a slightly different direction than what it is right now.

DAVE HARTMAN: A question to Pat on whether discounting is allowable?

PAT KENNEY: The current interpretation of accounting literature, and I say that because these are the people who've been dealing with this for a fairly long period of time, is that there is a misunderstanding or two avenues of interpretation. I indicated before that FASB 60 was a codification of previously existing accounting literature. The element of FASB 60 which would make discounting appropriate came out of the interpretation 1978-6. The people who wrote 1978-6 said discounting is not appropriate. When it got codified in FASB 60 there now does appear to be a situation in which FASB 60 would be appropriate. However, having said all of that, practice right now as accepted by the SEC is that you can discount reserves for GAAP purposes if you discount them for statutory purposes which would primarily limit it to life table, workers' compensation cases, and, in some states, medical malpractice. The SEC did amend its position slightly when they came out with SAP 62 in July of this year. In that case they said, yes, you can do all of that and you may also discount at a rate other than what your using for statutory purposes is allowed. If you do that and you change to that new rate you must treat this as an accounting change and run it through on a cumulative catchup basis. I've said a lot of words. Basically the interpretation by the SEC is that only discounting of workers' compensation and medical malpractice when it's permitted for statutory purposes. The reason they say that or the reason that you can interpret that as GAAP is that they just will not accept the preferability letter from an accountant if you had to get one relative to any other line of business.

DAVE HARTMAN: A question to Jim regarding alternatives to the legalistic approach.

JIM MACGINNITIE: What's the alternative to a legalistic approach? Taboo is a strong word. I think what I was saying in arguing is that there are a number of difficult situations that we as actuaries face. The choice of an appropriate method and an appropriate way to deal with that exercise is, in my opinion, a matter of professional judgment. My concern is that as we move toward a legalistic approach, witness FASB '87 on the pension cost and pension liability, the range of methods from which you can choose gets to be narrower, narrower and narrower. That's a direction that I think is inappropriate given the wide range of real world situations that we face. If somebody ended up saying to me look you can only use incurred losses, you can only use them if they're tabulated on an accident year basis, and you've got to use a trend assumption in the severity of 11%, then I think I've been shackled and I may no longer be able to produce, what in my opinion, is the most appropriate indication.

DAVE HARTMAN: A question to Jim regarding how will the AICPA respond if the NAIC disallows discounting

JIM MACGINNITIE: Most of the AICPA literature clearly states that it does not deal with statutory accounting practices. It deals with general accepted accounting practices. There are already some differences now between GAAP and SAP. The recover for salvage and subrogation is the biggest one on the casualty side, but on the life side there are enormous differences. You could have them going forward and essentially you'll find yourself keeping several sets of books. One for GAAP, one for SAP, one for the IRS. That's really where you are at today. It's just one more area of difference that comes into being. The other thing I have to say is I'm not so sure the NAIC is going to hold firm on this. As self appointed protectives of the consumer, discounting is something that they need to recognize in ratemaking. They have in many jurisdictions when it comes to a line I know a lot about -- medical malpractice. It's difficult to discount on the pricing and not for statutory reserving unless you've got an awful lot of surplus to fund that difference. Many of these enterprises that are providing capacity in a difficult market do not have.

DAVE HARTMAN: I'd like to extend some thanks. First of all to Susan Hankins here in the front row, who is serving as our recorder today. Second of all to you as the audience. I would urge you that if you felt this session was useful and valuable that you tell your friends about it, especially tell them how to get to this room. If it wasn't particularly good and valuable let me know. But most especially let's thank our three panelists, Jim MacGinnitie, Pat Kenny and Tom Murrin.

1986 CASUALTY LOSS RESERVE SEMINAR

2E - WORKERS' COMPENSATION RESERVING

Moderator: Richard I. Fein, President
Insurance Technical & Actuarial Consultants

Panel: James F. Golz, Asst. Vice President
Wausau Insurance Companies

Roy K. Morell, Asst. Vice President & Associate Actuary
Liberty Mutual Insurance Co.

Recorder: Raymond V. Debs, Consulting Actuary
Insurance Technical & Actuarial Consultants

RICHARD FEIN: My name is Richard Fein. This is Session 2E, Workers' Compensation Insurance. In this session we're going to consider three topics and they are somewhat diverse but they're related by the fact that they are all potential techniques underlying the setting of workers' compensation insurance reserves.

There are two panelists sitting to my left. The first is Roy Morell of Liberty. He's an Assistant Vice President and Senior Associate Actuary and has spent about 14 years at Liberty. He is certainly qualified to talk on this topic. Not to be outdone is Jim Golz from Wausau. He's an Assistant Vice President and Actuary and has spent 16 years at Wausau. Once again, another expert. I'm a moderator but I will certainly make a presentation as well. Let me remind the audience that the views expressed are the views of the individuals and not necessarily the views of the American Academy of Actuaries, the Casualty Actuarial Society, or the employers of the speakers.

The first speaker will be Roy Morell. He'll be talking about the use of law amendment factors for workers' compensation reserves. As a general format, rather than saving all of the questions for the end of the panel, we're going to try using some time after each speaker for questions. That means we may have to cut off some questions if time becomes a problem. Since we're getting started a little on the late side that might be the case.

ROY MORELL: Thank you Rich and good morning everybody. (Slide 1) As I began to prepare for this presentation one of the first questions I asked myself was why a panel on workers' compensation reserving? What makes workers' compensation deserve special attention? (Slide 2) Certainly workers' compensation is a long tail line of insurance but there are other lines of insurance with long payout patterns. Why don't we have a panel on general liability or auto liability reserving. Is it because workers' compensation has both indemnity and medical components?. That can't be it because the liability lines have bodily injury and property damage plus benefits for auto. I finally concluded that the other lines of insurance deserve special attention too. For those in the audience involved in planning future CAS Loss Reserve Seminars, I suggest that panels on some of the other individual lines of insurance are warranted.

Returning to workers' compensation and its special characteristics, you don't have to think very long before you consider the statutory nature of this line. Unlike most other lines of insurance the benefits provided in a workers' compensation policy are prescribed in the statutes of each state. (Slide 3) Some state laws contain medical fee schedules which determine, to some degree at least, the amount of medical benefits the claimant may receive. Most state laws, however, provide for unlimited medical care. Thus the cost of the medical component for workers' compensation losses can rise with inflation even without a change in the state law.

It's in the indemnity area, however, where the statutes are more explicit. Normally the statute will contain a schedule of awards payable for every type of permanent disability. Everything from the loss of a little toe all the way to the ultimate tragedy of death benefits. In the case of temporary disability the law usually calls for a certain percentage of lost wages (normally about 66-2/3% to be replaced subject to a weekly minimum and maximum). Thus in the case of scheduled awards, indemnity benefits can change only when there's a change in the law. Wage replacement benefits, on the other hand, can increase as wages increase but only to the extent that the minimum and maximum weekly benefit do not apply.

When there's a change in a state law as respects workers' compensation benefits, the rating bureau which is responsible for rates in that state will calculate a law amendment factor. The purpose of the law amendment factor is to measure the change in total losses due to the change in the law. Rates are then increased subject to regulatory approval by the law amendment factor. The remainder of this presentation will concern itself with the use of law amendment factors in setting workers' compensation reserves for indemnity benefits.

There are many different methods available for analyzing and calculating required reserves for workers' compensation. This presentation will concentrate on one particular method which I believe to be in fairly wide use today. (Slide 4) I will refer to it as the average cost method. I will be applying this method to accident year data.

At previous loss reserve seminars, the suggestion has been made and the importance has been stressed of separately analyzing and reserving for indemnity and medical benefits. This method, as applied to workers' compensation indemnity reserves, involves gathering accident year incurred indemnity losses reported at various ages and the corresponding reported number of claims. The incurred losses are divided by the corresponding claim counts to produce a triangle of historical average costs per case. Historical development patterns are calculated and future development factors are selected separately for average cost and claim counts. The product of developed ultimate average costs and developed ultimate claim counts equals the estimated ultimate incurred losses for each accident year. Current reported incurred losses are subtracted from the estimated ultimate losses to produce the required bulk reserve, that is, both pure IBNR and case supplement on an accident year by accident year basis.

It has further been suggested at past loss reserve seminars that indemnity reserves be set separately for pension and non-pension cases, if possible. Although I find this argument persuasive, at Liberty Mutual we do not have the required data split. Thus, I will be referring to total indemnity benefits.

Although I presume that most large multi-state insurance companies would apply this method on a country-wide basis, it could be applied on a state-by-state basis. In fact a company with it's book of business concentrated in a few states should probably do so. I will review Liberty Mutual experience using both countrywide data and selected state data.

The key to the proper use of this methodology is an accurate estimate of the developed average cost per claim. This is particularly true for the most recent years. The greatest portion of the total reserve and the greatest amount of uncertainty are associated with the most immature accident years. If there is some information which is external to the reserve data which can help us get a better estimate of ultimate average costs for the most recent years, then that information should be considered. For workers' compensation the law amendment factor is just such information.

Now that you know of the methodology to be employed, we can return to a discussion of the nature of law amendment factors. (Slide 5) As I mentioned earlier, when the workers' compensation law in a particular state changes, the responsible rating bureau will calculate the law amendment factor. The purpose of the law amendment factor is to measure the change in losses caused by the change in the law. Since the laws contain specific benefit provisions for each type of injury, the law amendment factor is calculated for each injury type. The various law amendment factors have been weighted with an injury type distribution to produce an overall law amendment factor. As an intermediate step, law amendment factors for total indemnity and total medical are normally calculated. This is an important point because if you are going to be reserving for indemnity benefits then you want to know the indemnity law amendment factor rather than the total law amendment factor.

Let me give a simple example. Suppose it is estimated that indemnity benefits are being increased by 10% due to a change in the law and that indemnity losses are 70% of total losses. Further, suppose that there is no change in medical benefits. In that case the overall law amendment factor will be 1.07 or a 7% increase. Sometimes the state law is amended only with respect to a single injury type. Suppose that benefits for death cases were increased by 100%. And further assume that death cases were 6% of indemnity losses and 4% of total losses. In this case the indemnity law amendment factor would be 1.06 and the total law amendment factor would be 1.04. In that situation if you have a typical distribution of losses by injury type, and assuming all else is constant, then you might expect to see your indemnity losses increase by 6%. If, on the other hand, you had no death cases in your data, then you may see no increase in your losses whatsoever. The key point is that when the benefit change is not uniform across injury type, then companies with different injury type distributions can expect different impacts.

For most law changes, total losses are increased by increasing the severity or average cost of claims. This is normally done by increasing weekly benefits, scheduled amount or duration. There are, however, occasions when the law change does not directly impact severity. Examples of such changes are a court case providing new coverage or a change in the waiting period for temporary disability benefits. I point this out now because I will later on be inferring that law changes impact severity. I want to caution you, however, about the exceptions to that assumption.

State law changes normally apply to all accidents occurring on or after the effective date of the change. For this reason, increased premium must be collected not only from new and renewal policies but for outstanding policies as well. Occasionally the Rating Bureau, to minimize the expense of collecting additional premium on outstanding policies will include in a rate change a law amendment factor greater than the change in losses, but apply the higher rates to new and renewal policies only. You need to be aware of such situations if you want to know the impact of the law on losses rather than on rates.

(Slide 6) Information about law amendment factors are available from several sources. I found the most comprehensive source to be the National Council's Annual Statistical Bulletin. The bulletin contains a history of law amendment factors by state by injury type. It also contains a country-wide law amendment factor using an industry wide distribution of premium by state. The countrywide law amendment factor is probably appropriate for most large companies with a nationwide mix of business. Companies that are geographically more concentrated, however, would need to calculate a countrywide law amendment factor using their own mix of business by state. Another source is NCCI's Legislation Update Service. Another source would be the Rate Revision Bulletin and Memoranda published by NCCI and the various independent rating bureaus. Still another source would be an annual study done by Norton Masterson which appears in A.M. Best Review. This preceding list may not be exhaustive.

Now that we all understand the nuances of law amendment factors and the reserve methodology for which they may be valuable, let us turn now to the historical results. Keep in mind that we want law amendment factors to assist us in selecting developed average costs for the most recent accident years. I begin with the hypothesis that there are essentially two forces which determine changes in indemnity severity. They are law changes and wage changes. Some serious study by NCCI suggests that unemployment rates may also affect severity by impacting duration. Although this argument has some intuitive appeal, I have not incorporated changes in unemployment into this particular study. One reason is that regression studies of Liberty Mutual have shown very little explanatory value in the unemployment rates. Now let's look at the historical relationship between benefit changes, wage changes, and indemnity severity changes on a country-wide basis.

(Slide 7) I began by posting the country-wide premium change due to law amendment from the NCCI Annual Statistical Bulletin. Because I want to analyze indemnity data only, I multiplied this total benefit change by a factor of 1.30. This judgmental adjustment reflects the fact that indemnity loss is about 2/3 of total loss and that most, but not all, law changes impact indemnity benefits.

(Slide 8) The next step is to combine these annual benefit changes with wage changes. Wage changes are from the U.S. Bureau of Labor Statistics. The product in the right hand column of this slide will be compared to annual changes in indemnity severity, using Liberty Mutual data. Before we look at that comparison, what do we expect to see? Earlier in this presentation I described why wage changes do not always produce a direct change in indemnity average cost. In particular the existence of schedule awards and maximum weekly benefits both tend to limit the impact of wage changes on average costs. Based on that fact, we might expect to see indemnity severity change to be less than this product amount.

(Slide 9) As expected, we see indemnity /severity changes which are generally less than the product of law and wage changes. This relationship is not quite as consistent as I would like it to be. Reasonable explanations, however, do exist. There are 3 years, 1975, 1976, and 1979 which do not follow the expected pattern and deserve comment. The year 1975 was one of the years of the greatest change in workers' compensation benefits. The view that I've heard expressed on many occasions was that the benefit changes of 1975 were underpriced. In particular, greater utilization of the workers' compensation system through longer duration of claims was seen. This would explain the anomaly of 1975.

The years 1976 and 1979 were years of significant changes in frequency as respects Liberty Mutual data. In 1976 we saw increased frequency and in 1979 we saw frequency decrease. My theory is that frequency changes occur at the low end of the average cost spectrum, that is for small claims. An increase in frequency, therefore, means more small claims and a decrease in average cost. For these reasons, it seems reasonable to exclude those three years from this analysis. I also don't want to use the latest 2 years since they're too immature to really draw conclusions from. So 1984 and 1985 have been excluded. I calculated an average difference of 5.3% between the actual severity change and the product of the change in law and the change in wage.

(Slide 10) If I now consider the product of the benefit change and only 40% of the wage change, then the difference between this product and the actual indemnity severity change is almost zero. This result seems reasonable in light of the fact that nearly 60% of indemnity benefits are associated with permanent partial injuries involving scheduled awards. We now have a historical relationship which can be used to help predict the change in indemnity severity for the two most recent years.

Although this historical relationship on a net basis is very close over the long range, the year to year fluctuations are more than I would like to see. On this slide, the difference between the severity change and the product (for the years used) is in a range of plus 4.1% to minus 5.6%. I have examined similar information on a state basis. I hope to again find the close long-term net relationship between the low wage product and the severity change. Additionally, I would hope to find a more consistent relationship from year to year.

Before we look at the state results, however, I'd like to address myself to those in the audience who are wondering why I didn't use the multiple regression to find the best relationship between law change, wage changes, and indemnity/severity change. The fact is that I did a regression analysis but rejected it for this relationship that I found more intuitively sensible. Let me, however, briefly share those regression results with you.

(Slide 11) These results were derived from the same data that I used to select my relationship. In particular I used indemnity law change, wage change, and indemnity severity change for 1977 through 1983 excluding 1979. The constant term and both coefficients are bothersome to me. The constant term implies that if there were no change in either law or wage, then a 15% decline in indemnity average severity could be expected. The fact that both coefficients are closer to two than to one is also unreasonable. I did rerun the regression and fixed the constant term at zero. In that case the coefficient for the law change was 46% and for wage change it was 68%. It may be that because these regression parameters which are derived from a fairly short history that they will not work well in times of law and wage changes that are significantly different from those in the experience period. Whatever the reason for the regression results, they were not consistent with my perception of the real world. And thus I chose the relationship previously discussed.

Let me return now to the relationship and the results on a state basis. (Slide 12) I reviewed six of the major states hoping to find greater stability in the larger states. On this slide, you can see the results of the state of New York. Although New York did not produce the long-term net result close to zero, it was the best behaved from year to year. And looking at that slide and saying it's the best behaved, you can imagine how the others looked. The product of the low change and 40% of the wage change was always within 8.7% as a predictor of actual indemnity severity change. In fact, this is a larger range than we saw in the country wide data. On a net long term basis, the minus 1.6% is pretty good.

(Slide 13) A similar analysis was performed on 5 other states and the results are summarized in this slide. Based on the long term average across all six states, the product of law change and 40% of the wage change

is an excellent predictor of indemnity severity change. The two statistics are different by only 0.1%. By state, the range states was from 2.0% to +3.3. This relationship was maintained for states which experienced both large and small law and wage changes during this period.

Overall this appears to be a very satisfying and valuable relationship. I'm still bothered, however, by the lack of consistency in a relationship from year to year. It's valuable therefore to consider some possible causes that would disturb the long-term relationship between the law/wage product and indemnity severity.

To the extent that the annual change in average cost of indemnity cases does not behave as we would expect, it may be due to changes in other factors aside from law and wage. These changes may be either internal (peculiar to the individual company), or external factors affecting the entire industry. We must begin by identifying these potential influences. And as reserve specialists it is our job to be mindful of such factors, to recognize when they are impacting our data; and to adjust our thinking and our reserving accordingly.

(Slide 14) Let's consider first the internal factors. Since workers' compensation benefits vary significantly by state, any change in mix by state will affect your indemnity severity. Whenever you write new business there's always the question of whether, in the aggregate, the new business is like the renewal business. Our studies have consistently shown a higher loss ratio for new business and generally higher indemnity severity for new business. Thus, a change in the mix of total business between new and renewal could impact the indemnity severity.

If you are analyzing your data on a total direct basis and if you're a servicing carrier, then your average cost could be affected by any change in your mix between voluntary and involuntary business. The involuntary business generally carries a significantly higher average cost. At Liberty Mutual, we have seen the impact of this factor very clearly as the marketplace shifts between a hard and soft market. I have eliminated this factor in the study just presented by using voluntary data only.

Any change in your mix of business by class is also likely to impact your indemnity severity. This might be monitored in a summary fashion by considering your distribution by industry group or by hazard group. Another element of mix by class is the mix of "F" class versus non "F" class. Because the National Council reports must be submitted excluding "F" class, this split can also be readily monitored.

If your loss reserve analysis uses unlimited losses, then your average cost could be affected by any unusually large claims. This problem could be avoided by eliminating excess losses above some appropriate loss level.

One final internal factor which can affect indemnity severity is the level and expertise of your own claims department. If your claims department is either inexperienced or understaffed, then they're not going to be able to investigate and settle claims as efficiently as possible. This could lead to inflated settlements.

(Slide 15) Turning now to external factors which affect indemnity severity, there are two which come to mind. First, studies have shown that increased activity in the U.S. economy has been positively correlated with increased frequency of workers' compensation claims. The increase in claims normally is not uniform across injury distribution by type of injury. This in turn impacts the total average cost per case.

Secondly, studies have shown that an increase in the unemployment rate has been associated with an increase in the average duration of claims. This is apparently due to the idea that someone already receiving workers' compensation benefits would resist admitting recovery when there is no job to which to return. Longer duration obviously means higher indemnity severity.

To summarize, I have identified a predictable relationship between law change, wage change, and indemnity severity change. The available information on law amendment factors is a key element. (Slide 16) The value of this relationship is its applicability to the immature accident years, when using the developed average cost times claim count method of reserving. Although I have not worked out the details, some judgmental credibility weighing seems appropriate to calculate the final developed average cost for accident years less than 3 years old. Initially, high credibility is given to the forecast using external data on law and wage changes. As the year matures, greater reliance is placed on a straight developed average cost.

(Slide 17) Further, I have identified some factors which tends to destroy the predictable long-term relationship between law change, wage change, and indemnity severity change. We must be watchful for such changes, quantify the impact of such forces, and adjust our reserving accordingly. In the absence of these destabilizing factors, we have a predictive relationship which makes intuitive sense and shows good long term results. Thank you very much.

Do we have any questions? Please talk in the microphone.

QUESTION: When you stated that there's an external correlation in increased activity in the U.S. economy, are you referring to real GNP or are you talking about social and economic inflation as far as increased frequency being correlated to it?

ANSWER: The real GNP.

QUESTION: Did you perform that analysis as you did with the voluntary data only with the involuntary? Are there any significant differences as a result?

ANSWER: I did not perform it with the involuntary data.

QUESTION: Did you find there's any overlap between the wage and the law amendment? For example, if there occurs an increase in the maximum or the minimum due to an increase in average wages. That would be reflected in the law factor but that's also reflected in the wage factor. Can you comment on that?

ANSWER: I would agree that that overlap exists. Wage changes quite frequently cause in the law change. There has been a long term difference of opinion as to whether or not when laws are changed (only because of a change in wage) there should be a corresponding law amendment factor. Regardless, clearly there is an overlap and I guess I'd have to say that that's recognized in the final relationship that I showed using the full law but only 40% of the wage change.

SLIDE 1

THE USE OF
LAW AMENDMENT FACTORS
IN
WORKERS' COMPENSATION RESERVING

SLIDE 2

SPECIAL CHARACTERISTICS OF WORKERS' COMPENSATION

- LONG PAYOUT PATTERN
- INDEMNITY & MEDICAL COMPONENTS
- STATUTORY BENEFITS

SLIDE 3

TYPES OF WORKERS' COMPENSATION BENEFITS

MEDICAL BENEFITS

- MEDICAL FEE SCHEDULE
- UNLIMITED MEDICAL

INDEMNITY BENEFITS

- SCHEDULED AWARDS
- WAGE REPLACEMENT
- VOCATIONAL REHABILITATION

SLIDE 4

THE AVERAGE COST METHOD
USING INDEMNITY ACCIDENT YEAR DATA

DEVELOPED AVERAGE COST
X DEVELOPED CLAIM COUNT

= ESTIMATED ULTIMATE LOSSES
- CURRENT REPORTED LOSSES

= REQUIRED BULK RESERVE
(IBNR PLUS CASE SUPPLEMENT)

SLIDE 5

THE NATURE OF W.C.
LAW AMENDMENT FACTORS

- TO MEASURE THE CHANGE IN LOSSES CAUSED BY THE CHANGE IN LAW.
- CALCULATED BY STATE
- CALCULATED BY INJURY TYPE
- AVAILABLE FOR INDEMNITY VS. MEDICAL
- NORMALLY MEASURE SEVERITY CHANGES
- NORMALLY APPLY TO RATES FOR NEW, RENEWAL AND OUTSTANDING POLICIES.

SLIDE 6

SOURCES FOR LAW AMENDMENT FACTOR INFORMATION

- NCCI'S ANNUAL STATISTICAL BULLETIN (COUNTRYWIDE & BY STATE)
- NCCI LEGISLATION UPDATE SERVICE (BY STATE)
- RATE REVISION BULLETINS (BY STATE)
- A.M. BEST REVIEW (COUNTRYWIDE)

SLIDE 7

COUNTRYWIDE W.C. BENEFIT CHANGES

YEAR	TOTAL BENEFIT CHANGE	INDEM. BENEFIT CHANGE
1975	7.7%	10.0%
1976	6.7%	8.7%
1977	1.8%	2.3%
1978	3.8%	4.9%
1979	2.1%	2.7%
1980	2.7%	3.5%
1981	3.1%	4.0%
1982	4.3%	5.6%
1983	5.0%	6.5%
1984	2.7%	3.5%
1985	1.7%	2.2%

INDEMNITY CHG. = TOTAL CHG. × 1.30

Slide 3

COUNTRYWIDE BENEFIT & WAGE CHANGES

YEAR	INDEM. BENEFIT CHANGE	WAGE CHANGE	PRODUCT OF LAW AND WAGE
1975	10.0%	7.0%	17.7%
1976	8.7%	7.2%	16.5%
1977	2.3%	7.5%	10.0%
1978	4.9%	8.2%	13.5%
1979	2.7%	8.0%	10.9%
1980	3.5%	9.0%	12.8%
1981	4.0%	9.1%	13.5%
1982	5.6%	6.9%	12.9%
1983	6.5%	4.6%	11.4%
1984	3.5%	3.4%	7.0%
1985	2.2%	3.0%	5.3%

$$\text{PRODUCT} = (1 + \text{BENEF})(1 + \text{WAGE}) - 1$$

Slide 9

YEAR	PRODUCT OF LAW AND WAGE	ACTUAL INDEMNITY SEVERITY CHANGE	ACTUAL - PRODUCT
1975	17.7%	20.7%	3.0%
1976	16.5%	-0.2%	-16.7%
1977	10.0%	3.2%	-6.8%
1978	13.5%	6.9%	-6.6%
1979	10.9%	24.5%	13.6%
1980	12.8%	9.7%	-3.1%
1981	13.5%	7.0%	-6.5%
1982	12.9%	12.6%	-0.3%
1983	11.4%	2.9%	-8.5%
AVG. 1977-83 (ex '79)			-5.3%

Slide 10

YEAR	PRODUCT OF LAW & 40% WAGE		ACTUAL INDEMNITY SEVERITY CHANGE	ACTUAL - PRODUCT
1975	13.1%		20.7%	7.6%
1976	11.8%		-0.2%	-12.0%
1977	5.4%		3.2%	-2.2%
1978	8.4%		6.9%	-1.5%
1979	6.0%		24.5%	18.5%
1980	7.2%		9.7%	2.5%
1981	7.8%		7.0%	-0.8%
1982	8.5%		12.6%	4.1%
1983	8.5%		2.9%	-5.6%
1984	4.9%	*	4.9%	
1985	3.4%	*	3.4%	
	AVG. 1977-83 (ex '79)			-0.6%

* FORECAST

SLIDE 11

Regression Output

Constant		-0.15453
Std Error of Y Est		0.03620
R Squared		0.43757
No. of Observations		6
Degrees of Freedom		3
	Law	Wage
X Coefficients	1.7514	1.9445
Std Err of Coef.	1.4366	1.2969

SLIDE 12

NEW YORK WORKERS' COMPENSATION

YEAR	PRODUCT OF LAW & 40% WAGE	ACTUAL INDEMNITY SEV. CHG.	ACTUAL - PRODUCT
1977	1.033	1.053	0.020
1978	1.236	1.188	-0.048
1979	1.220	1.202	-0.018
1980	1.039	1.079	0.040
1981	1.044	0.962	-0.082
1982	1.019	1.080	0.061
1983	1.102	1.015	-0.087
1984	1.106	1.128	0.022
AVG 1977-83 (EXCL 1979)	1.079	1.063	-0.016

Slide 13

AVERAGE LAW & 40% WAGE CHANGE VS. SEVERITY CHANGE
FOR YEARS 1977 - 83 (EXCL 1979)

STATE	PRODUCT OF LAW & 40% WAGE	ACTUAL INDEMNITY SEVERITY CHANGE	ACTUAL - PRODUCT
CALIFORNIA	11.6%	9.6%	-2.0%
ILLINOIS	3.3%	5.4%	2.1%
MASSACHUSETTS	7.2%	10.5%	3.3%
NEW YORK	7.9%	6.3%	-1.6%
PENNSYLVANIA	6.0%	5.2%	-0.8%
TEXAS	11.5%	11.3%	-0.2%
6 STATES AVG	7.9%	8.0%	0.1%

Slide 14

FACTORS AFFECTING INDEMNITY SEVERITY

INTERNAL FACTORS

- STATE DISTRIBUTION
- MIX OF NEW VS. RENEWAL BUSINESS
- MIX OF VOLUNTARY VS. INVOLUNTARY
- MIX BY CLASS
- EXCESS LOSSES
- LEVEL & EXPERTISE OF CLAIMS STAFF

Slide 15

FACTORS AFFECTING INDMENITY SEVERITY

INTERNAL FACTORS

- STATE DISTRIBUTION
- MIX OF NEW VS. RENEWAL BUSINESS
- MIX OF VOLUNTARY VS. INVOLUNTARY
- MIX BY CLASS
- EXCESS LOSSES
- LEVEL & EXPERTISE OF CLAIMS STAFF

EXTERNAL FACTORS

- NON-UNIFORM CHANGES IN FREQUENCY
- CHANGES IN UNEMPLOYMENT RATES

SLIDE 16

CREDIBILITY WEIGHTED DEVELOPED AVERAGE CLAIM COST

AVG. COST = (Z)(PREVIOUS SEVERITY)(1 + LAW)(1 + 40% WAGE)

+ (1-Z)(CURRENT REPORTED SEVERITY)(L.D.F.)

WHERE CREDIBILITY (Z) DECREASES AS ACCIDENT YEAR AGES

SLIDE 17

SUMMARY

* THE PRODUCT OF LAW CHANGE AND 40% OF WAGE CHANGE IS A GOOD PREDICTOR OF INDEMNITY SEVERITY CHANGE.

* LOOK FOR THOSE FACTORS WHICH TEND TO DISTORT THE RELATIONSHIP ABOVE AND ADJUST RESERVE ESTIMATES.

JIM GOLZ: This is about some of the problems that a speaker may run into when he attempts to demonstrate things that he thinks he knows. What I'm going to discuss is the use of refined experience periods for loss reserve analysis.

Let's begin with the principle of loss reserving: assume the future will mimic the past, ceteris paribus. Ceteris paribus you can think of as being Latin for loophole; it means other things being equal.

If you think about workers' compensation, we've really got a lot of favorable factors going for us when we try to analyze reserves. In general, we're looking at a lot of claims, typically of moderate size, and most important they normally have regular payments. Claim departments strive to issue the first check within 14 days. That should help us in reserving.

But I wouldn't have brought up the general principle unless there was an exception. When the conditions do change, when you can't take advantage of those favorable factors, and when those changing conditions distort your reserve indications, you can try to analyze finer experience periods. I quote from Salzmann (page 84): "When annual experience periods are not sufficiently responsive to changes in frequency and cost trends, monthly, quarterly or biannual periods can be substituted if credibility is not sacrificed. The tradeoff is between responsiveness and credibility. With a shorter experience period, the earlier periods of any accident or report year age sooner in chronological time than does the full year. Such earlier periods, therefore, are likely to be more reliable, improving the accuracy of the calculations."

At this point let's see what we can do by looking at finer experience periods. This is what we're trying to consider here. Pretend we're starting off with an accident year and a perfectly smooth emergence pattern. The average accident date is in the middle of the year. And the question we're asking ourselves, is if conditions change, how much might that shift buy.

What I was doing in Exhibit I was considering what happens when the claim count changes. I made up a little "what if" example pretending that we're working with a commercial insurer. And those of you who do know that we tend to have policies that are effective on the first of the month. I assume that any changes in the policies or the exposure written would have an effect of the first of the month. When we see either shrinkage or a growth in exposure it happens at the start of the month, but it therefore doesn't affect the average accident date within the month. I went through a few simple calculations on Exhibit I showing how when a shrinkage happens the average accident date moves earlier in the accident year. When there's

a growth in the claim it moves back to the right. Count, the average accident date moves later in the accident year.

When I summed the accident months up and summarize them into accident quarters, the change in the average accident date was about 2/3%, whether we were shrinking or growing in that hypothetical example. But, if you'll look at the full accident year, the effect is much greater. Just a little bit shy of 3%. I had hoped when I started the example that the result would be a little more dramatic, because, if you look at the actual numbers, you'll see that by the time we reached the end of the shrinkage, the monthly claim column had dropped by a full 30%. If you look at the accident year summaries, it doesn't show up to that degree, it was only about 15%. Even though there can be some dramatic changes in the exposure, the average accident date, the maturity of the data, only seems to have shifted by a couple of percent. And if we analyze data by looking at accident quarters rather than accident year, just on the surface of it, it appears to me that we can only expect a couple of percent improvement in our accuracy.

What is the reality? Does it ever happen that accident year claim counts shift by as much as in that hypothetical Exhibit I? It turns out that for one company whose data I have access to. There has been a shift over recent years. Exhibit II shows accident year estimated ultimate claims with cost indexed to the number of claims in terms of the number of claims in accident year 1980. And you'll notice that from 80-85 only three years have roughly the same annual claim count. We're down by about 10% in 1982; in 1984 we're about 17% above the long term level; by 1985 we dropped from that high level way down to about 10% below the typical level for those six years.

All I propose to do at this point is to look at the actual performance of 2 standard types of reserving analysis. In our company we refer to them as payment development. We're going to work with payment data and we're going to apply what we call development factors. You may know them as chain-link or age-to-age factors, whatever your own local vocabulary is. But we're going to see how they perform by comparing an accident year method to an accident quarter method. Of course, we're expecting that the accident quarter method may react better to the known changing conditions that underlay this data. The methods are comparable in that we forecast the future by averaging the latest 2 known accident year factors and the latest 8 known accident quarter factors.

We'll start off with Exhibit III showing medical for accident year 1982. You'll remember that that was a year when the claim count shrank. We might expect that if the accident quarter method is reacting swifter it might be, in general, a little bit less than the accident year method. You'll notice that in early 1984 there was a glitch in the data. Fortunately we managed to glitch in opposite directions in the two methods. In general, you might

see that the accident quarter method began less than the accident year method, though the results are hardly dramatic.

Moving on to accident year 1983 in Exhibit IV, we have that great growth in claim counts, even though it was only back to the former average level. I'm not sure that you'd expect the two methods to pretty much parallel one another here. There was a great growth in claim counts, so perhaps the accident quarter method should be higher.

Exhibit V shows accident year 1984 with its huge claim count growth. Until we get a full accident year, those early points over on the left, before 12/84, are a little bit distorted. There is a period when results are a little higher when we look at the accident quarter. But, again, I'm not sure how proud I would be of either of the methods.

By the time we look at '85 on Exhibit VI with that shrinkage, again I would tend not to look at the method until the last 2 or 3 points over on the right, where we're looking at the complete accident year. All you can say is that you expect the accident quarter method to perhaps show a lower average. It does 2 out of 3 times. I don't know if that's a good enough batting average for you to employ it or not.

What about the indemnity? Accident year 1982 is on Exhibit VII. Once again, we're looking at a year when the claim counts shrank, so we might if anything expect the accident quarter method to be lower; instead throughout much of the history it's a smidgen higher until recently. I don't think you'd write home about the performance of either of these methods, because as more and more payment data accumulated over time, their implications as to the ultimate average severity have both been trending up. You might get an earlier indication but what it wasn't a very good indication.

In 1983 on Exhibit VII, when we had the claim count growth, the accident quarter method here through much of the history, is indeed higher than the accident quarter method. But you run into a similar problem here with both methods trending up over time.

In 1984 on Exhibit IX, a year of growth, the accident quarter method was a little bit higher through much of the history. I'm not sure that I'm particularly proud of that. In 1985's massive shrinkage on Exhibit X, the accident quarter is uniformly less than the accident year and stays there at the end.

I guess all I want to get at here is that there can be theoretical advantages to analyzing finer experience periods. But don't look at these as being a panacea when you have changing conditions. You're always going to have to examine the particular methods that you're using and see whether they remain applicable. In this case the accident quarter advantage turned out to be much less than I generally expected. Nevertheless we do continue

EXHIBIT I

GRADUAL LOSS AND REGAIN OF 30% OF CLAIMS

Experience Period	Year 1 Claim Counts	Year 1 Average Accident Date*	Year 2 Claim Counts	Year 2 Average Accident Date*	Year 3 Claim Counts	Year 3 Average Accident Date*	Change in Average Accident Date as Fraction of Experience Period: Yr. 2 vs. Yr. 1	Change in Average Accident Date as Fraction of Experience Period: Yr. 3 vs. Yr. 1
January	1,000	.0417	975	.0417	725	.0417		
February	1,000	.1250	950	.1250	750	.1250		
March	1,000	.2083	925	.2083	775	.2083		
First Quarter	3,000	.1250	2,850	.1235	2,250	.1269	-.0058	.0074
April	1,000	.2917	900	.2917	800	.2917		
May	1,000	.3750	875	.3750	825	.3750		
June	1,000	.4583	850	.4583	850	.4583		
Second Quarter	3,000	.3750	2,625	.3734	2,475	.3767	-.0063	.0067
July	1,000	.5417	825	.5417	875	.5417		
August	1,000	.6250	800	.6250	900	.6250		
September	1,000	.7083	775	.7083	925	.7083		
Third Quarter	3,000	.6250	2,400	.6233	2,700	.6265	-.0069	.0062
October	1,000	.7917	750	.7917	950	.7917		
November	1,000	.8750	725	.8750	975	.8750		
December	1,000	.9583	700	.9583	1,000	.9583		
Fourth Quarter	3,000	.8750	2,175	.8731	2,925	.8764	-.0077	.0057
Accident Year	12,000	.5000	10,050	.4704	10,350	.5288	-.0296	.0288

*In terms of fraction of year, assuming average accident month accident date is middle of month.

EXHIBIT II

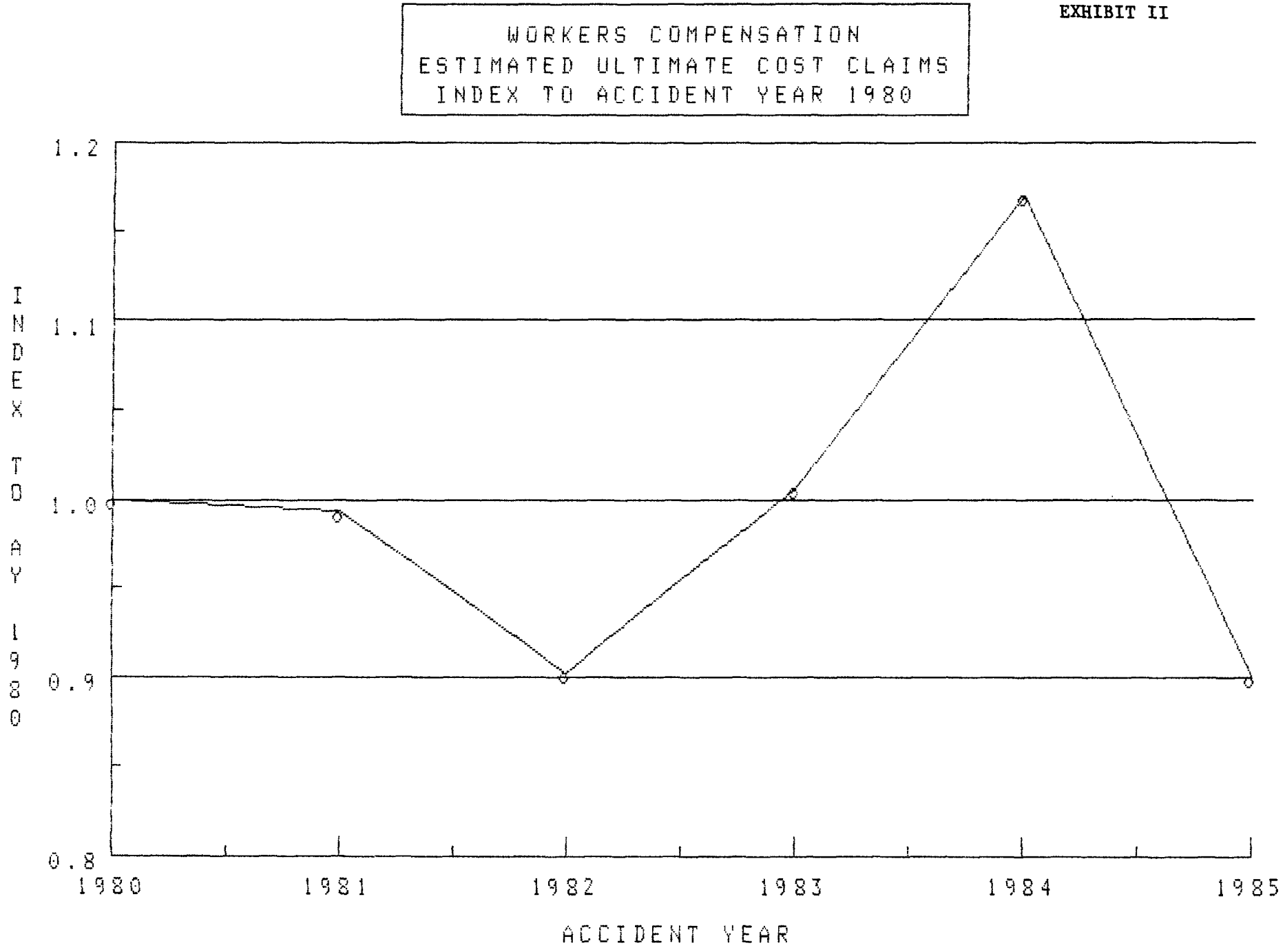

WORKERS COMPENSATION
ESTIMATED ULTIMATE COST CLAIMS
INDEX TO ACCIDENT YEAR 1980
INDEX TO AY 1980
1.2
1.1
1.0
0.9
0.8
1980
1981
1982
1983
1984
1985
ACCIDENT YEAR

EXHIBIT III

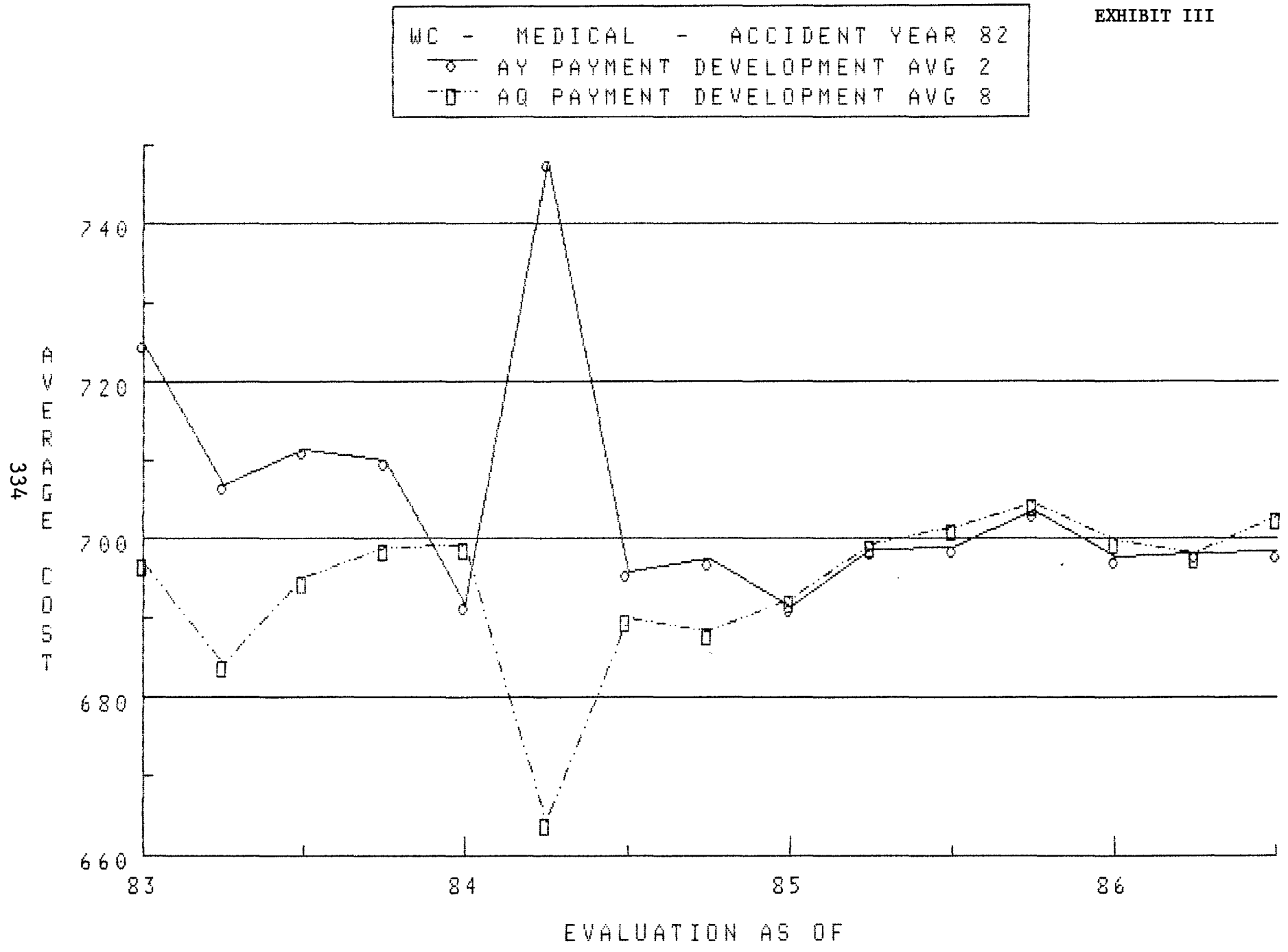

WC - MEDICAL - ACCIDENT YEAR 82
AY PAYMENT DEVELOPMENT AVG 2
AQ PAYMENT DEVELOPMENT AVG 8
740
720
700
680
660
AVERAGE COST
83
84
85
86
EVALUATION AS OF

EXHIBIT IV

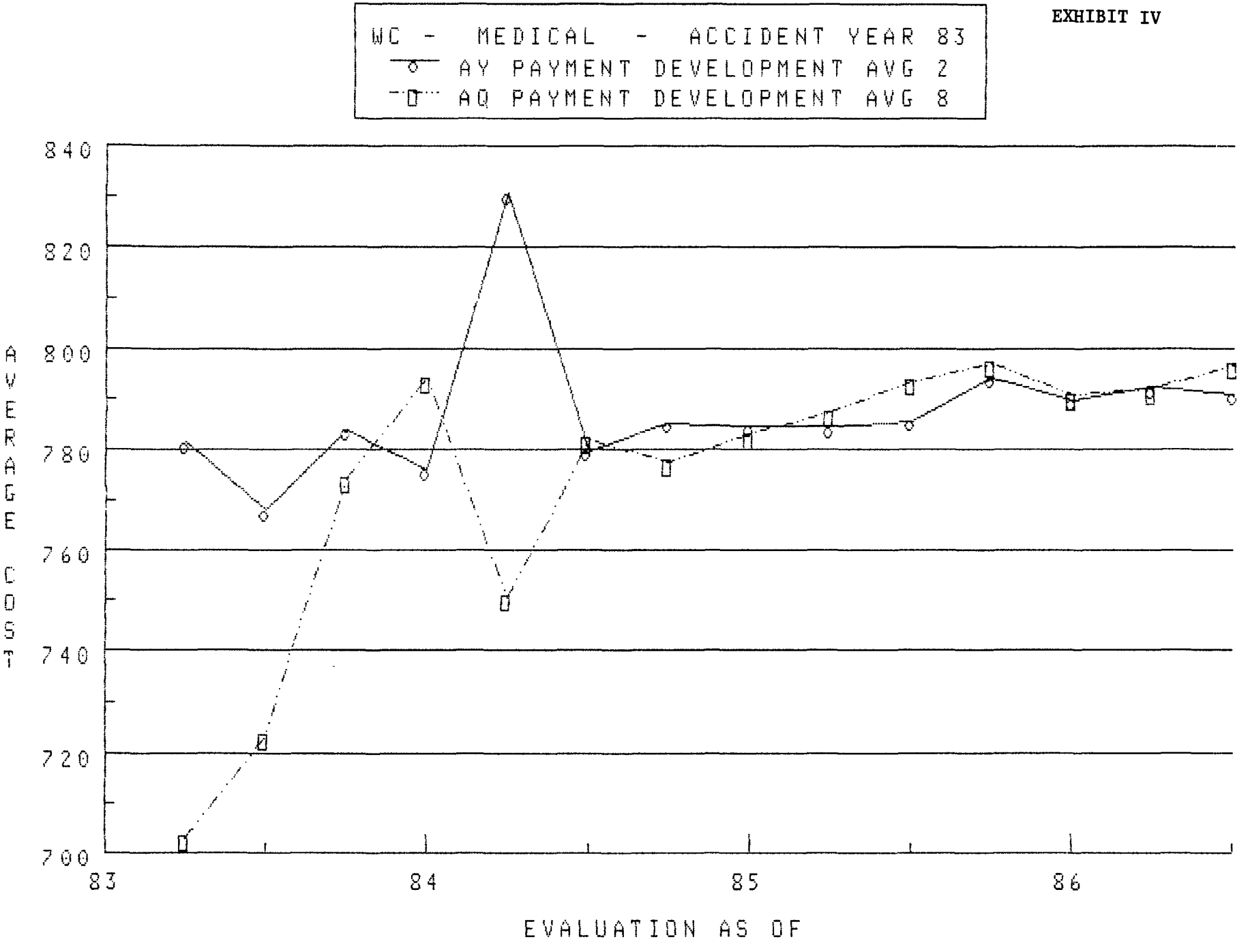

WC - MEDICAL - ACCIDENT YEAR 83
AY PAYMENT DEVELOPMENT AVG 2
AQ PAYMENT DEVELOPMENT AVG 8
AVERAGE COST-
840
820
800
780
760
740
720
700
83
84
85
86
EVALUATION AS OF

EXHIBIT V

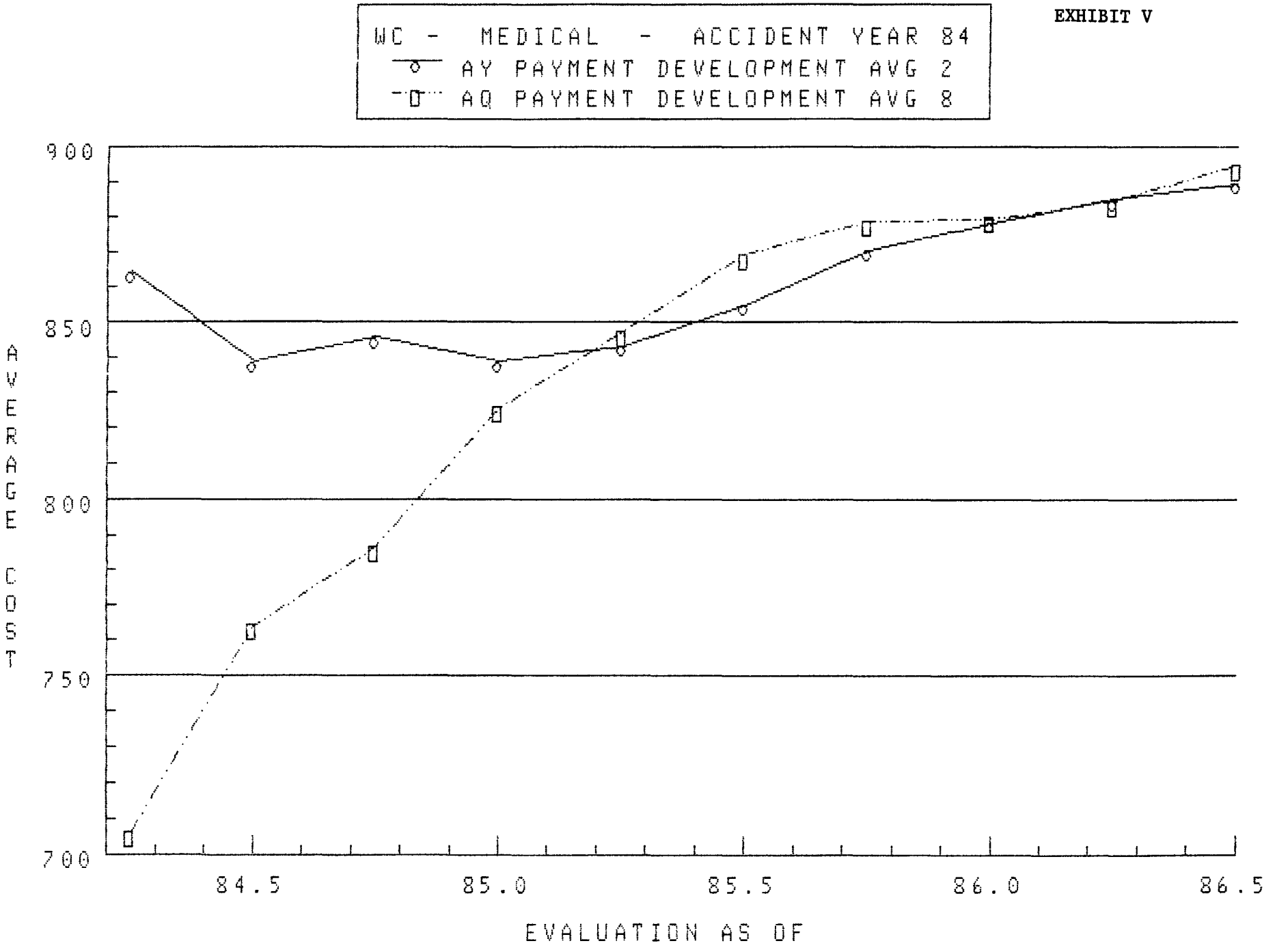
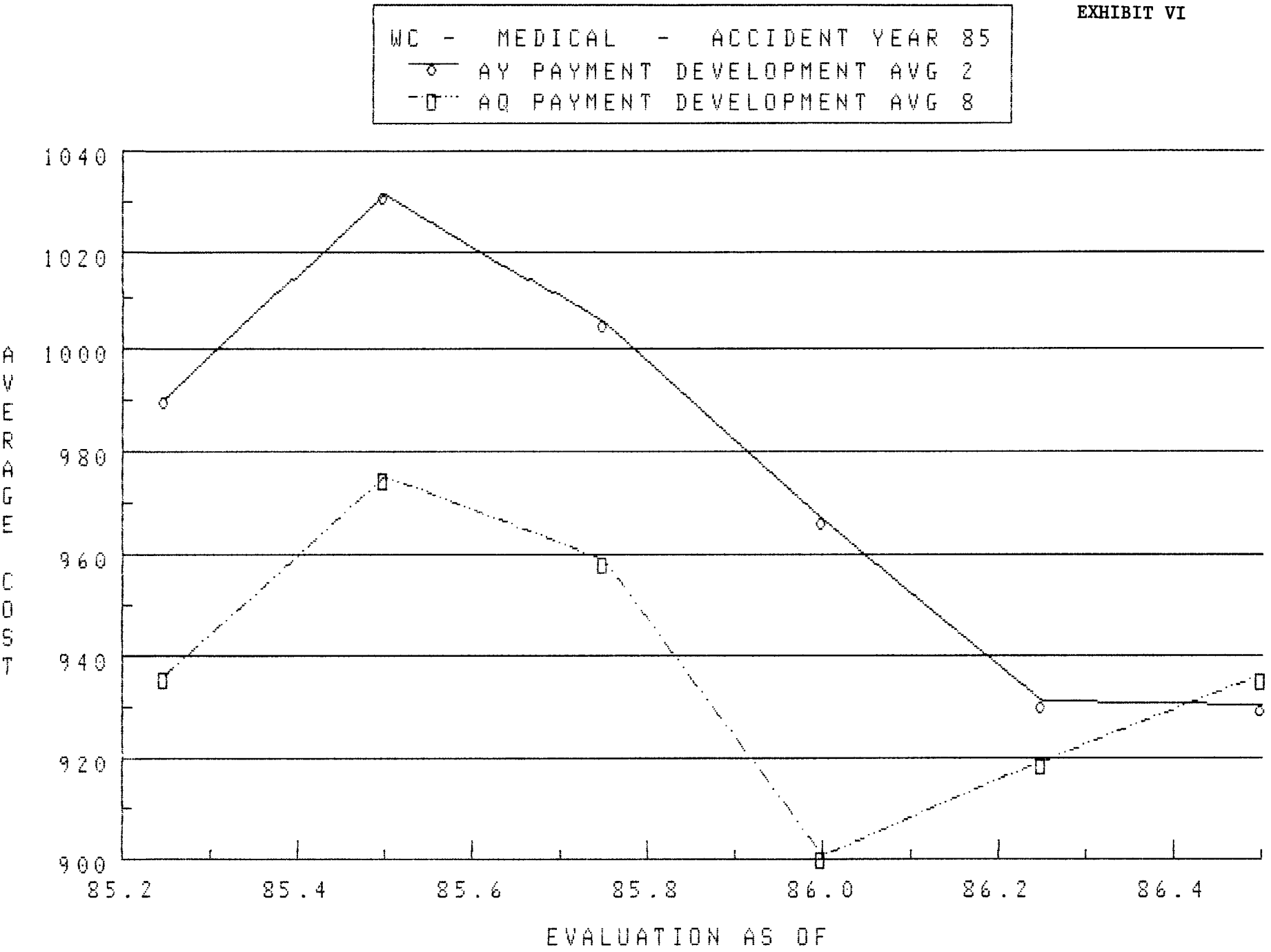

WC - MEDICAL - ACCIDENT YEAR 84
AY PAYMENT DEVELOPMENT AVG 2
AQ PAYMENT DEVELOPMENT AVG 8
900
850
800
750
700
AVERAGE COST
84.5
85.0
85.5
86.0
86.5
EVALUATION AS OF

EXHIBIT VI


WC - MEDICAL - ACCIDENT YEAR 85
AY PAYMENT DEVELOPMENT AVG 2
AQ PAYMENT DEVELOPMENT AVG 8
AVERAGE COST
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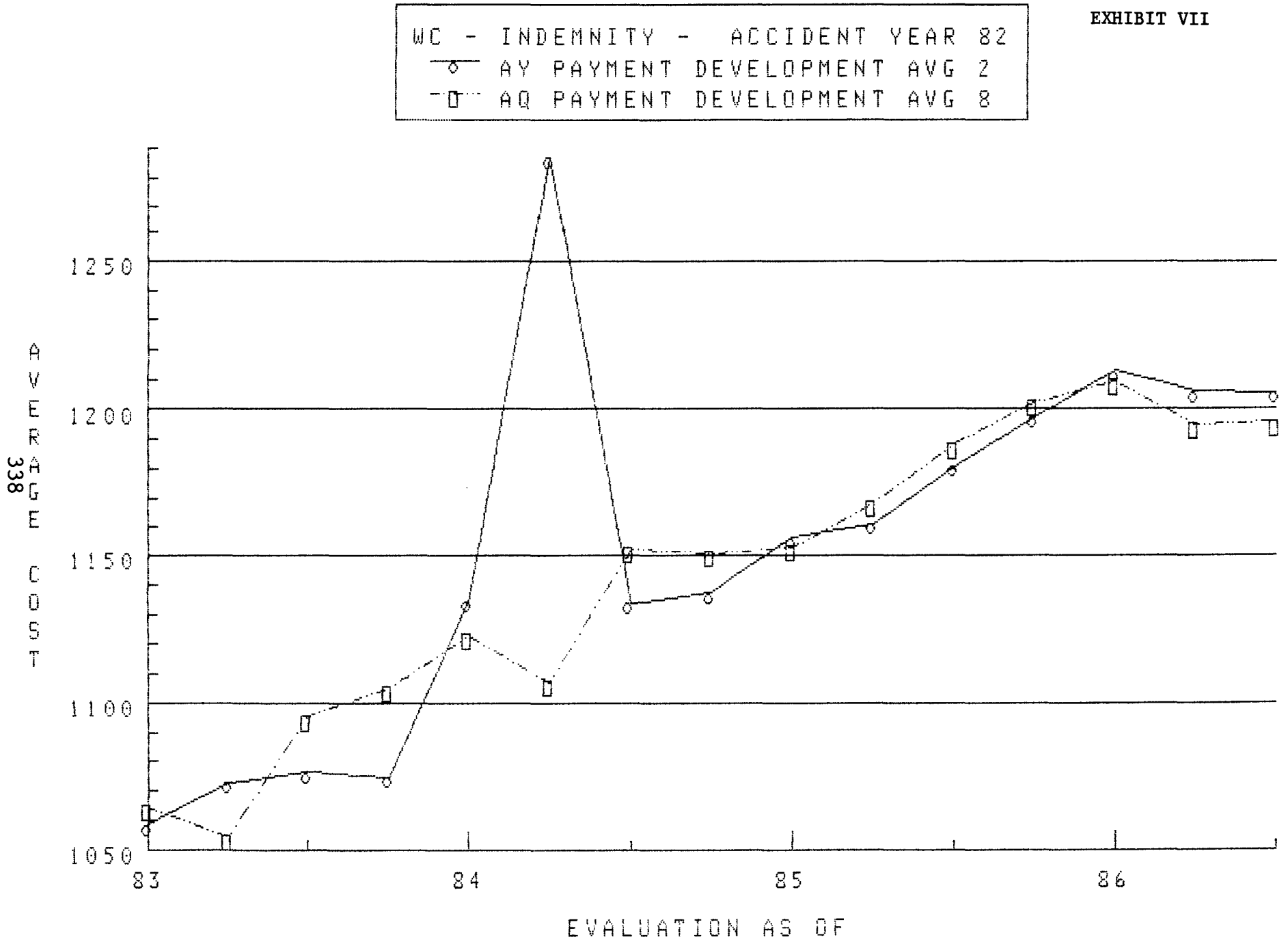
1020
1000
980
960
940
920
900
85.2
85.4
85.6
85.8
86.0
86.2
86.4
EVALUATION AS OF

EXHIBIT VII


WC - INDEMNITY - ACCIDENT YEAR 82
AY PAYMENT DEVELOPMENT AVG 2
AQ PAYMENT DEVELOPMENT AVG 8
AVERAGE COST
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1250
1200
1150
1100
1050
83
84
85
86
EVALUATION AS OF

EXHIBIT VIII

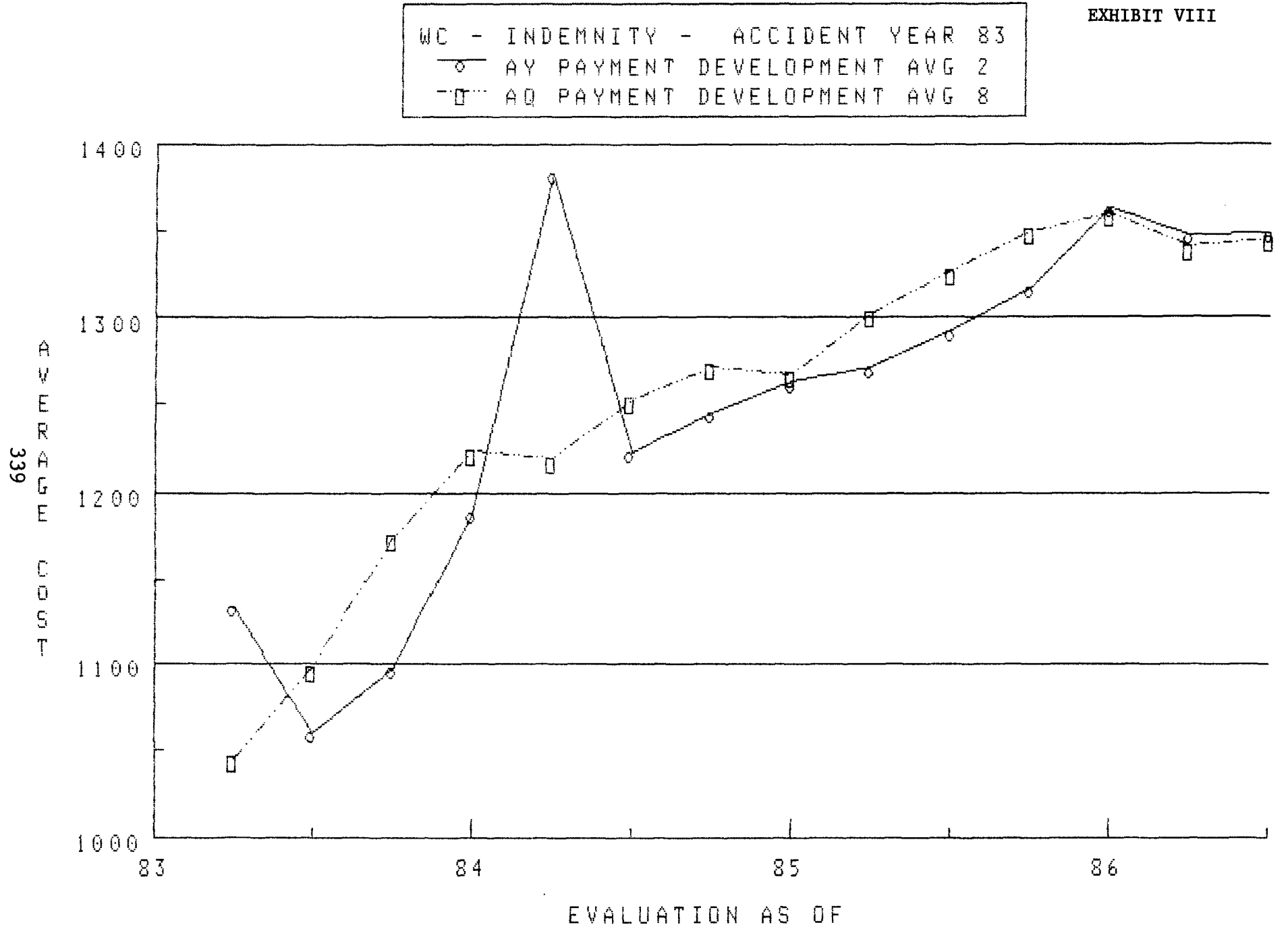


EXHIBIT IX

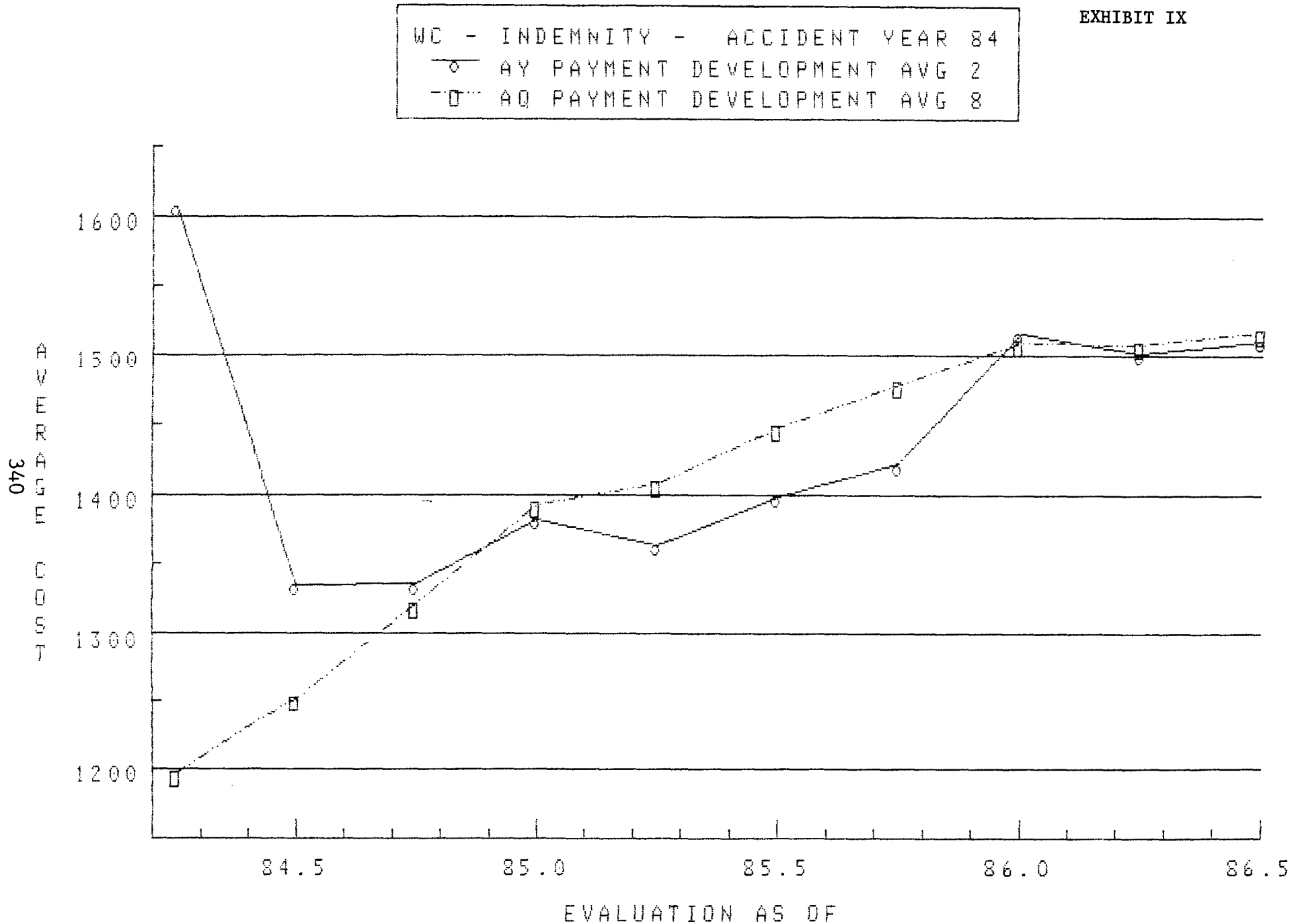
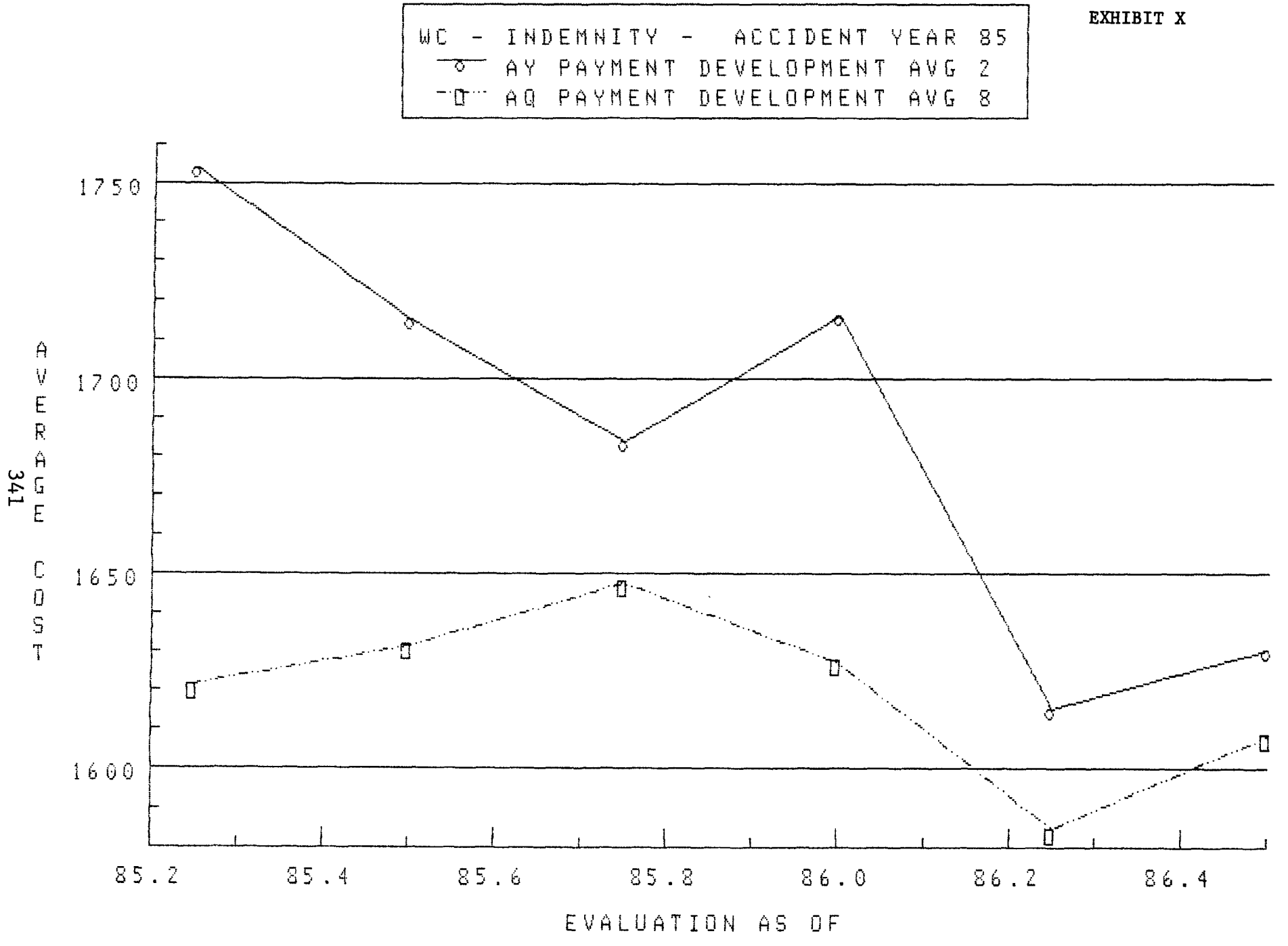

WC - INDEMNITY - ACCIDENT YEAR 84
AY PAYMENT DEVELOPMENT AVG 2
AQ PAYMENT DEVELOPMENT AVG 8
1600
1500
1400
1300
1200
AVERAGE COST
340
84.5
85.0
85.5
86.0
86.5
EVALUATION AS OF

EXHIBIT X


WC - INDEMNITY - ACCIDENT YEAR 85
AY PAYMENT DEVELOPMENT AVG 2
AQ PAYMENT DEVELOPMENT AVG 8
1750
1700
1650
1600
AVERAGE COST
85.2
85.4
85.6
85.8
86.0
86.2
86.4
EVALUATION AS OF

to use accident quarter methods. And in fact on a research basis we sometimes go as far as accident month. Thank you for your attention.

Actuaries tend to find themselves in some rather unusual places in insurance companies and outside of the insurance industry as well. Some actuaries have begun to work in financial services companies. Some have started to work in law firms. Actuaries are also appearing in claim departments.

Instead of attempting to work from the outside of the claims department, we are now going to work from inside. Some of the reasoning that may have previously applied in explaining why certain estimates could not be made probably diminishes somewhat since there is supposed to be some influence yielded when you're not operating within the claim department.

Periodically, you're going to get asked to assist not simply in reviewing reserves as they've occurred, but also to assist in setting up a reserve for an unusual kind of a case. I would like to talk to you this morning about a particular class of unusual cases. These are known as spinal cord injuries. Spinal cord injuries are unusual events although some people have estimated that one occurs every 35 minutes. With a spinal cord injury, an individual is transformed into a dependent paraplegic/quadriplegic. The number of these turns out to be about 52 per million and of those about 60% tend to live long enough to require medical care and rehabilitation. As you'll see, they tend to be rather expensive types of cases.

(Slide 1) Spinal cord injuries can be broken down into a two-way classification. There are paraplegics and quadriplegics which refer usually to the extremities that are involved. With paraplegics, usually lower extremities are involved; with quadraplegics, the upper as well as lower extremities and respiratory problems exist. There are two levels what are known as "incomplete" and "complete".

Without getting very technical, "complete" refers to the nature of the lesion. Any studies that exist (and there are not that many by the way) refer to these breakdowns or lesions. A "complete" case involves paralysis of all the muscles involved. An "incomplete" case is simply one that is not judged to be complete. There are greater chances of survival for the "incomplete" paraplegics and quadraplegics.

The breakdown is approximately 50%/50% for paraplegics versus quadraplegics. Within those categories of the paraplegics incomplete are about 40%; of the quadraplegics, incomplete are about 50%. Some of the numbers I'm quoting to you are from a study that was done at the Good Samaritan Hospital in Phoenix. The study was called Spinal Cord Injuries done back in the early 80's. Another analysis that was conducted at the

University of Alabama. Some are done in connection with Veterans Adminstration. There aren't that many other studies around.

(Slide 2) Today we'll review the cost of spinal injuries for workers' compensation purposes. Keep in mind we're talking about work related injuries. For workers' compensation purposes, we break these down into essentially three very broad categories. The first is indemnity (or loss time). That is based on the workers' compensation law in effect in the state. Maybe there are maximums, maybe not. Maybe the rate of compensation is two thirds of the injured workers' wage. There may also be some offset for social security or some method of indexing applicable. You certainly have to be very careful in establishing the indemnity reserve to be certain that you're reflecting the law of the injury in which the state is presumed to have occurred.

The second category is medical costs which are naturally those associated with medical for hospital and non-hospital costs, doctors fees and initial rehabilitation. That's what is meant by medical costs. Some of them are recurring, some of them occur immediately after the injury happens.

The third category is non-medical. These are costs that are not necessarily associated with the hospital or a doctor but may be compensated under the workers' compensation law. They include items such as attendant care, environmental modifications, custodial care, vocational rehabilitation and a kind of "catch-all" called "other". We proceed by reviewing the underlying 4-way classification (shown on the first chart) to see whether there is any significance to the 2-way classification (paraplegic versus quadriplegic). If there is you'd certainly want to take advantage of it when you're attempting to estimate future costs.

(Slide 3) On this chart physicians' costs and other medical cost are shown for incomplete paraplegics. The zero stands for those costs incurred at the time of the injury. The numbers 1-6 refer to the cost during follow-up years. There is a little persistency of costs over the six year period and in a sense beyond that timeframe. (Slide 4) It tends to be somewhat the same in the case of the complete quadriplegic, although the cost levels were a little bit higher as you might for a more serious kind of case.

There also appears to be a difference in frequency. This chart measures differences in the frequency of use of attendant care, etc. across each of the four categories. As noted, the red or the "most left" barring of each group represents the incomplete paraplegic. The purple color at the right hand side of each grouping represents the complete quadriplegic. As you'd expect, there appears to be slightly higher frequencies for the "complete" category. This is not a surprising result, although it is not consistent across the board.

For the environmental modification, voc rehab, and the "other" categories, there is a slight difference. You would want to evaluate a little further the date that is available.

(Slide 6) What we've attempted to do was to try to determine whether there was any significance in the changes of attendant care cost comparing the upper part of the exhibit, incomplete paraplegic, to the bottom part of the exhibit, which is complete quadriplegic. We attempted to fit a model to determine whether or not there was a sense of importance either about the time periods in which they occurred subsequent to the date of the injury, or to the notion of completeness or incompleteness. What we ended up doing was simply using a fitted value, which turned out to be reasonable. We rejected the first point and used an average value to go from the second period forward. That is the number that appears in the "fitted" column. The second number is used on an annual basis beyond the second year after the injury date. It should be noted these are in 1981 dollars. The same was done for the complete quadriplegic. However, the model just didn't seem to warrant going beyond that.

Attendant care is used to teach the victim to re-learn certain basic skills that he would need to survive day-to-day. (Slide 7) Custodial care and environmental modification, custodial care refers to the use of nursing homes. Because of the changing technology and the use of environmental modification, the frequency of use of custodial care is not that great. It turns out to be 2% for the incomplete paraplegic and about 4% for the complete quadriplegic. On the chart, we show 1981 and 1986 costs. Environmental modifications are essentially comprised of what one would expect. Electric wheelchairs would be an example assist people in functioning more independently are included as part of these environmental modifications. A much higher frequency for environmental modification becomes somewhat more important. However, environmental modifications are not the kinds of things that tend to continue. You must try to identify those costs that occur immediately and are not recurring. Environmental modifications usually would occur during the first year and probably not recur thereafter, whereas custodial care would not follow the same kind of pattern. Custodial care could occur almost anytime. It was assumed that at least there was an ongoing risk that this may happen. The 2% and the 4% frequencies, therefore, throughout the life of the case.

(Slide 8) For vocational rehabilitation, the 30-40% frequency was assumed to happen at once because this is not the kind of expense that would occur constantly throughout the life of these kinds of cases.

(Slide 9) In the case of the "other" non-medical costs category, it was possible to use some models to smooth out the bumps and to create some significance out of the timing of these kinds of payments. Although they are not significant by themselves, in some cases the "other" category shows there was some significance to these kinds of trends.

(Slide 10) The green line on the top represents a complete quadriplegic. Actual costs are shown and the 1-6 points correspond to the year after the discharge from the hospital. (Hospital stays tend to range in the 3-4 month area). Similarly, the blue line on the bottom represents the incomplete paraplegic costs. These represent other ongoing costs and they have some significance. The kind of model that was fit to these was a simple exponential. They're not straight lines; they're exponential models with dummy variables to indicate the two-way classification for the data. They seemed to fit well across each of the four areas. You're only looking at two, namely incomplete paraplegic and complete quadriplegic. Not shown are the complete paraplegic or the incomplete quadriplegic costs. Amounts are at 1981 cost levels. That becomes important because payments in the future are <u>not</u> going to be made at 1986 dollars. The costs next year for the "first year" subsequent to the injury are going to paid in 1987 dollars. These costs will tend to go up and you're going to have to make some assumptions about future inflation costs on medical cases.

(Slide 11) Hospital charges are shown on this chart. These are distinguished from re-hospitalization charges. These are the costs of the initial hospital stay, this is a one time cost. We're talking about 3 to 4 months worth of hospital charges. I should reiterate that these hospital costs, just like the other costs discussed, are sensitive to the regions in question. Keep in mind we're only talking about an overall method that you can use; not necessarily one you should specifically adopt. Hospital costs can vary significantly by region. The claims department should have a fairly good handle on what hospital costs are for the area where the injury occurred. Note for a complete quadriplegic, it's almost $90,000 just for the initial hospital stay. That does not even include the initial rehabilitation costs which occur during that 3 month period.

(Slide 12) A similar technique to that used on the "other non-medical" was used on "non-hospital" medical charges. These are medical but not hospital charges (which tend to be recurring). The model seems to fit reasonably well but the first point I'm not too comfortable with. However, that's the purpose of using these kinds of models; to attempt to smooth out some of the bumps. There may be some significance in the fact that for quadraplegics, the second year following the injury tends to have a higher cost than the first year. However, I could not discover such significance in the work that we did.

Once you've gone through the difficulty of determining what each of the individual components of those costs ought to be, which ones should occur only at the time of the outset of the case and which ought to be occurring on an ongoing basis, you are faced with a fairly difficult task. In today's session, I'll only be able to shed a little light on it.

There is considerable discussion as to exactly how long you're going to have to be paying out these costs. I don't mean that there are limitations on the medical benefits that you would pay. I don't think there are very many states left that have caps on workers' compensation medical benefits. There might be some states but as a rule that is not the case. I'm referring to the life expectancy of the injured worker. There is some data that says that after the first year of injury, the injured person has close to a "normal" life expectancy. The usual life table would apply. However, the "complete" quadriplegic may be a somewhat special group because of the other problems associated with that class of injury. Some people suggest a "rule of thumb" of a 12 year expected life difference for that class. That's a rule of thumb but no one is really quite sure.

(Slide 13) A study that was done at the University of Alabama would suggest a slightly different result. On this chart, life expectancies by category and by age are displayed. The first bar in each group represents life expectancy. Shown are the additional number of years expected for people without current injury. For example, the first group of bars represents age at injury and that age is 20. The second group of bars is 40, the last group of bars is 60. The first bar represents the view that a non-injured individual age 20 would expect to survive another 55 years. At age 40 it changes to about 35 or 36 more years. At 60, it becomes about 20 additional years. By comparison, the other bars in each group represent somewhat increasing severity of injury, i.e., the four-way classification of neurologically impaired injured workers. There is, at least accordingly to this one study, a very significant difference in life expectancy. That seems to be consistent with what our notion would be for those kinds of injuries because they are subject to all kinds of medical problems that can arise. Pressure sores probably are not the very worst of them, although they're fairly dangerous in and of themselves. In fact, at age 60 an individual would have just a few years of expected survival as a complete quadriplegic. Which assumptions you use should depend on how much help you need from your claims department. We have shown these categories to assist in making these kinds of projections.

(Slide 14) Displayed here are first year costs: initial medical rehabilitation and hospital costs. This chart shows, for incomplete paraplegics, the attendant care, custodial care, and other non-medical, re-hospitalization and non-hospitalization medical. These are ongoing costs with their associated frequencies. The last two, environmental modifications and rehabilitation costs, are probably going to occur in the first year. In other words, they'll occur during the first year following the injury but that's about it. They most likely won't occur in an ongoing way. Keep in mind, the average hospital stay is about 3 months. The remaining costs shown are annualized. Of course you'd have to multiply the cost times the frequency because not everyone is going to utilize these kinds of rehabilitation methods. Also, you'd have to only add up about 75% of the final expected annualized cost of the categories shown (other than

hospital and initial med. rehab.) This is because you're only dealing with part of a full year in addition to the initial hospital cost.

As for ongoing costs remember that these costs are going to be paid in future years. It's going to cost more if you believe that medical costs go up every year. What you select is certainly an important factor but will vary, not only by your disposition about the economy generally, but also by what costs are expected to be in the particular region in which the claim will be handled. (Slide 15) What we have done here was to estimate the various ongoing costs for incomplete paraplegics. We assumed an average for each of the individual components. Note that the rate of increase for each of those years in total actual dollars is much less than 8%. In fact it looks more like 2%, and that's because the underlying dollars themselves tend to slow down. The cost of subsequent medical care tends to decline in some exponential way; however the inflationary costs rise at a higher rate. The net effect is to increase the absolute value of costs. Also, interim costs tend to drop off. Therefore, the net effect is approximately a 1-1/2% or 2% increase in total ongoing costs per year. All of the preceding took frequency into account.

(Slide 16) The overall effect can be portrayed by an exhibit which may look something like this for an incomplete paraplegic. Indemnity payments on this chart assumed $250 per week. Medical payments were based on the exhibits that we reviewed. Note this is from the time of the injury; there's a life expectancy of an additional 33 years. We've used the expected life of the injured worker. We have not used any mortality decrements. In order for you to use this kind of a table. you're going to have to make some adjustments on your own based on what you truly believe would be the appropriate tables to use from one year to the next. You may believe the actual normal life expectancy tables or some of the adjusted ones we discussed. There also was no discounting uses in deriving these costs. That's a matter of various rules along with your company's philosophy about discounting for these kinds of reserves. Therefore, these estimates represent first dollar cost. Note, they are not cheap cases.

(Slide 17) This chart represents analogous results than incomplete paraplegics for the complete quadraplegics. The costs are higher also, because there is a much higher degree of care. The frequency is higher; attendant care in these cases rise by 40% as opposed to the 4% we saw for the incomplete paraplegic.

(Slide 18) These are the ongoing costs for complete quadraplegics. Once again, these are adjusted using the 8% inflation for each of the individual components. It doesn't increase as quickly as 8% for the same reason, cited previously; namely they tend to simultaneously diminish at a slow exponential rate. However, the net effect are increasing costs over time.

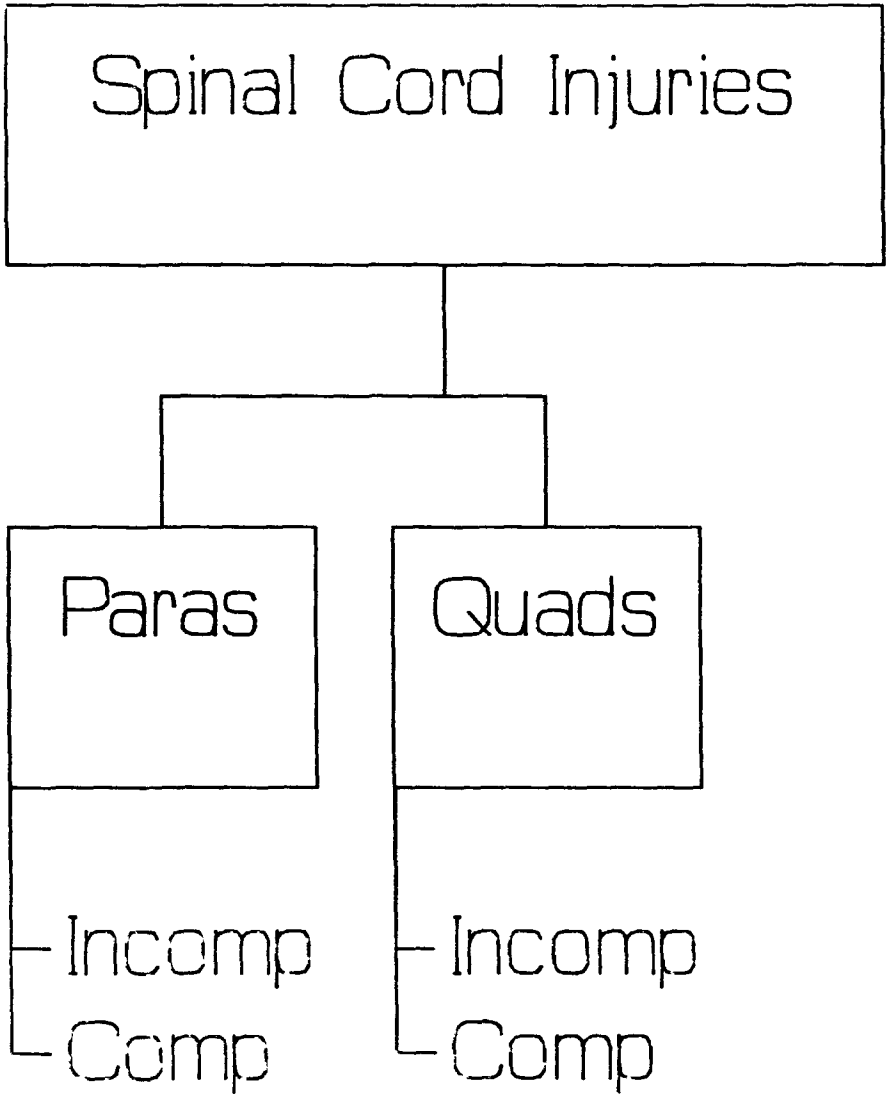
There is one part of the medical reserve that we've not considered; it could be a significant cost. The trouble is there's no information available as to how you'd value it. It involves costs that can occur when a neurologically impaired worker reaches a terminal stage. This terminal stage could occur at the end of their life expectancy and you're responsible for the payment of those costs. When this happens, the usual amount of care that is required at the end may be much higher than would have been required. We were unable to locate any information that told us anything at all about the so-called "terminal medical costs" for these kinds of injured workers. It could be a significant amount. I just don't know. If you have any sources of information on those kinds of costs, I sure would be interested.

(Slide 19) Finally this last exhibit simply wraps up the same numbers. You can produce results similar to this for each of the categories. If you have better information about how to break up those categories, you certainly can use that. You could employ the age at injury and use the number of years since the injury to help establish a reserve. You can probably get as intricate as you'd like given the limits of the available data.

For those of you for which this was "old hat", at least I hope that the subject of spinal cord injuries (about which not too much is known in terms of costs) at least gave a different slant on assisting claims personnel in providing medical reserves for complicated cases.

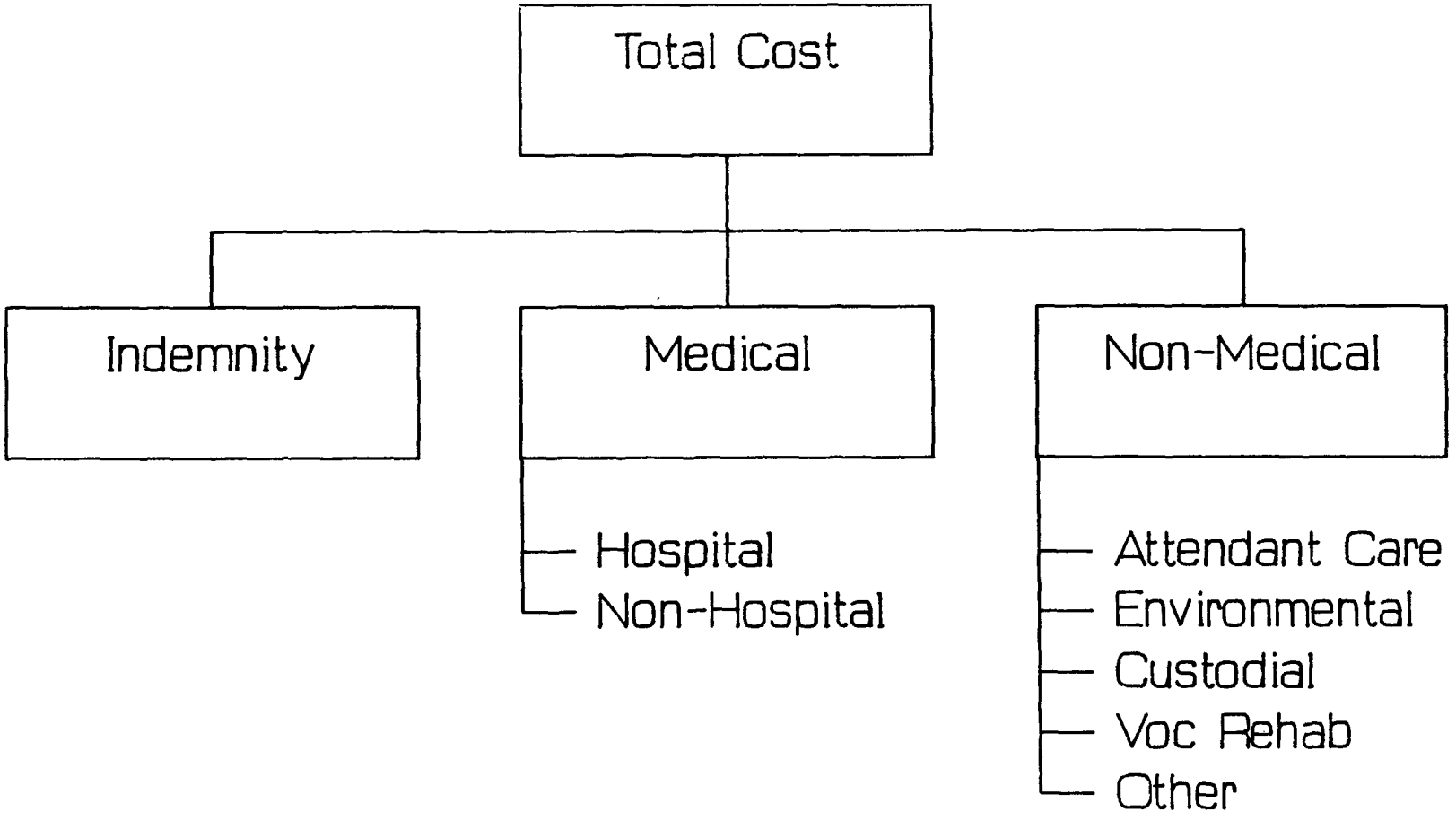
SLIDE 1

Types of Spinal Cord Injuries



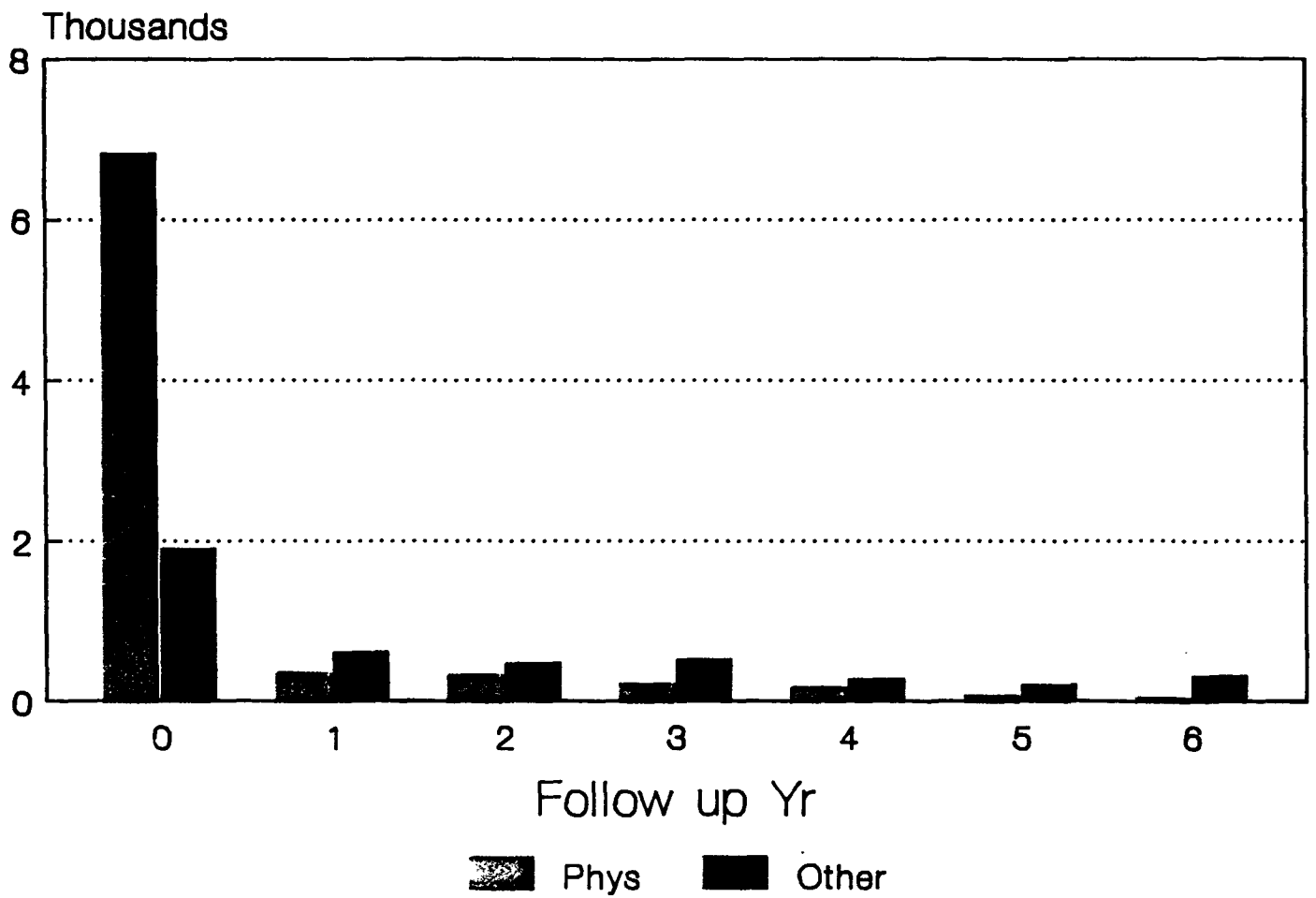
SLIDE 2

Cost of Spinal Injury



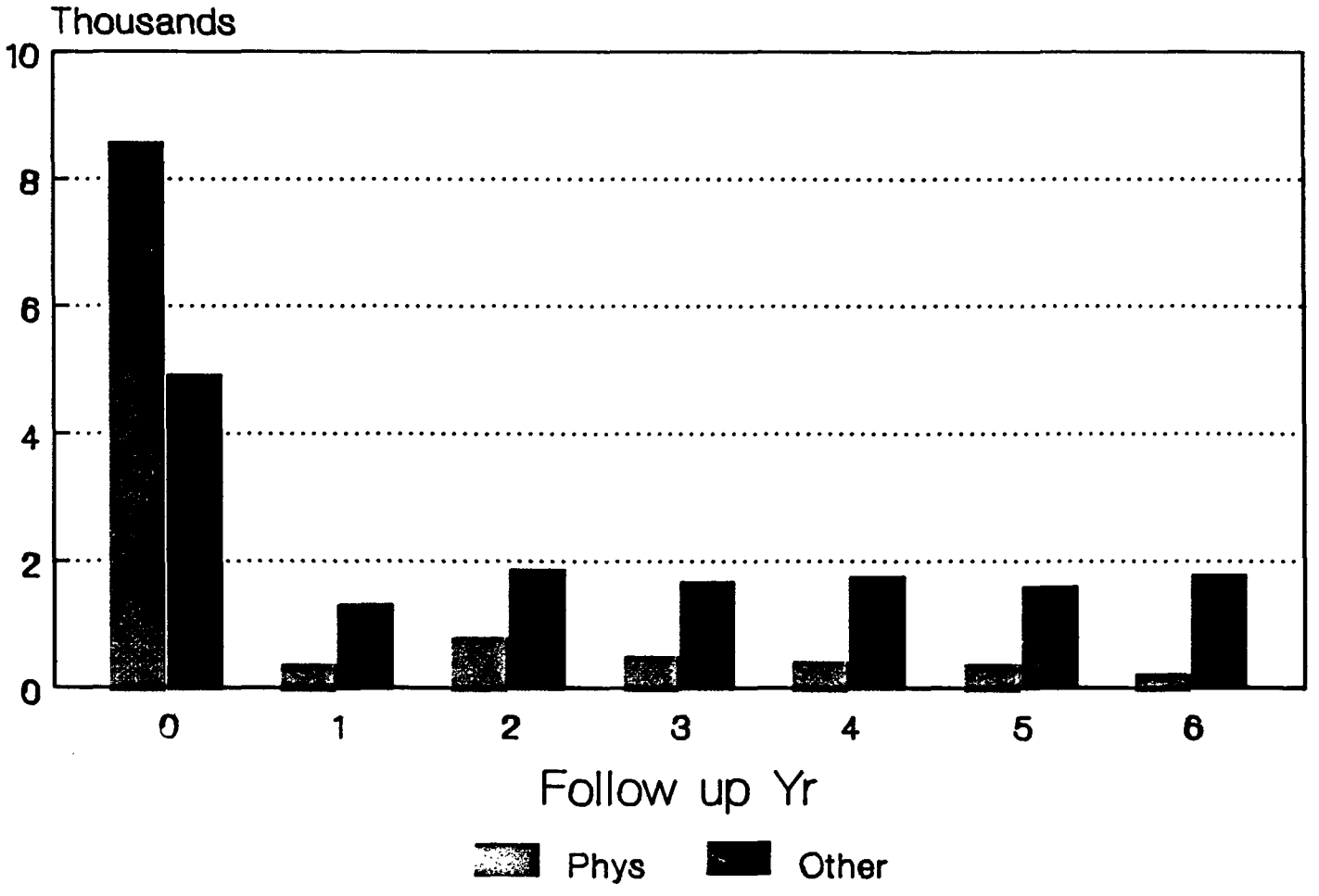
SLIDE 3

Non Hospital Medical Charges
Para Incomplete



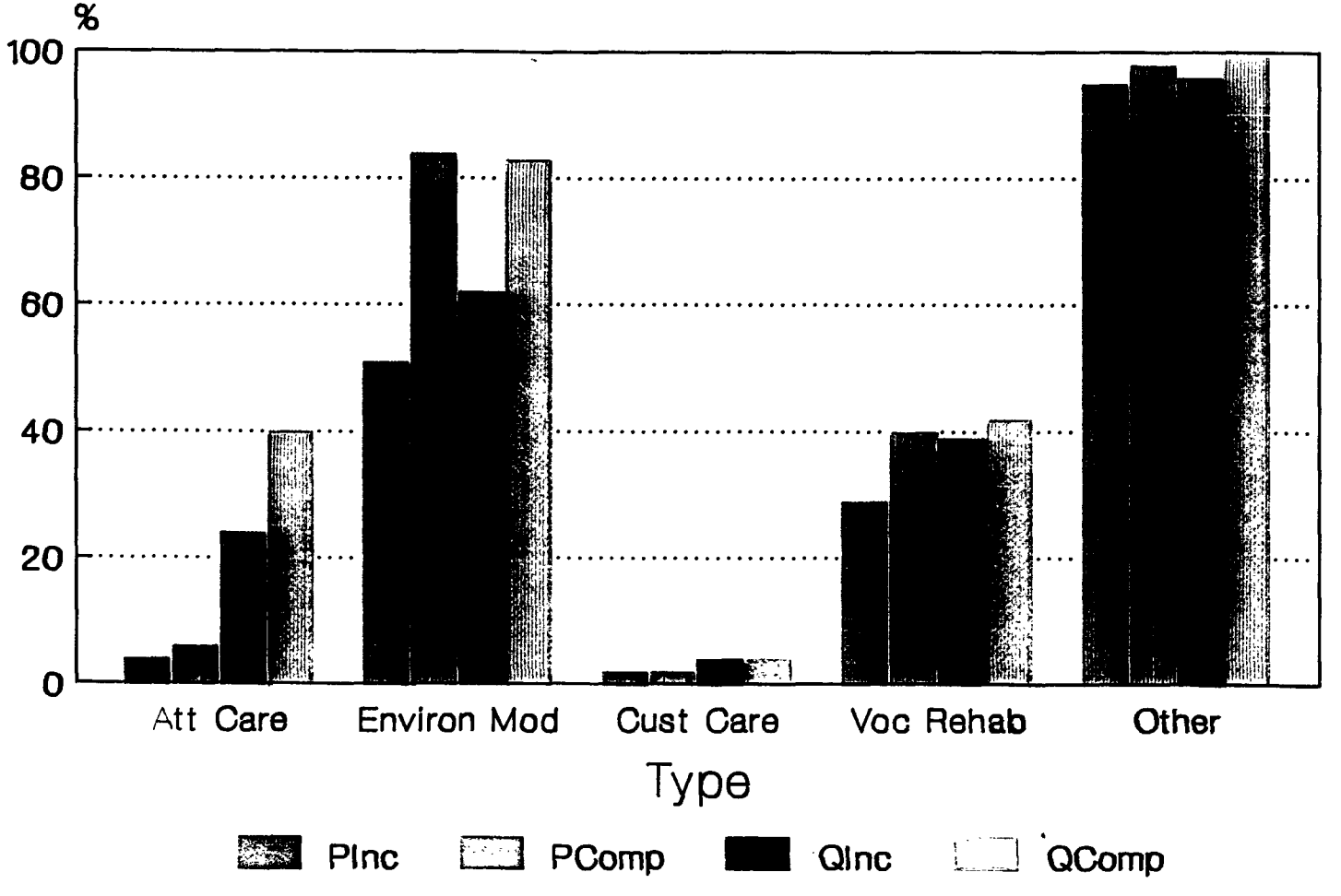
SLIDE 4

Non Hospital Medical Charges
Quad Complete



SLIDE 5

Non Medical Charges
Frequency



SLIDE 6

Non-Medical Costs
Attendant Care

		Actual	Fitted
P Inc	1	2004	1702
	2	4409	3405
	3	2037	
	4	3861	
	5	-	
		-	
Q Comp	1	3428	3181
	2	7158	6363
	3	6118	
	4	6355	
	5	6848	

1981 Dollars

SLIDE 7

Non-Medical Costs

	P Inc	Q Comp
Custodial Care		
Freq	2%	4%
1981 Cost	5352	10000
1986 Cost	7327	13690
Environ Mod		
Freq	51%	83%
1981 Cost	2000	10000
1986 Cost	2738	13690

SLIDE 8

Non-Medical Costs

	P Inc	Q Comp
Voc Rehab		
Freq	30%	40%
1981 Cost	1500	3000
1986 Cost	2053	4107

SLIDE 9

Non-Medical Costs
Other

		Actual	Fitted
P Inc	1	300	261
	2	260	223
	3	202	191
	4	188	163
	5	75	140
	6	139	120
Q Comp	1	375	592
	2	520	506
	3	423	433
	4	347	371
	5	408	318

SLIDE 9A

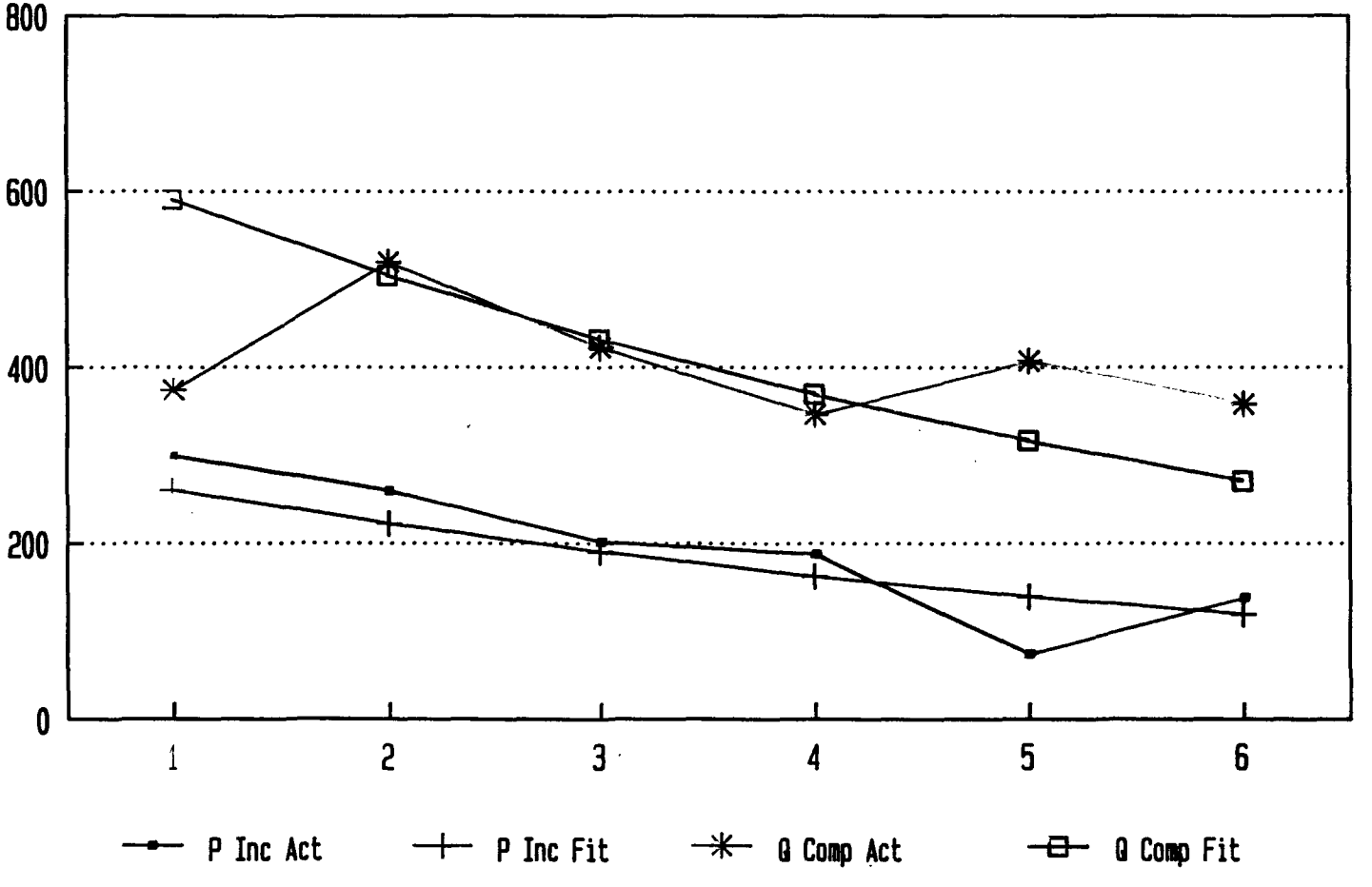
Medical Costs

Non-Hosp Charges

		Actual	Fitted
P Inc	1	727	570
	2	610	504
	3	561	445
	4	349	392
	5	219	346
	6	281	306
Q Comp	1	1284	2158
	2	2007	1905
	3	1643	1682
	4	1636	1485
	5	1491	1311

SLIDE 18

Non-Medical Costs
Other



1981 Dollars

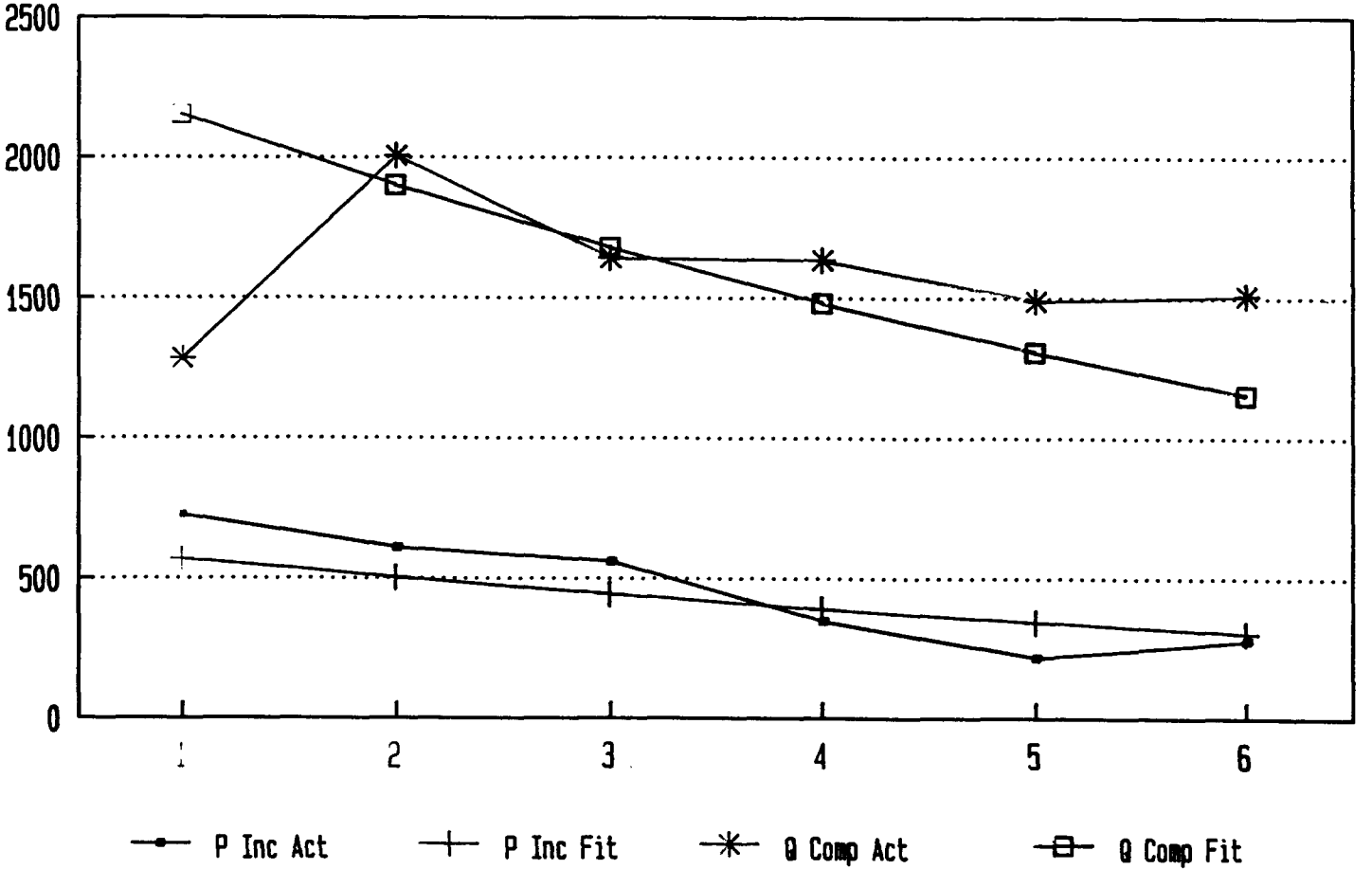
SLIDE 11

Medical Costs
Hosp Charges

	P Inc	Q Comp
1981 Cost	34355	65145
1986 Cost	47032	89183

SLIDE 12

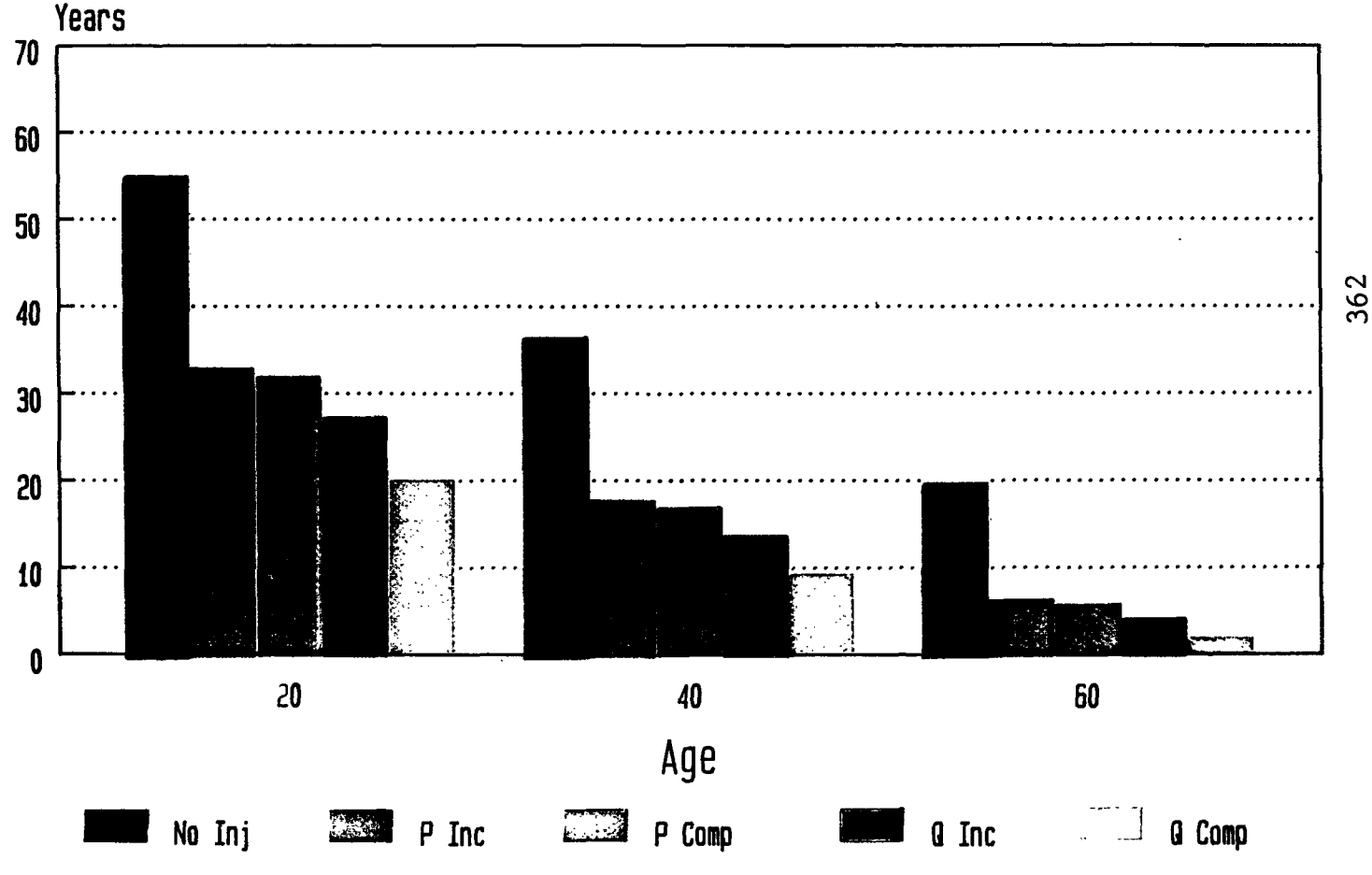
Medical Costs
Non-Hosp Charges



1981 Dollars

SLIDE 13

Life Expectancies
By Neuro Catagory



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Univ of Alabama

SLIDE 14

1st Year Costs
Para Inc

Type	Cost	Freq
Hosp Charge	47032	
Initial Med Rehab	8898	
Atten Care	2330	.04
Cust Care	7328	.02
Other Non-Med	386	1.00
Rehosp	5766	.25
Non-Hosp Med	780	1.00
Environ Mod	2738	.51
Voc Rehab	2054	.30

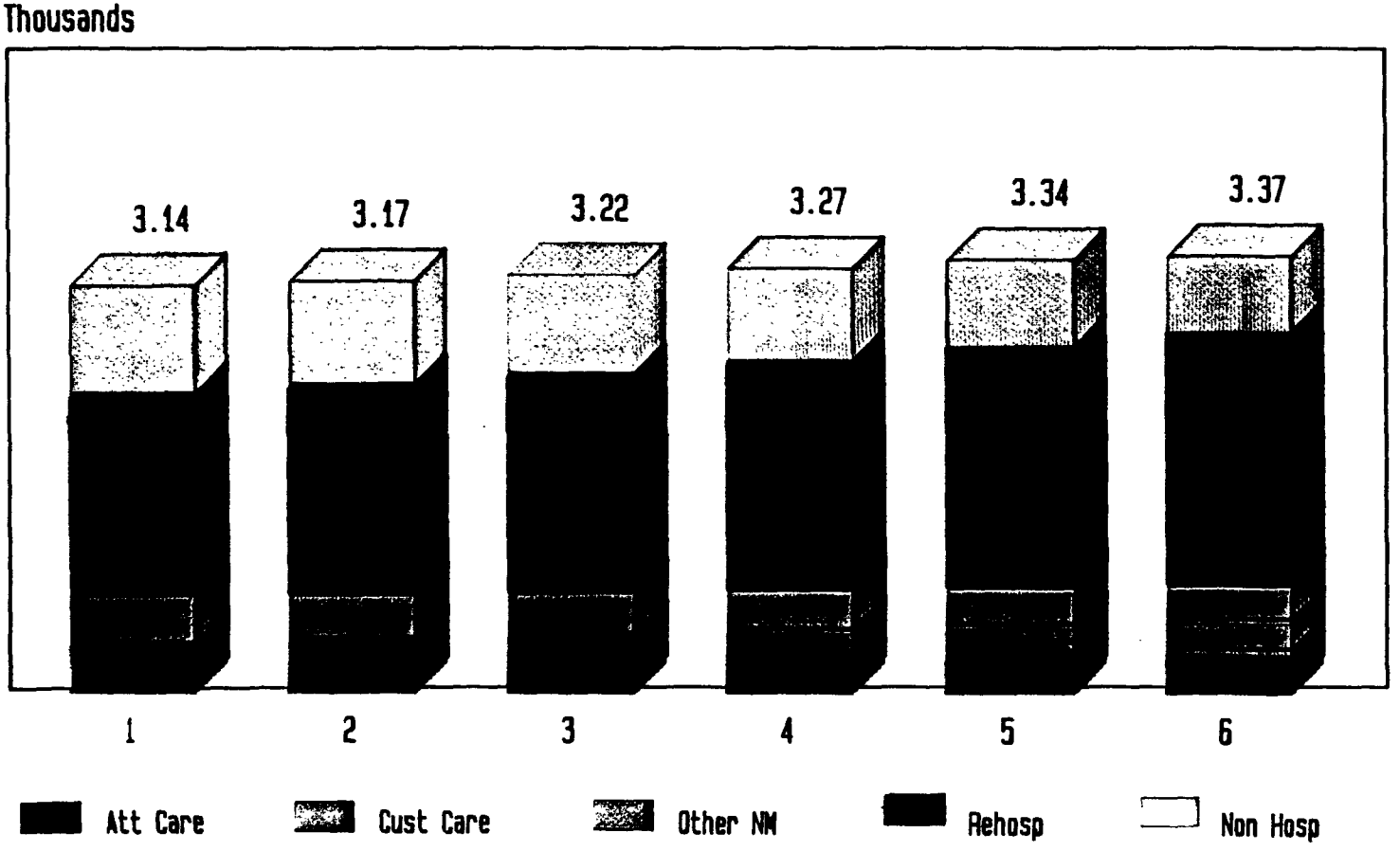
SLIDE 14 A

1st Year Costs
Quad Comp

Type	Cost	Freq
Hosp Charge	89183	
Initial Med Rehab	13689	
Atten Care	4354	.40
Cust Care	13690	.04
Other Non-Med	875	1.00
Rehosp	8296	.40
Non-Hosp Med	2954	1.00
Environ Mod	13690	.83
Voc Rehab	4107	.40

SLIDE 15

On-going Costs
Para Inc



SLIDE 16

Para Inc

Age 20

Year	Medical	Indemnity
1	60298	13000
2	3151	13000
3	3189	13000
4	3236	13000
5	3293	13000
6	3351	13000
7-33	113023	351000

Life Exp 33 years

SLIDE 17

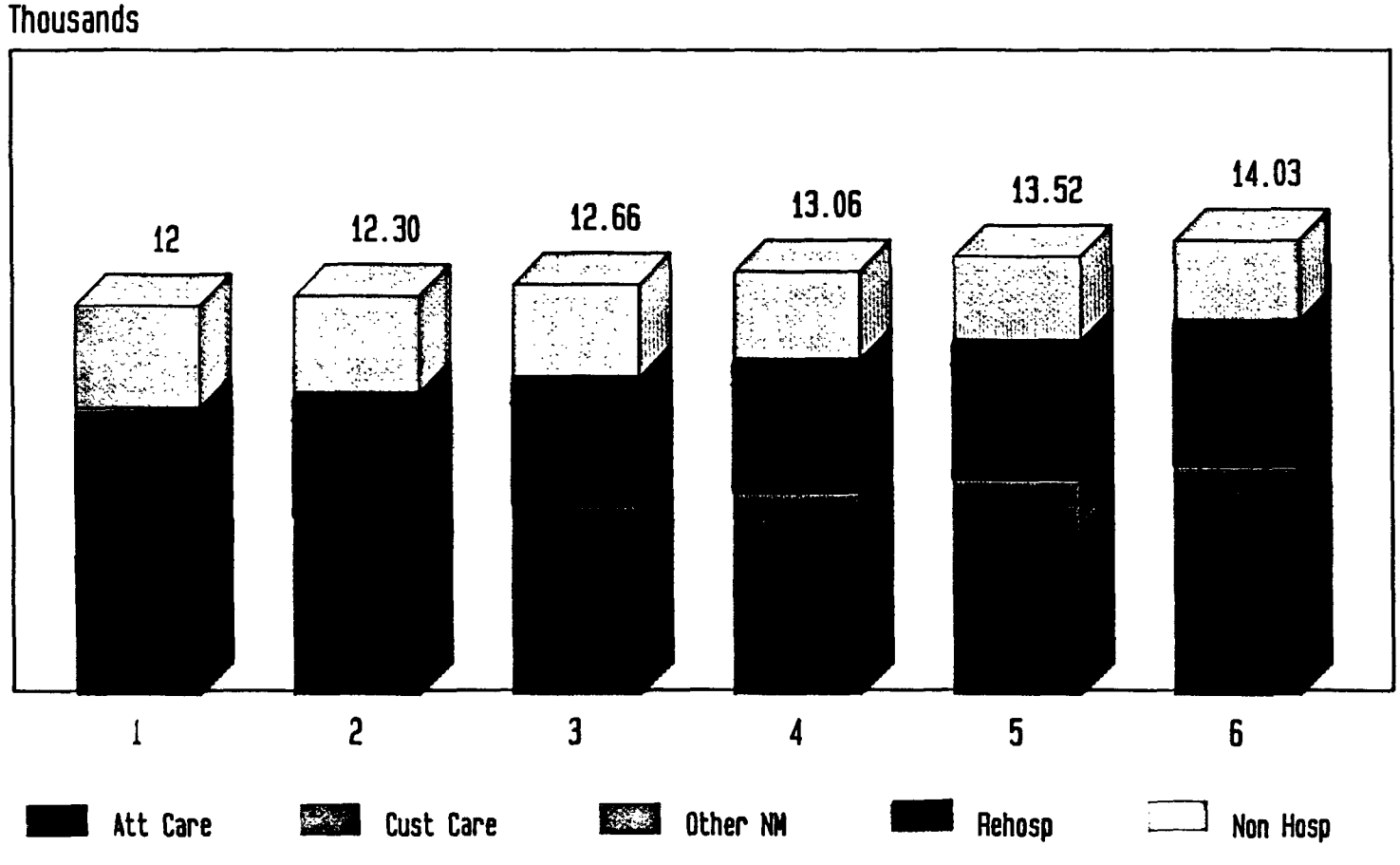
Quad Comp
Age 20

Year	Medical	Indemnity
1	124877	13000
2	12229	13000
3	12572	13000
4	12762	13000
5	13183	13000
6	13655	13000
7-20	243879	182000

Life Exp 20 years

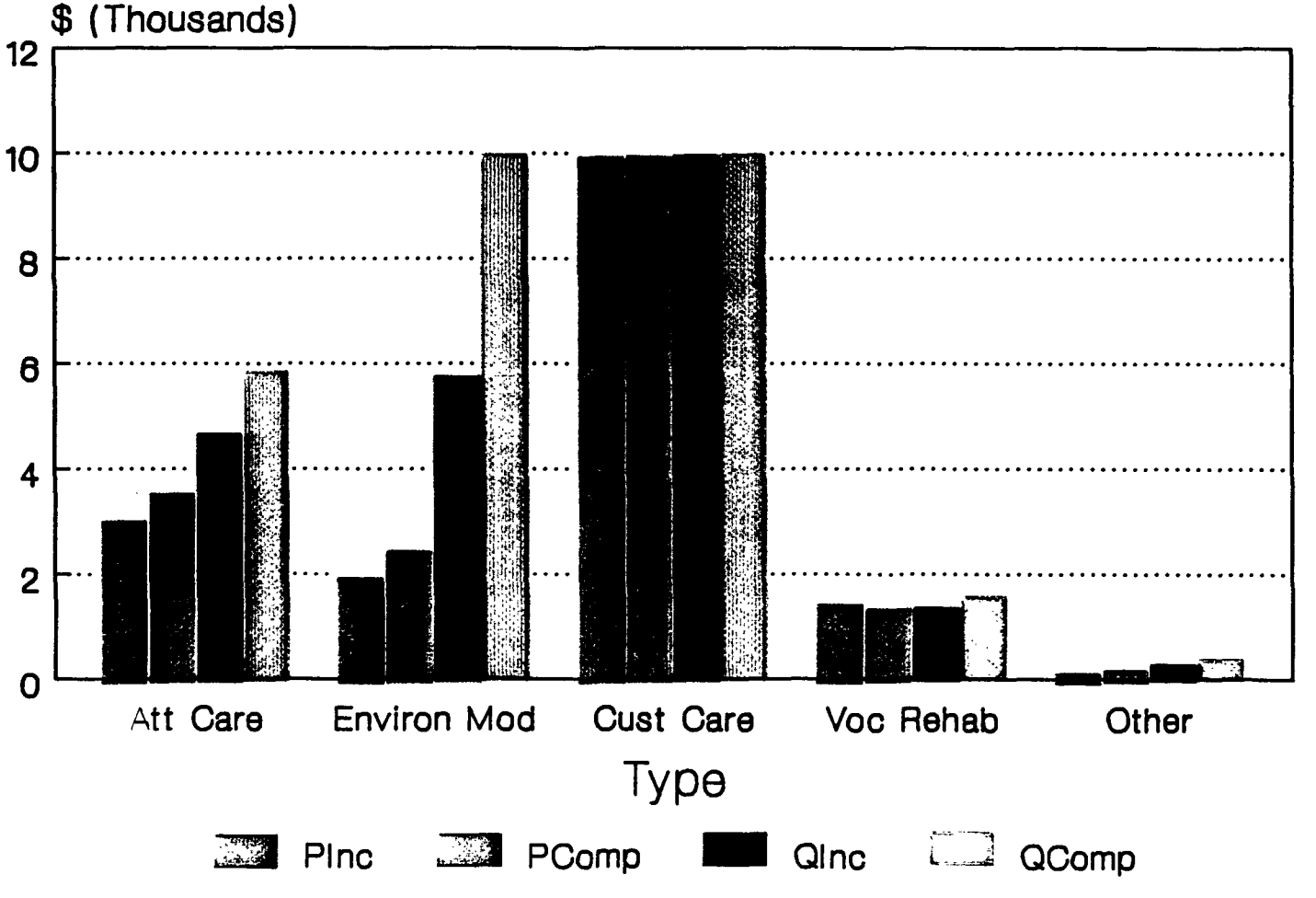
SLIDE 18

On-going Costs
Quad Comp



SLIDE 19

Non Medical Charges
Cost



1986 CASUALTY LOSS RESERVE SEMINAR

2F - REINSURANCE RESERVING: CEDING COMPANY PERSPECTIVES

Moderator: Patrick J. Grannan, Consulting Actuary
Milliman & Robertson, Inc.

Panel: Daniel G. Marren, Senior Manager
Ernst & Whinney

Vincent T. Donnelly, Vice President
& Associate Actuary
American International Group

Mr. Grannan:

This session is Reinsurance Reserving: Ceding Company Perspective. We have two speakers with a great deal of experience in the reinsurance issues that arise for primary companies. One of them will speak primarily about the accounting issues and the other will speak primarily about actuarial issues. We would like to ask that you make notes about any questions you have or discussion points you would like to raise. We should have ample time at the end of the session for a discussion period.

Our first speaker is Dan Marren. He is substituting for Bob Tschudy who had an emergency client situation at the last minute. Dan is a Senior Manager in Ernst & Whinney's National Insurance Group headquartered in New York City. He is a CPA and a CPCU. Prior to his assignment in New York Dan served in Ernst & Whinney's Chicago office where he specialized in the audits of property casualty direct writers and reinsurers. He also assisted the Illinois Insurance Department with various rehabilitations and liquidations. He will speak to us from an accounting and auditing viewpoint on issues relating to uncollectable reinsurance. Dan.

Mr. Marren:

Thank you Pat. I don't understand all of the controversy about uncollectable tree insurance. Last year a tree fell on our balcony and I had no trouble collecting from the tree insurer.

Mr. Grannan:

Dan, that's collectable reinsurance, not tree insurance. Did Bob tell you about that?

Mr. Marren:

Oh, that's completely different. Thankfully, I have a speech on that topic too.

My presentation as Pat mentioned will examine three topics relating to uncollectable reinsurance. First, how do you ascertain which recoverables are bad?

The second, if you think you have a bad recoverable how do you determine how much, if anything, you're going to collect.

And finally, how do you record all of this to keep the professional bean counters happy and off your backs.

Let's digress a minute to examine just how large of a problem uncollectable reinsurance is. Certainly the fact that this group has included it as a seminar topic is evidence of its importance. The importance can also be measured by reviewing the published financial reports of public property and casualty insurance companies. I am currently in the process of completing Ernst & Whinney's updated survey of the property casualty loss reserve disclosures required under the SEC's Financial Reporting Release No. 20. Many companies attributed a portion, and in some cases quite a sizeable portion, of their 1985 adverse loss development to uncollectable reinsurance balances. Also, the survey indicated a growing trend in the number of loss commutation agreements reported.

Even the general business press has picked up on the issue. For example, the September 22nd edition of Forbes magazine contained an article entitled "The

Reinsurance That Wasn't". This article focused on reinsurance losses due to fraud, which accounts for only a small portion of the overall uncollectable reinsurance, but the issue is gaining momentum. There are even suggestions that the complexity of reinsurance deals and the difficulty of collecting from far-flung reinsurers is a major argument for federal, rather than state, regulation of insurance. We all know there are not too many people in the industry who want to see that.

Clearly then uncollectable reinsurance is a large and growing problem. Now that we know that we have potential uncollectable reinsurance receivables out there, how do you ascertain which receivables are doubtful?

The major issue is, as always, security. How does the auditor analyze security on a reinsurance contract?

One of our procedures is to review the file that the security committee should maintain on each company to which business is ceded. This information should be accumulated before the reinsurance is placed, and should be maintained on a current basis. Except for the purposes of bayonetting the wounded, it's largely too late to analyze security when the recoverable is due. The AICPA's 1982 Statement of Position on Auditing Property and Liability Reinsurance outlines the items that will assist the company and its auditors in evaluating the financial responsibility of the assuming company. These items are not new to anyone so I will just run through them quickly. They include obtaining and analyzing recent financial information on the assuming company such as audited financial statements, financial reports filed with the SEC or similar bodies

for foreign companies, and financial statements filed with insurance regulatory authorities.

The next major area is obtaining and reviewing available sources of information relating to the assuming company, such as: insurance industry reporting and rating services, insurance department examination reports, and loss reserve certifications filed with regulatory authorities.

The next item is inquiring about the company's retrocessional practices and experience. To a great extent a reinsurer is only as strong as its major retrocessionaires.

The last item on the list is analyzing letters of credit or other means of security. The rule of thumb to remember is that you cannot have too much information on companies to whom you are ceding a material amount of business.

My first slide illustrates how one large ceding company obtained more information from a stubborn assuming company by using its own rule of thumb. [Slide].

It's easy to say that you should obtain and analyze recent financial information of the assuming company. What specifically should you be looking at? I will spend just a couple of minutes to discuss a few of the key items. The level of the reinsurance company's reported surplus should of course be monitored. However, except for the strongest reinsurance companies, this procedure is only the first step in analyzing a reinsurance company.

Look at the loss, expense, and combined ratios. Consistency and reasonableness are key here. Obtain full explanations for any unusual results relative to the industry or prior experience. Many people tend to look at calendar year loss ratios. But prudence indicates that accident loss ratios should also be examined. Accident year loss ratios eliminate any distortion included in calendar year loss ratios caused by prior year reserve redundancies or deficiencies. Accident year loss ratios should be more consistent than calendar year loss ratios. Absent large rate increases, a dramatic decrease in the current accident year loss ratio might indicate reserve problems. Look at the company's expense ratios. Is the reinsurance company's expense ratio in line with the industry? Does it require an unrealistic loss ratio to obtain profitability?

Look at the premiums written to surplus ratio. This ratio is often used but frequently it is only examined superficially. Monitoring the ratio to see that it is within industry norms is only the starting point. This ratio should be done gross of reinsurance in addition to the standard ratio which is net of reinsurance. In fact, the gross of reinsurance premiums written to surplus ratio is probably a better measure of the reinsurance company's exposure. It gives you an indication of the magnitude of the company's retrocession program. This ratio should be evaluated in relation to the reinsurance company's mix of business. A company engaging in mostly property business can have a higher premium written to surplus ratio than a company writing casualty business, without sacrificing its financial stability. Something to keep in mind when evaluating the reinsurance company's premiums written to surplus ratio is the effect of premiums underwritten but not yet recorded. This data is especially pertinent when the reinsurance company is

engaging in foreign reinsurance where it is not unusual to have up to a one year lag or more before being notified of the actual premiums. Some companies record estimated premiums to account for this time lag while others record the premiums when they become known. Find out what the reinsurance company's policy is relating to estimated premiums, especially if premium volume is volatile. The importance of this knowledge is that the reinsurance company may have accepted significantly more business than their financial statements indicate. That same point applies to companies who are involved in a significant number of fronting arrangements. What's their actual exposure? Look at the trend in premiums written. Wide fluctuations in premiums written may indicate changes in the reinsurance company's underwriting guidelines, product mix, or management philosophy. The numbers should also be examined gross of reinsurance in addition to net of reinsurance to indicate increases or decrease in business actually underwritten versus changes in the company's retrocession program. It may prove valuable to calculate these ratios separately for property business and casualty business.

In these items of rising reinsurance rates, written premiums are going to be higher so you have to also consider the number of exposures when you are looking at written premiums.

I would now like to go back to the thought about reviewing retrocessionaires. The reinsurer you are evaluating may only be as financially sound as its major retrocessionaires. The importance of this can not be over emphasized and is an area that probably does not receive the attention that it deserves. If the reinsurer has significant retrocessions, some or most of the procedures outlined earlier should be performed on the retrocessionaires.

In addition to all of the available financial data, a second and often more current source of information is the rumor mill. There can be surprises but often the grapevine knows which companies are insolvent, or nearly so, long before the regulators change the locks.

One of the problems with the information gathering process is that obtaining current information on assuming companies can be more difficult when you are dealing with foreign reinsurers. There are strong and weak domestic companies, and there are strong and weak alien companies. The different financial reporting practices, and time lags in reporting, make it much more difficult to track the financial stability of the foreign reinsurers, and the grapevine isn't as reliable either. Maybe the auditors just can't pronounce the names. All this can lead to special problems in trying to collect from foreign reinsurers. My second slide illustrates the CEO of one large company trying to collect from a small offshore reinsurer. [Slide].

Now we will assume that we have identified a company from whom collection is a problem. The ceding company then has to determine how much it might collect. This task is, as the old line goes, much like trying to nail jello to a wall. For reinsurance recoverables on paid losses, traditional auditing techniques can be effective and efficient. These techniques include review of agings, confirmations, examination of letters of credit, review of potential offsets, and support of subsequent cash receipts. Once the company has determined the amount deemed to be uncollectable, an allowance is recorded and netted against the recoverable asset. The chargeoff is treated as an operating loss. Depending on the magnitude of the amount, the chargeoff might be presented as

a separate line item in the income statement or it might be included as part of losses incurred.

Reinsurance recoverable on unpaid losses is a little trickier. Even if your reinsurer is around now will it be around when the losses come due? Facts and circumstances change and who is going to be around 10 years from now is not something one can predict based on historical experience. And we should not rely on size alone as a determination of who will be around to pay. Universal Re comes to mind in that regard.

The topic of uncollectable ceded IBNR losses is largely academic, given the methods currently employed for setting IBNR reserves. Until Schedule F of the statutory annual convention statement required disclosure of ceded IBNR from unauthorized companies, most companies were not even allocating it by company. Now the process is just that ... allocation. No company that I am aware of would go through the trouble of setting up gross ceded IBNR so they can write something off. Current GAAP accounting reflects this net calculation.

The final issue I would like to discuss is loss commutation agreements. The accounting for commutation agreements is an issue that has been receiving quite a bit of attention lately. It can be seen as part of the larger loss reserve discounting discussion.

It is easier to illustrate the issue with a simple example. Say the company has a $1,000 ceded loss reserve, the present value of which is $600. Now assume the company accepts a settlement of $500 under a commutation agreement. There currently is no definitive pronouncement on how to account for the

commutation. However, for transactions of this type that come to the attention of the SEC, the SEC requires that the company record the loss reserve at ultimate value. In our example, that would be $1,000 and the insurance company would have to record an immediate loss of $500. There are some who argue that the reserves should be $500 and thus, no loss is recognized immediately. Still others say that the present value of the reserve should be recorded and only $100 loss be recognized immediately.

These are the accounting and auditing issues that we face with regard to uncollectable reinsurance. The bottom line, as we accountants like to say, is that the issues outnumber the definitive answers. Uncollectable reinsurance is a major weakness in a recovering insurance industry, so I think you will continue to see the insurance industry and the actuarial and accounting professions focus on these issues. Thank you.

Mr. Grannan:

Thank you Dan. Our second speaker will be Vincent Donnelly. Vin is an Assistant Vice President and Associate Actuary at American International Group. He's an Associate of the Casualty Actuarial Society, and a member of the American Academy of Actuaries. He holds a B.A. Degree in Mathematics from Fordham University, and a M.A. in Math Education from City College of New York. He is going to speak to us primarily about the actuarial issues.

Mr. Donnelly:

Good morning. I welcome the opportunity today to be here to discuss some thoughts I have on ceded reinsurance and the actuarial involvement in such an area. I think most actuaries involved in the reserving process expend a great

deal of effort trying to find that elusive correct estimate of IBNR for the net exposure of their respective companies. However, little is done trying to estimate IBNR reserves for reinsurance ceded, yet it is one of the most important direct liabilities of the company that it expects to recover. We all know that the insurance industry as a whole has recently experienced some very difficult times, perhaps the worst ever in its history. These difficult times have been partially responsible for numerous reinsurers, both domestic and foreign, becoming financially unhealthy, and in some cases insolvent. That is, these reinsurers are unable to meet their full financial obligations. Many primary insurance companies now find themselves having to evaluate the magnitude of their ceded reserves and exposures to individual reinsurers. Management is now asking questions such as: what liability did we cede to Company ABC? What reinsurers will be around in the next few years to pay me their share of the losses? What percentage of the ceded liabilities to Company ABC will we be able to recoup? These questions are essentially retrospective in nature. The business has already been ceded; reinsurers have been selected; premium rates established.

We are taught that studying history is supposed to teach us the mistakes of the past. I hope one of the lessons that the insurance industry has learned is the need to have a stronger up front commitment with respect to prospectively evaluating reinsurance placements.

The first place we begin is deciding why an insurance company might be purchasing reinsurance. Each company has different reasons why and what reinsurance they exactly need. Varying reinsurance structures are utilized to reflect individual business plans, classes of business involved, company

capacity, and other variables. However, I believe one general theme is and should be that the reinsurance is a long term business partnership. That is, in the long run, say 10-15 years both parties should have gained. Primary carriers must always remember that reinsurance, in fact, does cost money. A primary carrier has a choice, either it cedes business which makes an operating profit for the reinsurer over the long haul, or that reinsurer will likely not be there for a full reinsurance recovery to be made. In fact, the primary company could find itself paying for its reinsurance twice. The first cost being the premium ceded to the reinsurer at the outset of a reinsurance contract; the second cost would be the absorption of the unrecoverable reinsurance losses. Obviously, a profit will not and cannot be made on every quota share treaty or facultative placement ceded by an individual carrier. However, it is equally obvious that a reinsurer should expect to achieve a profit from the total portfolio of reinsurance received from a ceding company. Incidentally, I keep referring to transactions between primary carriers and reinsurers. What I am discussing today is equally applicable to retrocessional arrangements. I might also add that the yardstick for profit will differ by reinsurer. Some will look only at total return; others will separate underwriting profit from investment return. Expected returns on equity will vary by class of business.

Once a company has decided on its own particular desires for reinsurance, attention then turns to the question of selecting quality reinsurance. I believe the actuary can play a critical role on that management team whose function it is to evaluate the credit risks of an individual prospective reinsurer. Several items come to mind as key in evaluating potential reinsurers. First, what is the quality of the assets of that company? Second, what

does the liability picture look like? Certainly, if you were already ceding business to a particular reinsurer then I think one has a sizeable advantage in getting a handle on "the real reserve position" of that company. Another point of consideration is the quality of their retrocessional placements. Who are they placing their reinsurance with? Are their liabilities properly protected? What is the maximum loss per risk that their surplus is exposed to at any one time?

On the other hand where are they assuming other business from? What classes of business do they write? Another point to consider is how leveraged the company may be. Premiums to surplus ratios can give some insight into how exposed a company's surplus may be. Given that rates have soared as of late, caution should be exercised in drawing some strong conclusions from such ratios alone. Another factor to examine is the company's historical bottom line. It is clear that if a company does not produce a profit it will not survive long enough to fully pay its share of today's product liability loss that settles 12 years from now for $10 million. One way to evaluate current profitability for a reinsurer is to examine the business you may be ceding to it. If that business in your judgment will likely run unprofitable for the reinsurer, then a next logical question is: is this pricing indicative of the reinsurer's entire portfolio? If the reinsurer is accepting your business at somewhat unfavorable terms, isn't it likely that they will accept such terms from others?

The last point of consideration with respect to determining the credit value of a reinsurer is "who" really is the company? What is your opinion of their management staff? Who is the ownership? Is their backup in the form of a

healthy committed parent? Let us assume that a company has evaluated as rigorously as possible various reinsurers and then implemented its reinsurance plan. Once the treaties are signed and facultative certificates issued, the reinsurance relationship does not simply become an issue of properly accounting for premium and loss transactions. At least two major reasons come to mind which should motivate the ceding company to continue to evaluate the liabilities they have ceded. First, I think a continual monitoring of how much exposure ceded to any individual reinsurer must be done. Clearly, knowing how much premium you have ceded to Company ABC, at best gives you a very rough estimate of the real ceded exposure. Just as companies regularly review their net liability picture, so should a similar effort be expended on at least the major blocks of ceded business. More and more, management will continually ask the question: is our spread of reinsured exposure according to our business plan?

I might add here that the process of evaluating potential reinsurers for your company is a continual exercise. After selecting reinsurers and subsequently ceding business to them, not only do you have to monitor those cessions but also the company as a whole must be continually watched. If one of the major assumptions you have made concerning that reinsurer has materially changed, your company may wish, so to speak, "to turn the faucet off" for future cessions.

The second reason to monitor your ceded results relates back to an earlier comment I made. Reinsurance is a business partnership. I believe a primary carrier should want to know as soon as possible, if they have ceded the kind of business they had originally intended. Generally a primary carrier will

know which direction a quota share treaty or a portfolio of a faculative placement has headed before the reinsurer will. Depending upon the nature of the business involved the lag could be substantial. As an example, let us assume that a casualty quota share treaty appears very likely to be ultimately unprofitable, well beyond any "normal" expectations. Remember, profitability yardsticks used by primary insurers and reinsurers may be different. I guess one reaction by the ceding company certainly could be to simply concentrate on their net exposure. However, both in the context of their financial partnership, and perhaps as well as in their best interest long term, reinsurer and reinsured should commonly understand the gross exposure at hand. Planning now for what may emerge in the future may make it easier to handle for all concerned.

Conversely, suppose that same casualty quota share treaty appears to be running incredibly profitable, well beyond any expectations. If I were ceding that business I would want the reinsurer to know how good of a deal is is likely to get. Secondly, I suppose the ceding company would want to reevaluate why it felt compelled to purchase reinsurance for that particular block of business, in the first place.

Most of my comments up to this point have addressed what I consider the prospective viewing of ceded liabilities. As we all know there are and there always will be some companies that become insolvent, or at least come dangerously close to reaching that state. It is at this juncture where a ceding company is faced with the problem of commutation or quantifying the potential uncollectable reinsurance.

At this point I'd like to take a few minutes to discuss some of the considerations and procedures that you should address in determining exposure for a particular seeded portfolio. I have not come here with any new mathematical techniques that could be used to estimate the liabilities. As in most reserving, a lot of good judgment, good number skills, and knowledge of underlying business written are the best tools you have.

Essentially in determining an estimate of liabilities for a particular company you have to look at treaty and facultative separately. Hopefully the facultative business can be placed into some homogeneous grouping: property and casualty at the very least. The simplest treaties to estimate should be the primary treaties. When I use the work "primary" here, I am referring to first dollar coverage of either property or casualty business. Even if one has not monitored their ceded business with some regularity, as I suggested earlier, exposure and results for primary treaties should follow the net reserve and profitability studies that are performed on a regular basis. Much more difficult to get a handle on is excell of loss layers. This is especially true if you were examining an excell layer where sporadic frequency is in fact expected. Very often, relying on expected loss ratios as a guide is not very helpful for estimating ultimate losses for excess of loss treaties. This is especially true over the last couple of years where excess of loss pricing seemingly had no rhyme or reason to it. Trying to project loss frequency and severity from historical patterns, if any exist should be supplemented by discussion with claims personnel. At the very least they should be able to give insight into potential large claims from the known inventory of claims, that they are currently working on.

The most difficult of all estimates is for the facultative placements with an individual reinsurer. Depending on the size of the portfolio you could literally be finding yourself being asked to estimate ultimate losses on a single individual policy basis. Generally, you are projecting a portfolio of facultative business and therefore can somewhat draw comparisons between ceded results and gross and net experience. However, keep in mind in a commutation you are also trying to find that unique account, or two, if any exist, which has "explosive" potential. Just as in the analysis of an excess of loss treaty, input from the claims department again can prove very valuable. Additionally reviewing the nature of the actual accounts with the respective underwriting areas should prove useful in identifying any "hidden" exposures.

Some other considerations to be dealt with in preparing to commute liabilities or simply accessing ultimate liabilities ceded to a particular reinsurer are: First, is there a potential unearned premium reserve deficiency? You must include a liability provision for losses that will exceed the unearned premium reserve. That is, if you expect a $100 of unearned premium to run to 150% loss ratio, then you have to include an additional $50 in your liability column. The second item which is very similar to that is premium lags. Suppose you estimate there is a backlog of written premium not yet reported or even booked by you, the primary carrier. This premium therefore has not been ceded to the reinsurer. Such premium if expected to produce over a 100% combined ratio, should have a premium deficiency provision included in the estimate of liabilities.

The third consideration deals with what I call contingency loadings. Suppose an unusual event, such as hurricane Gloria, occurs shortly before a

commutation is to be finalized. It is likely, that liability is still relatively uncertain for this event. Perhaps a way to deal with such a situation and a proposed commutation is to arrange a separate agreement for that occurrence. I think that this would be more applicable in an instance where a "solvent" reinsurer may be looking to commute some of its liabilities.

Any commutation would invariably take into account the time value of money. The difficulty here is obviously two-fold: first, how will future payments of losses and loss adjustment expense emerge over time, and secondly, at what interest rates will the bank account containing reserves grow? Payment patterns can be estimated by using internal and external sources which are representative of the kinds of business in questions.

In summary, I'd like to highlight a few points. First, the primary carriers have to place much more emphasis at the very beginning of the reinsurance process, both in the selection of reinsurers as well as the monitoring of those ceded results. Reinsurance should not be thought of as absolutely guaranteed after it is placed. There is risk in placing reinsurance and that risk should be minimized as much as possible, as soon as possible.

The final point is that the actuary can play an important role in reinsurance planning. The actuary is generally well equipped to provide insight into the financial analysis of potential reinsurers as well as the monitoring of ceded results. Thank you.

Mr. Grannan:

Thank you Vin. We'd like to open up the session to questions. Any discussion points anyone in the audience would like to raise at this point?

Dave Krystal:

You said to separate out the data between facultative and treaty, lots of times the stuff I work on there is not much data. I have to group between property and casualty. I would like to try to throw the facultative in with the treaty since I am going to be using industry factors anyway. Is that definitely a no-no that's never going to be a good thing to do?

Mr. Donnelly:

I don't think its a no-no. I don't think anything is a no-no when you're trying to evaluate a company. Generally on commutations I believe that when you're commuting liabilities with a particular reinsurer you literally have to itemize those individual treaties and make some type of distinction within the facultative business, whether it be property vs. casualty, or some other means. In terms of estimating the liabilities I think if you can separate facultative and treaty, if volume permits, you're better off doing that. However, one of the points I mentioned as well was that with facultative projections, you also should take a look at gross and net results. I would rely on looking at the gross result as well as the net results to assist projecting where the facultative is heading. The point I was stressing earlier about facultative business is that if you are especially dealing with a small reinsurer, small in terms of the amount of business that you might have ceded to that company, you should be very cautious not to assume little or no exposure. It literally could be one policy that you have given a

facultative placement on. That one placement could be greater in terms of liability than any of the other treaties combined or any other facultative placements. That is what you really want to get at. You want to find out if somehow you've made a facultative placement with a "Johns-Mansville" type risk and by looking at the aggregate data you might assume that the loss ratio is going to be 115 and in reality it's going to be 1,115 because there's a "Johns-Mansville" type exposure.

Question:

Could you briefly go over the accounting entries on a commutation. It seems that in the near future or the next couple of years, there's going to be a lot of commutations in the industry.

Mr. Marren:

The trick word is briefly. As I mentioned there is a lot of controversy in this area right now. And the answer probably depends on who you talk to, and the circumstances of your unique transaction. Generally however, the accounting you are trying to undo is the original transaction. The method that you used to book the cession, you reverse to record the commutation. I think where the controversy comes in and not only the SEC is looking at this, but the Insurance Company Committee of the AICPA is also looking into this is more at what value do you record it. When I spoke about the $1,000 loss and the $500 payment, and I talked in terms of recording an immediate loss as opposed to the company that wants to put up the $500 reserve, eventually that reserve has to grow to $1,000 as the funds grow. The question is more do you take an immediate loss now and recoup some of that as the investment income grows.

Question:

Does some of the $500 recovered have an element of premium income? Or do you book through losses with no premium entry?

Mr. Marren:

That, in a normal type situation, would be reflected as premium income and you would have the $1,000 loss and you would have an underwriting loss of $500. There are two ways of recording it. Typically on a portfolio reinsurance deal you might see a negative paid loss run through, and you have in effect no amounts running through the underwriting results. On a loss commutation agreement the preferred method is to undo the transaction that was recorded when you entered into the session. If you recorded it as a loss portfolio deal and ran it through as a negative paid loss in the first place, then yes, your accounting method would be what you do because you'd be reversing the previous entry. But if you recorded it as ceded premiums then it would go through the premiums under the commutation agreement.

Mr. Grannan:

Once you've decided what the amounts are, the question is what years to put them into in Schedule P. The premiums almost have to go into one year which would be the latest year of earned premiums. Losses normally go into past accident years. I'm not sure if that's correct in theory, since the premiums come into the current year. In theory if you want to match the two then losses ought to be assigned to the current year. They probably will not be though.

Question:

Would it be better because of that to record the commutation as a negative paid loss?

Mr. Grannan:

I think that would be true if you knew at the time of commutation what the losses would be and which years they would be in. Generally that's not true.

Question:

You present a number of facts to consider when reviewing a reinsurer to whom you're going to be ceding. From a practical standpoint we've been relying on an intermediary and an intermediary recommended Ideal Mutual. The good thing is I won the case in court to collect from it, unfortunately they don't have any money. From a practical standpoint Ideal was rated a A or A+ and then went down the tubes at which point I immediately said don't continue but by that time you're on the hook. From a practical standpoint who has had experience in getting all of this information from the reinsurers and particularly some of the secondary companies in London. Has anybody had experience in really getting all the details of who the retrocessionaire is so that you can make an intelligent decision?

Mr. Marren:

I guess I cannot speak directly to who has that experience. I think the answer I have is that in theory get as much information as you can. In practice you're going to get burned occasionally as everyone gets burned. I do not think the fact that you know you are going to get burned occasionally should stop you from getting as much information as you possible can on any cession.

Mr. Donnelly:

I guess I will add two things to that. One is the industry is a small place and people sometimes know before you do what really is true about a particular company. Word of mouth can sometime prove useful; at least it may raise a yellow flag. The second thing I would like to point out is that it is important if you are unsure about a particular company to really be monitoring how much you are ceding. If you start out saying I don't know a lot about them to begin with but I am going to take a chance because the Best rating is acceptable. I think it's very important to monitor that reinsurer and how much you rely on that company, i.e., how much ceded exposure are you giving that company. You may eventually get burned but the point is maybe you can mitigate some of that burning you are going to have 5 or 10 years down the road. I wouldn't put all of your eggs in one basket.

Question:

What Mr. Donnelly was talking about was one of the considerations, to make sure that you are in a long term partnership relationship and that you want to make sure that whatever you are ceding to the reinsurers does not put them out of business. But isn't it true that during the last underwriting cycle a lot of primary companies or ceding companies took advantage of the reinsurers and sent out a lot of business that was obviously underpriced. I'd just like your comments on that.

Mr. Donnelly:

I'd have to agree with that. I think the point is that primary carriers should not fool themselves when they are writing a particular risk or portfolio of business to say - I'll price it, it's not a great price, but I have

reinsurers there to back me up. Because in fact, if you give the reinsurer enough of that type of business, what is going to happen is they are not going to be there to pay the losses. I am not saying what the industry has done is right. What I am saying is: What the industry should do is to think twice before they charge prices that not only will burn themselves potentially in a net position, but will likely also burn the reinsurer. I think in that case the primary carrier is actually going to pay for their reinsurance twice. They are given the premium today and 5 or 10 years from now they are actually going to have to pay for most of those losses anyway because the reinsurer is not going to be around to do it.

Question:

What would be the CPA approach where you have recoverables from an insolvent company? Do you write off the entire balance or is some judgment made as to what would be collected from the estate?

Mr. Marren:

This, I think is a judgment call depending on the fact and circumstances. You try to work with the regulators to obtain an idea of just how far under water that company is. As you know, the reinsurance is not covered by the guarantee fund and you are last in line after the direct policyholders, lawyers, and accountants. In general, I think that in addition to looking at the amount of the potential recovery one needs to consider the timing of potential recoveries. Consider the time value of money in your negotiations. In general, I think it has to be looked at on a case-by-case basis. It is very difficult to try to estimate a percentage once you know that you have a bad company. I think it's just more of a gut feeling than anything else.

Then, in that respect, one of the criteria for evaluating a retrocessionaire would be if that retrocessionaire writes both direct business and reinsurance. From what I have seen of the insolvencies with the priorities under liquidation statutes, there would absolutely be no money available to a ceding company. It may be better to do business with a professional reinsurer rather than one that is both on the assuming end and in direct writing.

Maybe there is a general statement that might be true. I think that there is always going to be many, many, exceptions to that. I have also seen cases where the reinsurance business was bad and they had a profitable direct book of business. The direct book of business might keep the company afloat and maybe you would get some money out of them. Where normally if they were just on their reinsurance book of business they'd be out of business much earlier. Again, I think it's a case-by-case question.

1986 CASUALTY LOSS RESERVE SEMINAR

LUNCHEON REMARKS

Jerry A. Miccolis, Chairman
Casualty Loss Reserve Seminar

Bartley L. Munson, President
American Academy of Actuaries

LUNCHEON ADDRESS

John J. Byrne, Chairman & Chief Executive Officer
Fireman's Fund Corporation

Jerry Miccolis: Good Afternoon.

Planning, organizing and actually carrying off a seminar of this scale is, of course, a group effort. I'd like to acknowledge some of the members of that group.

Sitting at the head table with me are the hard working members of the 1986 Joint Program Committee, representing membership in both the American Academy of Actuaries and the Casualty Actuarial Society. Starting from my extreme right, we have Ron Wiser, Chris Garand, Donna Munt, Doug Kline and Dick Fallquist. Continuing, from down at my extreme left, Bob Miccolis, Heidi Hutter, Rich Bill, and Bert Horowitz.

It has been a pleasure, a real pleasure to have worked so closely with these men and women over the past year.

(applause)

As hard as our committee may have worked, we recognized that the real work in putting on this seminar was done behind the scenes by the convention staff of the American Academy of Actuaries. In particular Millie Prioleau, Convention Manager and Audrey Green, Assistant Convention Manager put in long, hard hours pulling this whole thing together, from attending all of our often-tedious program committee meetings, to the disciplined scrambling in the last few weeks to accommodate our almost overwhelming surge in attendance, to staffing our registration and information desk here at the hotel with gracious good humor.

Millie and Audrey please stand - and everyone please join me in applauding these two ladies.

(applause)

Other members of the Academy staff contributing to the success of this seminar include:

Kathleen Crawford - Publications Manager
Erich Parker - Director of Public Information and
Cindy Sharp - Director of Administration

All of these people are under the overall direction of Steve Kellison, Executive Director of American Academy of Actuaries.

I would also like to thank the hotel staff for all their fine work.

Sitting at our VIP tables here in front are the members of the Boards of Directors and Executive Councils of the Casualty Actuarial Society and the American Academy of Actuaries. You will recognize that many of these people are on the faculty of this seminar, and the majority, I believe, have served at one time or another on the Seminar Program Committee. The continued active involvement of the leadership of these professional organizations in the CLRS is, I think, noteworthy.

As I mentioned this morning, the CLRS enjoys the joint sponsorship of both the American Academy of Actuaries and the Casualty Actuarial Sociey. This morning we heard from Phil Ben-Zvi, CAS President.

This afternoon it is my pleasure to introduce Bart Munson, Vice President and Actuary with AID Association for Lutherans and President of the American Academy of Actuaries. Bart.....

Bart Munson: Thank you Jerry, Good afternoon.

Our luncheon speaker returns, at your request, after sharing his stimulating address with you at the first Casualty Loss Reserve Seminar, in 1981. And since then, interesting things continue to happen to John Byrne.

After ten years at GEICO, where he brought them back from the brink, Jack--as he prefers to be called -- moved to Fireman's Fund, where he's been the last year. He was responsible for them going public last October. Their earnings are looking good. And Jack says they are soundly, strongly reserved. The Wall Street Journal alleged he was brought to Fireman's Fund only as a name, to hype the stock; but we all know better.

Among other credentials of special interest to us, Jack is an ASA and a 21-year, charter Member of the American Academy of Actuaries.

Jack, as many of you know, is a rather shy, noncontroversial, reluctant speaker. But maybe with your warm welcome, we can get him to loosen up a bit.

Please join me in welcoming him back.

(applause)

Jack Byrne:

▮Note: a literal transcript of Mr. Byrne's address was not available. The following summary was prepared by Edward C. Shoop of Fireman's Fund and appeared in the November, 1986 issue of The Actuarial Review. It is reprinted here with the permission of Mr. Byrne, Mr. Shoop and The Actuarial Review.▮

Jack Byrne, at Loss Reserve Seminar, Reviews Progress, Needles the Industry

Calls for Market Valuation of Bonds, Promises 1991 Return — in France?

By Edward C. Shoop

Jack Byrne, chairman and chief executive officer of Fireman's Fund Corporation, reviewed progress against four improvements he had recommended for the industry at a 1977 meeting of the Casualty Actuarial Society. He was luncheon speaker at the Loss Reserve Seminar sponsored by the CAS and the American Academy of Actuaries, held on September 29-30 at the Hyatt Regency in Crystal City, Virginia.

Byrne, known as a vigilant spokesman for disciplined balanced sheets, in 1977 advocated specifically that the Annual Statement be required to be signed and certified by a Fellow of the CAS (and further certified by independent auditors), that the American Academy develop strong guides on discipline for its members, that the Central Office of the National Association of Insurance Commissioners be significantly strengthened in its role as watchdog of reserve adequacy, and that greater use be made of tabular reserves.

Acknowledges Progress

Acknowledging that considerable progress has been made with respect to Annual Statement certification by casualty actuaries, Byrne nevertheless took the opportunity to chide the profession for the snail's pace at which this progress was made, humorously claiming that he could have developed the "set of words" on certification in 11 minutes, in contrast to the several years it took the CAS. Byrne noted that independent public auditors are now required to sign statements in some 12 states.

In reporting on the American Academy's development of the Guides to Professional Conduct, Byrne congratulated the Academy and added that the industry could expect some 40 to 50 insolvencies for this and last year, some accompanied by annual statements duly signed and certified by actuaries. In his opinion, for the guides to have true value to the actuarial profession, the industry, and the general public, they should provide for the removal of the "license," or qualification, of the involved actuaries.

Commenting on the role of the National Association of Insurance Commissioners' Central Office in its role as reserve watchdog, Byrne said there has been virtually no progress. He claimed it is in the industry's own best interest to take the initiative and provide support, and charged the industry with abdicating this responsibility to the SEC. He was particularly critical of the industry's failure to adequately recognize and support the work done by Bob Bailey, formerly of the NAIC, whom he claimed was "cut off at the knees by the industry," adding that those who look to the regulators to keep the industry from shooting itself in the foot are living in a dream world.

Byrne regaled his audience regarding the use of tabular reserves by remarking that in 1977 he, Jim Berquist, Jim MacGinnitie, and Marty Adler could have "sat down and dreamed up some tables," adding that it's arguable that the industry would have been any worse off for their efforts, given that the runoff for that year was some 54 percent.

"Mark Bonds to Market"

Byrne then called for a fifth improvement—"mark bonds to market, immediately," as the time is reasonably right. He claimed that this was the most significant additional improvement which could be made to make our business well.

Byrne, ex-chief executive officer of GEICO, did not confine his remarks to his progress review, and did not fail to entertain in so doing. He coaxed his audience to chant with him his catechism for success in the insurance industry:

a) maintain a disciplined balance sheet (adding that when reserves are short, "*put* them in, don't *ooze* them in");
b) target for an *underwriting* profit; and
c) invest your assets for *total* return, ignoring accounting conventions.

"A Lousy Business"

He explained what he meant when he was quoted as saying insurance is "a lousy business to be in": we abuse owners' capital cyclically, and fail to adequately manage this aspect of our business. As a result, we fire long-term employees, cancel agents' contracts, and make our product unavailable and unaffordable to the public. Further, we characteristically respond to non-expense problems by savagely attacking the expense ratio. This does make for a pretty poor business to be in.

For the future, Byrne feels the industry is headed for a period of recordbreaking ROEs, (returns on equity), but he is concerned over how real these returns will be, adding that whether we will maintain disciplined balance sheets depends on us. He went on to say that he felt good about the prospects, as one change he had observed over the past five years was that CEOs respect their actuaries more now.

Fielding questions, Byrne reiterated his strong opposition to discounting of reserves, saying "it's all part of discipline in the balance sheet." In responding to another question, he conceded that the reserve situation he now finds himself associated with at Fireman's Fund is much more complex, and has caused him to move somewhat, but not significantly, from his previous position that "the problem of reserves is 30% technical and 70% political."

In closing, Byrne promised to make another return visit in 1991, and again monitor progress against the (now) five improvements he's set forth, plus the three premises of "running the business," set out above. He likes to refer to much of what he has to say as "blarney," and added a final liberal dose by suggesting that the 1991 Loss Reserve Seminar be held in the south of France! •

Jerry Miccolis:

Thank you very much Jack. There will indeed be a Casualty Loss Reserve Seminar in 1991 - at a location to be determined later - and, please, consider yourself invited. We may even invite you back sooner, should you change jobs again in the meantime.

(laughter)

I would like to repeat an announcement I made this morning. Session 4D "Claims Made Reserving" is currently oversubscribed. We have added a duplicate session during the preceding time slot to accommodate the overflow. This session, 3H, will begin at 1:30 immediately following our luncheon and will be held in Regency C. Both sessions 3H and 4D are open admittance and you are free, of course, to attend the one of your choice; however I would strongly urge those who can conveniently do so to switch to 3H. We think this will provide for a much more enjoyable and effective session for all attendees.

My last item is a commercial.

Those of you who are enjoying this seminar and may leave here tomorrow thirsty for more, should be reminded that this seminar is an annual event.

Reserving is of course a dynamic, not a static process, and those of you who are veterans of this seminar know that our program content is also dynamic, and changes each year in response to the changing reserving environment.

The next CLRS will be held October 1st and 2nd, 1987 at the Minneapolis Marriott City Center. [Note: later changed to September 10 and 11, 1987] We hope to see you there.

This concludes our luncheon.

Please remember to fill out those evaluation questionnaires,

and

enjoy the rest of the seminar.

Thank you.

1986 CASUALTY LOSS RESERVE SEMINAR

3E/4E - PROFESSIONAL RESPONSIBILITIES

Moderator: Robert W. Sturgis, Consulting Actuary
Tillinghast/TPF&C

Panel: Linda L. Bell, Senior Vice President
U.S. Insurance Group

Frederick W. Kilbourne, President
Future Cost Analyst

Gary D. Simms, General Counsel
American Academy of Actuaries

Recorder: Jeffrey Englander, Manager & Actuary
Ernst & Whinney

MONDAY, SEPTEMBER 29, 1986

Bob Sturgis:

The subject of this session is Professional Responsibilities. Presumably to do with loss reserving since that's why we're here. I want to assure you that most of what we have to say applies to non-actuaries who may be engaged in any aspect of the loss reserving process. Although from time to time there will be references to specific standards of the various actuarial bodies. Just from my own curiosity I'd like to have a show of hands. How many in the room are actuaries as such? Probably 90% or more of this particular audience. We planned this so that just about half of our allotted time is in prepared talk. The remaining half will be left for discussion and audience participation. I certainly hope as we go along that you will think of questions. I'll ask you to save them until we are through with our prepared remarks. The entire presentation should not go beyond 45 minutes. Also, I'll field any questions you may have on the Boston Red Soxs and their winning of the American League East. I thought I'd lead off with a little historical background on so called reserve certifications or what I'd prefer to call statements of actuarial opinion. The first landmark that I can identify is 1974 with ERISA which may not seem appropriate. That was when enrolled actuaries and their statement of opinion was explicitly required for pension reserves. The very next year in 1975, life annual statements required a statement of actuarial opinion or a statement of opinion by an actuary. Then, in 1979, the NAIC adopted a recommended requirement that similar opinions be required for property and casualty statement blanks. Either by an actuary or a member of the Academy or by a qualified reserve specialist. I was just getting started in the actuarial profession in 1964 and I believe the Academy was started in 1966. Not everyone has the same perspective and certainly at that time not every casualty actuary was in favor of the formation of the Academy. I think that we've made tremendous strides partially because of this certification. As you know there is no requirement that it be a independent individual nor that it be an actuary. And yet, there is no doubt in my mind that this has raised the consciousness. Even when that statement is signed by the same individual in a company that always did the reserves and continues to do so. It has raised the consciousness generally throughout the industry about loss reserves and that they be properly evaluated in spite of current status or what you may think is the current status of reserve levels. Initially, in response to that NAIC recommendation - and incidentally it applied to the 1980 statement -- there were 8 states that adopted it. Bermuda also adopted somewhat similar standards for certain lines of business. If I count that as 9, today there are 20 states that have some kind of requirement for reserve certification. Three states, Texas, New Jersey, and Florida require such an opinion for all states licensed to do business in that state. Currently, the NAIC is considering extending or requiring that such a provision be in all state regulations. A Casualty Actuarial Society Task Force was appointed and asked to study the issues. I believe Warren Cooper, who is with us is chairman of that group, which is to consider 3 questions: 1) possible waiver of the requirement for certain lines of business, 2) what the appropriate timing would be for introduction of such a requirement, 3) what should be the guidelines for non-actuaries

to qualify as loss reserve specialists. There has been quite a bit of activity recently in a related field that valuation actuary CAS task force on that question -- incidentally what I regard as the key concept of that is that you have to go beyond the liabilities. You have to take the assets into consideration and are those assets sufficient in terms of their maturities as well as their market values -- essentially to pay for the liabilities. That committee recommended two issues. First of all as I stated, or I think I've stated already is that it is not likely that any requirement would be forthcoming in the foreseeable future. That is in the next 3 years or so. But they did recommend another task force. This task force was a result of a prior task force which I was the chairman of, it recommended that there be a follow-up group. Of course, we've recently created the Interim Actuarial Standards Board which was created to review an develop more specific standards with regard to areas of actuarial practice including loss reserving. There has been a lot of regulatory activity has increased the conscious of this requirement or the loss reserve requirements in general. We've put together a panel here of 3 experts to discuss the issue from the perspective of an independent consulting actuary, an employed company actuary, and from a legal point of view.

The first panelist who was to have spoken is Fred Kilbourne. I've learned just yesterday that Fred is unable to join us today. I'd like to be able to take 6 inches off my waist and add it to my height and pretend to be Fred. I'd also like to be able to deliver on his notes with the same kind of humor that Fred would have delivered. However, as an actuary who was born and raised in the state of Maine and trained by the Aetna, I have nothing humorous to say. I'm going to speak briefly from Fred's notes.

I wish I could say to you that if you take care of your responsibilities and if you do your job properly that you have no concern about professional liability or litigation. However, that's not the case in today's litigious society. And we have the especially acute problem of E&O exposure for public actuaries. There are 3 rules of thumb, or things that you should make sure you've done your housekeeping on. The first one is to practice defensively. What I mean by this is that when we're doing our work I think it's extremely important to ask ourselves the question -- how would I explain this if I were under oath and on the witness stand. I want to stress not so much under oath as being on the witness stand. It's a very handy question to ask. And I think that we would go about our work quite differently if we asked ourselves that question. Some of you saw a mock trial that was put on at the Conference of Actuaries in Public Practice whereby a consulting actuary was on the stand and put through direct testimony by his attorney and everybody in the audience. There's just absolutely no case; he's clearly covered every situation and walked the extra mile. And then the plaintiff's attorney proceeded to cut him to ribbons. We want to word our opinions very carefully including the limitation of the accuracy or the preciseness of our work, and the kinds of

situations that can cause our answer to be wrong. Thirdly, of course, to document everything we do and make sure our files are in good order, which for many actuaries is a very difficult thing to do.

What are the responsibilities of the certifying and opining actuary? Our first and foremost is to conduct the project in an non-negligent manner. Which is, in Fred's opinion, the silver lining of the liability cloud. It has raised our consciousness to make sure that we do things as they should be done. Secondly, to go about the work in a competent manner or to ask ourselves we are competent to undertake the assignment. This is a question we ask ourselves in the consulting field very often. But there are some interesting wrinkles. One is -- is there someone better qualified. Very often we face an assignment where we say well, I can do that. I know something about triangles, pricing and exposures. But it may be that it's pretty clear that someone else is far better qualified and that should be given active consideration. The second requirement is to follow appropriate actuarial standards. This raises various questions. The Interim Actuarial Standards Board is wrestling with the subject of what sort of standards should be applied. And is the risk of making the field too narrow stifling innovation. There is the area of conflicts of interest. What I've found in my practice is that there are many, many situations where there is apparent conflict of interest. I have virtually never run into a situation where there is a clear cut conflict of interest where I would be precluded from doing the work assuming that I had notified all the parties involved. I can tell you that in some situations I have agreed to go ahead with the work. For example, when a company is being acquired I'd find myself on both sides of the table. Which is about as clear a conflict situation as you can imagine. When you get advance notice in writing from both parties to conduct yourself in that fashion, it seems an advance, in abstract sense that everything is fine because you're a professional and, after all, all you have to do is come up with a professional evaluation and walk away from it and let the parties do with it as they may. You find yourself in some pretty awkward situations.

What I'm trying to do here is raise some issues. I think it's becoming increasingly clear that I don't have the answers for all of these. One of them is the subject of peer review. In a large professional firm, all of us to my knowledge at least have very stringent peer review standards where everything that goes out the door is reviewed by a second professional. What about the sole practitioner? What kind of responsibilities does he have for peer review and how does he go about getting that done? Lastly, keep in mind the needs and responsibilities to the client. Which raises the interesting question of who is the client? And with regard to our responsibilities to the public, who is the public? Typically in a client situation a member of the management team (the CEO or the CFO) is the person we're dealing with, the person who is signing the check. But our real client is not always that person. In fact, it's virtually never that person. It's really the stockholders or policyholders. How do we

differentiate between those sorts of responsibilities? We're pretty clearly getting into a question that also faces the employed company actuary. The question has arisen in the practice of many of us in the last 5-10 years. What happens when we are engaged to do a reserve review and as a result of our work, it's fairly clear to us that the company is statutorily insolvent. Or perhaps insolvent by any yardstick. What are our obligations to the public? Again, who is the public? In practice you have to draw the line somewhere. I think where that has been traditionally drawn is that we do not have a whistle-blowing responsibility so long as we make our conclusions perfectly clear to people who have the explicit responsibility to properly manage that company.

The third major area of question is how does one professional sign an opinion when the work is really the product of many individuals? There are some firms that sign, in our profession and in the accounting profession, with the name of the firm. Those names are typically people's names who had nothing to do with the work and may not even be practicing or with us any longer. In particular firm we make it a big point that it is signed by an individual. I think it's important that individuals be assessable to the client and identifiable to any other proper reader of that report.

The fourth area of question -- how does one properly qualify his opinion when there are special difficulties? In Fred's language, either this is a brand new company [so I have no information about the claim practices] or it is a new line of business [so I have no statistical data] or it's a highly volatile coverage [so my loss reserve would be the midpoint of an infinite range so I thereby conclude nothing]. More alternatively, and incidentally, on two occasions I have seen members of the actuarial profession essentially take that stance. The issue in my mind was who was better qualified and an opinion is clearly required regardless of the difficulties of arriving at it. The alternative language, again in Fred's view would be [in view of the foregoing I've sought comparable or analogous data from other sources, I've interviewed company personnel and others to enhance my judgment input. I've made specific assumptions and test at a model based on adjusted data, etc. etc.] I recommend a special study of contingency or surplus needs as a result of these increased uncertainties.

The last area of question that causes us particular problems is second opinions. Does the first opinioner know about this? May I call him? Do I have an obligation to do so? I think it's fairly clear, in my opinion at least, that the answer is yes. I for one would not undertake a second opinion without making it clear to the client that I have a need to not ask permission on, but inform that first professional. And indeed a professional obligation to consult with him not for his advice and consent, but for any special information that he may be aware of. By and large those are questions and issues, not clear cut answers. I've expressed an opinion on a few of them and I know from personal experience that not

everyone shares those views. I hope that those of you who disagree or have a particular point of view will express it shortly.

Our next speaker is Linda Bell. Linda is the Sr. Vice President and Chief Actuary of the Transamerica Insurance Group. She's been out there on the West Cost for about six weeks now. Previously she was with Crum & Forster. Linda is a member of both boards of the CAS and the American Academy, and she formally chaired the Education Policy Committee. Linda.

Linda Bell:

Thanks Fred. I've been asked to speak about the professional responsibility that surrounds certification from the perspective of the company employed actuary. Responsibilities of the company actuary who is charged with certifying loss reserves go far beyond the collection and analysis of loss development triangles. As I thought about what those responsibilities are I realize that, even though there may be some very real advantages to being an independent certifier, a consultant such as Fred or Bob, the company actuary can use his or her position within the company in many ways to significantly reduce the potential of having to deliver bad news or conditional certification at year end. I'll be concentrating my discussion on the advantages of being an employee of the company and the year round aspect of the responsibilities that the certifying company actuary has. I've never given a talk at one of these loss reserve seminars without using umpteen overheads. I wasn't even able to begin to think about how I could talk with you without having some sort of a visual aid. But I was able to keep it down to just one. If you'll excuse me one minute I will go down and turn on the machine. Hopefully this one overhead will help me to remember what I want to say. And help all of you remember that IBNR is not a black box but is an essential ingredient of every loss reserve specialist's life. I've just used this to help me trigger some words that have to do with what I view is a year round responsibility of the company actuary. To me, the major advantage of being a company employee when it comes time to certify loss reserves is the fact that you have the opportunity to influence senior management's reserving decisions throughout the year. This influence is best developed if you really become an integral part of the total management team. That you come to be viewed as a business person who happens to be an actuary. You need to be involved in corporate discussions about all aspects of the operation. When there are discussions going on about the unusual cases that have developed, or the numbers and amounts of the large claims that are being reported. Or if there are company decisions being made about changes to take place in the field operation. Or changes in underwriting guidelines or claims handling procedures. All of these things need your involvement. By being involved in those discussions and those decisions, you can be informed about the changes that are taking place that are likely to impact the database used for reserve analysis. This influence that you should have should extend to the roles of being an educator. You'd be surprised at how much or how little many insurance executives really know about the impact that today's loss reserve deficiencies can have on future results.

Or about the impact that inadequate or even misallocated reserves can have on the statements of results that they use in establishing future strategies. As an aside, how many of you work for companies that use a comparison to peer performance as a performance measure of your management team? How many work for companies as opposed to consulting firms? The companies I've worked for do. Looking at the reserve strengthening activity that took place at the end of 1985 I think that perhaps many of those comparisons that have been made throughout the early 80's were unfair and invalid comparisons. That's the kind of thing that management needs to be educated about. You need to explain to management why IBNR goes up when exposures go up. And why it doesn't necessarily come down when earned premiums start to come down, if in fact there has been deterioration in the price levels. You need to explain that IBNR is not a black hole and it is not penalty for growth. You need to explain why even if you have the best claims people in the industry, you may still have a need for a supplemental or a bulk reserve for case reserve development. You need to make sure that your management understands that your reserve estimates can never be exactly right. And why it is better, from a perspective on the future, to be high today rather than low -- to error on the high side rather than the low side. The certification process really extends beyond the senior management level to all operating levels of a company. Everyone can manage the operations better if they understand the components of their operating results. Your job is made a lot easier if there's understanding throughout the organization of why you're establishing the rates and reserves that you feel are required. Speaking of decisions, as I mentioned, we need to let management know that our estimates can never be exactly right. Let's go on to the letter B. The first entry is the best estimate. I think that as a reserve specialist you have a responsibility to let management know what your best estimate of required reserves is. You need to let them know what reserve levels you would carry if there were no pressure on your financial results. A little bit of utopia. But you also have a responsibility to provide a range of reasonableness around your best estimate. For some lines that range will be very wide. For other lines it will be quite small or very narrow. In every case, revisions in underlying assumptions regarding inflation or severity trends or frequency trends will result in different reserve estimates. Certainly you believe a specific set assumptions. That's how you arrived at your best estimate. But there are other sets of assumptions that may be as reasonable or equally reasonable to your own. Management needs to know what those other sets of assumptions are and why you have chosen your particular set. Perhaps someone will convince you that another set of assumptions resulting in a different answer from your best estimate is as reasonable as your set of assumptions. However, note the next entry. You better see it in the data or you'd better see it in some data of the company even if it isn't in your reserving database, before you adopt assumptions that would significantly reduce indicated reserves. You ask is she talking out of both sides of her mouth? The answer is yes. I really am. There's a delicate balance here that needs to be maintained. Have you ever had to talk to the IRS and the

state insurance department examiners on the same day about your loss reserve. If you have, you know about that balance. What I'm saying is that there is a range of reasonableness within which you can be comfortable. And then there are estimates outside of that range. I think you have a responsibility to explain the range to your management and to defend the endpoints as well as your best estimate. Management needs to be aware of the uncertainties underlying your range. And the reasons why you've become most comfortable with your pick. The last entry under B is bad guys. At least the underwriters will say its your fault that workers' compensation is not improving in its results. It's your fault that the loss ratio for umbrellas is deteriorating. But if you've done your job educating and really explaining your information, the bad guy jokes will be back. They'll be jokes.

The letter "N" was a tough letter. I could be nitpicking. What I mean here is that -- if you see something happening in your data that it looks like a trend has changed or a trend is starting to develop that had not existed before, nitpick, ask questions and investigate until you get answers that you can believe. Don't just take the first answer that someone throws out. Investigate and really become comfortable with an explanation as to what is happening in your data. It's your responsibility to understand the underlying things that are effecting your data. Nitpick. If you don't have a good reserving database, demand one. You can't be expected to make due with what you've got forever, when your professional reputation is at stake. No one should be blaming lack of data for poor analysis or poor conclusions year after year, after year. As the actuary who certifies the loss reserves, it's your responsibility to make sure that you have the proper data resources to do the job that needs to be done. The next point here is to have meetings. Talk with the underwriters, talk with the claims people. Talk with the accountants about what you see happening in the data. Get whatever information and input from those groups that you can and take it back and see if you can quantify the impact of what you've learned on your reserve analysis. Good reserve estimates are based on analysis and judgment. Or, as someone said this morning, on experienced common sense but not on wishful thinking.

Nightwork. Hopefully you all have PC's at home so that when you get really bored with Monday Night Football you can run in and run another set of assumptions through your micro based reserving model. By now you know I'm very much in favor of year round involvement with the senior management and other levels of management. But I also strongly suggest that indepth analysis of key reserve components be done more frequently than annually. A whole year's worth of a changing trend can do a great deal of damage to prior estimates. If you want to avoid significant surprises, you do your indepth analysis as frequently as your data and people resources allow. And if those resources currently only allow annual analysis, then you know what your first priority is. Again, it's your responsibility to make certain you have the resources to do the job the certifying actuary needs

to do. Let's move on to "R" - responsive. That's tough one. I said earlier that you'd better see it in the data. And I said reserve estimates are not based on wishful thinking. How can you be responsive to management's insistence that the current book of business or the current loss will not develop as adversely as prior losses. I think the appropriate degree of responsiveness is to listen and to really investigate the available data to see if you can find support or evidence for this statement. You've got to make your judgment based on things that you can get your hands on. If you can, get your hands on underwriting files, again as suggested in one of the sessions this morning. That may be the place to go for the information that you need. It may not be in a database. But if you can't find any evidence to support significant changes in trends, then again, I think you have to talk with management about the need to be at least adequate and perhaps conservative in your estimates from a future perspective. Again, you continue to investigate incoming data. If management insists that things are changing, eventually that will show up in the data and if you continually investigate then you can respond, when in fact you see the changes in the data. Be realistic or objective. I think here is where a consultant really has an advantage. Being totally objective and realistic has to be easier when you're totally independent of the consequence. Our professional ethics demand that we all be objective and realistic in our certifications. And so we have to be. We will be, even when we've got bad news. A company actuary looses more sleep than the consultants do. What the range is and that the range is reasonable certainly help. Being right helps too. What I mean here is after you've been a reserving actuary for some time you'll have a record that will help convince management to know that you haven't been too conservative in the past in your assumptions. One of the things that experience has been teaching all of us is that even those estimates we thought were conservative back in the early 80's generally were not so conservative.

Lastly, be ready. I mean talk to yourself. Know ahead of time before you ever have to face it and hopefully you won't have to face it. But know ahead of time what your response or reaction will be if significant differences of opinion exist at the time you're required to certify. Perhaps where you're being asked to give unconditional certification to reserves with which you cannot become comfortable. Ultimately your response is a very personal decision. But I think it's important that the decision be made when you're not under the pressure of the moment. When you can rationally think about what all of your alternatives are. Whatever your decision is I'm sure it will be a very difficult one to carry out if and when you face that situation. That's why I've concentrated most of my discussion on what you can be doing as a company actuary to avoid those conflicts at the time of certification. Thank you.

Bob Sturgis:

Thank you Linda. Something has occurred and remind me of a situation several years ago where I was trying to defnd IBNR levels to a doctor's company and this one particular doctor was giving me a very hard time over a

prolonged discussion. And he kept referring to it as RBNI. In the beginning I was quite diplomatic. Finally I corrected him, I said "Doctor, it's not RBNI it's IBNR." And he said "No, it's RBNI, reported but it ain't incurred."

Our next speaker is Gary Simms who is the general counsel for the American Academy of Actuaries. He's been in that position for 3 years, and in that position he works closely with the Interim Actuarial Standards Board, the Discipline Committee, and the Committee on Guides to Professional Conduct. He is a graduate of Georgetown University Law School.

Gary Simms:

You will notice that I took off my watch to time myself here because as a lawyer I guess I'm like a consulting actuary. I'm used to getting paid by the hour so I keep going. In any case, it's a pleasure to be here with you today. I would also add that I'm sorry that Fred Kilbourne couldn't make it with us today. Appearing on a panel with Fred usually relieves you of the necessity to come up with some jokes. But in any case I saw before there were some hands raised about how many were staff actuaries? How many consulting actuaries were there here? You'll notice that I used the word staff actuary versus consulting actuary. Some people call consulting actuaries independent. I guess that makes staff actuaries dependent. Other people call staff actuaries employed actuaries. What does that make consulting actuaries? If you're not a company actuary are you a lonely actuary? If you're not an in-house actuary are you a ...? In any case when I was in law school the one course which we all dreaded taking was the course in professional responsibility. Nothing could be more boring. Of course in retrospect, particularly following the Watergate years, for lawyers a lot of us realized it was the most important course. We should have paid a little bit more attention and maybe shouldn't have taken on a pass/fail option. When we talk about actuaries in professional responsibility we are making a couple of assumptions. First, we assume that actuaries are professionals. Second, we assume that they have responsibility to someone or to something. I'm not being intentionally obtuse or simplistic, although I may appear that way to some of you. Rather, this is the way we have to begin looking at this subject from a legal perspective. As one would assume however, actuaries are considered by the courts (and that's what counts in this context) to be professionals. This is a fairly new development. For a long time the term "professional" was limited to doctors and lawyers and ministers. But the word has broadened in recent years and the courts have recognized that actuaries are professionals, generally, so far in the insurance related litigation. Professional liability (more specifically malpractice_ is considered to be professional misconduct or unreasonable lack of skill. It is the failure of one rendering professional services to exercise that degree of skill and learning commonly applied under all of the circumstances by an average, prudent, reputable member of the profession. As a result of this failure there has to be an injury, a loss or damage to the recipient of those services or one who is entitled to rely on those services. There are two

major theories of legal liability. One growing out of the contractual relationship between the parties, and the other growing out of negligence. I will not have the time here to explain in detail the ramifications of each theory. But I think it's enough to say that under the contractual theory of responsibility a breach of that responsibility generally is limited to those who are within the gambit of the contractual relationship. In other words, in law, they are within privity of contract. Under a broader tort theory however, the potential injured parties, that is the people who can sue you, can be much more remote from that relationship. The extent to which these more remote parties can sue the actuary for malpractice is a matter of state law. Although in almost all jurisdictions if the actuary could reasonably foresee the plaintiff relying on the exercise of those professional actuarial services, the liability can run to that individual. For example, most people would say that it is reasonable for an investor in an insurance company to take a look at recent filings prepared by the actuary and to look at those filings and to take those filings into consideration when he makes a decision about investing in that company. Now if the actuary was negligent in formulating that opinion, that actuary may be liable to that investor when the investment goes sour. We don't have enough time to permit discussing here in great detail some of the more exciting and interesting features of this issue. Issues like comparative negligence, assumption of risk, joint and several liability, primary and secondary liability, and other legal theories which do impact on the issue. If time permits during the question and answer session maybe we can get into some of these. I will say that as a result of the recent litigation crisis or insurance crisis. There have been rapid changes in state law in a lot of these areas. There probably will continue to be changes in the near future.

The second subject I wanted to cover today was the role of the professional in professional responsibility. The actuarial profession through the Academy promulgates a set of ethical standards as well as standards of practice which together, and I stress the word together, are designed to assist the actuary in performing its tasks with appropriate regard to professional responsibility. I would stress here today the interrelationship between standards of conduct and professional standards of practice. Guide 4B to the guides to professional conduct states in part that:

"The member will exercise due diligence to ensure that the methods employed are consistent with the sound actuarial principles and practices established within the profession."

Now interpretative opinion 4 which helps define some of these goes onto

indicate that the sound actuarial principles and practices are:

> "Generally accepted actuarial principles and practices" and further that the "sources of these generally accepted actuarial principles and practices include the recommendations and interpretations issued by the Academy through the IASB.

Further,

> "A member who is engaged in any specialized field, for example, in establishing loss reserves is expected to pay close attention to applicable standards issued by the Academy. And if he or she undertakes a practice which is materially different from the standard the fact of that deviation must be disclosed to the client. And the actuary must be prepared to explain why the actuary has made that deviation.

In addition to promulgating standards, the Academy's various committees are prepared to respond to practicing inquiries from individuals to assist those individuals in carrying out their responsibilities. And further, the Academy's disciplinary processes are available to help the profession maintain it's integrity and to help ensure that those who might give the profession a bad name are held to the correct path. In this regard I'd like to respond to today's luncheon speaker just a little bit regarding the disciplinary processes of the Academy. I think he made it fairly clear that from his perspective the Academy really wasn't doing enough to discipline actuaries. He indicated that if there were 50 insolvencies during a given year that he would expect several Academy members to be disciplined or essentially drummed out of the profession. It's an interesting thought and one we hear of more frequently from regulators than from members of the industry. I will point this out though. Number 1, when there are insolvencies the Academy's Discipline Committee, almost always when they come to the attention of the Committee, will do at least a preliminary investigation into that insolvency to see whether or not there is cause to investigate the actuary's role in that insolvency. This does not impute from the outset that the actuary did something wrong, but we want to take a look at that. It was explained to me by an ex-Navy man that whenever a ship goes they automatically investigate the Captain's conduct. It's a similar kind of analysis here. Secondly, we have to take a close look in those insolvencies to determine what the actuary's role really was, if any, in that insolvency. The fact that the company turned up to be 30% short in its reserves does not necessarily mean that it was the actuary's fault. There are other factors obviously that can play a part in that course of events. If a company is involved in litigation as a result of the insolvency, the Academy's Disciplinary Committee's practice has been to monitor that litigation. Not to get involved in it, not to try to

undermine one side or the other through inappropriate questioning -- but to wait and see what happens as a result of that litigation. Once that litigation has been completed then the Academy's Disciplinary Committee will take whatever action is appropriate. A footnote here and that is the Academy's Disciplinary practices only apply to members of the Academy. The Academy doesn't have a reach over non-members or over non-actuaries. That's a problem we hear from regulators, who by the way will sometimes come up and tell me story. They'll say: Gary, you should have seen this filing that I got on my desk the other day. This actuary, and I won't tell you his name, is a member of the Academy, and it was just pure trash. I can't believe the Academy lets people do that. My response to him in that set of circumstances was "let us know about it, we'd love to investigate it, we'd love to put this under our Disciplinary Procedure." We know that in order for us to be taken seriously we have to occasionally go out and find somebody who did something wrong. We can't do that without your assistance. The regulators to date have been very reluctant with supplying us names, facts, dates, anything along those lines which would allow us to get into that disciplinary process intelligently and completely. It's an ongoing debate we have with them. Similarly, I believe that members of the profession at large have the responsibility to bring matters of professional malfeasance to the attention of the Academy's Disciplinary process. We do not countenance where we should not countenance practicing with rogues, is what the legal professi[illegible] says. I think, similarly, actuaries have a responsibility to the profes[illegible] bring to the attention of responsible entities within the professio[illegible] legations of misconduct on the part of fellow professionals.

I could speak for about 15 minutes on the next subject alone, so I'll just hit some highlights. This may be an area which some of you have some specific interest in. That is minimizing your own potential liability. Every loss reserve specialist wants to minimize potential malpractice liability. By the way, I mean here, negligence from a legal perspective. What can the actuary or the loss reserve specialist do? The best way to eliminate all potential malpractice is to avoid all work. Get a different job, I'm not being facetious but rather I'm trying to express the fact that with any professional activity, there are some risks of malpractice. It can't be eliminated totally. The bigger the role you take the higher your profile, the greater the chance that you're going to be caught in some kind of litigation. First and perhaps most important from my perspective is the need for an engagement agreement or a written contract between the consultant and the company or client. I'm amazed that many large consulting firms fail to have these kinds of agreements with their clients, which spell out specifically the nature and extent of the work they plan on undertaking, the scope of their responsibility. Some firms say that they don't use them because they don't want to infringe on the personal friendly relationship that they may have with the clients. That's fine until the client sues you when he's not satisfied. For staff actuaries, I'm a firm believer in getting a good and detailed position description which can be

of great help to you individually. That document, or an employment contract, if that's appropriate, should be very specific and very detailed. If you can't get one from your boss I think the best thing for you to do is for you to write a memorandum yourself specifically explaining what it is you think you are responsible for, and what it is you plan on undertaking and giving a copy of that to the boss. Most particularly in that kind of document is the need to express very carefully what kind of reliance you undertake on the work of others. The issue of reliance is probably the greatest potential source of professional malpractice. No actuary works in a vacuum. You must rely in some way or another on information that you obtain from others. You must in any communication make the fact of that reliance absolutely clear. If possible you should get a letter from the person upon whom you are relying explaining the reliance from that person's perspective. I believe that those kinds of communications can be of particular help to you at some point. In that regard there is an interesting comparison between consulting actuaries and staff actuaries. The consulting actuary because of the fact that he or she holds himself out as an expert is going to generally be held to a fairly high standard. They're going to assume, as I said at the outset, that a reputable member, an experienced member of the profession who holds himself out as an expert is going to be held to a high standard. The in-house staff actuaries probably are not going to be held to quite so high a standard. On the other hand, in terms of reliance, the staff actuary is going to be very hard pressed to explain that he relied on something that were unreasonable to rely upon. As a person inside the management of that company he's going to be expected to understand what goes on inside that company. On the other hand, the consulting actuary will probably not be held to quite so high a level in terms of his reliance. It will be more reasonable to assume that if he said he relied upon these certain expressions for management that it was reasonable for him to do so. In terms of overall potential liability, I would put them both in about the same boat, the consulting actuary as the staff actuary. The use of qualified opinions that we talked about earlier is also essential. Auditors, I would point out, have standard qualifications for their opinions. And I think actuaries would profit from examining the language that auditors use. For an example, they use little words like "except for", or "subject to". The use of those kinds of words can be very significant in eliminating the potential liability. In a broader sense actuarial reports tend to be too short, too cryptic. Particularly in explaining the limits of the opinion, and more importantly, explaining why the opinion is being prepared. To reduce potential liability to the more remote parties, a statement can and should be included indicating the audience for which the opinion has been prepared. And warning the reader that the opinion should not be used for any purposes other than the specific purpose for which that opinion was prepared. There are a variety of in-house techniques which are available depending upon the nature of employment. Such as detailed scheduling calendars, specified divisions of responsibilities, peer review, which other people might be able to amplify on more than I can. If I can sum it

up from a legal perspective, I think that the best method of eliminating liability is to act professionally, observe applicable standards, and communicate fully and clearly exactly what you are doing for your client or employer. Thank you.

This is the portion of our program I understand from the schedule that this should conclude by 3:20 which leaves us about 1/2 hour for questions and answers. Do we have a question that could get us started? Do we have a question from the audience for any member of the panel?

I'm Paul Lascord. I've been on both sides of the fence. I've been a company staff actuary and a consultant. I have a particular problem that arises in both instances. The problem is that you discover that the company is deficient in reserves. This condition didn't occur overnight. It probably occurred over the course of 3-5 years, whatever it is depending upon the line of business that you're talking about. When you present management with that problem should you or can you allow them an equal time on the other side to correct the situation. If you are to do so, how do you couch your certification?

Linda do you want to take a crack at that?

I'm not sure I can answer that specifically. I think that you're right. Reserves generally don't become short in a one year time period. I think that often reserves are moving in different directions for different lines of business. I think the safeguard against the developing deficiency is to do those analyses frequently enough so that you can blow the whistle at the end of the first quarter and say, if we don't do something over the next 3 quarters I'm going to have a real problem certifying your reserves at year end. That's where I think that your relationship with management as the company actuary can be of significant benefit when it comes time for the certification. I think, and Gary may correct me if I'm wrong, I think on a strict certification, if in fact the carried reserves are outside of range that you believe may be adequate, that you cannot give an unqualified certification. I don't think you can give them a 3-4 year catchup, if in fact you believe the reserves are significantly deficient.

What if management says okay, I will embark on a five year correction process. I can't raise all of the money right now, but I will strengthen reserves over a course of five years. Can you give them that?

Again, I think if you're talking about a line of business where you have reserves and other lines offsetting deficiencies in a line, you do those kinds of programs over time. I think, and maybe we should ask the question of a consultant. But coming from a company perspective, that's a situation I would try real hard to avoid. But if I got there I don't think I could certify that the reserves weren't that adequate when I didn't believe that they are. I hope this is all off the record.

I've never been in such a situation. I think I understand your question, but just to be sure. First of all I stated earlier that I don't think we have an obligation to blow the whistle publicly. I think we're talking about establishing a clear cut message to management. If we're talking about certification and if we're a consulting actuary they have the option of hiring someone else. In terms of phasing it in and delaying, I don't think we can negotiate a schedule for telling the truth or saying what we believe. The solution may lie in qualifications. This gets to something that was alluded to earlier when I said I like the term statement of opinion versus certification. Is it appropriate in a so called certification environment when you've concluded what the reserves are? Do you essentially mean that that company is insolvent. Is it sufficient to just issue a statement of opinion that says I think the reserve should be "X"? I'm not sure regulators always read these things. They come in the mail and they staple it on the front of the cover. But it may be in terms of the qualification to talk in terms. If the reserves are inadequate it does not mean the company is insolvent. If the company is statutorily insolvent, it does not mean that they are not on a GAAP basis or a discounted basis, able to proceed under certain plans. But what's important is that management face up to the truth or fire us.

Obviously discounting allows you a little more time if you haven't been discounting.

I treat that as a qualification explicitly stated and not an excuse for saying everything is fine. Gary would you like to comment on this issue of opinion versus certification?

Actuaries in the profession I notice almost as soon as I came on board with the Academy, are really hung up on this word certification. I don't think that from a legal perspective that there is a great deal of difference between the words "I certify to the reserves" or "here is my statement of opinion regarding reserves". That's one of the kind of niceties which I believe in a lawsuit in Myron, which is where we really care about the issue. It's going to be totally lost. I spent a week two weeks ago on a jury. In the county that I lived in about one out of every eight men are lawyers. Lawyers serve on juries all the time. I was intrigued, I got on a small criminal drug case and I was intrigued by the fact that we went off into the jury room and said well, this is what the judge instructed us but the hell with that. Because we're not going to send this guy to 5 years in jail because he passed on $5.00 worth of marijuana. It just doesn't seem fair. I have a sneaking suspicion that that kind of an issue would also take place and go on in a jury room in which is doesn't matter if he's certified to the reserves. If they want to get you they're going to get you. I don't think that it makes a great deal of difference between the two. Whether it's a certification or a statement of opinion. Bob also mentioned something about him not knowing whether or not the regulators

read the opinions that were sent in. I recently heard from an actuary who will remain nameless. He had filed, 3 years running, statement on the annual statement line for a property/casualty company whose reserves did not make good and sufficient provision for future liabilities. He said that specifically. He was never questioned by the insurance department in 3 years. I'm not here to put down regulators because I think that they do by and large fill the job and they're outnumbered. There are just not enough actuaries in the departments to do an effective and efficient job. That is why they're looking to the actuarial profession for help. That's where professional responsibility comes in very clearly. The professional responsibility of doing a good job and giving your opinion correctly and acting professionally is essential to this kind of business where you've got regulators who are relying upon individual actuaries out there to do a large part of the job for them. Probably they want the actuaries to do more for them than the actuarial profession is ready to do. I'm sure that there are a lot of regulators who would like to turn actuaries into whistle blowers for them. We're not at that stage. I would suggest that to the extent that the profession does not in and of itself take its responsibility seriously, the time might come when there might not be regulators who would be saying "Maybe we need them to be whistle blowers". That will change obviously the nature of the actuaries role in the industry.

Any other questions? Warren.

I'm Warren Cooper. I believe I was alluded to a bit because I think somebody should stand up and give a little bit of defense to the regulators. I'm not sure if we have any in the audience. I'm an ex-regulator as you all know and surprisingly, when I went into the reserves of the insurance department we imposed then Rule 9 that had not been invoked part of that time. We did absolutely review every certification that came in. I personally did myself for 3 years running. I published those results as a matter of fact, in the Academy's literature. I know that the states in California and New York are doing the same thing, very seriously. Certain of the states have required the opinion rendering. Opinion rendering is by the way the term that is used in the statutory blank. The board certification never appears either in the life blank or the property casualty blank. Many of those states do not have actuaries. In the main these things are being signed by actuaries. In New Jersey we collected them from every company that required them or every company whose domiciliary state required them. Well over 50% were done by members of the Academy. They're being reviewed by people who have actuaries in some of all. They think this must mean something and they are very reluctant to probably do anything about it. Those of us who held at least we were dealing with our peers did. We actually sent back some we felt were insufficient, that did not realize the scope of the requirements in then Rule 9, now Rule 12. However, I do not remember a seriously qualified opinion in all of the 300 or so that we received in the state of New

Jersey. That involved companies which subsequently have been put in the tank. Whose opinions were signed by very responsible actuaries. One of the reasons that people aren't questioning the qualifications are there aren't any qualifications.

Warren, don't go. I'd like to present a simple hypothetical question which is a variation of what Gary raised. Where an insurance company is a subsidiary of a fairly large organization. And the statement of opinion reads as in your example "in my opinion these reserves are not sufficient and either stated or unstated the parent is going to have to put some money in order to make it so." In your opinion is that a proper statement of actuarial opinion?

I'm not sure that the jump to the fact that money has to be put in is a proper actuarial opinion. I think you state the fact that there isn't enough there. As to how and solve the problem is up to the management and the regulators. But no, I think the actuary has that responsibility. If he determines there is a deficiency and he is going to sign his name to an opinion, then he must give that opinion as he sees it. I think it's quite proper to give it within a range of reasonable outcomes. Then perhaps, this falls outside of that range, then that is his duty to report that fact or else refuse to give that opinion.

I know that not all regulators share that view. Is there anyone in the audience or up here that would like to state a contrary view? Is that recorded? Do you have a question?

My name is Mel Pinto. There was a lot of mention made of ranges around the best estimate. I was wondering whether any guidance could be given in terms of the parameters in deciding those ranges. I work for a reinsurance company and there is a great deal of uncertainty. I suppose if one wanted to they could contrive fairly faraway boundaries on both sides in which results wouldn't conceivably fall between. What would you suggest in the way of viewing those ranges?

I wish I could tell you that when I spoke of ranges I was talking about confidence intervals and statistically verified confidence intervals, but I wasn't. The ranges I spoke to were really ranges that would vary depending just upon the assumptions that you might make about whether or not there has in fact been case reserving strengthening. Or whether or not inflation is going to continue at the same rate or change in the future. I know that some companies are doing a lot of work on the actual variances and bias that different methods will produce. I don't think that the state of the art has yet been reached where we can really give a 95% confidence interval around our reserves. I wish we could.

I've got a gut feeling that isn't it essentially arbitrary ...

It really becomes highly judgmental. I don't know whether I can call it arbitrary. But it is a highly judgmental range just as your best estimate generally is a highly judgmental best estimate. There are an awful lot of judgments that go into putting out reserve estimates. It's not cut and dry.

I would add that from the previous show of hands that many people in the room had probably dealt with this standard. It's a commonly used standard in the accounting profession that many consulting actuarial firms have adopted. That a 5% difference or range from your single point answer is regarded as not material in many situations assuming it is a normal surplus available. I have on occasion when there is a particular reason such as the uncertainty of a new start of operation or let's say the difference is 10%. Again, assuming there is plenty of surplus to absorb that difference stated my opinion but stated in view of all of the uncertainty in the fact that management has done their own conscientious job and come up with a different answer. Then that was probably a reasonable difference. But like Linda, I have not solved the confidence interval problem. Another question?

My name is Susan Warner. I have a question for Linda first and then a question for Gary. My first question is what do you consider the responsibility of a staff actuary to be in a situation where your opinion differed from certain members or elements of upper management and they would go outside the company, hire an independent consulting firm that then gave them the answer that they were more comfortable. I know that it sounds funny but it's not really as hypothetical as you might think. I actually know of something like this. What is your responsibility, what do you feel it is when you essentially were bypassed because the opinion that you would have given was not the one that they wanted to hear.

That's an interesting situation. I think my first reaction might be one of relief that I'm not the one signing that opinion. I don't know that my responsibility goes outside the company at that point. Again, I think of the question of whistle blowing. I think that I have a responsibility to the consulting firm of whomever is brought in to explain to them why my findings were what they were and why my reserve estimates were in fact not the same as management. Then I have a responsibility to myself, I think, to determine what my relationship with that management is going to be over time and whether or not I really want to stay there. I don't see a further responsibility to the public at that point and time. Gary may have a different opinion.

Not really. I think your responsibility in that set of circumstances is number 1, be prepared to explain to anyone who asks within your company or in the new consulting company that comes how and why you've reached your decision. That's number one. That is your affirmative obligation to them. I don't think you have to go volunteering it but you have to make yourself

prepared and ready to answer. Number 2, I think that for purposes of your own protection as an employee in that set of circumstances. You need to write a memo to someone in senior management, preferably the person who disregarded your advice, and make it clear exactly the basis upon what your advice was. Document it, have it in writing, and have a copy somewhere in a safe deposit box or someplace. If the company goes down the tube you can whip out the memo and say "they didn't listen to me -- it's not my fault." Then you can have some proof to establish the fact that this didn't happen on your watch. I think in response to your earlier question, we talked about the range issue. I think the appropriate word there to use is "reasonable." The actuarial professional stresses time and time again that, the statement of opinion is the exercise of informed professional judgment. It has to be reasonable under all of the set circumstances. The difficulty here is that no one can really define what the word "reasonable" means. All we can say it implies reasonable compared to what. And that compared to what is what a jury is going to think the normal actuary should do under that set of circumstances. The benefit here I think for the individual actuary in that set of circumstances is that there are no specific confidence levels that they have to be held to. They have the entitlement to be judged that their exercise of reasonable responsibility and professional judgment was reasonable. When you go into litigation like that you've got that the presumption that what you did was correct. You don't have to prove that it was correct. The other side has got to say that that was unreasonable. Those kinds of fights obviously can be very difficult because you can be sure they'll call on expert witnesses to say "that guy was crazy, no reasonable actuary would do that." If your company supports you well then they'll bring in some other actuaries to say that this was eminently reasonable. I couldn't have done it any better myself. The jury goes back and decides to leave it. But in any case you've got the presumption with you. Similarly, the issue which intends to that is that of materiality. I think that is the key in this set of circumstances. When your talking about a range of potential outcomes you have to bear in mind clearly the issue of materiality. The Academy Standards talk about materiality in a couple of contexts. I think that it is one of the most significant factors in the exercise of professional judgment. Because you can't always know what is material before the fact. It is very easy to say whether or not it is material after the fact. But before the fact it requires the exercise of your judgment that the deed is part of the exercise.

The other question I have is for Gary. I was just curious to know what kinds of litigation has occurred to date in this area involving the professional liability for actuaries and has it effected more of the staff actuary or the consulting. In general, just what the outcome of the litigation has been.

Unfortunately that's a hard question to answer. A lot of the celebrated litigation to date has involved staff actuaries as well as consulting

actuaries in the same litigation. When we talk about actuarial malpractice cases, overwhelmingly, I mean 99.9% of the time, those cases are settled before they ever come to trial. Basically because the actuary or the actuarial firm doesn't want their name dragged through the court. Secondly, and perhaps even more importantly is the fact that the expense of defending that kind of lawsuit is tremendous. Those kind of lawsuits tend to be very technical. They tend to take a long time to try and the trial costs are immense. There are very, very few cases which actually go through the trial in which someone says you the actuary was guilty of malpractice. This makes it difficult apparently for some insurers to try to write liability insurance for actuaries. As most of you know it's a market which is almost impossible to get into right now. I would add that the profession as a whole through cooperation of the Academy and the Society of Actuaries, the Casualty Actuarial Society have a conference and are working together on the potential for some sort of relief in this area. It's not clear yet whether or not it will be through an insurance company or through some sort of captive insurer which was created. In recognition of a recent survey done by the conference which indicated that somewhere between 50% and 60% of consulting actuaries who responded were going without coverage at all. There's clearly a need for it. I didn't mention it before but one of the most important things to minimize your own liability is to try and get some kind of liability coverage. It may be a hopeless task right now. I guess you folks can control the market a little better than we can.

How about one final question?

I'm interested in what you mean by settlement. How do you determine damages? What were the damages in the settlement that you're talking about?

We really can't find out what the damages were because of the fact that when cases settle before they go to trial, there's no written record of what the settlement damages were. It's not reported widely. The only cases that we can follow closely and analyze are those which go through the entire litigation process and the judge decides to write an opinion, and that opinion is printed. There are very, very, few cases involving actuaries in which we went through that whole process. When you go up to look -- if you're doing some legal research as I've done on a time or two regarding this issue. Normally 3 or 4 cases which have never really been discussed actuarial malpractice. None have been widely publicized in recent years. Those cases establish the basic ground rules set. Yes, actuaries are professionals and yes they are held to the same kind of negligence standards as doctors and lawyers. There's not a lot of guidance that you can get beyond that in the existing case law today. God willing there could be a lot more cases in the near future.

I do have one final question that I would like to ask Linda which has to do with the "I" of IBNR independence and involvement. That speaks to the conflict, if you will, inside what we've been calling a staff actuary who is involved and part of the management team, and part of the marketing underwriting, pricing decisions and strategic plan. And when that comes into conflict with what he's seeing in his reserve work.

I might note that I didn't have the word independent under my "I". I think that question really goes to again the year end conflict. When you as a member of the management would very much like to find a given answer. As an independent observer of the data you find a different answer. What do you do in your signing of an opinion. To me you're signing that opinion as an actuary not as a member of that management team. There is a conflict, but I think that those are the kinds of decisions that I was talking about, that you need to make up front. This comes first to you, your profession as an actuary or your profession with that particular company. Are you in fact willing to sign your name to something you do not believe. I'm not.

Bob Eramo, Uniguard Insurance. Actuaries have been involved in loss reserve certification and it's required in a number of states now. My question is, I guess I have to present a situation first. You're working for an insurance company. You suddenly found out that there reserves are significantly deficient. They are out of the range that Linda talked about. Your president comes to you and says we need a certification of the reserves from the in-house actuary. The question is what do you do and given the light of the fact that you may get fired if you don't do what he tells you to do. Would it be wise for the American Academy to pursue a possible change in some of the state regulations where only independent actuaries sign that blank?

Is the identity of the respondent ...? What do you do if you're being asked to certify reserves that you think are outside the range of reasonableness? Those are things I think you need to decide before you get there and I think each person has to make his or her own decision. I would not sign something that I do not think is true. That's a matter of both personal and professional integrity. What do you do if you're fired? I think, again, you have to evaluate your profession as an actuary versus your particular job with a company. Do I think that the Academy and the body of actuaries would be better served or that the public perhaps would be better served if there were a demand for independent certification? As I indicated I think there are an awful lot of advantages to being a part of the organization when it comes to certifying reserves. I think that the corporate actuary knows a lot more about what's going on that the independent actuary can know. Even when we do the job right and ask all the questions and do all the interviews and that kind of thing. I think just being part of the organization makes you a lot more knowledgeable about underlying changes. But it does present you with that conflict, if in fact things have deteriorated to the point where you end up with

reserves that you just can't get comfortable with. There's no easy answers.

First of all I would comment that most of my career still is as a company actuary. In my 7 years or so in public practice, I have not seen that great a difference between the two positions in this regard. You can become quite committed to a client just as you can to your employer. And you wind up with similar kinds of questions and problems. Arguably I suppose it's easier to give up a client than to give up a job. However, I would take the situations as one way of trying to be helpful and put them into 2 categories. First of all the black and white category. Where there's just no question about what's being proposed as wrong and improper. I don't think there is any choice at all about what the answer to the question is. You have to take the stand and if that means losing your job, so be it. It's a little easier these days perhaps than it would be in other professions or other situations. Because finding another job would be quite easy for all of us. The second situation, I think, may more often be the case where it's more of a gray area. You kind of have taken a position but you have to admit to some uncertainty the people who have a different opinion have some valid arguments on there side that you recognize but have ultimately either discarded or not given the same weight to. Perhaps a qualified opinion is the answer to the dilemma. Gary, do you want to ...?

Let's pause here for a moment, we're talking about the black and white situation where you know it's clearly wrong. I think for 2 reasons you refuse to side. Number one is your personal integrity and the integrity of your profession. But when you're about to lose your job and you've got mortgage payments. I can understand how that integrity can -- a price may be attached to it. But more importantly from another perspective is that you sign that opinion and you know it's wrong. If that company goes down the tube your name is on that piece of paper for the whole world to see that you said it was good and now it's bad. And what's worst you knew it was bad when you signed it. Your suddenly creating a tremendous amount of potential liability for you personally in that set of circumstances. I think you need to take that into account. On the issue of consulting versus the staff actuary in this role, from a legal perspective there's not really a great deal of difference. The consulting actuary is going to be held initially to a higher standard because he holds himself out to the public as being an expert in that area. And when you hold yourself out as being an expert you're held to the standard of "experts." As compared to the company actuary who might not be held to quite so high a level. On the other hand, the consulting actuary when he says " Well, I relied on the client for this number, for this number, and that number" etc. People are going tend to say well he was not involved in the company, that reliance was reasonable. Whereas for the employed in-house actuary it's going to be a lot more difficult for him to rely unreasonably. People are going to say well he was employed by this company. How could he not know that those

figures were erroneous or that was not indeed the policy of the company. In terms of pluses and minuses, both kinds of actuaries wind up about the same in terms of potential liability. On the discussion now in the gray area where you're not entirely sure. I think the way to address that question is what would a reasonable proven not involved actuary who is not a consultant, not an employee. What would he say in this set of circumstances? In other words, that's the question that the jury is going to be asked to respond to. It's very difficult sometimes to figure that out but you have to put yourself in that set of circumstances. Lastly, on this issue of independence. That word seems to have a lot of different means to a lot of different people. Auditors certainly see the word independent in one set of circumstances. The courts understand the word independent from the auditors perspective. The courts say that auditors are independent and that their first responsibility is with the public. As a result things like work papers that they prepare for a client can be reached by the courts through subpoena. There's no auditor/client privilege like there is between a lawyer and a client, or a doctor and a patient. It means that you have a tremendous responsibility if that's what we mean by independent. To the public at large, it increases tremendously the number of potential plaintiffs that you have who can sue you because you have now your responsibility literally, there are no third parties which can't reach you if they somehow feel that they have been injured by your action. That may indeed be the way the actuarial profession wants to go. I don't think the issue has ever been debated. It is clearly not where the actuarial profession is now. I think when people talk about independent they tend to mean consulting actuary as opposed to an employed actuary of the company. If that is indeed the case I question whether or not there is much difference. I think that legally speaking I would go along with what Bob said from his experience, that you hire a consulting firm and they work with you for a couple of years. They become just as much involved and just as much subject to the same kinds of pressure as an employee would. I don't think that there's a great deal of difference as long as the profession is going to stay with its current definition of independent. Larry.

I'm Larry Swordlow, Metropolitan. Linda you mentioned that you've since have a range within which actuaries will feel comfortable. And also stress the importance of erring on the high side rather than the low side. A hypothetical situation -- the senior management of a company says we've hear all that but at this point and time we'd rather be on the low side. To what extent is it the responsibility of the actuary be it either in-house or consultant to try and educate management to change their philosophy?

I assume you're saying that the reserves are within the range, it was from the low end range. I think there is a very significant responsibility to educate. I think it's difficult to demonstrate clearly to management the potential cost of optimistic reserves. I think that over time you can demonstrate that consistent reserving in the low end of the range of

reasonableness is going to result, most likely, in deficiencies. Just because that's the way it's been. And given that you're going to be wrong, that your best estimate is going to be wrong is just as likely to be low as it is to be high. And if you're constantly reserving on the low end of reasonability with respect to that best estimate your reserves are likely to be deficient. I think that you need to put together whatever models and demonstrations that you can to show management the impact of that over time. Again, I think that the cost of the error is a big unknown for the future. Because you don't know what your volume will be. You don't know where the cycle will be when that deficiency comes home to roost and the actual payouts have to be made. Again, you do know the cost of an error on the high side today -- you can quantify that. I think you've got to get into discussions about the risk and uncertainty with management. It's an educational process and it takes time. But I think that the responsibility is there for either the consultant or the company actuary to go through that educational process. The certification or the signing of an opinion with respect to estimates that are within the range but on the low end of the range. I guess again that becomes a very personal decision. If I felt that the reserve was within the range that I have defined to be reasonable. That I can accept, that I can justify. That this may in fact be the right estimate, I would have no problem with the certification of those reserves, with signing an opinion on those reserves.

Mark Sobel, Touche Ross. I saw all of the consultants eyes light up when Bob suggested that we have independent certifications of loss reserves. Gary, you made a statement about if one actuary sees another actuary's work product that he believes to be negligent. That actuary has responsibility of whistle blowing on the first actuary. One of the things that bothers me about this whole area of professional responsibility and everything. I just came from the previous session on loss reserve standards and I think one of the things that I walked away from that session which I don't think is a surprise to anybody. We really don't have any set of standards that we can sink our teeth into. The thing that we see in our guides to professional conduct very much relies on the judgment of the individual actuary. We hear the term judgment, professional judgment over and over again, and for some very good reasons. When I put that into the context of one actuary trying to pass judgment on another actuary's perspective, that's where I think we end up in a conflict. Because what's negligent work to another actuary is a second actuary's creative actuarial work or his best judgment. I think because we haven't seen a lot of suits at least in the public forum regarding property casualty actuaries. I think it's very hard to get a feel for what the courts and/or our public might perceive to be negligent work. I don't know if I'm really asking a question other than if you could comment on that whole issue.

I think you've raised a very good point. The actuarial profession does not now have and for the foreseeable future will not have a great deal of specific standards against which to measure an actuary's work product.

That being the case there are two approaches which you follow. Number 1, negligence in this kind of area is sort of like one of our well known Supreme Court Justice's defined obscenity. I don't know what it is but I know it when I see it. To a certain extent it takes someone who has been practicing for a while to sort of feel if this is way outside the range of reasonableness. Is this something that a reputable, intelligent actuary would not sign his name to? Now, the first the thing you might want to do if you're not sure is approach the actuary and talk about it. There's no reason why that shouldn't happen. A second step you might want to do is if it's really outrageous. Send it on to some other people and say what's your views are on this. I'm not saying necessarily you have to dive in the minute you see something which may be a little questionable and report them to a discipline committee. What I am suggesting, however, is that you have a responsibility to be aware that there are actuaries out there who from time to time are negligent. And it's in the professions interest to try and minimize that. Further, the purpose of a disciplinary procedure is not purely one of retribution to penalize a malfeasance. It is also to help make sure that that individual does better in the future. Someone who is intelligent enough to become an actuary, and I'm not saying that facetiously. I have a great deal of respect for the profession. Someone who is intelligent enough to be an actuary and commit some kind of an error is probably intelligent enough to understand the nature of that error and to prove his or her performance in the future. I think that's in the entire professions best interest. There's no easy answer here. But we're dealing in concepts which by their nature do not provide easy answers. Questions or judgment. If you question someone else's judgment, I think it's your responsibility to investigate it a little bit further.

Gary, we're all professionals and colleagues. But in the public practice many of us are competitors. Supposing that the actuary that Mark is concerned about is me. And he's concerned that his motives will be suspect. Can he cause an investigation of me to commence without his being identified to me?

The answer is yes. The Academy's discipline procedures provide for anonymous complaints. As a matter of fact it doesn't take an outside complaint. If something comes across the desk of a member of the committee or if I read something about an actuary in a newspaper that gives rise to potential disciplinary action, we can initiate that. What is required in a set of circumstances like you described is for the Academy's Committee to be provided with enough information to get that investigation under way. If we just hear that Joe Actuary has acted negligently and signed anonymously yours, it's not going to help us very much. But if we get some additional information which says is this actuary. If you go and get a copy of this annual statement, for this company, in this state, for this year, and take a look at it, you can see that it's negligence on its face. That might be enough to get the Committee going.

I have a few questions. Pardon me for looking at my notes. My first point is as far as this question of negligence and being sued. It's been mentioned a few times in the context of a company becoming insolvent. Practically speaking, realistically, would that be the major area of concern. If you're with a very good company, there might be a wide range of predicting the IBNR. Would there be much reason for concern, or a slight reason for concern?

Let me play lawyer for a minute. Obviously in any negligence liability suit there has to be damages. I would say the most dangerous kind of situation we get involved in is where there's a purchase -- some type of securities work. Either a public offering or a acquisition where the price of the value of that company was at issue. If you're just talking about a situation where you do an internal study and you turn out to be wrong, and it was no harm done to the company. I suppose your exposure is the fee you collected.

The other area where you might have some concern would be in the dividend area where the decision on sizes of dividends may be related to the actuary's work. The biggest obviously, is in terms of insolvency. That's the greatest potential exposure. Not necessarily the most frequent exposure. But that's certainly the greatest potential for exposure.

The difficulty I have in trying to explain to you is that there are very few cases which have actually gone through the entire legal process dealing with actuarial malpractice. In almost all the situations in which charges or suits were filed they are almost always settled before they get to court. As a result there is not one decision of a court and no legal opinion, so we have no real way of tracking it. There are probably some people sitting in this room who work for companies which provide insurance for actuaries who would have a much better feel for the kind of litigation experience that really does evolve from this issue. But I haven't been able to get a hold of those statistics for a while.

I think you've mentioned different qualifications or wording to the opinion that -- is there any place where those are set down. Where can an actuary get a better idea of possible wordings.

Right now the actuarial profession, to the best of my knowledge, has not formulated any standard qualifications. You might want to look at what some of the auditors are doing. Because their qualifications have very specific meanings. You might get in touch with the AICPA for their standard form qualifications to their auditors' opinions. It's also interesting to note that it is my understanding that the AICPA is now working on possibly revising their standard opinion letters to reduce what

they perceive as the excessive potential liability of auditors as a result of those opinion letters even though they are filled with qualifications and limitations.

One last question. What about the possible use of second opinions? For example, a company actuary is doing a certification and trying to get a consultant. I realize the first part of that would be getting your company to be willing to pay the consultant. Aside from that issue what are the considerations for that?

I'm not exactly sure what you're asking. Are you saying that I as the company actuary have a disagreement with management and we therefore agree to bring in a consultant to take a look? A degree of uncertainty where I say Gee, Tillinghast has had an awful lot of experience with these lines of business and maybe they bring something more to the party." Do it, fine. If you can get management to agree and pay for it. I think that's fine. I think if you're working in a realm where you really feel you don't have the expertise to do the job. I think that's when consultants come in handy even if you have company actuaries. Because often they've developed expertise in areas you just haven't seen before. If you're in a company that is writing a line of business that's new to you, and you know of someone that's had some experience in that area. I see no problem at all with bringing them into help reach conclusions on the total reserve adequacy. You can't disagree with that one.

I have to admit that it doesn't have to be Tillinghast. Indeed some of our best clients, and I'm sure this true of other firms as well. Our working relationship and the original call came from the actuary of the firm. And these are blue chip companies, with large very competent actuarial departments. For their own comfort as part of due diligence, if you will. It's typically not ongoing regularly. It might be every couple of years or every 3 years. It's pretty common.

I'm Tom Bowling with the Union Labor Life. I always budget for consulting actuaries because you never know when you might need an opinion. I had to pay one fee this year because I got surprised by the New Jersey rules. They passed a change of rules 5 days before the end of the year. I didn't have time to hire a casualty actuary and I wonder if that may occur in any other state. Will they change their requirements that it be a casualty actuary to certify A&H reserves.

The answer to the question to the first is to the best of my knowledge New Jersey is not interested in changing that requirement. That it requires an actuary with an ACAS to sign their reserves. As to whether or not any other states are doing it, I have some groundswell. The NAIC, as was mentioned before, is considering a change in the model blank for fire and casualty companies which would make it much more parallel to the life blank. The focus would be on Academy membership in terms of qualifications

and the documentation and backup material that you would need would be much more similar to what's now used in the life line. Whether or not that will go anywhere is hard to say. One never knows with an entity as _____ as the NAIC. It is my understanding that one of the actuarial task forces will be reviewing that at their December meeting. That being the case it is highly unlikely that it would get to the Blanks Committee next spring, which it has to do in order to be in time for the following years statement of blanks. If there are going to be any changes it's at least probably 2 years away.

Mike Miller with Tillinghast. Gary I have a question that may help me better understand the position that the actuary in regulation might find himself or herself in. When we talked about the staff actuaries and the consulting actuaries being exposed to professional discipline, losses from injured parties. Wouldn't the actuary in regulation be in a somewhat safer position still subject to professional discipline, but perhaps not exposed to suits from injured parties?

By and large it's fair to say that a state regulator, an actuary in regulation enjoys governmental immunity from lawsuits. In other words, the individual can't be sued, the government might be sued as a result of his actions but the individual can't. That's the rule right now. I will say however, that there are some lawyers out there who are trying now to litigate some cases holding insurance commissioners personally liable for defaults for their failure to take action on a timely basis to put a company into receivership or declare a company insolvent. So far those cases have not been successful because they have to pierce this theory of governmental immunity. If, however, that wall is breached then I would say that the regulatory actuaries also might have some problems. That's speculative, right now the answer is no. They are generally free from lawsuits. The only exception to that being intentional wrongdoing. If it can be demonstrated that this individual intentionally took an action which was wrong and he knew it was wrong at the time. Then there is the potential from some lawsuits. But general negligence, the answer is no.

Mr. Linden with Coopers & Lybrand. Gary, a while back you said that the thing was too questionable. You said that the AICPA is taking steps to limit what they consider on reasonable liability in their opinions. It prompted 3 questions in my mind. First, actuaries be they staff or consultants who routinely sign things called certifications and other stuff. Are they being treated as statements of guarantee and legal documents. Should the lawyer review everything that an actuary signs? Should those statements be promulgated by lawyers? Second, do you know who makes up these statements of opinions or the other professional societies such as the AICPA or even the American Medical Association. When they sign releases are those made up by members of the profession or are they made up by competent legal counsel? Finally, are lawyers are getting involved with any of the other statements that are being signed or distributed by members

of the other professions. Is the American Academy contemplating the hiring of legal counsel to investigate and draft such statements?

I'll see if I can take those in order. First of all on the issue of certification, I think you'll note. If you take a close look at the annual statement blanks, the word certification does not appear. It is a statement of opinion. But on the other hand, I don't think that legally there's a great deal of difference between a "certification" and a "statement of opinion." That's an issue in which you would eventually probably go to a jury. I don't think that your typical jury will blame it or will be able to appreciate the distinction. By way of background I got to serve on a jury a couple of weeks ago. In Montgomery County, Maryland where I live, about 10% of the people are lawyers so they have to call lawyers for juries, they can't exclude them all. It was very interesting, we had a minor drug case and when we got back in the jury room after the judge had given us careful instructions about what is the law. We got in their and said the hell with those instructions we don't care what he has to say, we're going to do justice. I think that would happen here. Nice fine distinctions between "certification" and "statement of opinion" are going to be largely irrelevant. I think it is important, however, to note that the actuary is not an insurer of what he's saying. He is not providing liability insurance to the company. He is not saying that "if I'm wrong on these reserves I'm going to make good out of my pocket for it". There are companies out there that think that's the case. They need to be educated by their actuaries. On the second issue, who prepares those AICPA statements. It is my understanding that the AICPA has a task force put together right now that is reviewing the content of their standard statement of opinions, particularly in the auditing area. Further my understanding is that that's made up of practitioners. Then they take it out and review it by their lawyers. But that's very early on. Where it will go it's hard to say. As far as the Academy is concerned, right now we have not retained outside counsel to review opinion language. I would say that there is a potential for that happening at sometime in the not so distant future. As the valuation actuary concept which at least, initially, we'll deal on the life side goes forward. If it appears that that concept has a serious chance of being adopted I think the time will come in the not to distant future where we will probably engage outside counsel to review precisely the wording of that proposed opinion from evaluation actuaries. I will add that I have been doing a lot of work on that so far, but it never hurts to get an outside opinion.

I think that's a good note to conclude on. Thank you very much for attending. I'm sure we'll be available to some extent at least to answer individual questions. Thank you very much.

1986 CASUALTY LOSS RESERVE SEMINAR

3F - REINSURANCE RESERVING: AN INTEGRATED APPROACH

Moderator: James A. Hall, III, Partner
Coopers & Lybrand

Panel: Orin M. Linden, Director
Coopers & Lybrand

Gary Nelson, Chief Operating Officer
Lancer Claims Services, Inc.

JIM HALL: We were advised that this might be one of those overflow audiences which tends to raise temperatures in several ways. And fortunately I do see a few empty chairs so perhaps it will be a little bit more tolerable. I'm Jim Hall and will be moderating this session. I'd like to introduce the other people on this panel. Gary Nelson is our representative of the claims function. He is an officer with Lancer Claims Services, previously a senior claims officer of a rather large reinsurance company. On my left is Orin Linden, Director in the casualty actuarial practice of Coopers & Lybrand in New York. If any of you are wondering about the forth name tag here, I'm going to stand in for Bill Clark. Bill is the Executive V.P. in effect, Chief Underwriter of Clarendon Group. Bill has given me rather precise instructions as to what I am to say. And you are to interpret those remarks in the following way. Those things that you tend to agree with or think are rather brilliant were the remarks that Bill told me about, and the rest of it was my own undertaking.

Orin, Gary, Bill, and I participated in a rather interesting venture several years ago. While the names have all changed, at least two of the names have changed to protect the innocent. We thought it would be a good opportunity for us to recreate the sort of a learning experience that we all went through. I guess I could invite you to use your imagination. Supposing that you are the eager and somewhat anxious actuary reporting for duty on a new assignment. You're about to meet the Chief Operating Officer of a reinsurance company that has been in business for maybe the better part of 10 years, built up a significant amount of assets, and a very large premium volume, and has never had a actuarial study of its reserves. When you're ushered into the office of the man whose at the helm he asks you how you propose to advise as to the reserves that this company should be carrying. You proceed to explain something about the data that you're going to gather, the procedures that you're going to apply to that data, and the ways in which you're going to draw your conclusions. The gentlemen proceeds to inform you that he's personally underwritten all or most of the business. That he's been involved in this business for longer than you've been alive, and he has a pretty good idea of what the loss ratio is on each and every account. Furthermore, there are certain things that are going to make your actuarial procedures a little hard to place a lot of credibility in. First of all he's gone out, and according to his assessment of both the market conditions and the risk, and volume of each year, arranged certain types of projections. Some on an account basis and some on a line of business basis. And he's done some portfolios, not just loss portfolios, he's done some premium portfolios. All of these things are going to make the triangles a little funny. He also wants you to understand that the book of business has changed a fair amount. The first five years don't bear a lot of resemblance to the last five years. I suppose he also has a couple of comments about certain things that actuaries talk about. There's this multiplicative method in the case of this reinsurance company that is going to have to assume a series of perhaps 10 age-to-age factors for the 10 years that they've been in business, and then some sort of tail factor. And he wants to know where you're going to get a tail factor from. He wants you to know that he's not writing the kind of

stuff, and never did write the kind of stuff, that the RAA has got. He doesn't believe in curve fitting either because as far as he can see the way the business has changed over the years, there's been a lot of catchup and so it would be a mistake to compound all of that catchup. Of course it's also worth noting that the inflationary cycles changed a little bit and much of the adverse development is due to years in which inflation was roaring away at a fast clip and we all know it's not doing that anymore. And so that really ought to mean that these multiplicative factors are overstating things. Last but not least if you did assume that these age-to-age factors would compound out to your ultimate, that would probably mean everyone is broke. You kind of drop back 10 and say "gee, I'd better find out something about this company because obviously the old man is not going to buy any kind of strict mechanical procedures".

I would sort of step back out of this imaginary scenario now and say that you've summarized your first impression of the company very accurately. Mechanical procedures are, in fact, perhaps not right but certainly not something that is going to answer all of the questions that have been raised. You take that brief speech, file it away, and you go off and talk to some of the people who are actually operating the company and see what you can learn. In the first stop on this journey is the claims department where fortunately you've got somebody who's perhaps not so much interested in presenting a point of view as in working with you and getting you some helpful information. Here for that purpose is Gary Nelson, he'll tell us something about the kind of things that a claims officer can and ought to be contributing to the reserve process.

GARY NELSON: Thanks Jim. I think if there's one major point, a claims officers 15 charged generally with attempting to accurately establish the reserve position particularly of a reinsurer. I'm sure you all know that reserving at the reinsurance level will differ substantially from that of a primary carrier. Most of us, at least the people I know in the business, the professional people, tend to rely on actuaries more than you might think. Because we normally are not trained by our education and background to think particularly forward into the future, almost everything we do is after the fact. I have often said that if I could predict with any reasonable degree of accuracy what losses were going to occur next year, I'd be the highest paid claims guy in the business. But I think there are certain things that a group such as yourself should consider when your approaching, not necessarily the toughest of assignments that Jim just outlined, but really in your overall approach to reviewing a reinsurance company in particular, in reviewing their book and trying to assist them ultimately in financial statement presentation including reserves. I think first and foremost, and this won't be a particularly popular comment with the underwriters or the reinsurers, I strongly believe that, if the scope of your assignment can be such, rather than come in on a one shot deal at the end of the year and attempt to assimilate an enormous amount of information about a company, see if you can't do it in steps. See if you can't try to bring yourself around to more of a partnership role with the underwriters and the claims department, and certainly the database group so that by the time the real

crunch comes at the end of the year, when there's deadlines on everyone, you have a fundamental understanding of the company, its culture, the players in it. I know that this would be a benefit certainly to a number of people I've spoken with in my segment of the industry.

Some of the things that I believe that you ought to look for by way of a checklist: The first thing I think you should do is to review the claims department of the reinsurer. As you know we're one step removed from the original lost. Therefore the procedures the claims department will follow. Do they have a set procedure for reserving? Is there a reserving philosophy within the company? And I would be very careful here to discuss with the claims department what they perceive there philosophy to be as you will often times find that that's different from the underwriters perspective of what the reserving philosophy should be. A brief look at the technical staff in the claims department is often telling. How much experience do they have in the classes of business that they're writing. What's their background? Do they fundamentally understand the difference between primary reserving and reinsurance reserving? The nature of the book of business that the reinsurer is writing, I believe, is a very important aspect and Jim touched on that briefly. You also will tend to get somewhat of a different perspective of the book of business from the claims department standpoint because they're looking at different things. And it doesn't necessarily mean the claims departments view of the book is correct. But it is another piece of information which I believe will help you and provide perhaps some balance. Certainly I think speaking with the claims department who often isn't responsible for generating the data, talking with them regarding the kinds of internal reports they get, the kinds they may produce, what's available, sometimes that will help you with systems people. I know them to be able to cut through some of it and decide what it is you really need to look at, and what will help you in your analysis.

A discussion of major contracts in the reinsurance company I believe is crucial. In fact it is almost the starting point. A large number of reinsurers write a large book of business but there normally will be 10, 12, 15 or 20 major contracts. On some of those, if they haven't gotten it right, it could have a major impact. The other thing about that is that it's a little easier to analyze. The data can sometimes be a little bit more finite. You should be looking I believe at any particular features of these major contracts. Be aware if there are aggregate limits, if there's a claims made component to the book versus occurrence, and if it is claims made what kind of retroactive dates have they used, and is there any extended discovery period on expired contracts. Retro-sessions, of course are a nature of the reinsurance business. They're also significantly involved at the primary side.

I know you've all heard the following scenario and I don't want to offend anyone here. It's just something I've heard. The claims VP of the primary company comes into the claims manager and says "Gee, I hear we've got a big pot. Yes we have a million dollar loss. Are we protected? Oh yeah, don't worry about it. We're in excess of $100,000, it's all reinsured. And what impact is that going to have on the reserving

practices of the company? A study of major claims that the reinsurance company has had and particularly the closed claims will often tell you an awful lot about how that reinsurance company is reserving. By virtue of the fact, of course, that the claims paid is a finite amount. As we all know history doesn't necessarily always repeat itself. But it certainly is a good indication as to whether or not the story you're being told about the philosophy of reserving and how good they are at, whether or not that really has been proven historically by the reserve development on the cases which are now paid and closed and therefore the redundancy or deficiency is known.

If you have a reinsurance company who conducts audits and reviews of their and MGMA's and other people that they're reinsuring, that's extremely useful information. Ask for copies of those reports. At the reinsurance level it's probably the only way that you're going to get to know something about the cedents or the MGA or whoever it might be that your client is reinsuring. Because, just as it's essential to know the caliber, quality, training, and background of the reinsurance claims people, obviously it all starts with the primary. Most claims people in reinsurance companies will be able to tell you and give you opinions as to how well the underlying carriers are doing, and what their practices are. This also touches on a very important point and that's the reporting patterns of the various cedents and MGA's. In any company you will always find a certain list which everyone keeps mentally. They say "Oh yeah, there they are again, aggregates blowing. We just got the first report and they knew about this 18 months ago." That kind of thing can be very, very useful. Particularly if the nature of the company's book is such that this is one of their major contracts and it could have a material effect. A number of clients will report loss reserves to a reinsurer and they will also include an IBNR number. And that's very important for you to determine and to recognize simply because you don't want to double up and you may also want to analyze exactly what went into the IBNR underneath the reinsurer. That can sometimes be very beneficial and can tell you in your field of expertise just how well they're doing. ISO recently suggested that expenses might be 50% underreserved. I don't know if that's the right number or the wrong number. But I do know that it's been my experience in attempting to manage a group of technicians regardless of how good they are and how professional they are. We're all human and that's usually one of the things that we don't tend to focus on well enough. We're all real concerned whether or not in Illinois, and Cook County, that's going to be a $1 million case or a $1.2 million case. But we sometimes let the fact that it might cost $35,000 instead of $15,000 to try that case. We often let that slip through the cracks. Particularly when you're attempting to manage litigation from the reinsurance level. And in particular, where you maybe have an aggregate underlying limit, that this could be the claim which is going to expose you to first dollar. The expenses can be very real and very substantial. It's something that I perceive as a problem in our industry in general at the present time.

If it's possible don't just narrowly review the claims department because our group is going to talk about the other dimensions as well today. Every reinsurance company in the business has a culture. You can see it and feel it when you talk to the people. If you can get a feeling about that it might just be that little extra piece of information that you have that might help us all just come a little bit closer to our goal. I think certainly from a professional standpoint i time to read or talk with others and become familiar with our changing legal environment here in the United States. Become aware of the trends in litigation, particularly when you're analyzing major contracts, if there is exposure in certain high hazard states. And there's lots of material available on this. Just a general awareness of what's going on in the court system. And of course tort reform is a great topic now. It's in the newspaper everyday. But I'm here to tell you the impact of that is not going to be felt tomorrow. It's going to be a while. We still have an awful lot left under this old evolutionary system to catch up with. Thank you very much.

JIM HALL: Gary has given you the viewpoint of the helpful claims guy. You now have a bunch of very useful ideas that are going to help you to interpret the statistics and hopefully do a little better job. I should point out that perhaps the one thing that you started out when you interviewed Gary was to ask him how long he'd been there. Because obviously he can tell you a lot more if he's been in his present job for quite a while then if he just showed up a month before you did.

You then proceed to the underwriting department and of course you could have done this in the opposite order. But since Bill Clark wasn't here I figured I sit down between my moderator role and my underwriter role. The underwriter certainly is going to feel a little more anxiety about dealing with the actuary than the claims guy does. After all the claims guy wasn't the one who put the business on the books. And he can say I'm just settling the claims, don't blame me. The underwriter may feel some degree of anxiety that you might be critical of him by the time this exercise is over. But I wouldn't worry about that too much because unless you're dealing with one of the big 3 or 5, you're probably not going to meet the underwriter that put the business on the books. You won't embarrass anyone. He'll probably tell you something about how the mix of business has changed, and it almost always does. After all the mix of business in the primary markets changes. And so it's not really a song and dance. It's a very important thing for you to realize. You should certainly look at a listing of where the business comes from. Depending on the size of the company it may not be feasible to look at all of the listing. If you can't look at all of the listing you should get some summaries and then decide where you want to look in a little greater detail. You certainly want to know something about where the business comes from. Regardless of whether it comes from the top quality reinsurance intermediaries, or some far off guys that you've never heard of from some MGA's here in the states, ceding companies that you're quite familiar with or some that you're not so familiar with. You want to know

both which ones are new and which ones are old and get some flavor for what they do and how they operate.

I think it's inevitable given the turnover in the business today that you also will want to look at current active accounts versus cancelled or old business. Even if you don't want to look at it that way, somebody's going to say well did you take into consideration the effect of all this stuff that we got out of. Answering no to that question always lead to some unsatisfactory dialogue. Take a look at it and do something with it. One of the things that's not so obvious but your friendly underwriter ought to be able to tell you something about 15 this. If there's a lot of discontinued business and the volumes remained relatively stable or maybe even gone up, then you ought to be asking him something about where did he get the business to replace the business that he discontinued. How did he go about getting it? Try and get some flavor for whether the new business is just more of what's like the old business. And sometimes it is and sometimes it really is different. You probably would want to look at data with a kind of an open mind here. Some of these companies will be able to give you really neat data and triangles in various categories by line, major accounts. Perhaps each of those byline categories they can give you some direct business in a separate category, some pro rata insurance in a second category, some excess reinsurance in the third category. And if you're lucky maybe they can even tell you whether the stuff that they've got coded is pro rata first dollar or pro rata of somebody else's excess. What you should be aware of, however, is that perhaps if you can't get the data the way you want it, that perhaps on some of these major accounts you can get it out of the underwriting files. Secondly, if you can get it the way you want it, you might want to stop and really do some ticking and tying, or ask that the auditors do some ticking and tying. Make sure that those triangles that you're being given to work with really can be reconciled to the company's overall books before you put a lot of trust in what they're telling you. Make sure that you understand how the year should be interpreted. I think we've heard about accident year, policy year, and underwriting year, pool year, certificate year, and maybe a few other kinds of years. Whatever that is, after you talk to the people in the underwriting area who perhaps have told you that "yes we've got this kind of statistics" maybe you want to go and talk the accounting and systems people and ask -- "how do you code this stuff? Make sure that it's what you think you're being told it is.

You'll probably want to ask the underwriter what sort of information he has to work with when it comes time to consider renewal of these programs. They may have some pretty neat databases and maybe they don't. Maybe they're just working off of submissions prepared for them by the intermediaries. But you want to get a feel for what the process and is and then try and work with him to determine what his understanding is of how the underlying business has changed over the years and how he thinks the market conditions have changed and the pricing has changed and so on. You probably also want to explore with him the matter of premium reporting. Someone whose premiums developed upwards for several years is going to require a somewhat different loss analysis than someone who

perhaps has got real honest to God accident year premiums and accident year losses. I don't think that there are more than a couple of companies that can give you that. He'll probably tell you something about his philosophy of what classes of business he thinks he's been underwriting. Has the umbrella business that he's been writing come from pretty much the same group of companies? Did he underwrite some of the major large account companies in the 60's and 70's and switch to smaller regional companies during the 80's. That would certainly suggest that you're seeing different exposures. How's the geographical mix changed? In addition to whether or not he's shifted from high to low layers or vice versa. And we see people go in both directions in the same intervening period between visits. Has he also been thinking about fast developing lines versus slow developing lines. It is rather important, once you explore that factor, then to ask him "what do you really think about the expected loss ratio on business" after he makes that change. We had one rather candid fellow recently tell us that -- Well yeah, they decided they wanted to get out of the long tail excess business into some quicker casualty reinsurance. But they recognized that at the same time that they were doing that a lot of other people were doing it too. And that they probably were in slightly a more competitive class of business. And what they cutoff for the tail in loss development, they were probably cutting out of the premium in terms of adequacy. It's important to understand how the underwriter thinks that these things will be effecting the book of business.

As far as terms and conditions are concerned a number of companies have taken aim at common cause, in particular asbestos, and they've tried to tighten up on the wording of their reinsurance contracts to prevent getting hammered with whole multitudes of common cause claims. Some guys have gone to sunset causes. Some have gone to aggregate limits. I think to a large extent those are recent phenomenon. But I know of a few companies that got hurt early and despite the fact that it costs them an awful lot of their business, took that action several years ago. It's an important question to ask.

There's also an issue which gets back to how many contracts and how many ceding companies a reinsurer has a clients. Certainly, the way that you analyze a company that has a number of pretty large accounts will be very different from some company that's got a whole bunch of accounts so small that they defy individual analysis. You'll want to do some sampling to see whether you agree with the way the underwriter has characterized them. But you're going to have to talk to him about how he handles accounts where he's only taking a small share. This morning if any of you were in the first reinsurance assumed session Mary Hennessy said that those people that took a little bit of everything in the world might have been those people who got hurt the worst in the last cycle. And in fact, that's probably true for two reasons. First of all, they didn't have any leverage. And secondly, they didn't have the ability to analyze what they were doing. Without knowing what it was that they were trying to achieve even all the good intentions and leverage in the world certainly couldn't have helped them. The companies that have more riding on a smaller number of lines of business, a smaller number of programs, a

smaller number of contracts, can invest more data gathering time, more analytical time and come up with perhaps some better strategies, have a little more leverage because they've got a bigger share of the program and thus perhaps improve their position.

Finally a question I think that you might want to ask the underwriter has to do with certain runoff situations. It would be pretty surprising these days if any reinsurer doesn't have certain runoff situations falling into two or three categories. There are probably some bankrupt companies from whom it's assuming business. There are probably some bankrupt companies to whom their ceding business. There may even be, if they're in the most unfortunate condition, some intermediaries with whom they've done business who are out of business for either legal or financial reasons. That just makes life a little more difficult. Some of those runoff situations may be amenable to special treatment, and you want to know whether any of those special strategies have been implemented. Have there been any commutations in either the assumed or the ceded direction? I think that once you've gotten to that point you probably have picked up between a claims man and the underwriter more than enough information to give you a healthy respect for the task of analyzing statistics. Hopefully you will have merged with something which while it maybe a humongous job, requiring considerably more detail than which you had thought you were bargaining for, you'll be able to do a considerably better job. And I have to say that, both looking at some of the reinsurance companies where the actuarial loss reserve process has been in place for a number of years, or those companies where the same consultant has been in place for a number of years, that the learning process while it is slow and painful can assimilate that information. And some of the things that you think are nifty leads turn out not to be not so significant. Some of the things that you might have tended to disregard originally might turn out to jump out at you the next time you look at the losses and say -- "Gee, now I understand what that guy was talking about. If you're lucky, he'll still be around and you can go back and ask him for a little more detail.

Orin Linden has been the lucky recipient of this sort of experience with about a dozen reinsurers over the last 4 or 5 years. And he's going to hopefully give you the actuary's perspective on all of this.

ORIN LINDEN: Good afternoon. Jim's point about being the lucky recipient is very interesting, I think, for those of you in the consulting business. I go back to his original opening comments and some of you having seen Jim play underwriter, might have noticed a little bit of antagonism in his voice. Just a mild touch of it. My experience unfortunately has been that this is generally the case. The underwriter sees us as the enemy. I like Gary's point of view much better. We're not the enemy, we like the underwriter. We're really on the same team. And what are we trying to do? We're trying to take whatever data we have and lay it out in a way that we can look at it and try and come to some reasonable conclusions as to what the future holds about the losses. Because in the end it doesn't matter what we write down. The losses are going to come in, whatever we write down and they'll do as they damn well

please. Going back to Jack Burn's statement at lunch, what we're just trying to do is instill some discipline and get a handle on what's really going to come down the tubes.

A little while back, about ten years ago, I guess Jim Berquist and Rick Sherman wrote, I guess a classic paper on a comprehensive method for going about the loss reserving procedure. It was way ahead of its time I think and probably brilliant. And what was really involved in the brilliance? Well they came up with a novel suggestion. Let's learn something about the statistics we're analyzing. Not a totally unreasonable thing to do. They said sit down with your EDP officers and find out how they code data. What are they changing in the systems. Sit down with your underwriters. What can they tell you to help interpret data? What are they writing? What do they think they're writing? Where are they writing it? What do they know about the book that you don't? Sit down with the claims people. What do they see? They are in the trenches every day. What kind of claims are there? How long are they going to take to settle out? Berquist and Sherman I think were talking in the realm of a primary insurance company at that time although they probably didn't specifically say so. And they come up with some rather nice techniques for adjusting the database for all these changes that these people are going to tell you. Unfortunately we come into the reinsurance world. You may not have any good statistics. Somebody might be able to give you paid claims by line, they might not be able to. Sometimes you don't even have incurred losses. In general, almost always you're looking for some extra history to supplement your database. Does that mean that the conversations with the claim people, the EDP people who aren't represented here), and the underwriters are less important. Well actually no. That means they're more important because the little data you have will give you almost no information unless you can go and get behind those numbers and find out what that triangle and what those premiums are trying to tell you. From my point of view the whole idea is to try and listen to what the senior executives are telling you. And take what they tell you and try and use it somehow quantitatively to use what little data you have to come up with a more accurate projection of the future.

When I sit down with the underwriter in a reinsurance company I think of him as somebody who can tell me which pieces of the database I should look at. What are the ideal groupings here. Those of you who don't work for reinsurance companies might feel that that's kind of a funny way of going around it. Why not just get a run by class? Those of you in the reinsurance industry know that could be a very difficult job. What does class mean? It means that on the day of the coding of the policy the coder decided that policy was mostly workers' compensation. It may have been hospital professional liability but that day, he woke up, he felt like a workers' compensation person. Just looking at a class code doesn't tell you very much. What about things like claims made versus occurrence? Most reinsurance companies don't keep such nice statistics. Casualty in a reinsurance company is a broad brush. And it's very difficult to break casualty insurance down between property and liability. Just asking for the data and saying well I'll get you and

work on it on my own may not work too terribly well. But sitting down with the underwriter can help very much because he can take out large chunks of the business and give you actual policies to read and tell you what the risk is. And you can go to all the sources to figure out what is in that book. The underwriter will know, generally, if there's anything unusual about it. For example, is this policy written over an index retention. What is the profile of the business? What kind of retention are we talking about in a reinsurance company? What kind of aggregate exposure were we into? Where are we writing? What is our company trying to achieve? And that's a whole lot of qualitative information that you can actually assimilate and use to help you breakdown that book into more homogeneous pieces. At least you can go to a source and that makes a lot of sense. We don't want to develop property loss using RAA general liability factors. We don't want to use property factors on general liability losses. Even though he can't say "well, here's the actual statistics for the property, he can point you to the contracts that are property. And he can tell you which class codes he thinks are reliable and which aren't. He can tell you whether there's a big book of claims made. He can tell you whether a contract is making an abrupt change between occurrence and claims made or whether it's wavering between the two or whether it's one on the other. In a certain sense the underwriter can serve as a segregation of the database.

The claims personnel I view a little bit differently. Where the underwriter can help you segregate the database and tell you what course the company is trying to follow in the books that their writing, the claims person is, as I said before, in the trenches. He sees the losses, and he can tell you a little bit about what's really going on in the reporting patterns. In a primary insurance company many of you find that it's a bit hard to find out what a single company claims department is doing. In a reinsurance company you may be dealing with 100 claims departments or more. Now your problem is magnified 100 times. But that doesn't mean that you should say "well I can't do anything, too many claims departments." What could I say just trickle some numbers on a piece of paper, do some projections and that's where it comes. The claims examiner in a reinsurance company has often been on the scene during on sight examinations of their ceding carriers. He has a very good idea of what's going on in those ceding insurers. He's spoken with the claims people. He's reviewed the case files. He's seen the losses. He has a fairly good idea of whether these guys are good, whether they have inferior claims settlement. He can tell you whether, for example, if a company has grown very rapidly and they didn't increase their claims staff fast enough so that the claims handlers are well overworked and they're not keeping up on the claims leading to a large lag slowdown in the settlement patterns. He can tell you whether they've gotten in some very good guys and changed things around and started to really get the dollars up on the books, and there's claim strengthening. This is on an individual company by company basis the claims person can tell you what's changing in the book. What's changing in the individual insurer's. And to a certain extent help you in performing the adjustments that you would normally do by looking at ratios of closed claims to total reported claims. Just as I look at underwriter as somebody that can help me

segregate the book into pieces that I can deal with, I look at the claims person as someone who can help me adjust the data that I see to something that makes more sense to me.

The final point on the claims area is that by working very closely with their ceding insurers, sometimes the claims people have a wealth of statistics that nobody else knows about, and they seem to kind of zealously guard them. But sometimes, by going to the claims officers he can either
produce or give you the name of somebody who can produce direct statistics on an account. Obviously when you're working back with the primary data the situation becomes a lot easier.

By just having some conversations and getting to know what it is that the underwriter and the claims people do in a reinsurance company. You can broaden the spectrum of your analysis and do some of the things that you'd like to do but you don't have the statistical base to do it. I'll give you a little case study of how it went one time with us. We were working in a reinsurance company and we ha met briefly with the underwriting personnel and with the claims personnel. We had broken the book down into 6 or 7 large contracts. One of the large contracts that we saw was a hospital professional liability reinsurance company. Our client was on the risk for excess of something. We went about our projections and turned around and met with the client and showed them our result and the client looked at us and said, "There's something wrong here because these loss ratios are 2, 3, 400%." This goes back to 1982 long before those loss ratios were fashionable, so you can see that the client was a wee bit upset about it. We sat down again with the underwriter and the underwriter described to us in great detail how the account worked. It turns out that there was an indexed retention. The retention started out in a certain amount per claim and for each year that if the claim remained open the retention increased. Let's think of $15,000 a year so that the claim was settled in the first year it might have had a $250,000 deductible. If it was settled in the second year it might have had a $265,000 deductible. And if it took 10 years it might have had a $400,000 deductible. Those of you who have done any work with hospital professional liability reinsurance know that the larger claims that are going to break through those deductibles often take at least 10 years to settle. That was one piece of information that we didn't know about and we hadn't factored in. The claims officer had made on sight reviews and he told us that in his opinion they had a very competent claims staff. They were reserving to the full exposure based on the facts at hand. And also that when they did their reserving they didn't consider the time that the claim was going to settle. They just said once a year at least, they look at each claim. Whatever the retention is at that point and time, those are the reserves we put up on the book. The claims officer felt that if they were doing a good job in reserving, and if they were reserving the retention during the year as if they were unchanging and they were actually increasing the experience should actually settle favorably. Claims guys are real good with case reserves and not so good with IBNR. That's not their job so I don't mean that as a barb. But we took back the facts and we actually got on a plane and

visited a third party. We visited the actuary, the independent actuarial consultant for that particular program and got his view. He verified both by word and by additional data that he could provide on a direct basis that what the claims officer and the underwriting officer had told us was the truth. And that was indeed an indexed retention and that they had done a fairly decent job of getting the reserves up on known claims. We went back and developed a little technique to incorporate all of that given the additional data that we've gotten from the actuary. It wasn't very difficult. We put the losses in that were removed from the indexed retention, we did our projections that way, on a fixed retention basis, projected them to a projected payout period and then reduced the projected losses for the change in the retention. And sure enough, the loss ratios came down. They didn't come down below 200 but they did come down from the 400-500 range that they were in. Over the last 3 years we've monitored that program and the history seems to say that was correct. The steps we had taken within reasonable accuracy were appropriate and that we were well over projecting the losses. Just by sitting down for half and hour with the individual claims and underwriting officers we were able to get a great deal more insight into one policy. If I go back to the whole job over the last 4 years was still doing the independent actuarial work for the reinsurer. The original job started out that we had broken the book into 7 pieces and analyzed the rest as all of the casualty. Over the last four years or so we've learned a lot about the book and the reinsurer is fed off of us and has taken it on their own to go back and get their statistical house in order to see if what we were telling them was indeed the truth. They've over the last year performed a major rework of their database cleaning up their errors and getting better class information, to the point where now we analyze 16 contracts separately. The remainder of the book is broken down into things like fire, E&O, products liability, general classes that you have in a primary insurance company. The database is still not perfect but it's a lot better than it was before and it's come about because of the team approach that we've taken. We've learned from them and they've learned a little bit from us.

The final point I want to make is that I'm not saying that you should go and ask the underwriter what should we do, and whatever they tell you go ahead and do it. I'm just trying to say that they're there everyday and they know the company. They have a lot of information that can be gotten. And if you ignore it you're not looking at your statistical base properly and you're probably making the wrong projections.

JIM HALL: If there aren't any questions from the audience I guess I've got a proposition that I'd like to get a reaction to. But I would like to hear questions.

QUESTION: The question is in a small company like one of the reinsurance exchange syndicates, how much claims work could you reasonably expect the claims auditor to perform?

GARY NELSON: I think the chances are if you're a small company, you're not writing a whole line. You might be taking a percentage and participating with others. One of the things that you can do if you have time, is to make sure that you coordinate with the leader or the persons who have the majority of the largest lines, when they're going to do their audits. It's been my experience that in most cases, not all but in most cases, if you genuinely just can get to that and you ask for them to share with you their results, that they often will. And that's very beneficial. The other thing that can sometimes help you rather than traveling all over the country is to go and review the brokers file. Because if you're dealing with reinsurance brokers, if you're not writing direct, often times the brokers' file will contain a lot more information than they're actually sending you on individual notice. They may be editing it substantially before it goes out because they may be sending it in 17 different places.

Three quick questions for Gary from the claims perspective. I'd like to hear a little bit about ACR's from a reinsurance claims department versus a primary. I'd also like to hear your comment on looking at treaties in a dichotomy for individual reported treaties versus bulk reported treaties. And then a third one would be -- would it not be helpful for a claims person to perhaps point out certain treaties or files to the people investigating that might be sleeping dogs that the claims department might be the best place to be an early warning system.

I think we do tend to form opinions particularly on treaties. Bearing in mind that a lot of times we only really know what we're being told. One of the things we really don't like is not to be told too much. Claims people are trained to be inherently suspicious. And we don't really respond favorably to contracts where the information is extremely minimal. I think that's a very appropriate question to ask the claims department.

Are you talking about bulk reported versus ... I think it's an interesting dimension. My claims people keep bringing it up to me.

The other significant problem with that, if you are, or are reviewing a reinsurer who has a broad book of business, they're taking smaller lines on a number of different contracts. The clash exposure there, the potential for that is enormous. And that's the biggest single problem that I've seen from the claims side on bulk reporting treaties, being able to isolate those losses whether it be asbestos or chemical dump sites or major catastrophes. It's a very difficult problem and those are the ones we tend to be suspicious of. I think it's a very appropriate question.

I don't think everyone here has heard ACR. You should define it for everybody here. In other words it's a question of whether the claims department and in reinsurance company accepts the primary company's claims departments estimates or feels they need to put additional reserves over and above that. I can think of a couple of toxic losses

I've seen recently where the prime rate company might have $100,000 up. And our claims department says we're 500 excess 500. We're putting up a $1 million, never mind what they're saying. I don't know if the term is generic. I thought it was. But it get's thrown around a lot in our shop -- ACR, and from the buyer claims people. The reinsurance claims department increasing the case reserves over the primaries
I think that it's relatively common reinsurance reserving practice that's actually an inherent part of what we do. A lot of people I know in the business have started in primary, gone through excess experience, and then gone to reinsurance. And we just tend to reserve things I think a little bit more pessimistically and certainly differently. The other phenomenon that occurs in reinsurance, of course, particularly when you're dealing with excess layers, is that the impact of under reserving is compounded about 4-fold at the excess and reinsurance layer. I think often we'll see many, many treaties will have a "50% of the retention" reporting clause and a "serious injury" reporting clause. And these claims will tend to come in and we'll see what the underlying reserve. And often times we'll just arbitrarily reserve that into our layer. And yes, I think that's a good practice. I don't believe we're causing inordinate reserve redundancy there. I really don't think so. Although I think you would also have a little trouble getting a claims department to quantify that.

HEIDI HUTTER: We do as a matter of course.

GARY NELSON: I'm just curious, you don't do that. In other words, keep track of the primary companies total case reserve estimates, thee ACR's, and the difference. We keep track closely of the amount that we're loading on. And I also keep track by ceding companies. Not always a good thing at least as our claims people are concerned. They may say that in 1981 we were doing business with Company X and that's why we have all of these additional reserves for Company X. And it's a good thing we don't do business with them anymore. Therefore we're not keeping the same loadings on top of the primary companies report.

I think that's an excellent idea and for another reason also. Overtime you'll be able to measure that because something that's measurable is much better that something judgmental.

For the actuary whose trying to decide what data he'd most like to work with you might consider this really gives you a choice. You can view a case plus ACR as your claims department case estimate and work with that or you can just work with the seeding company's case reserves. And see whether the two different viewpoints might help you to understand what's going on better.

JIM HALL: Many of the things that we've talked about in the last hour are the sort of comments that come to light only after the actuary has done a calculation and management is complaining that these numbers are too good to be true. And therefore the discussion seems to be driven to some degree of let's dig into this and see if we can make the problem go away. My friend, Dr. Linden here, coined an expression when we were

working together on another company a few years ago. You have to bear in mind that Orin is a native New Yorker and that certain forms of commerce that take place in New York are somewhat different from other cities in the United States. He reminded me that when one is standing at the curb side haggling with a fruit and vegetable vendor over the price for a certain piece of fruit, it's not surprising that the longer you argue the worse the bananas seem to look. We often find that while the analysis we do at the end of this great soul searching and fact finding is intellectually more complete and certainly more defensible. It's not uncommon that the answers have gotten worse in the sense that they are more to management's liking. Hence, his rather pragmatic observation. I would agree with you that the discussions are often prompted by dissatisfaction with the numbers. And in recent years, of course, management has not had the reason to lobby for higher reserves. Perhaps over the next couple of years we'll see that emerge, but I'm not holding my breath.

ORIN LINDEN: The way that we've been talking this morning it does seem that the discussions tend to drive the numbers down and not up. And I've said to myself many times, how come nobody ever tells me that -- "you know your answers are awfully low. You should raise them 100 points from loss ratio. A couple of observations -- in talking with underwriters and claims people the underwriters don't always know what they're telling you, whether it's going to bring answers up or down. I had one underwriter who told me that there was no IBNR on his pro rata book because it was really a pro rata piece of an excess book. 100 points on a loss ratio later he was a little bit wiser. Sometimes just the conversation that you will have will shed light on what's really going on in the book. And by no means is it a one way street. Every time he gives you a piece of information that tends to make the losses lower, generally out of the other side of his mouth he's giving you another one that's going to raise things. And where it all ends up is a matter of how well he really knows the book and can really tell you about it. Often times it does go up and significantly up. And one other point is that in 1982 nobody was interested in raising their reserves very much perhaps. But over the last 4 years I am delighted to see that many companies have gotten more interested in telling you things that will drive the losses up because they are trying to get a better handle on what they should be booking today.

QUESTION: Doesn't the question of integration go a little bit beyond the reserving? By the time you're doing your job with the reserving you've already put the business on the books. A lot of what you're talking about can also go on at the level of pricing the business before you even put it on the books. And if you do that then hopefully the surprises won't come in 2 or 3 years down the road.

JIM HALL: I'd agree with you in theory. I'm greatly afraid that may put a greater amount of responsibility on our shoulders. It's a lot easier to stand back and keep score rather than to become a player in the game. I'd like to throw out one comment and get a little reaction from the audience. As consultants, once we've reviewed reserves for a large

enough number of reinsurers, we begin to see the same contracts coming up over and over again. Largely because one company was on a risk from 72 to 76, another one was on it from 76 to 80 and so on. The thought that leads you to is -- Well gee, if we only had some sort of a catalog of where we had all the major reinsurance programs in the country. We could kind of dispense with this law of large numbers driven actuarial triangulation approach. And just look up -- Oh that Howden Treaty in 1983 was this loss ratio, and in 1984 it was that loss ratio and so on. That would make life considerably easier. Of course figuring out the effect of the terms and conditions in pricing makes it a little easier said that done. But I'm wondering whether I could get a reaction from the audience on two points. One is would you be willing to believe what you heard from someone who professed to know more about the business than you or your underwriters thought they knew when they booked it. 2) Would there be an interest or perhaps, would there be reasons not to exchange that pint of information with other people in the business. We all know how rumors go around the street. It's fascinating to think of how an exchange of information on various contracts might help new reinsurers from following in the footsteps of some of the older ones, or at least at the same price. Any reaction?

No one has raised the point that it makes a difference whether you're talking brokerage market or direct. Obviously if you only have a small number of direct insurers I think, they're not going to talk to each other. Whereas if you have a large number of broker driven companies that sort of word of mouth is less likely to be considered restraint of trade or other undesirable behavior. From the overall lack of enthusiasm from the audience I would conclude ... Aah, a reaction.

I think you asked the question that is classically the haves and the have notes. The have nots which have no knowledge and no data are looking to get that knowledge and data so that they can cut your rate by only 10% and get a tremendous markup as opposed to an operations markup. Whereas the haves mostly guard their secrets so that anybody who does try to take the account away they may do something as stupid as selling it at half the price. I don't think the people in the know will care to share with the have nots. Could you all hear that in the back. It sounded rather full of conviction. And in fact I think that there are many organizations of both reinsurers and primary who argue that the best defense against innocent capacity is to try and keep it out with some good hard competition. I think that that's a good answer to the proposition.

The comment from the front is that there maybe a certain vindictive motive for those who have gotten hurt to band together to try and exact retribution. And certainly those of you who follow the legal news know that there are a number of arbitrations, and litigations. Some involving producers, some involving reinsurers. It does seem in fact as if there are some people out to settle some scores.

Thank you very much for your participation. I hope you enjoy a cool drink.

1986 CASUALTY LOSS RESERVE SEMINAR

3G - CLAIMS MANAGEMENT PERSPECTIVES

Moderator: Michael G. Zipkin, Claims Consultant
Tillinghast/TPF7C

Panel: David A. Kocher, Claims Vice President
Aetna Life & Casualty

Richard E. Marrs, Senior Vice President
Travelers Insurance Co.

J.G. Tangney, Vice President & General Claims Manager
Liberty Mutual Insurance Company

1986 CASUALTY LOSS RESERVE SEMINAR

Washington, D.C. - September 29, 1986

Panel Session 3G - Claims Management Perspectives

(Description of Subject Matter: "Virtually all of our reserving methods depend upon the timing, accuracy and consistency of the reserving of the individual claims, controlled within the Claims Department. Standards and procedures within Claims Departments vary widely and it is important to understand the workings of the Claims Department in order to reasonably project ultimate losses. This panel will explore the very critical 'message from top management' and the reflection of this message in the setting of reserving authorities, acceptance of judgement in setting reserves, establishment of various budgetary constraints and the changing balance between claims investigation and claims bookkeeping.

Further influencing the claims evaluation procedure are many external factors whose influence varies over time and by line of business and jurisdiction. Several of the more critical of these elements discussed will include the concept of joint and several liability, the unfair claims practices act, punitive damages, inflation, prejudgement interest, contributory and comparative negligence, class action suits, and the shift towards discovery reserving.")

Good afternoon. My name is Michael Zipkin. I'm a Vice President in the Tillinghast division of TPF&C, and the head of Tillinghast's claim management consulting division. I'm also the moderator of today's panel session on Claims Management Perspectives involved in the loss reserving process.

Our panel on this topic consists of the heads of the claim departments of three of the country's largest property and casualty insurance companies - David Kocher of Ætna Life and Casualty, Richard Marrs of Travelers Insurance Companies, and Joseph Tangney of Liberty Mutual Insurance Company.

Our topic today deals with several key issues which an insurer, reinsurer, or self-insured company faces as it attempts to deal with the problem of how to effectively and consistently reserve its claims:

- The case basis reserving philosophy and methods which should be used by that company in establishing case basis reserves, and the kinds of technical claim problems which can be encountered in estimating case values and setting appropriate reserves in conjunction with those values. These issues will be covered by Dick Marrs of Travelers.

- The management problems inherent in the case basis reserving process, i.e., the kind of auditing, monitoring and control procedures which are required to manage the case reserving process in a typical claim operation. This issue will be handled by Joe Tangney of Liberty.

- The problems of projecting loss costs and establishing case reserves in today's complex claim environment; and the influence which tort reform, judicial interpretations of case law and legislation, and large jury verdict awards have had on the claim department's case reserving practices. These issues will be discussed by Dave Kocher of The Ætna.

Throughout these presentations, we will emphasize not only the importance of the case evaluation and reserving process, but also the fact that in today's highly uncertain and volatile claim environment, establishing case basis reserves in a proper and consistent manner is an exceptionally difficult task.

Before we begin our persentations, I would like to request that you hold off asking questions until all of the panel members have finished their presentations. At that time, you can locate one of the microphones in the audience, and refer your questions to us up here as a group.

I'm being asked to point out to you that the views and opinions expressed by this panel are the views of the individuals on the panel, not the views of the American Academy of Actuaries, the Casualty Actuarial Society, or the employers of the individuals who are about to talk to you.

Now let's get started with our presentations.

Dave Kocher is going to talk about the problems of projecting loss costs and establishing case reserves in today's complex claim environment, and the influence of such issues as tort reform on the case reserving process.

Joe Tangney is going to discuss the management problems inherent in the case basis reserving process, including the kinds of auditing, monitoring and control procedures which are required to manage that process.

Dick Marrs is going to talk about various case basis reserving philosophies and methods and the kinds of technical claim problems which can be encountered in estimating case values in setting appropriate reserves.

DAVID A. KOCHER

REMARKS TO 1986 CASUALTY LOSS RESERVE SEMINAR

WASHINGTON, D.C.

SEPTEMBER 29, 1986

I'M PLEASED TO BE WITH YOU TODAY TO TALK ABOUT THE MANY PROBLEMS SURROUNDING THE ISSUE OF CLAIM HANDLING IN THE UNSTABLE LEGAL ENVIRONMENT WE FIND OURSELVES IN IN THE 1980'S. THE INSTABILITY OF THIS ENVIRONMENT CLEARLY RELATES TO PROBLEMS WITH OUR TORT SYSTEM. UNFORTUNATELY TODAY I AM NOT GOING TO BE ABLE TO DELIVER A LOT OF ANSWERS TO YOU. I HOPE TO BE ABLE TO ILLUSTRATE THE ISSUES, HOWEVER, AND MANY OF THE QUESTIONS SURROUNDING THE ISSUES. I'M SATISFIED THAT A THOROUGH ANALYSIS OF THE ISSUES AND THE QUESTIONS WILL LEAD US IN THE DIRECTION OF SOUND CLAIM HANDLING AND CONSISTENT CASE BASIS RESERVING EVEN IN THE MOST DIFFICULT OF ENVIRONMENTS.

I THINK IT IS APPROPRIATE THAT WE DISCUSS AND FULLY UNDERSTAND THE CURRENT CLAIM ENVIRONMENT, IN TERMS OF THE TRADITIONAL CLAIMS, PRODUCT LIABILITY CLAIMS, AND THE NEW GENERATION OF LATENT INJURY KIND OF CLAIMS. AFTER THAT DISCUSSION, I WILL TALK ABOUT SOME OF THE STEPS THAT NEED TO BE TAKEN BY CLAIM PROFESSIONALS TO PERFORM IN AN EFFECTIVE MANNER. LET ME BEGIN WITH SOME COMMENTS DIRECTLY RELATED TO THE TORT SITUATION AS WE FIND IT TODAY.

UNTIL RECENTLY, THE WORLD OF INSURANCE CLAIMS WAS MADE UP OF PROPERTY CLAIMS AND LIABILITY AND WORKERS COMPENSATION CLAIMS. THESE CLAIMS OCCURRED AT A FIXED POINT IN TIME AND BECAUSE THERE WERE MILLIONS OF POLICYHOLDERS AND THOUSANDS OF CLAIMS IT WAS FAIRLY EASY TO PREDICT ULTIMATE COST USING TRIED AND TRUE CASE BASIS AND ACTUARIAL PROJECTION METHODS. ACTUARIAL BASED PRICING TECHNIQUES REACHED A FAIRLY HIGH LEVEL OF CERTAINTY AND PREDICTABILITY. THE LEGAL RULES OF LIABILITY AND DAMAGES WERE WELL ESTABLISHED AND RELATIVELY STABLE. BY ADJUSTING EXPERIENCE REGARDING PRIOR LOSSES TO REFLECT TRENDS IN THE NUMBER AND SIZE OF CLAIMS, FUTURE RATES AND PREMIUMS COULD BE ESTABLISHED. CLAIM HANDLING IN THIS ENVIRONMENT WAS TECHNICAL BUT THE RULES WERE CONSISTENT AND SLOW TO CHANGE.

IN THE LAST 10-15 YEARS NEW TERMS AND PHRASES BEGAN TO CREEP INTO THE CLAIM AND LEGAL VOCABULARY REGARDING EVEN TRADITIONAL CLAIMS. WE BEGAN TO HEAR ABOUT PSYCHOLOGICAL CLAIMS BEING MADE BY PEOPLE WHO SAW OTHERS INJURED. WE BEGAN TO HEAR ABOUT CUMULATIVE TRAUMA WORKERS COMPENSATION CLAIMS AND STRESS-RELATED CLAIMS. WE BEGAN TO HEAR MORE ABOUT BAD FAITH, PUNITIVE DAMAGES AND STRICT LIABILITY AND "JOINT AND SEVERAL" LEGAL DOCTRINES. THESE DEVELOPMENTS CAUSED US TO REACT AND ADAPT TO A NEW WORLD OF CLAIM HANDLING. TO OBSERVE THAT THIS NEW WORLD HAS AN UNSETTLING IMPACT ON THE PRINCIPLES OF PREDICTABILITY WE HAD BECOME MOST ACCUSTOMED TO IS AN UNDERSTATEMENT. CLAIM FILE HANDLERS NOW HAVE MANY MORE DECISIONS TO MAKE IN ESTABLISHING THEIR BEST JUDGMENT ON CASE BASIS RESERVES.

WE COULD TALK FOR A LONG TIME TODAY ABOUT THE SPECIFIC CHANGES IN THE TORT SYSTEM THAT HAVE LED TO THE INSURANCE AVAILABILITY AND AFFORDABILITY PROBLEMS WE ARE SEEING. HOWEVER, THIS IS NOT THE SPECIFIC SUBJECT FOR OUR TALK. LET ME MENTION, HOWEVER, THAT THE EROSION OF TRADITIONAL TORT CONCEPTS OF FAULT, LIABILITY AND DAMAGES ARE AT THE HEART OF THE UNCERTAINTY WE ARE FACED WITH IN CLAIM HANDLING AND PROJECTION OF LOSS COST. THIS UNCERTAINTY AND LACK OF PREDICTABILITY IS AT THE HEART OF OUR INDUSTRY'S AVAILABILITY AND AFFORDABILITY PROBLEMS AND IS DRIVING MUCH OF THE NATIONAL TORT REFORM ACTIVITY WE SEE.

RECENTLY GUSTAVE SHUBERT, DIRECTOR OF THE INSTITUTE FOR CIVIL JUSTICE, DESCRIBED THE PROBLEM WELL WHEN HE SAID THAT UNDERLYING ALL OUR PROBLEMS WITH THE CIVIL JUSTICE SYSTEM IS THE INABILITY OF THIS COUNTRY TO DECIDE WHETHER IT WANTS TO HAVE A COMPENSATORY SYSTEM OR WHETHER IT WANTS TO HAVE A FAULT- BASED LIABILITY SYSTEM. THAT APPEARS TO BE A CLEAR AND ACCURATE STATEMENT OF THE PROBLEM. MY OWN CONCLUSION IS THAT WE CANNOT AFFORD A COMPENSATORY SYSTEM AND THAT WE MUST RETURN TORT LAW TO A FAULT-BASE WITH STABLE AND PREDICTABLE RULES FOR ADMINISTRATION. NEVERTHELESS, TORT REFORM IS NOT THE SUBJECT FOR THIS DISCUSSION AND WE MUST MOVE ON.

FAST-CHANGING RULES OF LIABILITY AND DAMAGES AND THE "LONG TAIL" NATURE OF THE GENERAL LIABILITY RISK CAUSE THE COMMERCIAL <u>GENERAL LIABILITY</u> INSURER GREATER PROBLEMS IN HANDLING CLAIMS AND PRICING THE PRODUCT.

THE LAW REGARDING THESE CASES IS CREATED EACH DAY IN THE COURTS AND THE LAWS OF LIABILITY AND DAMAGES ARE CONSTANTLY CHANGING. JUDICIAL DECISIONS EXPANDING TORT LAW LIABILITY ARE MADE DAILY THAT COULD NOT HAVE BEEN ANTICIPATED WHEN THE INSURANCE POLICY WAS WRITTEN. LET ME DISCUSS WITH YOU SOME OF THESE JUDICIAL DECISIONS CREATING SEVERE INSTABILITY IN PRODUCT LIABILITY CLAIM HANDLING, CASE BASIS RESERVING, AND OF COURSE THE ABILITY TO ACCURATELY PRICE THE INSURANCE PRODUCT.

EXAMPLE NO. 1: SOME COURTS HAVE RECENTLY DECIDED THAT A PRODUCT MANUFACTURER MAY BE LIABLE FOR RISKS THAT IT COULD NOT HAVE DISCOVERED BY ANY SCIENTIFIC MEANS AT THE TIME THE PRODUCT WAS MADE. WHILE THIS RULE HAS NOT BEEN ADOPTED IN EVERY STATE, IT HAS CREATED A SEVERE AREA OF INSTABILITY IN LIABILITY LAW. UNDER THIS RULE, THE MANUFACTURER'S EXPOSURE IS COMPLETELY OPEN ENDED. JUDGEMENTS BASED ON THIS RULE HAVE BEEN MADE IN NEW JERSEY, ARIZONA AND LOUISIANA. NOW I ASK YOU: HOW DO YOU PRICE FOR THAT KIND OF EXPOSURE - FROM STRICT TO ABSOLUTE LIABILITY? DOES THE CLAIM PERSON RESERVE EXPECTING THIS RULE TO SPREAD SLOWLY OR QUICKLY?

EXAMPLE NO. 2: LIABILITY CAN BE IMPOSED EVEN IN CASES WHERE THE PRODUCT IS NOT DEFECTIVE. UNTIL RECENTLY, SOMETHING ALWAYS HAD TO BE WRONG WITH THE PRODUCT OR THERE WOULD BE NO LIABILITY. THE MARYLAND COURT OF APPEALS RECENTLY HELD THAT A MANUFACTURER OF A "SATURDAY NIGHT SPECIAL" HANDGUN MAY BE HELD LIABLE FOR THE SHOOTING OF A PERSON IN A GROCERY STORE ROBBERY. THE GUN WAS NOT DEFECTIVE BUT THE COURT HELD

THAT THE MANUFACTURER KNEW IT COULD BE USED IN CRIMINAL ACTIVITY. HOW DO YOU PLAN FOR THAT KIND OF EXPOSURE? AND HOW DO YOU PRICE IT? HOW DO YOU RESERVE FILES LIKE THIS?

THIS IS A GOOD EXAMPLE OF WHAT'S HAPPENING TO CASUALTY INSURERS TODAY. HOW COULD THE COMPANY THAT INSURED THAT HANDGUN MANUFACTURER HAVE POSSIBLY FORESEEN THAT AN EXTREME CHANGE IN THE LAW WOULD DRAMATICALLY ALTER THE EXPOSURE HE WAS INSURING?

SOME OF THESE RULINGS, TO BE SURE, HAVE OCCURRED IN ONLY A FEW STATES. BUT THE INSURER'S DILEMMA IS THIS: ONCE A DECISION LIKE THIS IS REACHED ANYWHERE IN THE COUNTRY, IT MAY NOT BE LONG BEFORE OTHER STATES FOLLOW. THE LAW, AS YOU KNOW, IS BUILT ON PRECEDENT.

EXAMPLE NO. 3: IN SOME JURISDICTIONS, IT IS NO LONGER NECESSARY TO SUFFER ACTUAL PHYSICAL BODILY INJURY TO RECOVER DAMAGES, OR EVEN TO CLAIM EMOTIONAL TRAUMA AS THE RESULT OF AN INJURY. THIS DEVELOPMENT IS NOT LIMITED TO PRODUCTS CLAIMS. A FEDERAL COURT OF APPEALS, INTERPRETING MISSISSIPPI LAW, VERY RECENTLY PERMITTED RECOVERY TO A FORMER SHIPYARD WORKER BECAUSE THERE WAS A MEDICAL <u>POSSIBILITY</u> THAT HE MIGHT DEVELOP CANCER IN THE FUTURE. NOT ONLY COULD A CLAIM BE BROUGHT FOR MENTAL DISTRESS RELATING TO THE <u>FEAR</u> OF GETTING CANCER, BUT A CLAIM COULD ALSO BE BROUGHT FOR THE <u>POSSIBILITY</u> OF GETTING CANCER. BOTH BASES OF RECOVERY ARE A MAJOR DEPARTURE FROM EXISTING TORT DOCTRINE. HOW DO YOU PLAN FOR THIS KIND OF EXPOSURE? HOW DO YOU PRICE IT? HOW DOES A CLAIM PROFESSIONAL RESERVE THIS KIND OF CLAIM FILE?

NOTICE THAT IN THE EXPANSION OF TORT LAW CITED IN THE FIRST EXAMPLE - THE MANUFACTURER SOLD A PRODUCT DEEMED SAFE AT THE TIME HE PRODUCED IT - THE INNOCENT HAD TO PAY. IN THE SECOND EXAMPLE - THAT OF THE GUN MANUFACTURER - LIABILITY WAS IMPOSED WHEN THERE WAS NOTHING WRONG WITH THE PRODUCT. IN THE THIRD EXAMPLE, WE FOUND THAT A PERSON CAN RECOVER WHEN HE OR SHE HAS NO PRESENT INJURY BUT MERELY A FEAR OR POSSIBILITY OF INJURY EXISTS. IF A COURT EVER COMBINED THESE RULES, A PERSON COULD RECOVER TORT DAMAGES EVEN WHEN THERE HAS BEEN NO FAULT, NO DEFECT, AND NO INJURY!

ONE FINAL EXAMPLE. FOR OVER 200 YEARS, ONE COULD RECOVER ONLY FOR ONE'S OWN HARM OR THREAT OF HARM. NOW SOME COURTS HAVE HELD THAT ONE CAN RECOVER DAMAGES IF ONE WITNESSES HARM TO A RELATIVE. THE MOST FAMILIAR EXAMPLE TO YOU MIGHT BE THE NEW YORK STATE "ZONE OF DANGER" RULE NOW BEING EXPANDED IN SEVERAL STATES. IF THIS NEW RULE BECOMES STANDARD, WHO'S TO SAY IT WILL BE LIMITED TO RELATIVES? WHAT ABOUT THE CHILDREN WHO WATCHED THE CHALLENGER SPACE SHUTTLE TRAGEDY? DID THEY NOT EXPERIENCE EMOTIONAL HARM? A FEW YEARS FROM NOW, WILL THESE CHILDREN BE SUING NASA, THE SHUTTLE MANUFACTURER AND A DOZEN OTHERS FOR PSYCHOLOGICAL DAMAGE THAT OCCURRED BACK IN JANUARY, 1986? DID THE RESPECTIVE INSURERS COLLECT A PREMIUM FOR THAT EVENTUALITY? OF COURSE NOT. AND EVEN IF THEY HAD, WHAT WOULD THEY HAVE CHARGED?

THE LEGAL UNCERTAINTY ILLUSTRATED BY THESE EXAMPLES MAKES IT IMPERATIVE THAT CLAIM DEPARTMENTS PERFORM IN A HIGH QUALITY MANNER. THIS

PERFORMANCE, IN TERMS OF CLAIM HANDLING AND CASE BASIS RESERVING, WILL BE DISCUSSED BY MY ASSOCIATES IN FURTHER DETAIL AND TOUCHED ON BRIEFLY BY ME LATER IN THIS TALK.

IN FACT, CAREFUL ATTENTION TO DETAIL AND STRONG, CONSISTENT CASE BASIS CLAIM HANDLING WOULD SEE US REASONABLY WELL THROUGH THE PROBLEMS I HAVE DISCUSSED ABOVE. BUT WE ARE FACED WITH EVEN FURTHER DIFFICULTIES IN COMMERCIAL CLAIM HANDLING. THESE DIFFICULTIES SURROUND THE NEW WORLD OF LATENT INJURY CLAIMS.

WE HAVE A WHOLE CLASS OF CLAIMS NOW INVOLVING ASBESTOS BODILY INJURY AND PROPERTY DAMAGE, HAZARDOUS WASTE AND MANY OTHER LESS GLAMOROUS SUBSTANCES. THESE CLAIMS PROVIDE US WITH SIGNIFICANT QUESTIONS AND VERY FEW ANSWERS AT THE PRESENT TIME. LET ME LIST SOME OF THE QUESTIONS ON ISSUES OF COVERAGE, FAULT AND DAMAGES WE ARE CONFRONTING ON THESE CASES:

- THE ISSUE OF THE DEFINITION OF OCCURRENCE
- THE TRIGGER OF COVERAGE ISSUE
- THE POLICY LIMITS QUESTION
- CRITICAL POLICY EXCLUSIONS
- THE INSURER'S DUTY TO DEFEND

- HOW WILL THE COURTS INTERPRET THE DEFINITION OF OCCURRENCE? WILL WE SEE COURTS AWARD VICTIMS DAMAGES WHO ARE EXPOSED TO HAZARDOUS

SUBSTANCES AND ALLEGING FEAR OF INJURY WITH NO INJURY IN FACT? WILL PROPERTY DAMAGE OCCURRENCES BE EXPANDED TO INCLUDE INJUNCTIVE RELIEF FOR CLEANUP OF DUMPS AND DIMINUTION OF PROPERTY VALUES TO THIRD PARTY CLAIMANTS?

- HOW WILL THE COURTS DECIDE WHAT THE TRIGGER OF COVERAGE IS UNDER OUR POLICIES? WE HAVE ALL HEARD ABOUT THE ASBESTOS BODILY INJURY TRIPLE TRIGGER DECISION. HERE THE COURT DECIDED THAT COVERAGE WOULD APPLY FROM THE TIME THE ASBESTOS IS BREATHED UNTIL THE INJURY IS DISCOVERED. IN 1984, A COURT DECIDED THAT INSURANCE POLICIES ARE TRIGGERED WHEN THERE IS EVIDENCE OF ACTUAL INJURY, SICKNESS OR DISEASE OCCURRING DURING THE POLICY PERIOD BASED UPON THE FACTS PROVED IN EACH PARTICULAR CASE. WE HAVE COME TO KNOW THIS AS THE "INJURY IN FACT" TRIGGER. HOW WOULD THIS BE APPLIED TO A HAZARDOUS WASTE CLAIM? WE HAVE ALREADY SEEN SOME COURTS CONCLUDE THAT EACH DUMPING WAS AN OCCURRENCE. IN 1985, A UNITED STATES DISTRICT COURT JUDGE IN THE WESTERN DISTRICT OF MISSOURI DECIDED THAT THE EPA NOTICE FOR CLEANUP WAS THE OCCURRENCE. FOR ASBESTOS PROPERTY DAMAGE CLAIMS, CAN WE EXPECT THE COURTS TO DECIDE A TRIGGER OF COVERAGE WHEN THE ASBESTOS WAS INSTALLED, WHEN IT WAS DISCOVERED, WHEN IT'S TORN OUT, OR ALL OF THE ABOVE?

- CLOSELY RELATED TO THE TRIGGER OF COVERAGE ISSUE IS THE POLICY LIMIT QUESTION, PARTICULARLY FOR HAZARDOUS WASTE CLAIMS. FOR EXAMPLE, IN THE JACKSON TOWNSHIP LITIGATION THE LOWER COURT DECIDED

THAT EVERY TIME THERE WAS A DUMPING IT WAS AN OCCURRENCE. WHEN YOU CONSIDER THAT MOST DUMPING IN THIS COUNTRY HAS TAKEN PLACE OVER DECADES, AN INTERPRETATION SUCH AS THIS APPEARS UNREALISTIC PARTICULARLY WHEN MOST OF THE HAZARDOUS WASTE CLAIMS MAY NOT BE SUBJECT TO AGGREGATE LIMITS.

- HOW WILL COURTS INTERPRET CRITICAL EXCLUSIONS TO OUR POLICY? THE MOST SIGNIFICANT EXCLUSION FOR HAZARDOUS WASTE CLAIMS IS THE POLLUTION EXCLUSION. EARLY IN THE LITIGATION MANY COURTS CONFUSED THE POLLUTION EXCLUSION WITH THE OCCURRENCE LANGUAGE OF OUR POLICIES. THEREFORE, IF THE INSURED COULD SHOW THAT THEY NEITHER EXPECTED NOR INTENDED TO POLLUTE, THE POLLUTION EXCLUSION WAS NOT FOUND TO BE APPLICABLE BY THE COURTS. MORE RECENTLY (FOR EXAMPLE, IN THE STATE COURTS OF NORTH CAROLINA AND OREGON AND THE U. S. DISTRICT COURT IN MASSACHUSETTS), DECISIONS INVOLVING THE POLLUTION EXCLUSION HAVE INTERPRETED IT AS THE INDUSTRY INTENDED. THESE DECISIONS LOOK TO THE ACT OF POLLUTING BY THE INSURED TO DETERMINE IF THE EXCLUSION APPLIED. SPECIFICALLY, WHERE THE INSURED DISPOSED OF ITS WASTE OVER TIME (AS OPPOSED TO SUDDENLY OR ACCIDENTALLY) THE POLLUTION EXCLUSION WAS FOUND TO APPLY. ANOTHER IMPORTANT EXCLUSION IS DAMAGE TO PROPERTY OWNED BY THE INSURED. WITH RESPECT TO HAZARDOUS WASTE CLAIMS, THE COURTS WILL BE CALLED UPON TO DECIDE WHETHER THE INSURED'S OWNERSHIP EXTENDS INTO THE SUBSOIL AND/OR AQUIFERS WHEN APPLYING THIS EXCLUSION.

- How will the courts interpret the insurer's duty to defend? For hazardous waste claims this has become a significant issue. In a number of cases, the insured is served with a notice by the EPA to remediate a hazardous waste site. The insured immediately hires attorneys, engineers and other experts to either remediate and/or negotiate settlement. The cost of these experts oftentimes is much greater than the costs to actually clean up. When all is said or done there may never have been a lawsuit by the EPA. Our policies obligate an insurer to defend any suit seeking damages because of property damage as defined. Is the insurer obligated to pay for defense in the previous scenario where there is no lawsuit by the EPA and the remedy they seek is for cleanup only? There's a strong argument that this is merely an administrative proceeding and not an adversarial one and, further, the relief <u>sought</u> (the cleanup) is not damages but rather equitable and/or injunctive in nature. For both these reasons, no duty to defend would be triggered.

While we are pleased with the tort reform activity taking place in legislatures around the country, this activity so far has been limited to the more traditional claims we see and has not yet formed the latent injury class of cases. The one exception to this, of course, is changes in rules regarding joint and several liability. More rational, thoughtful and conservative judicial decisions responding to the national tort reform debate will help us only marginally on the kinds of issues discussed above. Our hope is that more thoughtful judicial

DECISIONS WILL LEAD TO A MORE CONSERVATIVE RESOLUTION OF SOME OF THE ISSUES OUTLINED ABOVE.

FEEDBACK TELLS US THAT JURIES ARE PAYING MORE ATTENTION TO NEGLIGENCE AND LIABILITY ARGUMENTS GENERALLY AND THERE ARE SOME FAINT SIGNS THAT THE INTENT OF OUR POLLUTION EXCLUSION IS BETTER UNDERSTOOD. WE HAVE A PENNSYLVANIA ASBESTOS DECISION STATING THAT THE AWARDS IN PENNSYLVANIA WILL BE REDUCED WITH CONSIDERATION GIVEN TO THE SMOKING HISTORY OF THE CLAIMANT. FINALLY WE SEE SOME SUPREME COURT PUNITIVE DAMAGE DECISIONS THAT MORE RATIONALLY REFLECT THE PUNITIVE DAMAGE DISCUSSIONS BEING CARRIED ON IN TORT REFORM DEBATE. AGAIN, THE SITUATION IS NOT TOTALLY BLEAK, BUT ONLY FUTURE CASE BASIS DECISIONS WILL HELP US WITH THE LIABILITY, COVERAGE, AND DAMAGE RULES TO BE APPLIED TO THE NEW CLASS OF LATENT INJURY CASES.

WHILE I MAY HAVE BURDENED YOU WITH MORE QUESTIONS THAN ANSWERS, I CAN TELL YOU THERE ARE SOME THINGS THAT QUALITY CLAIM DEPARTMENTS MUST HAVE IN PLACE IN THIS DYNAMIC DECADE OF THE 1980'S. LET ME LIST SOME OF THESE SPECIFICS FOR YOU:

- CLAIM DEPARTMENTS MUST HAVE ORGANIZED AND SOUND CLAIM FILE ADMINISTRATION. CLAIM FILES MUST BE AVAILABLE, MUST BE WORKED (INVESTIGATED, EVALUATED AND DOCUMENTED) BY THE PEOPLE, AND MUST CLEARLY BE SUPERVISED. RESERVING SYSTEMS AND AUDIT ROUTINES MUST BE IN PLACE AND APPLIED CONSISTENTLY, AS YOU WILL HEAR DISCUSSED BY DICK MARRS AND JOE TANGNEY.

- THERE MUST BE SYSTEMS IN PLACE TO COUNT AND TRACK CLAIMS. IN THE LATENT INJURY CLAIM SITUATION, THE CLAIM DEPARTMENT SHOULD KNOW AND TRACK SEPARATELY MULTIPLE OCCURRENCE ISSUES VS SINGLE OCCURRENCE ISSUES. THE TRIGGER OF COVERAGE PREDICAMENT MUST BE CLEARLY UNDERSTOOD BY CLAIM DEPARTMENTS RELATIVE TO LATENT INJURY CASES.

- A CLAIM DEPARTMENT FOR A COMMERCIAL CARRIER SHOULD HAVE A SEPARATE ENVIRONMENTAL/LATENT INJURY FOCUS PROVIDING EXPERTISE IN BOTH CLAIM HANDLING AND LITIGATION MANAGEMENT. PREFERABLY THIS EXPERTISE SHOULD FUNCTION TOGETHER.

- CLAIM DEPARTMENTS MUST HAVE THE APPROPRIATE LEVELS OF TECHNICAL EXPERTISE AND ADEQUATE NUMBERS OF PEOPLE TO ADDRESS THESE ISSUES. MOST OF THESE LATENT INJURY CASES REQUIRE ENORMOUS INVESTIGATION EFFORTS AND SOPHISTICATED LITIGATION JUDGMENTS.

- FINALLY, CLAIM PEOPLE MUST HAVE CLOSE WORKING RELATIONSHIPS WITH UNDERWRITERS AND WITH ACTUARIES WHO BUILD ON CASE BASIS RESERVES. A TEAM APPROACH WILL HELP KEEP THE COMPANIES' MARKET DIRECTION ON TARGET AND HELP THE TOTAL RESERVE PICTURE REFLECT THE UNCERTAINTIES AND CHANGES TAKING PLACE IN THE LEGAL ENVIRONMENT.

MY INTENT TODAY WAS TO ILLUSTRATE FOR YOU THE ENVIRONMENT OF UNCERTAINTY THAT CONFRONTS CLAIM HANDLERS IN THE TRADITIONAL CLAIM ENVIRONMENT, THE PRODUCT LIABILITY SITUATION, AND THE NEW ENVIRONMENT OF LATENT INJURY CLAIMS. IT IS WITHIN THIS CLIMATE THAT I OUTLINE FOR YOU SOME "MUST HAVE" CLAIM MANAGEMENT FUNDAMENTALS. THESE FUNDAMENTALS ARE REALLY THE DEFINITION OF QUALITY CLAIM ADMINISTRATION IN THE 1980'S. IT WAS A PLEASURE BEING WITH YOU.

TRADITIONAL CLAIMS

PRODUCT LIABILITY CLAIMS

LATENT INJURY CLAIMS

D. A. Kocher
Slide 1

- CUMULATIVE TRAUMA
- STRESS RELATED
- BAD FAITH/PUNITIVE DAMAGES
- STRICT LIABILITY
- JOINT AND SEVERAL

D. A. Kocher
Slide 2

TRADITIONAL TORT CONCEPTS

- FAULT
- LIABILITY
- DAMAGES

D. A. Kocher
Slide 3

TORT SYSTEM

FAULT BASED SYSTEM

OR

COMPENSATORY SYSTEM

D. A. Kocher
Slide 4

LATENT INJURY ISSUES

- DEFINITION OF OCCURRENCE
- TRIGGER OF COVERAGE
- POLICY LIMITS QUESTION
- CRITICAL POLICY EXCLUSIONS
- INSURER'S DUTY TO DEFEND

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CLAIM ADMINISTRATION MUSTS:

- SOUND FILE AND GENERAL ADMINISTRATION
- SYSTEMS TO COUNT AND TRACK CLAIMS
- SEPARATE ENVIRONMENTAL/LATENT INJURY FOCUS
- APPROPRIATE LEVELS OF TECHNICAL EXPERTISE AND ADEQUATE NUMBERS OF PEOPLE
- CLOSE WORKING RELATIONSHIPS WITH UNDERWRITERS AND ACTUARIES

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R. E. MARRS, SR. V.P.
THE TRAVELERS COMPANIES

1986 CASUALTY LOSS RESERVE SEMINAR
WASHINGTON, D.C.

SEPTEMBER 29-30, 1986

THE OUTSTANDING LOSS RESERVE IS MADE UP OF THREE PIECES:

1. IBNR
2. CASE BASIS ESTIMATES
3. DEVELOPMENT

THIS PANEL WILL DEAL WITH ONLY THE SECOND PIECE OF THE TOTAL RESERVE - THE ADJUSTER'S CASE BASIS ESTIMATE.

WHAT IS THE ADJUSTERS' CASE BASIS ESTIMATE? HERE IS MY DEFINITION. IT IS THE ADJUSTERS' BEST JUDGMENT OF THE TOTAL CURRENT VALUE OF AN OPEN CLAIM (INCLUDING ANY AMOUNTS PAID TO DATE) AT A GIVEN POINT IN TIME ACCORDING TO THE COMPANY'S STANDARDS FOR EVALUATION. -REPEAT- EACH ONE OF THESE WORDS HAS A MEANING. I BELIEVE THE MOST IMPORTANT PART OF THE DEFINITION IS - "THE COMPANY'S STANDARDS FOR EVALUATION".

LET'S LOOK AT THE DIFFERENT STANDARDS COMPANIES SET FOR MAKING ESTIMATES.

FIRST - THE OBJECTIVE OF THE ESTIMATE. IT CAN BE ANY ONE OR MORE OF THE FOLLOWING:

* TO REGISTER THE EXISTENCE OF THE CLAIM ON THE THE COMPANY'S RECORDS.

* TO ESTIMATE THE <u>BEST POSSIBLE</u> OR <u>WORST POSSIBLE</u> OUTCOME OF THE CLAIM

* TO ESTIMATE THE PRESENT VALUE OF THE CLAIM BASED ONLY ON WHAT IS <u>PROVEN</u> BY THE RECORD AT THE TIME THE ESTIMATE IS MADE.

* TO ESTIMATE THE VALUE OF THE MOST LIKELY OUTCOME OF THE CLAIM BASED ON WHAT IS CURRENTLY PROVEN IN THE

RECORD PLUS REASONABLE INFERENCES THAT CAN BE DRAWN FROM WHAT IS PROVEN.

LET'S LOOK A LITTLE CLOSER AT EACH OF THESE:

REGISTER THE CLAIM - IF THIS IS YOUR OBJECTIVE, IT DOESN"T MAKE MUCH DIFFERENCE WHAT ESTIMATE YOU PLACE ON THE FILE. YOU ONLY WANT TO KNOW THAT THERE IS A CLAIM. PRESUMABLY THE ACTUARY WILL TAKE IT FROM THERE.

BEST POSSIBLE/WORST POSSIBLE OUTCOME - THE CLAIM PERSON IS ANALYZING FACTS AND MAKING A JUDGMENT ON THE VALUE OF THE CLAIM - BUT IT IS A BIASED VALUE - TOWARDS EITHER WORST OR BEST OUTCOME.

PRESENT VALUE BASED ON PROVEN FACTS - I REFER TO THIS AS THE "SHOW ME" OR MISSOURI RULE. IT IS THE ONE OFTEN PREFERRED BY LARGE RETRO ACCOUNTS. I RECALL HAVING ONE SUCH ACCOUNT

AGREEING THAT A BAD RESULT WAS ALMOST A CERTAINTY, BUT THAT IT WAS UNFAIR OF ME TO PLACE AN ESTIMATE ON THE CLAIM FILE CONSISTENT WITH THAT JUDGMENT UNTIL THERE WAS CLEAR PROOF OF A BAD RESULT. (IN OTHER WORDS, DELAY MAKING AN ESTIMATE UNTIL IT WAS UNNECESSARY TO ESTIMATE - BECAUSE YOU'D KNOW THE OUTCOME.)

MOST LIKELY OUTCOME - THE CLAIM PERSON LOOKS AT ALL THE FACTS OF COVERAGE, LIABILITY, INJURY, OR DAMAGE, EXPENSES, AND ALL OTHER CONSIDERATIONS. ONE OF THE BIGGEST PROBLEMS FOR CLAIMS PEOPLE IS GETTING ALL THOSE FACTS, ESPECIALLY WITHIN THE NECESSARY TIME FRAMES. THAT REQUIRES THAT THEY TAKE WHAT FACTS THEY DO HAVE - AND - BASED ON THEIR EXPERIENCES WITH SIMILAR FACT SITUATIONS - MAKE JUDGMENTS ABOUT THE FINAL OUTCOME - THEN PLACE AN ESTIMATE ON THE FILE CONSISTENT WITH THAT JUDGEMENT. THIS IS THE MOST DIFFICULT STANDARD FOR CLAIM PEOPLE TO ACHIEVE, YET THE ONE MOST OF THEM PREFER.

AND THAT LEADS ME TO THE SECOND SET OF COMPANY STANDARDS I WANT TO TALK ABOUT - THE TIME FRAME.

THERE ARE TWO PIECES TO THE TIME FRAME STANDARD. THE TIME FOR:

* THE INITIAL ESTIMATE
* THE REVISED ESTIMATE

OPTIONS FOR TIME FRAMES

INITIAL ESTIMATES:

* IMMEDIATELY UPON GETTING THE NOTICE.

  THIS ONE IS GENERALLY USED BY COMPANIES WHOSE SOLE OBJECTIVE, IN SETTING THE ESTIMATE, IS TO REGISTER THE CLAIM ON THE COMPANY'S RECORD.

* A SPECIFIC TIME LAPSE FROM THE DATE THE CLAIM

IS RECEIVED IN THE CLAIM DEPARTMENT - I.E., 30, 60, OR 90 DAYS. THIS GIVES THE CLAIM DEPARTMENT TIME TO GET MUCH OF THE INFORMATION ON ROUTINE CLAIMS --AND AT LEAST SOME OF THE INFORMATION ON COMPLEX CLAIMS.

* WHEN THE VALUE OF THE CLAIM EQUALS OR EXCEEDS A SPECIFIC AMOUNT, SUCH AS $20,000. FOR CASES BELOW THIS LEVEL, YOU ACTUARIES MAKE THE DECISIONS.

REVISED ESTIMATES:

THE INITIAL ESTIMATE OF VALUE IS ALMOST ALWAYS WRONG. SO, IT'S NECESSARY TO MAKE REVISIONS. WHEN DO YOU MAKE THEM? HERE ARE THE EVENTS THAT TRIGGER A CHANGE:

* AT A GIVEN POINT IN THE LIFE CYCLE OF A FILE -- I.E., WHEN IT IS 6 MONTHS OR 12 MONTHS OLD.

* WHEN THERE IS ADDITIONAL EVIDENCE (FACTS CONCERNING LIABILITY, INJURY, OR DAMAGE - OR A LAW CHANGE) INDICATING A CHANGE IN VALUE OF PLUS OR MINUS A SPECIFIED AMOUNT OR PER CENT.

WHO HAS AUTHORITY TO ESTABLISH ESTIMATES AND REVISE THEM?

THIS WILL VARY SOMEWHAT - BUT GENERALLY NOBODY BELOW THE LEVEL OF SUPERVISOR CAN ESTABLISH OR REVISE A CASE BASIS ESTIMATE. THERE ARE USUALLY DOLLAR LIMITS TO AN INDIVIDUAL'S AUTHORITY TO ESTABLISH AN ESTIMATE. THE LARGEST ESTIMATES REQUIRE HOME OFFICE AUTHORIZATION.

EVEN WITH THESE STANDARDS TO GO BY, THERE ARE MANY PROBLEMS WITH RELIABILITY OF CASE BASIS ESTIMATES. LET'S LOOK AT A FEW OF THEM.

INVESTIGATION - WHEN YOU HAVE ALL THE FACTS, ESTIMATING CAN BE DONE FAIRLY ACCURATELY ON MOST CASES. THE PROBLEM IS TO GET ALL THE FACTS. MOST CLAIM DEPARTMENTS ARE VERY BUSY. OVER THE PAST SEVERAL YEARS, MOST COMPANIES HAVE PLACED GREATER RELIANCE ON INVESTIGATING BY TELEPHONE COMPARED TO EARLIER GREATER USE OF OUTSIDE, ON-THE-SCENE INVESTIGATING. IT UNQUESTIONABLY CONSUMES LESS ADJUSTING RESOURCE TO INVESTIGATE BY PHONE. THE QUALITY OF INFORMATION PRODUCED BY TELEPHONE INVESTIGATION IS NOT AS HIGH AS ON-THE-SCENE INVESTIGATION. MOST WITNESSES CANNOT DESCRIBE ACCURATELY OVER THE PHONE WHAT THE SCENE OF AN ACCIDENT LOOKS LIKE. MOST PARTIES TO AN ACCIDENT HAVE TROUBLE DESCRIBING OVER THE PHONE THEIR INVOLVEMENT IN THE ACCIDENT. CLAIMS PEOPLE HAVE MORE DIFFICULTY EVALUATING THE QUALITY OF THE WITNESS' STATEMENTS MADE OVER THE PHONE. IN ALL BUT ROUTINE CASES, TELEPHONE INVESTIGATION CAN LEAD TO INCOMPLETE INFORMATION. IT GOES WITHOUT SAYING WHAT EFFECT THIS CAN HAVE ON THE TIMELINESS OF ACCURATE ESTIMATES.

WITNESSES

WITNESSES WHO HAVE INFORMATION NEEDED TO MAKE A GOOD EVALUATION DO NOT ALWAYS COOPERATE. MANY DO NOT WANT TO GET INVOLVED. SOME JUST DON'T HAVE THE TIME. SOME ARE OF QUESTIONABLE VALUE DUE TO BIAS TOWARDS ONE OF THE PARTIES.

INSUREDS

NOBODY LIKES TO ADMIT THAT THEY ARE WRONG. INSURED'S USUALLY PAINT THEIR SIDE OF THE CASE IN THE BEST POSSIBLE LIGHT. SOMETIMES THEY GO MUCH FURTHER. ALTHOUGH IT IS NOT A FREQUENT PROBLEM, INSUREDS DO, ON OCCASION, WITHHOLD DAMAGING INFORMATION WHICH, WHEN DISCOVERED, CHANGES THE VALUE OF THE CLAIM.

CLAIMANTS AND THE ADVOCATES

CLAIMANTS AND THEIR ADVOCATES ALMOST ALWAYS GIVE YOU ONLY WHAT THEY PERCEIVE WILL HELP THEM. THEY OPERATE ON THEIR

OWN TIMETABLE. THEY MAY EXAGGERATE THEIR INJURIES OR DAMAGES OR THEY MAY WITHHOLD ANY INFORMATION FROM YOU SUCH AS A MEDICAL REPORT FOR SEVERAL MONTHS.

INJURIES

THE SAME INITIAL INJURY TO TWO DIFFERENT PERSONS OFTEN HAS SIGNIFICANTLY DIFFERENT EFFECT. PEOPLE WHO HAVE STABLE EMOTIONAL, PHYSICAL, ECONOMIC AND SOCIAL CIRCUMSTANCES ARE USUALLY AFFECTED LESS SERIOUSLY THAN THOSE IN LESS STABLE CIRCUMSTANCES. IF CLAIM PEOPLE ARE ABLE TO LEARN THE DIFFERENCES AMONG PEOPLE, THEY CAN TAKE THIS INTO ACCOUNT WHEN SETTING THE ESTIMATE. HOWEVER, THEY DO NOT ALWAYS HAVE ACCESS TO SUCH INFORMATION. EVEN WHEN THEY DO, IT DOES NOT ALWAYS PROVIDE THE ANSWER.

WHY DOES A BACK INJURY TO ONE PERSON HEAL WHILE THE SAME INJURY TO ANOTHER LEADS TO SURGERY? WHY DOES SURGERY CURE SOME PEOPLE AND NOT OTHERS?

INTERNAL PROCESSES

AS YOU CAN SEE, THERE ARE MANY REASONS WHY CASE BASIS ESTIMATING CAN BE TRICKY. BUT, EVEN IF YOU OVERCOME THE HURDLES ALREADY DISCUSSED, THERE IS YET ANOTHER BIG ONE -- THE "INTERNAL PROCESSES" OF THE COMPANY.

THE INTERNAL PROCESS I REFER TO GOES ALL THE WAY FROM THE TIME THE CLAIM DEPARTMENT RECEIVES THE NOTICE OF A CLAIM UNTIL THE INFORMATION ABOUT THAT CLAIM IS IN THE FINANCIAL RECORDS OF THE COMPANY.

HERE ARE SOME KEY THINGS TO WATCH:

CHANGING THE TIMING OF: (SPEEDING UP OR SLOWING DOWN)

* RECEIVING NOTICES OF LOSS (EXAMPLE: MOVING FROM MAILED TO TELEPHONED NOTICES)

* BEGINNING OR COMPLETING INVESTIGATIONS

* SETTING THE INITIAL OR REVISING CLAIM ESTIMATES

PROCESS OR ORGANIZATIONAL CHANGES WHICH:

* CHANGE ANY OF THE STANDARDS FOR ESTABLISHING CASE BASIS ESTIMATES

* RESULT IN MOVING MORE THAN 10% OF OPEN CLAIMS OF A GIVEN TYPE FROM ONE HANDLER TO ANOTHER. THIS INCLUDES CHANGING THE GUIDELINES BY WHICH CLAIMS ARE ASSIGNED TO INDIVIDUALS AS WELL AS CONSOLIDATIONS.

AUTOMATION

AUTOMATING ANY PART OF THE PROCESS. NO MATTER HOW GOOD YOUR MANUAL PROCESS IS, AUTOMATING IT WILL MAKE A DIFFERENCE.

FIRST OF ALL, EVEN IF YOUR NEW SYSTEM WORKS, THERE WILL BE BUGS IN IT AT LEAST IN THE EARLY STAGES. IT WILL TAKE TIME TO WORK THEM OUT - AND IN THE MEANTIME, YOU HAVE TO DECIDE HOW TO INTERPRET WHAT YOU DO HAVE IN ORDER TO GET YOUR JOB DONE. THE CHANCES ARE THAT A GOOD SYSTEM WILL PRODUCE MORE ACCURATE INFORMATION FASTER THAN A MANUAL PROCESS. IT MAY GIVE YOU SEVERAL EXTRA DAYS OF PROCESSED WORK IN THE FIRST PERIOD OF USING THE SYSTEM. IT IS IMPORTANT FOR YOU TO KNOW THAT. YOU MUST KNOW WHETHER THINGS HAVE TRULY CHANGED - OR IF THEY'VE STAYED THE SAME, BUT THE INFORMATION IS DIFFERENT.

PROBLEMS IN THE SYSTEM OR PROCESS

IS THE FLOW OF INFORMATION THE SAME AS IT HAS BEEN, OR ARE THERE CHANGES SUCH AS:

* HIGHER OR LOWER SUSPENSE ACCOUNTS?

* HIGHER OR LOWER BACKLOGS OF UNFINISHED WORK - ANYWHERE IN THE STREAM?

* CHANGES IN THE CUT OFF DATES FOR INFORMATION THAT WILL BE PROCESSED IN A PERIOD?

* CHANGES OF ANY KIND IN THE SYSTEM ITSELF? (SO YOU CAN EVALUATE THEIR EFFECT ON YOUR DATA)

IN SPITE OF ALL THE PROBLEMS ONE ENCOUNTERS IN SETTING ADJUSTERS' ESTIMATES, YOU MAY BE SURPRISED TO FIND OUT JUST HOW WELL SOME CLAIM DEPARTMENTS CAN DO THE JOB. LET'S LOOK AT THE NEXT SLIDE FOR AN EXAMPLE.

THIS SHOWS FIVE YEARS OF DEVELOPMENT ON A GIVEN ACCIDENT YEAR FOR WORKERS COMPENSATION AT MY COMPANY. THE LEFT HAND SIDE SHOWS CLOSED CLAIMS, THE RIGHT HAND SIDE SHOWS CLAIMS

THAT ARE STILL OPEN. NOTE THAT AFTER FIVE YEARS, 96% OF ALL THE CLAIMS WERE CLOSED - THEY REPRESENTED 60% OF ALL THE CLAIM DOLLARS FOR THAT ACCIDENT YEAR. THE FINAL AVERAGE CLOSING VALUE OF ALL THOSE CLAIMS WAS ONLY 4% MORE THAN THE ADJUSTER'S ESTIMATE PLACED ON THE FILES 30 DAYS AFTER THE ADJUSTER GOT THEM.

NOW LET'S LOOK AT THE RIGHT HAND SIDE - THE FILES THAT ARE STILL OPEN. THEY REPRESENT 4% OF ALL FILES FOR THE ACCIDENT YEAR - BUT 40% OF ALL THE DOLLARS. THE AVERAGE VALUE PLACED ON THESE FILES AFTER FIVES YEARS IS A WHOOPING 300% MORE THAN THE ADJUSTER'S ESTIMATE AT THE END OF 30 DAYS.

IF YOU LOOK AT THE GENERAL LIABILITY FILES, YOU WILL FIND A SOMEWHAT SIMILAR PICTURE. THE POINT I WANT TO MAKE IS THAT CLAIM PEOPLE ARE PRETTY GOOD AT ESTIMATING WHAT WILL HAPPEN TO MOST OF THE CLAIMS. THERE ARE, HOWEVER, A SMALL NUMBER

OF CLAIMS (JUST 4 PER CENT IN THIS EXAMPLE) THAT TURN OUT SO DIFFERENTLY FROM EARLY EXPECTATIONS THAT THEY DISTORT ADJUSTERS' ESTIMATES IN THE AGGREGATE. THAT, LADIES AND GENTLEMEN, IS WHY WE NEED YOU.

IN CONCLUSION - YOU CAN SEE THAT THERE ARE MANY FACETS TO THE JOB OF SETTING ADJUSTER'S CASE BASIS ESTIMATES. EVEN WHEN THE JOB IS DONE WELL BY THE CLAIM DEPARTMENT, THINGS CAN GO WRONG. IF I COULD SUGGEST ONLY ONE THING THAT WILL HELP YOU, AS ACTUARIES, UNDERSTAND BETTER WHAT YOUR CLAIM DEPARTMENT IS DOING, IT IS TO IMPROVE YOUR PROCESS OF INTERNAL COMMUNICATIONS. THINGS ARE HAPPENING EVERY DAY, INTERNALLY AND EXTERNALLY, THAT AFFECT THE ADJUSTERS' ESTIMATES WHICH YOU SEE POURING OUT OF YOUR SYSTEMS. YOU NEED TO KNOW ABOUT THESE EVENTS.

YOU SHOULD HAVE A VERY CLEARLY THOUGHT-OUT AND STRUCTURED WAY OF COMMUNICATING. MEETINGS SHOULD TAKE PLACE AT A REGULARLY SCHEDULED TIME EACH MONTH. A REPRESENTATIVE SHOULD BE PRESENT FROM EACH CRITICAL AREA TO DISCUSS CHANGES AND OTHER EVENTS THAT TOOK PLACE DURING THE PRECEDING MONTH. THE EFFECTS OF THESE CHANGES, IF ANY, SHOULD BE DETERMINED. CHANGES PLANNED FOR THE FUTURE SHOULD BE DISCUSSED IN THIS GROUP - AND THEIR EXPECTED IMPACT AS WELL AS HOW THEY WILL BE MEASURED SHOULD BE AGREED UPON.

I CAN'T PROMISE YOU THAT BETTER COMMUNICATIONS WILL MAKE THINGS PERFECT -- BUT IT IS ONE OF THE FEW WAYS I KNOW TO MAKE IT LESS IMPERFECT.

R. E. MARRS
SLIDE 1

TOTAL OUTSTANDING LOSS RESERVE

ALL P.C. LINES COMBINED AS OF DEC 31 19XX

IBNR 24%	CASE BASIS ESTIMATES ON OPEN CLAIMS, LESS AMOUNTS PAID 60%	DEVELOPMENT 16%

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SLIDE 2

DEFINITION OF CASE BASIS ESTIMATE

THE ADJUSTERS BEST JUDGMENT OF THE
TOTAL CURRENT VALUE OF AN OPEN CLAIM
(INCLUDING ANY AMOUNTS PAID TO DATE)
AT A GIVEN POINT IN TIME ACCORDING TO THE
COMPANY'S STANDARDS FOR EVALUATION

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SLIDE 3

OBJECTIVES OF CASE BASIS ESTIMATE

1. REGISTER THE CLAIM

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SLIDE 4

OBJECTIVES OF CASE BASIS ESTIMATE

1. REGISTER THE CLAIM

2. BEST POSSIBLE - WORST POSSIBLE RESULT

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SLIDE 5

OBJECTIVES OF CASE BASIS ESTIMATE

1. REGISTER THE CLAIM

2. BEST POSSIBLE - WORST POSSIBLE RESULT

3. PRESENT VALUE BASED ON PRESENT PROOF

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SLIDE 5

OBJECTIVES OF CASE BASIS ESTIMATE

1. REGISTER THE CLAIM
2. BEST POSSIBLE - WORST POSSIBLE RESULT
3. PRESENT VALUE BASED ON PRESENT PROOF
4. MOST LIKELY OUTCOME BASED ON PRESENT PROOF AND INFERENCES

R. E. MARRS
SLIDE 7

TIME FRAME

INITIAL ESTIMATES

- o IMMEDIATELY
- o SPECIFIED TIME LAPSE
- o SPECIFIED DOLLAR VALUE

REVISED ESTIMATES

- o SPECIFIED POINT IN LIFE CYCLE
- o ADDITIONAL EVIDENCE

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SLIDE 8

PROBLEMS IN SETTING ESTIMATES

EXTERNAL

- o INVESTIGATION
- o WITNESSES
- o INSURERS
- o CLAIMANTS - THEIR ATTORNEYS
- o INJURY DEVELOPMENT

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SLIDE 9

PROBLEMS IN SETTING ESTIMATES

INTERNAL

- o CHANGES IN TIMING
- o CHANGES IN PROCESS OR ORGANIZATION
- o AUTOMATION
- o SYSTEMS OR PROCESS PROBLEMS

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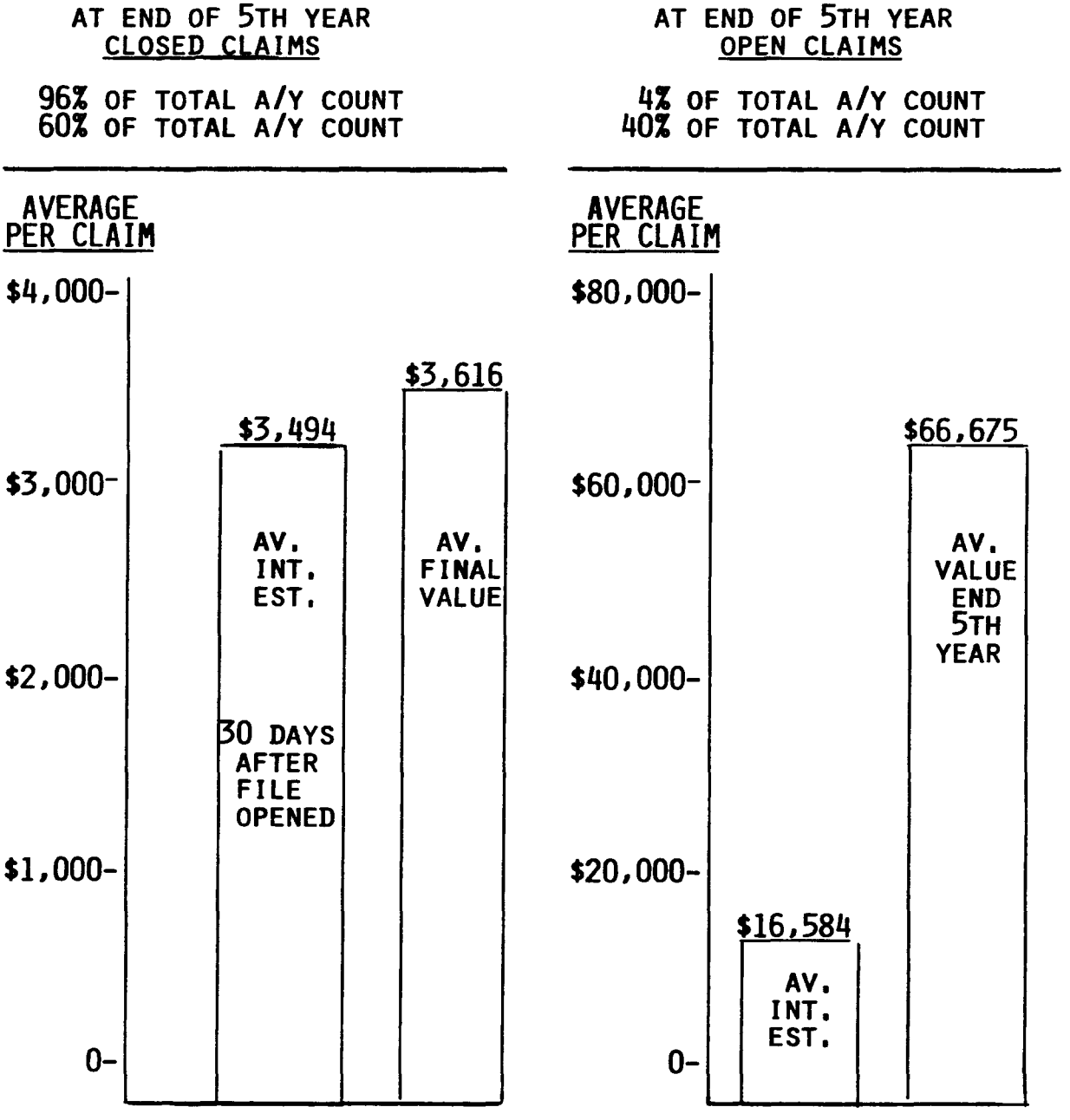
SLIDE 10

WC LOST TIME CLAIMS - ADJUSTER ESTIMATES
AVERAGE VALUES END OF 5TH YEAR VS. INITIAL ESTIMATES
INCLUDES CLOSED WITHOUT INDEMNITY PAYMENTS



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SLIDE 11

C O M M U N I C A T E

C O M M U N I C A T E

C O M M U N I C A T E

C O M M U N I C A T E

COMMUNICATE!

1986 CASUALTY LOSS RESERVE SEMINAR

WASHINGTON, D.C.

SEPTEMBER 29, 1986

COMMENTS ON

CLAIMS MANAGEMENT PERSPECTIVES

BY

JOSEPH G. TANGNEY

I. INTRODUCTION

Any discussions relating to reserving practices and principles should begin with a clarification of what is meant by the term "reserves". As you are well aware, depending upon the nature of the discussion at hand this term takes on different connotations. Terminology such as case reserves, IBNR, formula reserves, to name a few, can cloud an issue if specific definitions are not clarified. For purposes of this discussion, by reserves I mean "case reserves": the dollar estimates of loss placed on individual claims by Claims department personnel. For the most part, I will not be referring to separate reserves for allocated expenses associated with case dispositions.

The importance of this topic in this industry, you would agree, is unrefutable. Reserving principles and practices directly affect the firm's financial picture. The insurer's ability to operate within the marketplace is impacted by proper reserve procedures. The need for consistent, accurate, and timely reserves is essential.

Yet, what kinds of things affect the company's ability to properly set reserves? One could argue that a variety of forces interact both on an external and internal front.

Let's begin with the external forces that can impact the Claims departments' operations, its case evaluation procedures and ultimately the case reserves.

II EXTERNAL FOCUS

It is often stated that reserving methods depend upon the timing, accuracy and consistency of the reserving of individual claims, which are controlled within the Claims Department. Each individual claim reserve requires a claim evaluation. Yet, isn't this claim evaluation procedure influenced by external factors? Of course it is. The dynamic and evolutionary nature of the marketplace within which we operate is key. There is a need to keep abreast of current issues and their ramifications in the case evaluation and reserve processes. A variety of external factors are operating simultaneously and are having varying effects on the insurance business. These factors include:

- Regulatory and Jurisdictional Changes,
- Insurance Industry Activity,
- Legal Environment,
- Socio-economic factors and
- Policyholder Requests and Demands

REGULATORY AND JURISDICTIONAL CHANGES

Claims, in many ways similar, can vary greatly in value depending on the jurisdictions. This is also true in comparing the expense of handling or defending suits in alternative locations.

Naturally, these variables must be reflected in the thought process of the individuals calculating the reserves. The essentials of each claim, such as the injuries, the damages and the liability exposure, must be overlaid on the current status of the judicial, statutory and regulatory law that will direct the resolution of that claim.

Let's briefly review a few of the major legal issues which significantly impact on the evaluation of liability and damages in any particular case.

1. JOINT AND SEVERAL LIABILITY:

The doctrine of Joint and Several Liability has been completely abolished in some states (Colorado, Utah, Washington and Wyoming) and in some others defendants are only required to pay their proportionate share. In some states there are variations on these themes. For example, Connecticut has abolished joint and several liability, but if one defendant is unable to pay its share, other defendants share the unpaid amount, but only up to their proportionate percentage of the entire judgement.

2. COMPARATIVE NEGLIGENCE:

Historically, under a doctrine of contributory negligence the greater fault on the part of the plaintiff was a complete bar to recovery, however, the spread of the doctrine of comparative negligence, has drastically changed the Claims person's evaluation of liability in individual cases. Comparative negligence virtually assures some degree of recovery by most injured plaintiffs. Again, the spread of this doctrine has varied from jurisdiction to jurisdiction.

3. TORT REFORM

There has been a great deal of recent public discussion related to various aspects of tort reform.

Let me mention just a few of the areas of activity which would directly impact on individual case reserving.

A. PUNITIVE DAMAGES:

Reforms have been mainly directed to limiting the amounts recoverable. Colorado has limited punitive damages to the amount of actual damages or $25,000; a significant limitation. Iowa limits the recovery of punitive damages to those cases in which there was a willful and wanton disregard for the rights and safety of others. 75% of the award goes to the States Civil Reparations Trust Fund diluting a plaintiff's incentive to bring such a claim.

B. ATTORNEY'S FEES:

Connecticut has set a contingent fee scale. Indiana and Georgia allow for the recovery of attorney's fees against parties who bring frivolous suits or raise frivolous defenses.

C. MEDICAL MALPRACTICE:

Non-economic damages have been capped in many jurisdictions.

SOCIO-ECONOMIC FACTORS

Also, we should not lose sight of the socio-economic factors at work in today's environment that impact on individual claims.

The post World War II era has seen a confluence of socio-economic factors that have dramatically affected the reserve placed on an insurance claim.

Forty years ago there clearly was a stigma attached to one who did not work when able. Such persons were thought to be living on the "dole", and as such were strongly motivated to return to work as soon as possible. While generalizations are always dangerous, society does not seem to stigmatize this individual as much today. There is more of an attitude that the person is entitled to their benefits, whether it be Worker's Compensation, Social Security, or Welfare. Accordingly, the lessening of an incentive to return to work results in extended disability, which in turn requires increased reserves on a case by case basis.

To some degree the level of unemployment in the community has an impact on the length of disability. In periods of high unemployment, workers are inclined to return to work as soon as possible in order to protect their jobs. When jobs are plentiful this compulsion is reduced. Alternatively, high unemployment may produce extended disability. A good example is an area that suffers the closing of a major plant.

Frequently marginal compensation claims will be presented just prior to the closing in the hope of obtaining disability benefits. The absence of other employment opportunities minimizes the insurance carrier's ability to get the disabled worker back to work.

It has also been noted that during periods of economic prosperity and low unemployment that the marginal workers is brought into the workforce. This person may not be particularly well trained or motivated. This person's accident frequency often exceeds the norm. Once injured there is greater difficulty in getting the worker back to work, largely due to the factors that made this person marginal in the first place. These types of situations will result in higher reserves.

Increased medical costs and the standard of care demanded by today's society have a substantial impact on reserves. Overall medical costs have tripled since 1967. Medicare alone is now approaching $100 billion in medical expenditure. The continued inflationary spiral of medical costs at 5% to 10% per anum dictates that the predent insurer reserve for the expected higher costs down the road.

A portion of the increased medical cost stems from the degree of sophistication of today's diagnostic equipment. Only recently did modern hospitals become equipped with a CAT scanner. The typical CAT scan charge would be between $200 to $300. The CAT scan is no longer the latest in diagnostic technology. Nuclear magnetic resonance (NMR) provides greater accuracy with less risk. It also costs the insurer $300 to $400 more than a CAT scan. Each advance in medical technology seems to result in higher costs per claim and this higher reserves. Hopefully, more sophisticated equipment will produce better health care and ultimately lower medical costs for society.

While unemployment and increased medical costs are partially the product of inflation, inflation itself has an impact on reserves. Forty states now tie WC indemnity rates to the state's average wage. On the liability side we see cases where economists are projecting future lost wages using inflation factors of 10% to 20%. This results in a tremendous future loss of income even if the current wage is rather low when we are dealing with a young claimant.

It should also be noted that the rising level of education within this country has produced a more aware consumer. Consumer activist groups and consumer protection agencies have proliferated. An individual today is fully cognizant of warranties, his or her rights as a consumer, not to mention avenues of recourse should a "wrong doing" or malfunction occur. The result certainly is more a litigious society.

Furthermore, with the advent of consumerism, consumer legislation and increased regulations, the situation in the marketplace is such that a potential for punitive dameages can seriously complicate the judgment process in setting proper reserves. The various Unfair Trade Practices Acts adopted by most jurisdictions infer a sense of a broadening of liability, thereby, complicating and impacting the individual case reserving process.

POLICYHOLDER SERVICE

Finally, the insurer's customers, the policyholders - commercial or personal, are requesting increasingly higher degrees and levels of service. Specific requests and/or demands for information have proliferated.

Increased service and communication requirements for our customers places additional constraints on available resources. We need to ensure that in spite of these additional demands, adequate and proper attention is given to the reserving process and function. This, of course, requires an adequate commitment of resources to satsifactorily handle all of the Claims Departments responsibilities.

It is clear to me that effective and accurate case basis reserving will continue to require a careful consideration of the many external factors which impact on individual case reserves.

III. INTERNAL FOCUS

Now, let's turn to another focus, that being, the internal one. The Claims Department operations are complex, dynamic and fast paced. As a result, the need for effective and efficient management cannot be understated. As a major operating department, its impact on company operations is an obvious one and it is critical to understand the workings of the Claims department in order to reasonably project ultimate losses.

Let's examine a few of the internal activities that will impact on case basis reserving.

ADMINISTRATIVE ISSUES

Standards and procedures within the Claims departments vary widely within the industry. With a large natiuonwide network of branch Claims offices, variations from the approved departmental procedures are certainly possible. Monitoring, inspecting and controlling procedural activity requires considerable attention. Built-in controls are needed. Guidelines and procedural manuals are abount. The reserving practices are no exception. Detailed, specific procedures should outline the reserve mechanism and process. Completion of forms and case reviews at appropriate, predesignated time frames are imperative.

In addition to individual case reserving by supervisors and examiners, review and supervision by experienced management personnel must be an ongoing function. Management information via monthly, quarterly or annual reports must monitor reserve changes, loss data, case counts, average values and a host of other relevant issues.

STAFFING

Let's turn our attention for a moment to another area affecting every major insurer today, that is, staffing considerations. Maintaining an appropriate level of predictability and continuity in reserving methods and practices within the Claims department is definitely affected by the experience levels and rate of turnover of personnel. No one,

will argue the point that there is no substitute for experience in establishing case reserves. The ability to spot on a timely basis the catastrophic case, or the coverage issues, or the potential exposure on a complex products liability case, for example, can be most difficult for the inexperienced. Ensuring the proper staffing mix, minimizing turnover and fostering an experienced personnel base is an ongoing management issue that must be addressed.

Simultaneously, manageable workloads and realistic productivity goals that do not sacrifice the quality of work are compulsory. An experienced claims person with a manageable workload with realistic productivity goals must be afforded the opportunity to give the proper attention to case reserving practices. Achieving the proper balance in these areas can dramatically impact loss reserving trends now and down the road.

TRAINING AND EDUCATION

Regardless of who sets the reserve (adjuster supervisor, manager, examiner) the claims adjuster is in an ideal position to furnish the kind of information necessary to set accurate and realistic reserves, and must understand the importance of this function in the process. The more specific the information obtained, the more accurate the reserve will be.

The reserve training function, on both a formal and informal basis, should include discussions of the following factors which must be considered when setting reserves.

1. nature and extent of injuries
2. medical specials
3. lost earnings/occupation
4. claimant profile
5. legal liability factor
6. litigation
    a. attorney skills
    b. local impact of witnesses on a jury
7. applicable statutes
    a. comparative or contributory negligence
    b. applicable workers compensation act

The role of training and education in the reserving process also should include the importance of timeliness and accuracy in the process, and how to analyze the information that is gathered to develop realistic evaluations for reserving purposes.

We currently use a combination of approaches through Divisional Orientation Programs, seminars and other training sessions for our supervisory personnel. In many instances there is a crossover between formal and informal training. Formal training in investigative techniques can also serve as informal training for reserve analysis.

Most of our training for adjusters falls into the investigative training category since they are generally not directly responsible for setting reserves.

Supervisors, who are directly responsible for setting reserves, must be addressed with a more formalized approach. This can be handled a number of ways such as videotape, lecture, workshop, etc. However, all methods should have the underlying purpose of setting out clear objectives as to why, how and when reserves are established, and the importance of gathering only that information which is necessary and relevant and will impact disposition (and the reserve) of a claim.

Each time we attempt to set a reserve on a claim we should be drawing on our past experiences and at the same time be adding new ones for future reference.

AUTOMATION

Another vital component of today's claims department's operations which can significantly impact reserving patterns is the automation of existing manual/clerical operations.

Changing a company's loss processing system from a manual processing system to an automated claims processing system stresses the entire claims handling function. Because of the importance of accurate and timely reserving in any claims operation the reserving process becomes one of the most critical areas which must be watched very closely during the transition to an automated claims processing environment. Adverse trends, one-time adjustments and increased opportunity for reserve analysis are a few of the results which may occur in this transition.

Implementation of an automated claims processing system may take several years to complete due to several factors. These include budget restrictions, training and technical staff expertise and the pace at which an organization can effectively manage change. Because of the necessary lengthy and phased approach to implementation, a company needs to develop pre and post installation reserve and office profiles for each line of business and office. The profiles help measure any change and determine what part of the implementation caused the change. Collaborative efforts between Claims, Actuarial, Financial, and the Data Processing departments is needed in order to define reserve developments and initiate any needed corrective action. Without timely communication and corrective action between departments, false information may be provided to corporate management and used for decision making.

Replacement of an existing manual operation with an automated operation involves training on a one-on-one individual basis for a lengthy period of time. During this training period, incoming works continues and mandatory transactions must be timely completed. Normal productivity objectives may decline during the training phase. Errors associated with reserve judgements and transaction processing may increase.

Problems occurring during the implementation and training stages create backlogs. Reducing normal backlogs to zero levels prior to the beginning of training is a must. The increased volume of transaction processing during this period can cause an unusual swing in reserve development and payment activity. After an operation goes live productivity decreases, backlogs develop at high levels and payment activity slows. This is then followed by a short increase in payment activity during a catch up phase before leveling off to normal levels.

The swings in payment activity which occur is dependent upon the complexity of the system, the size of a branch office operation, the number of operations being installed simultaneously and the size of the backlogs relevant to each phase. Actuarial personnel must be aware of automation plans and their anticipated short term impact on payment and reserving activity.

Unlike manual loss processing systems, automated systems contain front end edits comparing reserves against paid to date values. These edits virtually eliminate errors where paid to date amounts exceed reserves. Warning messages and large dollar reserve change report listings add additional opportunities for checks and balances reducing errors and readjustments. Hard editing against authority limits on high exposure claims strengthens compliance and forces review by more specialized claims personnel. This reduces future adverse development as case evaluation is more accurate and timely.

After the pains of the implementation and training phase are behind, many positive benefits relating to high quality case basis reserving begin to accrue. Reliable editing results in more reliable reserves and lower error rates. Information available on a more timely basis and on an individual and aggregate basis provides more opportunities for both Claims and Actuarial departments to conduct reserve analysis. Faster up-dates of claim investigative information allows for faster sharing of information with other technical specialists in remote locations increasing the quality of reserve judgements and claims handling. Reduced time and labor in a branch operation spent looking for information previously available in a manual file increases the available time for better claims handling and reserving.

Daily corporate loss record updates on reserve changes allows analysis of a day to day position compared to month to month updates where some degree of information staleness occurs. Front end editing and replacement of manual tasks with automated functions improves data quality, consistency, effectiveness and efficiency.

OPERATIONAL CHANGES

Finally, certain operational and organizational changes may occur in order to meet long-term corporate strategic goals.

These changes can take the form of new authority levels, expanded payment approvals, increased field office responsibility, decentralization of control, office consolidations, reorganizations, changing productivity goals, new work measurement techniques, just to name a few.

Certainly, these types of decisions are made to improve the effectiveness and efficiency of the claims' operation. Yet, these changes are not made in a vacuum. Interdepartmental coordination and cooperation are essential to the success of these operational changes.

Senior management approval is often a pre-requisite. Of equal importance is the need to advise the Actuaries of these plans. Together, we can determine what impact, if any, will occur in loss trends. A comprehensive monitoring mechanism must be planned to determine any adverse trends so that needed corrective action is completed.

CONCLUSION

I'll leave you with this list of suggested questions to ask your respective Claims departments' management team on a periodic basis:

- What internal changes, if any are occurring that effect the creation, payment or closing of claims received?
- Are customers reporting cases differently?
- Are there any changes in procedures that affect reserves or payments planned or underway?
- Are there any changes in authority levels?
- How experienced or stable is your claims workforce?
- Are there any changes to the timing of key transactions? (i.e. reserve revisions, payments, closings.)
- What functions are we automating? When?
- Are there any important organizational changes taking place?
- Are there any changes in how we are training our claims people in reserving techniques?
- Are there any new programs in place for suit disposition or case settlement?
- What new coding procedures are expected and why?
- Do we have any customer procedural demands that impact case reserves?

Although, not necessarily an all inclusive list, this list does imply one thing that I would like to emphasize in closing. To better understand the Claims operation and case basis reserving, ongoing and effective documentation, communication and cooperation between Claims and Actuarial is absolutely essential.

1986 CASUALTY LOSS RESERVE SEMINAR

3H/4D - CLAIMS MADE RESERVING

Moderator: Dorothy A. Zelenko, Second Vice President
General Reinsurance Corp.

Panel: Bruce C. Anderson, Associate Actuary
NAC Re

George Burger, Associate Actuary
Insurance Services Office, Inc.

Terrence M. O'Brien, Sr. Consultant
Coopers & Lybrand

Recorder: Gregory A. Cuzzi, Assistant Secretary
General Reinsurance Corp.

I'm Dorothy Zelenko from General Reinsurance. I want to make something of a speech to start and say that no matter what we think about the difficulties of claims made reserving, I believe that claims made is very good for the industry, and I would like to see it become the standard for general liability insurance. In other words, ultimately replace occurrence coverage completely. As any of you who know about the market are probably aware that is far, far, far from happening. But the reasons for claims made I've illustrated right up here on this first slide. The most important one is the first, and then possibly the second. The second grows out of the first. With claims made coverage you cut off the long tail of late discovered and reported claims. I'll give you an example right out of our new files. We recently had a report of molestation in a day care center, not the only such claim that we've received. If we were covering this on a claims made basis it would be our current year's policy that would pick up that claim. We are, however, covering it on an occurrence basis, so when that is reserved it will have to go back to the year or the years when that molestation occurred. If we were on the same risk for some 10 years, perhaps starting in 1975 through 1985, and during that whole period of time there were such activity going on, those claims as they come in would go back to 1975-1985. That's what we mean by stacking. If you have claims made coverage it would be a current year loss and that would be the only year that's exposed. Is that perfectly clear to everybody here? You see what is happening in the marketplace is that general liability rates have gone up a lot. And a lot of people, I believe, think that rates are taking care of this problem. Rate has absolutely nothing to do with this problem. The problem of late discovered and unreported claims is independent of what you charged, and so also is the problem of stacking. You can get a very, very high rate for an occurrence policy and it will not eliminate the stacking at all.

As far as the other two things, those are nice things about claims made. In other words, claims made improves loss predictability. It improves loss predictability in the same way as forecasting this <u>week's</u> weather makes the weather more predictable than forecasting this <u>month's</u> weather. It doesn't change the weather, it makes the time period that we're looking forward shorter. That's all it does about improving loss predictability. The losses are the same, the losses don't know anything about what kind of coverage they're going to come under. If they are wildly erratic, they will be wildly erratic whether there's claims made or occurrence coverage. If we make the time segment smaller, we're closer to the period that we're trying to predict. The same with results being known more quickly. If you want to know how good a job I did in predicting the weather this week as opposed to how good a job I did in predicting the weather this month, you will find out sooner that I did a good job in this first instance, or a bad job, simply because the period ends sooner. These are nice things about claims made but as far as I'm concerned the main thing is you don't want the long tail claims and most especially, you don't want stacking.

My concern is that so little of claims made is being sold, that every time I go to a session like this we have an audience full of people who have imagined all the worst scenarios -- suppose a guy does this or suppose he does that -- many of which are never going to happen. People are so

confused and they think the form is so complicated and they are so suspicious of how it's going to be used, that I think very, very little of this is being sold.

As far as loss reserves are concerned I want to say very plainly that claims made is better for setting loss reserves. I've been to sessions where somebody has said, well, there is this problem or that problem. All of that notwithstanding, claims made cuts off the tail of unknown and unreported events. As hard as it is, if you have a known event and you don't have the claim closed yet, as hard as it is to predict what that claim is worth, that was always the problem. But you don't have the unknown and the unreported. You greatly lessen the IBNR problem with claims made.

What we'll say today, will show you some of the problems with claims made reserving. I don't want to obscure in any way the fact that reserving for claims made is easier. This is a good product for the industry. It's a great product for the loss reservist.

QUESTION: Will this be a balanced discussion?

ANSWER: You're not going to get a balanced talk in that sense from me. But there are three other people in the room. I'm not balanced on your point at all.

Now for the current form and by the current form I mean there are a lot of claims made forms out in the marketplace, but the most common one would be ISO's form because that's the industry standard. What I'm going to say now has to do with ISO's form. There were 3 possible triggers that you could have had for an insurance policy, maybe there are more. You could have when the injury occurs. You could have when the incident is reported, and you could have when the claim is made. The pure use of any one of these triggers turns out to be conceptually very simple. If you had a pure occurrence trigger, and the injury occurred during the policy period it would be covered, and it would make no difference when it was reported, and it would make no difference when the claim was made. That's what we have under the occurrence form, and I think you're all aware of the problems that resulted from that. If you had pure claims made you would have coverage if the claim was made during the policy period and it wouldn't make any difference when the injury occurred, and it wouldn't make any difference when the incident became known. But there were many problems with that. And that's why the ISO form which started out pretty close to pure claims made, wound up very, very, different. In fact, the ISO form is not a pure claims made. It is a hybrid, it has all of these triggers incorporated in it.

These are the complications in the ISO form. First off you have a retroactive date. A retroactive date reintroduces a injury criteria. It says the claims is covered if it's made during the policy period but only if the injury occurred after this particular date. That's like injury criteria coming in the back door. As for the term "retroactive coverage", that expression comes out of occurrence mentality. Retroactive coverage

means that you cover in this policy something that occurred before you came on. As far as claims made is concerned, that's exactly the idea. If you're going to cover claims made during the policy period, naturally some of the injuries would have occurred prior to the policy. So that when you start on claims made you can put a retroactive date there and say no injuries are covered that occurred before this date. If you expect the program to succeed you cannot keep doing that. You must provide retroactive cover or claims made falls apart. Retroactive coverage is automatically provided by anybody who's writing a 2nd year of claims made or a 3rd year of claims made. You can have this retroactive date the first year because your policyholder has previous occurrence cover and he has some other insurance for those injuries. But if the program is to succeed going forward you must provide retroactive coverage. Retroactive coverage is intrinsic to claims made.

Now you have another occurrence idea which is called extended reporting period. And this is when coverage ends for somebody and you say, well, if the injury has already occurred we'll give him more time to report it. That reintroduces at the far end occurrence ideas rather than claims made.

There's also in the ISO policy something called midi-tail for reported incidents. That introduces an idea of incident reporting into the form, so that if you know about the incident during the policy period we'll let you make claims after the policy period.

Finally, there's this thing called laser beam endorsements. I think these are going to be a lot more important than a lot of people believe. These say that while we're not going to change the overall idea of claims made cover and we're going to continue on claims made coverage, for particular things that we now know about we're going to exclude them from subsequent renewals. They'll be covered now in this current policy but not in the future. If you're real familiar with the ISO form all of this is old hat.

If you're not really familiar with the ISO form you're probably hopelessly confused. What it amounts to is here's a policy period under the ISO form. But instead of just covering the claims made in that policy it's possible that some of them will be excluded because the injuries occurred prior to the retroactive date. It's possible that claims that are made outside of that policy period will be included because tails are purchased or offered, either because coverage couldn't be obtained again or else because the incident was already reported and coverage was not obtained on a specific incident.

I didn't make a slide of the next thing that's in your package because it's just too detailed. There's a bunch of tiny little prints that shows the actual provisions of the ISO form.

What I believe is that what we really want from claims made is not to cut out those things that we know about that happen to occur close to the end of a policy period where we're confused as to whether we can get out of the claim or whatever. What we want to exclude from coverage are the things that are unknown at the time that the policy ends. In that way we will be

able to accomplish what we set out to do. We'll avoid the long tail of things we don't know about and we'll avoid the stacking and we don't necessarily have to stick to a pure claims made trigger if it doesn't work right for the policyholder.

What I think is going to happen is that in actuality, general liability insurance consists of some small claims but mostly big and serious claims. If you look at your general liability results for most small policyholders, from year to year they don't even have a single claim. Then once in a while something will happen and there will be one claim. It's immensely rare on what is known as "main street" business or "mom and pop" stuff that you get any kind of frequency situation. I'm not talking about the great big Fortune 500 companies. I'm talking about the stuff that is written by a lot of agency companies, they call it "main street" business. It seems to me that when an incident occurs under one of those policies, say it's a claims made policy, and an incident occurs, there's some serious happening like I mentioned to you at the start. It becomes known that there has been a history of molestation at this particular day care center, or some particular staircase collapses in this building and several people are injured. If you are on the risk at the time that happens, there is no way that you are not going to cover that in my opinion. It looks like theoretically on the form that you might be able to wait it out and see if the claim is going to come in. Say your policy runs from January to December and this particular event happens December 15th. There is a good chance that the claims themselves will not come in during your policy period. But what I am suggesting to you is that it would make everything much, much, simpler if you treated that as though it were a claim under your claims made policy. What I recommend is that you yourself, if you renew this risk, exclude that claim from your renewal. What you do, is use laser endorsements to do that. I believe you're going to cover the claim anyway and this solves a great many of your reserve problems. First, as soon as you say we're going to cover that claim, your claims department can start doing what they do with real claims. They can try to reach an early settlement offer. They can investigate it, they can reserve it. It will then resemble the claims that you have always had in the past. Under an occurrence form you would not hesitate to contact the claimant in the hopes that the claim might shift over into another year. You would greatly simplify your situation in the claims department because the policy period would be irrelevant. If you recognize that claim, you investigate it, you reserve it, you eliminate it from your renewal. When you eliminate it from your renewal you'll avoid the situation of possibly putting out two limits on the same claim. Take the situation of the day care center. If one lawyer makes it and files a claim prior to the end of the year and another lawyer doesn't get around to it until the next year, if you haven't eliminated the incident from your renewal you have two limits out. That is just by accident, that's not what you intended.

The ISO form as George is going to explain a little bit later, has allowed for the fact that known incidents will, in all likelihood, be covered under the current policy and therefore the premium for that is in this year's rate. My other reason is that if your insured is shopping the risk, you're certainly not going to be able to get his next carrier to pick this up.

You'll have to be trying to follow the story as to how he's doing with the renewal with someone else to know whether this claim is yours because it's covered under the tail for reported incidents or whether it's someone elses. Talk to your claims department and ask them how they would like to follow the history of the renewal on all of the outstanding incidents!

Let me reiterate again: It makes so much sense, if you use the ISO form, when you have an incident reported to you that you believe is the kind of thing that in the past, under occurrence, you would have reserved and treated as a serious claim and would have put up a number for it that you should do the same now, and you should tell the insured that if he renews with you, this incident will be excluded from the renewal. That's possible through laser endorsements.

If you buy as much as I've told you so far then loss reserving under claims made becomes a whole lot more simple. In fact, in my opinion, this is a working simplification. Mature claims made covers injuries that become known during the policy period. That's not what the language says but as a reservist this is a way that you can think about it. Then you have a very minor IBNR problem relative to what you used to have under occurrence. You have a big problem deciding on the value of the cases, but that's the same problem that you had before. You always had that. Your paid development is as it was. Your IBNR is greatly reduced. It's just a little bit of pipeline type stuff because you've accepted already all the claims that become known during your policy period. If by chance any of this should go away because somebody else picks them up, well I think your loss reserves will probably swallow that eventuality. That would be good news.

Now you might ask about tail cover. My feeling is that with respect to the real tail cover that is provided by the ISO form which is known as a supplemental tail, very, very, little of this will be sold. In order to buy this kind of tail cover you have to be in situations. One, you're going out of business. Those people who go out of business involuntarily ordinarily do not worry about their future claims. They have nothing to worry about because they've gone out of business involuntarily. But if you are somebody who is a respectable person in some trade and you are closing it down and you think there is a possibility that your business is such that claims might come up in the future, you might buy a tail. This stuff is no more hazardous than ordinary occurrence runoff. But the second type - kind of stuff that somebody buys who can get claims made coverage and wants extra, or he thinks his claims are not going to come in within 5 years on incidents that he already knows about and he's willing to pay 200% of premium for something that will cover things he doesn't know about or that might not become claims within 5 years -- this guy knows <u>something</u> and this is not going to be 100% loss ratio combined business. It's your guess or my guess, or anybody's guess as to how bad this is going to be. But what I'm saying to you is that this is a very small part of your book. There are a few policies like that, expect the worst from those. The <u>rest</u> of your book you do not have very much IBNR on at all.

QUESTION: How can you say there won't be IBNR when you might cover a 1986 accident on a claims made policy written years later?

ANSWER: If you write on a claims made form, as I understand it, the accident is the claim. When you speak of accident year '86, we're not talking injury anymore when you're writing on claims made. Accident year '86 is claims made in year '86. Therefore, estimating your liabilities for those claims that you know about -- you don't know how much they're going to be but you know which ones they are -- has got to be by definition easier than estimating the liability for the ones that you don't know about.

QUESTION: Are you sure that's the way the accident year will be defined?

ANSWER: It's the only sensible definition because that's the basis that the coverage is sold on.

QUESTION: Are you suggesting that tail coverage isn't a problem?

ANSWER: Going out of business coverage with people who are responsible and have assets will look just like occurrence. That's what I'm suggesting.

I want to make sure that the other folks here get a chance to give you another viewpoint. I'd like to introduce them to you now. If you have questions of clarification while they're talking, please ask them. We may run a little short here because the session was shortened. If you have questions of point of view, in other words, you don't agree at all with my opinion or their opinion, I'd like to save those for the end to make sure everybody get's his say.

On the panel here with me I have George Burger, who is Associate Actuary from ISO. George is going to tell you the pricing assumptions that went into the ISO rates. I think they are valuable to you as loss reservists because as some of you know, in the absence of experience often times you use your planning assumptions in order to figure out how your loss reserves are going to runoff. George will tell you if you're using ISO rates what the planning assumptions were.

Then we have Terry O'Brien from C&L in Chicago. Terry is a Senior Consultant with them. Terry is going to talk about how you can look at your own business, your own data, that you wrote on an occurrence basis to get some clues as to what you might expect for your loss developments on the cases that now arise under claims made. Bruce Anderson, who is with NAC Re but has in his background actual experience as a loss reserve specialist on a claims made book, is going to show you a case study of something that could come up in claims made reserving. I'd like to let George get started now.

GEORGE BURGER: Thank you Dorothy. As Dorothy mentioned, what I'd like to accomplish in the next few minutes is to explain the procedures and perhaps more important the pricing or the underlying assumptions in pricing all the various aspects of claims made, which would include the basic coverage but in addition to the tail provisions. What I would like to do first is to show you an overview of our pricing methodology. What this is doing is

showing you a flowchart of our pricing. As you can see, at the heart of our approach is the lag factors. These lag factors are critical because they really explain why claims made is priced at a discount to occurrence rates. The definition of a lag factor is if you take losses occurring in a given year, the percentage of losses that are reported in that year or in successive years are the lag factors. For example, if you're dealing with accidents in 1986, lag 2 would be the reported claims resulting from 1986 accidents in 1988. What I would like to do now is to concentrate on the lag factors. The next slide shows you a schematic of how that works. The example here is for owners, landlords, and tenants. As you can see at the bottom left is, the 100% year incurred. What this means is that if you take all of the losses occuring in that first year you can see that the losses being reported on top there are being spread out over five years. It's really this spreading out which accounts for the lag factors. You can see, for example, that lag zero here is 73%. Those are the losses being reported in the first year; Lag 1, for example, is 12%. How does this explain why claims made is priced at a discount? If you take an in terms of reporting, you've got the coverage in that year so you're in effect paying 100% worth. That's not true for claims made. Assuming that you have a retroactive date all the way on the left hand side here, being really the first year on the program, we'll cover you only for losses reported in that year. And based on this diagram you can see that results in a 27% discount. You can also see from this chart that it would take a full 5 years -- a risk would have to be in a claims made program for 5 years before he's actually covered for the same number of losses as that occurrence policy. The 5th year in the program is essentially equivalent to an occurrence risk and we term that a "mature claims made risk." How do we calculate these lag factors? Ideally, we like data organized in an accident year/report year format. Unfortunately the ISO database is not organized that way. What we've had to use as a proxy for that is loss development factors. These loss development factors take losses which are reported at an immature development stage and project them to ultimate settlement values. In other words, reflecting what we feel were our best estimates of all reported losses. I guess the point of these loss development factors in terms of claims made is that if you take the reciprocals of these factors, you're in effect dealing with the lag factors. In a minute or so I'll show you an example of exactly how that's done.

Once we have those lag factors we're not done with the pricing. We still have to make certain adjustments. For example, we have to make a trend adjustment. This is not the usual type of trend adjustment where you have to project into future settlement values. Really what we're doing here is reflecting the timing difference between occurrence and claims made. Once we do that we have our adjusted lag factors and we're now in a position of actually calculating the multipliers, although they're pure premium multipliers and I'll explain why in a second. In order to actually calculate the multiplier it's simply a question of accumulating whatever lag factors you have by simply taking the appropriate factors for a given year. For example, if you're dealing with the first year program you simply have to add the lag zero. The second year in program now you've got a little more. You've got lag zero, plus lag one and so on down the line.

They're pure premiums though because so far we've only been dealing with losses.

The final adjustment is to reflect the expense portion of the rate. The reason we have to make this adjustment is that the expenses are really not reduced to the same extent as the losses in moving to claims made. Again, we'll see the details of this in a little bit.

QUESTION: What are these multipliers actually applied to?

That's a good point. This presentation actually will assume that all of these multipliers apply to the occurrence rate. That's why I say they're gradually calculating discounts from the occurrence rate. There's a final step which is not important for this group's purposes, that is to make them a percentage of mature claims made rates. It's really just for ease in terms of automation and actual rating. But again it's a percentage of occurrence rates.

This slide shows the actual calculation of the lag factors using our loss development factors. Again we'll use O.L. & T. as an example for the entire calculation, although the procedures apply similarly to the other sublines as well. Taking the 27 months to ultimate, what this is really doing is saying that if we get a policy year as of 27 months which is our earliest report, the loss development factor to take those immature reported losses to what we feel is full report, is a factor of 1.375. This is based on our historical patterns. By simply inverting this relationship we can see that the lag zero factor, in other words the earliest or the shortest lag in terms of the reporting is the reciprocal, 1 over 1.375, and that gives you the 73% that you saw on the previous slide. That's the basic methodology. As you go down the line you can see that the loss development factors decrease because obviously we're getting more and more reported losses for later development stages. What happens is that by again taking the reciprocals of these factors we actually would build up our lag factors. You'll have to take my word for the fact that when you work it all out, the lag factor is actually total to 100%.

QUESTION: Why is 27 months used for the lag zero factor?

That's our earliest report. In other words, the most immature report is as of 27 months. You're probably a little puzzled by that and that's another thing that I'll be talking about in a little bit. There are certain implicit assumptions that aren't 100% accurate, and we need to talk about them. But again, any questions in terms of how this is done?

The next step is our trend adjustment. I think this slide shows you why we need to make this adjustment. Really, again what we're trying to do is to reflect the difference in timing. As you can see from the chart the occurrence policy really gives you a more advanced stage of losses than a claims made policy would. And you can see this in two ways: you can either look at occurrences or you could look at the claims report. If you look at occurrences, for example, you can see that the occurrence policy covers occurrences in that year of the policy. The claims made policy, on the

other hand, will cover occurrences from previous years. The best example of this is the mature claims made policy, where again, you're covering occurrences from as many years back as you have them. What is really happening is that even though you have, in effect as many occurrences as you do under an occurrence policy, if you assume any sort of inflation you're really dealing with deflated loss sizes for that mature claims made policy. Really the coverage under even mature claims made is somewhat less than you have under occurrence, if you assume inflation, even though you in effect have the same number of occurrences on a mature claims made policy as you do under an occurrence policy. Your coverage is still less because you're dealing with deflated loss sizes relative to what you would have for that occurrence policy.

You can look at it in terms of occurrence or reports. If you look at it in terms of reported claims, fine. The claims made policy covers reports in that particular year. If you look at the occurrence policy now you're looking at reported claims in the future. Again, they'll be at higher values than what you have for claims made.

Let's see what happens when we apply these trend adjustments. Again, if we're dealing with deflated loss sizes, what we need to do is to detrend these lag factors and that's what's being done here. You can see under that detrend column, that the annual rate assumed here was 13%. And you can see by looking at the exponents that as you go through the program you're talking about more and more detrending. Which makes sense because obviously when you're talking about lag 4 you're talking about losses way back there. Obviously they're at the most deflated loss size levels so you get the greatest detrend. The last column there shows that the adjusted lag factors are obtained by simply multiplying the original lag factor by the detrend factor. I should note that for O. L. & T. there's really not a tremendous effect here. However, for products the effect is more than double so that the detrend can be an important aspect.

QUESTION: Is I.S.O. using 13% trend now in its rates?

I would say that the numbers we're using now are somewhat lower. They're more in the range of about 10%. Don't forget these are for a combination of severity and frequency. Don't let the 13% throw you in terms of the inflation rate now.

Perhaps in your question, you're saying that effectively the 13% should change. In other words, clearly the exponents are reflecting the change in the number of years. Perhaps the 13% should change and if you want to be more refined than that go ahead, you can adjust these numbers. I don't think it will have a tremendous effect. The way we do our trending in general is to take an annual trend and simply carry that forward "x" number of years. We're really being consistent with our pricing approach. No argument that you can be a little bit more refined.

The next step, after we've taken care of adjusting the lag factors, we're now in a position to actually calculate our multipliers. Again, with the qualifier it is simply pure premium at this point. It's simply a question

of for each year in the program adding up the lag factors. The first year in program you've only got the lag zero so you end up with a 73. For mature, on the other hand, you've got all 5 lag factors and you end up with .95. Again, here's that detrend coming into play. Because you would think that mature would add up to 100%. As you almost saw on the previous slide there the lag factor added up to 100%. However, after making that detrend adjustment now we're cutting it back to 95%. And for products again, it's a greater effect and the multiplier for mature is .89. The detrend had an 11% effect there. Actually we went out 7 years, although the final multipliers were still compressed for rating purposes so that we end up with maturity going into the fifth year.

As I mentioned, up to this point we've only been dealing with losses. We need to bring in the expense element now. If we thought that the expenses were being reduced to the same extent as losses, you wouldn't need this slide. However, the feeling on the part of the ISO Committee was that the general expense provision would not be reduced to the same extent. In fact, the general expense provision was deemed to be constant regardless of whether you're writing an occurrence policy or a claims made policy. Because of that we really need to increase our multipliers. I think you can see the logic of that by simply going through this example. Suppose we start off with an occurrence rate of $100. The occurrence losses underlying this rate are $54.00 simply based on our expected loss ratio here of .54. The first year of claims made losses now are $54.00 multiplied by that omnipresent .73. That's our pure premium multiplier in the first year, so you have $39. Here's the key element here. The general expenses are .13 which is our expense provision there, times the $100, not times the $39. We're keeping that portion of the pricing constant and we end up with $13. The first year of claims made premium is the sum of the loss element of $39, and the general expense element of $13 which is $52. And then we simply divide by the .67 which is intended to load in for the other elements of the expenses and profits as well. The final result is $78. The effect of this is that we started off with a multiplier of .73 and we end up with a multiplier of .78. What's happening is that under claims made you can expect a higher expense provision and therefore a lower expected loss ratio. In fact, in this example you can see that the losses of $39 over the final payment of $78 is only 50%. Remember we started off with 54%. Keep that in mind in terms of pricing and reserving.

QUESTION: Don't you think that's unfair?

ANSWER: We feel not and I guess the reason is that from an equity standpoint, yes, there can be a problem, whether it's a rate increase or a territorial or class changes. If you have a higher loss provision perhaps the expense provision really doesn't quite track. The problem here is that if we didn't reflect this as the general expense constant we'd actually be short changing on an overall basis as well, and not just from an equity standpoint. That's why we felt that this really should be an exception. I guess the key here is that the 13% is really based on occurrence data, so that in moving to claims made the 13% would really be wrong. I guess another consideration is more a question of equity. Let's move on.

These are the results of the expense adjustment. Again the point really is that all of the multipliers that we got before the adjustment are now increased due to the expense element.

I'd like to discuss some of the assumptions and a couple of you have already brought them up. On point is that loss development has been used as a proxy to estimate our lag factors. Some of the implicit assumptions perhaps don't work out 100%. For example, one of the assumptions we make is that the loss development factors reflect IBNR emergence only, in other words, the lag factor. Implicit in that is the fact that there's no case development in our loss development factor. This is simply untrue. Unfortunately our loss development factors are really an indivisible product of both IBNR development and case development and we simply can't break it out. That's one assumption that may not be 100% accurate. Another one is the fact that we're assuming a certain relationship between a lag and a development stage. Policy year as of 27 months which is our earliest report we feel is equivalent to lag zero which is the shortest lag. But there is a consensus, really, that the policy year as of 27 months is too advanced at this stage. You're really covering a little bit more than you should in talking about lag zero. Again, there's a bit of an assumption there that isn't totally accurate. Another example, reported occurrence losses reflect the claims made trigger. Don't forget that the loss development factors that we're using are based on a current status. That's all we have. To the extent that companies are reporting the losses to ISO based on the report of an injury claim by the injured party, to that extent our data is accurate. But for example, if a company reports a loss to ISO simply because there is a notification of occurrence, even though there was no report of an injury by the claimant, to that extent we're actually kind of advancing the loss development. And finally, the last assumption is that there is no acceleration of claim reporting under claims made. I know this was an issue when claims made was implemented for medical malpractice. There were a lot of questions as to whether the claim reporting pattern up to that point would be changed because now after all the trigger reflects a report basis and not an occurrence basis. That's something that will be tested in the future and our data will reflect that.

These are the assumptions that we've made. I should point out that I think the multipliers are still fundamentally accurate, and in fact there have been a lot of tests done. I know in-house we tested the products closed claim survey. We got a company sample of data on an accident year/report year format. And what we found is that the multipliers measured up. I think the reason is that there is a great deal of offsetting going on here. For example, assumption 3 may overstate the multipliers but assumption 4 would tend to understate them. To a large extent these things are offsetting and you're ending up with reasonably accurate multipliers.

QUESTION: How many company's report incidents before there is an actual claim?

ANSWER: I don't have numbers for you. There's no question that some companies do report simply based on an incident. I would say most of those do follow the principle that unless there's an injured party making the

claim, they really won't set up a file. Even if they do they won't report it to ISO. But definitely we have heard that there are some, but hopefully a clear minority.

This is a slide that Dorothy was referring to. What we're doing here is pricing the basic extended reporting period. Again, what we're doing is really adding coverage to the extent that risks identify occurrences and the claims do emerge within a 5 year period after leaving the program. That's what we're trying to reflect here. Let's take the first year multiplier for example. Again, if there wasn't any midi-tail you'd simply have the lag zero element. With midi-tail we have to add in that extra piece there. We start with something called the "k multiplier" about which I was going to go into more detail. What essentially that is measuring is the probability that an insured can identify the occurrence. Again that's one of the key elements of midi-tail and it's really one of the limitations. To the extent that "k" is positive obviously we're adding coverage or adding to the price. To the extent that it is less than 100% we're reflecting that particular limitation. We take that "k" multiplier and simply multiply by the sum of lags 1-5. This reflects the other limitation, namely the 5 year emergence limit. That's fairly simple. When you get into the second year though, it's a little bit more complicated. You'll notice the first 2 terms are very similar to what we had before midi-tail. In other words, we want Lag zero and a detrended Lag One. The wrinkle here is that in the second term there we're adding the 1 minus "k" factor. And the reason is that we want to make sure there's no overlap between the first year and the second year. If you think about it, in the first year we've already priced for the "k" times Lag one. If we added in the full Lag one in year two you'd really be overpricing. What's happening is that the risk is getting a credit to the extent of the one minus "k". The third term is really adding the next piece of midi-tail in. In other words the "k" times the sum of the Lag factors 1-5, because again midi-tail now goes into the second year. The final piece is the Lag 6 over trend. And the reason for that is that if the risk goes into the second year he's really in addition to getting that year of midi-tail, now extending his first year of midi-tail. Because again, the 5-year emergence now gets stretched an extra year. In the first year we've cut it off at Lag 5. If he goes into the second year we have to add the Lag 6 piece. That's a basic pricing for midi-tail and the pattern is really followed through in the rest of the years of the program.

The reasons for "k" are that we really don't have any data to tell how often a risk will be able to identify an occurrence before the claim actually comes in. We had to make some judgmental selection and those judgments, again on the part of our Committees, are 30% for operations and 60% for products. Those are the "k's" that were cranked in pricing midi-tail.

TERRY O'BRIEN: The ISO's general liability claims made policy is a new product, and as with other new products we are faced with two challenges. First, to address a temporary situation of reserving without any history directly derived from that product. And second, to define the data elements that comprise a database that will long term allow us to reserve

most accurately. The best we could hope for is to be able to adapt data from existing coverages that will match the new coverage.

From an individual company's perspective adapting its own data provides several advantages such as reflecting the company's claim handling procedures and subline mix or customer mix. We are fortunate that a sizeable portion of the exposure under claims made is simply occurrence coverage sliced up differently so that it will be possible to borrow from existing occurrence experience for the claims made reserving. On the other hand certain aspects of the ISO's claim made policy have no equivalents in available occurrence data and these can only be initially reserved for based on industry data or judgment. And eventually these pieces can only be addressed by capturing new data elements.

[SLIDE 2].

For earlier or claims made products without all the bells and whistles of the ISO claims made policy, the reserving implications for the transition from occurrence policies to claims made policies were rather simple to explain because almost everything you needed to know to set a reserve was embedded in the company's occurrence year data segmented by report year. The ISO's new claims made policy is not so simple. Besides the basic claims made coverage, retroactive coverage and tail coverage present special problems under certain circumstances. This makes the transition a good deal more complicated. Initially I'll discuss how occurrence data can be used for reserving certain aspects of the claims made exposure and then I'll discuss what needs to be done prospectively to address the remaining aspects. To begin my discussion I'll focus on the basic claims made coverage. That is, losses reported during the policy year from occurrences subsequent to the last occurrence coverage. For now this will eliminate any questions of overlap with previous occurrence problems due to retroactive coverage or tail coverage considerations after a policyholder terminates.

[SLIDE 3]

I've generally found the next series of diagrams to most readily communicate the relationship between occurrence data and this portion of the claims made data. In this exhibit each cell represents a separate report year for accident year 1977. I've assumed that all losses are reported within 4 years. Clearly this is an optimistic assumption for any type of business and would be totally inappropriate for some types of business such as products liability. It should be emphasized that because reporting lags vary so much by type of business, each subline should be analyzed separately. In this diagram, a loss reported in the first report year would fall in the 1977 report year cell, and a loss reported during the second report year would fall within the 1978 report year cell and so on. Each cell could be evaluated at a series of calendar year ends to produce developments for each report year within accident year. At the end of each year all reported claims should be in so the total of reported claim counts should not develop but the paid and incurred losses and the closed claim counts would develop.

[SLIDE 4]

The next exhibit incorporates the second accident year, 1978. The cells are aligned by report year so that accident year 1978 begins with report year 1978. By configuring the data in this fashion we can see that this company's experience is by report year and what the experience would have been if it had begun selling traditional claims made coverage exclusively at the beginning of 1977. Its exposure to loss under the claims made policy at the beginning of 1977 would be limited to the claims that fell within the left most cell, report year 1977 for accident year 1977. At the end of 1978 this company's exposure would include report year 1978 for accident years 1977 and 1978. There would be no need to reserve the IBNR losses that would fall in report year cells 1979, 1980 and 1981.

[SLIDE]

This Exhibit shows how the company's exposure to loss would have progressed by the end of 1982. The interesting part of this exhibit is that the number of cells included in a report year for each year up to 1980, but in report year 1981 we had only 4 accident year cells to consider, the same number as in 1980. Each report year subsequent to 1981 would also have only 4 accident year cells. This is a function of our original assumption that all claims were reported within 4 years. A claims made year is considered mature when the number of years in claims made equals or exceeds the maximum lag between occurrence and reporting.

What use can be made of these diagrams now that the industry is moving to claims made reserving for some policies? The first step is to recognize the previous accident year data segmented by report to provide the foundation for how losses from claims made policies will develop if they're sorted by year-end claims made. The first full year under claims made can be reserved by referring to occurrence year experience for the first report year within an accident year. Looking at the diagram, report year 1977 within accident year 1977 data and report year 1978 within accident year 1978 data and so on can be used to project how the first year in claims made will develop. The second report years within accident years can be used to analyze the second year in claims made exposure and so on.

[SLIDE]

One problem that becomes readily apparent is that the number of cells for which a reserve must be set rapidly multiplies even in our simple example of having all claims reported within 4 years. From an efficiency point of view we'll want to group together similar cells when analyzing reserves. If the growth and exposure is consistent from year to year there should be no problem with grouping all occurrence years together as soon as a claims made year reaches maturity. Consistent exposure growth is rarely something that can be relied upon for any length of time. What can reasonably be grouped together? Almost certainly claims arising from policies in the first year in claims made have patterns that show more development going from say 12-24 months of maturity than claims from policies in later years

of claims made. This is probably because less time has elapsed since the incident and therefore fewer facts are known and fewer items have been resolved. The second year in claims made also seems to have higher development in the remaining years but not so much as the first. Typically losses from the third year in claims and subsequent do not have discernably different development patterns, so grouping these together will reduce statistical variations besides reducing the number of groupings which we must set reserves for.

[SLIDE]

There is one potential shortcoming in the applicability of report year/accident year data to a claims made situation. That shortcoming hinges on the definition of report year that a company may be using. For actuarial reports many companies appropriately utilize a report date that is based on when a claim enters its computer systems. Typically these reports are used to analyze the adequacy of case reserves. Under claims made coverage a claim is triggered when notice for a claim for damages is received and recorded by the insured or the insurer. Computer system entry dates shift some claims into a later report year instead of showing the reported but not recorded claims as additional development for the earlier report year. Some of these claims can be shifted back to the appropriate report year by a minor adjustment. Many companies, even though they utilize the computer system entry date, have captured the dates when each claim was first reported to the company. Basing the report year on date of reporting to the company instead of the computer system entry date alleviates part of the problem of sorting report year within accident year data for claims made reserving. Most companies have not captured information which will allow them to recognize claims that were reported to the policyholder one year but not reported to the insurer until the next year. In order to compensate for these claims a subjective adjustment to report year within accident year data must be made to approximate the additional development under the ISO's claims made policy.

[SLIDE]

Claims made coverage intuitively seems simple from the point of view of a policyholder first moving to claims made. During the first year in claims made the policyholder does not want to pay twice for coverage provided for its previous occurrence policy, so claims reported during the year from incidents that occurred prior to the inception of the claims made policy are excluded. During the second year the policyholder does need coverage for incidents that occurred during both the first year and the second year in claims made. As long as the policyholder remains with the same carrier, the date after which occurrences are covered should not change. Claims made gets complicated when you realize that the retroactive date can be set to a date prior to the claims made policy inception date regardless of the previous coverage. The major complication arises if retroactive coverage includes a period when the insured was covered by an occurrence policy, although I don't know how common this will be. The retroactive coverage is excess above the occurrence coverage. Excess losses develop much slower than primary losses and manipulating report year within accident year

primary data will not help. Separate developments must be captured for the excess piece. The higher the underlying limits the slower the development. Notification as soon as practicable is required under the claims made policy, but in an excess situation what that will entail, especially if the insured receives a significant number of claims, is unknown at this time. When a policyholder stays with the same carrier when he switches from occurrence to claims made, wouldn't the notification under the occurrence policy also constitute notification to the company for the claims made policy? If the policyholder switches carriers any duplicate notification scheme would fulfill the notification obligation. Therefore, realistically notification that the claims made carrier can act upon will only come when it's evident that a claim may penetrate the underlying occurrence carriers limits.

[SLIDE]

As I mentioned, retroactive coverage is for claims that are reported during the coverage period but that arise from an occurrence that is prior to the inception date. When dealing with coverage that does not have a retroactive date prior to the first year in continuous claims made coverage, experience can be easily adapted from previous occurrence policies. This Exhibit shows how retroactive coverage simply expands the cells upwards as shown for 1982.

BRUCE ANDERSON: There's a certain charm to the claims made form when it comes to estimating loss reserves, and that is the predictability. What I have here is a case study. This is the actual claim experience of the ACME Mutual Medical Liability Insurance Company. Part of the issue here is that when we look at the claim development factors, these are reported claims. Just forget the definition of reported claim for this. We can see that we have 1/8th of the claims reported by the end of the first 12 months. Probably when they were pricing 1980 coverage they had probably thought they had 1/4th of the claims in. From this very angle we can see that there is a certain amount of predictability that we're losing by going with an occurrence coverage, at least on a long-tail line of business like this. When we look at accident year 1979 for instance, we have 2200 claims. If I break those into 12 month intervals as we see on the bottom triangle, and I accumulate a long diagonals I actually have report year claims. If you switch to Exhibit II you'll see that if I'm reserving for an occurrence policy I'm reserving for 13,000 known claims and some number which I've sort of guessed in the neighborhood of 5,000 unknown claims. Whereas if I'm reserving for claims made I've got 13,000 claims to deal with and that's really about it. Forgetting reopened claims or pipeline reserves and so forth. Exhibit III are actual report year developments from this company. By the way this company has a very optimistic and understaffed claims department. Had George been using this type of data when they had priced the ISO'c CPL, they would have come up with extremely deficient lag factors had they started at 12 months. I go ahead and I calculate my loss development factors. This is just by rote and it isn't something I would normally do. However, I run into a snag because I happen to know that report year '82 has been closed out. There are no single claims left there open. I realize that there is a problem with the loss development approach

here. If you flip to Exhibit III or IV we can breakdown these losses actually by their paid components and their outstanding components. What we can look at in this particular case is the one thing we know from a claims made policy is that once a loss is closed, we'll have to define paid as being closed here, it's gone and there's no further development on it. Really the only area that we can further develop are the outstanding claims. In this particular case if you were to take 1984 for instance, we've got $3.9 million of paid claims. And we've got $38.7 million of open claims. The only piece that's subject to development is the $38.7 million. What we do, last year we had kind of a detailed explanation about this. Jim Moll has come up with a process called the "backward recursive method." What we would do is we'd say what can happen to those outstanding claims. They can either be settled or they can be readjusted or nothing can happen at all. Now if we were to take the change in paid, we consider that to be one component of this factor so that when we look at the 1984 piece we have $19.9 million less $3.9 million. We've got $16 million of paid losses that took place during that 12 months. You compare that $16 million to the $38.7 million. By the same taken you've got a restated reserve of $30.3 million. The first component would be 41%, the second component would be 78%. If you slide down to the factors at the bottom end of that final diagonal at the bottom -- the two of these add up to 19.6%. When you add them together you're basically going to say that the outstanding reserves are going to develop 19.6% and going from 12 months to 24 months. Intuitively this is kind of pleasing, it basically says that loss reserves are at a common level of adequacy across maturities regardless of what year they happen to come from. When we accumulate these factors there's a problem, you just can't multiply them together as you would loss development factors. All you can really do is you can develop the outstanding portion. If you follow the bottom -- let's take 36-48 months, we've got a weighted factor. We've got a change in paid going from 36-48-- .811, and an outstanding restatement of .279 adding up to 1.09. The .279 is the only piece subject to change. That would be multiplied by the 1.027 off the bottom row. So that you're always accumulating on that particular component until finally at the end you say any case outstanding at 12 months is going to develop 54% which is the lower right hand side. Should I slow down here.

If we move on to the Exhibit V, this is a comparison of the two methods. It just happens to make a difference of $5 million in the reserve. I have to add that this a particularly dramatic case of claims made. I wanted to make a point so I wanted to have something that would develop. We usually don't see this kind of development at least not on the primary side. Quite often you sometimes see downward development. Which means that there won't be such a thing as a claims made industry wide factor. We could always get an industry wide occurrence development but there's always two components. There's the environmental piece which is the growth of claims and the losses that follow from that. And then we also have the individual company's claim reserving. In which case you have plaintiff's attorneys doing the reserving -- you're going to see downward development probably. And again you see people of Acme Mutual you'll see upward development.

In any case what we've come up with is what we believe to be a superior set of factors. We roll onto Exhibit VI. Once you've run through one of these exercises you always want to go ... we just want to do one additional test and basically say this is reasonable. In this particular case I'm looking at the average claim severity. I know what my reported claims are and I've made an estimate of ultimate loss. I can see that the claims have grown 13, 19, 11% over each of those years. Now I'm not so sure this is reasonable. If all the industry-wide indications tell me that claims are growing in this example at a rate of 10%. I'd like to test the reserves to that particular assumption. What I'd do here is take the reported losses and I sum them up. Now I say how many claims have I actually on a 1981 level would follow from that particular dollar amount of losses. That's an undeveloped level as well. Basically I take my reported claims and rather than trending the losses I'll trend my reported claims. This is my stable piece I may as well work with the stable pieces here. By the same token I will essentially burn off these claim counts so that just because the losses themselves are not fully developed, I can find a comparable number of claims. If I go through all of these exercises of Column I and VI and I divide one by the other I come up with an average report year loss of $16,090 -- that's actually an average claim severity for 1981. I extend that by the ultimate or my reported number of claims which also is my ultimate number of claims. I've got an expected ultimate loss which I then go through and do a little Bornhuetter-Ferguson type of an approach and come up with a new estimate of outstanding loss. Or in this case loss development, there's no such thing as IBNR in this case. Again, I have another estimate. This type of thing I'd probably like to do for several trend assumptions.

Exhibit VII -- I really don't know why I put this exhibit in here. For some reason I got kind of interested along the way in seeing what the comparison of claim development versus real loss development was. What we have here, this is not your standard loss development triangle. These are actual accident year/report year lags. We slided each of the losses into their appropriate accident year-end report year. We developed them -- I just went ahead and used the original loss development factors. I went ahead and I developed them and came up with incremental amounts and I accumulated them and came up with what would be lag factors. I called them a development factor. I just couldn't think of the word lag at this time. Essentially what they're doing is they're showing us something very close to the claim development factor so that when all else fails and you have nothing else to go on and you want a conservative estimate of a lag factor, all you really have to do is turn your claim development factor upside down. Actually the differences probably come from trends here. This type of exhibit, once you manage to match your exposures and so forth, can just be extended several steps further so that you can actually go ahead and price your tail loss reserve. Just forget about the whole occurrence concept altogether if you're working on claims made. And you could just come up with pure premiums by lag extended by year expired policies.

When I finally went through and I took each accident year/report year lag or each accident year/report year component of loss, all valued as of 12/31/85 and I slided those into the top. Actually what we're seeing here

is that final diagonal will add up to whatever my final number was. This is my report year 1985 number, so that's my very low number from the original page. I go through and I develop these particular losses and on the very bottom I come up with what are actually developed report year losses. That's not a development factor that's a lag factor on the bottom. It matches very closely to your claims development factor. The only difference it picks up or it seems to pickup are the differences in trend. This worked out quite well.

CLAIMS-MADE RESERVING
#4D

MODERATOR/PANELIST
DOROTHY ZELENKO

CLAIMS MADE

- CUTS OFF THE LONG TAIL OF LATE DISCOVERED AND REPORTED CLAIMS.
- ELIMINATES STACKING OF LIMITS OVER TIME.
- IMPROVES LOSS PREDICTABILITY.
- LETS RESULTS BE KNOWN MORE QUICKLY.

COVERAGE TRIGGER OPTIONS

- WHEN INJURY OCCURS
- WHEN INCIDENT IS REPORTED
- WHEN CLAIM IS MADE

COVERAGE TABLE

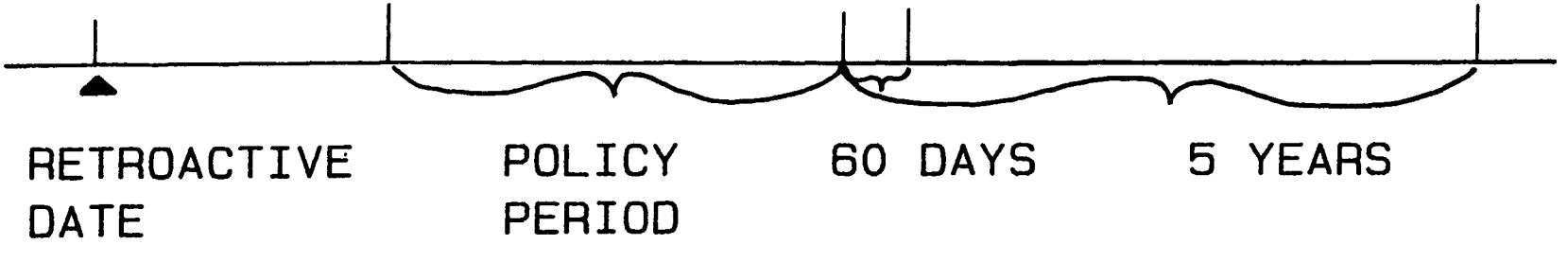
	INJURY OCCURS	INCIDENT IS REPORTED	CLAIM IS 1ST MADE
"PURE" OCCURRENCE	DURING THE POLICY PERIOD	ANYTIME	ANYTIME
"PURE" REPORTED INCIDENTS	ANYTIME	DURING THE POLICY PERIOD	ANYTIME
"PURE" CLAIMS MADE	ANYTIME	ANYTIME	DURING THE POLICY PERIOD

COMPLICATIONS:

- RETROACTIVE DATE
- RETROACTIVE COVERAGE
  ("PRIOR ACTS" OR "NOSE")
- EXTENDED REPORTING PERIOD
  ("TAIL")
- LASER BEAM ENDORSEMENTS

CLAIMS TIME LINE

538



Cover Claims If:	Injury Occurs	Incident is Reported	Claim is first made	Cost	Applies
Basic Claims Made Policy	After the retroactive date	Anytime	During the policy period	Claims made "step" factor X Occurrence Premium	Primary, except excess over other non-claims made insurance effective prior to this policy
60 Day Mini-Tail	After the retroactive date and before the expiration date	Anytime	Within 60 days after the expiration date date	Free (in Basic Premium)	Automatically if Basic Policy is cancelled/ non-renewed or retro-active date is moved and no subsequent insurance purchased applies
5 Year Midi-Tail	After the retroactive date and before the expiration date	Before 60 days after the expira-tion date	After 60 days but within five years after the expiration date	Free (in Basic Premium)	Automatically if Basic Policy is cancelled/ non-renewed or retro-active date is moved and no subsequent insurance purchased applies
Unlimited Tail	After the retroactive date and before the expiration date			Up to 200% of last annual claims-made premium	If Basic Policy is cancelled/non-renewed or retroactive date is moved and if requested within 60 days after expiration
a. Original Aggregate applies		Before 60 days after the expiration date	More than 5 years after the expira-tion date		Excess over any other insurance effective after this endorsement
b. Reinstated aggregate applies		After 60 days after the expiration date	After 60 days after the expira-tion date		Excess over any other insurance effective after this endorsement

3 "LASER BEAM" ENDORSEMENTS

(ALWAYS USED TOGETHER)

---

1. EXCLUDES SPECIFIC ACCIDENTS, PRODUCTS, WORK OR LOCATIONS FROM CLAIMS MADE RENEWAL.
   (ATTACHED TO ALL SUBSEQUENT RENEWALS AS WELL.)

2. AMENDS EXISTING POLICY SECTION DEALING WITH ERP'S.

3. ACTUALLY PROVIDES UNLIMITED ERP AND CHARGES PREMIUM.

WORKING SIMPLIFICATION:

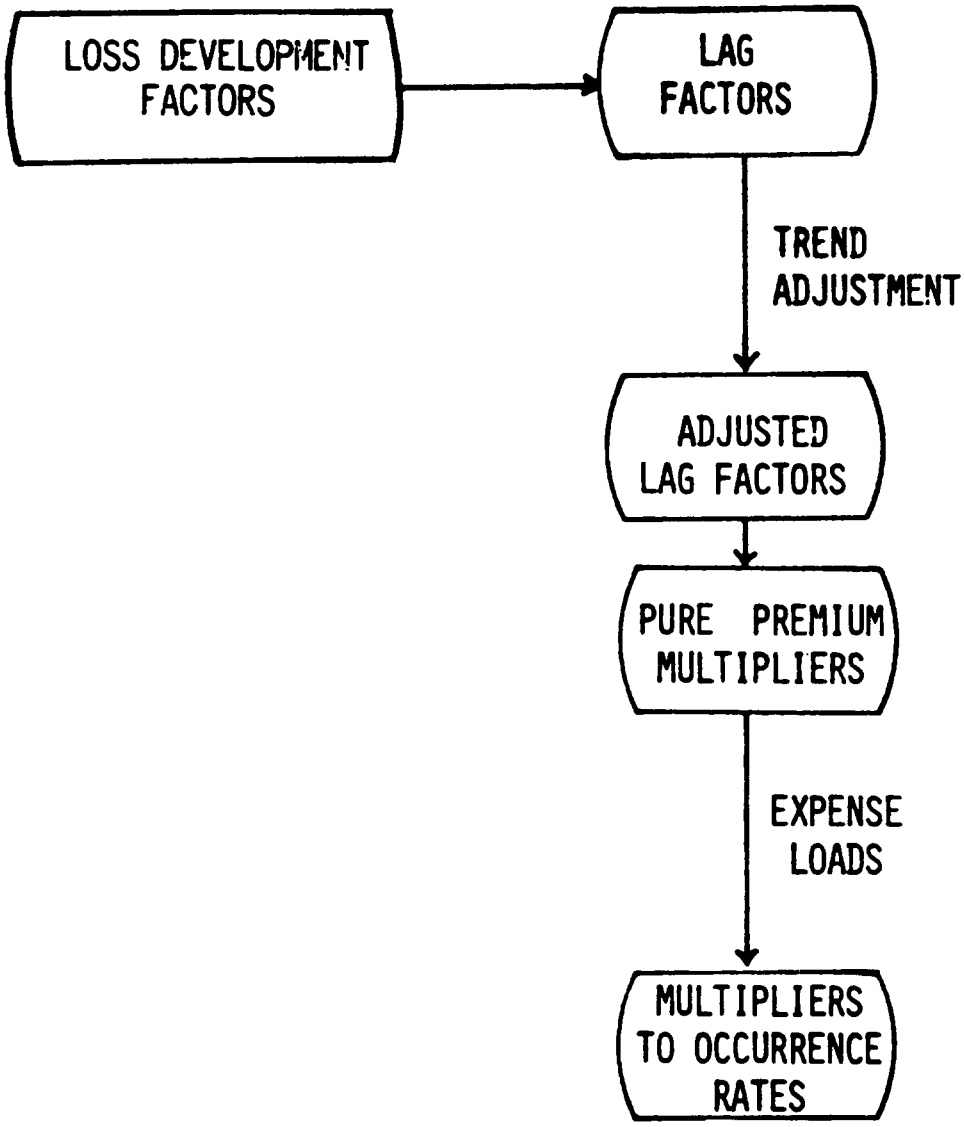
MATURE CLAIMS MADE COVERS INJURIES THAT BECOME KNOWN DURING THE POLICY PERIOD.

WORKING SIMPLIFICATIONS:

- SUPPLEMENTAL EXTENDED REPORTING PERIOD COVERAGE WILL RESEMBLE OCCURRENCE IBNR.

- EXCEPT FOR SOME "GOING-OUT-OF BUSINESS" COVERAGE IT WILL PROBABLY BE "DISTRESSED" BUSINESS.

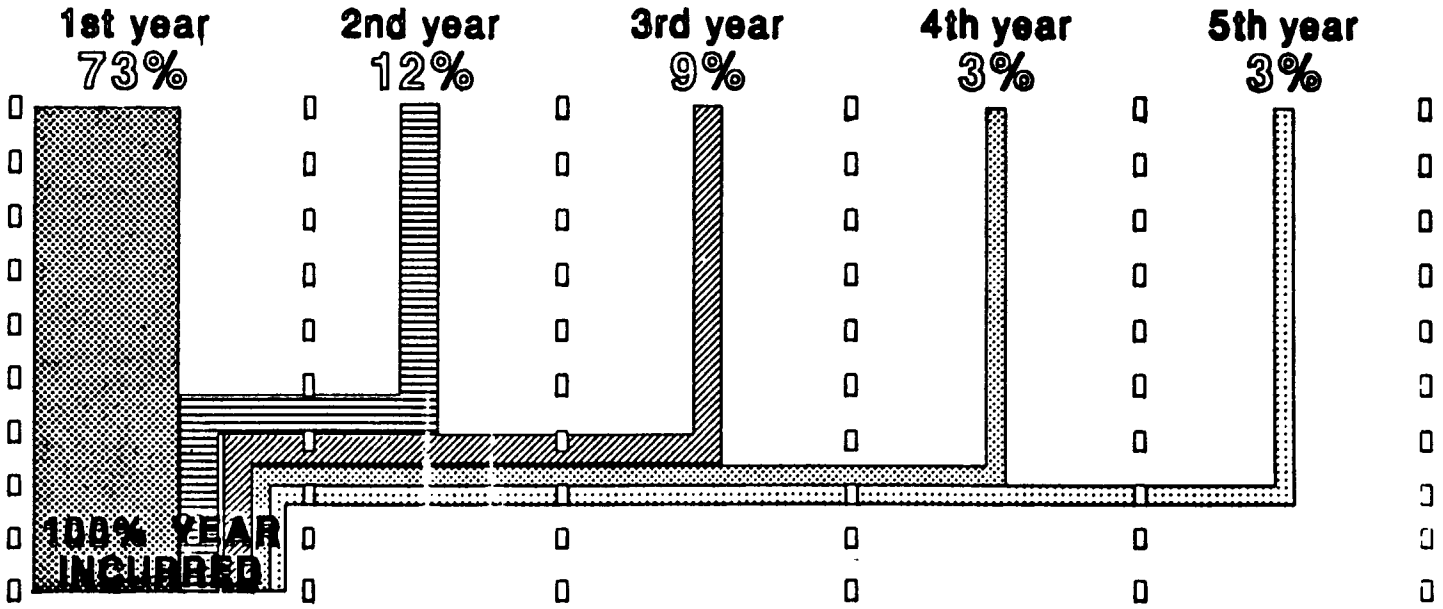
DERIVATION OF
CLAIMS-MADE MULTIPLIERS



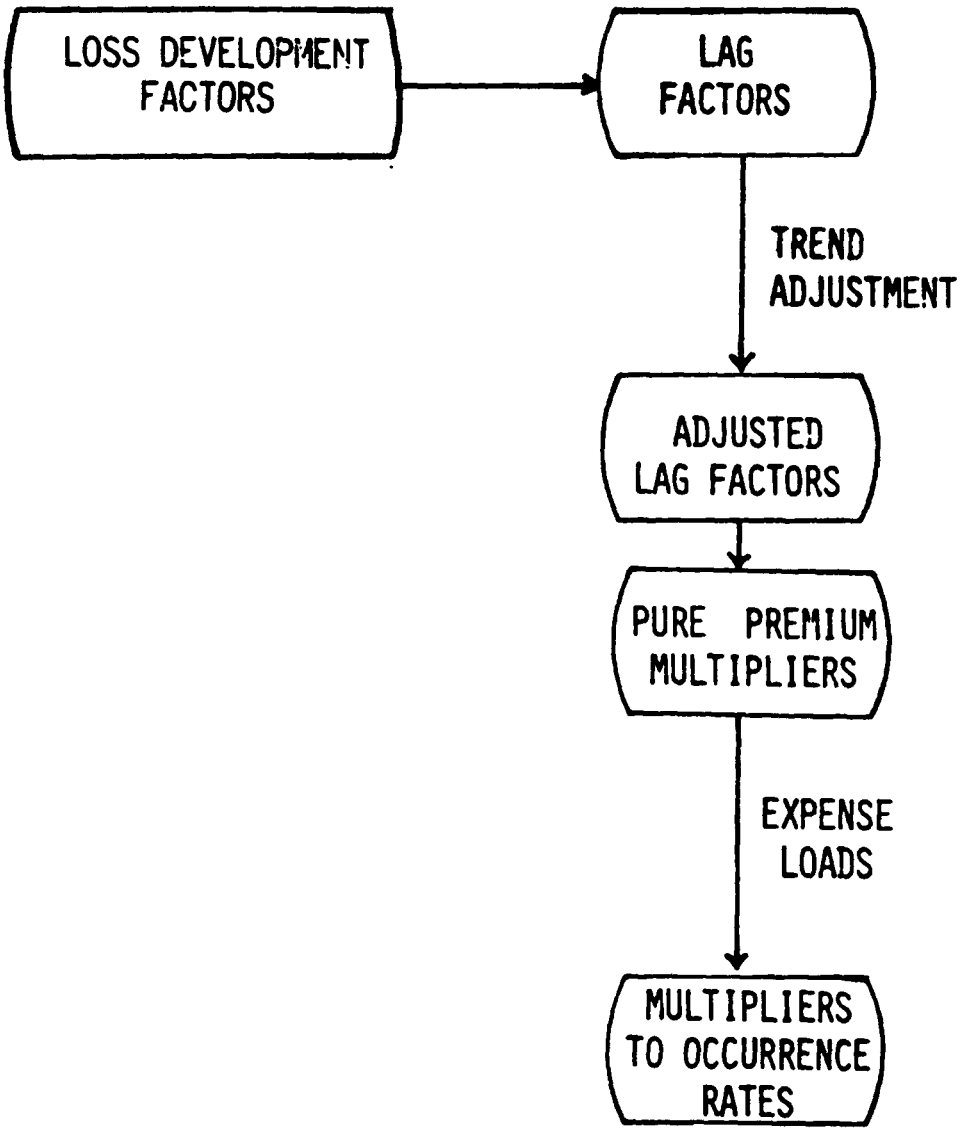
COMMERCIAL GENERAL LIABILITY

RATE REVISION

Lag Factors OL&T - Year Reported



DERIVATION OF
CLAIMS-MADE MULTIPLIERS



CGL CLAIMS-MADE

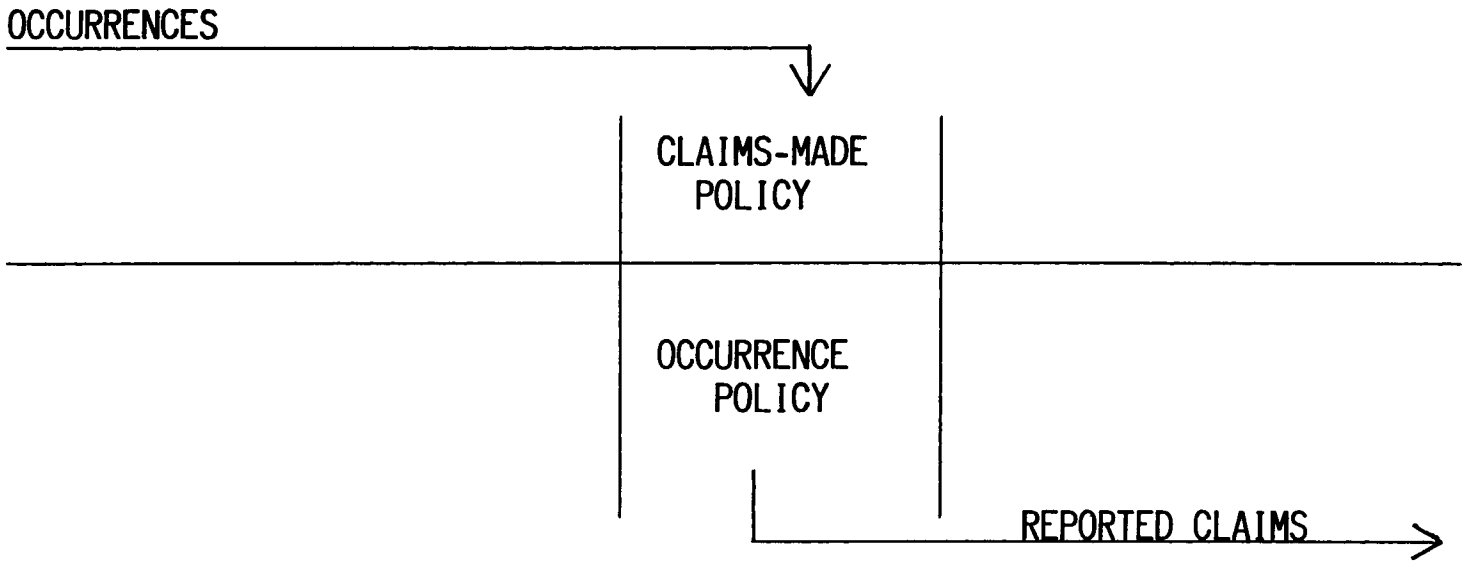
CALCULATION OF LAG FACTORS

(EXAMPLE: OL&T)

LOSS DEVELOPMENT FACTORS	LAG FACTORS
27 MOS. TO ULTIMATE = 1.375	LAG 0 = 1/1.375 = .73
39 MOS. TO ULTIMATE = 1.180	LAG 1 = 1/1.180 - .73 = .12
51 MOS. TO ULTIMATE = 1.065	LAG 2 = 1/1.065 - .85 = .09
63 MOS. TO ULTIMATE = 1.026	LAG 3 = 1/1.026 - .94 = .03
75 MOS. TO ULTIMATE = 1.013	LAG 4 = 1/1.013 - .97 = .03

CGL CLAIMS-MADE

REASON FOR TREND ADJUSTMENT



CGL CLAIMS MADE

DE-TRENDING LAG FACTORS

(EXAMPLE: OL&T)

LAG	FACTOR	DE-TREND	ADJUSTED LAG FACTOR
0	.73	$(1.13)^0$	.73
1	.12	$(1.13)^{-1}$	.11
2	.09	$(1.13)^{-2}$	.07
3	.03	$(1.13)^{-3}$	.02
4	.03	$(1.13)^{-4}$	.02

CGL CLAIMS-MADE

CALCULATION OF PURE PREMIUM MULTIPLIERS

(EXAMPLE: OL&T)

YEAR IN PROGRAM

LAG	1ST	2ND	3RD	4TH	MATURE
0	.73	.73	.73	.73	.73
1		.11	.11	.11	.11
2			.07	.07	.07
3				.02	.02
4					.02
SUM	.73	.84	.91	.93	.95

CGL CLAIMS-MADE
EXPENSE ADJUSTMENT

(EXAMPLE: OL&T 1ST YEAR)

(1) "OCCURRENCE" RATE = $100

(2) "OCCURRENCE" LOSSES = $54

(3) 1ST YEAR CLAIMS-MADE LOSSES = .73 x $54 = $39

(4) GENERAL EXPENSES = .13 x $100 = $13

(5) 1ST YEAR CLAIMS-MADE PREMIUM = ($39 + $13) ÷ .67 = $78

CGL CLAIMS-MADE

CALCULATION OF OCCURRENCE RATE MULTIPLIERS

(EXAMPLE: OL&T)

YEAR IN PROGRAM	PURE PREMIUM MULTIPLIER	EXPENSE ADJUSTED RATE MULTIPLIER
1	.73	.78
2	.84	.87
3	.91	.92
4	.93	.94
MATURE	.95	.96

CGL CLAIMS-MADE

LOSS DEVELOPMENT: UNDERLYING ASSUMPTIONS

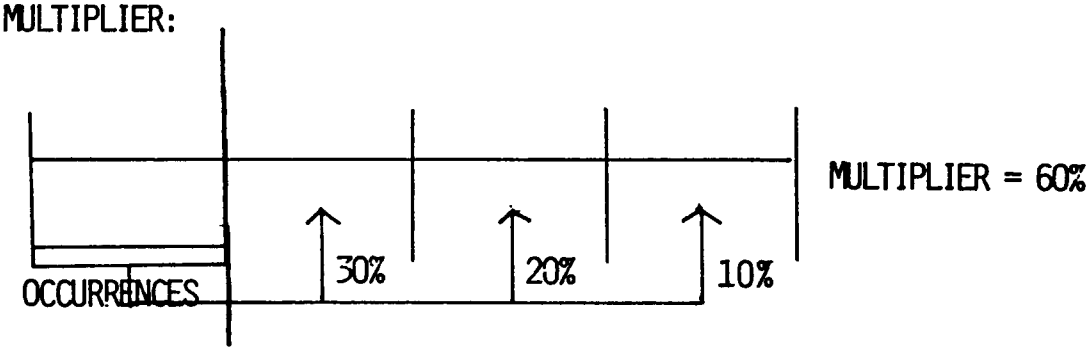
- IBNR EMERGENCE ONLY (NO CASE DEVELOPMENT)
- MATCH BETWEEN LAG AND DEVELOPMENT STAGE
- REPORTED "OCCURRENCE" LOSSES REFLECT "CLAIMS-MADE" TRIGGER
  - NO ACCELERATION OF CLAIM REPORTING UNDER "CLAIMS-MADE"

CGL CLAIMS MADE
CALCULATION OF TAIL MULTIPLIERS

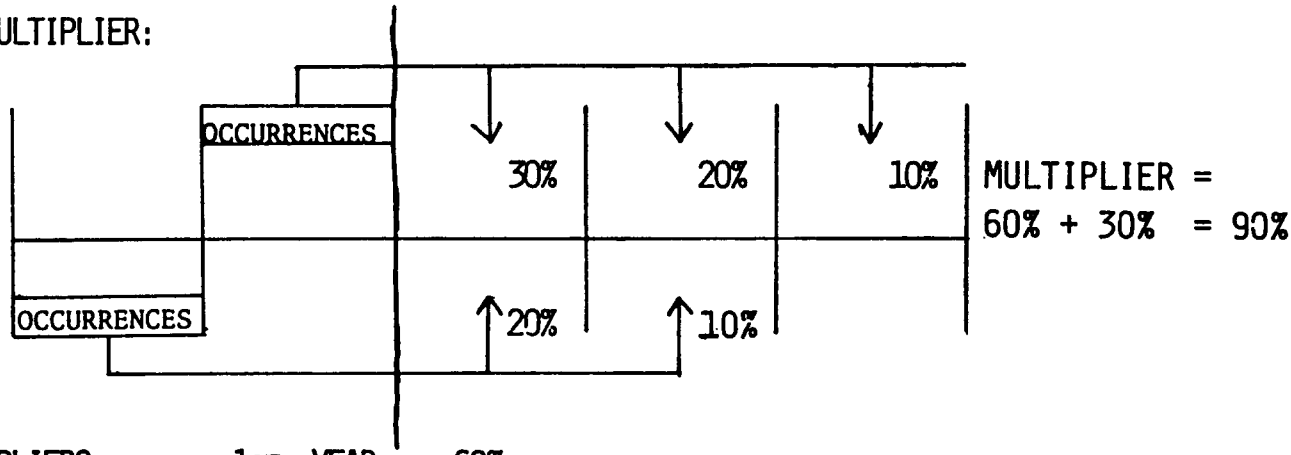
HYPOTHETICAL EXAMPLE:

LAG 0	LAG 1	LAG 2	LAG 3
40%	30%	20%	10%

1ST YEAR MULTIPLIER:



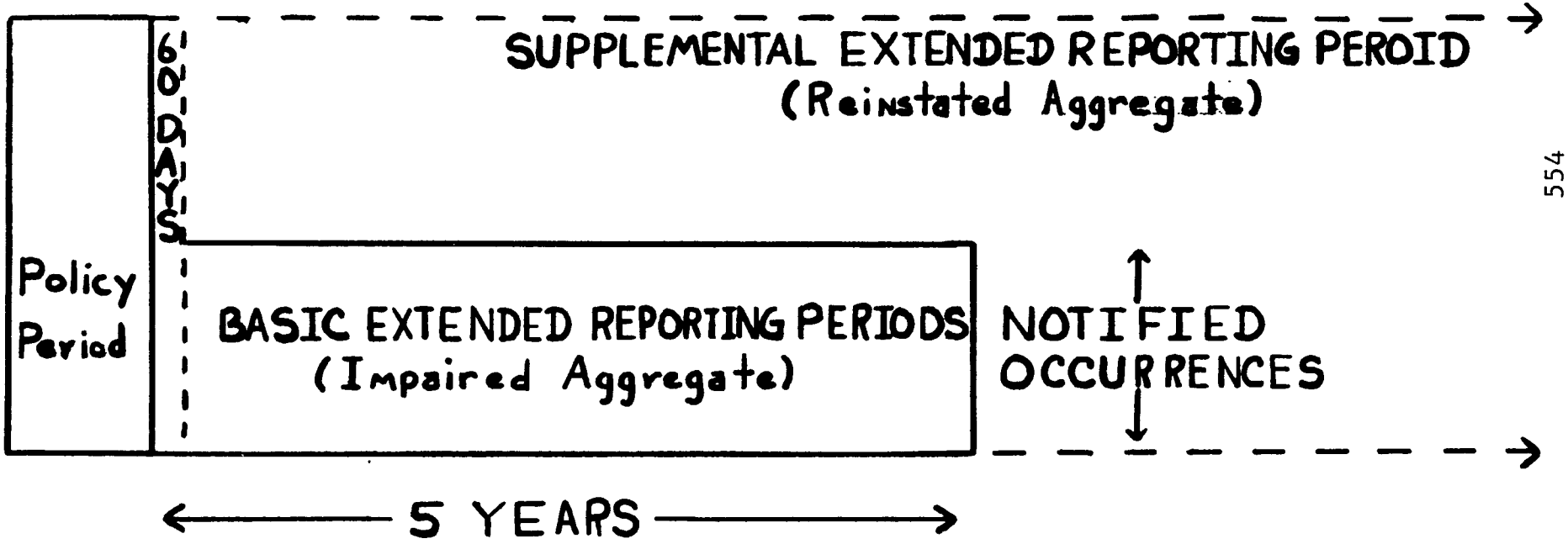
2ND YEAR MULTIPLIER:



TAIL MULTIPLIERS:

1ST YEAR = 60%
2ND YEAR = 60% + 30% = 90%
3RD YEAR = 90% + 10% = 100%
MATURE = 100% + 0% = 100%

CGL CLAIMS MADE TAIL PROVISIONS



CGL CLAIMS-MADE

"MIDI-TAIL"

PRICING ASSUMPTION: "K" - MULTIPLIERS

- K = PROBABILITY OF INSURED IDENTIFYING OCCURRENCE
- NO DATA ⟶ JUDGMENTAL SELECTION
- K = .30 FOR PREM./OPS.
  .60 FOR PRODUCTS

CGL CLAIMS-MADE

"MIDI-TAIL"

PRICING FORMULAS

1ST YEAR MULTIPLIER

$$\text{LAG 0} + K\left(\text{LAG 1} + \frac{}{} + \text{LAG 5}\right)$$

2ND YEAR MULTIPLIER

$$\text{LAG 0} + (1 - K)\frac{\text{LAG 1}}{\text{TREND}} + K\left(\text{LAG 1} + \frac{}{} \text{LAG 5} + \frac{\text{LAG 6}}{\text{TREND}}\right)$$

CGL CLAIMS-MADE

"MIDI-TAIL"

BASIC MULTIPLIERS

YEAR IN PROGRAM	PREMISES (OL&T)		OPERATIONS (M&C)		PRODUCTS	
	ORIGINAL	NEW	ORIGINAL	NEW	ORIGINAL	NEW
1	.79	.85	.71	.80	.56	.75
2	.88	.91	.86	.88	.68	.80
3	.94	.95	.92	.93	.77	.86
4	.96	.96	.95	.95	.81	.87
MATURE	.96	.96	.97	.97	.89	.89

CGL CLAIMS-MADE

" SUPPLEMENTAL TAIL" MULTIPLIERS

YEAR IN PROGRAM	PREMISES (OL&T)		OPERATIONS (M&C)		PRODUCTS	
	ORIGINAL	NEW	ORIGINAL	NEW	ORIGINAL	NEW
1	.25	.19	.33	.24	.48	.29
2	.36	.29	.47	.38	.78	.53
3	.40	.35	.54	.45	.97	.70
4	.41	.39	.57	.50	1.10	.86
MATURE	.41	.44	.59	.54	1.29	1.12

CGL CLAIMS-MADE

" SUPPLEMENTAL TAIL"

ADVERSE SELECTION

(EXAMPLE: PRODUCTS)

YEAR IN PROGRAM	"TAIL" FORMULA MULTIPLIER	ADVERSE SELECTION MODIFIER	FINAL MULTIPLIER
1	.28	1.05	.29
2	.46	1.15	.53
3	.56	1.25	.70
4	.64	1.35	.86
MATURE	.77	1.45	1.12

Exhibit 1

Acme Mutual

Cumulative Reported Claims

Accident Year	@12	@24	@36	@48	@60	@72	@84
1979	306	943	1621	1966	2089	2165	2215
1980	259	865	1644	2010	2141	2232	
1981	283	1078	1935	2374	2483		
1982	379	1240	2167	2596			
1983	393	1303	2273				
1984	353	1234					
1985	365						
CDF							
Incremental	3.357	1.761	1.215	1.057	1.039	1.023	
Cumulative	8.073	2.404	1.366	1.124	1.063	1.023	

Incremental Reported Claims

Accident Year	@12	@24	@36	@48	@60	@72	@84
1979	306	637	678	345	123	76	50
1980	259	606	779	366	131	91	
1981	283	795	857	439	109		
1982	379	861	927	429			
1983	393	910	970				
1984	353	881					
1985	365						

Exhibit 2

Acme Mutual

Occurrence Reserving

Accident Year	Known Claims	Optimistic Estimate of Unknown Claims
1979	2,215	0
1980	2,232	51
1981	2,483	156
1982	2,596	322
1983	2,273	832
1984	1,234	1,733
1985	365	2,582
Total	13,398	5,676

Claims Made Reserving

Report Year	Known Claims	Optimistic Estimate of Unknown Claims
1979	306	0
1980	896	0
1981	1,567	0
1982	2,298	0
1983	2,600	0
1984	2,836	0
1985	2,895	0
Total	13,398	0

Exhibit 3

Acme Mutual

Case Incurred Loss (000 Omitted)

Report Year	@12mos	@24mos	@36mos	@48mos	@60mos
1979				3,700	3,700
1980			12,500	13,200	13,300
1981		17,100	21,400	22,400	22,600
1982	24,300	28,400	35,800	37,600	
1983	33,900	41,700	48,000		
1984	42,600	50,200			
1985	50,300				

Loss Development Factors

Report Year	12 to 24	24 to 36	36 to 48	48 to 60	60 to Ult
1979				1.000	
1980			1.056	1.008	
1981		1.251	1.047	1.009	
1982	1.169	1.261	1.050		
1983	1.230	1.151			
1984	1.178				
Incremental	1.193	1.206	1.050	1.008	1.008
Cumulative	1.536	1.287	1.067	1.016	1.008

Exhibit 4

Acme Mutual

Case Incurred Loss (000 Omitted)

Report Year		@12mos	@24mos	@36mos	@48mos	@60mos
1979	Paid				2,400	3,600
	O/s				1,300	100
1980	Paid			4,200	8,900	12,600
	O/s			8,300	4,300	700
1981	Paid		3,400	9,200	15,900	20,300
	O/s		13,700	12,200	6,500	2,300
1982	Paid	2,300	6,700	17,600	37,600	
	O/s	22,000	21,700	18,200	0	
1983	Paid	3,100	14,300	19,400		
	O/s	30,800	27,400	28,600		
1984	Paid	3,900	19,900			
	O/s	38,700	30,300			
1985	Paid	5,200				
	O/s	45,100				

Run-off Factors

Report Year		12 to 24	24 to 36	36 to 48	48 to 60	60 to Ult
1979	Ch.Pd				0.923	
	O/S'				0.077	
	Sum				1.000	
1980	Ch.Pd			0.566	0.860	
	O/S'			0.518	0.163	
	Sum			1.084	1.023	
1981	Ch.Pd		0.423	0.549	0.677	
	O/S'		0.891	0.533	0.354	
	Sum		1.314	1.082	1.031	
1982	Ch.Pd	0.200	0.502	1.099		
	O/S'	0.986	0.839	0.000		
	Sum	1.186	1.341	1.099		
1983	Ch.Pd	0.364	0.186			
	O/S'	0.890	1.044			
	Sum	1.253	1.230			
1984	Ch.Pd	0.413				
	O/S'	0.783				
	Sum	1.196				
Incremental						
	Ch.Pd	0.345	0.347	0.811	0.769	
	O/S'	0.868	0.939	0.279	0.256	
	Sum	1.213	1.287	1.090	1.025	1.010
Cumulative						
	Ch.Pd	0.345	0.347	0.811	0.769	
	O/S'	1.196	1.032	0.287	0.259	
	Sum	1.542	1.379	1.098	1.027	1.010

Exhibit 5

Acme Mutual

Comparison of Results

"Backwards Recursive" Method

Report Year	Paid Loss	O/S Loss	Runoff Factor	Ultimate Loss
1981	20,300	2,300	1.010	22,623
1982	37,600	0	1.027	37,600
1983	19,400	28,600	1.098	50,803
1984	19,900	30,300	1.379	61,684
1985	5,200	45,100	1.548	75,015
Total	102,400	106,300		247,724

Loss Development Method

Report Year	Reported Loss	LDF	Ultimate Loss
1981	22,600	1.008	22,781
1982	37,600	1.016	38,202
1983	48,000	1.067	51,216
1984	50,200	1.269	63,704
1985	50,300	1.536	77,261
Total	208,700		253,164

Exhibit 6

Acme Mutual

Claim Severity Test

Report Year	Ultimate Loss	Reported Claims	Average Claim Severity	Claim Size Index
1981	22,623	1,567	14,437	-
1982	37,600	2,298	16,362	1.13
1983	50,803	2,600	19,540	1.19
1984	61,684	2,836	21,750	1.11
1985	75,015	2,895	25,912	1.19

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	(1)	(2)	(3)	(4)	(6)
Report Year	Reported Loss	Reported Claims	"LDF"	Claim Size Index	"Claims Exposed" (2)x(4)/(3)
1981	22,600	1,567	1.001	1.00	1,565
1982	37,600	2,298	1.000	1.10	2,528
1983	48,000	2,600	1.058	1.21	2,974
1984	50,200	2,836	1.229	1.33	3,069
1985	50,300	2,895	1.491	1.46	2,835
Total	208,700	12,196			12,971

	(7)	(8)	(9)	(10)
Report Year	Expected Claim Severity	Expected Ultimate Loss	Loss Development	Ultimate Loss
1981	16,090	25,213	25	22,625
1982	17,699	40,672	0	37,600
1983	19,469	50,619	2,775	50,775
1984	21,400	60,690	11,308	61,508
1985	23,491	68,006	22,395	72,695
Total			36,503	245,203

Column (7): 16,090= 208,700,000/12,971

(8) = (2) x (7)

(9) = (8) x (LDF-1)/LDF

Exhibit 7

Acme Mutual

Comparison of Claim Development
and Development of Losses

REPORTED LOSS

Accident Year	Report Year N	N+1	N+2	N+3	N+4
1979	4,200	9,200	9,400	4,000	2,100
1980	5,300	8,300	12,000	5,400	2,400
1981	4,900	12,300	17,300	7,100	2,500
1982	7,600	15,000	17,100	7,100	
1983	8,200	17,000	17,600		
1984	6,600	16,300			
1985	6,800				

DEVELOPED LOSS

Accident Year	Report Year N	N+1	N+2	N+3	N+4
1979	4,200	9,200	9,475	4,064	2,241
1980	5,300	8,366	12,192	5,762	3,089
1981	4,939	12,497	18,459	9,138	3,840
1982	7,722	16,005	22,008	10,906	
1983	8,749	21,879	27,034		
1984	8,494	25,037			
1985	10,445				

CUMULATIVE DEVELOPED LOSS

Accident Year	Report Year N	N+1	N+2	N+3	N+4
1979	4,200	13,400	22,875	26,939	29,180
1980	5,300	13,666	25,858	31,620	34,709
1981	4,939	17,436	35,895	45,033	48,873
1982	7,722	23,727	45,734	56,640	
1983	8,749	30,628	57,662		
1984	8,494	33,531			
1985	10,445				
Dev.Factor	3.520	1.940	1.240	1.089	
CDF	3.357	1.761	1.215	1.057	

1986 CASUALTY LOSS RESERVE SEMINAR

4A - BASIC TECHNIQUES III

Faculty: Gary V. Nickerson, Assistant Vice President
Universal Underwriters Insurance Corp.

E. Toni Mulder, Consulting Actuary
Tillinghast/TPF&C

I would like to welcome you all to session 4A - Basic Techniques III. My name is Gary Nickerson; I am an Assistant Vice President with Universal Underwriters Insurance Group. I am moderator for this session and I will also be presenting about half of the material. My co-panelist is Toni Mulder who is the Manager of Casualty Actuarial Consulting services for Deloitte, Haskins & Sells located in their Washington, D.C. office.

As moderator, I have a couple of housekeeping type announcements to make, which I am sure you already heard in the other sessions you were at yesterday.

The first is that the views expressed here are our own and not necessarily those of the Casualty Actuarial Society, the American Academy of Actuaries, or our employers.

The second is that this session is being taped. So, when we get to the question and answer session, I would like to ask everyone who has a question to go to the microphone in the center of the room so that the question can get on the tape and become part of the transcript.

As stated in the abstract for this session, we are going to be covering four different but somewhat related topics. I will be presenting how the separation of the IBNR produced by the Bornhuetter-Ferguson method into true IBNR emergence and development on case reserves can be accomplished, the importance of the use of tail factors in both paid and incurred loss development techniques and the use of external data in all aspects of the reserving process. Toni will be presenting the Bornhuetter-Ferguson IBNR method, as its generally known. And now Toni will begin with the Bornhuetter-Ferguson method.

TONI

Good afternoon. I'd like to begin this session by defining what an actuary is. How many of you know what an actuary is? The first slide gives you the definition of an actuary. Any questions? Yes, question on the definition of an actuary. Yes, we would be glad to send you a copy of the presentation if you would like to leave your business cards.

The next slide shows the presentation of the Bornhuetter-Ferguson IBNR method. In case you're wondering, this is called the Bornhuetter-Ferguson method because it was first proposed in a paper written by Mr. Bornhuetter and Mr. Ferguson, who both worked for General Reinsurance Corporation at the time. As you might suspect, their primary concern was reserving for reinsurance, not primary insurance, but one of the advantages of this method, which we'll get in to a little later, is that it can be used for primary insurance as well as reinsurance.

This first exhibit (Exhibit 1) is just an example of the method. As you can see here, this is an accident year method, in which IBNR is based on the expected losses for each accident year, which is simply the product of the earned premium in Column 2 and an expected loss ratio of 60%. The IBNR factor will be discussed when we get to Exhibit 3. For now, note that the IBNR is equal to the expected losses times the IBNR factor. The last column represents the ultimate losses for the accident year, which is the sum of the IBNR (defined as the unreported losses) and the losses incurred to date (also known as reported losses). The original Bornhuetter-Ferguson paper stresses the calculation of the IBNR only, but I think most of us in practice use this method as a way of obtaining ultimate incurred losses by accident year.

The next exhibit (Exhibit 2) compares both the ultimate losses and the IBNR for each accident year produced by the Bornhuetter-Ferguson method with those obtained using the incurred loss development method in the Basic Techniques I Session. The next exhibit (Exhibit 3) shows the derivation of the IBNR factor. The IBNR factor comes from the loss development factor to ultimate. You start with the definition of IBNR which is just the IBNR as a percent of ultimate losses. A little algebraic manipulation of the terms, along with the substitution for ultimate losses in the next to last line produces the formula IBNR factor. The formula IBNR factor is one minus one over the loss development factor to ultimate. This is the same loss development factor that you saw in the Basic Techniques I session. Any questions on this?

The next exhibit (Exhibit 4) shows an example of a calculation of the IBNR factors derived from the incurred loss development method that you learned in the Basic Techniques I. How many were in the Basic Techniques I? Good. Does this look familiar? This is the same method that you saw there. The top half of the exhibit shows the incurred losses, the middle part of the exhibit shows the development factors that come from the incurred loss development triangle and the bottom part of the exhibit shows selected factors and the different kinds of averages. The cumulative selected factor is the product of the age to age factors. To get the IBNR factors, as we saw earlier, we would take one minus one over the cumulative loss development factor. For example, the IBNR factor of .1773 for 12 months is one minus one over 1.2155. This means that 17.73% of your losses have not been reported for years that are evaluated at 12 months. The next factor is one minus one over 1.0462 which equals .0442, which means that 4.42% of your losses have not been reported as of 24 months.

The next exhibit (Exhibit 5) lists several things that should be considered in establishing the expected loss ratios. You will recall that, in the example, we used an expected loss ratio of 60% for each year. Although this is nice because its simple, it may be too simple. That is, you shouldn't expect the expected loss ratios to be constant for all years. There are various reasons for this, which are listed here. One of the most important, especially in the past few years, is premium adequacy. It is not the absolute premium adequacy but the relative premium adequacy that is important. If premiums are inadequate by 10% a year, then this will be reflected in your expected loss ratio and it will be projected in your results. But if premium adequacy is changing from year to year, then it is important that this is reflected in your expected loss ratio. The second item on the list is underlying pricing; this refers to one way of obtaining an expected loss ratio which is derived in a pricing situation by subtracting the sum of the expense and profit ratios from 100%.

Other changes which can affect the expected loss ratio include changes in operations such as reinsurance programs, changes in your underlying limits and deductibles, or a change in the mix of claims made versus occurrence coverage and changes in the mix of business sublines within a major line of business, for example. It's important that you consider these things when you select your expected loss ratios for each year.

This leads us into some of the assumptions and potential problems in using Bornhuetter-Ferguson. On the next exhibit (Exhibit 6), we are assuming that the premiums are an adequate measure of exposure. If the pricing is

inconsistent then this could be a problem. We're assuming that the expected loss ratio is predictable. An instability in the loss ratios will be a problem. We're also assuming that there is a constant reporting pattern and that the reporting pattern that you are projecting is based on your past experience and that the development (in the triangle that we looked at on the earlier exhibit) is going to continue into the future. You are making assumptions that your reporting patterns are going to be the same. The answer that you get from Bornhuetter-Ferguson will depend on how well these assumptions hold up in reality. These assumptions come from the Basic Techniques I Session where you talked about loss development and the incurred loss development method. These same assumptions will hold for the Bornhuetter-Ferguson method because a part of the Bornhuetter-Ferguson method is the development of the IBNR factor which comes from the incurred loss development method. On the next exhibit (Exhibit 7) is a copy of the one from the Basic Techniques I Session which lists assumptions and problems with loss development factor analyses. Since the Bornhuetter-Ferguson IBNR factors are derived from the incurred loss development factors, the same assumptions and problems apply here as well.

The next exhibit (Exhibit 8) is an example of what happens with the three methods that you've seen so far. When your incurred losses are double (or less than half) of what you thought they were, your expected pattern is that your expected IBNR is going to equal the expected reported losses. Under the loss development method, if the losses are twice as great as that, then your incurred loss development will result in IBNR being twice as great. Over here your IBNR is going to be practically nothing because your loss development is nothing. It's very sensitive to your incurred losses. Under the expected

loss ratio method your ultimates will always be the same so it is the opposite extreme. Under Bornhuetter-Ferguson there is a compromise between these two methods. Your IBNR is the same. You can see here that your IBNR is the same no matter what your incurred losses are. Your ultimates are going to be a compromise between the two methods, between the incurred loss development and the expected loss ratio method.

This leads us into the advantages and disadvantages of the Bornhuetter-Ferguson technique on the next exhibit (Exhibit 9). The advantage we've just seen is that it is a compromise between the loss development method and the expected loss ratio method. It avoids an overreaction to unexpected incurred losses. Another advantage is that it's suitable for a new or volatile line of business. It does rely on the accuracy of your earned premium, even in those situations. It can be used with no internal loss history. If for some reason your loss history is distorted or you don't have any, then you can use external data. Gary will be talking about that in his presentation on how you would use external data. Lastly, its advantage is it is relatively easy to use.

In summary there are three things that you need to have. You need to have your earned premium by accident year. You need to have an estimate of what your expected loss ratio is by year. And you need to have your reporting patterns, whether they are based on your own company data or external statistics. It's relatively easy to use given that you only need these three things. Are there any questions?

QUESTION: What data do you use in coming up with expected loss ratio?

TONI

You could look at the expected loss ratios that are underlying your pricing which would be one minus your expense ratio and your profit ratio. You can look at the reported losses to date. You can look at what you booked last year on that accident year as an ultimate loss ratio and use that as a starting point for the Bornhuetter-Ferguson. That would be sort of a modified Bornhuetter-Ferguson. You can keep doing that -- you can keep running the method over and over again on a personal computer. And if you hit the calc button about 20 times you're going to end up with the incurred loss development method. They are equivalent. Any other questions? OK. Now Gary will discuss the other three topics contained in the abstract for this session.

GARY

I think I ought to point out first of all that for several years in my own work, I never used anything like Bornhuetter-Ferguson. For one thing it is hard to pronounce, the other thing is I was working mainly with property insurance. And loss development is something that wasn't that big of a deal and it is something where you could estimate your ultimate losses very well using the incurred loss development method and even the paid loss development method such as you learned earlier today. It kind of depends on the type of insurance you're working with or the type of loss that you're working with as to whether you can be very content using a development factor method or if you wanted to use something where you would want to bring in something else besides the development pattern. Having a change in my job responsibilities after 4 or 5 years, I got involved with commercial liability excess policies,

and also professional liability. You couldn't imagine something more different than property insurance development. At the end of an accident year there weren't any losses? Apply your loss development factor to that, what is your projection of ultimate losses. Not something very believable to me or anyone else. I had to change my thinking as to what kind of loss development techniques are good ones. You can't be too narrow minded and just use certain techniques that you like that seem to work pretty well for you. You do have to consider other techniques such as the Bornhuetter-Ferguson technique that was presented to you this afternoon. The question we have from the back of the room earlier, how did you get a good expected loss ratio? A crucial question. In order to make this work you need to have a good estimate of that.

Now I think it is a good time to talk about what is IBNR. After all, we've been talking about it all day long. We've talked about how to project IBNR. You need to estimate what the IBNR is for a given coverage, given by accident year. What is this anyway? If I were to ask you to give me a definition for it, probably most of you could. I think that if you listen to someone give a definition of IBNR you might think, well wait a minute now, that's not really what I thought IBNR was. You would discover that different people use the term to mean different things. It's not a well defined term. IBNR without being further explained is somewhat ambiguous. We'd like to talk about what are the various components of IBNR. When we use those letters "IBNR", they are usually taken to mean incurred but not reported. What if you take that to be literal? It means that the loss has been incurred but the company doesn't know about it yet. I'm going to put an overhead on here that shows different meanings of IBNR reserves.

The first meaning is "true IBNR", unreported. This probably is what comes to your mind when we say IBNR. True IBNR means literally incurred but not reported to the company. To get an appreciation for this second category think of how your claims department operates. Somebody will be notified of a claim, some claims adjuster or an insurance agent working on behalf of the company. From that point on you could say the claim has been reported. However, if you're going to do a loss development analysis you're going to use data derived from a computer -- 99% of the time you're going to use computerized reports of some type of claim history. If a claim has been reported to a human being in your company, that is not what's really relevant to your analysis of data. It only counts once its gotten into the computer. As far as you can tell doing loss development analysis, a claim is reported once it gets into the computer system. At any given point in time there are a number of claims that have been reported to the company but not yet coded up and entered into the records of the company in the computer. That's what we call "claims in transit". Another meaning or interpretation of the term IBNR would be true IBNR plus claims in transit. Usually, even when you talk about true IBNR, it usually is implied to also include claims in transit. Depending on what kinds of dates are recorded on a claim, you might not be able to tell the difference in your loss development history as to which claims were in transit at any given point and time.

Let's take a look at the third category, which is "true IBNR plus claims in transit" plus "development on known claims". The latter is a very important item in loss development. Again, think about how your claim department operates. Your claim is reported to the insurance company and a loss reserve is estimated for that particular claim and a loss reserve is quoted and that

gets into the records of the company. There are sometimes tabular reserves used. It is very common for a claims department to establish reserves on individual claims. When a claim is actually paid it is almost always different from the amount for which it is reserved. Reserves are set up at certain round number amounts and the actual payment is usually somewhat higher or lower. Sometimes it is a lot higher or a lot lower than the original reserves. You might establish a reserve for $500,000 in a liability claim, and then end up winning the lawsuit and not paying it at all. Development on known claims is an important category. And sometimes we use the term IBNR to include not only true IBNR but also development of known claims.

Look at the fourth category, true IBNR plus claims in transit, plus reopened claims reserve. For some lines of business such as Workers' Compensation, it is not unusual to have a claim closed and then later on have it reopened. You pay some medical expense, and you think you're done with it. A couple of years later there is a relapse and there is some additional medical expense, resulting in a re-opened claim.

The fifth definition of IBNR is the most broad definition of IBNR that you can have, which includes all of the above. All possible future developments of losses are included. You see the comment at the bottom of the slide there, it says that the Bornhuetter-Ferguson method and all accident year loss development methods produce IBNR using the broad definition. When we say "IBNR" when we're using an accident year loss development method, we mean more than just claims that are unreported. We're also talking about development on known claims, and we're also talking about reopened claims -- claims in transit, everything.

You've learned some ways of estimating the broad definition of IBNR. What if you wanted to decompose this total IBNR estimate into some of its component pieces? In particular, the development on known claims versus true IBNR. What if you wanted to subdivide between those two categories. How would you do it? You can't do it using any of the accident year methods that have been presented to you. I'm going to show you an example here of an insurance company. And I will start out keeping it simple and looking like the accident year loss development that you're used to seeing. We have our Easy Insurance Co. again. We're going to take a look at one accident year -- 1978. We're going to look at the value of those claims at various points in time -- December 1978 (which would be at age 12 months) and then 1979 and so forth -- all the way out to December of 1984, which is age 84 months. What you have here is a single line from a loss development triangle and we can see how accident year 1978 develops. Notice that it starts out with the value of $8 million. One year later the losses have developed up to $9,781,000. In developing upward, there are different kinds of development that go on there. One important element is that you've had some new claims reported during 1979, and they've been paid or case reserved, and that value is showing up at 12/79. Some of the additional million and a half dollars would be due to development on known reserves. There could be a claim that was reserved during 1978 for $100,000, and then in 1979 the reserve was increased to $200,000. You have an additional $100,000 of case development. I say case development to mean development on known claims. From this accident year development you can't tell how much is from the case development, or how much was from the new claims being reported. In order to tell the difference we can take a look at another dimension here. We can break down the losses into report years. The

first line shows you the total of all report years combined. By breaking it down by report year we can see how much of the loss development comes from development on known claims versus newly reported claims. Let's again look at accident year 1978 valued as of the end of 1979. What was the value of newly reported claims? We can see that would be claims reported during 1979 or $980,000. At the end of 1978 we had $8,382,000 of incurred loss and those very same claims have developed up to $8,801,000. The difference between $8,382,000 and $8,801,000 would be development on known claims. The important thing to note here is that if you look at your data by report year, within the accident year, you can decompose your total loss development between development on claims that are already reported versus newly reported claims.

Let's take a look at December 1984. We'll assume for the time being that the losses at 84 months are at an ultimate basis. Assume that these claims are all closed and we aren't going to get any new ones. Let's consider the December, 1978 loss reserve need, as observed at December, 1984. The losses that originally had a value of $8,382,000, those reported in 1978, ultimately have a value of $9,044,000. Your case development is the difference between $8,382,000 and $9,044,000. Your IBNR emergence would be the sum of all of the values of your claims reported in 1979 or later. We have this summarized at the bottom of the exhibit. Your broad IBNR is your ultimate value of $10,292,000 minus the original value of $8,382,000. Pure IBNR is the $10,292,000 minus the ultimate value of claims reported in 1978 -- $9,044,000. That would be your pure IBNR, and case development would be the $9,044,000 minus the original value of those claims $8,382,000. It's more complicated than the broad definition of IBNR, but it gives you a more complete picture of the total loss development.

You might be wondering, why would you do that? Here you've been learning about accident year loss development and just trying to get the hang of it. Now we're trying to make it more complicated. Why would we want to do that? Let's take a look at some advantages, which are listed in our next exhibit. The first is that changes in loss emergence or reporting patterns can be more easily identified. This affects your pure IBNR. You could have a change in mix of business for one thing. Sometimes loss emergence reporting patterns vary by state, so if the mix of business by state changes you could have this show up as a change in your loss reporting pattern. The second item here is that development on known claims can be useful in managing the claims operation. Whose controlling that? It does vary depending on where you're working but typically that is under the control of the claims department. There is a different set of decision makers than those who are making decisions on IBNR reserves, allocated loss expense reserves, and other types of reserves. Sometimes the development on known claims can be helpful to those people responsible for the claim function.

The third item is that changes in claims handling practices can be more easily identified. The fourth one summarizes the first three. The identification of adequacy of components are useful for managing overall reserve operation. Again, that gets to the point that there are a lot of people involved in deciding what reserves are to be carried. You have a lot of people working on case reserving and you have other people involved with bulk reserving and what we often call IBNR reserving. The other thing to point out here is that in applying incurred loss development techniques, it's very important to have consistency in case reserving. If you don't have consistency in case

reserving, it will throw off your incurred loss development and you could come up with poor estimates. If you can break down your total loss development into these component pieces, it's easier to tell when you have a change in pattern. If you can see that you have a change in pattern it raises questions and gives you an idea as to where to go to look for answers. The last advantage mentioned here refers to the setting of unallocated loss adjustment expense reserves. A method that is sometimes used is to set unallocated loss adjustment expense reserves as a factor of 50% of your reserve for known losses, plus that same factor times 100% of your IBNR. I'm not going to go into the rationale for that at this point, other than to just point out that if this applies to you it is something for you to consider. One thing that will make that estimate wrong would be if you have a misallocation between a reserve for known claims versus true IBNR.

How do you organize your data to carry out this type of analysis? If you look at accident year data by valuation date, you will end up with the ability to estimate broad IBNR and that will give you your total loss reserves. If you organize your data by report year then you can estimate your development on known claims. That makes sense -- if you have data by report year, then you are excluding claims that are unreported, so you are left only with development on known claims.

The third way of organizing data is the most complex way -- report year within accident year. If you have your data organized in that fashion then you can estimate both the pure IBNR and the development on known claims separately. By adding them together, you get your total loss reserves. We talked about some of the advantages of this more detailed way of estimating reserves. Can

you think of any disadvantages? I can only think of one, or at least one broad category of disadvantages; and that is, it is harder. You need to have your data organized in that way and you might not even have your data available in that way. If you did, the matter of analyzing the data is much more complex. I'm going to go on to a new topic; tail factors. Do you have any comments or questions about case development?

QUESTION: It seems to be good to have industry comparisons when you're looking at that type of data. Is that readily available?

Yes, generally speaking there is some industry data available, and in fact we'll talk about that. However, concerning industry data that separates pure IBNR from the development on known claims, I can't think of an industry source that makes that separation. I know of a lot of individual companies that make that separation.

QUESTION: Is it a fair measurement of an actuary's ability that development on known claims should be near zero?

I would say not necessarily, it depends on the situation. What's important is that the development pattern on case reserves be consistent. That's very important in order for you to come up with any reasonable projection of IBNR using accident year incurred loss. You need to have consistency in the pattern of development on known reserves. Suppose they always start out at 100 and end up being 110. It is not necessarily going to be a bad thing if you have that situation, because as long as it's consistent you can predict it. You can put up a bulk reserve for it. In my own company, that would be

considered bad because there are some internal management reports that don't have IBNR in them. All they have are the individual case estimates. That report would be distorted if the reserve on known claims was biased on the low side. That's the situation in my own company, that is not everywhere.

QUESTION: If claim departments consistently under reserve, doesn't that force the actuary to determine "broad" IBNR?

Back to your question, if your claim adjusters consistently under-reserved 10% or 20%, that would not necessarily cause you a problem. You could still predict what the ultimate losses were going to be. It's only a problem when they start changing from being 10% under-reserved for 3 years and all of a sudden they jump to 20% over. That would distort all of your loss development patterns. If you wanted to change case reserve practices, you could do that but then you have to make some adjustments to your loss development history.

QUESTION: If the claims department is told of the development, might they not overreact?

The claim department may really load up on their losses for a while. Human tendency being what it is, they tend to do that for six months and then they've gone back into their own pattern within a month of developing.

We've latched on to somewhat of a controversial subject. Earlier today I attended a session on managing a loss reserve function and this is one of the things that we discussed. What do you tell your claims people? You do have to be very careful on how you handle that. The development on known reserves

is something that would be very helpful to senior management and to loss reserve specialists. As far as how you deal with that with your claims department you get into some human relations types of things. If they feel threatened by what you're saying, that can sometimes create more problems than you had to start with. What we were saying in our session here this afternoon, is that there is a way of estimating the numbers. What are you going to do with the numbers once you've got them? Come back next year and attend the session on how to manage a loss reserve function. We'll go on to our next topic which has to do with tail factors.

Earlier I had this illustration up here that showed accident year 1978 experience. Now you can see how it developed over time. It started out $8,382,000 and developed up, up, up until it developed to $10,292,000. Is it done? Can it develop more? You can't really tell from this data. What's going to happen out in the tail? That's the question I would like to address right now. I would say the best way to find out is to go back in time and look at your older accident years and see how they developed. Once you get to a point where there is no more development, then you can assume that your development factors are 1.0. I want to talk about the situation where you can't assume that development factors are 1.0. What if this is the oldest accident year available to you? If this is what you saw, how would you project accident year 1978 to an ultimate basis? When I used this exhibit earlier I said -- let's assume it's on an ultimate basis. I'm taking away that assumption. We don't know now. I would like to talk about some ways of projecting that to an ultimate basis. I know that for some companies this is a crucial problem. Think of a medical malpractice insurer that started in 1976. If they wrote occurrence policies in 1976, they're still going to get

loss development on those policies. Of course they don't have any corporate data prior to that. This isn't just a hypothetical question, it is a vital question for a lot of people.

What kind of impact can it have anyway? How wrong can you be? In the exhibit I showed you, you could tell that the loss development was slowing down. If you missed loss development by a few thousand dollars, big deal. Maybe the question isn't very important. However, the question can be important, as you will soon see. Our next exhibit illustrates the impact that tail factors can have on the estimate of IBNR need. If you'll look at the top line it says that the ultimate losses, assuming no development beyond 84 months, is $102,840,000. This is all accident years combined. We're no longer talking about only accident year 1978. The second line shows you the required case plus IBNR is $27,746,000. We said that we're going to assume that there is no development beyond 84 months and that would give us the total incurred loss of $102 million. But what if we're wrong about that? What if there's 1% more development? Your development factor going from age 84 months to ultimate would be 1.01 instead of 1.00. One percent -- it doesn't sound like much. But that is 1% of $102 million, so that's a million dollars. That million dollars relative to the total loss reserves of $27 million is 4%, so you have a 4% error in your total loss reserves. But what you're really working on at this point is your IBNR reserve. That $1 million compared to your IBNR estimate of $4.7 million is 22%. Ignoring the 1.01 tail factor made you wrong by 22%. The point is, tail factors are important. One approach you can take is to look at the development you've had so far and try to extrapolate from that. This next exhibit illustrates three ways of doing that. Suppose we are trying to get a tail factor for accident year 1978. We have two columns, paid

and incurred; you can do this for either paid loss development or you can do it for incurred loss development. I'll talk about the paid just as an example.

Paid losses at 72 months were $9,408,000. The development in the following 12 months is $351,000, to give you losses at 84 months of $9,759,000. What we do is take that development in the most recent 12 months and make an extrapolation from that into the future. The first method is to assume that the tail factor will be equal to the last age-to-age factor, which is 1.0373. A second approach is to assume that the dollars that will develop from 84 months to ultimate will equal the dollars that developed during the most recent year (from 72 months to 84 months), which is $351,000. If you assume that $351,000 will emerge in the future, you divide that by the developed losses to date of $9,759,000, which gives you this factor of 1.036.

There's a third way of doing the extrapolation -- it's the half rule. Let's take a look at the most recent development factor of 1.0373. That's the development that you actually had from age 72 months to age 84 months. The half rule says that in the next 12 months the development you will experience is half of the .0373, which is .0187. Obviously there is some round off here. At 12 months beyond that point the additional development would be half of the .0187 which gives you the .0094, 12 months after that again it's half, .0047, and so on. You keep going on out until you get to 1.0001 and then it falls out of sight. That takes you one year into the future each time. The tail factor from 84 months to ultimate would be the product of these factors together and that gives you 1.0381. These are the three different ways of extrapolating a tail factor from losses that have already developed to date.

You'll notice that the three different tail factors are pretty close to each other. The last of the three is slightly more work but it is intuitively a more pleasing way of coming up with the tail factor. If you'll look over the incurred column, the three different methods produce the same development factor accurate to four places after the decimal.

QUESTION: Is that a mathematical factor or just a coincidence?

It is coincidence. The number is pretty close to 1.0; the closer to 1.0 you get, the less variation you'll have in the three different methods.

I can show you now another way of using your data to extrapolate into the future. The methods that we just talked about look at your most recent 12 months of development and extrapolate from that. You can come up with a more sophisticated method of extrapolating into the future by using several years of development simultaneously. What I'm showing you here are some graphs, and the graphs show you loss development factors on the vertical axis and months of development along the bottom. We're showing a loss development factor as of 12 months, 24 months, and so on, going all the way out to 84 months. We want to extrapolate into the future, beyond 84 months. The idea behind these methods is to fit a theoretical curve to your actual data, the historic loss development factors at various months of development. What we have illustrated for you are two theoretical curves. The first one being a exponential curve, you see a formula there with a loss development factor at age "x" is 1+A exp (-BX). Obviously you need to have some estimates of what A and B are, those are your parameters. Given some historical data you can estimate your parameters A and B using some statistical technique like maximum

likelihood. You're in business, plug in any value for "x" you want in the future and you get a loss development factor.

The second model is the inverse power curve, which also requires you to estimate two parameters. The inverse power curve is something that has been found to work pretty well in a lot of situations. I have to warn you about something -- if you want to use this technique, remember that the whole point behind doing it is to extrapolate into the future. You want to use a theoretical curve that will fit well out there in the tail. You're probably not going to get a good fit at your early ages like 12 months. In fact, with the graphs you see in the exhibit, the actual loss development factor at age 12 months is 1.8. 1.7 is the number that you get from the exponential curve, and you get a 1.5 from the inverse power curve, which is a long ways from 1.8. It's not a good model for early ages, but you don't need it for the early ages. That's where you have your data. You can get your development at your early ages using other methods. You can use your curve fitting to project, smooth out, extrapolate, out in the tail. This is the more sophisticated way of extrapolating into the future, out in the tail, using several years of development history.

If you've ever tried to do extrapolations you probably know that you have to be careful with them. Interpolations generally work pretty well, but extrapolation requires care. You extrapolate if you have to, but there is another way of estimating the tail factor. That is to use some external data.

We're going to talk about our last topic on external data sources and their uses. We can use our discussion of the tail factor as a spring board to make

this transition because that is one of the areas where you may find an external data source to be very helpful.

What are some other uses of external data? Your own corporate data may be very limited or inconsistent. Examples of this are a new line of business, a small company, or a partial year. These are some areas where you could have limited or inconsistent data. Trending is another area -- there's a lot of external data information available on trending. Earlier today I think you saw some techniques that use trending and projecting average severities. That method used actual historic severity to project and smooth out future severity. But if that's not sufficiently stable, you can use external sources for trending. Another area would be doing an analysis by size of loss. One example would be if you have changing reinsurance retentions. You may have history showing net losses at the older lower retention, but your current situation is at a higher retention. Here's another way that you can possibly use information from the external source on loss by size. Your net retention might be $1 million -- if you look at your historic loss development data for losses cut off at $1 million, it could be affected quite a bit by the presence or absence of large losses. For example, suppose that the total loss developed at a given age is $3 million, but $1 million of it is coming from one claim. And if you didn't have that claim, it would be only $2 million. Your projection of ultimate would be very seriously affected in that situation by the presence of that one large claim. One way of dealing with situations like these is to cut off your losses at a lower level -- say $100,000. Do a loss development analysis on losses limited to $100,000, even though your net retention is $1 million. Project what your ultimate losses will be if losses were cut off by the $100,000 -- that will be your first step. You then need

to estimate your ultimate losses in the layer from $100,000 to $1 million. That's where you might use an external data source such as ISO when you can come up with an expectation of what you think the losses will be in the first layer. Another possible application of external data is in using the Bornhuetter-Ferguson technique. How are you going to come up with a good expected loss ratio? Sometimes you need to rely on some external data to supplement what you have in your own corporate data. It can be used as a check of reasonableness.

Let's take a look at some sources of industry data: the Reinsurance Association of America's Loss Development Study. This report is widely distributed. I've come across it at a lot of different times working with other people. I'd say this would be an important source of information if you're dealing with reinsurance. It shows you the historic development by major line of business of selected reinsurance companies combined that report their data to the Reinsurance Association of America. It's a broad industry average of loss development on excess of loss reinsurance for workers' compensation, general liability and auto liability. I'll make a comment here that applies to all of these external data sources. When you use a data source like this you have to be very careful. You have to make an informed judgment as to how applicable this industry average is to your own situation. The external source gives you an industry benchmark. You need to be very familiar with your own corporate situation in terms of what are the net retentions, what are the underlying limits. When you are working with a longer tail or shorter tail than the industry average, you need to be informed and have good judgment about what adjustments are reasonable.

The next data source would be the annual statement. The annual statement (Schedule P) shows historic loss development. You can obtain annual statements for other insurance companies. That is public information. If you can look at Schedule P development on other companies that you consider to be similar to your company, that would be an external data source. Again, you've got to be careful how similar you can expect your company to be. The main thing that can be different there would be your corporate case reserving policies. That can vary considerably from company to company. Some companies are "case reserving companies", and their philosophy is to put up real strong case reserves. Other companies won't put anything up in reserves until they know whether or not to pay and their case reserves tend to be inadequate -- this varies quite a bit from company to company. Nevertheless, it is an external source of data that can be used. Now Best's summarizes Schedule P data for all companies that report to them. That would give you an industry average and that would be a benchmark that you could use, in addition, perhaps, to looking at some individual companies that you think might be similar to your own company.

Another source that could be very helpful in coming up with an expected loss ratio would be ratemaking data from ISO or the National Council for Workers' Compensation Insurance. They come up with loss development factors for ratemaking which you might consider to be a benchmark as a comparison to your own loss development factors. They come up with expected loss ratios, if you use the ISO rate. Don't be surprised if your loss ratios are higher if your rates are 40% below ISO. A lot of information is contained in a ratemaking analysis from ISO if you're a member or subscriber.

Another source that possibly could be of use to you would be NAIC closed claim surveys for medical malpractice and products liability. Another source would be Masterson or other economic indices which occasionally are published in one of the industry publications. This is not an exhaustive list -- there are other sources of external information. The U.S. Government publishes indices that could be of use in determining trends. And for a fee there are companies that will print all kinds of econometric data trends, and predictions of the future. There are external sources of predictions of future trends -- places like Data Resources, Inc. or Chase Econometrics, others I'm sure. I'll open this up to general questions.

QUESTION: How common is the use of the Bornhuetter-Ferguson method in the industry.

I would say that it is very common in reinsurance, very common in long tailed lines. What does that mean? Does that mean more than 50% of all such companies use it? I don't know. But I would say it is not rarely used -- it is commonly used. I would say probably not as commonly used as incurred or paid loss development methods, but you see it a lot.

QUESTION: Are most loss development triangles developed gross or net of reinsurance?

It's done both ways and you can run into problems if you have changing reinsurance retentions. If you have that, then it is not a good idea to simply use your historical net loss data. If currently you have an excess of loss reinsurance treaty where the cut-off point is $300,000 per claim, but

historically in your older years it was $100,000 per claim, you don't want to use your old historical data. One thing you could do would be to reconstruct your history so that losses are limited to $300,000, then you would have a loss development triangle as if you had always been at a $300,000 level -- that's a way of handling that.

QUESTION: If you were to set up an "ideal" loss reinsurance system for a primary company, what would you set up?

Ideally you would set it up so you could estimate it on a gross basis before reinsurance. But of course, you have to set it up so you can get it on a net basis as well. I think this is becoming more important than it used to be because you used to assume that you could collect your reinsurance. We don't necessarily assume that any more, so it's becoming more important to know what it is that you're expecting to recover from your reinsurers, if you did recover from your reinsurers.

*** AN ACTUARY ***

AN ACTUARY IS A PERSON WHO PASSES AS AN EXPERT ON THE BASIS OF HIS PROLIFIC ABILITY TO PRODUCE AN INFINITE VARIETY OF INCOMPREHENSIBLE FIGURES CALCULATED WITH MICROMETRIC PRECISION FROM THE VAGUEST OF ASSUMPTIONS BASED UPON DEBATABLE EVIDENCE FROM INCLUSIVE DATA DERIVED BY PERSONS OF DOUBTFUL RELIABILITY FOR THE SOLE PURPOSE OF CONFUSING AN ALREADY HOPELESSLY BEFUDDLED GROUP OF PERSONS WHO NEVER READ THE STATISTICS ANYWAY.

EZ INSURANCE COMPANY

BORNHUETTER-FERGUSON IBNR METHOD

AUTOMOBILE LIABILITY

Accident Year	Earned Premium	Expected Losses	IBNR Factor	IBNR	Ultimate Losses	Ultimate Loss Ratio
1978	$17,153	$10,292	.0000	$ 0	$ 10,292	.600
1979	18,168	10,901	.0012	13	11,263	.620
1980	21,995	13,197	.0025	33	12,758	.580
1981	24,173	14,504	.0063	91	14,504	.600
1982	25,534	15,320	.0169	259	16,325	.639
1983	31,341	18,805	.0442	831	17,607	.562
1984	38,469	23,081	.1773	4,092	20,653	.537
				$ 5,319	$ 103,402	

Expected Losses = Earned premium x .60
IBNR = Expected Losses x IBNR Factor
Ultimate Losses = IBNR + Losses Incurred to Date
Ultimate Loss Ratio = Ultimate Losses / Earned Premium

EZ INSURANCE COMPANY
INCURRED LOSS DEVELOPMENT VS. BORNHUETTER-FERGUSON
AUTOMOBILE LIABILITY

Accident Year	Bornhuetter-Ferguson Ultimate Losses	Bornhuetter-Ferguson IBNR	Incurred Loss Development Ultimate Losses	Incurred Loss Development IBNR
1978	$ 10.292	$ 0	$ 10.292	$ 0
1979	11.263	13	11.264	14
1980	12.758	33	12.757	32
1981	14.504	91	14.504	91
1982	16.325	259	16.342	276
1983	17.607	831	17.551	775
1984	20.653	4.092	20.130	3.569
	$103.402	$5.319	$102.840	$4.757

DERIVATION OF BORNHUETTER-FERGUSON IBNR FACTOR

$$\text{IBNR Factor} = \frac{\text{IBNR}}{\text{ULTIMATE LOSSES}}$$

$$= \frac{\text{ULTIMATE - INCURRED TO DATE}}{\text{ULTIMATE}}$$

$$= 1 - \frac{\text{INCURRED TO DATE}}{\text{ULTIMATE}}$$

$$= 1 - \frac{\text{INCURRED TO DATE}}{\text{INCURRED TO DATE X LDF TO ULTIMATE}}$$

$$= 1 - \frac{1}{\text{LDF TO ULTIMATE}}$$

EZ Insurance Company
INCURRED LOSSES
Automobile Liability

Accident Year	Months of Development						
	12	24	36	48	60	72	84
1978	$ 8,382	$ 9,781	$10,110	$10,219	$10,268	$10,280	$10,292
1979	9,337	10,847	11,092	11,192	11,235	11,250	
1980	10,540	12,205	12,551	12,690	12,725		
1981	11,875	13,832	14,238	14,413			
1982	13,343	15,542	16,066				
1983	14,469	16,776					
1984	16,561						
	Development Factors						
1978	1.1669	1.0336	1.0108	1.0048	1.0012	1.0012	
1979	1.1617	1.0226	1.0090	1.0038	1.0013		
1980	1.1580	1.0283	1.0111	1.0028			
1981	1.1648	1.0294	1.0123				
1982	1.1648	1.0337					
1983	1.1594						
Selected Factor	1.1618	1.0285	1.0108	1.0038	1.0013	1.0012	1.0000
Cumulative Selected Factor	1.2155	1.0462	1.0172	1.0063	1.0025	1.0012	1.0000
IBNR Factor	.1773	.0442	.0169	.0063	.0025	.0012	.0000

NOTE: Loss amounts are in thousands of dollars

CONSIDERATIONS IN ESTABLISHING EXPECTED LOSS RATIOS

- PREMIUM ADEQUACY
- UNDERLYING PRICING
- CHANGES IN OPERATIONS, E.G.
  - REINSURANCE
  - UNDERLYING LIMITS, DEDUCTIBLES
  - CLAIMS MADE VS OCCURRENCE
- HISTORICAL CONSISTENCY
- CHANGES IN MIX OF BUSINESS

BORNHUETTER-FERGUSON
ASSUMPTIONS AND PROBLEMS

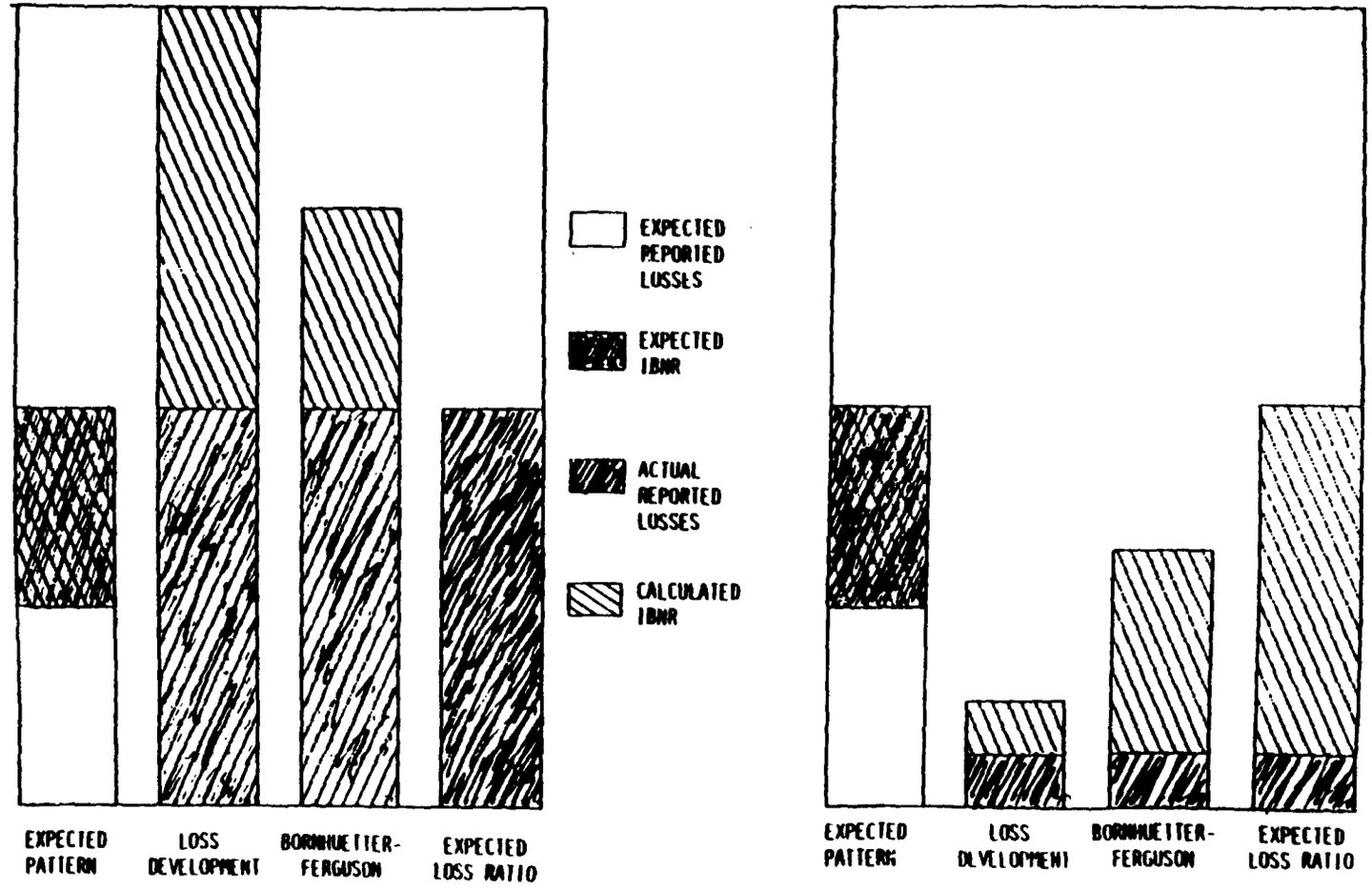
ASSUMPTIONS	SAMPLE PROBLEMS
- PREMIUMS ACCURATE MEASURE OF EXPOSURE	- PRICING INCONSISTENCY
- EXPECTED LOSS RATIO PREDICTABLE	- INSTABILITY IN ACCIDENT YEAR LOSS RATIOS
- CONSTANT REPORTING PATTERN	- INTRODUCTION OF AUTOMATED CLAIM SYSTEM - BACKLOG IN PROCESSING

A N D . . .

KEY ASSUMPTIONS AND POTENTIAL PROBLEMS INHERENT IN BORNHUETTER-FERGUSON ANALYSES

ASSUMPTIONS	SAMPLE PROBLEMS
CLAIM SETTLEMENT PATTERNS UNCHANGING	- INCREASING DELAYS IN CLAIMS CLOSING RATES
CASE RESERVING PRACTICES & PHILOSOPHIES UNCHANGING	- CONSCIOUS EFFORT TO IMPROVE CASE RESERVING ADEQUACY - INTRODUCTION OF NEW CASE RESERVING PROCEDURES
NO CLAIM PROCESSING CHANGES	- CHANGE IN DATA PROCESSING - REVISED CLAIM PAYMENT RECORDING PROCEDURES
POLICY LIMITS HAVE NO IMPACT ON LOSS DEVELOPMENT	- INCREASING FREQUENCY OF FULL POLICY LIMIT CLAIMS - CHANGING POLICY LIMITS
LOSS DEVELOPMENT UNAFFECTED	- SURGES IN INFLATION - INCREASED LITIGATION - DIMINISHED POLICY DEFENSES
NO CHANGES IN MIX OF BUSINESS	- CHANGES IN REINSURANCE COVERAGES - INCREASED "LONG-TAIL" EXPOSURE - INTRODUCTION OF NEW OR REVISED COVERAGES
NO CYCLICITY IN LOSS DEVELOPMENT	- CLAIM SETTLEMENT OR RESERVING IMPACTED BY BUSINESS OR UNDERWRITING CYCLES
NO DATA ANOMALIES	- CATASTROPHIC OR UNUSUAL LOSSES REFLECTED IN LOSS EXPERIENCE - UNUSUAL CLAIM SETTLEMENT/ REPORTING DELAYS

COMPARISON OF RESERVE METHODOLOGIES



BORNHUETTER-FERGUSON

ADVANTAGES	DISADVANTAGES
. COMPROMISES BETWEEN LOSS DEVELOPMENT AND EXPECTED LOSS RATIO METHODS	. BROAD DEFINITION OF IBNR
. AVOIDS OVERREACTION TO UNEXPECTED INCURRED LOSSES TO DATE	. UNCERTAINTY OF PROJECTED ULTIMATE LR
. SUITABLE FOR NEW OR VOLATILE LINE OF BUSINESS	. IGNORES LOSSES INCURRED TO DATE
. CAN BE USED WITH NO INTERNAL LOSS HISTORY	. RELIES ON ACCURACY OF EP
. EASY TO USE	. ASSUMES THAT CASE DEVELOPMENT IS UNRELATED TO REPORTED LOSSES

IBNR RESERVES

1. "TRUE" IBNR - UNREPORTED
2. "TRUE" IBNR + CLAIMS IN TRANSIT
3. (2) + DEVELOPMENT ON KNOWN CLAIMS
4. (2) + REOPENED CLAIMS RESERVE
5. (2) + DEVELOPMENT + REOPENED

BORNHUETTER-FERGUSON METHOD AND ALL ACCIDENT YEAR METHODS PRODUCE IBNR DEFINED AS IN (5)

EZ INSURANCE COMPANY
ACCIDENT YEAR 1978 EXPERIENCE

Report Year	12/78	12/79	12/80	12/81	12/82	12/83	12/84
All	$8,382	9,781	10,110	10,219	10,268	10,280	10,292
1978	$8,382	8,801	8,977	9,022	9,044	9,044	9,044
1979		980	1,039	1,065	1,071	1,074	1,074
1980			94	101	104	105	105
1981				31	33	34	34
1982					16	17	18
1983						6	7
1984							10

Broad IBNR = $10,292 - $8,382
Pure IBNR = $10,292 - $9,044
Case Development = $9,044 - $8,382

ADVANTAGES OF SEPARATING PURE IBNR EMERGENCE AND DEVELOPMENT ON KNOWN CLAIMS

1. CHANGES IN LOSS EMERGENCE OR REPORTING PATTERNS CAN BE MORE EASILY IDENTIFIED.

2. DEVELOPMENT ON KNOWN CLAIMS CAN BE USEFUL IN MANAGING THE CLAIMS OPERATION.

3. CHANGES IN CLAIMS HANDLING PRACTICES CAN BE MORE EASILY IDENTIFIED.

4. IDENTIFICATION OF ADEQUACY OF COMPONENTS IS USEFUL FOR MANAGING OVERALL RESERVE OPERATION.

5. IMPROPER STATEMENT OF LOSS RESERVES RESULTS IN IMPROPER STATEMENT OF UNALLOCATED LOSS EXPENSE RESERVES, ASSUMING ULE IS BASED ON 50% OF CASE + 100% OF IBNR.

DATA ORGANIZATION AND RESERVE MEASUREMENT

ACCIDENT YEAR	- BROAD IBNR
	- TOTAL LOSS RESERVES
REPORT YEAR	- DEVELOPMENT ON KNOWN CLAIMS
REPORT YEAR WITHIN ACCIDENT YEAR	- PURE IBNR
	- DEVELOPMENT ON KNOWN CLAIMS
	- TOTAL LOSS RESERVES

EZ INSURANCE COMPANY
IMPACT OF TAIL FACTORS

ULTIMATE LOSSES FROM INCURRED LOSS DEVELOPMENT (ASSUMING NO DEVELOPMENT BEYOND 84 MONTHS)	$102,840
REQUIRED CASE + IBNR = ULTIMATE - PAID TO DATE = $102,840 - 75,094	$ 27,746
REQUIRED (BROAD) IBNR = ULTIMATE - INCURRED TO DATE = $102,840 - 98,083	$ 4,757
EVERY 1% OF DEVELOPMENT BEYOND 84 MONTHS INCREASES:	
ULTIMATE LOSSES BY $1,028	1%
REQUIRED CASE + IBNR BY $1,028	4%
REQUIRED BROAD IBNR BY $1,028	22%

EZ INSURANCE COMPANY
HALF-RULE TAIL FACTORS

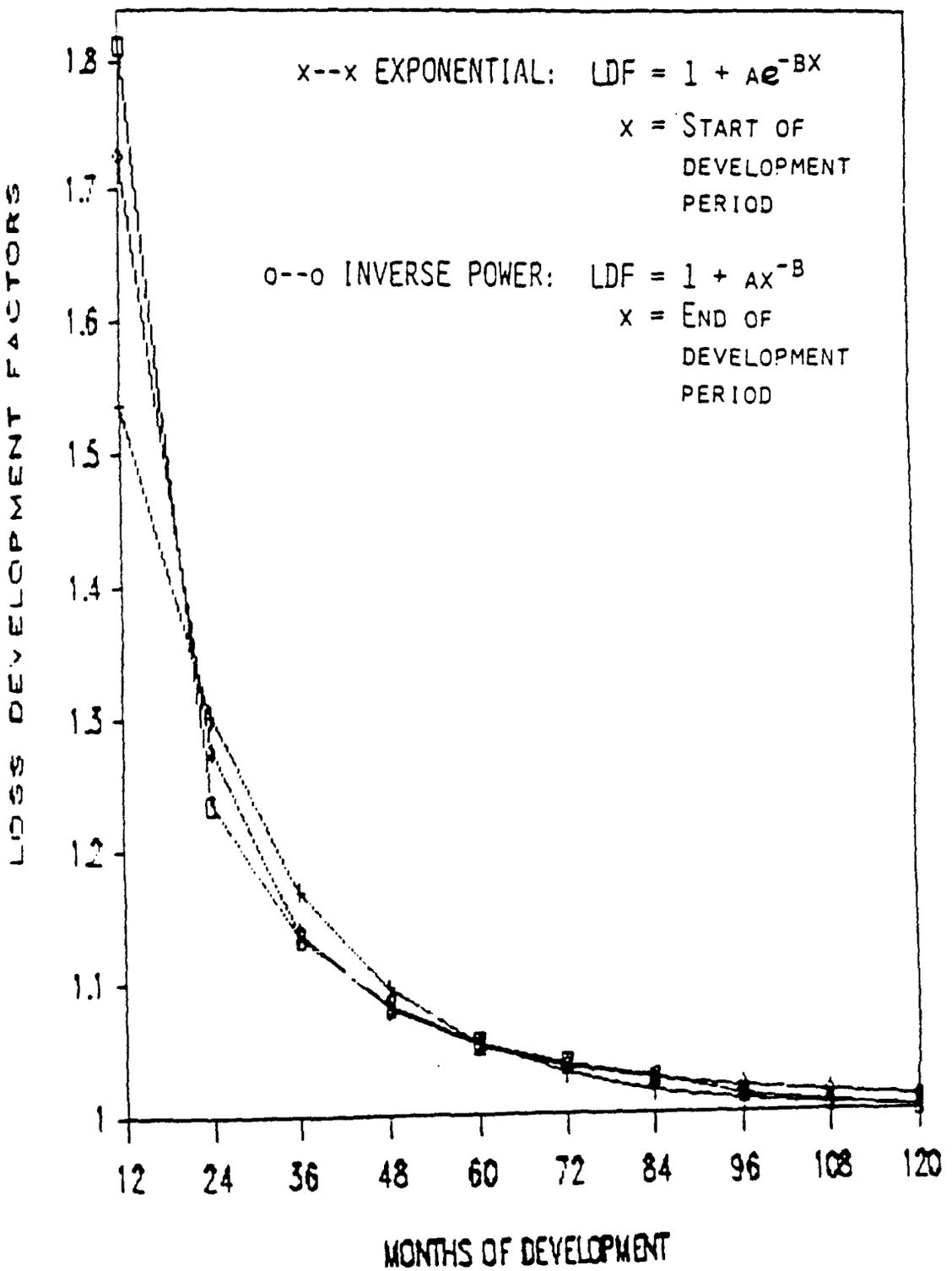
	PAID	INCURRED
AY 1978 LOSSES AT 72 MONTHS	$9,408	$ 10,280
72-84 MONTH DEVELOPMENT	$ 351	$ 12
LOSSES AT 84 MONTHS	$9,759	$ 10,292
DEVELOPMENT FACTOR	1.0373	1.0012
TAIL FACTOR = LAST AGE-TO-AGE FACTOR	1.0373	1.0012
TAIL FACTOR = 72-84 MONTH DEVELOPMENT/ LOSSES AT 84 MONTHS	1.0360	1.0012
TAIL FACTOR BASED ON HALF-RULE AGE-TO-AGE FACTORS	1.0381*	1.0012

*1.0381 = 1.0187 X 1.0094 X 1.0047 X 1.0024 X 1.0012 X 1.0006 X 1.0003 X 10002 X 1.0001

EZ INSURANCE COMPANY

TAIL FACTORS THROUGH CURVE FITTING

PAID LOSS DEVELOPMENT



USES OF EXTERNAL DATA

- TAIL FACTOR

- LIMITED OR INCONSISTENT DATA

  - NEW LINE OF BUSINESS
  - SMALL COMPANY/BRANCH OFFICE
  - PARTIAL YEAR

- TRENDING

  - EXPLICIT IDENTIFICATION OF INFLATION

- ANALYSIS BY SIZE OF LOSS

  - CHANGING REINSURANCE RETENTIONS

SOURCES OF EXTERNAL DATA

- REINSURANCE ASSOCIATION OF AMERICA LOSS DEVELOPMENT
- ANNUAL STATEMENT
- BESTS SUMMARIES OF SCHEDULE P DATA
- RATEMAKING DATA FROM ISO, NCCI, ETC.
- NAIC CLOSED CLAIM SURVEYS (MEDICAL MALPRACTICE, PRODUCTS LIABILITY)
- MASTERSON OR OTHER ECONOMIC INDICES

1986 CASUALTY LOSS RESERVE SEMINAR

4F - ADVANCED TECHNIQUES I

Moderator: Robert S. Miccolis, Consulting Actuary
Tillinghast/TPF&C

Panel: Tapan S. Roy, Consultant
Liscord, Ward & Roy, Inc.

David F. Mohrman, Consulting Actuary
Tillinghast/TPF&C

Ben Zehnwirth, Professor-Economics & Financial Studies
Macquarie University

I'm Robert Miccolis, and I'm the moderator for this session. And we've switched things around a little bit so hopefully some of you in the back can see some of the slides better. I think we have some handouts of some of the material. In any event, the transcripts will have all of the relevant material. To my immediate left is Dave Mohrman. And Dave's going to be our first speaker. Dave is from Tillinghast. To his left is Tapan Roy from Liscord, Ward & Roy. To the far left is Ben Zehnwirth from Macquarie University in Australia. This is the first of three sessions on advanced techniques. And the general concept here with these three sessions is to try and get some of the modeling and special topics on confidence levels that had been in these sessions in the past, and try to consolidate them in a more organized fashion. What we're going to try to accomplish is to at least detail some of the concepts. There just isn't enough time in these sessions to get into the development of the mathematics and all the statistics behind them. We're going to ask you to save any discussion type questions until the end. But at the end of each speaker if you have just an understanding question, we'll take those questions at the end of each speaker. The basic idea of this Advanced Technique I session is what we're going to call completing the triangle; filling out the missing part of the triangle of data. And in particular, trying to estimate what the last column of information ought to be. Some of the approaches we are going to talk about are fitting historical data and selecting different kinds of models. The other sessions tomorrow in Techniques II and III will be more in the probablistic descriptions of reserving and in some of the confidence level and ranges approaches for reserve estimates. I'll let these speakers get started. Dave.

DAVE MOHRMAN: Since I am the first one out here today I will start with a few generalities of why we're going to fit curves to triangles, or use some of these alternative techniques. The first reason is probably just to get another idea of what we're trying to do. Most people apply the chain ladder technique or development factor technique and all of these are probably alternatives to that. We can get another estimate of what ultimate or what development patterns can look like. Most of these methods also allow for a little more statistical analysis. We can look at errors between our fitted and actual points and, perhaps, even get an idea of how good our fit is going to be out on the tail. The third point is that many of these methods will handle irregular data better. That is, maybe our valuations don't have to be equi-distant from each other. Another benefit of some of these methods is that they use more information. That is they can use the points around missing datapoints, use irregular data. Often they use the information simultaneously. In conjunction with all of these sometimes we can get a better understanding of what's going on in the triangle and that if we do a fit, maybe it doesn't fit too well in one area. Well, then we can have an idea of why it doesn't fit in that area or at least we can see where there is a problem. And maybe we can do something to adjust it. Finally, I think another benefit is that we can get an estimation of tail development that we just couldn't get using a development factor approach.

Next I'm going to go into a little bit about the specifics of the technique that I've been working on, which is a curve fitting approach.

It's non-linear, and I attempt to fit a curve to the development pattern. To determine the best fit I use a least squares criteria. It's deterministic, we're just going to come up with a point estimate. Here's the formulation of the problem. It's sort of a formulation one would see in operations research type applications. What we need to do is minimize some objective function, call it "z", which is the sum of the actual minus fitted point squared. In other words, it's the least squares and we want to minimize that. Several definitions: the i(t)'s are going to be our actual losses for period "i" and for valuation "t", our fitted datapoints li(t) are equal to a value times the function which is a function of "t" and also of parameter vector "x". In this formulation the periods which are represented by "i" are positive integers and "i" is just a real number, that's our valuation point. And again, that ties back to what I was saying earlier, we can have irregularly spaced data and missing datapoints and it doesn't really matter as long as we just sum over the points we have. Finally we have a parameter vector "x" and that's what we're going to attempt to solve for when we minimize "z", our objective function. Restating that one more time. What we want to do is minimize our objective function by finding the best fitted values. And the best fitted values are found by solving for the parameter values "x". I think the next step to understand this particular technique is to go back and take a look at what our two pieces are, our li* and the function that we're going to fit. The first part is what we have for the properties for our function. First of all the function we're going to fit is some kind of cumulative development pattern. That is, it could be paid as a percent of ultimate incurred or some kind of what we think of as a claim count pattern. And the one essential criteria is that as "t" goes to infinity, that is our evaluation points move out in time, eventually our function is going to settle down at one. In other words we're going to reach an ultimate. Second, we require "x" to be zero at the origin. That's certainly a reasonable criteria. But not necessary, in fact if we start further out on the triangle, let's say at 24 months. Maybe we don't care what's going to happen at 12 months, or 6 months. Third, we require "f" to be an increasing function. We could also require that it just approaches one from the bottom, it never goes greater than one. None of these are certainly necessary to our formulation.

The other half of the equation is our li*. That's going to be our fitted ultimate values. One of the properties of li* is that, for any particular "x" we pick, we can solve for this value easily and we can find the best one in the sense that we can minimize our objective function. At this point we've got both of these pieces, we've defined each of them. It may seem a problem that, we're trying to solve for our ultimate values and, at the same time, our pattern is a percent of ultimate. What we're going to do is solve for these simultaneously. I'm going to get into a little bit more of the specifics of how I actually try and fit this, and solve the problem.

One of the first things that must be done with any method is to state the assumptions. The first is that the development pattern remains stable. In the present formulation of the problem I haven't set up the function

"f", our development pattern function as a function with respect to the accident periods or policy years. It assumes that the development has been constant over time. A little later in the talk I'm going to discuss what we can do about that. The other assumption is that errors are normally distributed around each of the actual points. By changing our objective function, let's say using the log of the actual losses to be fit, we can change our assumption so that errors are log normally distributed. Under the present formulation I'm using this log-normal assumption. We're going to use a non-linear optimization algorithm from the field of non-linear programming. The basic premise is that we're going to search for the optimum values along lines. We don't ever really search along a surface. The first type of method used to derive these are function specific in that we need to compute the derivative for this specific function. And for functions with more than one variable that becomes the gradient. In addition, these methods are actually more efficient than the methods that don't use the derivative because the gradient direction that we choose happens to be the best line to search in. The alternative is to use a method that doesn't use derivatives, and that's the approach I've taken. The reason is because it's not function specific. In other words, I can choose any function that meets the criteria that the function goes to one as time goes to infinity. It's also a little simpler to implement in that we don't have to take gradients.

There are many methods that don't use derivatives. And the particular one that I've been working with is called the modified version of a Hook Jeeve's algorithm, which I think was developed in the early 60's. This method essentially attempts to find and solve the objective function by 2 types of line searches. The first type is that we start searching in the direction of each axis. And then we try an acceleration step where we search along the line of our latest two points. The method starts by picking some point pretty arbitrarily. If you've done the algorithm a couple of times you may have an idea of where you need to start. What we do is search in the direction of the "x" axis until we find the best possible point in terms of our objective function. And you can see that we've started somewhere out above 40 and we've ended up between 7 and 14. And then the next step is to search along the "y" axis. And we come down here and we've also made a big improvement. And then comes this acceleration step I was mentioning where we search along the line that goes through "x1" and "x_2". In this case it doesn't help us much in terms of if we were just to start searching along the "x" axis again, we could probably even do better. But as we can see, after we go again, the "x" axis, the "y" axis, we get to this point "x3". And when we go along the line "x_2, x_3" we do much better than we would because we'd just be zigzagging if we took the x-axis approach which is one of the most basic approaches to use in this type of algorithm. In this case the approximation of the gradient has been very good and we reach our optimum.

Another point I want to mention is that we're solving for the parameter "x" and the ultimate values at the same time. What we do is we start searching along the "x" axis in this first step. And we just keep

picking points essentially a certain interval away until we find a grouping in between them. And in each one of these points we can solve for our objective function, mainly because of the property I put up earlier that we can solve for our ultimate values easily once we're given "x". At this point, given x, we can find out that our objective function (the best possible value of our objective function) would be, for example, 50. Here's where I get some real nice algebra.

To solve for these li*'s we fix "x" and our objective function merely becomes a function of our ultimate values. To solve for the best "z" or the minimum "z" we need to set all the partial derivatives equal to zero. The beauty is that looking back at the problem, once we take the derivative of "z" with respect to some li*, substituting in that equation, we find that all the terms that don't have li* in them go to zero. The individual partial just takes this form. And it's only the sum over t, not the sum over i and t now. Given an "x" we can easily solve for our best ultimate values, given that particular development function. What it does essentially is it picks the pattern going through the points we have that minimizes these least squared errors. That's essentially how the technique works.

The only other things I want to discuss are some advantages and disadvantages of this particular technique. One of the main advantages is that it's pretty general. We can use many functions. For example, statistical distributions, power functions, exponential functions. In a sense you have to feel around and find out which one is probably the best function to use in a particular case. I've experimented mainly with a version of the power function. Also, the method is pretty flexible in that as I mentioned earlier we can use the regular data. Because we keep fitting at each point, sort of to ultimate, it doesn't matter what our valuation scheme is. Points can be missing, they can be other than equi-distant. Another flexibility is that we can change the objective function if we didn't want to use least squares and we didn't want to make the assumption that errors were normal, we could change it so that they were log normal. I think the final advantage is that the method is relatively simple. Again, it just uses line searches and there are many techniques available. The handout again includes an example which shows the particular line search technique that I've used. It's pretty intuitive in that we're fitting for ultimate and the actual development patterns at the same time.

With advantages of course, go disadvantages. As I mentioned earlier is the assumption that we require stable development. While this is a problem in most cases, it is not insurmountable. Often it's possible to adjust the triangle first, maybe a Berquist technique or some other technique. It's possible that we could handle the triangle in pieces. We could, perhaps, not use the first couple valuations, if we're not interested in what happens there. Let's say we're just mainly interested in what's happening out on the tail. And we think that the first couple of valuations are making our data unstable or we can just look at the end of the triangle. The other problem with this particular algorithm is that since we're doing line searches, as some of you probably know from

Part III of the CAS exams, when you do line searches you can never be guaranteed that you're going to converge. If you can't be guaranteed that you're going to converge at the global minimum, it depends on the individual function you pick as to whether you can get to the global minimum. And it also depends on where your starting point is. You can certainly select a particular function that can't diverge, for example. Many of the statistical distributions would have a hard time diverging. Although I've actually used a case where it has because I had a triangle where the data keeps going up and I don't have far enough out on the tail to know what's going to happen, and the model just actually said it's not going to stop. I think the final disadvantage is the speed of convergence. I've had pretty good success, although there have been cases where I haven't been able to get the model to fit ultimately well so it goes real slow. In general, a fair size triangle of 10 x 10 could be fit on a PC in about 5 minutes. If anyone has any questions, I'd be glad to answer them now.

He asked why I don't have the actual accident period as a parameter in my development pattern function. Why isn't that really just the same as using a pure development factor approach. I think we'd pick a more optimal development factor, in one sense since we're minimizing errors between actual data. Another benefit is that we end up with a functional form that we can apply at any different valuation point. For example, if we wanted to track development on a monthly basis, we would be able to do that without having to revise our triangle totally to come up with monthly data. Another advantage is that we actually get an estimate of what's going to happen out on the tail that we wouldn't have if we just did age-to-age factors since the triangle ended before ultimate was reached. The only relationship we need to assume is that our fitted points are the product of our ultimate values in our function.

Tappan Roy:

I'm Tappan Roy. Before I get started how many of your are familiar with least square techniques, linear models. Terrific. I can go right to the middle then. Basically what we are trying to look at is data that has an underlying pattern and we're trying to, in some sense, extract that underlying pattern hoping that the underlying pattern is going to have some projective value in it which can be used for purposes of extrapolation. It is in some sense pattern recognition, and in pattern recognition what we're trying to do is look at the data. And the issue often becomes how many different ways can you look at the same data. Dave talked about looking at the data in a cumulative fashion. You can look at the data cumulatively. But you can look at the data in a variety of different ways. And the idea here is that you want to look at the data really for the purpose of determining if there is any significant underlying patterns that might be captured. You might look at losses. Losses can be looked at in an aggregate sense, or an average sense. You can look at incurred data, paid data, you can look at them cumulatively, you can look at them incrementally, you can break the losses up into claim counts versus severities. There are a whole host of ways in which you might go about looking at the data itself. This notion of data mining, before you talk about model fitting, can also become very useful and should really be a part of your tools. How many different ways do

you want to look at the data? We'll start at something very simple--data-mining. After you have done the data-mining you might say what is the objective we're trying to accomplish out here? There are usually two kinds of objectives that I have noticed people work with when there are working with triangulated data. I am not going to go into why the data is a triangle. I'm hoping all of you know why we have a triangle of data and not perhaps a series of data. Most statisticians get confused with triangles. They like linear data, and the next thing they want to jump into is matrices. Triangles are something which are very unique to the actuary. You can say that here we have some historical data and this is triangulated data. What we're trying to do is to project the triangulated data outward in this dimension which we call the developing dimension. This is a kind of projection you would do for purposes of reserving. You also make projection for purposes of ratemaking. One might say why do you need all of this data in ratemaking. All you really need is the ultimate value so why don't we just do a linear forecast of the last value. But true, in that case you'd have to do it in two steps: Forecast out to ultimate and then from ultimate out to the trended value; it's a two-step process. Invariably it turns out that the simultaneous techniques are much more efficient than this two-step technique. The objective is: look at the data; forecast it, in the triangle dimension, or the development dimension; and forecast it in the trend dimension. It turns out the kinds of techniques that we've been talking about here are very useful. In the sense that when you're talking about just chain ladder or development factor types of analysis, it is good to go in this dimension. The question is how do we go out in this dimension too. Let's see what is going on underneath the data which is the next item that I always urge people to think about. Understand the data that you're working with. You must have some understanding of the data that you're working with. I used to play this game in some of my statistical classes. Where after you teach somebody how to forecast you give them a series of random numbers, tell them to take it home and do some fitting. You'd be surprised how many of them had answers. They always had an answer as to where this number was going to go. Because you are using the technology without understanding the data. Let's look at how we start out. Let's assume that we're living in this wonderful world: no inflation, no growth, no change in the mix of business, no change in experience, no change in the operating style of the corporation, and no change in the enviroment. Pretend for a moment you're working in this environment and you had this fantastic insurance company and you're an actuary. You don't have to take any exams either. You look and ask yourself what is the data going to look like. Let's pretend for a moment that this is the data. What would you say about these values, the data that we collected. Anything, whether it is an average data, or whether it's cumulative data. What would all of these values look like? They would all be equal. What about these values? They would all be equal but different from the previous depending on whether you're looking at cummulative values or you're looking at incremental values. What you're really trying to do is extract column to column differences. When you apply your development factor technology, what are you trying to do there. You're trying to extract column to column differences. What are the effects from column to column? Is that the only thing that is going

on in this world? No. The technology in statistics, when you're looking at estimating or evaluating the differences of column effects, is called analysis of variance. You pretend that this is a state, but the state has been carved up into little cells. And in the little cells seeds have been planted. Along each row there has been different types of fertilizers that have been applied. And what you want to look at is column-to-column differences which is the same as asking the fertilizer-to-fertilizer differences. And I would like to estimate the effect of the fertilizer to fertilizer differences. What you're really trying to do is to estimate the effect of the development differences which means that there is an underlying process of something that goes on; namely, the claim process which is the column to column difference. You can apply very simple analysis techniques on the columns themselves. All of you who have used development factors have used analysis of variance without knowing it. Just as you are talking about column-to-column differences, the very next thing that you would ask yourself is if there are also row differences. How do row differences come about? Now ask yourself what is underlying this data process. Basically there is an underlying process which may explain development a certain way. You also know that as you're looking at the historical data, there is something that is going in another dimension. What is going on is you have marketing decisions being made in this dimension; underwriting decisions being made in this dimension. And you might think of three other different kinds of decisions that are being made which effect your data row-wise. And then along the calendar dimension there's a claim settlement process going on. And to think about it every quarter or every year, you add eight extra diagonals to your triangle. And adding an extra diagonal to a triangle is the equivalent of creating a new diagonal so actually the diagonal is the one that is moving along your time dimension. Your diagonal is moving on a time dimension and you are creating claim development along the column dimension and you are having all of these marketing and underwriting effects along the row dimension. This is one of the things that will create patterns which may or may not allow you to stick to the kind of row-to-row or column-to-column effects that we always talk about. What we're saying is that the development effects that might be true for earlier periods may not hold true as you're moving down the row effects. I'll give you again the analogy of the agriculture experiment. Pretend for a moment that we have these seeds and the fertilizer is being applied along the row dimension. And let's say that various levels of water are being applied along the row dimension. Now you want to see what is the optimal combination of the water and the fertilizer, and what their effect is on the outcome. Here again, you can think about the row effect as the marketing effect or the underwriting effect, which is the equivalent of saying we are making changes along the row of the inputs. However, a lot of times this you probably begin to see that things are beginning to not work out. Meaning that you're looking at the data and for some sense the data doesn't make sense. And suddenly somebody begins to dig down and you find there is a ledge or rock underneath the plot. And therefore the amount of ledge that you have below it has an effect on the outcome. I'm not interested in the ledge part of it, but you have to account for the ledge in the analysis. Accounting for the ledge in the analysis is something that

might be called analysis of co-variance. The analysis of co-variance is nothing more than taking out the effect from the data of a variable that is not strictly row effect or column effect. In your data can you think of something that would be the equivalent of a ledge in the sense that it effects the data but not really a development effect or an underwriting effect. There's underlying economic indices which are going every which way. That will effect your data which is being driven by effects that are not under your control. The claim settlement is under your control; underwriting is under your control; but the economic indices underlying the data are the equivalent of this ledge that is effects your data and you would like to have the effect of that in the forecasting model. We're looking at the data from the point of view of row effects and column effects. And we're also looking at it from the point of view of external indices that are effecting the data. In addition to these kinds of effects you have discontinuities in the data. The kinds of discontinuities that you have, one might be called a spike effect. Pretend for a moment that everything is going fine except that you have a huge hurricane in a given quarter. The hurricane happens in this particular exposure period's data. Or it can happen in this particular calendar data, it depends on how you want to look at it. Would you say that when you have a discontinuity in the data the pattern of its settlement or something that is uniquely different is going to be the same as the rest of the data. This might be one type of a discontinuity. Another kind of discontinuity is something that we call a box type of discontinuity. In underwriting that goes on -- you loosen up on underwriting and then you, say, you want to tighten it back again. You might have a box type of discontinuity. You might have a step discontinuity. Step discontinuities might come about when you have triangles or sources of data coming from two different areas. The practices of one firm might be very different from the practices of the other firm. If you merge the data together you might ask yourself that there should be some way in which to identify the fact that there is a discontinuity of a mixture. Or you might have a ramp type of a discontinuity. And the ramps might be where you make changes however the impact of the changes gradually reach a certain limit which might be when we entered a new territory. Gradually the new territory began to take over and there was a ramp change along the data. These are the various ways you can look at the external influences coming into the structure. What we are saying out here, therefore, is that we start at some period and the data is beginning to change. We ask ourselves how did this data get to be what it is? The data got to be what it is because one, it was developed; two, there were effects along the row, meaning that there were underwriting effects on it, marketing effects on it; and three, that there were the time dimension effects on it, or the claim settlement effects on it. Basically it has been driven by controllable events and also driven by external events such as the underlying economic indices that make this data what it is. Now what we would like to do is to say that this piece of data is some function of the development effect, the exposure effect, the calendar effect. The underlying indices that are effecting it in all of these three dimensions, and the certain interventions that may or may not exist in the data. It's a functional form. We're talking about some kind of functional form. Once you have

this kind of functional form what we have done so far is done really no statistics. Up to this point we were trying to understand the data. Do the data mining, understand the data, find out what happened to the data over time. Ask what other kinds of indices effect this particular data then ask yourself what kind of functional form can be used for purposes of doing the forecasting.

In the engineering environment there are lots of designs of experience. And in the agricultural environment there are a lot of designs of experiments. We jump out of the design of experiment and we get into this area where we are working with data that is available without any underlying struture known and without any availability of experimentation. Known underlying structure is prevalent in physics. We know the laws of physics; there's an underlying theory. And if we're trying to do something in physics we know how to collect the data and what the mortal ought to be. The only problem we're left with are the problems of estimation. In insurance we are saying that structure is not known. All we have is input data and output data. We get into really doing a structure search for the model. Then once we have determined what the structure of the model is going to be, then we talk about estimation of parameters. And once we have gone through the process of estimation of parameters, we talk about comparisons of the goodness of the model, meaning how good is the model in terms of what we are attempting to use it for. And then we talk about the verification of model, and if we don't like it we have to go back and change the structure of the model. In good models this would be the process that you would be following: structure, estimation, goodness of fit, model verification, I don't like it, start again. Does start again mean that we start from nothing? No. Start again means that we learned something. The question is can we improve the something that we just learned. The other thing that you might find is that on the parameters you might have some prior estimates of parameters you might be able to use. In actuarial science we might call that credibility approaches. You can bring in external information over and above the estimation process. What we are now trying to do is to create a model that will account for all of these indices and effects that we talked about and say that I have a model, which means I have a structure, and I would like to estimate the parameters. Now the question becomes what are you looking for? Very quickly, the kinds of models we are talking about are used for three different purposes. One is theory construction; the other is control; and the third is forecast. Theory construction is not something that we spend a lot of time on. But if somebody wants to put together a theory of insurance on a particular line how does the line behave; what are the economic indices that effect it; what are the parameters; what are the elasticity of the indices, i.e., for a 1% change in an index, by what percent does the loss change). Those are the kinds of things that you might be talking about in theory construction. Out here control might be the things of underwriting. And down here things are forecasting which is where you might want to do an estimate of your reserves. One of the things that is a favorite of most statisticians is something that is known as r^2, which is the multiple regression squared. How many of you are unfamiliar with r^2? Very simply r^2 measures the amount of

variability in the data. We talked about the data and we said that the data has changes. And so the data has its ups and downs. Now we have a model that tries to pick up the information in that. The amount of information that has been captured by the model is r^2, and r^2 says how much of the variation in the data that was observed can be captured by the model. A very simple concept, so think about it as an index. Pretend for a moment you have some data and you have two functions. One is really a mirror image of the other. Let's say these are the two functions; it doesn't really matter whether they are the right ones are not. What would you say is the amount of variability explained in these two functions on that data? They're the same, because whatever is big on this side is big on that side for this function and vice versa. If I had put these two functions through this data and had calculated r^2, the r^2 would have been the same for both those functions. I take these two functions and extrapolate out to fill out my triangle. Which one would you pick? You have to think about whether r^2 is a good criteria for forecasting. It is a good measure of fit. It is not necessarily a good measure for extrapolation. Remember what you are doing here is the extrapolation, not just fitting. What are we looking for in extrapolation? In extrapolation basically we're looking at an error structure and asking that it meet certain criteria. Remember when you are doing forecasting you can think about it as gambling. You can go and play blackjack randomly, or you can count cards. But you are still gambling; one has a little more information that the other. But what does one do? What are you trying to do when you begin to count cards? What you are beginning to do is that you're trying to improve the odds that you would be right. There's no such thing as an exact forecast. There's no such thing as a forecast that does not have some error around it. But what you're really trying to do is to improve the odds of being right. In order to improve the odds that you are right, the most important is to make sure that you have the right structure. Then we have a whole bunch of other things that one looks for in these models. One is the requirement of normality; normality in the error structure. Everybody keeps talking about normality. Why do we need normality? The only reason for normality is because a whole bunch of tests have been developed which are based on the theory of normality which one can use and have some credibility saying these tests make sense because it meets the normality assumptions. What it really does is increases the credibility of the test that you're conducting. Homogeneity is that the error structure should be such that all of the points have the same error structure, meaning that the error does not vary from point-to-point either because of time or because of any other variation. Homogeniety and independence are really important not from the purposes of the forecast being good; But it makes the forecast more efficient. Efficient meaning that after you've made the forecast the standard error of the forecast is tighter if it meets these conditions. In some sense you improve your odds again. We also have problems with the data itself. The problems that you have with data are issues of multi-linearity. It's like saying that suppose you have two indices, or three indices, which really contain the same information. The two indices vary exactly the same way. One might say that it turns out if you take two indices that vary but behave in exactly the same way, and you have them in your model,

is it improving the forecast or does it create problems with respectto the odds of being right. What you really want is all of the indices that you are using not to have multi-linearity. Most of you will just apply your regression to data and say I've got a good r^2, but you would really like to know what causes the model to be what it is? Was it caused by a single point? Was it caused by five points? What would happen to the model if I removed a point? It turns out that each point in your data has a different influence in the model structure. The simplest way to look at it is to ask yourself if I removed one point from the data, by how much would the parameters change if I use the same model. If the parameters changed significantly that says that this particular point has a lot of influence. And you want to be very careful to determine if using a model that is constructed on the basis of few points with a lot of influence is a good model.

The third is parsimony which deals with the number of parameters that you work with in a model. You might think that more parameters are good for purposes of fit. And it does turn out that your r^2 will increase as you begin to put in more and more indices and estimate more and more parameters. Unfortunately it turns out that as your parameters increase your forecast ability decreases. You can think about modeling as really made up of two pieces. One is what we call a fit set, and the other is what we call a forecast fit. What is good for the fit is not always necessarily good for the forecast set. Meaning too many parameters to pick up every change on the fit can create very poor forecasts on the forecast set. You have to develop some notion of how many parameters do I need to optimize the forecasting? There are criteria. Influence functions can be handled by looking at certain influence measures. There is something called the Cook measure, it can be handled by a variety of criteria. There's a whole series of criteria that tells you whether you are over fitting data.

In the modeling there are techniques which tells you as to whether there is excess structure. There is a test which we go through after you have fit the model, look at the error structure and comes out with a test which says there is structure left over. And you might want to capture the structure through some kind of transformation. The transformation that we look at is called a power transformation, which is nothing more than raising the data to some power and dividing it by a scaling factor such that it maintains the original scale of the data. It is like saying you're looking at the data or you're looking at the reciprocal of the data. And the question is which structure should it be. It turns out there are test that will tell you as to what the structure should be. There is a maximum likelihood estimate of lambda which tells you exactly what the structure should be. And then you look at the error to see whether it is meeting all of those criteria. This is a very useful transformation.

Pretend for a moment that you are trying to put a model together of somebody doing a 100 meter sprint. You go out there and you look at the condition of the ground, you look at the weather and so forth, and you say what I'm going to do is time the runners. What you get is so many

seconds; you'll get nine seconds flat for 100 meters. It could be a good model, but instead of looking at the nine seconds, suppose I looked at the reciprocal of the nine seconds as the dependent variable. What have I done? To make it simple if I take 100 meters and divide by time what do I get. Distance divided by time is speed. Taking the reciprocal of the data is nothing more than converting measuring in time to measuring in speed. Who is to tell you that a model that is based on time is any better than a model that is based on speed. It is quite possible that all of these things that we just measured, condition of the ground, weather, and so forth, might relate much better to the speed than it might to the time. In which case this lamda would have been minus one. That is what you really want to search for in your data. Now there are a whole bunch of different things that we can talk about as to how one goes about searching for these and this is really what we'd want in terms of the regression techniques and where to go beyond the regression techniques. The fit might be terrible for the purposes of extrapolation. You're extrapolating, remember that.

BEN ZEHNWIRTH: The purpose of my talk is threefold. First, I want to demonstrate to you quite forcefully that the technique based on the computation of development factors, or what is popularly known as the chain ladder method, is unsound and leads to incorrect results. Second, I want to illustrate the fundamental principles of statistical modeling and forecasting reserves. And third, I want to discuss some of my own work in the area. I have a rather ambitious program. I will start with a case study as the vehicle for illustrating the deficiencies of the chain ladder or any method based on calculation of development factors. I then will discuss the chain ladder <u>model</u> corresponding to calculation of development factors. There is in fact an underlying model. This will help us reveal the deficiencies of standard actuarial techniques and also help us later in discussing some of the fundamental principles of forecasting such as: simplicity, parsimony, separation of systematic component from random components and so on. I will then return to the case study armed with some new ammunition. I will read Case Study I in order to illustrate the principles, and then I will go on to some of my own work involving the fitting of Hoerl curves and the concept of varying parameters in order to accomodate the principle of parsimony. Then we'll discuss a real life case study. This is a cumulative paid losses development array. I don't know if you can tell anything by just looking at it. I'll just calculate quickly the development factors. You might notice there is a great variation in development factors between accident years. I've also calculated the weighted average development factors. What I'm essentially doing is using the chain ladder approach in a semi-automatic fashion as most actuaries do. Then I've produced the projected ultimate losses. And if you look at the ultimate losses you might notice that they vary from accident year to accident year. I've then actually also produced the projected non cumulative paid losses to give a better idea of future case flow. $162,865 is the projected total reserve that you need to set aside based on this chain ladder technique. I hope in this session to destroy some of the myths about the chain ladder technique and calculation of development factors. Inherent in the chain ladder technique is an underlying model. This fact is very important

because then you can reveal more clearly what are the deficiencies or the merits of the chain ladder technique. Let's suppose that our triangle delay or development periods measure across the horizontal axis, the veritical axis is the accident year and what I call diagonals are the payment years. Let's suppose that triangle we start out with has cumulative paid losses and then we create a triangle of the non cumulative paid losses. In other words we assume that every accident year has its effect. Every column has its effect. The number of parameters is equal to the number of accident years multiplied by two minus one. This two-way analysis of variance model is essentially the chain ladder technique applied to the cumulative development array. This was demonstrated by Crane 1982 paper in the Scandanavian Actuarial Journal and also Charles Heckmeister has written a paper. Where he uses a two-way analysis of variance model. We are assuming that the logorithm of the paid losses have a normal distribution. But if you actually push this mathematics through, you will also find out two things about the chain ladder. One is that the estimates produced by the chain ladder are biased downwards. In other words, only average you are underpredicting. Another thing is that the hours associated with the chain letter, the prediction errors, are very high. The chain letter typically produces very unstable answers. If you just changed one billion by ten percent at the bottom part of your triangle, you'll find that your answer will change by quite a lot more than ten percent. Let us discuss the deficiencies standard actuarial techniques. These techniques are (high uncertainties); biased downwards, over-parameterized (too many quantities are calculated). Again I want to emphasize: the chain ladder approach actually involves a model where you have the main effect for every accident year and the main effect for every development age. It is a two-way analysis of variance model. To estimate the parameter associated with your latest accident year, you essentially use one observation. The last accident year in your triangle only has one observation. The stated actuarial techniques do not separate the systematic component from the random component. Standard errors are not computed and that sort of estimation is non-optimal. The way you use the chain ladder technique, the way you estimate your parameters is not done optimally. This chain ladder technique actually goes a number of steps. The first step is loss development factors, the second step is actually getting the projections. And it's when you get the projections that you're assuming that every accident year has a different mean level. The models are not tested. The model is theoretically inconsistent. In fact, one of the theoretical inconsistencies of the chain ladder approach led to the Bornhuetter-Ferguson technique, because of inconsistent losses between accident years.

I will now highlight the fundamental principles of modeling. First, models should be simple. The processes that affect severity are invariably complex. A model is not intended to explain every aspect of the claims processes. What it should do is bring out the essential features. Milton Freeman said "the hypothesis is important if it explains much by little." He said that simple statements are to be prized more highly than less simple ones, because they tell us more, need tobecause their empirical content is greater, and most importantly, they

are better testable." Testing is very important. Actually this idea of simple models I suppose is incapsulated in the statistical principle of parsimony which essentially says that a model should have as few parameters as possible. A model should capture the systematic components in the data. It should separate the systematic component from the random component. You need to calculate certain standard errors (uncertainties) especially to do some monitoring. I attended a session this morning where people were talking about hindsight reserving. How do we know that we were (i.e., comparing the projections with the actualities). You need some kind of framework in which to do the comparison and you haven't got that framework unless you've calculated uncertainties.

What are the steps in modeling? Tapan mentioned some of them. The first step is to explore the data, find out what the data tells you, look at the data. You then need to postulate a simple model. Next, estimate that model and then test it to make sure that it has captured all of the systematic components. And whatever is left over is random. This sequence of postulate model, estimate model, and test model, is an iterative procedure. And hopefully to converge very quickly. Let's revisit the case study. Are the development factors the same for every accident year or are they different. Who would use the chain ladder technique? Keep in mind that when you're using the chain ladder technique you are assuming that every accident year has a different level and every development period has a different level. If you feel that the development factors are different for accident years, and development factors are different for the columns, why not use the chain ladder technique? You'll find out why in a minute. The first thing you should do is look at your data. What I've done essentially here, is plot the paid losses against the lag, or against development period for all the accident years combined. Can we tell anything from this? The numbers seem to be going all over the place. That's all I can tell so far, that's the only knowledge I have at the moment. I can't really tell that accident years are different, not from that plot. I'm going to try to fit the following model to see if it works. It's a very simple model. I'm going to say that the logorithm of the paid losses has a normal distribution with a constant mean. It doesn't depend on which accident year you're in and which development year. In other words each paid loss is a realization from the same distribution. Nothing changes, which is pretty bad for the company actually. I'm assuming that model and then I derive the parameters of that model using an optimal statistical technique and then I obtain forcasts. The forecasts that I obtain are mean forecasts. Incidentally when you transform the data to get the forecast in your original dollars, you don't just retransform. If you take the logorithm of the data then you can find your forecast on a logorithmic scale. If you want to get your forecast in your original dollars, you just don't exponentiate. You'll have to read the manual if you want to know why. I've done this very quickly, I've obtained the estimates of the parameters and so on. Notice that this time the model assumes complete homogeneity as far as all development factors are really the same; all accident years are the same; payments are just realization from the same distribution. These are the answers and the total answer I get is 194,000 this time. I've also calculated all the standard errors

and I've actually calculated each forecast according to this model. What I've done now what Kevin suggested. I've looked at the residuals, the errors. I've fitted a model which is simply just plane. Then I've taken the observed minus the expected, what is sitting on the plane, and plotted that against delay to see if there is any distinct pattern. To see if there is anything there that my model has not explained. I'm looking at what is left over, the unexplained part of my model. To see whether it's a decent model or not. I can't detect any pattern there at all. This is just the residuals or standardized residuals against delay. Then I look at the standardized residuals against accident years because that's another important direction. Payment years or calendar years is the most important direction. Time moves in the direction of your diagonals. The most important data that you'll have is the last diagonal. That's the most important data. If you knock out the first diagonals, should you get the same answer. Suppose you've got two actuaries, and you'd present one with a whole triangle and the other one with a triangle save the first three diagonals. All the diagonals that are sitting out there are just observations further in the past. Why should that influence so much what happens in the future? It's the last diagonal which is most important. In fact you should be able to do a lot of calculations just based on the last diagonal. If you read the manual you'll find out in a lot of situations the answer you get with the last diagonal is the same as if you had the whole triangle. This is just a plot against accident years, and again I cannot really detect any distinct systematic pattern. It seems to be random. Here is another one against payment years or what you call calendar years which is also very important. And again, there is no distinct pattern. As far as I'm concerned my model has explained everything that is happening. Anything that is left over is really what we call randomness. And in your forecast in the model you do take account of the degree of that randomness when we forecast. Now I can tell you what the answer is for the total forecast because I know what model generated the data. Because after all what you're observing in the future are realizations of random variables. The final forecast is 225,000 with a standard error of 20,000. This result is quite different (higher) than that produced by the chain ladder technique.

SLIDES OF TALK PRESENTED AT

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BY

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PROGRAM

1. CASE STUDY 1 INVOLVING CHAIN LADDER

2. CHAIN LADDER MODEL

3. DEFICIENCIES OF STANDARD ACTUARIAL TECHNIQUES

4. FUNDAMENTAL PRINCIPLES OF FORECASTING

   - SIMPLICITY
   - PARSIMONY
   - SEPARATION OF SYSTEMATIC COMPONENT
   - FROM RANDOM COMPONENTS

5. RE-VISIT CASE STUDY 1 IN ORDER TO ILLUSTRATE PRINCIPLES

6. HOERL CURVES

7. VARYING PARAMETERS (PRINCIPLE OF PARSIMONY)

8. CASE STUDY 2

CUMULATIVE PAID LOSSES

10266	13685	17409	27015	35167	43342	47300	50330	52063	55574
1767	4221	10801	13620	15577	17727	21404	26155	28987	
6232	11375	14042	18320	20609	26824	33097	38002		
4597	8188	14097	19253	23266	26823	28784			
4248	8053	12048	18363	21843	25329				
1643	3720	8821	10728	14002					
3270	10500	12353	16511						
3161	5226	11116							
5305	11383								
6127									

DEVELOPMENT FACTORS

1.333	1.272	1.552	1.302	1.232	1.091	1.064	1.034	1.067
2.389	2.559	1.261	1.144	1.138	1.207	1.222	1.108	
1.825	1.234	1.305	1.125	1.302	1.234	1.148		
1.781	1.722	1.366	1.208	1.153	1.073			
1.896	1.496	1.524	1.190	1.160				
2.264	2.371	1.216	1.305					
3.211	1.176	1.337						
1.653	2.127							
2.146								

WEIGHTED AVERAGE DEVELOPMENT FACTORS

1.886	1.550	1.382	1.216	1.202	1.138	1.125	1.060	1.067

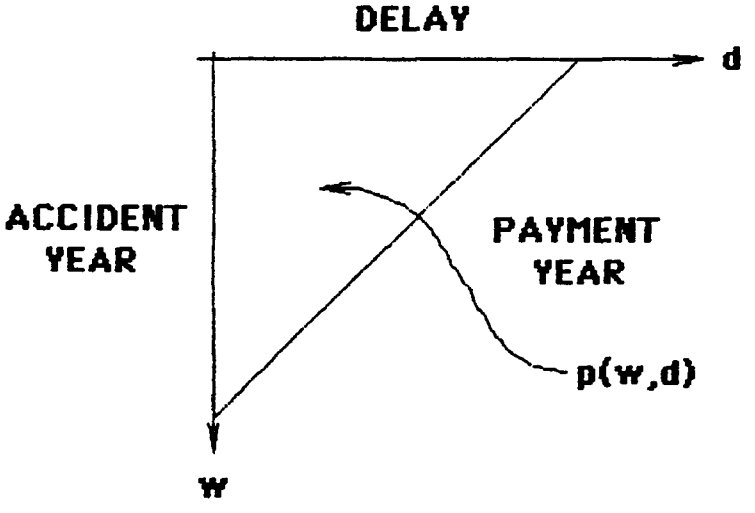
PROJECTED ULTIMATE LOSSES

10266	13685	17409	27015	35167	43342	47300	50330	52063	55574
1767	4221	10801	13620	15577	17727	21404	26155	28987	30942
6232	11375	14042	18320	20609	26824	33097	38002	40270	42986
4597	8188	14097	19253	23266	26823	28784	32371	34303	36616
4248	8053	12048	18363	21843	25329	28833	32426	34361	36678
1643	3720	8821	10728	14002	16837	19166	21555	22841	24382
3270	10500	12353	16511	20076	24141	27480	30905	32749	34958
3161	5226	11116	15365	18682	22465	25573	28760	30477	32532
5305	11383	17641	24385	29649	35653	40585	45643	48367	51629
6127	11554	17906	24751	30094	36188	41194	46328	49093	52403

PROJECTED NON-CUMULATIVE PAID LOSSES

10266	3419	3724	9606	8152	8175	3958	3030	1733	3511	
1767	2454	6580	2819	1957	2150	3677	4751	2832	1955	1955
6232	5143	2667	4278	2289	6215	6273	4905	2268	2716	4983
4597	3591	5909	5156	4013	3557	1961	3587	1932	2313	7831
4248	3805	3995	6315	3480	3486	3504	3593	1935	2317	11348
1643	2077	5101	1907	3274	2835	2329	2388	1287	1540	10378
3270	7230	1853	4158	3565	4065	3339	3424	1845	2209	18444
3161	2065	5890	4249	3317	3783	3108	3187	1717	2055	21413
5305	6078	6258	6743	5264	6004	4932	5058	2724	3262	40242
6127	5427	6352	6845	5343	6094	5006	5133	2765	3311	46272
	33643	31046	25866	21480	17595	13987	9912	6026	3310	162865

CHAIN LADDER MODEL



$$y(w,d) = \log p(w,d)$$

$$= \mu + a_w + b_d + \varepsilon$$

$$VAR[\varepsilon] = \sigma^2$$

$$\hat{y}(w,d) = \hat{\mu} + \hat{a}_w + \hat{b}_d$$

$$se(\hat{y}) = s$$

$$\hat{p}(w,d) = \exp[\hat{y} + \tfrac{1}{2}s^2]$$

DEFICIENCIES OF STANDARD ACTUARIAL TECHNIQUES

- UNSTABLE (HIGH UNCERTAINTIES)

- BIASED DOWNWARDS

- OVERPARAMETERISED

- DO NOT SEPARATE THE SYSTEMATIC COMPONENT FROM THE RANDOM COMPONENT

- STANDARD ERRORS NOT COMPUTED

- METHOD OF ESTIMATION NON-OPTIMAL

- MODELS NOT TESTED

- THEORETICALLY INCONSISTENT

FUNDAMENTAL PRINCIPLES

- SIMPLE MODELS

- PARSIMONY

- CAPTURE SYSTEMATIC COMPONENT

- SEPARATE SYSTEMATIC COMPONENT FROM RANDOM COMPONENT

- STANDARD ERRORS (UNCERTAINTIES)

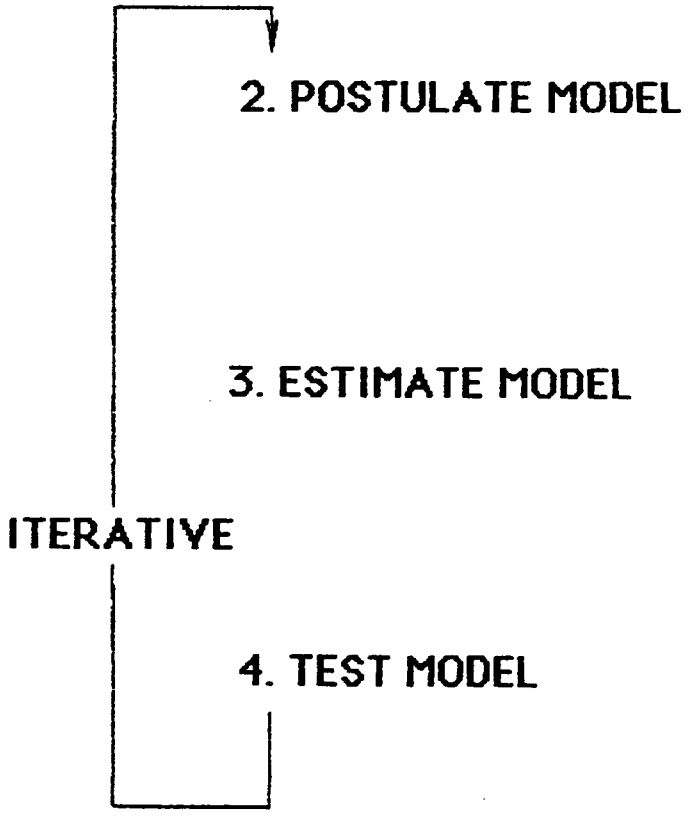
- TEST MODELS

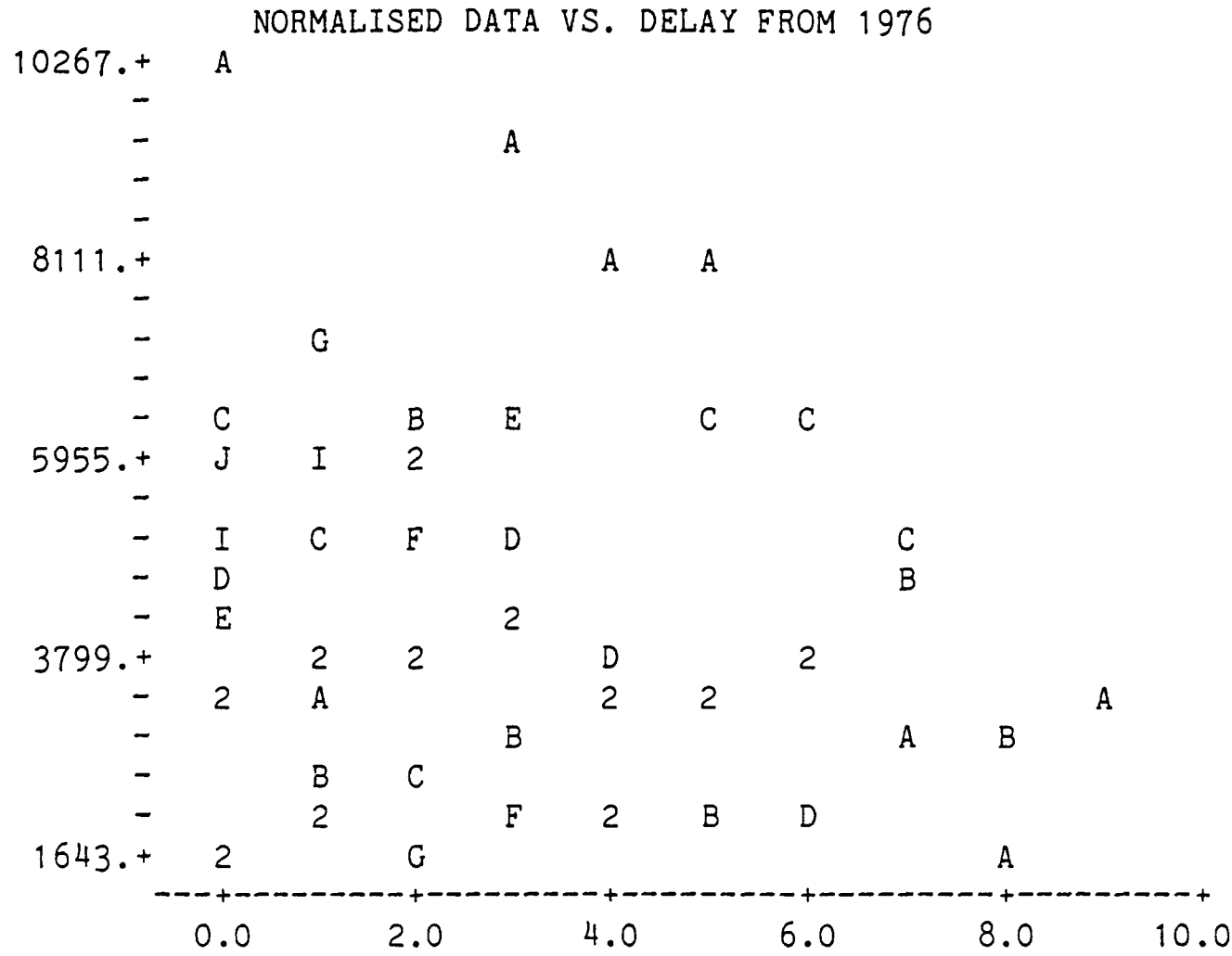
- THEORETICALLY CONSISTENT

STEPS IN MODELLING

1. EXPLORE DATA

   (PRELIMINARY ANALYSIS)




NORMALISED DATA VS. DELAY FROM 1976
10267.+
8111.+
5955.+
3799.+
1643.+
0.0
2.0
4.0
6.0
8.0
10.0

MODEL

$$y(w,d) = \log p(w,d)$$

$$= \alpha + \varepsilon \; : \; VAR[\varepsilon] = \sigma^2$$

$$\hat{\alpha} = 8.257$$

$$\hat{\sigma}^2 = 0.2201$$

$$s.e.(\hat{\alpha}) = 0.0633$$

$$\hat{y}(w,d) = 8.257$$

$$\hat{p}(w,d) = EXP[\hat{\alpha} + 0.5 \times (0.0633^2 + 0.2201^2)]$$

$$= 4313$$

$$MEDIAN = EXP[\hat{\alpha}]$$

$$= 3855$$

PARAMETER ESTIMATES

ACCI YEAR	ALPHA	S.E.	T-RATIO	BETA	S.E.	T-RATIO	GAMMA	S.E.	T-RATIO
1976	8.257	0.0633	130.53	0.000	0.0000	0.00	0.000	0.0000	0.00
1977	8.257	0.0633	130.53	0.000	0.0000	0.00	0.000	0.0000	0.00
1978	8.257	0.0633	130.53	0.000	0.0000	0.00	0.000	0.0000	0.00
1979	8.257	0.0633	130.53	0.000	0.0000	0.00	0.000	0.0000	0.00
1980	8.257	0.0633	130.53	0.000	0.0000	0.00	0.000	0.0000	0.00
1981	8.257	0.0633	130.53	0.000	0.0000	0.00	0.000	0.0000	0.00
1982	8.257	0.0633	130.53	0.000	0.0000	0.00	0.000	0.0000	0.00
1983	8.257	0.0633	130.53	0.000	0.0000	0.00	0.000	0.0000	0.00
1984	8.257	0.0633	130.53	0.000	0.0000	0.00	0.000	0.0000	0.00
1985	8.257	0.0633	130.53	0.000	0.0000	0.00	0.000	0.0000	0.00

S = 0.4691 S-SQUARED = 0.2201 S-SQUARED(SC) = 0.2247

R-SQUARED = 0.0 PERCENT N = 55 P = 1.0

AIC = 73.83 AIC(SC) = 76.97

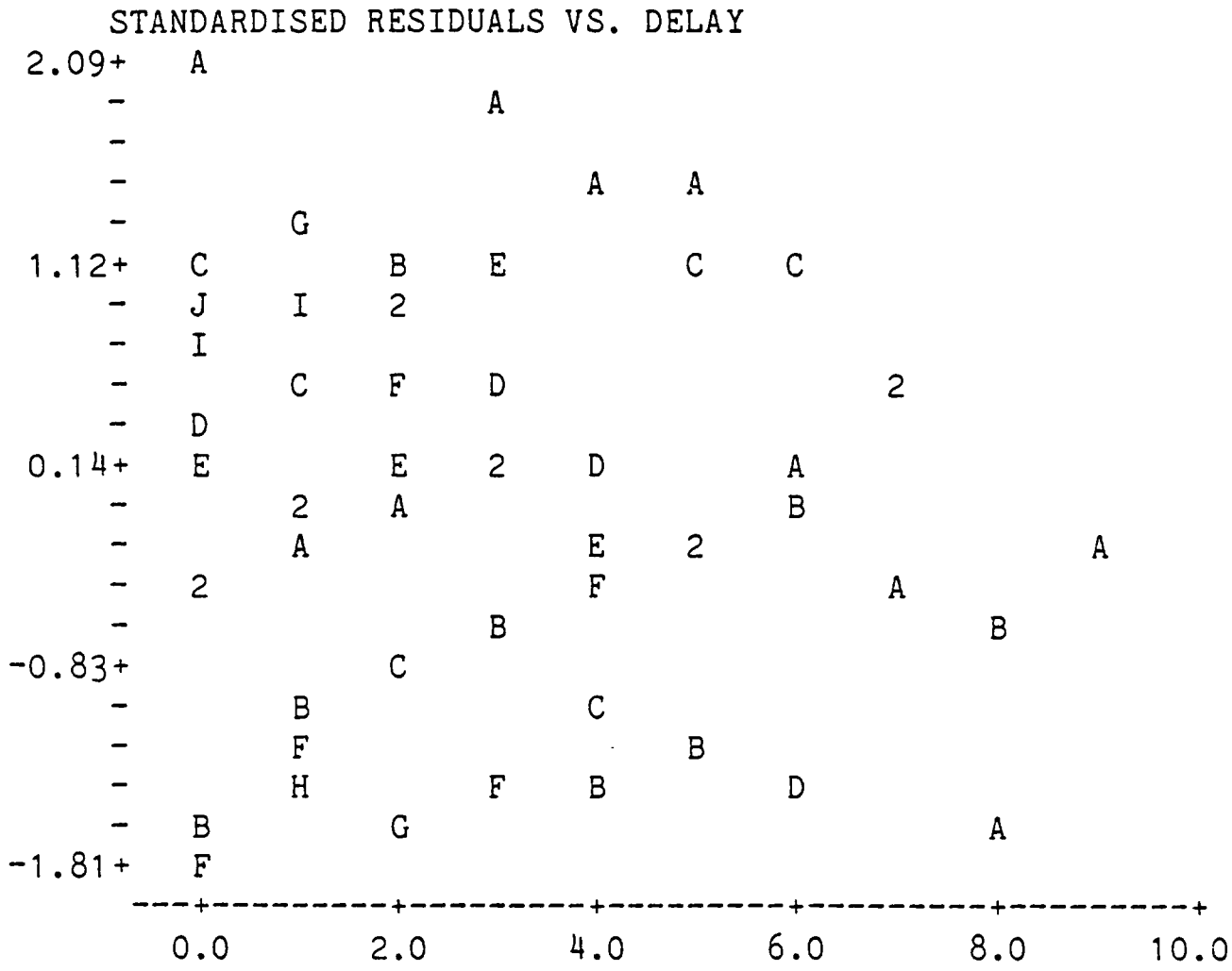
EXPECTED PAYMENTS/OBSERVED PAYMENTS

FORECAST MEAN PAYMENTS/STANDARD ERRORS

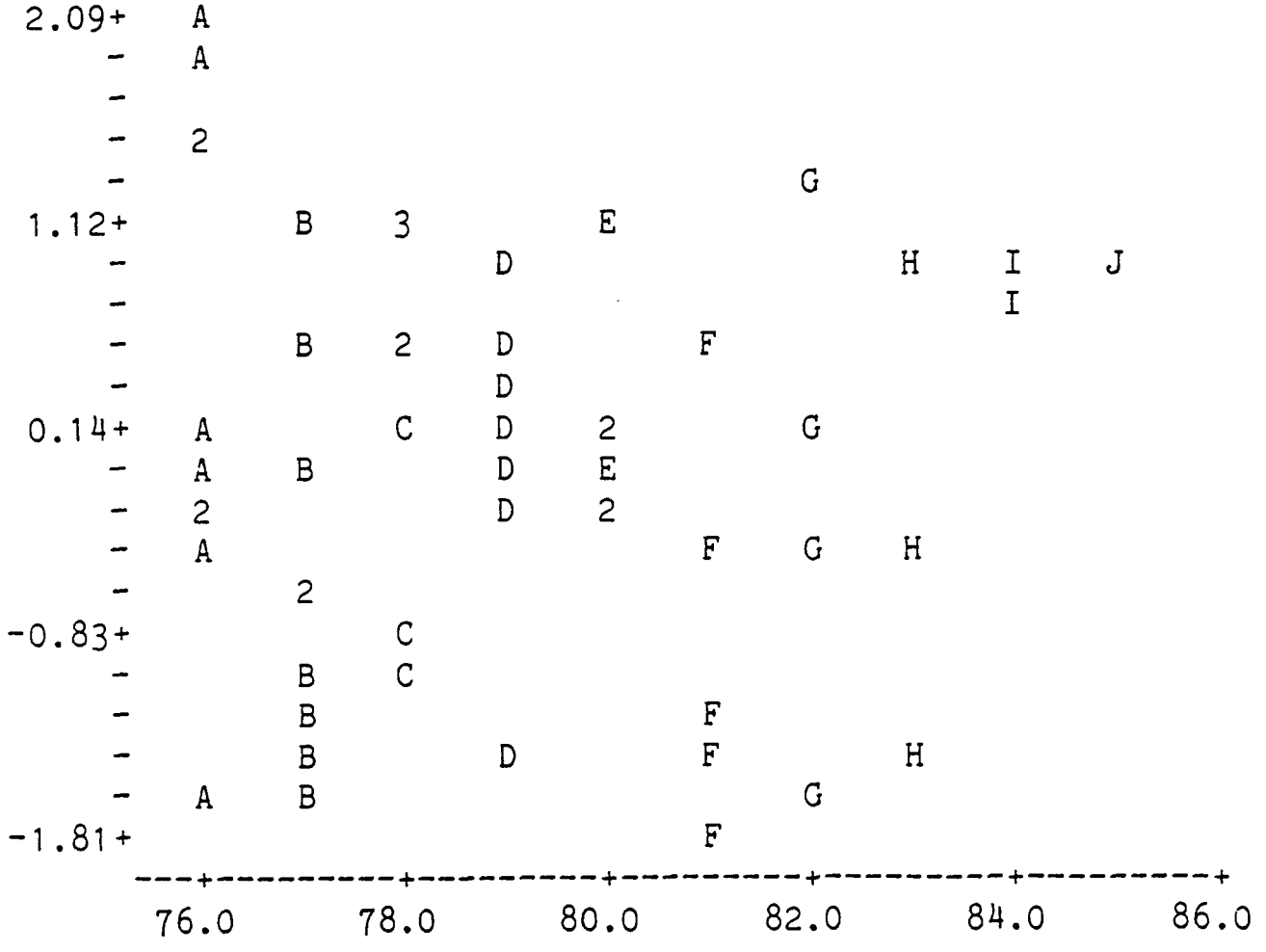
(PAYMENTS IN $1'S)

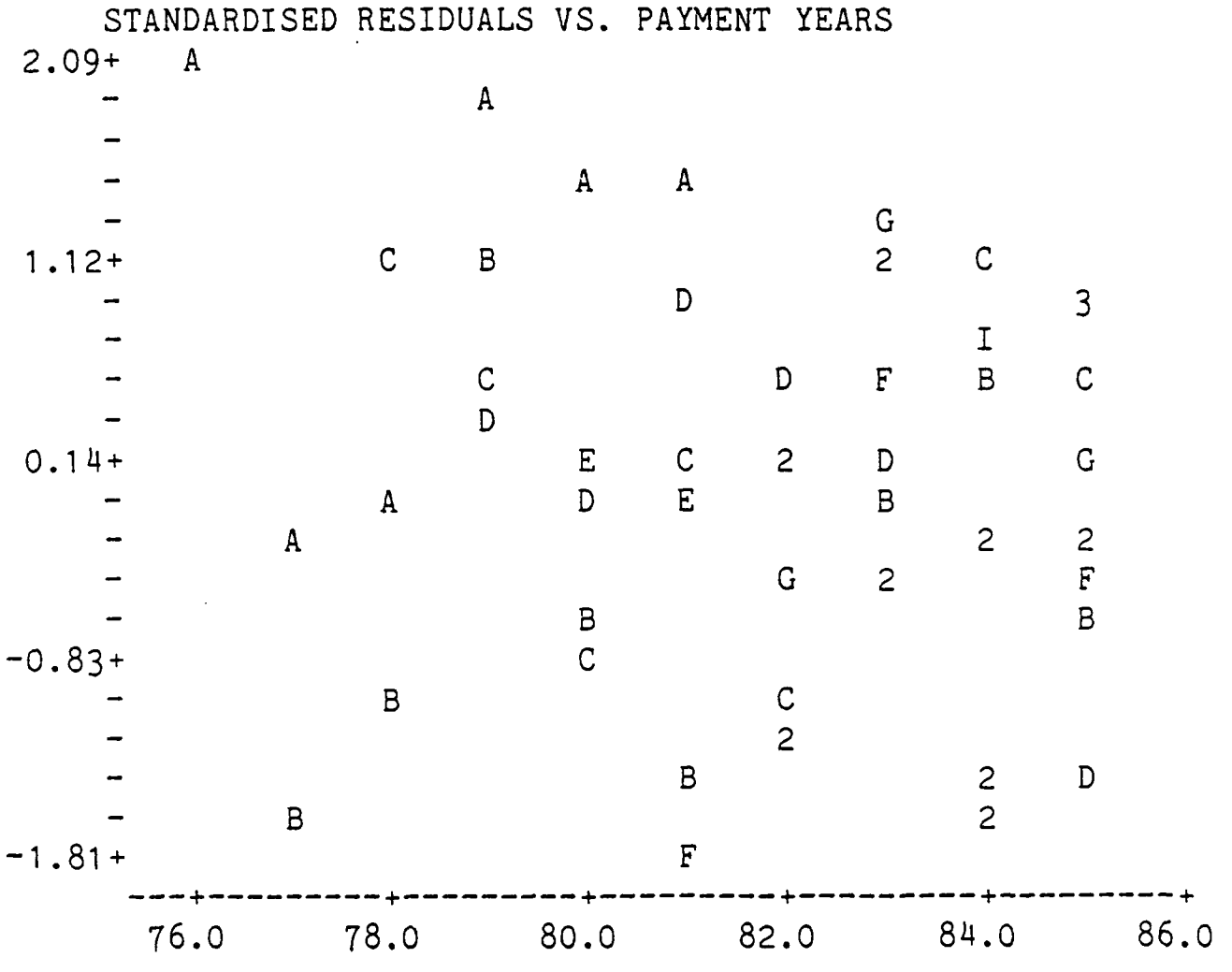
YEAR											
1976	3855	3855	3855	3855	3855	3855	3855	3855	3855	3855	0
	10266	3419	3724	9606	8152	8175	3958	3030	1733	3511	0
1977	3855	3855	3855	3855	3855	3855	3855	3855	3855	4313	4313
	1767	2454	6580	2819	1957	2150	3677	4751	2832	2161	2161
1978	3855	3855	3855	3855	3855	3855	3855	3855	4313	4313	8625
	6232	5143	2667	4278	2289	6215	6273	4905	2161	2161	3080
1979	3855	3855	3855	3855	3855	3855	3855	4313	4313	4313	12938
	4597	3591	5909	5156	4013	3557	1961	2161	2161	2161	3800
1980	3855	3855	3855	3855	3855	3855	4313	4313	4313	4313	17250
	4248	3805	3995	6315	3480	3486	2161	2161	2161	2161	4420
1981	3855	3855	3855	3855	3855	4313	4313	4313	4313	4313	21563
	1643	2077	5101	1907	3274	2161	2161	2161	2161	2161	4977
1982	3855	3855	3855	3855	4313	4313	4313	4313	4313	4313	25875
	3270	7230	1853	4158	2161	2161	2161	2161	2161	2161	5491
1983	3855	3855	3855	4313	4313	4313	4313	4313	4313	4313	30188
	3161	2065	5890	2161	2161	2161	2161	2161	2161	2161	5973
1984	3855	3855	4313	4313	4313	4313	4313	4313	4313	4313	34500
	5305	6078	2161	2161	2161	2161	2161	2161	2161	2161	6429
1985	3855	4313	4313	4313	4313	4313	4313	4313	4313	4313	38813
	6127	2161	2161	2161	2161	2161	2161	2161	2161	2161	6866
PMT TOTS		38813	34500	30188	25875	21563	17250	12938	8625	4313	194065
STD ERRORS		6886	6446	5986	5502	4985	4425	3803	3081	2161	18918

ACC. YEAR	EXPECTED	OBSERVED	DIFF	%ER	PMNT YEAR	EXPECTED	OBSERVED	DIFF	%ER
	(PAYMENTS IN $1'S)					(PAYMENTS IN $1's)			
76	38554	55574	17020	44	76	3855	10266	6411	166
77	34699	28987	-5712	-16	77	7711	5186	-2525	-32
78	30843	38002	7159	23	78	11566	12410	844	7
79	26988	28784	1796	6	79	15422	25926	10504	68
80	23133	25329	2196	9	80	19277	21477	2200	11
81	19277	14002	-5275	-27	81	23133	25767	2634	11
82	15422	16511	1089	7	82	26988	22895	-4093	-15
83	11566	11116	-450	-3	83	30843	38742	7899	25
84	7711	11383	3672	47	84	34699	30924	-3775	-10
85	3855	6127	2272	58	85	38554	42222	3668	9


STANDARDISED RESIDUALS VS. DELAY
2.09+ A
- A
- A A
- G
1.12+ C B E C C
- J I 2
- I
- C F D 2
- D
0.14+ E E 2 D A
- 2 A B
- A E 2 A
- 2 F A
- B B
-0.83+ C
- B C
- F B
- H F B D
- B G A
-1.81+ F
0.0 2.0 4.0 6.0 8.0 10.0

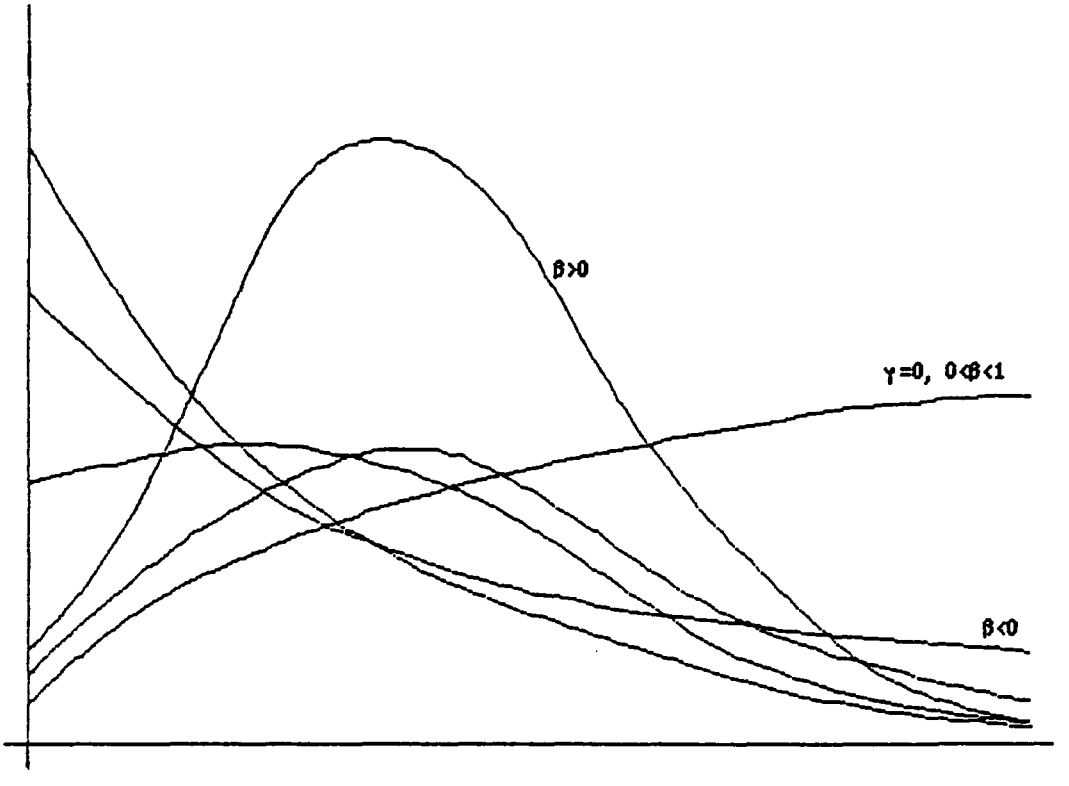
STANDARDISED RESIDUALS VS. ACCIDENT YEARS




STANDARDISED RESIDUALS VS. PAYMENT YEARS
2.09+ A
A
A A
G
1.12+ C B 2 C
D 3
I
C D F B C
D
0.14+ E C 2 D G
A D E B
A 2 2
G 2 F
B B
-0.83+ C
B C
2
B 2 D
B 2
-1.81+ F
76.0 78.0 80.0 82.0 84.0 86.0

BASIC MODELLING CONCEPTS

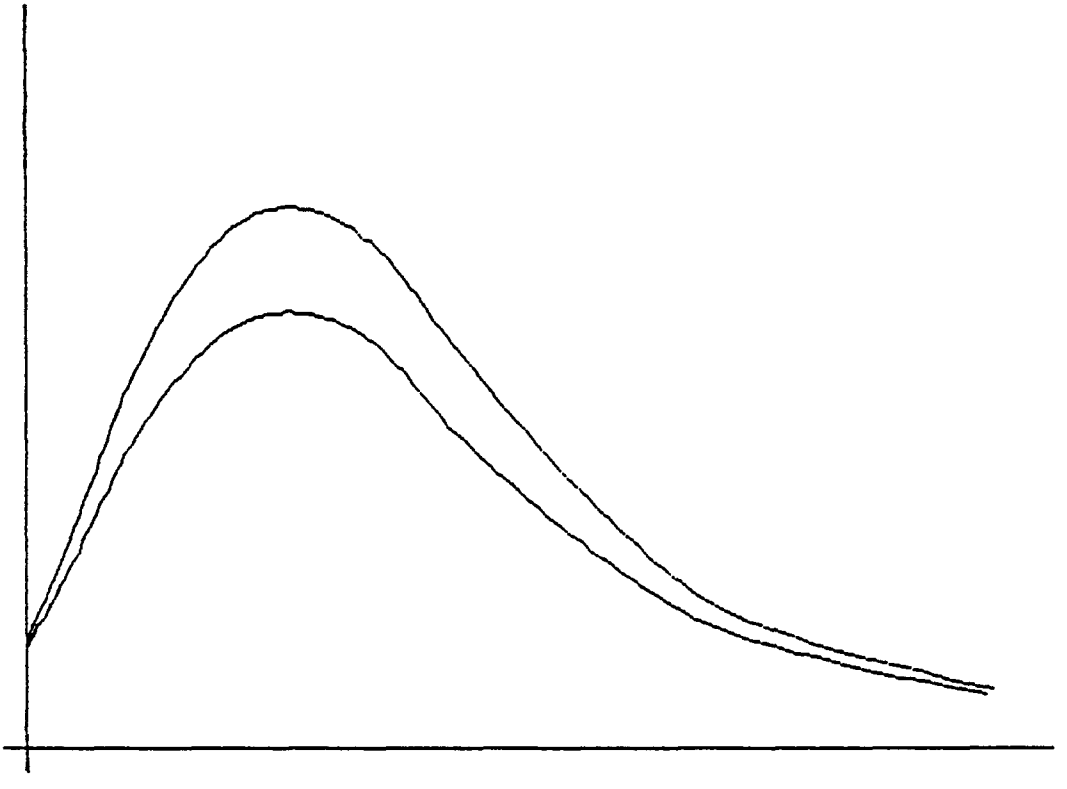
RUN-OFF CURVES



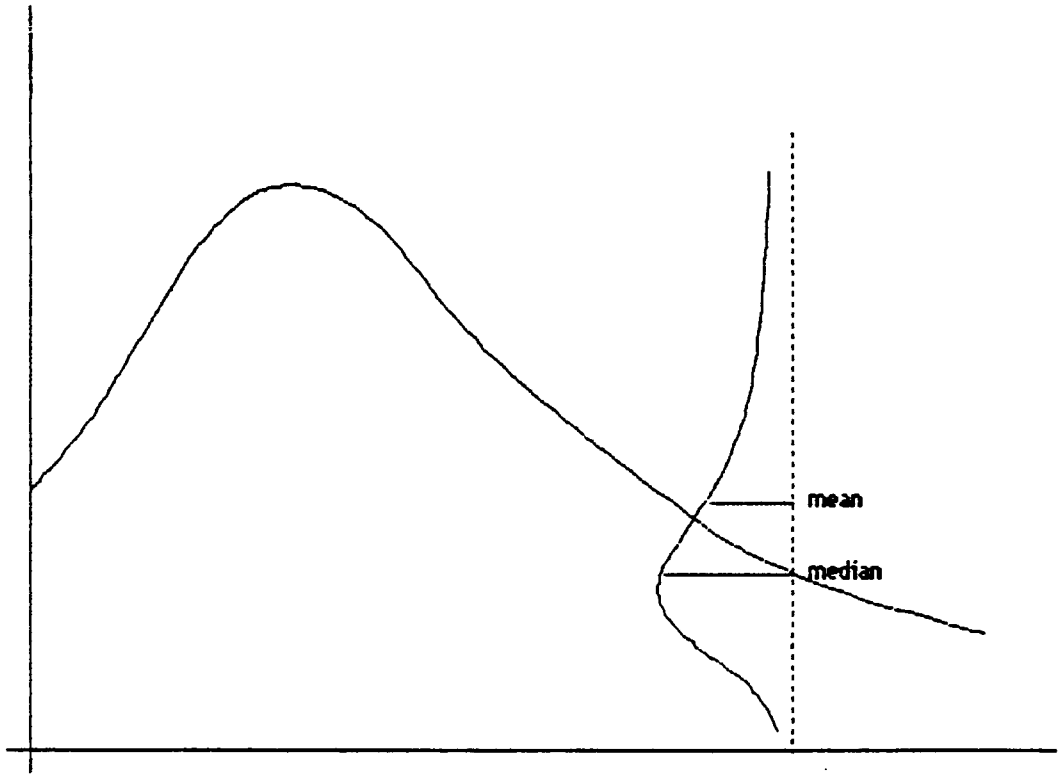
THREE PARAMETERS

ALPHA	BETA	GAMMA
LEVEL	SHAPE	SHAPE
	BODY AND TAIL	TAIL

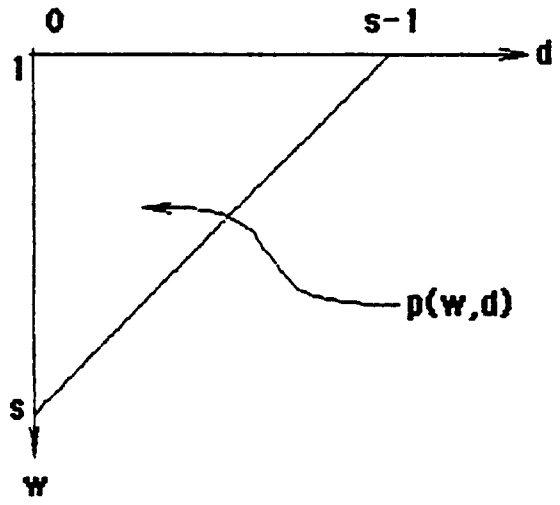
DIFFERENT ALPHAS



DEVIATIONS FROM RUN-OFF CURVES



EXAMPLES OF MODELS



$$y(w,d) = \log p(w,d) = \alpha(w) + \beta(w)\log(1+d) + \gamma(w)d + \varepsilon$$

CHAIN LADDER

$$y(w,d) = \mu + a_w + b_d + \varepsilon$$

SINGLE CURVE

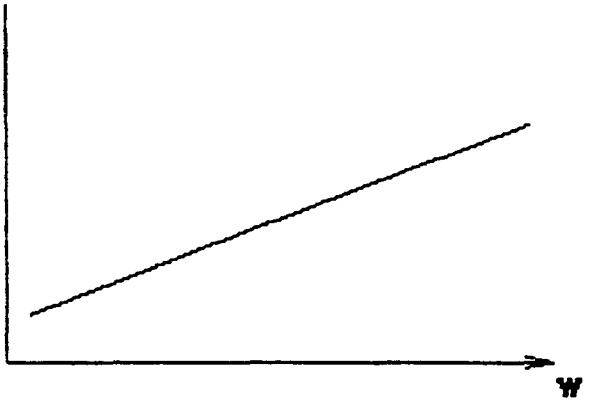
$$y(w,d) = \alpha + \beta \log(1+d) + \gamma d + \varepsilon$$

SMOOTH CHAIN LADDER

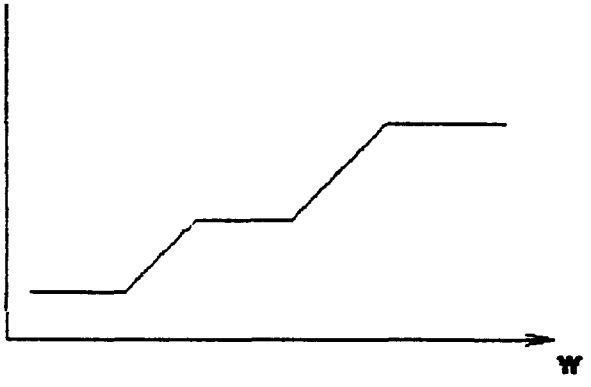
$$y(w,d) = \alpha(w) + \beta \log(1+d) + \gamma d + \varepsilon$$

ANY TRENDS IN LEVEL

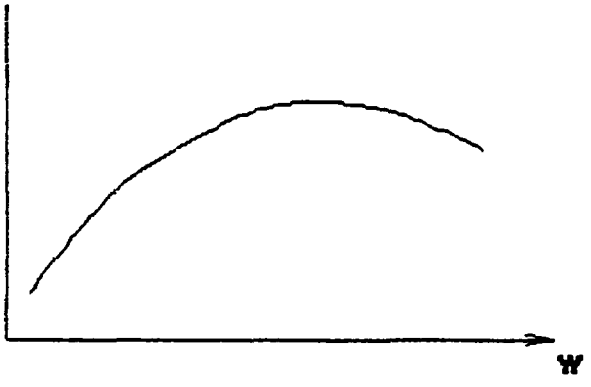
(i)



(ii)



(iii)



PRINCIPLE OF PARSIMONY

THIS IMPORTANT PRINCIPLE CAN BE ACCOMODATED RATHER NEATLY USING THE CONCEPT OF

VARYING PARAMETERS

THERE IS NO NEED TO HAVE A FREE α PARAMETER FOR EACH ACCIDENT YEAR AS IN SMOOTH CHAIN LADDER

IN PLACE

$$\alpha(w) = \alpha(w-1) + \delta \;:\; VAR[\delta] = \sigma_\delta^2$$

ANALOGOUS TO EXPONENTIAL SMOOTHING

APPENDIX B2

CLAIM PAYMENTS ($ '000s) IN 30.6.85 VALUES

ACCIDENT YEAR	DELAY (OR DEVELOPMENT)																	
	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1968	2048	1873	911	945	711	301	219	256	215	109	19	134	117	33	32	86	75	118
1969	2271	1743	977	671	520	657	652	299	128	76	242	297	151	134	315	51	82	
1970	2104	1780	1157	733	518	541	408	445	272	246	397	371	268	460	53	82		
1971	1850	2174	1281	816	1340	627	59	191	341	253	511	188	295	274	107			
1972	2394	2519	1594	1804	687	342	329	542	445	218	261	146	167	100				
1973	2766	3028	2483	1137	989	778	802	402	400	286	328	155	160					
1974	3066	2467	1972	1207	793	1124	753	500	502	393	321	203						
1975	2936	2610	2079	1725	1740	1458	1088	708	652	318	255							
1976	2665	2964	2330	3253	1795	752	851	740	731	543								
1977	3455	3866	6378	3369	2049	1058	1303	980	944									
1978	5067	8858	6459	2905	2816	1970	1476	1303										
1979	9747	11151	7261	5311	3050	2220	2683											
1980	10656	10812	7645	6041	5400	2339												
1981	11955	11027	7777	5702	4390													
1982	12479	11353	10039	6312														
1983	11494	10894	8173															
1984	11787	14087																
1985	12951																	

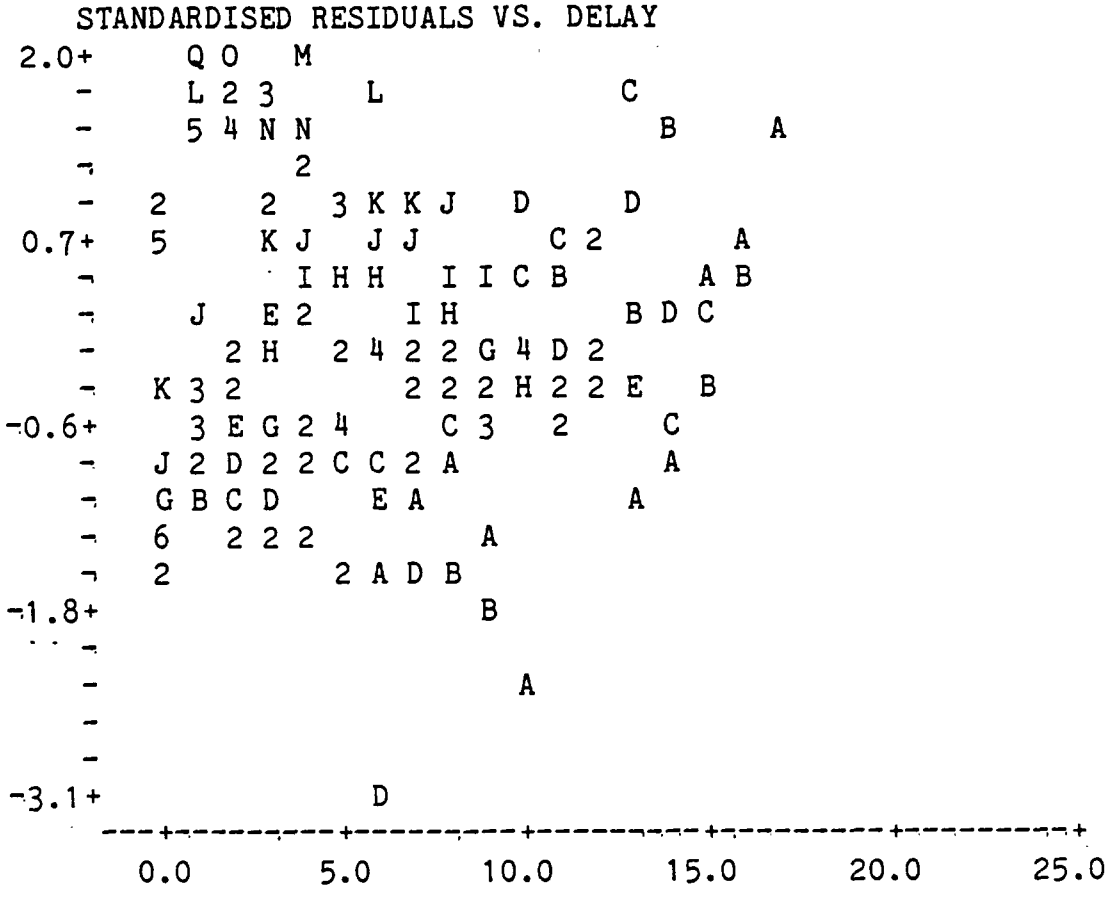
**** PROJECT GOV0 ****

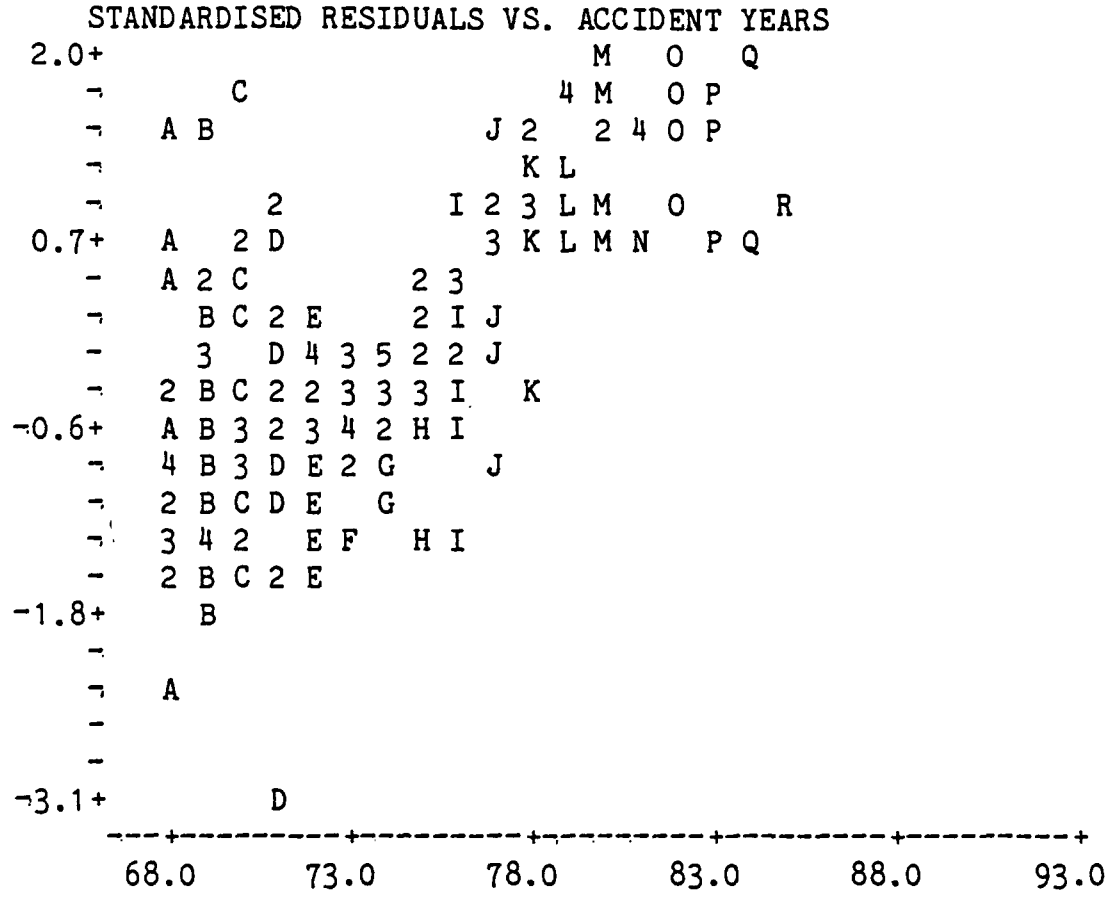
REGRESSION FOR ACCIDENT YEARS 1968-1985

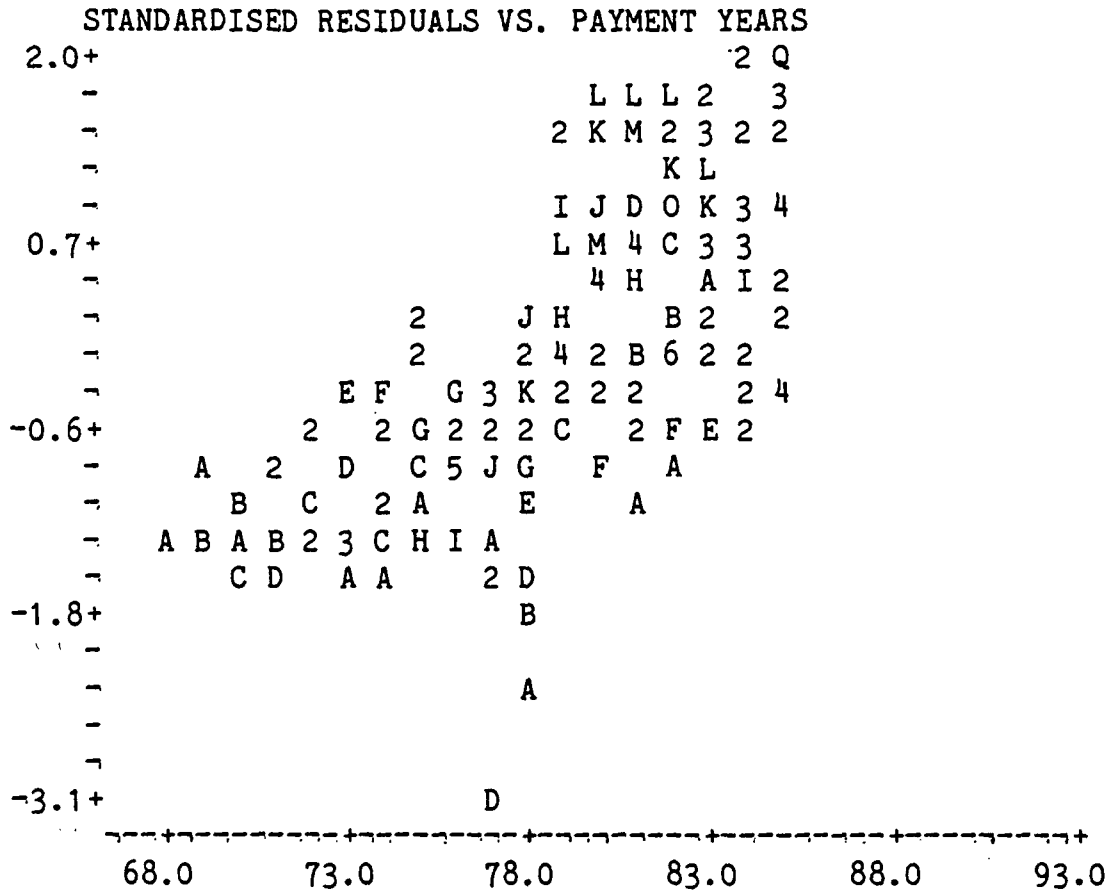
PARAMETER	ESTIMATE	ST. ERR OF ESTIM.	T-RATIO
ALPHA	5.928	0.1268	46.74
BETA	-0.4628	0.1568	-2.951
GAMMA	-0.1685	0.2926E-01	-5.758

S = 0.6140 S-SQUARED = 0.3771

R-SQUARED = 76.2 PERCENT N = 171


STANDARDISED RESIDUALS VS. DELAY
2.0+
0.7+
-0.6+
-1.8+
-3.1+
0.0
5.0
10.0
15.0
20.0
25.0


STANDARDISED RESIDUALS VS. ACCIDENT YEARS
2.0+
0.7+
-0.6+
-1.8+
-3.1+
68.0
73.0
78.0
83.0
88.0
93.0


STANDARDISED RESIDUALS VS. PAYMENT YEARS
2.0+
0.7+
-0.6+
-1.8+
-3.1+
68.0
73.0
78.0
83.0
88.0
93.0

**** PROJECT gov1 ****

PARAMETER ESTIMATES

ACCI YEAR	ALPHA	S.E.	T-RATIO	BETA	S.E.	T-RATIO	GAMMA	S.E.	T-RATIO
1968	5.568	0.2249	24.76	-0.342	0.1228	-2.79	-0.164	0.0248	-6.63
1969	5.747	0.2143	26.81	-0.342	0.1228	-2.79	-0.164	0.0248	-6.63
1970	5.827	0.2059	28.30	-0.342	0.1228	-2.79	-0.164	0.0248	-6.63
1971	5.757	0.1984	29.02	-0.342	0.1228	-2.79	-0.164	0.0248	-6.63
1972	5.518	0.1918	28.77	-0.342	0.1228	-2.79	-0.164	0.0248	-6.63
1973	5.434	0.1887	28.80	-0.342	0.1228	-2.79	-0.164	0.0248	-6.63
1974	5.570	0.1855	30.02	-0.342	0.1228	-2.79	-0.164	0.0248	-6.63
1975	5.714	0.1803	31.69	-0.342	0.1228	-2.79	-0.164	0.0248	-6.63
1976	5.842	0.1746	33.46	-0.342	0.1228	-2.79	-0.164	0.0248	-6.63
1977	6.212	0.1677	37.04	-0.342	0.1228	-2.79	-0.164	0.0248	-6.63
1978	6.413	0.1580	40.59	-0.342	0.1228	-2.79	-0.164	0.0248	-6.63
1979	6.654	0.0999	66.60	-0.342	0.1228	-2.79	-0.164	0.0248	-6.63
1980	6.656	0.0972	68.50	-0.342	0.1228	-2.79	-0.164	0.0248	-6.63
1981	6.658	0.0954	69.81	-0.342	0.1228	-2.79	-0.164	0.0248	-6.63
1982	6.660	0.0946	70.42	-0.342	0.1228	-2.79	-0.164	0.0248	-6.63
1983	6.660	0.0950	70.10	-0.342	0.1228	-2.79	-0.164	0.0248	-6.63
1984	6.660	0.0968	68.80	-0.342	0.1228	-2.79	-0.164	0.0248	-6.63
1985	6.658	0.0999	66.66	-0.342	0.1228	-2.79	-0.164	0.0248	-6.63

S = 0.2801 S-SQUARED = 0.0785 S-SQUARED(SC) = 0.1561

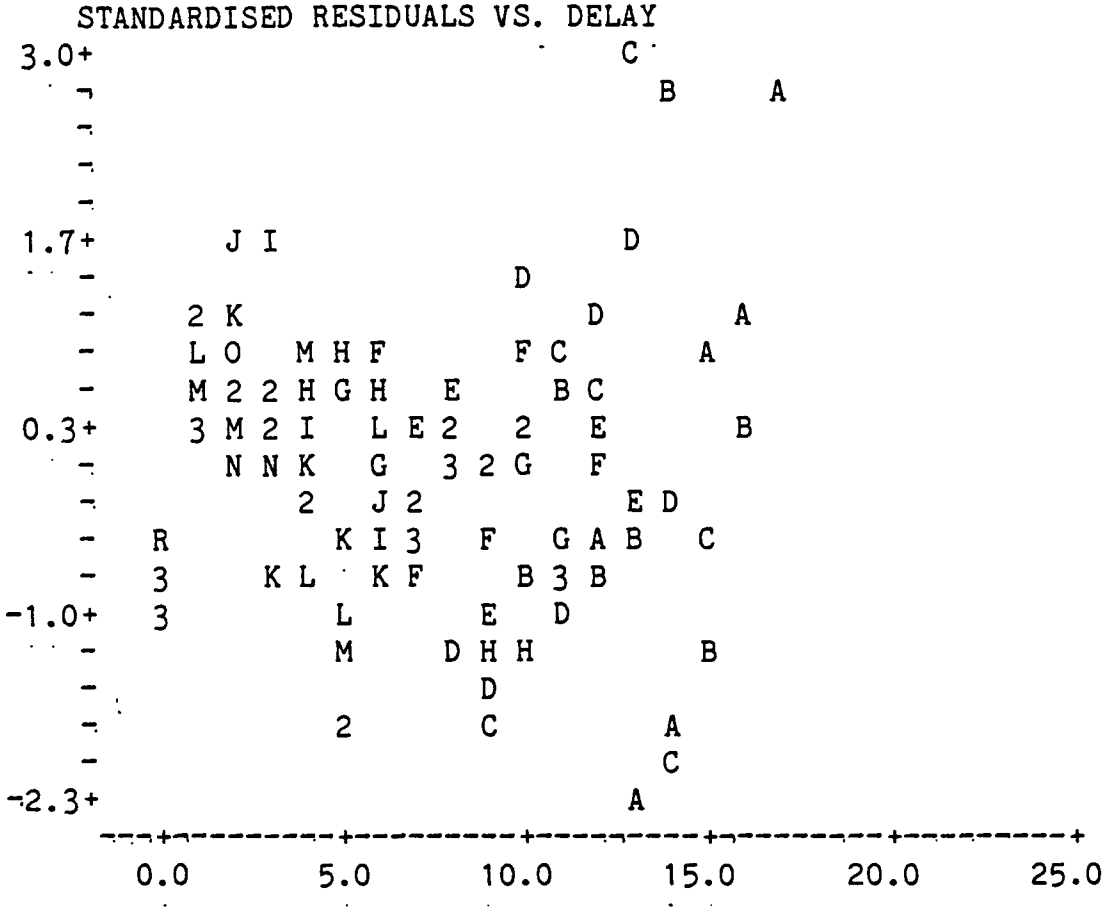
R-SQUARED = 96.1 PERCENT N = 105 P = 5.4

AIC = 36.18 AIC(SC) = 105.94

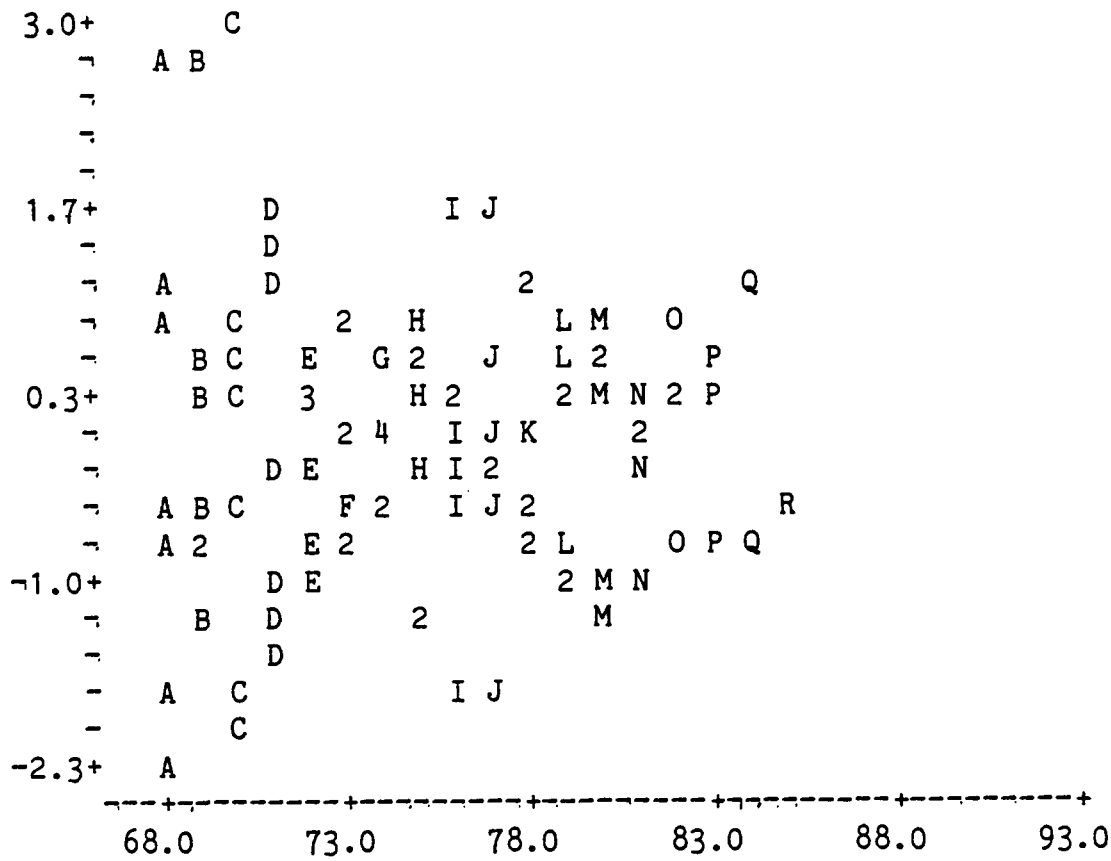
EXPECTED PAYMENTS/OBSERVED PAYMENTS (PAYMENTS IN $1000'S) FORECAST MEAN PAYMENTS/STANDARD ERRORS

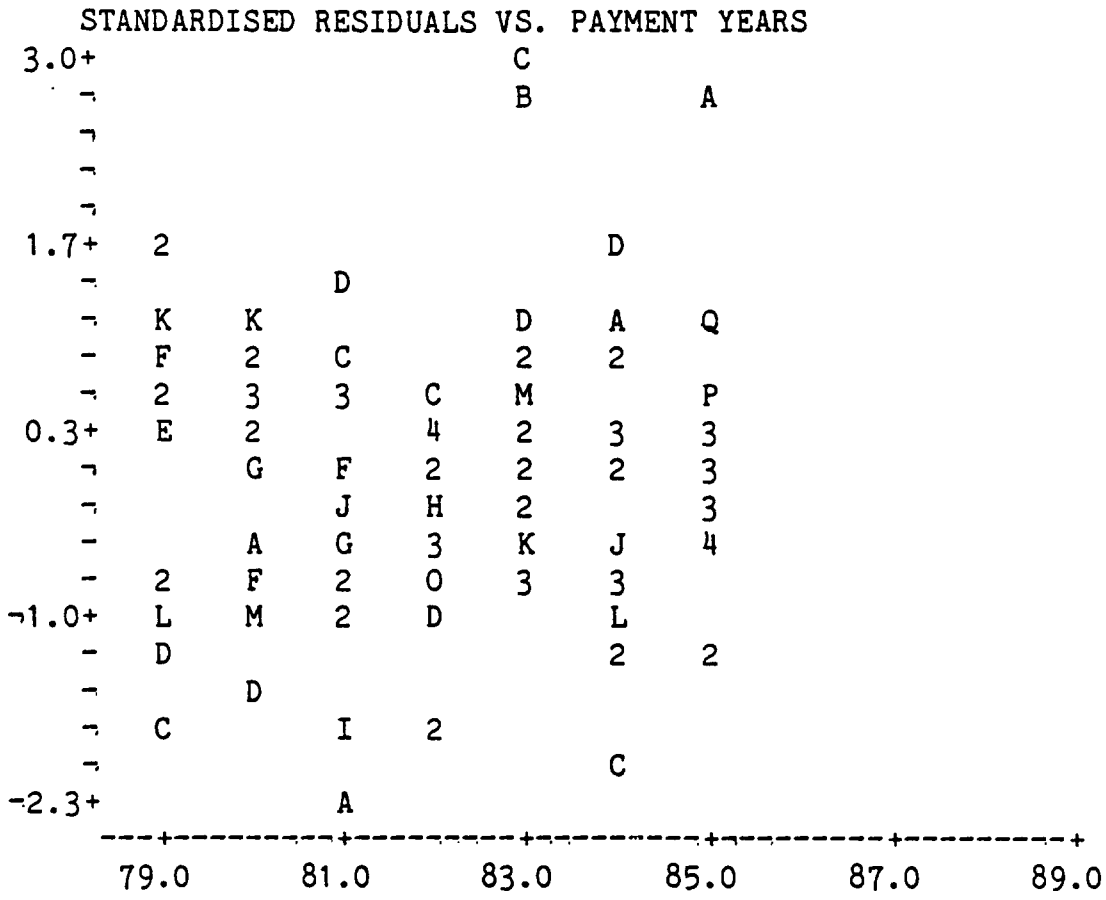
YEAR																			
1968												182	142	109	82	59	41	26	0
												134	117	33	32	86	75	118	0
1969											317	253	200	157	121	92	68	62	62
											242	297	151	134	315	51	82	60	60
1970										432	346	276	219	173	135	103	95	71	165
										246	397	371	268	460	53	82	78	65	104
1971									495	396	316	252	199	156	121	111	84	62	257
									341	253	511	188	295	274	107	87	73	61	135
1972								480	382	304	240	189	148	113	104	78	56	39	277
								542	445	218	261	146	167	100	83	69	58	49	142
1973							638	508	405	322	256	202	158	145	112	85	62	44	448
							802	402	400	286	328	155	160	105	88	74	62	52	194
1974						940	747	596	476	381	304	241	223	176	138	106	80	59	783
						1124	753	500	502	393	321	203	147	123	103	86	73	61	289
1975					1442	1139	907	726	582	468	375	348	279	222	176	138	107	81	1351
					1740	1458	1088	708	652	317	255	214	178	149	124	105	88	75	436
1976				2047	1599	1264	1008	807	649	522	484	390	314	251	200	158	124	95	2016
				3253	1795	752	851	740	731	543	287	238	198	165	139	117	98	83	600
1977			3645	2791	2183	1730	1383	1112	897	830	673	547	443	359	290	233	186	147	3708
			6019	3369	2049	1058	1303	980	944	473	391	324	270	226	190	160	135	114	1006
1978		6399	4713	3612	2829	2245	1797	1447	1336	1085	883	720	587	478	389	315	254	204	6252
		8858	6459	2905	2816	1970	1476	1303	745	613	507	421	351	293	246	207	175	149	1598
1979	12834	8573	6318	4847	3799	3019	2420	2219	1800	1466	1197	978	801	655	536	438	357	290	10736
	9748	11151	7261	5311	3050	2219	2683	1208	989	814	673	559	466	390	328	276	233	198	2511
1980	13806	9223	6798	5216	4090	3250	2957	2389	1940	1580	1291	1056	865	708	580	474	387	315	14544
	10656	10811	7644	6041	5400	2339	1596	1299	1063	875	724	601	501	420	352	297	251	212	3243
1981	15165	10132	7470	5732	4496	4050	3253	2629	2135	1741	1422	1165	955	783	642	526	430	351	20082
	11954	11026	7777	5701	4390	2171	1754	1427	1169	962	796	661	551	461	387	326	276	233	4310
1982	15415	10300	7594	5827	5176	4119	3308	2674	2172	1770	1447	1185	971	797	654	536	438	358	25604
	12479	11353	10039	6312	2762	2210	1785	1453	1190	979	810	673	561	469	394	332	280	238	5347
1983	14381	9608	7083	6151	4828	3841	3084	2493	2024	1649	1347	1103	903	741	607	497	406	331	30005
	11495	10894	8173	3273	2582	2066	1669	1358	1112	916	757	629	524	439	368	310	262	222	6154
1984	14902	9957	8304	6378	5006	3983	3199	2585	2100	1711	1399	1145	938	769	631	517	422	345	39432
	11787	14087	4402	3398	2681	2145	1733	1410	1155	951	786	653	544	456	382	322	272	230	7974
1985	15017	11348	8371	6430	5047	4016	3225	2607	2117	1726	1410	1155	946	776	636	521	426	348	51105
	12951	6008	4445	3431	2707	2166	1750	1424	1166	960	794	659	550	460	386	325	275	233	10285
PMT TOTS		43942	34086	26927	21499	17297	13976	11314	9156	7401	5933	4690	3604	2693	1916	1274	771	348	206826
STD ERRS		9442	7360	5893	4794	3945	3277	2743	2309	1952	1648	1383	1137	919	719	539	384	233	24342

ACC. YEAR	EXP.	OBS.	DIFF	%ER	YEAR	EXP.	PMNT OBS.	DIFF	%ER
	(PAYMENTS IN $1000'S)					(PAYMENTS IN $1000's)			
68	640	592	-48	-7	68				
69	1208	1272	64	5	69				
70	1684	1876	192	11	70				
71	1936	1969	33	1	71				
72	1857	1880	23	1	72				
73	2489	2533	44	1	73				
74	3685	3796	111	3	74				
75	5638	6218	580	10	75				
76	7896	8664	768	9	76				
77	13741	15722	1981	14	77				
78	23042	25787	2745	11	78				
79	41810	41423	-387	0	79	29851	33048	3197	10
80	42383	42891	508	1	80	35393	37551	2158	6
81	42995	40849	-2146	-4	81	40878	39004	-1874	-4
82	39135	40183	1048	2	82	45233	43563	-1670	-3
83	31071	30561	-510	-1	83	47562	46405	-1157	-2
84	24859	25874	1015	4	84	50047	50641	594	1
85	15017	12951	-2066	-13	85	52121	54830	2709	5


STANDARDISED RESIDUALS VS. DELAY
3.0+
1.7+
0.3+
-1.0+
-2.3+
0.0
5.0
10.0
15.0
20.0
25.0

STANDARDISED RESIDUALS VS. ACCIDENT YEARS




STANDARDISED RESIDUALS VS. PAYMENT YEARS
3.0+
1.7+
0.3+
-1.0+
-2.3+
79.0
81.0
83.0
85.0
87.0
89.0

1986 CASUALTY LOSS RESERVE SEMINAR

4G - CURRENT EVENTS

Moderator: Allan M. Kaufman, Consulting Actuary
Milliman & Robertson, Inc.

Panel: Peter Burgess, Partner
Arthur Andersen & Co.

Owen Gleeson, Second Vice President
General Reinsurance Corp.

Dennis R. Connolly, Vice President
American Insurance Association

Recorder: William F. Murphy, Consulting Actuary
Milliman & Robertson

Allan Kaufman:

I trust you're finding the seminar valuable in meeting your objectives. Our topic here is Current Events. We've included a number of areas that were of emerging importance as the seminar was prepared in the spring and summer of 1986 and continue to be of importance. Our first speaker will be Peter Burgess. He is replacing Edward Bader. Peter is a partner in the Hartford office of Arthur Andersen Co. He is responsible for a number of Arthur Andersen's largest insurance clients. He serves as Arthur Andersen's Technical Coordinator of the insurance industry practice. Formerly Peter served as Arthur Andersen's representative on the AICPA's Insurance Companies Committee. Peter is currently on the AICPA Committee on Relations with Actuaries. Formerly he was Chairman of the Accounting Principles Committee of the Connecticut Society of CPA's. Peter is a member of the AICPA, the Connecticut Society of CPA's, the National Accounting Association, and the EBP Auditors Association.

Peter Burgess:

Thank you Al. Some of you who know Ed Bader know I don't look at all like him. I have a lot more hair and a lot more weight than he does. Ed, unfortunately had to be in Zurich. What we're going to do is explore some current topics. The neet thing about discussing accounting principles is that you can leave the scene for several years and come back several years later and still discuss the same current events topics. There's a certain advantage - you never have to worry about new information. You don't have to worry about becoming obsolete. The process which I think a number of you are aware of, and I might repeat, because sometimes it is very convoluted in terms of how we get accounting principles out, if in fact we do get them out. There are a number of participants involved not the least of which is the American Institute of CPA's. Which basically tries to identify an issue and send it down to a task force, and the major one, the Standing Committee is the American Institute of Insurance Companies Committee. Which, as Alan said, I served on for 3 years ending in 1984. From there they also have task forces that go down. I think some of the ones that you're familiar with are the Reinsurance Task Force, and the task force dealing with health care matters. That group reports to ASEC which is the Accounting Standards Executive Committee which reports to the governing board. The AICPA really doesn't put out anything without sending it to the FSB. The FSB deliberates and either decides it's a technical bulletin or worthy of their review. If not, they can send it back to the AICPA who can issue it out as a statement of position, or further deliberate. In the meantime we also have the FCC involved in issues who hopes that the AICPA and the FASB will issue accounting matters more promptly. We have a lot of people involved and consequently we do get a lot of words out there, often not saying too much.

As I said, some of these are topics that you may have heard about last year but they continue to be important. The first of these is the Securities Exchange Commission disclosure requirements on casualty loss reserves. The requirements really came in and became effective for 1984 so we have 2 years under our belt and another year to go. In fact, once we get to '86 we will have 10 years of data on an aggregate basis which basically reflects the total reserve balance at the end of each of the last 10 years. It shows the amount paid on a cumulative basis and the re-estimated liability change. Additionally the requirement is for an exhibit to

reconcile the reserve status. How did it get from last year to this year, which seems really easy. You've had more claims and you paid some, and you have the ever popular "other". They did ask that incurred and paid be split between prior years. They added a new schedule. The schedule looks very much like the old schedule except if you compare, it does have some categories but basically it breaks down certain line items within the financial statements, grouping them by consolidated subsidiaries, unconsolidated subsidiaries, and 50% or less owned persons. The requirement also asks for greater discussion, management's discussion, and an analysis as to some of the events that took place and impacted the financial statements (MD&A). That included current year adjustments to prior year reserves, material reinsurance transactions, significant reserving assumptions, changes in mix of business, changes in payment patterns, effects of inflation, unusually large gains or losses for discounting, unusually large gains or losses for reduction and reserve, and effect of pretax income. And finally the effects on foreign currency fluctuations. I go through those rather quickly because obviously none of the insurance companies have any of those events that are worthy of discussing in their MD&A until the FCC reminds them that they're supposed to put something in there as to what happened and whether the reserves had an impact on their financial statements. Additionally, they ask for reconciliation between statutory and GAAP reserves. And finally, they have a requirement for an exhibit which is really the Schedules O & P filed on a consolidated basis.

The information, as I said, has been around for two years, so why is it current? Well we keep waiting for the other shoe to drop, I suppose. Once you start providing information to somebody, you presume that something will happen to it. I know, being part of the process that responded for the ASCPA to the FCC on the proposal that we had to put in words. Words like the end of the world would come if we required this information that nobody would understand it, nobody could get it down in time, etc. Needless to say the FCC proceeded ahead. They had heard that before. Consequently, we do now have two years under our belt. One of the companies that analyzes the results -- Tillinghast -- puts out a survey or summary each year which in effect includes 30 insurance company groups that have filed, and goes through all of the schedules on a summary basis for each of those companies and on a grand total basis. Some things can be learned from there, I suppose, if you want to use these statistics. One that interests me is that the reserve strengthening as a percentage of beginning reserves moved from .07% in 1983 to 3.9% in 1984. This is charged to current year P&L for strengthening prior year reserves. In 1985 it represents 6.9%. One would guess that if we keep at that pace, everything in the P&L is going to be prior year items so we won't have to analyze it. However, I think that what we're seeing is putting away some additional reserves during a little better profitability years.

The next thing that they showed was reserve developments by reserve date. A summary of that one statistic that I found interesting in their table indicated the percent deficiency one year later for the 1976 on prior reserves was listed as 3.83%. That's up to 28% now. The 1976 and prior claim liabilities are now considered to be 28%, almost 29% deficient. That

compares to a one year later of 3.83 back in 1977. We are now at a 7.21% deficiency, one year after the end of 1984. If you do your typical triangulation, do the projections out, you get a huge number on that basis. Again, it suggests that the data has to be looked at kind of closely. They show the reserve development by accident year. Also, within that summary they do a statutory and GAAP reconciliation. Not surprisingly, salvage and subrogation were the biggest items that were different between statutory and GAAP. Negative discounting appeared for 1985 as a rather large item-- $400 million off of a $70 billion base. The prior year was a 129 positive discount. What I mean by positive is that we're taking statutory reserves, deducting a positive discounting, and getting a lower GAAP reserve in 1984, apparently on a combined basis. On a combined basis in 1985 we went the other way. The discounting in effect was reversed out of the statutory reserves and into the GAAP reserves. Certain companies obviously had an impact on that presentation.

The next group that I became aware of that analyzed the results was that great actuarial firm of Solomon Brothers in New York. They put together a graphical presentation. I didn't put this up there because I don't want you to see it, so I'll hold it up. The idea in the graphs is to plot the percentage change plus or minus and there's a zero point going across the middle. That is in the charted and they do this for about 20 companies chartered out. You can reach your own conclusions. I will give a plug for Ohio Casualty, they thought Ohio Casualty did the best of anybody in the world based on the 1985 results. Interestingly enough, the comments in there get back to the disastrous results. On the basis of the FCC disclosures the world would come to an end, everybody would sell their stock, management would be put in jail, etc, etc. What we've learned, I think is that doing casualty loss reserve is an estimation process. And we can get the numbers wrong. Apparently the market has already discounted that fact because not much happened as a result of those disclosures. And in fact, the market went the other way on property casualty companies primarily because of the increased pricing and the increased profitability. It was kind of hard to isolate the event of disclosure. In any event, Solomon concludes that our findings show dramatic disparity even among insurers with broadly similar books of business. We conclude from this that an insurance company reserve philosophy is of greater importance than the actuarial processes when it comes to shaping year to year reserve patterns. Overall it appears that the company's reserve record is an appropriate indicator of future reserve volatility, barring changes in philosophy. However, reserve accuracy does not appear to have a marked effect on long term share valuations. No matter what you do the world has already taken into account in your share valuations if you're a public company, which I find interesting also. They also concluded, surprisingly, that short-tail lines generally provide the most comfort and long-tail lines provide the most discomfort. Strong industry pricing and earnings are associated with wide spread redundancies and weak pricing and low earnings are associated with deficiencies. Again, not terribly surprising. Obviously as all this information gets out there -- management tries to lead people or at least indicate the validity of the data and how to interpret it. I thought that Travelers were particularly appropriate last year in their 10K. I quote "conditions and trends that have affected the

development of these liabilities in the past will not necessarily recur in the future." Therefore, no meaningful extrapolation of estimated future redundancies or deficiencies in loss reserves can be developed from the data in the above table."

What is current in the FCC action? I have not heard of any direct action that they have planned to take on these disclosures. I know that increasingly they question the MD&A if you go to file a registration. I think they're using that as a vehicle to improve the disclosures. Certainly they're getting more information on certain large bulk type transactions, which they are also quizzing. And possibly somewhere along the line they'll decide that the statistics are telling us something or that maybe they should look into it further, or as we know under Murphy's Law, you'll obviously need more statistics when you can't prove your viewpoint.

The next area of what's happening is the ICB Medical Malpractice Loss Contingencies. Again, deja vu, because I worked on this statement back in the early '80's. Finally we have a draft dated April 10, 1986 that has in fact received a review of the FASB, and probably shall go forward. The concern was obviously started back in the early '80's. Nobody could get medical malpractice insurance. As a result many of the health care providers were self-insuring or setting up captives, or going into plans with much higher deductibles or much greater retroactive pricing included within them. Which caused some consternation as to what to do for the accounting. Obviously what was happening is that their total costs were effectively going down because they weren't setting aside adequate reserves. On the other hand, some of the entities were proceeding ahead and based on experience or whatever, were providing reserves. It's all over the lot out there as to what is appropriate and what should they take into account and how do you deal with medical malpractice. Additionally, a number of these health care providers were obviously not using appropriate consultants to assist them in the process. Consequently we were getting reserving done by attorneys, ward members, etc. on hospitals. There's not much question that if there is an asserted claim, you estimate the impact of that claim on an individual case basis. Obviously, if you have enough individual claims you provide yourself with additional data that you can probably do some reserving for on asserted claims on reported incidents. The final area which is basically unreported incidents is a problem from the standpoint of should we allow companies to establish reserves, and what about good old FASB No. 5, which doesn't allow you to set up contingency reserves. The other issue was if we don't have any experience ourselves can we use industry experience? The profession has generally been trying to fight industry experience because that sucks you back into FASB 5 again. The whole world has catastrophes out there. Therefore we should have a catastrophe reserve. With that settled by FASB No. 5, you've now got a problem when you go back to industry experience. In any event, the resolution now is that you should accrue the ultimate cost, if it is probable that a liability has been incurred and the amount can be reasonably estimated. For unreported incidents without sufficient claims experience you may use industry experience if there is a probable occurrence. Industry experience is of a similar health care provider. You

can use industry experience if you can find somebody that looks like your entity within the industry. That has been approved by the FASB earlier this month at the September 3rd meeting. It had some minor wording changes to it and now it's back at the AICPA and will probably be issued as an exposure draft of an SOP. Which under our due process only takes another four months to get something out. Also, to the extent that you're discounting you've got to make some disclosures on it. This used to be called the accounting for health maintenance organizations. The big step that has happened in the last four years is that we've changed the title to make it a broader perspective. I should step back one moment and indicate that there is a rivalry between the Health Care Committee of the AICPA and the Insurance Company Committee of the AICPA. Consequently, when you get an area that crosses over, one committee takes it on. Usually the other committee is at a 180 stance -- then they form a task force with two members of each committee on it go to a neutral site and fight it out. Theoretically, that fight out on previous items produced two conclusions. One the insurance company's committee and one the health care committee. In most cases I'm proud to say that the insurance company's committee has won out. Although in this one it's close. Most HMO's wanted to be on a cash basis because they were basically bankrupt if you put them on an accrual basis several years ago. A good reason not to go on an accrual basis is not to reflect those kind of deficiencies. At any rate the world did agree that maybe the cash basis was inappropriate. But again you get down to the fine line when do you accrue IBNR. Is it as of the point and time? Do you accrue for just costs as services are rendered, or do you go on an occurrence basis? Which means when you know the date of initial service you know what the total cost is going to be. HMO's generally are on a cash basis -- they get the premium in, that covers that month's expense -- you just keep rolling it. I think the insurance companies were competing with them on trying to show profitability would indicate that that's not very appropriate, that you should accrue some of that cost. You do accrue cost as services are rendered which is an accrual basis. But there is no accrual accounting for what I would call IBNR on these. Consequently, there rolling forward on a different claim than insurance companies are presently. This may suggest that if you have a large insurance company and you really want to do the accounting like this, you ought to get yourself a health care subsidiary and adopt health care accounting for it. Because it will reduce the cost that you have to reflect. It makes it a kind of incredible environment but that's about what is going to happen. The June '85 draft is the last draft again. It has been approved by the FASB and been sent back to the AICPA and is going out.

The next item to come along is CCRC's Continuing Care, Retirement Communities. You can bet where future and health care committees in the insurance committee will be on that issue. Accounting for claims made policies -- I guess the world has accepted claims made policies. There's some question as to what degree and whether it will be a big issue. It's certainly an issue for us auditors because we want to know what database is going to be used to accrue. The question really arose as to what is an insurer to do under claims made. The FASB has an emerging issues task force. I left that group out because the FASB takes too long and the staff

takes too long. They need a group of people to get together and sort of kick around those things that were sort of in between. They don't know whether they were big issues or small issues. Consequently there is a fairly large committee of the EITF (Emerging Issues Task Force) that meets monthly, discusses issues that are put in by the various representatives on the committee. One of them was this claims made. Again, it went back to similar wording -- you obviously should accrue for IBNR losses probable and reasonably estimable. However, you cannot use the tail coverage provision of the claims made as a substitute for accruing the IBNR. Consequently, you can't say "well if I ever get to stop having claims made policies I'll just buy the tail coverage that will be my expense, don't worry about it". We decided that that was not appropriate, that you should be producing an IBNR figure. Although, obviously your plans in the future and what you're currently doing are important to the old accrual. They continue again-- this started this year, basically in March. They are now arguing about how you do interim periods within the year and whether somebody is on a calendar year basis. What you should do is estimate what your IBNR should be at the end of the year. Take that change, amortize it regularly over the 12 month period. You would take any payments that you make for the claims made against that liability to extend and cover the IBNR cost. One presumes that all of these companies with claims made policies out there really know how to do IBNR. The FCC issues staff accounting bulletins which are not authoritative announcements of the FCC, but just what the staff thinks. Basically what happens is if you try to get a filing in there without filing SAB's you're in a lot of trouble. I think they have some authority behind them. What the question asks is what is the staff's position with respect to discounting claim liability related to short duration insurance contracts. They basically came back and said if you are doing it for state purposes you may do it for public reporting purposes. There is one additional to the extent that you have an individual claim and the ultimate cost and payment pattern are fixed and determinable. You may also discount that using a discount rate reasonable under the facts at the time of settlement. A preferability letter is needed from the independent accountant on any of these items. If a company is changing to them they have considered a change in rates. That is the discount rate that is applied to claims to be not a change in estimate but an accounting principle change. It used to be changes under our esoteric literature. Changes and estimates just sort of flow through. You didn't have a lot to say about them, you sort of did it on a going forward basis. They are now saying if you go from the statutory discount rate of 2%, 3%, whatever, to a current yield -- that is a change in accounting principles and needs a cumulative catchup. It needs an accountant's preferability letter. You go through the whole 9 yards to get there from here. Any other company that wants to discount or any other reserve where it isn't discounting for statutory purposes, good luck. You will not get it approved. The FCC has said that they are waiting for the accounting profession to provide guidance as to when discounting is appropriate. If you go back, the earliest mention is probably in the property casualty guide but it's SOP 78.6. That's 1978 that this was identified as an issue. We're still going for resolutions.

What is the AICPA doing on discounting? This is the second force on discounting. The first task force of the AICPA was use of interest rates within the accounting. It produced about a $2.50 book on the 4,000 different interest rates that there were in the world, but it didn't get to the accounting principle involved. Consequently, it was disbanded. In the meantime the AICPA Insurance Company's Committee -- again, I go back to my experience on it. Actually it was an unresolved problem and still is listed as such. In FASB 60, which is the guideline for insurance companies, it is an unresolved problem. When you get into the Committee you start discussing discounting. If you've got actuaries present, even more so, it is an emotional issue. There are several things that you have to remember when going through this to try and understand why accountants are going through this process. One is when you look at it, we discover there's a big difference between life actuaries and property/casualty actuaries. And that is a life actuary will discount anything that walks. Consequently if we get A&H business on the books it's amazing, depending whether you're a life company or a property/casualty company, what you do with those reserves. We thought that kind of unique and that maybe we shouldn't try to differentiate between life and P&C companies because that fall back position had already been taken away from the group by FASB 60 which went into short duration contracts and long duration contracts. We don't have life and property casualty. The second issue to remember is that everybody goes around saying that the reserves are suspect in the first place. That's a whole new world. What we're saying is that if we want to all go out and dare and declare that nobody knows what they're doing when they're reserving, we probably should not worry about discounting. I agree with that. But no matter where you go, people bring this up -- well we're just not too happy with reserves and if you discount, what are you going to do. The other problem you've got to remember is that as we don't resolve these issues, the insurance industry and some of the Solomon Bros. of the world have been able to develop products which basically do discounting through the back door. We've had portfolios which are now basically dried up. We have commutations. We have a whole series of products which have basically accomplished some form of discounting. They have died down, I think probably as a result of lack of earnings pressure. The problem is you do have to resolve issue otherwise you're going to have to deal with each of these products on a one-by-one basis. Everybody likes the words "fixed and determinable" and what does that mean on an individual basis and can you do it on a group basis, meaning IBNR. You have to deal with those concepts.

Finally, the words that come out are effectively, you don't understand. You need provision for adverse deviation when you do discounting. It's kind of hard to write a paper when you get through all of these points that people are making. You cannot get it down in writing because they're emotional. They are trying to resolve what the current climate is. They're trying to accomplish all sorts of things. What came out of the insurance company's committee was "yeah there is a difference between a time value of money and the provision for adverse deviation." In our case it was called provision for adverse claim variability. Nobody would think that it was tied into the life insurer guys and what they do. The process came out and said "Look, if you're going to look at this process it is

obvious that discounting is appropriate." The pricing is being done on that in many lines on a discounted basis. If you go through it to write a paper we've really go to say discounting is appropriate but we need a backoff position so that you can get ultimate reserves. That paper came out and went to the ACSEC group which is the next group under AICPA. They have some problems with the variability but then sent it on to the FSAB. The FSAB said why don't you get a whole project going on it. We'll hold on all of these other issues including premium deficiencies, which I can't believe because I wrote that paper back in 1981. They are still holding on to it. I thought it was fairly simple but it isn't. They're holding that one, they're holding portfolios which is really not appropriate any more because nobody is doing it. The Discounting Committee has basically produced a paper that has been delivered to a couple of people including myself. Because one of my fellow partners is the chairman of that committee I get some insight information. Although I disagree with him at times. He came through with this big paper discussing discounting in the insurance industry. If you're going to look at this thing you've got to come up with discounting as appropriate. Except if you can determine some situations where you have reserves that are not reasonably estimable. Well that's a Catch 22. In any event, that's the wording that's in there. There is a 5 man committee on this thing. They vote 3 and 2 all the time. That tells you how much weight they have. The Academy of Actuaries is ready to kill that group because they've refused to talk about adverse claim variability or provision for deviation. Consequently, we don't know where it will go. It is out and has been presented to the Insurance Company Committee. It's being finalized and interestingly enough there were a number of issues within it to talk about discounting. The next major issue was income taxes. They haven't even written that section yet. They immediately jumped to the P&C side. There's a number of us who would hope that they don't issue a paper at this point and time. In terms of the NAIC, IRS and everybody else. The NAIC, I think summed it up pretty well. There past president said that very simply reserve discounting decreases the assets that are set aside for future losses in anticipation that future investment income will be sufficient to fill in the gap. We don't fee it is appropriate to take credit for something that may or may not develop in the future. That's the problem with developing that accounting principle.

Allan Kaufman:

Thank you Peter. I now know what a property casualty actuary is. He is someone that discounts things that walk for long distances with a steady gate. Our next speaker is Owen Gleason. He will discuss discounting as it appears in the California Solvency Standards and compare that to the new tax law at discounting. Owen is currently 2nd Vice President at General Reinsurance Corporation. His responsibilities there include loss reserving, preparation of special financial treaties and tax analysis. Prior to his employment at General Reinsurance, Owen was employed at USF&G where he was responsible for loss reserving, annual statement preparation, tax planning and other corporate functions. Owen is a fellow of the Casualty Actuarial Society, a member of the American Academy of Actuaries, and has a Ph.D in mathematics. Owen.

Owen Gleeson

I have a handout of the transparency. There are some extra copies around, I think. Loss reserve discounting has always been a controversial subject.

The industry and the NAIC have generally been opposed to discounting loss reserves for financial statement purposes. They are still very opposed in some instances. The insurance companies now find themselves in a situation in which some government agencies are requiring the discounting of losses. One instance of this is the California Surplus Report and another the proposed tax law. I'm going to describe the two discounting approaches that result and make some comparisons between them. First we'll look at the payout rates. The instructions in the California Surplus Report state in part that "the percent of payout by line and by year should be based on company experience." That's all it says. This instruction is not very specific and seems to allow companies wide latitude in determining payout on unpaid losses. In the case of General Reinsurance we used the results of an internal study of payout patterns and use a good number of years of data. We don't use the annual statement because of all of the loss portfolios. We use strict payout on accident as a percent of incurred, estimate the runoff on each accident year, and then total over the payment years. Another company that I know of simply uses a runoff on year end reserves where the reserves are comprised of the current and all prior accident years. The insurance company supplied an example of the completed report and this contained the payout rates that the company could choose to use. Later I want to come back to this and discuss these payout rates in a little more depth. The calculation of payout rates under the proposed tax law is much more specific. The data source specified in the tax bill is the 1986 edition of Best Aggregates and Averages. If you attended the federal tax sessions this morning you heard this. This contains 1985 industry data. Apparently they have determined that they will only use one year even though two years are available, at least for Schedule P. This published the consolidated industry Schedule P, but only Part One of the Schedule. This essentially requires that cumulative payouts as a percent of incurred be calculated to obtain the payout rates. It is a very specific type of methodology that is used here as opposed to the California Surplus Report in which you can apparently use anything you feel like. There are very special rules for Schedules O and P and the payout rates applicable to reinsurance. This is under the proposed tax law and we'll take a look at some of these rules a little bit later. The company may elect its own experience but even in this case rules for determining the payout rates are very precise. You have to use the latest year's annual statement. To get the election you have to satisfy the Treasury Department that you deserve the election. I'll read the words out of the bill that went into the House last week. These are the exact words:

> "Generally it is intended that the election be available only for those lines of business for which the taxpayer's own historical experience is statistically significant. If a taxpayers business in any line of business does not represent the meaningful portion of the total industry-wide business in that line of business, the election does not apply. Generally, a meaningful portion would be a portion in the 10th percentile of industry wide reserves for a line of business. That is, no election is permitted where 90% of

the taxpayers that have reserves in that line of business have reserves that are bigger than those of the taxpayer."

It looks like most companies would qualify for the election if they so wished. Let's go on to compare the interest rates used in the discounting. That would be Exhibit 2. The California Surplus Report specifies the rate used in the discounting be the lesser of 10% or the actual current year's after tax rate of return on the company's invested assets after excluding real estate owned investments in affiliates. Appropriate exclusions I feel. Under the proposed tax law the interest rate to be used is-- there's a lot of words in these things because they are all very technical. The interest rate to be used is 100% of the average of the applicable federal mid-term rates. That's what AFR stands for. This is rate determined by the Treasury Department and it approximates the rate the government is paying on securities of intermediate terms (3-9 years). Eventually a rolling five-year average will be used. But the base period will start in August of 1986. Only 5 months go into the first determination. Accident years 1987 and prior will be discounted using the average of these 5 months. That's '87 and prior. For the accident year in 1988 the last 5 months of 1986, plus the 12 months of 1987 will be used, and so forth. These rates will be "vintaged." A new word that will be on our vocabulary I suppose. That is, once a rate has been used to discount an accident year, the rate remains until the accident year has been paid out. Note the difference between this and the California Surplus Report in which an accident year will be effectively discounted at a different rate each year as the portfolio rate changes. Let's go on to the next Exhibit.

I wanted also to compare the objectives between the two reports. The reasons for discounting losses in the California Surplus Report are entirely different from those underlying the proposed tax law change. In the case of the California Surplus Report, it is recognizing the time value of money by discounting the loss reserve. This gives a better measure of a company's true economic condition. We give the insurance department a better idea of the real financial condition of the company. In some situations it would allow the insurance department to differentiate between troubled companies, some of which could be rehabilitated and some of which could not. We'll come back to this point in a minute. The objective of the revision in the tax law is to more accurately state the income of property casualty companies. In the words of the Senate Finance Committee Report "the Committee believes that the present law does not accurately measure the income of property casualty insurers. The deduction for incurred losses is overstated by the amount by which the nominal dollar value of loss exceeds the present value of the insurers liability to pay the claim". In other words, the failure of current laws to reflect the time value of the money, permits these companies to understate their income. When you read these words for the reasons for the changes, particularly in the case of the property casualty company. The writers for the government feel that they're very injured and they've done a great justice. They want to match revenues and expenses. That's their motivation. We've looked at a general comparison of the two methods of discounting. Now I would like to look at some of the details. Earlier I

mentioned that the proposed tax law contained very specific guidelines for determining payout rates. Let's take a look at these. Steve Broadie went over some of them today. He spent about 40 minutes. I don't have 40 minutes to do this. It's a little complex and it might be worth taking a second look at them. Particularly for those of you who attended those sessions. For the Schedule P lines of business, the cumulative paid to incurred method will be used. My speculation was right, to obtain cumulative payout percentages. These will then be difference to obtain incremental payouts. The loss history in the annual statement is limited to 10 years. But the drafters of the bill felt a longer payout maybe more appropriate in some instances. The payout pattern is to be extended if the indicated percent paid in the 10th year is less than the amount of reserve outstanding. Percent paid in each of the succeeding years is deemed to be equal to the percent paid in the 10th year. The payment pattern is continued in this fashion until 100% has been reached or the payment pattern has been extended to 15 years. That's for Schedule P. The payment pattern for the Schedule O lines of business is determined by the following rule. The bill provides that losses paid after the first year following the accident year are treated as paid equally in the succeeding 2 years. For example, the Schedule O line of business shows 70% paid in the first year, and 20% paid in the first following year. Special treatment is provided for reinsurers in international business. These lines are reported on Schedule O but are recognized to have long payout patterns. The solution provided by the tax bill is to use the payout pattern placed on all Schedule P lines combined. However, again we have exceptions. If a reinsurance company wrote primarily one line of business, the applicable Schedule P payout pattern would be used. An example of this might be the Workers' Compensation Reinsurance Association of Minnesota, which writes only excess coverage for workers' compensation.

An example of how the payout pattern is extended is shown in the next Exhibit. This example of extending the payout period is printed in the Senate Committee Report. At the time they were thinking only in terms of a 9 year payout being available in the annual statement but the principle is the same. The data shows that 25% of the incurred loss were paid within the accident year -- 10% paid in the next year, and so forth. In the 9th year, 5% of the incurred loss was paid, but 12% is still unpaid. The rule deems that 5% be paid in the 10th year, another 5% in the 11th year, and the final 2% in the 12th year. These will add up to 100%. That's the explanation of the rule. Exhibits of the payout rates that the Treasury Department will use are given in the next two Exhibits. Payout rates shown on Exhibits 6 and 7 have been developed from the 1986 Best Aggregates and Average. This was published less than a month ago, just about the time it normally comes out. I've just reviewed the example that the Treasury Department furnished as part of the bill introduced in the House last week. I was glad to see that the payout rates that they came up with were approximately the same as what you see here. Because I told the management this was what they were going to be. The example showed only the payout rates for automobile liability. There are slight differences between what I have shown here and what they've published. It's simply that the differences are due to rounding and they carry a abnormally large number of decimal places when they do their calculations. Let's look at Exhibit 7.

This has payout rates that will be applied to reinsurance. The rule for reinsurance results in a payout pattern that is only slightly slower than that of automobile. This is due in large part to the inclusion of the multi-peril lines in the data so that the reinsurance companies have a relatively slow rate used in calculating the discount factors that will be applied to their loss reserves. Some lines of business show a substantial portion of losses as unpaid in the final year even after extending the payout pattern. For example, you've seen medical malpractice shows 14.6% and other liability -- workers' compensation both say 8.3%. These amounts will be treated as paid in the 15th year when the discount factors are calculated by the Treasury Department. At least that's my current understanding. Let's take a look at something else that struck me as somewhat odd when I picked this up Friday to leave the office and reviewed it just before leaving. I thought that I had a typo in here. The multi-peril lines have 1, 4, 1.4 and 7. It looks like there's an error here. I didn't want an error to go unnoticed. I've redone the calculations. It looks like these years are reversed. But the calculations using Best Aggregates and Averages 1986 Ed. show exactly this. This I think is an example of what happens when payout rates are calculated from a single annual statement instead of using a number of annual statements. Another oddity that showed up here and that's the 3% in medical malpractice. I would like to go back to the 1984 industry annual statement and see what that figures shows. Let's go onto Exhibit 8. We've sort of worked over the proposed tax law. The payouts in this Exhibit are taken from the completed example of the California Surplus Report. The example was distributed along with the forms to assist companies in completing the report. The instructions were not extremely detailed but the examples helped a lot. If you'll look at these payout rates they seem peculiar. You'll recall that the payout rates given here are intended to be applied to total year end reserves. These payout rates are very similar to those under prior exhibits. In the case of the prior exhibits we were looking at payouts on accident years incurred losses. Let's compare a few of the numbers. The first year payouts for Best for workers' compensation was 25.9%. For multi-peril it was 55.6% -- we have 58%. Other liability shows 9% just like here. I can't be certain about what I'm going to say because I haven't talked to the Department. But it looks like the insurance department mistakenly used calendar year payout statistics rather than loss reserve runoff statistics. I wanted to look into this a little bit further and decided to construct year end reserve payouts from industry data. In the automobile liability line of business I found that the first year's number should be approximately 45% as opposed to 37%. The second year 24%, the third 13%, and so forth. In the case of other liability the figures for the first 3 years were 21%, 17% and 15% as opposed to 9, 11, and 12. After I finished working on that Saturday, I felt more strongly that my suspicions were correct in that the payouts provided were probably incorrect. You might just stop and think about the purpose of the California Surplus Report. The Department would like to look at surplus in several different ways. One of which uses discounts. Now suppose if you were working for a company that was financially troubled and you wanted to show the greatest amount of discount possible, then you would use the slowest payout. If you opted to use the payouts shown here, you get a much

deeper discount than you do if you used probably statistics. It seems like the report is such that it could be manipulated.

And just to say a few words more in summary. This morning, Steve Broadie in the federal tax presentation, mentioned a couple of the theoretical problems associated with the discounting as required by the new tax law. These include the use of an interest rate that is different from that on the portfolio of the insurer and a payout pattern that differs from that of the insurer. We've seen here that there are certain problems with discounting in the California Surplus Report. Steve also mentioned that the industry still opposes discounting. There may be good reasons for that, but after reviewing the discounting as outlined in the tax law in the California Surplus Report, I've come to the conclusion that the industry would be better off if there were an agreement on the proper method of discounting in the event that it is required in the report.

Allan Kaufman:

Thank you Owen. No current events discussion could be complete without some recognition of the turmoil in the tort liability system. To provide a viewpoint on this issue, we have Mr. Dennis Connolly. Mr. Connolly is an attorney admitted to the Bar in New York. He is currently Vice President in the Casualty Departent of Johnson & Higgins. Prior to joining Johnson & Higgins, Mr. Connolly was employed at the American Insurance Association where he was responsible for developing and implementing policy positions and directing state legal counsel in areas of products liability, toxic torts, nuclear liability, taxes, medical malpractice, government liability, self-insurance and insurance availability. He serves on numerous committees including the McKeystone Center for Products Liability Program, Love Canal Medical Trust Board of Directors, and the National Association of Manufacturers Product Liability Task Force. He has spoken and testified in a number of environments including seminars in the U.S. and in Europe. He has appeared on television and radio shows including several debates with Ralph Nader and others. Dennis.

Dennis Connolly:

Thank you. When Allan called me he told me he had some good news and some bad news. He said that the bad news would be that I would be the last speaker on the program and the end of the day, after a large lunch. And that I would follow 2 speakers who would talk about technical aspects of SEC and discounting reserves. I said well what was the good news. And he said that the second speaker would have the lights on.

We're here to talk about, I think, imagination. What we're really talking about is the imagination of the plaintiff's bar. I think that is really the key to what we really ought to be considering in my section. I want to ask you at what point will the trial bar be successful with the following scenario. What if the attendees in today's session eating lunch discovers that its Chicken Kiev that they've just eaten, remembering that Kiev is next to Chernobyl, fearing that the Chicken Kiev might be imported Chicken Kiev, they decide to sue the Society, allenging that there was a failure to warn that this was domestic Chicken Kiev. At the moment it's unlikely that there's going to be a success in that lawsuit. But if you're an actuary you may have to figure out whether to set for a class action. I want to also

stress to you that my point of view here is for the moment, at least, my own. I have recently left the American Insurance Association. I worked a long time on tort reform. I think I understand their issues. My views are not necessarily completely theirs. And I haven't been at Johnson & Higgins long enough to be sure that my views are entirely theirs. What you'll hear are basically my points of view. My basic point though is the plaintiff's bars imagination. Societal changes mean that you cannot tell what's going to happen in the future just by looking at the past. Looking at data for purposes of measuring the tort system is like driving an automobile looking exclusively through the rear view mirror. It gives you some idea of where you have been but it's not particularly good for telling you where you're going. I think the data and actuarial processes are of reduced value and you should recognize that when you are dealing with an extremely unstable tort system. That is what we are confronted with today. If look at data I will give you two examples of deficiency. If you look at the data for losses for federal Superfund, if you are really smart you'd know that it was probably the largest single liability this industry side confronts. But if you look at the data in 1980 you'd discover there were no losses. Of course that's because the law didn't pass until December 11, 1980. There was no data -- until the law came along, there was no liability. After the law came along it was the biggest liability we had today. It hasn't even begun to start asserting itself because the system is just getting off the ground. That law is the one that created joint and several liability in its most absolute form. It is a retroactive imposition of liability, and it is an abandonment of even the most elementary principles of strict liability. It is, I suggest to you, almost absolute liability. The one saving grace here is that ultimately we may be able to reduce transaction costs because the EPA will just come to you and say write out the check right now and you may well do it.

A second piece of data, just to show how the law can change. There are a number of suits that have already been decided concerning property damage and the liability of asbestos manufacturers. And particularly for removal from buildings. In fact there have been 3 suits. Two suits have held that the manufacturers, sellers, and installers of asbestos cannot be held liability for the removal costs. One suit in Greenville, North Carolina held that they can be liable and that was an $8 million judgment which was later on reduced. Part of the damages were $2 million in punitive damages, and that portion of the suit was reduced. If you'll look at your data and you've got this normal potential liability, your data will show you approximately $8 million in losses. Not counting allocated loss adjustment expense. However, if you look at this, this is the plaintiff's numbers. The defendants, they are not numbers. When the class action involving some 14,000 schools is decided, the day after its decided you may have some very startling and very different data then you have today. If you look strictly at data you will have problems assessing what is happening in the liability system. I suggest to you that the tort liability system remains expansive.

I do have an optimistic closing. The tort liability system does remain expansive. In August of 1986 this year, for the first time a really major case came down. The Velsico case in which individual plaintiffs were given

awards of damages. Concrete dollar awards for 1) the fear that they may come down with cancer and 2) for their increased risk that they may come down with cancer. That's really the first time that we've passed out the money through a judgment, to people who haven't actually had anything physical happen to them. The second kind of expansion, of course, is what I've described before which was the federal Superfund. There was the most sweeping change in the liability system -- day one, no liability, day two-- you've had it. There are positive changes that are likely to occur through statutory reform. We're seeing them in the various states. There are about 29 states that have enacted toward reform. The categories of usual activity include joint and several liability. But before you reduce your reserves because a state has enacted joint and several liability reform, you might want to look at whether it carved out for future reference concerted action. That is where people agreed to do something together. Will they then be held jointly and severally liable and if that's allowed will the plaintiff's bar sweep into that section? You might also want to look at joint and several liability to see whether anything was done to carve out toxic liability, because it usually is. What you've got is joint and several liability for most automobile crashes, limited to several liability. That's not terrible useful because basically that's the way the system works today. You have in numerous states a collateral source rule abolition. That has it's limitations too, because collateral sources for which there are liens are not usually exempted from the collateral sources. You have caps on damages. That's all very useful as long as the caps refer to the type of damages which may be recovered today. However, the phrasing of many of these statutes is such that it tends to create new causes of action so that you have people capping damages but they're damages which were not previously recoverable. There is one other type of tort reform and that's the one which some people on what you might call "the other side" are pushing for, and that is a federal cause of action. A federal cause of action would allow people not only to recover in the Chicken Kiev situation but would actually given them a presumption to send them along their way. It would say that if a plaintiff or injured party has been exposed to a substance which could theoretically have caused an injury of the nature complained of by the plaintiff, then the defendant must prove that their substance did not cause the injury! In other words if someone smokes, and they have lung cancer, I would have to come along and prove that it wasn't caused by smoking. I'd have to prove that it wasn't caused by my substance. The effect, what that system would do is reverse what is probably about a 2% error and create a 98% error which the insurance industry will have to pay for. If it is retroactive it could top Superfund. I think you have to look carefully when you try and figure out what the exact meaning of these statutes is. You have to measure them carefully. You have to know what the law actually will be under these statutes.

A good example of the kind of problem you'll run into is the Colorado Statute on Collateral Sources. There's a statute which says that collateral sources will be deducted from any plaintiff's recovery. Meaning that if the plaintiff has recovered workers' compensation benefits, then any judgment the plaintiff may have will be reduced by those workers' compensation benefits. That idea was one which came out of the American

Insurance Association. We had another part to it which was, where you deduct the collateral source, you must also eliminate the lien. But in Colorado they didn't eliminate the lien. Let's assume a plaintiff who has recovered $100,000 and has received $60,000 in collateral benefits, in which there is a lien. First the plaintiff's judgment is reduced by the workers' compensation benefit. You have $100,000, less $60,000, so the plaintiff is left with $40,000. Because they forgot to eliminate the lien, along comes the workers' compensation carrier and says by the way you owe me $60,000. The plaintiff actually ends up with the theoretical net $20,000. When the court gets a hold of that you'll have a statute with very different implications than it's intended effect. The next reason that one runs into trouble because of the statutory enactment of tort reform is because ultimately this is the system which returns to the judiciary for interpretation. The very people who created the problem, the judiciary, who have expanded the liability system, are the same people who are compelled to interpret the statutes intended to rein back the system. That is not going to accomplish as much as one would hope.

The next factor in determining what the tort reforms will mean is to assess exactly what will be the action of the plaintiff's bar. I think that we've gotten into trouble because the plaintiff's bar is imaginative. I think that they will remain imaginative and will affect the liability changes that are enacted. One of the more famous liability changes is Proposition 51, which limited joint and several liability in California. Here is an advertisement, I don't have a blow up on it, but it's from the Law Journal for California. All it says is "Make Prop. 51 work for you." It's a seminar from the California Trial Bar Association. The first topic is Favorably construing an unfavorable statute," and they're on their way. One of the best tort reforms I saw was one in the City of New York which said, after they had been sued for thousands of potholes, that you couldn't sue the City of New York unless the City of New York had actual notice. That's a legal term but it means they actually had to know that the pothole was there. For some reason it turned out that that didn't work out too well. One reason was that the plaintiff's bar organized and formed something called The Big Apple Pothole and Sidewalk Protection Corporation. What they did was they hired a helicopter, and they photographed all of the streets. Then they marked the potholes and sent it into the City of New York. If you want to find out if you have a registered pothole, you send it in to them. Down at the bottom I marked this. It said Fred Playor, president. I happen to remember Fred play our -- when I used to do litigation practice. I looked him up, and low and behold I was right. He was the past president of the New York Trial Lawyers Association. He wasn't really doing this for charity.

Another example, just a quick one. I ran into this in discussing this issue with people like Ralph Nader. Which is a fact. In Pennsylvania for municipalities, the state enacted a cap on damages. It had some other statutory reforms of municipal liability -- exclusively from municipal liability. Ralph used to like to go around and point out that the rates didn't go down in Pennsylvania. That was because what happened in Pennsylvania was there was a cap on damages, so the severity over 4 years only went up 27%, which really, in these days, over 4 years is not all that

bad. Unfortunately, frequency -- which is what I call the imagination factor on the plaintiff's part -- went up 400%. It is true that the damages and premiums did not go down.

This is the optimistic ending. There is an important trend in the judiciary, in the state legislatures. It is very important and also appears among the public. That is a beginning of an awareness that the system is going too far. We see this in the public. If you look through the New York Times periodically on weekends, they have a series of cartoons. They're really pretty good. Sometimes they take the barometer of what people are thinking about. One of them recently was a picture of this kind of lake and next to the lake it said Camaroon. If you remember that's where the lake burped up some poisonous gas. Next to it were these vultures who were standing there with these briefcases, and it says "American Trial Bar". One of them is saying to another one "A lake, a lake did this? How do you sue a lake?" It seems to me that people are actually becoming aware of the fact that the plaintiff's bar is a little bit over imaginative. That's an important factor. The second thing is, and it may even be more important, the judiciary, in some very important coverage decisions, has ricocheted it back on a series of decisions which have expanded insurance coverage. When I was at the American Insurance Association my job included writing a paper on the pollution exclusion and setting forth those decisions which interpreted it. I put together the 13 decisions that existed as of March 1985. Of the 13 decisions the only ones that upheld the pollution exclusion were those where the polluter not only knew what he was doing, but virtually knew that it was going to be harmful. Other than that you had cases where pollution had been going on for 12 years. Where people knew, sort of, that it was leaking and where the court nevertheless found that that was not excluded by language which provided coverage only where the event was sudden and accidental. Now all of a sudden, if you read the coverage cases since that time, there has been a dramatic reversal. And a lot of the court cases referred to the inability of the insurance industry to deal with the unpredictability that arises because of judicial interpretation of insurance policies in ways that are beyond ordinary use. When the courts begin to recognize the effect that their policy interpretation have on insurers abilities to predict their coverages, it shows that they're also going to do that with regard to the liability. I think that that's a more important breakthrough than any of the individual statutes. Thankyou.

Maybe Owen would like to explain, if he could, on claims made policies in the discounting formulas for California and IRS, whether there is any change for a company that might have a current policy and is changing to claims made policies?

No. No separate treatment.

Anyone in the audience have any questions? You're all anxious to get to the cocktail party. Thank you for your attention. I would like to thank the participants on the panel and I'm sure you'll join me in giving them a hand for their efforts.

CURRENT TOPICS CONCERNING RESERVES OF PROPERTY/CASUALTY INSURANCE COMPANIES

INTRODUCTION

The reserves of property/casualty insurers are under close scrutiny from several different authoritative bodies, including the National Association of Insurance Commissioners (NAIC), the American Institute of Certified Public Accountants (AICPA), the Securities and Exchange Commission (SEC), the Internal Revenue Service (IRS), and the General Accounting Office (GAO). Any discussion of loss reserves could elicit strong emotional arguments from a number of different viewpoints. This discussion today will focus on loss reserves and some of the key issues and pronouncements which are currently under heated debate among several of the insurance industry's governing bodies, as well as among several very interested government regulatory agencies.

SEC LOSS RESERVE DISCLOSURE REQUIREMENTS

In 1984, in response to the desires of several concerned groups, the SEC imposed new reporting requirements for property/casualty insurance companies in their annual Form 10-K reports. These new disclosures were designed to shed more insight into the reserve position of all publicly held property/casualty insurers, to enable users of the annual statements of these insurers to better analyze the balance sheet position of a particular company. To refresh your memory, the following will detail the required disclosures of the 1984 SEC regulations.

The SEC requires of all property/casualty insurers filing annual Form 10-K's

to include a table of loss and loss adjustment expense development showing the following information:

1. The amount of the year-end reserve for each of the ten years prior to the latest fiscal year;

2. The cumulative amount paid on each of these reserve amounts for each succeeding year;

3. The re-estimated reserve amount for each of the years presented, for each succeeding year; and

4. The difference between each of the re-estimated reserves and each year's original reserve amount, for each succeeding year.

For 1984 the reporting requirement was for 8 years; for 1985 it was increased to 9 years and to 10 years for fiscal year 1986 and beyond.

The SEC also required as of 1984 an exhibit showing a reconciliation of the beginning and ending reserve balances for each of the last three years.

The SEC required that supplemental information be disclosed in another schedule - called Schedule X. This schedule is similar to Schedule V, with a few differences: balance sheet items are required for two years and income statement disclosures for 3 years (Schedule V requires 3 for both); whereas the information presented in Schedule V is required by segments, for Schedule X the information must be presented for each of 3 major categories -

registrant plus consolidated subsidiaries, unconsolidated subsidiaries, and 50% or less-owned equity subs. Such supplementary information includes deferred policy acquisition costs, loss and loss adjustment reserves, unearned and earned premiums, net investment income, amortization of DPAC, and premiums written.

Further loss reserve information is required to be disclosed in the Management Discussion and Analysis (MD&A), the narrative portion of Form 10-K. Several subjects are now required to be mentioned in the MD&A. The registrant must disclose any adjustments made in the current year to prior year reserves. Any material reinsurance transactions entered into in the current year must be reported. A discussion of significant reserving assumptions is required. Any changes in the company's mix of business or changes in payment patterns must be disclosed. A discussion is needed on the effects of inflation and the effects of foreign currency fluctuations. Unusually large gains or losses on reserve transactions should be discussed. Finally, for those companies involved in the discounting of loss reserves, disclosure must be made of the reduction in reserves and the effect on pretax income of discounting practices.

A final SEC disclosure new in 1984 is a reconciliation of reserves under statutory and Generally Accepted Accounting Principles (GAAP) reporting. Common reconciling items, as noted by a review of several Form 10-K's submitted to the SEC, include additional discounting of GAAP reserves, reserves for salvage and subrogation recoverable, loss and loss adjustment expense (LAE) reserves reported as ceded for statutory purposes, and loss and LAE reserves for foreign subsidiaries.

The actuarial consulting firm of Tillinghast, Nelson and Warren has compiled summary data for all property/casualty insurance companies complying with the new SEC reporting requirements for each of the past two years, together with the individual companies' schedules. This publication allows for a comparative study of each company's compliance reporting. Salomon Brothers, Inc. also produces a comparative study of selected companies in graphic presentation, focusing on adequacy of each year's loss reserves, as evaluated each subsequent year and compared to the original year's estimate. Their analysis indicates that personal lines specialists were more accurate in their initial reserves, and that the short-tailed, dispersed nature of Auto coverage provided the most comfort when viewed in retrospect. Findings also suggest that strong industry pricing and earnings are associated with widespread redundancy in loss reserves, and conversely, weak pricing and low earnings are associated with deficiencies in loss reserves.

SEC STAFF ACCOUNTING BULLETIN #62

On July 7, 1986, the SEC issued their Staff Accounting Bulletin (SAB) Number 62, which addressed the controversial topic of discounting loss reserves. Discounting had been and still is resisted for most lines of business by the National Association of Insurance Commissioners (NAIC) for state reporting requirements.

The SEC, in its SAB No. 62, announced that it will accept discounting only under two scenarios: if the entity discounts such liabilities in its reporting to state regulatory authorities; or, with respect to settled claims,

when the ultimate cost and payment patterns are fixed and determinable on an individual claim basis, and the discount rate used is reasonable based on the facts and circumstances applicable to the registrant at the time of the settlement. The SEC would also require that a preferability letter from the registrant's independent public accountant accompany the change to discounting procedures.

AICPA TASK FORCE ON DISCOUNTING

The AICPA, in its Discounting Issues Paper (draft only), is wrestling with the issue of discounting loss reserves. Various other authoritative bodies are currently or have recently addressed this issue. An NAIC Task Force Study Group has recommended that the NAIC not support discounting for annual reporting to the various state insurance departments. However, for those lines of business for which insurance companies are already allowed to utilize discounting (workers compensation, medical malpractice in certain cases), the Task Force Study Group recommended that the NAIC require disclosure of discounting practices and their effects on the company's statutory financial statements. The NAIC has adopted changes increasing disclosure related to discounting of loss reserves, beginning for statements submitted in 1985. Also in 1985, both the Treasury Department and the General Accounting Office recommended, in two separate reports, some form of discounting of loss reserves for property/casualty insurers.

The AICPA Task Force on discounting has not reached a final conclusion on the subject to date. They agree that the overriding concept they are concerned

with is not conservatism (as is the NAIC), but to obtain the best (that is, the "least wrong") estimated of the liability. The Task Force is entertaining two views on the types of claims eligible for discounting: those claims for which the ultimate cost and payment pattern are probable and can be reasonably estimated on an individual basis; or, those for which the ultimate cost and payment pattern are probable and can be reasonably estimated on either an individual or group basis. In either circumstance, all other claims would be presented at ultimate estimated cost.

AICPA MEDICAL MALPRACTICE LOSS CONTINGENCIES

For healthcare providers, the current situation in insurance for medical malpractice claims is anything but optimistic. Insurance premiums are exorbitantly high, so high in fact that many providers have dropped coverage. Others have self-insured in any of several ways - accepted higher deductibles with their policies, accepted retrospectively rated policies, established captive insurance companies, or joined with organizations similar to themselves to establish multi-provider captives. Still others have purchased claims-made policies covering only those claims reported to the insurance company during the policy year.

Current reserving practices also vary. Some providers accrue for asserted claims based on a "best estimate", sometimes made by claims managers or attorneys. Some accrue for unasserted claims from reported incidents based on estimates, either individually (case analysis) or in groups (historical experience). Others accrue for unreported incidents based on the provider's

experience, often with the help of actuaries. Finally, some providers accrue for estimated losses based on payments made to a trust fund or to a captive insurance company, usually representing the present value of expected future payments (i.e., discounting).

The AICPA's Statement of Position (current draft dated April 10, 1986), entitled "Accounting for Asserted and Unasserted Medical Malpractice Claims of Health Care Providers", concludes that ultimate costs of malpractice claims should be accrued when the incidents occur, if it is probable that the liability has been incurred and the amount can be reasonably estimated. If it is not probable, or if a reasonable amount cannot be determined, no accrual should be made, but disclosure should be made in notes to the financial statements. Pending resolution of the discounting issue by the Accounting Standards Division Task Force, such disclosure should include the carrying amount of all accrued malpractice claims presented at present value, and the interest rate(s) used to discount those claims.

FASB EMERGING ISSUES TASK FORCE: ACCOUNTING FOR CLAIMS-MADE POLICIES

The Financial Accounting Standards Board's (FASB) Emerging Issues Task Force, in grappling with accounting for claims-made insurance policies, is attempting to address the controversial issue -- should an insured, covered by a claims-made policy, accrue for incidents reported after expiration of the policy? In other words, should an IBNR reserve be established on the books of the insured to cover those incidents incurred during the period covered by a claims-made policy, but not reported until after its expiration, and thus not

covered by the policy? This topic has been under heavy debate ever since the claims-made policy was introduced, and controversy has only increased as this type of policy gains favor over a wide range of insurance coverage.

The Emerging Issues Task Force (Issue #86-12), while not as yet reaching a final conclusion, has reached an apparent consensus. They suggest that an entity should accrue for IBNR under a claims-made policy if a loss is probable, and if such a loss is reasonably estimable. This conclusion is consistent with FASB #5, Accounting for Contingent Liabilities. The Task Force further indicated that an accrual for IBNR is needed even if the company plans to continue to purchase claims-made coverage, and even if it plans to purchase tail coverage in a future period. Finally, the Task Force suggests that the IBNR accrual should be offset by premium payments for future claims-made policies, on a pro-rata basis.

EXHIBIT 1

CALIFORNIA SURPLUS REPORT - PROPOSED TAX LAW

LOSS RESERVE DISCOUNTING

COMPARISON

PAYOUT RATES

- CALIFORNIA SURPLUS REPORT
  - DATA SOURCE:

    "PERCENT PAYOUT - - - SHOULD BE BASED ON COMPANY EXPERIENCE, OTHERWISE USE THE PERCENTAGE PROVIDED"

  - METHODOLOGY:

    UNSPECIFIED

- PROPOSED TAX LAW
  - DATA SOURCE:

    BEST'S AGGREGATES AND AVERAGES - 1986 EDITION
    (MAY ELECT TO USE OWN EXPERIENCE)

  - METHODOLOGY:

    PAID AS PERCENT OF INCURRED;
    SPECIAL RULES FOR SCHEDULE O, SCHEDULE P, REINSURANCE

EXHIBIT 2

CALIFORNIA SURPLUS REPORT - PROPOSED TAX LAW

LOSS RESERVE DISCOUNTING

COMPARISON

INTEREST RATES USED

- CALIFORNIA SURPLUS REPORT
  - ADJUSTED PRETAX COMPANY EXPERIENCE (LIMITED TO 10%)
  - CURRENT YEAR

- PROPOSED TAX LAW
  - ANNUAL FEDERAL MID-TERM RATE (AFR)
  - 5 YEAR AVERAGE

EXHIBIT 3

CALIFORNIA SURPLUS REPORT - PROPOSED TAX LAW

LOSS RESERVE DISCOUNTING

COMPARISON

OBJECTIVES

- CALIFORNIA SURPLUS REPORT
  - ADJUST SURPLUS

- PROPOSED TAX LAW
  - ADJUST INCOME

EXHIBIT 4

CALIFORNIA SURPLUS REPORT - PROPOSED TAX LAW

LOSS RESERVE DISCOUNTING

COMPARISON

PROPOSED TAX LAW
PAYOUT RATE CALCULATIONS

- SCHEDULE P
  - TEN YEAR PAYOUT FROM ANNUAL STATEMENT
  - EXTEND PAYMENT PERIOD IF LOSSES IN 10TH YEAR EXCEED LOSSES IN 9TH YEAR
- SCHEDULE O
  - LOSSES PAID AFTER THE FIRST YEAR FOLLOWING ACCIDENT YEAR ARE TREATED AS PAID EQUALLY IN THE SUCCEEDING 2 YEARS
- REINSURANCE AND INTERNATIONAL
  - COMBINE PAYMENT PATTERN FOR ALL SCHEDULE P LINES
  - ADJUSTMENTS FOR SPECIALTY COMPANIES

Year	Loss Payment Pattern (percent)
Accident Year	25
Accident Year + 1	10
Accident Year + 2	8
Accident Year + 3	8
Accident Year + 4	8
Accident Year + 5	7
Accident Year + 6	7
Accident Year + 7	5
Accident Year + 8	5
Accident Year + 9	5
Accident Year + 10	12

In this example, the amount of losses paid in the 9th year following the accident year are less than the amount of losses treated as paid in the 10th year following the accident year. Accordingly, the special rule applicable to long-tail lines of business applies. Under this special rule, the amount of losses paid in the 10th and later years after the accident year are treated as equalling the amount of losses paid in the 9th year after the accident year. Therefore, under the special rule, the loss payment period is extended for an additional 2 years, as follows:

Year	Special Rule Loss Payment Pattern (percent)
Accident Year	25
Accident Year + 1	10
Accident Year + 2	8
Accident Year + 3	8
Accident Year + 4	8
Accident Year + 5	7
Accident Year + 6	7
Accident Year + 7	5
Accident Year + 8	5
Accident Year + 9	5
Accident Year + 10	5
Accident Year + 11	5
Accident Year + 12	2

EXHIBIT 6

CALIFORNIA SURPLUS REPORT - PROPOSED TAX LAW
LOSS RESERVE DISCOUNTING
COMPARISON

PAYOUT RATES - PROPOSED TAX LAW

YEAR	AUTO LIABILITY	OTHER LIABILITY	WORKER'S COMPENSATION
1	34.3	9.2	25.9
2	30.9	16.2	28.6
3	15.0	14.7	13.4
4	8.9	15.1	7.7
5	4.7	11.0	4.5
6	2.8	8.9	3.5
7	1.2	5.1	1.9
8	.6	4.3	1.7
9	.3	2.2	1.5
10	.3	1.0	.6
11	.3	1.0	.6
12	.3	1.0	.6
13	.3	1.0	.6
14	.1	1.0	.6
15	-0-	8.3	8.3

EXHIBIT 7

CALIFORNIA SURPLUS REPORT - PROPOSED TAX LAW
LOSS RESERVE DISCOUNTING
COMPARISON

PAYOUT RATES - PROPOSED TAX LAW

YEAR	MEDICAL MALPRACTICE	MULTI-PERIL LINES	ALL SCHEDULE P (REINSURANCE)
1	3.0	55.7	34.3
2	10.0	23.4	26.7
3	10.4	7.4	12.6
4	12.2	4.7	8.1
5	9.9	3.1	4.9
6	8.3	2.4	3.7
7	7.0	1.0	2.0
8	6.5	.4	1.3
9	5.1	.7	.9
10	2.6	.3	.5
11	2.6	.3	.5
12	2.6	.3	.5
13	2.6	.3	.5
14	2.6	-0-	.5
15	14.6	-0-	3.0

EXHIBIT 8

CALIFORNIA SURPLUS REPORT - PROPOSED TAX LAW

LOSS RESERVE DISCOUNTING

COMPARISON

PAYOUT RATES - CSR

YEAR	MULTIPLE PERIL	WORKER'S COMPENSATION	OTHER LIABILITY	AUTO LIABILITY
1	58%	26%	9%	37%
2	26%	25%	11%	29%
3	5%	15%	12%	14%
4	4%	10%	15%	9%
5	3%	7%	13%	5%
6	2%	5%	11%	3%
7	2%	3%	9%	2%
8		2%	7%	1%
9		1%	4%	
10		1%	3%	
OVER 10		5%	6%	

1986 CASUALTY LOSS RESERVE SEMINAR

5A/6C - BASIC CASE STUDY

Robert V. Deutsch, Asst. Vice President
North American Reinsurance Corp.

Mark J. Silverman, Actuary
Ernst & Whinney

Recorder: Daniel F. Kligman, Actuary
Ernst & Whinney

TUESDAY, SEPTEMBER 30, 1986

BOB DEUTSCH: Our first speaker this morning is Mark Silverman. Mark is an actuary and manager at Ernst and Whinney in New York. Prior to joining Ernst & Whinney, he worked at Royal Insurance, where he was last in charge of personal lines pricing. He has a varied actuarial background, working on both commercial lines pricing and many reserving projects. I'm with North American Reinsurance Corp. which I just joined this year and in my previous life I was a consultant with Ernst & Whinney for 5 years. Mark is going to take us through the first case study. Did everybody get a handout? They're all on the chair back there. We do have slides but it is easier to have the handouts to take home. Mark, would you like to start?

MARK SILVERMAN: Good morning everybody. Hopefully, we all have the handouts and See that our first case study involves a company called On the Edge Mutual. On the Edge Mutual is a non-standard automobile writer that has been experiencing fast growth. Perhaps this growth is due to stricter underwriting guidelines being imposed by the standard automobile writers or perhaps it is due to the tightening of capacity by On the Edge Mutual's competitors. Or, the growth could be due to a combination of both of these factors. In any case though, we know the company is a pretty well leveraged one. At year end '85, the company was carrying reserves of $5.5 million. And its surplus position was $2 million.

We're interested in testing the adequacy of the company's reserves. Our analysis focuses on the company's paid losses. And in a sense this is a very objective standard. Objective in the sense that we're not relying on case reserve estimates which would be the situation if our database was on an incurred loss basis. Let's keep that in mind. We're looking at the company's paid losses. We're going to take a look at our first exhibit. Here we see Exhibit 1, which is in the familiar accident year triangle format. The exhibit traces the development of the company's latest 5 complete accident years. That is, we're looking at the company's cumulative paid losses at successive 12 month points in time. For illustration purposes, we're assuming that ultimate is at 60 months and time. That is, all claims are paid, settled, and closed within 5 years. In order to estimate a reserve for the company, we need to project ultimate losses for accident years '82 through '85. We're going to do this based upon the observation here of the historical development of the company's paid losses.

Exhibit 2 shown here illustrates the calculation of the Age-to-Age development factors. For each age group, for each column, we also have the arithmetic average of those factors. And based on this information we select development factors. For the last two columns, we selected the average factor. For the first 2 columns, we did not select the average factor. In each of these columns we noticed both a downward trend in the calculated factors and a drop in the last factor shown. For example, in the second column, where paid losses for accident years '81 and '82 increased by about 50% from 24 months to 36 months of development, accident year '83 developed by less than half that -- by only 21% in the same relative timeframe. Since we believe that this slower development from the more recent past would be more representative of the future development for accident years '84 and '85, we selected a factor of 1.20 which is more in line with the recent development. Similarly, in the first column, we selected a factor of 3.5 which again is more in line with the recent development. Question?

[Question, Inaudible]

Next we multiply out these age-to-age development factors in order to derive age-to-ultimate factors. If we select a higher age-to-age factor then that would result in a higher age-to-age ultimate factor, which would result in a higher ultimate loss estimate and therefore a higher reserve. In order to derive the reserve estimates, we're going to subtract from our ultimate estimates the paid losses as of year end '85.

[Comment, Inaudible]

That is our present assumption on this Exhibit. Yes. Admittedly, I did not make up these Exhibits and I would have chosen a factor larger than the 3.50 in the first column. In any case, if we multiply out those age-to-age development factors we will get the age to ultimate factors which we'll see in the next Exhibit. I guess we have them here on the last line. In the next Exhibit apply those age-to-ultimate factors shown in column (2) to the paid losses as of year end '85 to arrive at a set of ultimate losses shown in column (3). The difference between those ultimate losses in column (3) and the paid losses in column (1) yields our estimate of the reserves as of year end '85. If we sum up the individual accident year reserves, the total is $6.4 million, which is about $1 million greater than the $5.5 million in reserves which the company was carrying on its books as of 12/31/85.

At this point, we wanted to delve a little more deeper into the decreases in the recent paid loss development factors that we saw on Exhibit 2. Specifically, we wanted to focus attention on whether or not this observation signaled a change in the rate of settlement of claims. In other words, if less losses were being paid out in terms of dollars, then

perhaps this signaled a smaller number of claims being paid out as well. This is a signficant point because a major assumption in the reserving technique that we just -- the paid loss extrapolation technique -- is that the rate of settlement of claims is a relatively constant one. If that is indeed not the case, then our $6.4 million reserve estimate is not a very valid one.

We felt that further analysis was warranted regarding the rate of settlement of claims. We specifically continued to examine the data to focus in on claim count information. What we wanted to do is to examine the claims disposed ratios. A formula appears on this chart to my right which defines the claims disposed ratio as the number of cumulative claims paid divided by the estimated number of ultimate claims paid. We were interested in calculating this ratio for each accident year at its different stages of development. If we see a trend in these ratios we can then assume that there is indeed a change in the rate of settlement of claims going on here.

We're looking at claim count information for On the Edge Mutual and we see that in the next Exhibit. Here, we compiled the historical data in the usual triangle format and we're looking at incurred claims, or claims both paid to date and those still outstanding -- everything that's been reported to the company for those 5 accident years. And in the next Exhibit we calculated age to age count development factors. What we're doing here is concentrating on the denominator of the claims disposed ratio. We want to come up with an estimated number of ultimate claims incurred. Note that the ultimate number of claims incurred is identical to the ultimate number of claims paid.

[Question, Inaudible]

That's correct. Because we are looking at incurred claims here, paid and outstanding. If an open claim closes without pay, we can get a decrease in the number of incurred claims.

The next Exhibit, we calculate age to age incurred claim development factors. We then calculate the average for each age grouping or for each column. Again, leaning more heavily on the recent development, a selection for each column was made. We multiplied those age-to-age claim count factors out, and we obtained the cumulative age-to-ultimate factors shown on the last line on the chart. We then applied those factors to the latest available claim count information as of year end '85 to arrive at the estimated ultimate number of claims paid. That's shown in the next Exhibit. Our ultimate claim count projection which will be the denominator of our claims disposed ratio, appears in the third column. To those accident year ultimate number of claims paid we ratioed the historical number of cumulative paid claims which appear on the next exhibit. The resulting claims disposed ratios appear on Exhibit 8.

Let's take a closer look at this Exhibit by examing each column for trends. Let's focus in on the first two columns where we see a downward shift in the claims disposed rates, or settlement rates. In the first column, for example, after one year of development, we see that for accident years '82, '83, and '84, from 35% to 39% of the claims being settled. And then the settlement rate suddenly drops to 29% for the most recent year. In the second column, after two years of development, we also see a drop in the most recent year in the percent of ultimate number of claims paid. The drop is from 83.3% to the 79.9%, as shown.

We can speculate here that the decrease in the rate of settlement of claims is due to one of many possible factors. Perhaps, there is an understaffing situation in the claims department relative to the growth of the company. There are too few claims department people to close out the increased number of claims that are being reported to the company. Or, perhaps there have been directives from top management of the company to slow down the settlement process of claims. This directive could be due to cashflow considerations. Or perhaps, the slow down is due to the nature of the claims themselves. The company could be experiencing more serious claims. These more severe claims typically take a much longer time to settle. Sometimes, for example, there is litigation involved, which could last several years. No matter what the cause, we need to adjust our paid loss data for the shift in the settlement of rates. Because, again, the main underlying assumption of the paid extrapolation method is that the rate of settlement of rates must be a relatively constant one.

[Question, Inaudible]

I think in this situation we are seeing growth; we saw it on the prior Exhibit -- the number of incurred claims from one year to the next has been growing.

[Comment, Inaudible]

That's correct. That's the basis of our assumption. I'm not quite sure what you're getting at.

BOB DEUTSCH: The question was if you're getting fewer claim counts coming in, won't you over project your ultimate number of claim counts? The assumption here is that the reporting pattern or the payment pattern of those claims are consistent from interval to interval. Even though you may ultimately get a lower number of claims, if you started with 100 claims and then at the end of the next period it went to 150. If you assumed that the second development stage will always have 50% of the claims in the first development stage, then you'll project the right number albeit a lower one if the numbers are coming in at a lower volume. They are coming in at the same rate. As long as the rate is consistent the loss development factor will capture it.

MARK SILVERMAN: Another assumption, too, is that the definition of a claim is remaining the same throughout the period.

Again, we wanted to adjust the database for this change in the rate of settlement of claims. And we wanted to also adjust the historical paid loss experience and align it with the recent claims practice. With such an adjusted database we can then confidently rely upon the paid loss extrapolation technique in estimating the reserves for the company.

How are we going to adjust the paid loss database? Well, what we're going to do is twofold in nature. The first step is to select a representative claims disposed ratio for each year of development. For this purpose, we selected the claims disposed ratio for the most recent calendar year which were those appearing on the latest diagonal in Exhibit 8. These appear as headings in the next Exhibit. For we used those claims disposed ratios, or percentages, to calculate the adjusted number of paid claims shown here. The adjusted number of paid claims shown are calculated by applying the claims disposed ratios for each time period to the projected number of ultimate claims for each accident year. We have an example on the bottom of the Exhibit. The adjusted number of claims paid after 12 months for accident year '81 is 161. That equals the product of 29.29% and the ultimate number of claims estimated for that year, which is 551. Similarly, for accident year '82 at 12 months of development, the 308 that's displayed there is calculated as the product of the 29.29% and the number of ultimate claims estimated for that particular accident year, which was 1,052. Notice that, because we used the actual claims disposed ratio for the latest calendar year, the number of claims on the last diagonal are the actual number of paid claims. They are not adjusted numbers.

Corresponding to this adjusted data of number of paid claims we now need to determine the dollars of paid losses which is the second step in our adjustment process. What this task basically consists of is identifying a mathematical function which closely approximates the relationship between the cumulative number of paid claims and the cumulative dollars of paid losses. What we assumed here is that the relationship was a linear one. On the top row, we see the accident year '81 adjusted set of cumulative number of paid claims during its five years of development. These adjusted number of paid claims are repeated in the next to last column on Exhibit 10, with the different stages of development appearing on the far left, we have the unadjusted information for the '81 accident year. We have the unadjusted or actual number of cumulative paid claims, and the unadjusted or actual dollars in paid losses. What we're assuming, then, is that there is a linear relationship between these two quantities. In fact, what we're assuming here, for purposes of illustration, is that the linear relationship is a perfect one. We can apply linear interpolation techniques for example, to calculate the adjusted dollars of paid losses in the last column, on the first line, of $358,328. Again, by applying linear interpolation techniques, just as the 161 adjusted number of paid claims lies between the actual number of paid claims of 143 and 423, then the adjusted dollars $358,328 is calculated between the actual loss dollars of $286,640 and $1,401,784.

The specifics of that calculation is shown on the bottom of the Exhibit. In similar fashion, we calculated the rest of the adjusted dollars in paid losses for the '81 accident year at its different stages of development. The results are shown on the last column. We applied this linear interpolation procedure for each accident year separately. And we calculated similarly adjusted paid losses, all of which appear on Exhibit 11.

We now applied our paid loss extrapolation technique to this adjusted paid loss database. The age-to-age development factors are shown on the next exhibit. Not too surprising is the fact that the factors are more stable than the ones that we saw earlier on Exhibit 2. And because of the stability of the factors here, we are able to make as our select the average factors. We then cumulated these average factors, multiplied them together, and applied them to the paid losses as of year end '85 to arrive at a revised set of ultimate losses. Once again, the difference between our ultimate losses and our paid losses as of year-end 1985 yields a reserve estimate. The total loss reserve estimate here is $10 million, which is greater than our $6.4 million estimate. By detecting a change in the rate of settlement of the claims, and by adjusting the paid losses for this change, and applying a standard reserving technique like the paid loss extrapolation one, we come up with a more valid reserve estimate and a different conclusion. And that is that the company's reserves are more deficient then we had originally thought.

The company is not in a very good condition at all; actually it's technically insolvent.

[Question, Inaudible]

That's correct. There is a built in bias here. The question concerns Exhibit 10, regarding the linear interpolation process. The fact that we are really not looking at the size of loss distribution over time. Yes, it could be the case that in this situation perhaps, we see that more dollars of paid losses are on the books, and yet a <u>smaller</u> number of claims are being paid. This is because there is a larger number of more severe claims that underlie the database. Yes, typically you would have to look at the size of loss distribution as well.

I should also add that the interpolation process here was a linear one. And what's often used is an exponential process. If you fit the cumulative paid claims and the cumulative paid losses to an expedential curve, you get a rather good fit here with a high coefficient of determination, then you can use that as well in coming up with an adjusted set of paid losses.

[Comment, Inaudible]

The question involves the selection of the age-to-age development factors on Exhibit 2. And we were selecting factors which were on the low side and which then yielded very low ultimates and low reserves. And if we had selected higher factors there, then certainly the $6.4 million reserve estimate which is the first one we obtained, would have been a much higher one and certainly much closer to the $10 million estimate that we arrived at after the adjustment process. Yes, that is indeed the case. Again, I wasn't in on the selection process on Exhibit 2.

BOB DEUTSCH: Jim that's a really good point. In fact, we would never advocate just using one method to come up with reserves especially when you're going to put them in the tank. On Exhibit 2 had people selected 4.0 as the 24 over 12 development factor which looks reasonable there. And had you selected 1.45 for the 36 over 24 factor. If you had only made those two changes both of which the two of you were alluding to, you'd come up with a reserve estimate that was $3 million higher. You'd end up with $9-1/2 million versus 10. Either way the company is beyond repair.

MARK SILVRMAN: One further point that we're trying to make here is that you should know your database. If there is an underlying change in the settlement rate, then you should perform the proper adjustments like the one we did here.

[Question, Inaudible].

That's a good point. The question concerns the interpolation process and how a change in the mix of business would effect that process. You're absolutely right. The adjustment process basically assumes that the mix is not being changed too drastically here. In this case, we were looking at a non-standard automobile writer. That's one line of business in which the mix wouldn't change terribly.

BOB DEUTSCH: We'll have more time for questions on this but I just want to cover some more methods and then we'll come back and cover questions on all of them. Tom, regarding the mix of business issue, you might want to break down the database further between non-standard private passenger business, and non-standard commercial. Mark, thanks for bankrupting On The Edge Method!

Our next case study deals with Medical Malpractice Mutual Company. It's a Bedpan mutual. I don't know if you are familiar with the terms. Mutual malpractice companies were formed by physicians in the mid-70's and late 70's. There's an actuary right here in our audience. Her real name is Sue Deeppockets. Sue is the actuary that was just hired by Bedpan Mutual. As we see in Case Study II, the company was run by a doctor named Dr. Golfanyone. I've seen this happened too frequently, he ran the company, collected lots of premiums, but didn't quite understand the tail on medical malpractice. He saw his bank accounts getting increasingly large. Then Sue came in and suggested that maybe he ought to curtail writing new business and he said "well we won't do that, we'll just cover up the problems by making it up in volume." He continued to write more business. Finally a competitor of his, Bedpan Overflow, was declared insolvent. I have a warped sense of humor, I apologize. Bedpan Overflow went into the tank, they were in trouble and seeing this Dr. Golfanyone became serious about setting adequate reserves. At year end '85 they had $100 million of loss reserves and $50 million of surplus. The question for Sue Deepockets is whether or not to certify to the reserves, get kicked out the CAS and have to repeat this case study next year, or believe that IBNR means insolvent but not yet recognized. Of course, the last alternative is to prepare your resume omitting reference to your work at Bedpan Mutual. Okay, now the fun starts.

Page 1 shows historical claim counts reported to Bedpan Mutual. I was just talking about the tail. Here we've assumed ultimate is at 60 months. The only reason for that is that's all that would fit on the slide. The fact of the matter is that we probably should go out, depending on whether it's claims-made or occurrence policies, if it is it ought to go out 10 to 15 years. We've assumed ultimate is at 60 months, but that is a poor assumption. Don't ever do that on medical malpractice! Page 2 shows the age-to-age development factors for the reported claim counts. It's simply one column divided by the previous column. Looking at this data there is quite a bit of volatility, that is not unusual with medical malpractice. In fact if you found more stable numbers than this it was because somebody

prepared it for a case study! In the real world the numbers really do jump around like this. Looking at this it would be hard to know whether the reporting patterns were consistent. One thing we're going to assume here is that we don't have that much knowledge about what's gone on in the reporting process. Keep in mind that many of these companies are not sophisticated in terms of the systems they have and in terms of the databases they've been able to build. On page 3, what we've done is taken a simple average of the age-to-age factors in the previous columns. For example, that 3.5 in 24 over 12 is just the sum of the 4 factors above it divided by 4. Likewise going across. As I pointed out before I think here it would also be a mistake to pick a factor like 2.8 and put all of your weight on the latest development experience. The last column is simply the cumulative product of the selected age to age factors. They're called the age to ultimate factors. Feel free to jump in with questions any time. Page 4 shows the results of the multiplication of the latest diagonal on page 1 which is the claim units reported through the end of calendar year 1985 for all of the accident years, by the age-to-ultimate factors that we derived on page 3. That gives you the ultimate column. This software package also projected the development of those claim units reported. For example, 158 times 3.5115 gives you the 555. And then the 155 times the age to ultimate factor of 11.89 gives you the 1879. Based on page 4 we have what we think are the ultimate number of claim units to be reported to Bedpan Mutual by accident year.

We're going to delve a bit into the internal and external considerations that one must look at in doing loss reserving. As a preface to this it would be a mistake as Lee pointed out, to simply take historical observed patterns and assume that they would be appropriate for the year that you're trying to reserve for. That's inappropriate for very good internal and external reasons. That's what I'm going to go through in the next few charts. The examples of internal considerations that make the past not necessarily reflective of the future would first be changes in the relative adequacy of case reserves. That's either called strengthening or weakening using standard, undefined, misunderstood, ambiguous actuarial terminology. Strengthening means that more of the ultimate loss is reflected sooner than it use to be. In these examples the claim that first started out at, I guess it was $800, as of the end of the first year that is now getting reserved at $1200 and is a stronger reserve. You've got more of the ultimate dollars on the books already so you don't want to assume that ultimately it's going to double because it is not going to. It can go the other way too. It could be that the $800 became $400 or $500. You have to try and get a feel for whether reserves are equally strong or if they are stronger or weaker than they used to be. There are several changes in the claims handling procedures that need to be taken into account. Obviously the reserving process deals with measuring the lags and putting values on what the lags are worth. Anything you do that effects the lags or the values needs to be considered so that you don't just assume that the historical lags are going to work for the future.

Several types of claims lend themselves very well to putting up an average reserve the day the claim is reported, instead of having an adjuster go out and review the claim immediately so for every "fast track" claim you put in an average value of, say $1,000. When that claim is settled you'll eventually replace the average with the actual. That's generally done on fast reporting lines, that is for claims that won't be on the books with an average value for very long. You very quickly replace it with an actual value. If a company changes either the length of time that a claims stay with the average value or the average value that is used obviously that will affect your aggregate data and you need to know that. The claim counting procedure could also be changed. One of the prior exhibits showed the different ways that claims could be counted. It could be on a per accident basis, on a per claimant basis. If one accident produces five individual claims some companies may count that as one count while others may count it as five. You just need to know if any change in your system took place. Consistency is something you can deal with. If your data starts to be inconsistent then you need to know that it can't be used to project the future. Allocated loss adjustment expense payments are frequently abbreviated ALAE. A company may change their procedure for paying the allocated expenses. For example, perhaps throughout a lengthy trial you might pay your attorney every month or every six months or something. It's conceivable that a company would then decide to change that system and pay the attorney only at the end of the case. Again, if it's done the same way throughout time it's not that big of a deal. But if it's changed during your experience period you need to know that and make an adjustment. It could be that a new system for issuing checks to pay losses is put into place.

Page 5 is a triangle showing reported losses and allocated loss adjustment expenses incurred. It shows this by accident year by development stage. This is the typical triangle that you get. In fact, as Jack Burns said yesterday that "If you're not able to get data like this, the company probably should have its licenses revoked."

Page 6 gives you average severity per reported claim. This is the page 5 reported losses divided by the page 1 claim units reported. We see that generally speaking in the later development stages, the severity per claim is increasing. I think you would probably expect that intuitively factors like inflation and jury awards, and other escalating trends would cause the average severities to go up. On page 7 we've taken this average severity triangle and calculated age-to-age development factors for all of the intervals. Page 8 shows the simple average weighting of the development factors. Again, the 1.39 was calculated similarly as the one before. Likewise for all of the other factors. We're going to come back to this page 8 in a minute.

On page 9 what we've done is taken our average severity that was on page 6, multiplied these by the age to ultimate factors on page 8 to give us the ultimate severity per reported claim for Bedpan Mutual by accident year. Now that we've got ultimate severity and previously from page 4 we had ultimate claim counts, we now multiply the two together and that gives us one estimate of ultimate losses. Those ultimate losses are again the last column of page 9 times the last column of page 4. So simply, they are the severity times the claim units reported. From the ultimate losses we subtract out what's been paid to date, and the difference is the reserves that should be carried at year end '85. In this case it is $2 million. One concern I had with this was that there was an awful lot of volatility in some of these age-to-age development factors. What I did was on page 8 a sensitivity analysis. In 36 over 24, I ended up choosing 1.19 and that was heavily weighted by that 1.42. That it could be a blip in the data. It could be a coding error or lot's of reasons why that one age-to-age factor looks as high as it does. We could have tempered that a little and selected perhaps the last one, the 1.122, which is the middle of the three. If you were to have selected that and carried the projections through you would have ended up with ultimate numbers on page 10 of $64.8 million for accident year 1984, and $72.3 million for 1985. Since this factor was changed in 36 over 24, it only effects the latest two accident years. You can see that a small change in the development factor from 1.18 to 1.12 has a pretty significant effect on the ultimate numbers and consequently also the reserves. The $68.6 million became $64.8 million and the $76.5 million became $72.3 million. You can check those calculations later. The total change here is $8 million. That's a big difference when you've only changed one development factor slightly. We see that there can be a large difference based on one small change to the selected development factors. Very sensitive results. Like me, I'm a sensitive actuary.

Page 11 shows the loss and allocated loss expense ratios by accident year assuming that we went with the ultimates on page 10. Had we used these adjusted numbers the loss ratios would have come down for the last two accident years. Now we're going to discuss a method that you've heard all about and it's called the Bornhuetter-Ferguson method. Ron Bornhuetter and Ron Ferguson are two tremendous actuaries. They've both been at General Reinsurance when they developed this method. Ron Bornhuetter is now at NAC Re and Ron Ferguson is the president of Gen Re. Their method came out in a paper in the Proceedings back in 1973. It is used frequently. It's used in medical malpractice, reinsurance, and those lines where you've got some question as to the credibility of the database that you have to work with. What it does is temper several different methods and we'll go through in detail what those are. This triangle we've seen before. This was the triangle that was on page five. It simply shows the reported losses and allocated loss expenses by accident year. Page 13 shows the age-to-age development factors. This is the simple division of the columns on page 12. On page 14 here we see the selected age-to-age factors. Again, here, we took a simple average. To be honest. you often don't use things like a

simple average because of information you've picked up in talking to the claims people, the accountants and the systems people. You may feel that going back to 1981 was too long ago to include in the calculation. Maybe you'll take an average of the last three factors, maybe you'll take an average of the last four but exclude the high and the low. There are many different ways of selecting these factors. This is an intermediate step in the Bornhuetter-Ferguson approach. However, if we were to take the age-to-ultimate factors and multiply by the last diagonal on the reported incurred triangle which was on page 12 that would be the method called the reported incurred extrapolation. All you do is, just as Mark did on Exhibits 1 and 2 of his presentation he did a paid loss extrapolation. Here we could perform a reported incurred extrapolation. That would give us the following numbers. What happens is if you multiply the last diagonal on page 12 times those age-to-ultimate factors, you would come up with ultimate incurred losses of $242 million. Keep that in mind because of what, under the Bornhuetter-Ferugson approach, we'll do with that number. We've got $242 million as one possible indication of ultimate incurred losses.

On page 15 we've developed what's called unreported loss and allocated expense factors. If you've got an age to ultimate factor and you take the reciprocal of that, that will give you the percentage that is reported through that point and time. For example, in 1984 we've got age-to-ultimate factor of 4. That means that about 25% of the dollars have been reported to you and the reason you're multiplying it by 4 is to get out to ultimate. One minus the percent reported factor is simply the percent unreported factor. It's the unreported factors that are used further in this approach. The first important assumption made in the Bornhuetter-Ferguson approach deals with what you're reporting pattern looks like and consequently your unreported pattern. The second major assumption is the loss ratio you think you will write this book of business at.

On page 16 what we've assumed is that we wrote this business at a 160% loss ratio. That could have been the loss ratio assumed in the pricing calculations. It could have been the loss ratio that some of your competitors have had. But for whatever reason you tend to think that 160% might be the loss ratio that you wrote this business at if you did not know further information about the block of business. Taking the 160% and multiplying it by the premiums earned is what is called the expected loss ratio approach. And here we see that this gives us ultimates of $143 million. Using the expected loss ratio approach we had $143 million. Using the reported incurred extrapolation we had $242 million as ultimate. That's about $100 million difference between the loss ratio approach and the reported incurred approach. The Bornhuetter-Ferguson method very cleverly weights those two indications. If you knew nothing about the database you might go with the loss ratio approach. If you knew a tremendous amount about the database you may believe that the reported extrapolation was the way to go. Here because it's medical malpractice,

and because we only have 5 years of data, there is still a great deal of uncertainty. Consequently we'll temper those two approaches. We'll meld them together. The way we meld them together is by determining the IBNR provision using the unreported factors. Let's turn to page 17.

On page 17 we have the unreported factors which come from page 15. We multiply them by the ultimate loss and allocated expenses incurred that comes straight off of page 16. Multiply the two together and that gives you unreported losses and allocated expenses. That's your IBNR provision under this method. Keep in mind that this is what is called broad IBNR. There's pure IBNR and there's broad IBNR. Pure IBNR covers only unreported cases. Broad IBNR covers unreported cases as well as adverse development or favorable development on case reserves. Here we're developing a broad concept. It is a catchall for all further development.

On page 18 we take the unreported losses that we just previously calculated and add to that the actual case reserves outstanding at 12/31/85. That gives us an indication of the total loss reserves. Here, the total loss reserves would be $132 million. Take the loss reserves and add to them what is then paid to date to give you an estimate of ultimate losses.

Page 20 shows the loss ratios using the ultimate losses developed on page 19. One point I want to make about Bornhuetter-Ferguson is in the immature years, 1984 and 1985, the method puts more weight on the loss ratio approach. As the years become more mature the method puts more weight on the reported projection. You can see that clearly with these loss ratios. Keep in mind that under the loss ratio approach we had used 160% and with the reported extrapolation we had loss ratios which were not shown in the Exhibits, but which were in excess of 200%. You see we're weighting the loss ratio approach more in the immature years and relying more on the actual experience to date in the earlier years. Here are the three results that we came up with; from Bornhuetter-Ferguson: $132 million of reserves and $180 million of ultimate. Under the loss ratio approach it was $144 million of ultimate and $96 million of reserves, and $242 million ultimate under the reported extrapolation with $194 million of reserves. Page 16 is where the $144 million came from. All I did was subtract out the paid losses to date ($48 million), that's shown on page 19, resulting in $96 million of reserves.

[Comment, Inaudible].

The question dealt with what happens if you now take the loss ratios that you think are more representative and plug them back into the Bornhuetter-Ferguson method where you calculate the ultimate losses using the loss ratio approach. That's right, you would get a higher number. I'd have to think about it, but at some point it does level out. Whether it levels out at the reported incurred, I don't exactly know. That would really be forcing a number though. If you keep plugging in a number you'll eventually come up with whatever you want. That's the great thing about actuarial science. It is a good point, in fact one of the large consulting firms will often go through Bornhuetter-Ferguson twice. They'll use what's called an iterative approach where they'll run it through once and then take the loss ratios that came from page 20 and feed it back into the loss ratio part of the analysis.

[Question, Inaudible].

Keep in mind we also had $240 million of ultimate using the counts and averages method. You've got a number closer to this. It is really difficult to say, there's a lot of qualitative analysis that goes into certifying. You really must talk to the claims people. You must find out if they've changed the definition of a claim count, of a reported loss; if the data includes claim without payment in some years and if in other years it doesn't. It is really a lot that you need to look at. You also have to look into whether or not you should discount the reserves. I hate to say that. But many of these Bedpan Mutuals' actually do discount their reserves with explicit statutory permission from the Commissioner. They realize that while they would all be solvent on paper, statutory accounting would declare them insolvent. As a result they do explicitly discount.

[Question, Indaudible].

Depending on what kind of malpractice this was. I was thinking that this was physician's malpractice. But if it was hospital malpractice you would look at exposures. You would look at patient days, the number of beds utilized and things like that. Any other questions?. We've got time for general questions on various methods of loss reserving. One thing that I want to stress is not to set the reserves using one method. That is clearly the wrong way to do it. You're subject to errors and omissions and all of the wonderful liability problems if you were to certify a reserve and you didn't have sufficient documentation or methods on why you came up with the number you did. Any questions on Case Study I? Any questions on Case Study II?

[Question, Inaudible].

That's a very good question. For the '84 accident year number of 344; I am assuming that that's the number you were looking at, how did that number come about? It was outside the range of the linear interpolation process. There are other numerical techniques that can be used rather than linear interpolation. I believe the technique that was used here was the LaGrange method which is a numerical analysis technique. It's on Part III of the CAS Syllabus, and I believe that's how that number was determined. Any other questions?

[Question, Inaudible].

You really would need to do more work than this. You need to use lots of methods. You need to talk to the people. You'll probably have to meet with the client as well as the State Insurance Department on a situation like this. There may be other actuaries involved and you'll want to talk to the auditors. I've been through these kind of scenarios with Bedpan Mutual and it's always an awkward situaion because these doctors who are running these companies have no concept of the insurance business. They just see their bank accounts getting fatter and fatter. That's not to say that doctors are any greedier than insurance personnel, of course. Any other questions? Well, thank you.

1986 CASUALTY LOSS RESERVE SEMINAR

5B - BASIC CASE STUDY

Faculty: Edward W. Ford, Corporate Actuary
The Progressive Group

Mark Doepke, Senior Consultant
Touche Ross & Co.

Recorder: Daniel F. Kligman, Actuary
Ernst & Whinney

TUESDAY, SEPTEMBER 30, 1986

EDWARD FORD: I am the corporate actuary at The Progressive Corporation. With me is Mark Doepke, who is a managing actuary for Touche Ross & Co. He is also a Fellow of the CAS and a member of the Academy. There are handouts in the back if you don't have them. We'll be showing slides that show up pretty well, but you ought to have handouts to take notes. I make the classic disclaimer that both Mark's and my comments are our own and our organizations have nothing to do with them. With that we'll start and Mark is going to go first and talk about some changes in payment rates and how to adjust for them. Mark.

MARK DOEPKE: Good morning and thanks Ed. The purpose of this first case study is to investigate the types of adjustments you can make to paid loss data to account for changes in claims settlement patterns. Or put another way, claims closure rates. Arguably what I'll be going through are two different methods for projecting losses. Basically, we have a pure paid loss projection method and an adjustment to that method. Arguably then, you just have one method and according to everything that you've probably heard in the sessions over the last day or so, you have to try your best to use as many loss reserving methods as possible in order to attack a problem. The example I'm going over, however, illustrates just one method. Realize that as part of my reason for saying that, is that any of the methods that one uses for projecting reserves is subject to bias at one time or another. That bias is due to one or more of the assumptions underlying the method being violated. We'll see in this particular example how that can come about. As you can see in your material on the very first page, Case Study I, we're talking about On the Edge Mutual, a company that's experienced rapid growth especially during the last year. This particular company as of the end of 12/85 has $5.5 million in loss reserves and only $3 million in surplus. You as the actuary for a state insurance department have been asked if it is okay for the company to be admitted to do business in your particular state? Your task is to try and come to some sort of conclusion on that. Getting into the paid loss projection method, the first slide illustrates what you've probably seen at least 1,000 times before: a triangle of paid losses. You can see paid losses arranged by accident year going down the left side and by maturity in months across the top. We're talking about substandard auto liability business here. We're assuming that payments are essentially complete at 60 months. This assumption is made to keep this slide down to a reasonable size. In terms of incurred loss reporting patterns I'd say 60 months would probably be reasonable. But as far as payment patterns go you could probably expect at least a couple of more years on auto liability. We have our basic paid loss triangle and on the next slide we go through the mechanics of calculating age-to-age factors which relate paid losses at a certain maturity to paid losses at the prior maturity. We can also see that average age to age factors have been computed and some selections have been made. In a couple of cases the selections differ from the actual average. The reason for that is that normally you don't want to blindly use the average. You want to take a look and see if there's been any sort of trend in your age-to-age development stage. For example, the first column is 12 to 24 months factors; we see that accident year 1981 starts up at about 4.9; '82 and '83 are around 4.0 and 1984 is down to 3.5. To the extent that you can actually utilize the past to predict the future you might even

suspect that 1985, when 24 months of data is available might be even lower than 3.5. You perhaps select 3.5 because you're not quite sure for one reason or another. At least selecting 3.5 as opposed to the calculated average of 4.1 reflects the fact that there is a downward trend in those factors. This is also true at the 24 to 36 months development stage. When we get way out on the right hand side of the exhibit where there is not as much data and tbere's no reliable indication of any sort of trend out there, we're using the average. Slide 3 goes over the development of our reserve estimate. In this particular method we take paid losses at 12/85 and simply apply the selected age-to-age ultimate loss development factor. The loss development factor, I should have mentioned, although you're probably all aware was simply the backwards multiplication of all of the age-to-age factors on the earlier exhibit. By multiplying the paid losses at 12/85 by the loss development factor one can derive an estimate of ultimate losses. By subtracting out paid losses to date from these ultimate loss estimates one can come up with an estimate of reserves. By summing the reserves for all accident years, we see that we're indicating $6.4 million of reserves at 12/85 according to this method. Comparing that to the $5.5 million we can see that if the company should really be at $6.4 million they would have had to reallocate about one third of their surplus back into the reserve category. That could significantly impact their capacity to write that new amount of business in your state in the upcoming year. Recognizing that any method is subject to potential bias one has to ask the question -- how exactly can I identify any bias? Probably one of the most important assumptions in the paid loss development method is that the rate of claims closure is fairly constant over time. What we're going to try and do is investigate whether this can reasonably be expected to hold in this particular case. We're going to look at some claim data. To jump forward just a little bit the idea will be to relate cumulative paid claim counts, that is closed claim counts, to expected ultimate claim counts. In this exhibit and in the two following exhibits we're going to be deriving an estimate of ultimate claim counts. Here we have cumulative incurred claims by accident year and by maturity. By incurred claims I mean claims which have been completely closed plus any claims that are still open. Any claims which have been closed without payment would not be included. We're leaving claims closed without payment completely out of this consideration. The number of claims can go down because certain claims can be closed without payment. For example, taking accident year 1981 at 36 months, there were 560 claims incurred. Some of those claims were open at that time and some claims were closed. What appears to have happened from 36 months to 48 months is that some of those open claims were closed without any payment at all. There was no liability on the part of the company, so they dropped into the CWP category. Apparently there were six of those from 36 months to 48 months. There could have been six of those. I guess I was ignoring the fact that there could also be some new reportings during that period of time too. Again, looking at relationships over time we can come up with age-to-age factors in the completely analogous way that we did for the paid losses. Following similar logic we make selections of age-to-age factors at the bottom of the slide and the cumulative age-to-ultimate claim count development factors then would be shown on the bottom. To derive an estimate of ultimate claims we simply take the incurred claims as of 12/31/85 and multiply them by the claim

count development factor. We can see the answers over on the right. This procedure in itself is a projection and has various assumptions underlying it. One assumption is that there has been no particular change in the claim reporting pattern over time. You can see that loss reserving can be pretty complicated if you really want to get into it. For example, the state law could have changed making relatively more claims likely -- this year versus years in the past. Or possibly your claims reporting pattern could change suddenly if all the lawyers in your state start to advertise their services. These variables could impact your rate of claims reporting and to investigate that you have to get into some other things. We're simply assuming that the rate of claims reporting hasn't changed here.

Slide No. 7 -- I mentioned before that we would be relating cumulative paid claims to an estimate of ultimate claims. Here we have our cumulative paid claims. Again, I'm talking claims closed with some non-zero payment only here. If we take the numbers on this triangle and relate them to the ultimate claim estimate from the earlier slide, we come up with something that we can call a number of things. On the slide it's labeled cumulative paid claims over ultimate incurred claims. It could also be called claim closure rates or claims disposed ratios. They all mean the same thing. The idea here is to look down each of these columns, the 12 month column, the 24 month column and so forth, and try to see, at identical points of development if there have been any consistent shifts in the rate of claim settlement over time. What types of relationships can we see from this triangle? Looking at the 12-month column we can see that accident year 1981 paid claims at 12 months of development is right around 26% of the claims that will ultimately happen. In 1982 through 1984 this percentage goes up very gradually. But in 1985, which I mentioned was the year of dramatic growth for this company, we can see that it has tailed off dramatically, from 39% down to 29%. At 24 months we note a similar type of phenomenon starting at 76% going up to 83% gradually. At the end of calendar year 1985 only about 80% of ultimate had been closed. There may be some evidence here that the rate of claims closure has dropped somewhat. We could tie it in with the premium growth. That's sort of behind the scenes in the example here and we never actually present the premium. The hypothesis was that the company has grown dramatically during 1985.

Ideally one would want to look for persistent changes over time in these claim settlement patterns. Here we have a situation which may or may not warrant the adjustment of the actual data for any persistent change. But we have what looks like a pretty dramatic change over the last year. What we're about to go through will be a method of adjusting historical paid losses to enable us to make the assumption that claims rate settlements have not changed over time. We've already spoken to why we would expect that the claims rates settlement have decreased as shown on this triangle. Some of the other possible sources of bias in the rates of claim settlement could include something like management directing the claims department to slow down the claims closure process in some fashion, slow down the payments and hold onto the cash. Management also could have directed the claims department to speed up payments. There might have been a bad faith suit and management may have been embarrassed and wanted to avoid such things from happening in the future. I mentioned before that changes in

the rate of claims reporting is another possible source of bias. A third and very important possible source of bias would be changing workload within the claims department. We have a constant number of people in the claims department trying to handle an increasing volume of business. This might result in a slowdown in your payment pattern, in relative terms. Often under self-insured programs third party administrators are involved. The same type of comments could be made about third-party administrators. If your third-party administrator suddenly has taken on a bunch of new contracts but hasn't added staff then you would expect a similar slowdown in claim payments.

How do we remove the effects of bias? We can go onto slide 9. Here, we have taken the most recent claims disposed ratio from the earlier slide. That is the claims disposed ratio along the lower diagonal of the triangle from the earlier exhibit and said how many claims would have closed in the past if there had been absolutely no change in the claims disposed ratio over time. For example, in the very first column we see that 29% of the claims that will ultimately be incurred have been closed. Recasting the past as if that 29% figure applied all the way through, we apply the 29% to each of the estimates of ultimate claims from before and we come up with the numbers that you see here in the first column. Likewise, all the way off to the right we've done exactly the same thing. And notice that the latest diagonal stays exactly the same. That's because we're using the actual claims disposed rate there.

On Slide 10 we're going to be making the jump from what I could call "as if" historical closed claims to "as if" historical paid dollars. On the left hand side of this exhibit you can see the unadjusted figures, namely the actual paid claims, the actual paid dollars of loss, and also notice the 161-551 over there. That would be the adjusted cumulative paid claims from the prior exhibit. The idea would be to come up with some sort of a relationship which would enable us to say well if 161 claims had been closed for accident year 1981 as of 12 months, what would we have expected the loss payments to be. What we've chosen to do is use a simple linear interpolation approach whereby we can take the 161 claims and realize that it falls between the 143 and the 423 claims shown off to the left side. The idea would be to simply interpolate them between the loss dollars of $286,000 and the $1,402,000 coming up with the $358,000. We can say that if 161 claims have been closed in the past then roughly $358,000 may have been paid in the past corresponding to those claims. We can use the same sort of approach in deriving each of the "as if" paid loss dollar amounts shown way off to the right hand side. The next slide will show the adjusted triangle of cumulative paid losses as though the rate of claims closure had not changed over time.

[Question, Inaudible].

No I don't think we're assuming that necessarily. I think if you took a look at that original paid loss triangle and divided into it the historical cumulative paid you'd probably find that the average closed claim would be going up over time, say from 12 to 24 to 36. Because your more severe claims will be settled later.

[Comment, Inaudible].

Does that answer the question?

On Exhibit 11 we have the adjusted paid figures. On Exhibit 12 we go through a similar age-to-age triangle computation. Notice that there isn't really much of a pattern in the age to age factors meaning that there's less reason to deviate from the average as far as what our selections are. I guess the only possible exception to that might be the second column there where a number -- somewhat less than a 1.344 could have been chosen. Cumulative loss development factors are computed. On the next slide we apply those cumulative loss development factors to the paid losses as we did before coming up with revised estimates of ultimate and revised reserve figures. This shows that after making these adjustments the indicated reserves are $10 million. Comparing that with the figure from the earlier exhibit of $6.4 million, you can see that maybe we have something to worry about here. Maybe I should not certify this company for operation in my state. It's an important point to mention though that we've essentially been talking about one loss reserving method here, possibly two. You should really try to get some sort of a handle on how your reported losses have been developing over time. You might even want to try and do a frequency and severity analysis on this data too to see whether you can learn anything else about the operations of this company and whether you can come up with a more refined reserve estimate. It might very well be that when you look at 2 or 3 other reserving methods that this $10 million that you see in this slide quite, quite high relative to all of your other estimates. In conclusion, know thy sources of bias. Try to adjust for the bias whenever you possibly can and use a variety of methods. I guess those would be the conclusions from this case study. Do you have any questions? Okay, well I'll turn the microphone back to Ed for Case Study No. 2.

EDWARD FORD: In this educational process we tend to focus on one or two methods and try to highlight differences. This practice and the reality of reserving differ. If you have the data you may do 10 methods all simultaneously. The stuff we present focuses on a particular issue and makes you aware of specific strengths or weaknesses. But again, we can't stress enough that you do as many methods as the data you have will allow. I want to go into Case No. 2. You'll remember that in Case I there was no mention of premiums whatsoever. There was no premium on any of the exhibits. That means that the reservist didn't care what the pricing folks thought when they set the price for whatever that product was. That is a very pure way of looking at things I suppose. In certain circumstances however, you might want to reflect what the pricing actuary, and that may have been yourself, thought this product or this line was going to do. There is an approach which Ralph tried to describe, which allows you to reflect some previous knowledge or belief about the price of the line. To review our program we have a medical malpractice company. You are the certifying reservist. Your management and your company wants to have a $100 million reserve balance, $50 million of reserves, and your question is do you wish to certify. This is a good example for this particular technique as medical malpractice has a very slow reporting pattern. The

results of development techniques can be volatile and you definitely want to reflect on what your pricing assumptions were. We'll go through a number of exhibits. Again, we'll follow this basic triangular format which you've seen a great deal of. Here we see another technique of reserving that uses classic development triangles. What we have here is a triangle of claim units reported. You'll notice that in this triangle nothing ever decreases. There is a software package that produced these results; it is consultants'. I love the 5 decimal points that they carry results to. I feel embarrassed as a casualty actuary showing anything to anybody with five decimal places. Consultants might get paid by the number of decimal points. Boy am I a funny guy! You'll notice in the heading that the technique is a simple average of the development factors of the last five accident years. Of course five years are not available so I suppose it's the average of the last four. It's a nice little exhibit because it highlights the fact that when you do this development factor approach you're assuming that the future development factors will be identical as historical accident year factors. The age to ultimate factors on the right are the simple products of the numbers for each accident year below those lines. We continue this same process and if you use these development factors you can then fill out the claims reported triangle. For instance, let's look at accident year 1985; 555 claims is the result of the 158 from Exhibit 1. Let's start again. We have the 158 claim units reported when accident '85 was at 12 months, multiplied that by 3.5115, and that should project us to accident year '85 as of 24 months, which is what that 555 is. Think of completing that reported unit triangle by the development factors. In Mark's presentation you did that in one step. You have those cumulative development factors times the latest diagonal and got there in one shot. You projected that ultimate column over there on the far right. This is just the particular computer package that does it. The user likes to see all of the intermediate stuff. The end result is that we have a estimate of ultimate reported claims on the far right. Here's another data triangle, this time it is reported losses plus allocated loss adjustment expenses incurred. If we do some arithmetic now and take the prior triangle of incurred losses and divide by a triangle of reported claims on the very first page cell by cell (the page 5 triangle divided by the page 1 triangle), you will get this average incurred loss and allocated loss adjustment expense per reported claim. Is everybody with me so far?

[Question, Inaudible].

If you go to page 5 and take that $3.4 million of incurred losses and then go to page 1 and divide by the 158. Now we're going to try to project those severities to ultimate and you get an ultimate average severity. We complete the relevant loss development factors by taking that simple average down each column and again you'll note that the development factor projections are constant by accident year. The age-to-ultimate factor is a simple product. We then fill out the average severity triangle the same way we filled out the claim count triangle. We take the development factors and fill out the projected future development by stages. Now we have a projection of ultimate average severity from here. And we have a projection on page five of the ultimate claim counts. And if we multiply these two together we get the left hand column -- ultimate losses and

allocated loss adjustment expense. For instance, for accident year '85, $76.5 million is the product of $40,739 from page 9, and the 1,879 from page 4. This is an estimate derived from separate projections of ultimate claim counts and ultimate severity. From ultimate losses we subtract the paid to date and we get an indicated reserve of $192 million. At this time you should be getting a little bit nervous if you're the certifier. The surplus is $50 million and so you are appropriately motivated to do some more thinking. Note that in this particular technique premiums have not gotten to the picture at all. This is a pure development factor approach; the assumption of constant development is there so you know that there might be a problem there.

The next step is to look at the resulting loss ratios. You divide the estimated ultimate losses by the applicable premium. Our premium is in another exhibit. You get this series of loss ratios. Something you do for reasonableness. I'm not going to comment on the quality of the business; it clearly shows some very high loss ratios. You look at those and you think a couple of things. You might look at them and say they appear consistent. I looked at it and they looked pretty good to me. You might have known that when you set the rates for this thing. And again, medical malpractice is very a long tailed line of business -- we set the rates for it several years ago. You were shooting for 160% loss ratio. You were going to earn investment income on the reserves and you thought they did a pretty good study. You hired every consultant you could find in the United States and you took the average of their numbers, and you thought you had a pretty good fix on what loss ratio this business was going to eventually produce. Now you're estimating something that is much much higher. You might want to think about some way to incorporate that loss ratio assumed in the ratemaking process with the indications from loss development. You're now a little suspicious of the development data that there's something wrong there. I'm going to show how to do that. You could simply ignore the development indications. I don't believe any of those numbers, I'm going to make the loss ratio 160%. That's one technique. But you want to be able to blend the loss development material you have with the ratemaking information that you have some faith in. We're going to grind some more numbers here. This is the same triangle that was on page 5, I believe, it's just the incurred losses. We do the same kind of thing with the simple average to produce the age-to-ultimate factors on the right. You've seen this two other times here. Now we're going to do something different. Let's think about this step since this is the real guts of the method. On the left column is the age-to-ultimate factor copied from the previous page. Let's think about the middle line. It is labelled reported loss unallocated. Think about this development factor, this 19.5 in 1985. If you have some number, say 85 as of 12 months, that 19.5 says I take that 85 number and multiply it by 19.5 and I get an estimate of ultimate. You have reported: ("r"), times 19.5 equals: ultimate ("u). If you then do a little algebra and calculate "r" divided by "u" that's going to equal one over 19.5. That fraction is then the percent of ultimate losses that are reported. That's what is embedded in that 19.5. It is another way of looking at the 19.5. Instead of saying that you take the reported and increase it 19.5 times to get ultimate you can say that as of 12 months your reported is 5% of your ultimate. That middle column is simply the

reciprocal of the column on the left. For instance, accident year 1984 as of 24 months that the development factors of 4 (roughly) applies to implies that about 25% of the ultimate losses have been reported through 24 months. In the last column it's simply one minus that percent reported. For accident year '85 if 5% is reported then obviously 95% is unreported. Now here is where you bring in the fact that you had every actuary in the country working for you to produce this study and you're absolutely convinced that 160% was the best ultimate loss ratio. That's what the analysis did, that's what the rate study said the loss ratio was going to be. You want to reflect that. You take the loss ratio multiplied by the premiums earned. For instance in accident year '85, given the rates that underlie the earned premiums for that year, you expected them to generate a loss ratio. Therefore, you would expect $42.7 million in ultimate losses for accident year '85. As I said before, you might simply then use this estimate for your reserving absent completely what you want to blend in. This is what the rate study showed. Now we're going to use that unreported loss and loss adjustment expense factor. That came from page 15. Now remember that this is the proportion of ultimate losses that are unreported as of year end '85. If we take that column and multiply it times this ultimate that is implied in the rates we get a reserve that has a blend of the development factor approach and also has the rate assumption in it. Those reserves have a mixture of the two things. If we then do a little bit of addition we take that first column which is the unreported losses or broad IBNR and we add it to the case reserves and get another estimate of $132 million in reserves.

We take those reserves and add them to the paid losses to date and create ultimates. Because then we can take those ultimates, divide them by the applicable earned premium and get another series of loss ratios.

Notice in terms of mechanics what happens here. You picked a 160% loss ratio at ratemaking and notice how that is incorporated in the very recent year '85. The ultimate loss ratio is very close to what was assumed in the rates. This makes sense because there's not too much reserving data now. All you have is just a little bit of reported losses so that is the year where you might say that you're not willing to rely on the development factor method, you're going to hold to the ratemaking loss ratio. That will gradually change, the ultimate loss ratio is starting to diverge from the ratemaking one and approach the loss development one. I really view this method as a way of weighting a simple loss ratio technique. Pick a loss ratio of 160% and there's your reserve. Now pick the reserves from the development technique. Here, the result is a weighted average of the two, and it's weighted almost by the maturity of the accident year. As the accident matures you're willing to believe more of the development factor approach and when it is very immature you might want to stay with the ratemaking approach.

Back to the case study. We have one hundred million dollars carried, $132 million indicated from this technique and $192 million from the other. I don't think I would personally sign unless there was something that I didn't know. Questions folks?

QUESTION: What was the name of this technique?

ANSWER: It is known in standard parlance as the Bornhuetter-Ferguson approach.

Do you have any questions now? I can personally answer any now or if you look at this and think about it, call me up. I find with a lot of this stuff that I have to sit and think and the questions come later. Don't hesitate to call either myself or Mark with any other questions. Thank you ladies and gentlemen.

CASE STUDY #1

On the Edge Mutual Insurance Company

You are Mike Hammer (no relation to the detective), the actuary for the insurance department. You have been sent to help in a special exam of On the Edge. The purpose of the exam is to qualify the company for a license to write business in your state. Your role is to advise the commissioner of the adequacy of the company's reserves.

On the Edge is a non-standard Automobile insurer that has experienced rapid growth. Its 12/31/85 reserves were $5.5 million and its surplus was $3.0 million. What is your opinion? Do you allow the company to write in your state?

EXHIBIT I

CUMULATIVE PAID LOSSES

MONTHS OF DEVELOPMENT

ACCIDENT YEAR	12	24	36	48	ULTIMATE 60
1981	$286,640	$1,401,784	$2,109,497	$2,296,770	$2,414,889
1982	647,010	2,618,784	3,908,230	4,216,755	
1983	972,814	3,920,689	4,760,558		
1984	1,129,806	3,995,030			
1985	1,079,497				

EXHIBIT II

LOSS DEVELOPMENT FACTORS FOR
CUMULATIVE PAID LOSSES

ACCIDENT YEAR	24/12	36/24	48/36	60/48
1981	4.890	1.505	1.089	1.051
1982	4.048	1.492	1.079	
1983	4.030	1.214		
1984	3.536			
AVERAGE	4.126	1.404	1.084	1.051
SELECTED	3.500	1.200	1.084	1.051
CUMULATIVE	4.785	1.367	1.139	1.051

12/31/85 RESERVES

EXHIBIT III

ACCIDENT YEAR	(1) PAID LOSSES @12/31/85	(2) LOSS DEVELOPMENT FACTOR	(3) (1)x(2) ULTIMATE LOSSES	(4) (3)-(1) RESERVES @12/31/85
1981	$2,414,889	1.000	$2,414,889	$0
1982	4,216,755	1.051	4,431,810	215,055
1983	4,760,558	1.139	5,423,628	663,070
1984	3,995,030	1.367	5,461,769	1,466,739
1985	1,079,497	4.785	5,165,385	4,085,888
TOTAL	16,466,729		22,897,480	6,430,751

EXHIBIT IV

CUMULATIVE INCURRED CLAIMS

MONTHS OF DEVELOPMENT

ACCIDENT YEAR	12	24	36	48	ULTIMATE 60
1981	527	570	560	554	551
1982	983	1,060	1,056	1,057	
1983	1,185	1,249	1,261		
1984	1,125	1,181			
1985	1,428				

EXHIBIT V

LOSS DEVELOPMENT FACTORS FOR
CUMULATIVE INCURRED CLAIMS

ACCIDENT YEAR	24/12	36/24	48/36	60/48
1981	1.082	0.982	0.989	0.995
1982	1.078	0.996	1.001	
1983	1.054	1.010		
1984	1.050			
AVERAGE	1.066	0.996	0.995	0.995
SELECTED	1.050	1.005	0.995	0.995
CUMULATIVE	1.045	0.995	0.990	0.995

ULTIMATE CLAIM COUNT

EXHIBIT VI

ACCIDENT YEAR	(1) INCURRED CLAIMS @12/31/85	(2) LOSS DEVELOPMENT FACTOR	(3) (1)x(2) ULTIMATE CLAIM COUNT
1981	551	1.000	551
1982	1,057	0.995	1,052
1983	1,261	0.990	1,248
1984	1,181	0.995	1,175
1985	1,428	1.045	1,492

EXHIBIT VII

CUMULATIVE PAID CLAIMS

MONTHS OF DEVELOPMENT

ACCIDENT YEAR	12	24	36	48	ULTIMATE 60
1981	143	423	512	539	551
1982	364	812	973	1,019	
1983	466	1,041	1,157		
1984	459	939			
1985	437				

EXHIBIT VIII

CUMULATIVE PAID CLAIMS/ULTIMATE INCURRED CLAIMS

ACCIDENT YEAR	MONTHS OF DEVELOPMENT 12	24	36	48	ULTIMATE 60
1981	25.95%	76.77%	92.92%	97.82%	100.00%
1982	34.61%	77.21%	92.52%	96.89%	
1983	37.33%	83.39%	92.68%		
1984	39.06%	79.91%			
1985	29.29%				

EXAMPLE FOR ACCIDENT YEAR 1981 AT 12 MONTHS OF DEVELOPMENT:

25.95% = 143 (EXHIBIT VII) / 551 (EXHIBIT VI)

EXHIBIT IX

CUMULATIVE PAID CLAIMS

PERCENTAGE OF ULTIMATE CLAIMS CLOSED

ACCIDENT YEAR	29.29%	79.91%	92.68%	96.89%	100.00%
1981	161	440	511	534	551
1982	308	840	975	1,019	
1983	366	998	1,157		
1984	344	939			
1985	437				

EXAMPLE FOR ACCIDENT YEAR 1981 AT 29.29% CLOSURE:

161 = 29.29% (EXHIBIT VIII) X 551 (EXHIBIT VI)

ACCIDENT YEAR 1981 EXHIBIT X

	UNADJUSTED		ADJUSTED LINEAR INTERPOLATION	
MONTHS OF DEVELOPMENT	CUMULATIVE PAID CLAIMS (EXHIBIT VII)	CUMULATIVE PAID LOSSES (EXHIBIT I)	CUMULATIVE PAID CLAIMS (EXHIBIT IX)	ADJUSTED CUMULATIVE PAID LOSSES
12	143	$286,640	161	$358,328
24	423	1,401,784	440	1,536,965
36	512	2,109,497	511	2,101,545
48	539	2,296,770	534	2,262,090
60	551	2,414,889	551	2,414,889

EXAMPLE: $358,328 = (161-143)/(423-143) X (1,401,784-286,640) + 286,640

EXHIBIT XI

ADJUSTED CUMULATIVE PAID LOSSES

PERCENTAGE OF ULTIMATE CLAIMS CLOSED

ACCIDENT YEAR	29.29%	79.91%	92.68%	96.89%	100.00%
1981	$358,328	$1,536,965	$2,101,545	$2,262,090	$2,414,889
1982	547,470	2,843,035	3,921,644	4,216,755	
1983	764,056	3,700,239	4,760,558		
1984	846,739	3,995,030			
1985	1,079,497				

EXHIBIT XII

LOSS DEVELOPMENT FACTORS FOR
ADJUSTED CUMULATIVE PAID LOSSES

ACCIDENT YEAR	81%/29%	93%/81%	97%/93%	100%/97%
1981	4.289	1.367	1.076	1.068
1982	5.193	1.379	1.075	
1983	4.843	1.287		
1984	4.718			
AVERAGE	4.761	1.344	1.076	1.068
SELECTED	4.761	1.344	1.076	1.068
CUMULATIVE	7.353	1.544	1.149	1.068

EXHIBIT XIII

12/31/85 RESERVES

ACCIDENT YEAR	(1) PAID LOSSES @12/31/85	(2) ADJUSTED LOSS DEVELOPMENT FACTOR	(3) (1)x(2) ULTIMATE LOSSES	(4) (3)-(1) RESERVES @12/31/85
1981	$2,414,889	1.000	$2,414,889	$0
1982	4,216,755	1.068	4,503,494	286,739
1983	4,760,558	1.149	5,470,681	710,123
1984	3,995,030	1.544	6,170,251	2,175,221
1985	1,079,497	7.353	7,937,841	6,858,344
TOTAL	16,466,729		26,497,157	10,030,428

RESERVES FROM EXHIBIT III	6,430,751
DIFFERENCE IN DOLLARS	3,599,677
DIFFERENCE IN PERCENT	56.0%

CASE STUDY #2

Bedpan Mutual Insurance Company
(referred to as Company XYZ in exhibits)

You are Sue Deeppockets, the actuary newly hired by Bedpan Mutual to begin an actuarial department. Among your many responsibilities includes the obligation of certifying the loss reserves.

For many years the company was collecting lots of premium and paying few losses. Then the plaintiffs' bar got smart and started suing every doctor for any trivial incident. Dr. Golf Anyone, the President of Bedpan Mutual, decided to solve the problem by "making it up in volume". He saw all the investment income rolling in and the bank accounts swelling up like his patients (of course, he's an obstetrician). It wasn't until his competitor, Bedpan Overflow, was declared insolvent that Dr. Anyone considered the liability side of the balance sheet and hired you to determine the true picture.

You've been given the attached underlying data. Bedpan Mutual has reserves at December 31, 1985 of $100 million and surplus of $50 million. Do you:

A. Certify the loss reserves.

B. Get kicked out of the CAS and have to repeat this case study next year.

C. Believe that IBNR means Insolvent But Not (Yet) Recognized.

D. Prepare your resume omitting your current position.

COMPANY XYZ / BASIC PROFESSIONAL LIABILITY
Claim Units Reported

Valuation Date: December 31, 1985
Cumulative Basis

Accident Year	Development Stage (in months) 12	24	36	48	Ult
1981	39	108	243	291	317
1982	60	258	793	920	
1983	94	389	1005		
1984	161	457			
1985	158				

COMPANY XYZ / BASIC PROFESSIONAL LIABILITY
Age-to-Age Development - Claim Units Reported

Valuation Date: December 31, 1985
Cumulative Basis

Accident Year	Development Stage (in months) 24/ 12	36/ 24	48/ 36	Ult/ 48
1981	2.76923	2.25000	1.19753	1.08935
1982	4.30000	3.07364	1.16015	
1983	4.13830	2.58355		
1984	2.83851			
1985				

COMPANY XYZ / BASIC PROFESSIONAL LIABILITY
Projected Age-to-Age Development - Claim Units Reported
Forecasted using simple average of last 5 accident years.

Valuation Date: December 31, 1985
Cumulative Basis

Accident Year	Development Stage 24/ 12	36/ 24	48/ 36	Ult/ 48	(in months) Age-to-Ult
1981	2.76923	2.25000	1.19753	1.08935	
1982	4.30000	3.07364	1.16015	1.08935	1.08935
1983	4.13830	2.58355	1.17884	1.08935	1.28417
1984	2.83851	2.63573	1.17884	1.08935	3.38472
1985	3.51151	2.63573	1.17884	1.08935	11.88549

Forecasted developments are below each line.

COMPANY XYZ / BASIC PROFESSIONAL LIABILITY
Projected Claim Units Reported

Valuation Date: December 31, 1985
Cumulative Basis

Accident Year	Development Stage (in months) 12	24	36	48	Ult
1981	39	108	243	291	317
1982	60	258	793	920	1002
1983	94	389	1005	1185	1291
1984	161	457	1205	1421	1548
1985	158	555	1463	1725	1879

COMPANY XYZ / BASIC PROFESSIONAL LIABILITY
Reported Losses & ALAE Incurred

Valuation Date: December 31, 1985
Cumulative Basis

Accident Year	Development Stage 12	24	36	48	(in months) Ultimate
1981	524154	2150951	4941374	5920749	6686481
1982	1161542	6845706	29903435	30557800	
1983	2519425	14682220	42574046		
1984	4703943	17481605			
1985	3989210				

COMPANY XYZ / BASIC PROFESSIONAL LIABILITY
Average Incurred Severity Per Reported Claim

Valuation Date: December 31, 1985
Cumulative Basis

Accident Year	Development Stage 12	24	36	48	(in months) Ultimate
1981	13440	19916	20335	20346	21093
1982	19359	26534	37709	33215	
1983	26802	37743	42362		
1984	29217	38253			
1985	25248				

COMPANY XYZ / BASIC PROFESSIONAL LIABILITY
Age-to-Age Development - Average Incurred Severity Per Reported Claim

Valuation Date: December 31, 1985
Cumulative Basis

Accident Year	Development Stage (in months) 24/ 12	36/ 24	48/ 36	Ult/ 48
1981	1.48185	1.02104	1.00054	1.03671
1982	1.37063	1.42116	0.88082	
1983	1.40822	1.12238		
1984	1.30927			
1985				

COMPANY XYZ / BASIC PROFESSIONAL LIABILITY
Projected Age-to-Age Development - Average Incurred Severity Per Reported Claim
Forecasted using simple average of last 5 accident years.

Valuation Date: December 31, 1985
Cumulative Basis

Accident Year	Development Stage 24/ 12	36/ 24	48/ 36	Ult/ 48	(in months) Age-to-Ult
1981	1.48185	1.02104	1.00054	1.03671	
1982	1.37063	1.42116	0.88082	1.03671	1.03671
1983	1.40822	1.12238	0.94068	1.03671	0.97521
1984	1.30927	1.18819	0.94068	1.03671	1.15874
1985	1.39249	1.18819	0.94068	1.03671	1.61353

COMPANY XYZ / BASIC PROFESSIONAL LIABILITY
Projected Average Incurred Severity Per Reported Claim

Valuation Date: December 31, 1985
Cumulative Basis

Accident Year	Development Stage 12	24	36	48	(in months) Ultimate
1981	13440	19916	20335	20346	21093
1982	19359	26534	37709	33215	34434
1983	26802	37743	42362	39849	41312
1984	29217	38253	45452	42756	44326
1985	25248	35158	41774	39296	40739

COMPANY XYZ / BASIC PROFESSIONAL LIABILITY
Projected Loss & ALAE Reserves

Valuation Date: December 31, 1985

Accident Year	Ultimate Losses & ALAE		Losses & ALAE Paid		Loss & ALAE Reserves
1981	6686481	-	6686481	=	0
1982	34502868	-	27855909	=	6646959
1983	53333792	-	12243173	=	41090619
1984	68616648	-	1191877	=	67424771
1985	76548581	-	43507	=	76505074
Total	239688370	-	48020947	=	191667423

(Ultimate Avg. Severity per reported claim) x (Ultimate Claims Reported).

COMPANY XYZ / BASIC PROFESSIONAL LIABILITY
Projected Ultimate Loss Ratios - Losses & ALAE

Valuation Date: December 31, 1985

Accident Year	Ratios
1981	0.83703
1982	2.16557
1983	2.86909
1984	2.81135
1985	2.86844

COMPANY XYZ / BASIC PROFESSIONAL LIABILITY
Reported Losses & ALAE Incurred

Valuation Date: December 31, 1985
Cumulative Basis

Accident Year	Development Stage 12	24	36	48	(in months) Ultimate
1981	524154	2150951	4941374	5920749	6686481
1982	1161542	6845706	29903435	30557800	
1983	2519425	14682220	42574046		
1984	4703943	17481605			
1985	3989210				

COMPANY XYZ / BASIC PROFESSIONAL LIABILITY
Age-to-Age Development - Reported Losses & ALAE Incurred

Valuation Date: December 31, 1985
Cumulative Basis

Accident Year	Development Stage (in months) 24/ 12	36/ 24	48/ 36	Ult/ 48
1981	4.10366	2.29730	1.19820	1.12933
1982	5.89364	4.36820	1.02188	
1983	5.82761	2.89970		
1984	3.71637			
1985				

COMPANY XYZ / BASIC PROFESSIONAL LIABILITY
Projected Age-to-Age Development - Reported Losses & ALAE Incurred
Forecasted using simple average of last 5 accident years.

Valuation Date: December 31, 1985
Cumulative Basis

Accident Year	Development Stage 24/ 12	36/ 24	48/ 36	Ult/ 48	(in months) Age-to-Ult
1981	4.10366	2.29730	1.19820	1.12933	
1982	5.89364	4.36820	1.02188	1.12933	1.12933
1983	5.82761	2.89970	1.11004	1.12933	1.25360
1984	3.71637	3.18840	1.11004	1.12933	3.99698
1985	4.88532	3.18840	1.11004	1.12933	19.52654

COMPANY XYZ / BASIC PROFESSIONAL LIABILITY
Projected Unreported Loss & ALAE Factors

Valuation Date: December 31, 1985

Accident Year	Age-to-Ult. Development Factors	Reported Loss & ALAE Factors	Unreported Loss & ALAE Factors
1981	1.00000	1.00000	0.00000
1982	1.12933	0.88548	0.11452
1983	1.25360	0.79770	0.20230
1984	3.99698	0.25019	0.74981
1985	19.52654	0.05121	0.94879

COMPANY XYZ / BASIC PROFESSIONAL LIABILITY
Projected Est. Ult. Loss & ALAE Incurred

Valuation Date: December 31, 1985

Accident Year	Assumed Ult. Loss & ALAE Ratios		Premiums Earned		Est. Ult. Loss & ALAE Incurred
1981	0.83703	x	7988341	=	6686481
1982	1.60000	x	15932457	=	25491932
1983	1.60000	x	18589109	=	29742575
1984	1.60000	x	24407024	=	39051239
1985	1.60000	x	26686512	=	42698420
Total			93603443		143670647

Your estimate of ultimate loss and ALAE ratios.

COMPANY XYZ / BASIC PROFESSIONAL LIABILITY
Projected Unreported Losses & ALAE

Valuation Date: December 31, 1985

Accident Year	Unreported Loss & ALAE Factors		Est. Ult. Loss & ALAE Incurred		Unreported Losses & ALAE
1981	0.00000	x	6686481	=	0
1982	0.11452	x	25491932	=	2919336
1983	0.20230	x	29742575	=	6016923
1984	0.74981	x	39051239	=	29281009
1985	0.94879	x	42698420	=	40511835
Total			143670647		78729103

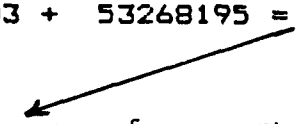
Needed gross IBNR reserve implied by your selection of:

(i) ultimate loss & ALAE ratios
(ii) development factors.

COMPANY XYZ / BASIC PROFESSIONAL LIABILITY
Projected Loss & ALAE Reserves

Valuation Date: December 31, 1985

Accident Year	Unreported Losses & ALAE		Loss & ALAE Reserves Outstanding		Loss & ALAE Reserves
1981	0	+	0	=	0
1982	2919336	+	2701891	=	5621227
1983	6016923	+	30330873	=	36347796
1984	29281009	+	16289728	=	45570737
1985	40511835	+	3945703	=	44457538
Total	78729103	+	53268195	=	131997298



Revised loss & ALAE reserves for reported and unreported claims.

COMPANY XYZ / BASIC PROFESSIONAL LIABILITY
Projected Ultimate Losses & ALAE

Valuation Date: December 31, 1985

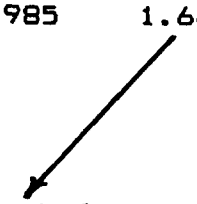
Accident Year	Loss & ALAE Reserves		Losses & ALAE Paid		Ultimate Losses & ALAE
1981	0	+	6686481	=	6686481
1982	5621227	+	27855909	=	33477136
1983	36347796	+	12243173	=	48590969
1984	45570737	+	1191877	=	46762614
1985	44457538	+	43507	=	44501045
Total	131997298	+	48020947	=	180018245

Revised ultimate losses & ALAE using revised estimate of needed gross IBNR reserves.

COMPANY XYZ / BASIC PROFESSIONAL LIABILITY
Projected Ultimate Loss Ratios - Losses & ALAE

Valuation Date: December 31, 1985

Accident Year	Ratios
1981	0.83703
1982	2.10119
1983	2.61395
1984	1.91595
1985	1.66755



Revised ultimate loss & ALAE ratios based on your recommended reserves.

1986 CASUALTY LOSS RESERVE SEMINAR

5E/6B - COMMON PITFALLS IN RESERVE ANALYSIS

Moderator: Warren P. Cooper, Vice President & Consulting Actuary
Huggins Financial Services

Panel: Spencer M. Gluck, Sr. Vice President & Actuary
Kramer Capital Consultants, Inc.

Richard E. Sherman, Partner
Coopers & Lybrand

Recorder: Patricia Yates, Actuarial Analyst
USAA

MR. COOPER: Rick Sherman is a veteran from last year's session, obviously one of the most popular that was given. Rick is a member of the CAS and of the Academy. He is currently a principal with Coopers & Lybrand in San Francisco where he has an office of vast amounts of people that he directs. He's been a consulting actuary for some 11 years, both with Coopers and with Milliman & Robertson. He served as a commercial lines actuary for Firemen's Fund before that, and has conducted several loss reserve studies for various companies. I understand the studies have been for about 15 of the 60 largest companies. And I'm told that he has analyzed total loss reserves amounting to approximately $25 billion in the course of his career. He recently authored several papers, one of which is called "Extrapolating, Smoothing and Interpolating Development Factors." And we all know him as the second name in the Berquist-Sherman paper. Rick also writes an article, and I hope you all read it because I find it myself very illuminating. An article in Business Insurance, "Ask a Consulting Actuary." I'll think you'll find that Rick's presentation is extremely interesting.

MR. SHERMAN: I can think of 2 or 3 possible subtitles for the discussion today. The first is The Hazards of Intuitively Appealing Ideas. And I'd like to start out with an analogy that will give you some notion of what some of these intuitively appealing ideas can be like. Another subtitle might be A Little Knowledge is a Dangerous Thing, from Alexander Pope. And finally, How a Local View Can Vary from a Global View of Things.

Let's start with an intuitively appealing idea, at least if you've never been told otherwise. Based solely on personal experience, I think it is quite possible to conclude that the earth is flat. As far as I can see it looks flat, even when I get in a plane. If you think of it, a property of water is that it tends to flow to the lowest places. If the earth is round, and I'm out on the ocean I ought to see water flowing away from me. I don't see that happening so therefore, the earth is flat. On a local basis that assumption is really not a bad one. After all, the curvature of the earth is only about 1 foot per mile. The error in that assumption is about .02%. However, if you base your life on that assumption and you try to travel straight out miles from here on a horizontal plane, you'll find yourself 1,656 miles above the surface of the earth. This illustrates a number of things. First, the further out you go from that localized experience, the error of your assumption compounds, not in a multiplicative sense but in a exponential sense. It's also interesting because our real basis for knowing that the earth is round is based almost totally on science, and we have some pictures that were taken by astronauts. What I'd also like to suggest here is to draw an analogy between what I would call the expert land surveyor or the claims adjuster or auditor. And if you'll pardon the analogy, the actuary takes the role of the astronaut here. If you were looking for the details of a local plot of ground you certainly wouldn't go to the astronaut. If you're looking for the total picture of where the whole claims process is going in terms of a global perspective,

you should be a little careful about just talking to the land surveyor. The trick of the analogy is switching variables. The variable of land surveying, earlier was space and in claims the variable is time.

Let's take a first glance of a global view of the claims process (Exhibit 1). This is for Workers' Compensation and a single accident year, 1975. If you'll start with me in the first four columns. The first column is labeled "The Year of Development." For accident year 1975, the year number 1 is what transpired in 1975. We see that $5,504,000 were paid in claims and 16,568 claims were closed. The average closure was $332 per claim. The year of development No. 2 is what transpired in 1976. The paid losses were $12,874,000 and 18,416 claims were closed for an average of $699 per claim. At 24 months from the inception of the accident year, 95% of the claims have been closed. And so, you might perhaps postulate that ought to give us a pretty good idea of what the remaining 5% of the claims are like. In Columns 4, 5, and 6, by the second year of development we've paid $18,378,000 and closed 34,984 claims. And we did so on an average of $525 per claim. This point is frequently the jumping off point, where people will then conclude that for the remaining 5%, $525 may not be a bad number to use as the average outstanding claim. Maybe you need to throw in a little bit of inflation, because, after all it's going to take a little while to settle those things. The first fallacy to talk about, (and there are several derivatives from it) is that you can try to draw some valid conclusions from what has already been closed to project what will be closed. This is a foundation for several methods that can produce some highly inappropriate results. I said that in this method we assume $525 as the average of the remaining claims. What should that result have been? To that we have to look at the last three columns. Column 7 is labeled the "Hindsight Outstanding Reserve." As of 1 year of development or 12 months, you see the figure $30,718,000. What that means is that you take the total amount paid plus case reserves as of the 10th year of development and assume it is your ultimate loss. You subtract from that the payment through 12 months. The difference should tell you, on a hindsight basis, an estimate of how much your reserve should have been as of 12 months. You'll see in Column 8 the Number of Open and IBNR Claims. And then finally we get over to Column 9 where you see the Average Hindsight Reserve. That is the average amount per claim that you should have set up. If we go to Column 9 at the second year of development, we get a test of how good that $525 average is. What we see is the average hindsight reserve is about 12 times as large, $6,124 versus $525. This illustrates the fact that it's very hazardous and almost always erroneous to draw a conclusion about the nature of what will be paid based on what has been paid. Now, of course, there are some methods that you can use, such as paid loss development, that are valid, if properly applied. But there are a whole host of methods where you can look at what's happened recently, try to conclude what's going to happen, and come up with some fairly wrong answers. I think this is an interesting slide to look at. I have also seen various methods which are based on the notion that there is no

relationship between the lag from the incident date to the closure date and the size of the claim. In fact, I think there is a paper to be presented to the CAS in November that makes that very assumption. I've oeen asked to review that paper, and I think you know what I'm going to say. If you look at Column 3 the average paid loss you can see that there is a strong relationship between how long it takes to close a claim and how big the claim is.

Exhibit 2: Maybe I shouldn't start with the title at the top. It's kind of a dead giveaway. What I've done here is to construct an illustrative example based on 10 representative claims in the claims process for a given accident year, 1978. Quite frequently, claims departments produce an analysis which is quite useful to them. It is quite useful if it's interpreted properly in terms of monitoring claims. The analysis compares the amount paid on claims that have just been closed with the amount of the final reserve on those claims. Then you derive an item called the savings on closure and percentage of savings. In this particular case for the first year 1979, we paid $4,000 to closed claims. Those claims had a final reserve of $11,000 and we saved $7,000 or 64%. In 1980 we paid $2,000, our final reserve was $12,000. (That's actually a typo that carries through the whole exhibit unfortunately, it should be $15,000). The percentage of savings here is 83% upon closure. And what we see for the first 4 years is the percentage savings on closure is very substantial running between 50% and 87%. Finally, in the fifth year the amount of savings is slightly negative. But for the whole process we paid out $193,000 on these claims and the final reserve was $263,000. We had savings of 27%. What can you conclude, based on this analysis, about how adequate the case reserves are? It would seem that this is fairly convincing evidence that the reserves are strong and sufficient. Of course, a problem here is comparing the paid on closed with the final reserve, rather than the initial reserve. That's a big step forward in terms of proving the analysis. Although, in this particular example you're still going to show very substantial savings on closure. And, you probably would conclude that reserves are redundant and nice and strong.

Let's move to the bottom half of the exhibit. What I've done in constructing this example is to use characteristics of the claims development process and to put them into an example of 10 representative claims. What you see in the first column is the status of each of these 10 claims as of year end 1978, the second column, the status of year end 1979, and so forth. We're assuming there are no partial payments here, a claim is either all unpaid and or paid. The asterisk designates the first year end point after the payment of the claim, and shows the amount of the point. In this case, 8 claims settled for less than the initial reserve. Nine of the claims settled for less than the final reserve. That is, 80% developed downward and only 20% of the claims develop upward. That's fairly typical, and in view of those facts and the percentage savings, you might still come to the conclusion that reserves are strong. However,

let's look at the bottom line. At the bottom of each column is the total incurred loss, which is moving up in a fairly systematic and disturbing way. What's going on here? Essentially, this model was constructed based on the characteristics of the loss development process. The smaller claims, the easier claims, tend to settle quickly. The tougher claims tend to take longer to close and they often tend to be ones that are larger in size. We saw that from the actual data in Exhibit 1. In addition, the adverse development on a very small minority of claims, more than offsets the favorable development on the great majority of claims. That's a very critical thing to understand. A lot of claims develop favorably and ib average they develop favorably for a small amount. But the ones that go bad often go real bad. Taking an example here, claim No. 9 started out with a reserve of $5,000 moved to $25,000 when things looked a little more serious. Then a lawyer was brought in and the reserve went up to $50,000. And then in 1982 they switched lawyers and got in F. Lee Bailey and it went up to $100,000 and then they finally settled the thing for $115,000. What does this all indicate? It is very hazardous to take some of the details of the claims process and to draw conclusions from items such as how much you save when you close a claim or even to compare savings to the initial amounts. The difficulty is that you still have a lot of the tough ones out there that remain to be settled.

This point has managed to escape the notice of IRS claims auditors for many years. It was the basis for the whole IRS closed claims approach that you can in effect use the type of analysis that we saw at the start of the slide. Although they used an improved technique and that they take a look at the losses paid on closed claims compared to the initial reserve or the reserve at some fixed point in time. Then, they take the percentage saved on that and apply it to the remaining cases. In this case, suppose we chose December 1981 as our rule of thumb for applying an IRS test. The total paid losses for all the claims that have been closed through that point is $8,000, and the initial reserve on all of those was $41,000. On average we had an 80% redundancy, so the final reserve should only be 20% of the initial reserve. You go on to apply that to the outstanding reserves and shave off 80% of those reserves. Of course, the IRS test runs over a longer period of time than the 4 years in the simple example. But it is illustrative of a method that has been condemned by the Casualty Actuarial Society. I have included a document from a statement of position by the CAS on the IRS closed claim method that denounces this approach (Attachment I). Of course, things are always changing and just late last week I got a copy of the IRS new guidelines for their new closed claim test. As I say it is a very recent release, but what I will tell you about it is that they have recognized a lot of the weaknesses of their technique. They're still holding onto some of the basic principles but expanded the time periods, and basically improved the method substantially. But, I think it's still going to often come up indicating that your reserves are redundant when they probably aren't. It's a big step in the right direction but still not entirely enough. In the new guidelines, they do

look at the paid on closed. An example, if they're auditing 1982 they will go back to accident year '75, '76, and '77 timed to the annual statement. They look at the payments on the claims that closed through 1985 on those years and compare those payments with the reserves established as of year end 1975, '77, and '77. They're using a nice long time period which is very good. If you've settled all the claims during that period of time then you probably won't have too much difficulty with the method. They then go further and apply a significant enhancement for the claims that are still outstanding 10 years after the beginning of the accident year. They develop an experience ratio which is based on the experience of your company for accident year '75, '76, '77. For claims that were outstanding after 10 years of development for those really old years, they look at the ratio of payments on those to the reserves on those 10 year old cases. They derive another experience ratio which would then apply to the claims that are still outstanding as of 1985. They go through the whole process again on IBNR claims. You take the IBNR claims as of 75-77 and do another experience ratio test. I think they're coming a lot closer to what things ought to be. One obvious weakness of it, especially in Workers' Compensation where you have a lot of life pension cases, is that a fair number of claims take more than 20 years to close. And they will probably still draw some conclusion that things are more redundant than they really are.

What about the whole matter of a claims audit versus an overall statistical analysis of reserves? You bring in a claims auditor because you want to make sure that your reserves are adequate. He looks at the facts in the files and draws the reasonable conclusions that the most experienced claims people can draw. I think that's an excellent exercise, and can prove a substantial amount. But, there's still some risk because of the basic problem that on the few claims that go really sour, it is awfully tough for best of claims auditors to see what's going to happen several years in the future, based on the facts in the file. There are always surprising developments that occur on some of these claims that go bad, and even the best can't foresee it all. Even with the claims audit, you're probably still going to need to add a bit more to conclude the final condition of reserves.

Now let's go onto another method, Exhibit 3. This particular fallacy deals with a common method that is applied to estimate allocated loss adjustment expense (ALAE) reserves. Essentially what the method does is it takes a look at the calendar year ratio of ALAE paid to losses paid. It applies that ratio to the outstanding loss reserve to estimate the outstanding reserve for allocated loss adjustment expense payments. Let's take a look at this example to illustrate the difficulty with the method. I've often said that this method doesn't work because frequently a company is growing and growth causes the method to produce an inaccurate result. To take away that notion that only growth affects the method, I decided to use a representative model that has no growth in it. I base this model on some

live data, in the sense that halfway down the page you'll see the ratio of paid ALAE to paid loss according to year of development. It indicates that for claims closed within the first 12 months, the ALAE is 1.5% of paid loss. For those closed in the second year of development it rises to 3.5%, going to 7% for those that close in the third year, and then finally to 10% for those that close in the fourth year of development and beyond. I started with this assumption, which I've derived from actual data. This is an example of the Boring Insurance Company. It's so boring, that there's no growth or change and the loss payment pattern is the same in every year. You pay $1 million the first year of development, $2 million the second, $500,000 the third, and $300,000 the fourth. It's easy to calculate a reserve, you draw a diagonal line and extrapolate the future payments. You come up with a required loss reserve of $3,900,000. In the paid ALAE using the assumption of ALAE by age of development, we have the amount of allocated loss expense payments in each period. It's easy to also calculate the reserve here by drawing the diagonal line and adding up the pieces in the bottom. And we come up with the actual required reserve of $230,000.

Now let's apply the commonly used technique, using the most recent experience just above the diagonal line. We sum up the paid losses and we come up with $3,800,000 in losses. We sum up the paid ALAE and come up with $150,000. That's a ratio of 3.95%. We apply that ratio to the absolutely correct loss reserve of $3,900,000, and we come up with an estimate of $154,000 for the ALAE reserve. As we noted before, we already know the required reserve is $230,000. And so by using this method we have a reserve deficiency of 49% in the ALAE reserve. What's causing this method to go off? Essentially, we've taken a straight average. Again, if you'll focus on the percentages in the middle of Exhibit 3, we've taken a average of 1.5%, 3.5%, 7%, and 10%, weighted by the actual amount of paid losses above the diagonal. However, what we should have done is throw out the 1.5%, because it isn't related at all to the portion that is below the diagonal. The 3.5% portion should be counted only once, the 7% portion for the third year should be counted twice, and the 10% amount should be given 3 times the weight. A weighted average of these should be weighted by the paid losses as well. Then you come up with the appropriate ratio which in this case is a lot higher than the calendar year estimate. It's a lot higher because the ratio of paid ALAE to paid loss trends up over time. Here we have a basic model, derived on reasonable assumptions, that shows the fallacy of this type of technique.

We're going to try to guess what the tail, or the remaining development, is based upon the loss development as occurred to date. Write down 4 columns. The first is the line of business, the second is the development factor from 12 months to 24 months, the third is the development factor from 24 months to 36 months, the fourth is from 36 months to 48 months. You need to add 2 more columns to put your guesses in. The next one is the development from 48 months to 15 years, and then finally from 15 years to

25 years of development. For the first row, the line of business is General Liability (GL), with the standard book or mix of GL business. The first factor is 1.839, an incurred development factor, not paid but incurred. Then 1.279 from 24 to 36 months, and then 1.185. This data is based on a composition of 5 major carriers. That's all the experience that we have supposedly, and we've got to estimate how much development is yet to accrue beyond the fourth year of development. This is a very common situation for a new line of business or a new company. We have to try and estimate what's going to happen even though we don't have additional experience. Anyone want to guess is as to what the development is from 4 years to 15 years? In this case the answer, because we actually have 15 years of experience, 1.329. There is a common method, that I've heard of in the past, where you simply take the last incurred development factor and repeat it. However, in this particular case, that ends up being a fair amount short. Being somewhat diabolical, I chose lines of business where that method is going to fail.

Let's take Workers' Compensation, primary business. The first factor 1.493, then 1.167, then 1.094. How much development from 4 years to 15 years? It's 21% in this example. Now let's go to some exciting stuff, excess Medical Malpractice. The first factor is 7.9, 2.2, and 1.65. How much development from 4 years to 15?

QUESTION: What time period is the data?

MR. SHERMAN: That's a good point. This example is one where we actually have 25 years of experience, so we're slugging right through the last half of the 70's and the first half of the 1980's in this loss development data. The development from 4 years to 15 is 3.6. That's 260% development beyond the fourth year. How about from 15 years to 25 years of development? We have to add another 30%. I don't know what to tell you beyond 25 years. It's anybody's guess. How about excess Workers' Compensation with the factors 1.63, 1.29, 1.17? Now we want to get from 4 years to 15 years. The answer is 1.69. Now that gets us out to 15 years, we've got to get from 15 to 25 years. We have to add a little bit more, in fact, 22.3% more.

The next example starts with Exhibit 5 rather than 4, starting with the primary lines of business. This is a composite of results from 5 major insurance companies. What we have here are the development factors for Auto, BI, General Liability, and Workers' Compensation over several periods of development. Then I show here the results of a curve fitting method, which was developed in the paper that Warren referred to. This shows the side-by-side comparison of the curve fit with the actual. It's from these factors that we went through this exercise of trying to guess the tail from the early factors. We pretended we didn't know the subsequent experience and tried to guess it based on the prior experience. The approach was to try to develop a technique that would at least have some hope of estimating

how much development would occur in the future. I leave these results of the method with you to give you a little cause to worry and to ponder as you select your development factors for your tail.

Now let's go on to the scary stuff which is Exhibit 4. This is a composite of experience from the Reinsurance Association of America. I've taken 4 lines of business -- Auto Liability, General Liability, Medical Malpractice, Workers' Compensation. This is excess experience, and here you can see the development factors for each of these lines, both the actual and the fitted using a model going out given so many years. This illustrates is that it's a very hazardous process to pick that development tail. One problem is if your selected tail factor is 1.1 and it should have been 1.2 then you're 10% low in your reserve for each year. This error compounds as you go on down the line. The total reserve variability is enormously dependent on that little tail factor. After you've done so much work on the triangle of known experience that you have, you still come to the end of your experience and have to take a shot a what's going to happen out in the great unknown. These sets of factors can help you to not sleep well at night.

What I want to illustrate through the next example is just to give you a one of the other common fallacies, relying on only one reserve method. Basically it's a tale of two reserve analysts. The first gentleman's name is M. Penn Dingdoom. He does an incurred loss projection, applying standard factors (Exhibit 6).

Mr. Dingdoom goes through the standard analysis, takes an average factor, projects losses to ultimate, and subtracts the paid losses. For this company, he concludes that the loss reserve ought to be $144 million. Bear in mind the company in this case is carrying a $100 million loss reserve and has $20 million in surplus. He walks into the president's office and tells him that his company is in the tank to the tune of $24 million beyond its surplus. The president of the company then says, "Well I've got another reserve specialist that I talk to". His name is Mr. Moore Caw Shush, who applied the paid loss development technique (Exhibit 8). We use very standard methods that you've been using throughout the whole process. To get from the 4th year of paid losses to ultimate you simply take the ratio of his ultimate incurred projection to the paid-to-date and you get that factor of 1.33 at the bottom. Mr. Caw Shush comes up with a paid projection. The president says, my other analyst here tell me that my reserve rather than being $100 million, ought to be $65 million. I've got $35 million of fat in my reserves.

Here we've got a situation where the incurred projection indicates that the reserves are $44 million short and the paid projection indicates that they're $35 million redundant. How do you resolve that kind of situation? It's a rather disturbing phenomenon. The basic approach may have been covered in some of the other sessions. Essentially, for each of these

methods you have to look at the underlying assumptions. The incurred loss projection is assuming that there are consistent practices in the setting of case reserves, and that there is a constant adequacy level of the case reserves. If the assumptions are not true over the experienced period that you're using for incurred loss analysis, then you can really be way off. In this particular case, what occurred in the middle of the experience period was a major increase in the adequacy of the case reserves. And so applying the incurred loss projection, effect, doubled up the effect of that increase in adequacy during the period, overshooting the proper result. For the paid loss projection, you're assuming that there's a consistent practice in the settling of claims, that is, a fairly constant rate in closing claims. However, when we look at the underlying data we find a continual decline in the rate of the closing claims. As a result, there is a tendency for the paid projection to undershoot. The problem encountered in the first method is that everybody always believes that things are getting better. Reserves are always stronger than they used to be, therefore, you could probably conclude that the incurred loss projection is almost always going to overshoot.

Being a born skeptic and constantly hearing that reserves are stronger now than they used to be, I think it's important to have some objective information to assess the claim that reserves are stronger.

Let's look at a triangular rate by accident year and year of development of the average case reserve. (Exhibit 7) Remember, I said here that in 1979 there was a substantial increase in the adequacy of the case reserves, or at least that's what is claimed. And we want to see if there's some evidence that supports that claim. You'll note as we go cross the diagonal line that the average reserve per claim goes up 132% in the first column, 129% in the second column, 130% in the next. This is a trite example, so it's very smooth. It's never quite that nice in reality. But nevertheless, what we see for all of the other periods is that the percentage increases in the average case reserves from year to year, run along somewhat in a normal inflationary manner, except along a diagonal of 1979. When you see this kind of pattern along a diagonal, it indicates there has probably been some systematic reworking of the claim files over a period of time, resulting in a change in the adequacy of the reserves.

What can we do in a case like this in terms of incurred loss projections? You can start with your average outstandings for the latest periods of time. By deflating them in an ordinary manner you can recast what the incurred losses would have been above the diagonal line, if the reserving practices in that prior period were like those currently. Then you can recalculate incurred development. We're running out of time so I won't spend too much more on this. It's illustrated in Exhibit 7. If you go through that exercise and reapply the technique then you end up with the case reserves. You adjust the case reserves up based on the difference between what the average outstanding should have been and it was. Restate

the case reserves and add the paid losses to it, and reapply your incurred development technique. Then your incurred projection of loss reserves becomes about $99.6 million or very close to what is being carried.

Finally in Exhibit 9, we go onto the paid technique. We're considering the notion that there's been a slowdown in the settlement rate. We look at the ratio of claims closed to claims reported. As we look down the first column, we see that the claims disposed ratio is declining consistently and steadily over time. What can be done is adjust the paid loss triangle to show that the prior paid loss patterns are reflective of a specific claims disposed ratio, rather than a specific age of development. For example, in the first column, we can readjust the paid losses to what they would have been for each of the prior years, if only 31% of the claims has been closed. By taking an old year, where we know things pretty well, we derive a relationship between percentage of claims closed and paid losses. Using the mathematic relationship of those two, we apply this adjustment. Going through that exercise in relation to the paid loss projection, the rises to around $85 million. We started out with a $80 million difference between the paid and the incurred method, and after adjustment we've reduced that about $15 or $15 million, and we can feel a little bit more comfortable.

What the point of all of this? It is very important to apply a number of techniques, to make sure that you understand the underlying assumptions of each method, and when the projections are far apart to find out why there are differences. For some arcane circumstances, the underlying assumptions of both the paid and incurred methods could be violated to the point where both will underproject or both will overproject. Just the fact that they both agree is not always cause for celebration. It's important to look at the whole process and see how valid are those underlying assumptions are, how consistent has the claim history been. Then you can draw some conclusions as to the reasonableness of your method.

MR. COOPER: Spencer Gluck is Sr. Vice President & Actuary with Kramer Capital Consultant in Greenwich. Spencer is a fellow of the CAS, and a member of the American Academy of Actuaries. He has bachelors and a masters degree in mathematics and education from Cornell. He does note that Kramer Capital is a consulting firm that specializes in distressed companies, including liquidations and rehabilitations. Spencer certainly has some insight into what can go wrong with the reserves that underlie those companies. He spent several years as manager in the actuarial division of Peat, Marwick & Mitchell and conducted loss reserves studies for many large self insurers. They bring substantial expertise to us in this general field of loss reserves.

MR. GLUCK: I'd like to talk around on both sides of Rick's presentation. First I'll start with some things that are even more basic than the analysis areas that Rick talked about. Just to start from scratch, consider data. Anybody who has worked with this kind of complex data,

which often doesn't have internal checks built into it, knows you get a lot of mistakes in your data. And obviously your answer can't be any better than the data you start with. The first and simplest way a loss reserve study goes wrong is by starting with bad data. I'm going to move on to other data issues other than simple errors. Many times, although there are no specific errors there are distortions inherent in the data that you're working with. Let's first talk about the homogeity of that data. When you're talking about a large company, you can breakdown your loss reserves into fairly homogenous pieces. But, frequently you've got mixed data, the best example of which is Schedule P data. There are many different kinds of business mixed into that data, with different developing characteristics. As long as the proportions of the different kinds of business stay reasonably constant over time, the techniques work reasonably well. But often, that's not the case. For example, in the Auto part of Schedule P, there may be commercial Auto generally has a longer development tail and higher claims severities. If the proportions of those two types of business are shifting over time, historical data can be distorted. Obviously, if they're shifting toward the longer tail you're going to tend to understate reserves. And if the mix is shifting toward the shorter tail, it would be the other way around. The General Liability line on the annual statement is even more non-homogenous. You can have the simplest case of OL&T type risks up to the longest tail and most hazardous products liability risk. They're all mixed together and the proportion there don't stay constant over time. The Part IE multi-peril is a mixture of many different kinds of business. Again, you have no confidence a constant mix of business over time. That's something that you have to look into and understand in what direction your data might be distorted. Although, in a small company, it's not really practical to sub-divide the data any further. It may be difficult to make a precise adjustment for the mix of business, but, you should at least be aware of the pattern and the extent of the distortion which may arise. Another type of shifting in the mix of business is between first dollar business and excess of loss or large deductible business. Rick just showed you some statistics that demonstrate a massive difference in the type of development pattern you see on a first dollar basis and on an excess of loss basis. If you write both kinds, they mix in your database and again, the proportions are shifting over time. This creates some very substantial errors in applying standard development methodology.

The next set of data distortions apply to working with net data. Most of us work with net data most of the time. Depending on the consistency of the reinsurance credit taken over time, you can have tremendous distortions in net data. The most obvious cases are changing retentions. That's something to look out for right now with the tight reinsurance market. In 1986 you'll probably see a lot of primary companies whose net retention takes a nice jump in '86 because of the high cost and poor availability of reinsurance. If you've got an database which was mostly at a $100,000 retention which the latest accident year or two jumps to a $150,000 or

$200,000 retention, you can expect to see much worse development in the year or two at the higher retention. Again, if you don't have constant retentions in your database you could have a serious distortion. I'll make the point a little more complex. A constant retention over time is not the perfect answer. That should tend to some degree of overstatement of reserves. A constant retention in dollar amounts over time is not a constant retention in real economic terms. In the best of all possible worlds, you would have a retention that was increasing at approximately an inflationary rate. That would be your most undistorted database. However, the constant retention in most types of insurance is not a great deal to worry about, if the average claim size is still substantially lower than the retention. The amount of distortion you get from a constant retention over time is probably not that severe. In any case, it's on the conservative side, and we can take that comfort in that. In case of very long tailed lines with very high claim severity and high trend rates, Medical Malpractice for example, straight incurred development at data with a constant retention or a constant policy limit can actually lead to substantial overstatement and overprojection of reserves for the last few years. This is due to the early years of your database with $100,000 average claim size against a $500,000 retention becoming, by the end of 15 years, years with an average claim size of over $500,000. If you're still working on data at $500,000 retention, the development will be much less than in the past. All of these distortions from a change of retention on the primary side, obviously also affect excess of loss from the other side. The distortions are more severe there on an excess of loss claim because the effect of the retention is much more direct and much more substantial. In the annual statement you could really see some pretty strange things happen in Schedule P when there's been portfolio reinsurance of some kind. Where aggregate excess of loss reinsurance applied, you've got to find out what it is, gross the data back up and pretend that excess of loss didn't exist for development purposes. At the end you can go back to what the terms of the treaty are and see how they would apply. If data is net of any kind of aggregate excess of loss reinsurance, not just portfolio but any kind of aggregate excess of loss reinsurance, development patterns are meaningless. You've got to find out what's happening underneath. Another area of problems is retro-rated excess of loss reinsurance. That's very popular these days, it's all over the place. Retrorated excess of loss reinsurance doesn't really provide you with any coverage until you've paid the maximum premium. Otherwise, any losses you cede into the reinsurance contract just come back to you. As a matter of fact, they come back to you and factor up a little bit. In Schedule P and in a net database the data appears as if that reinsurance is real reinsurance. When the additional premiums come due it really should be loss development but it comes through as additional premiums instead of losses. The annual statement doesn't really track anything historically over time, and it gets lost. The final point of direct errors in data is errors in taking reinsurance credits. This is probably a common way to get errors in your database. Often you have in your computer system, a program which nets down for excess of loss

reinsurance. That makes a lot of sense and that's the way it should be. But, I have frequently found that there are many errors made in that side of the calculation in creating the database.

One other problem we may have in the future involves discounted reserves. I know the IRS is going to force us all to be calculating discounted reserves for income tax purposes in the near future. Somehow, I feel the discounted reserves are going to increasingly be finding their way onto statements. A mixture of data with discounted reserves can be pretty complicated but, I'm not going to try and get into that now. I feel that it is something which will confuse databases for years to come.

Now, let's say you've got your data right or correct to the extent you can have it. I'm going to talk about an even simpler method than Rick talked about. These are in some way, shape, or form are bona fide loss reserve methods. But, they can go wrong pretty easily. The simplest one and the oldest is good old fixed loss ratio method. We know the loss ratio we've priced for is the one we intended to get. We multiply it times the premiums and that's ultimate losses. You subtract out the losses reported to date, and that's your loss reserve. If you are a brand new company and have no history for your reserve, that's probably as good a method as you're going to come up with. As you get past that situation, it hardly becomes a viable method. Over time it becomes ridiculous because as your loss experience obviously will emerge to some loss ratio different from the one you set originally. If it is worse you may wind up with negative IBNR reserves, because, the actual reported losses will exceed the loss ratio in time. Even on the other side if it comes out better, you may have a 10 year old accident year of property business and carrying a monstrous IBNR reserve. The target loss ratios is something you should only use when you have no information. You should do as much research as possible to get a good estimate of what the actual loss ratio is.

I'm going to move onto to talk about the Bornhuetter-Ferguson method. In last year's session they said they would show you how to do the Bornhuetter-Ferguson method, and I'm here to warn you about it. It can be done well and it can be used well. But I say in my experience, I see many companies with qualified actuary doing reserves, who came up with an answer which turned out to be way off. It turns out that way because of an unrealistic application of the Bornhuetter-Ferguson method. It's a little better than the loss ratio method. But, you still assume a loss ratio to start with and gradually over time you drop the reliance on that loss ratio. The problem I had with it is that you've got to do a good job on the loss ratio. You can't just talk to the underwriter and say what loss ratio do you think you've got. You can't just say the expected loss ratio is 100% minus 5% for profit and deduct the expense loading. That gets you the target you might have used in ratemaking but it doesn't necessarily give a good estimate of the loss ratio you're likely to achieve. This is a little bit of diverging into ratemaking. It's meant to be a little humble

in that area and I realize that you do the best actuarial calculation of the rates you can. But, it's the marketplace tells you what loss ratio you're going to get. Even if you stick to the line and said I won't charge less of the market, in competitive times. You lose a bunch of business and, of course, the business you're likely to lose is your best business. The only people who stay with you if you're changing higher than the market rate are the ones who can't get coverage everywhere. The adverse selection kills you anyway and your loss ratio still goes up. It's very hard to beat the market on a loss ratio. The one you used in pricing isn't necessarily the one to use in reserving.

The other problem with the Bornhuetter-Ferguson is like that although it drops reliance in that loss ratio over time, it does very slowly. You may have 3 or 4 years development data down the road and good development indications. It tells you the net loss ratio you started with was wrong and it's time to drop it. But only now can you use it in the Bornhuetter-Ferguson analysis much less a loss ratio. Bornhuetter-Ferguson is a good stable method if the expected loss ratio used in it was really the expected loss ratio. Unfortunately there's no way of knowing what the expected loss ratio really is. As the year gets a few years old you probably should drop the expected loss ratio altogether.

Some other methods, for example, IBNR as a percentage of premium done by accident year, are really not that different from the Bornhuetter-Ferguson method. From the Bornhuetter-Ferguson method, you take the expected loss ratio and multiply it by the percent assumed unreported and that gives you IBNR as a percent of your premium. If it's provided by individual accident year, I guess it's viable. But, if the loss ratio is shifting over time and the premium adequacy is shifting over time, it doesn't work very well. If there are shifts in a type of business and the length of the tail, it doesn't work very well. The worst cases I've seen are when it's applied on a calendar year basis. Suppose, we set our total IBNR reserve for a line of business at 30% of the latest year written premium -- now you've got the problems of shifts in loss ratio, shifts in kind of business, add the problem of the growth or shrinkage of the company. If you're using a total calendar year or total reserve basis like that, you've got a new problem and I wouldn't consider the method viable. I've seen cases where the IBNR reserve for the whole company combined is X% of the latest years earned premium. That's what it's always been. Such methods are not viable. There are some methods where, other than IBNR reserves is a percentage of premium, where a company will set total reserves as a percentage of premiums. Almost ignoring the change of reserve information. As a matter of fact in the reinsurance market Lloyds Audit Factors for years was stated that way. These aren't supposed to be methods they recommended you use to set reserves, although some people used them that way. Rather, they were minimum values that Lloyds auditors used. That is, your total reserves for a given underwriting year must be X% of the premium for this year at various points in time.

If you've used total reserves as a percentage of premium you might deduct case reserves and get negative IBNR, for example. None of these would be highly recommended methods. I'm pretty wary of premium altogether. If it is possible to project your losses based on loss data, it's usually a lot better. The relationship of premiums to losses seems to be unpredictable. I once heard someone once say that in our industry it appears from year to year that the losses are more predictable than the premiums.

Now I want to go to the other side of Rich's talk and expand a little on some of his points. I was nervous because last year he didn't make the point that the paid and the incurred loss method might both be wrong on the same side. I have some remarks on that subject. Exhibit 10 represents an aggregate pattern of an average claim over time. We had a claim specialist on our company make up these nice reports when he looked at a claims department when he checked out the aggregate pattern over time. The initial reserve value is low and the first jump is usually a pretty good one. As more information comes in, the claim tends to grow over time. When it settles it usually settles somewhere less than the last estimate. I want to point out that's aggregate as Rich pointed out to you. Many claims settle for less than the initial amount. But when you aggregate many claims together, this is the pattern you normally tend to see. Let me tell you about a situation, commonly seen in distressed insurance companies, but not unique to them. You see it anyplace with a disrupted claims department. A lot of things can cause this. A lot of staff turnover especially near the reserve, growing problem of short staffing over time, companies pulling back on expenses. If you find out that all the claims examiners have average case loads of 1,000 claims each, when 2 years ago they only had 300 claims, you're going to have a problem of backlogs and slowdowns. On the paid side, the effect is pretty obvious and pretty intuitive. When you have a backlog, there's going to be some kind of slowdown in processing of payments. Many people don't realize that the exact same effect will usually cause a loss of case reserve adequacy at the same time, even though there is no overall change in case reserving philosophy. If you think of what normally happens when a case comes in, there's almost no information about it when it arrives. They just know three words as to what the claim is about, until somebody looks at it, they take a round number and stick it on the claim. They put it in the file and maybe, if they have a good system, they set it up to come up on diary, in 30 days. In 30 days when it comes up on diary they review the file, some more details will come in, and then they may get the first realistic case estimate on it. If you've got big backlogs in your claims department and everybody's behind, when things come up on diary in 30 days they may get to them before 45 days, or 60 days. What you get, especially in your latest accident year, is a larger percent of your claims still sitting at the initial value than you would have had in prior years. If the aggregate average claims shows a pattern of bumping over time, the most dramatic problem often tends to be the latest accident year, where many cases are

sitting at initial values. But every year gets a little pushed back on the pattern, if everybody's behind. When you have a disrupted claims department, you can frequently expect a simultaneous slowdown in payments and loss of case reserve adequacy. And this happens without any specific directive from management to the weaken case reserves, without any change of philosophy. It's just a function of the slowdown. Sometimes in these cases paid and incurred development methods agree, and they're both wrong. I would say yes, do as many methods as possible. The paid and incurred are probably not enough. You have to look at claim count data and do the other kinds of tests that Rick talked about, looking at the average case reserves over time, looking at the closing rates.

Another aspect to consider in looking at the change in average of case reserves over time is that case reserve weakening is a lot harder to see than strengthening. Case reserve weakening is a gradual process while case reserve strengthening is often abrupt. Case reserve weakening happens without trying, from people not quite keeping up with inflation. It's been a big problems in the 80's. What happened is the general inflation rate coming way down. But, the perception of inflation went down more than claim inflation did. It's my interpretation of why, for most companies in the past 4 years, paid development methods always come out higher than incurred development methods. About 7 or 8 years ago the opposite was true. I think there's been gradual creeping of case reserve inadequacy from just not quite keeping up with inflation. In some companies you can have a pattern of creeping case reserve adequacy and then somebody realizes something is wrong. Usually through a claims department review, you see that calendar year discontinuity that Rick spoke of. The increases are often these sudden specific programs that you can see but, decreases in case reserve adequacy are frequently gradual and happen unintentionally over time. You have to look at that loss development triangle and not just look for the jumps, also try to see how the case reserves look. Do they look like they're keeping up with inflation? You want the inflation rate in outstanding losses to be at least as great as the inflation rate measured in paid losses. There is a lot of logic and reasons to believe it probably should be a little greater. Do many reasonableness, such as claim count data. There are distortions in every kind of data, but, your triangle of reported claim counts tend to be the projection with less distortion. Projections over several years usually come in pretty accurate. I can't necessarily say the same for any other loss reserve method. Predicting the ultimate number of claims is probably the most reliable thing you can do, so use that as a reasonableness base. You can use it almost as an exposure base, better than premiums. Before you select a reserve estimate, project the ultimate claim counts. Look at the implied severity for every year and make sure it makes sense. You probably should also look at the loss ratios and make sure they make sense as your basis for doing a Bornhuetter-Ferguson method.

In Berquist and Sherman's paper, which I'm sure some of you have had to study, a big portion is a very useful questionnaire. Talk to everybody, try to find out what's underneath the numbers. Listen to everything they say but don't necessarily believe them. They're not necessarily lying to you, but everybody tends to take an optimistic view of the world. All changes in case reserves are not strengthening. All changes in payment patterns are not acceleration. And all changes in the book of business are not shorter tails, lower severity, and lower loss ratios. Any other changes they don't want to talk about anyway. There maybe certain things that they don't point out. It's great to have methods for adjusting for case reserve adequacy and changes in payment patterns, but, they often get applied with bias. Everybody adjusts for case reserve strengthening but only reluctantly adjusts for cases of weakening. The same bias occurs with speedups and slowdowns in settlement. Adjustments should be applied evenly, in both cases.

The greatest pitfall in loss reserving has nothing to do with methods, and nothing to do with calculations. It occurs as you get to be in a position where you have some authority to select the answer. Whether you're doing a consulting study, or whether you're internal, you're going to be under attack. There are a million people who have a vested interest in your answer and they almost always want it lower. Sometimes they want it higher, it can go both ways. You're going to be under constant attack for the rest of your career. A constant assault on your integrity will never end. Listen to what people say, test for it in the data. Don't believe too much that is not measurable but do try to measure to test what people are saying. I'm not trying to tell you to be uncooperative. Investigate the situation thoroughly, know what's in your database. Once you've analyzed it all and nobody's giving you any more objective information then take your position and stand your ground. The greatest pitfall and the greatest reasons for short reserves aren't bad calculations but just the failure to stand your ground.

MR. COOPER: Thank you Spencer.

Mr. Sherman, what shouldn't we do in the unallocated loss adjustment expense (ULAE) reserve? What are the methods that aren't any good for ULAE?

MR. SHERMAN: One of the problems in the area of ULAE is that you're dealing with something that is somewhat arbitrarily defined. That is, arbitrarily defined in terms of the allocation approach of unallocated loss adjustment expense to a given year. You have to be careful that whatever method you're using is going to jibe with the basic approach to the allocation of unallocated to accident year. The calendar year methods that exist currently are reasonable. In effect ULAE itself defines the approach that is used for defining the reserve. It's somewhat circular reasoning, if you will. The comments I made about allocated don't really apply to

unallocated reserves. The standard technique of a calendar year method, a calendar ratio of ULAE paid to loss paid, is fine. I don't have any difficulty with it.

MR. GLUCK: I'd like to start out with something I didn't cover last session that I think is very common situation. It concerns setting your reserves for the latest year according to a loss ratio, particularly if your rates have been discounted. If you weren't discounting rates and had a 25% expense ratio, you might be targeting for a 70 or 75% loss ratio. And so you go through the typical exercise of taking a premium and deducting the expenses. And the balance is left there for losses, considering the fact that you paid a bit out. There's been a lot of discounting in the making of rates these days. You end up with a situation where you probably started figuring that you were going to be having a combined ratio of 120 or 130%. If it's a long tail line, you subtract expenses and your loss ratio that you're targeting to is around 100%. But, when your setting reserves is you go through the same exercise you went through before. You start with your premium, you subtract out your expense and there's a very strong tendency to set up no more than the premium less expenses and paid losses. You don't want to immediately recognize that you've discounted your rates. But, if you're not discounting your reserves you're going to be to show a significant loss immediately for the most recent year. There's a real reluctance to do that. It's a serious problem and a common one.

Some additional things have also been problems in the different methodologies. There are various methods that have been presented in this seminar applying a claims severity technique. In these you often look at your historical information and try to measure the rate of increase in claim severity. The caveat is that the data has probably been capped at some level. Say the loss is capped at $25,000 or $100,000. You need to make sure that the data that you're applying the severity trend to bears some relationship to the capped data used in coming up with the trend factor, because severity trends for higher layers tend to be higher. I'll tell you a horror story from what I've seen in the last year. The data was capped at $25,000 but the average claim severity was about $50,000. What In that situation is you come to the conclusion that there's no inflation. This was in a medical malpractice situation and they concluded that over the last 15 years there was no inflation in medical malpractice costs. I just shuddered. You've got to be careful in terms of what caps can do to your severity trends.

Another thing that I've seen recently is trying to analyze the daylights out of it. You break it down into very fine pieces, accident quarters or accident months, monthly or quarterly development. Remember, the whole loss development process which essentially consists of a great majority of claims developing favorably and a few developing adversely. If you combine that process with breaking your data down too finely, you will end up with

an array of development factors, many which are near 1, and a few big blips of 1.3, or 1.5. There's a strong tendency to smooth those out of your data resulting in underprojecting your real need. You have to somehow another anticipate the occurrence, from time to time, of adverse development on major claims. The same goes with the approach of removing large losses (that are completely exceptions) from the data. There needs to be some provision for the likelihood that some of the cases for the most recent years have not yet developed to the point where you can see how bad they're going to be. You take it out, saying it's exceptional and then you don't put in any sort of provision for adverse development that's going to result from having a few bad claims for the recent year.

Another problem is when you get down to the most recent year or two. You can end up just applying a paid and incurred method and making some selections. The problem for the most recent year, in a long tail line, is that both of those techniques are highly leveraged. It becomes very important, when you're in that type of situation, to make some initial selections and look at your projections from many different angles. Look at what they mean in terms of a progression of loss ratios, a progression of pure premiums, of frequencies, of severity. Do those projections of ultimate loss hang together and make sense in terms of what is going on in the company? Often, final adjustments made in the numbers can result in something more appropriate than what you get from a straight application of some very good methods.

Just one final point. We're talking a lot about how wonderful claim count information is. As with anything, there are precautions about it. One precaution is change in the definition of a claim. This is where you can really get into problems because the vast majority of claims are small claims. There are always a lot of borderline situations where you question whether to set up a claim file or not. If there has been any sort of shift in how the borderline is defined or whether you set up a claim file, it can strongly influence the validity of your claim count information. That's always something that you have to worry about when you use claim count information. There's no perfect solution to the process of trying to estimate reserves.

1986 CASUALTY LOSS RESERVE SEMINAR

5E/6B AVOIDING PITFALLS IN ANALYZING RESERVES & FORECASTING LOSSES

by

Richard E. Sherman

Workers' Compensation
Accident Year 1975

Year of Development	(1) Paid Losses (000's)	(2) Claims Closed	(3) Average Paid Loss	(4) Cumulative Paid Loss (000's)	(5) Cumulative Claims Closed	(6) Cumulative Average Paid Loss	(7) Hindsight Outstanding Reserve (000's)	(8) Number of Open & IBNR Claims	(9) Average Hindsight Reserve
1	$5,504	16,568	$332	$5,504	16,568	$332	$30,718	21,330	$1,440
2	12,874	18,416	699	18,378	34,984	525	17,844	2,914	6,124
3	6,938	1,393	4,981	25,316	36,377	696	10,906	1,521	7,170
4	4,155	504	8,244	29,471	36,881	799	6,751	1,017	6,638
5	2,171	286	7,591	31,642	37,167	851	4,580	731	6,265
6	1,270	184	6,902	32,912	37,351	881	3,310	547	6,051
7	818	128	6,391	33,730	37,479	900	2,492	419	5,947
8	453	85	5,329	34,183	37,564	910	2,039	334	6,105
9	345	135	2,556	34,528	37,699	916	1,694	199	8,513
10	312	53	5,887	34,840	37,752	923	1,382	146	9,466

EXHIBIT 1

EXHIBIT 2

DECEPTIVE CLAIMS STATISTICS

Year	Paid on Closure	Final Reserve	Savings	Percentage Savings
1979	4	11	7	64%
1980	2	12	10	83
1981	2	15	13	87
1982	50	100	50	50
1983	135	125	(10)	(8)
Total	193	263	70	27%

Claim Number	Incurred Losses (000's) As of					
	12/78	12/79	12/80	12/81	12/82	12/83
1	5	5	2*	2	2	2
2	5	2*	2	2	2	2
3	5	5	5	2*	2	2
4	5	2*	2	2	2	2
5	10	10	10	0*	0	0
6	1	0*	0	0	0	0
7	10	10	0*	0	0	0
8	25	35	50	100	50*	50
9	5	25	50	50	100	115*
10	—	—	—	—	25	20*
Total	71	94	121	158	183	193

*Year of Closure

CASUALTY ACTUARIAL SOCIETY

C. K. Khury
President

23 Main Street
Holmdel, NJ 07733
(201) 946-5600

December 4, 1984

Mr. M. S. Hughey
President
American Academy of Actuaries
1835 K Street, N.W.
Washington, D.C. 20006

Dear Stan:

At its November 11 meeting, the CAS Board of Directors adopted the following resolution:

> The CAS Board of Directors endorses the statement of the Committee on Reserves (on the IRS closed claim method) and approves its publication in the next edition of Proceedings (1984) as a Statement of Opinion of the CAS Board of Directors and of the Committee on Reserves.

Attached is a copy of the subject report.

I was directed by the Board to pass this information along to the AAA for use in connection with Academy public interface activities. No preference for a particular course of action (by the AAA) was expressed by the CAS Board.

After you have had an opportunity to discuss this matter with the AAA Executive Committee, I'd appreciate it if you would let me know how you propose to proceed. In the meantime if you wish to discuss, please call.

Thanks.

Sincerely,

Stan

C. K. Khury
President

cc: S. G. Kellison
CAS Board of Directors
CAS Executive Council

Casualty Actuarial Society

Committee on Reserves

Position Paper: Closed Case Method

for Reviewing the Adequacy of Loss Reserves

Comparison of the cost of closed claims to reserves has been used for many years, often simplistically, to evaluate loss reserve adequacy. Recently a particular "closed case" method, developed by the Internal Revenue Service, has received attention within the insurance industry. The Committee on Reserves has reviewed this method for its adherence to sound actuarial principles. The Committee finds that the closed case method is seriously inconsistent with the Casualty Actuarial Society's Statement of Principles Regarding Property and Casualty Loss and Loss Adjustment Expense Liabilities and is inappropriate for testing the adequacy of loss reserves. The following statement expands upon this finding.

Description of Method

In its basic form the closed case method of testing loss reserves examines claims by line of business which were reported and case reserved, but unpaid, as of an earlier reserve evaluation date and which have been settled subsequently.

It develops an "experience rate" by dividing the amount reserved for these settled claims at the reserve evaluation date by the total amount paid on them subsequently. The experience rate is applied to (divided into) total reserves, reported and unreported, as of the current reserve date to adjust current reserves to an indicated zero redundancy/deficiency level. Typically, the earlier reserve date (test year) would precede the current date by five to seven years, and the experience rate would be the average of the rate developed for each of the test years.

Implicit Assumptions

Application of the closed case methodology carries certain implicit assumptions. For its indicated results to be valid, satisfactory testing of the acceptability of these assumptions would be necessary. Major implicit assumptions are:

(a) The relative strength of case reserves at the earlier reserve evaluation date, for claims that are settled by the current reserve date, is comparable to that of total reserves at the current reserve date.

(b) The relative strength of the estimate for incurred but not reported (IBNR) claims at the current reserve date is comparable to that of the case reserves. The implication here is that the combined frequency and severity components of the IBNR reserve are comparable in strength to the severity component alone of case reserves. Alternatively, if the strength of the severity component of the IBNR reserve alone is comparable to that of the case reserves, then the frequency component is exact.

(c) The relative strength of the reserves for reinsurance assumed from all sources is comparable to that of the direct case reserves.

(d) Estimates of credits for ceded reinsurance are proportional to the direct case reserves and to assumed reinsurance in their impact on relative adequacy.

Adherence to Actuarial Principles

The Statement of Principles Regarding Property and Casualty Loss and Loss Adjustment Expense Liabilities outlines a series of principles which must be considered for a reasonable and appropriate review of reserves. A comparison of these principles to the closed case method clearly illustrates that this method does not meet the criteria established by the CAS for proper review or establishment of reserves.

Key principles outlined in this statement and corresponding deficiencies in the closed case method are:

1. "Loss reserving procedures should operate on well defined groups of losses" and give consideration to all elements of the total loss reserve.

The closed case method:

(a) gives no consideration to IBNR claims or reopened claims in the determination of the experience rate.

(b) ignores the extent to which reinsurance arrangements applicable to claims outstanding at the current reserve date might differ from programs in place for claims in the test years and the effect such differences might have on claims emergence and development patterns.

(c) has drawbacks even as a means for testing only the case reserves. The implicit assumption that the relative strength of case reserves has remained constant is always questionable absent a review of

average outstanding values over successive periods. Further, the method does not consider claims reserved at the test date but not yet settled nor any changes in the reserves thereon. These are the claims likely to be in litigation with their ultimate settled values less certain. For workers' compensation, permanent disability claims and even certain temporary disability claims would remain open and not considered even though periodic payments are being made on them. Additionally, if the case reserves are meant to contain a provision for reopened claims, the closed case method of testing would not consider this element since the reopened claims would not have been specifically case reserved at the reserve evaluation date.

2. "Understanding the trends and changes affecting the data base is a prerequisite to the application of actuarially sound reserving methods. A knowledge of changes in underwriting, claims handling, data processing and accounting, as well as changes in the legal and social environment affecting the experience is essential to the accurate interpretation and evaluation of observed data and the choice of reserving method."

"It is not sufficient for the actuary merely to apply historical analytical procedures in the calculation of reserves. Whenever the impact of internal or external changes on claim data can be isolated or reasonably quantified, adjustment of the data is warranted before applying various reserving methods."

"A competent actuary will ordinarily examine the indications of more than one method before arriving at an evaluation of an insurer's reserve liability for a specific group of claims."

The closed case method:

(a) does not recognize or adjust for changes in size of distribution, external influences, operational changes, reinsurance retention changes, aggregate limit changes, or other underlying changes affecting losses;

(b) is a straight application of a formula with no consideration of trends or changes affecting the data;

(c) is generally used as an only method rather than in conjunction with other reserving methods.

3. "The actuary should be conversant with the general characteristics of the insurance portfolio for which reserves are to be established." There should also be a thorough knowledge of claims practices. This principle implies that having this knowledge will affect one's reserve evalution.

The closed case method does not fulfill this requirement in that:

(a) it ignores general characteristics of the nature of losses between various lines of business. The method is assumed to work equally well for low frequency/high severity lines as it does for high frequency/low severity lines of business;

(b) out-of-the-ordinary claims practices, such as discounting loss reserves, are not given special recognition;

(c) it provides no variation for differences in settlement patterns among different groups of claims, which is contrary to the Statement of Principles note that "the length of time that it normally takes for reported claims to be settled will affect the choice of the loss reserving procedure";

(d) all data is treated to be fully credible, with no consideration given to the lack of credibility of indications based on small volumes of historical data.

Proponents' Viewpoint

Proponents of the closed case method argue that it is improper to use estimates to test reserves that are themselves estimates. They believe that the use of a test period of claims settlements produces a more accurate indicator by which to adjust current reserves. However, proper use of estimates in no way violates the Statement of Principles. Rather, the closed case method ignores significant information, which can be valuable when used with proper analytical techniques.

Committee Position

The Committee on Reserves believes that the closed case method of testing the adequacy of loss reserves, as described in the foregoing statement, does not conform to sound actuarial principles. While the method provides indications as to the historical adequacy of case reserves, such indications are incomplete and may be misleading. The committee has no objections to the underlying data used in the closed case method. However, they are appropriate only when used with proper actuarial techniques. In general, the committee finds that the closed case method is unsound and should not be used to evaluate total loss reserves.

EXHIBIT 3

USING CALENDAR YEAR RATIOS TO ESTIMATE THE ALAE RESERVE

Paid Losses (000's)

Accident Year	12	24	36	48	
1980	1,000	2,000	500	300	
1981	1,000	2,000	500	300	
1982	1,000	2,000	500	300	Required Reserve = 3,900
1983	1,000	2,000	500	300	
1984	1,000	2,000	500	300	

Paid Allocated Loss Expense (000's)

1980	15	70	35	30	
1981	15	70	35	30	
1982	15	70	35	30	Required Reserve = 230
1983	15	70	35	30	
1984	15	70	35	30	
Ratio of Paid ALAE to Paid Loss	1.5%	3.5%	7.0%	10.0%	

$$\text{Ratio of Calendar Year Paid ALAE to Paid Loss} = \frac{150}{3{,}800} = 3.95\%$$

(Calender Year) Ratio) x Loss Reserve = 3.95% x $3,900 = $154

ALAE Reserve Based on Calendar Year Ratio = $154

Actual Required Reserve = $230

Percentage Reserve Deficiency = 49.4%

Prepared by: Richard Sherman

Prepared for: Common Reserve Pitfalls

COMPARISON OF ACTUAL AND FITTED INCURRED LOSS DEVELOPMENT FACTORS

REINSURANCE ASSOCIATION OF AMERICA EXPERIENCE

Years of Development	Automobile Liability		General Liability		Medical Malpractice		Workers' Compensation	
	Actual*	Fitted	Actual*	Fitted	Actual*	Fitted	Actual*	Fitted
2:1	1.760	1.619	2.300	2.290	7.876	6.104	1.634	1.630
3:2	1.227	1.264	1.541	1.536	2.172	2.480	1.285	1.287
4:3	1.100	1.123	1.295	1.287	1.654	1.717	1.169	1.172
5:4	1.061	1.062	1.171	1.177	1.334	1.429	1.134	1.118
6:5	1.031	1.033	1.109	1.119	1.150	1.288	1.092	1.088
7:6	1.015	1.018	1.093	1.085	1.156	1.208	1.053	1.068
8:7	1.015	1.011	1.060	1.064	1.163	1.158	1.055	1.055
9:8	1.008	1.007	1.046	1.050	1.120	1.124	1.048	1.046
10:9	1.006	1.004	1.045	1.039	1.133	1.101	1.039	1.039
11:10	1.000	1.003	1.039	1.032	1.023	1.084	1.036	1.034
12:11	1.001	1.002	1.022	1.027	1.058	1.070	1.014	1.029
13:12	1.001	1.001	1.024	1.022	1.090	1.060	1.017	1.026
14:13	1.001	1.001	1.004	1.019	1.063	1.052	1.030	1.023
15:14	1.000	1.001	1.019	1.016	1.089	1.046	1.023	1.021
16:15	1.000	1.000	1.008	1.014		1.040	1.016	1.019
17:16	1.001	1.000	1.010	1.012		1.036	1.032	1.017
18:17	.999	1.000	1.008	1.011		1.032	1.005	1.016
19:18	1.000	1.000	1.018	1.010		1.029	1.021	1.015
20:19	1.000	1.000	1.004	1.009		1.027	1.015	1.014
21:20	.999	1.000	1.005	1.008		1.024	1.037	1.013
22:21	1.000	1.000	1.017	1.007		1.022	.996	1.012
23:22	1.000	1.000	1.000	1.006		1.020	1.038	1.011
24:23	1.000	1.000	.997	1.006		1.019	1.026	1.010
25:24	1.000	1.000	1.000	1.005		1.017	1.018	1.010

*These factors are the average of the latest 10 accident years for each given year of development from the 1983 edition of the RAA's Loss Development Study.

EXHIBIT 5

COMPARISON OF ACTUAL AND FITTED INCURRED LOSS DEVELOPMENT FACTORS USING AN INVERSE POWER FUNCTION

Years of Development	Auto Bodily Injury Liability		General Liability		Workers' Compensation	
	Actual	Fitted	Actual	Fitted	Actual	Fitted
2	1.634	1.680	1.839	1.886	1.493	1.490
3	1.094	1.077	1.279	1.266	1.167	1.159
4	1.025	1.022	1.185	1.132	1.094	1.082
5	1.008	1.009	1.077	1.080	1.046	1.052
6	1.003	1.004	1.039	1.054	1.033	1.036
7	1.003	1.002	1.033	1.040	1.028	1.027
8	1.001	1.002	1.029	1.030	1.019	1.021
9	1.000	1.001	1.030	1.024	1.012	1.017
10	1.001	1.001	1.019	1.020	1.010	1.014
11	-	-	1.014	1.016	1.011	1.012
12	-	-	1.016	1.014	1.010	1.010
13	-	-	1.013	1.012	1.009	1.009
14	-	-	1.012	1.010	1.008	1.008
15	-	-	1.008	1.009	1.007	1.007
Goodness of fit (R^2)	.98462		.98278		.98551	
Parameters						
a =	.68047		.88614		.48984	
b =	3.14215		1.73380		1.62362	
c =	-1.00000		-1.00000		-1.00000	

Notes:

1) The actual factors above represent composite experience from five major carriers for each line of business.

2) The goodness of fit is measured by the coefficient of determination (R^2)

EXHIBIT 6

M. PENN DINGDOOM'S ANALYSIS

CUMULATIVE INCURRED LOSS
AS OF DECEMBER 31, 1980

ACCIDENT YEAR	MONTHS OF DEVELOPMENT 12	24	36	48	60
1976	8100	15500	16700	17200	17200
1977	10000	19300	27100	25700	
1978	12400	38100	37400		
1979	23700	51000			
1980	31400				

ACCIDENT YEAR	MONTHS OF DEVELOPMENT 12	24	36	48	60
1976	1.914	1.077	1.030	1.000	
1977	1.930	1.404	0.948		
1978	3.073	0.982			
1979	2.152				
1980					
AVERAGE	2.267	1.154	0.989	1.000	
WEIGHTED AVERAGE	2.360	1.138	0.976	1.000	
LINEAR TREND					
SLOPE	0.186	-0.048	-0.082		
INTERCEPT	1.803	1.250	1.112		
R2	0.192	0.047	1.000		
PROJECTED	2.731	1.059	0.867		
EXPONENTIAL CURVE					
SLOPE	8.514	-4.549	-7.923		
INTERCEPT	1.812	1.252	1.119		
R2	0.225	0.063	1.000		
PROJECTED	2.727	1.039	0.873		
SELECTED	2.267	1.154	0.989	1.000	1.000

ULTIMATE LOSS BASED ON INCURRED LOSS DEVELOPMENT
AS OF DECEMBER 31, 1980

ACCIDENT YEAR	CUMULATIVE INCURRED LOSS (1)	SELECTED DEVELOPMENT FACTOR (2)	CUMULATIVE DEVELOPMENT FACTOR (3)	ULTIMATE LOSS (1)X(3) (4)
1976	17200	1.000	1.000	17200
1977	25700	1.000	1.000	25700
1978	37400	0.989	0.989	36989
1979	51000	1.154	1.141	58207
1980	31400	2.267	2.587	81242

EXHIBIT 7

REVISING INCURRED LOSS PROJECTIONS FOR CHANGES IN RESERVE ADEQUACY

CASE LOSS RESERVES PER OPEN CLAIM AS OF DECEMBER 31, 1980

ACCIDENT YEAR	MONTHS OF DEVELOPMENT 12	24	36	48	60
1976	450	1500	2000	4501	19626
1977	500	1700	4600	5200	
1978	560	3900	5301		
1979	1300	4500			
1980	1500				

ACTUAL CASE LOSS RESERVES AS OF DECEMBER 31, 1980

ACCIDENT YEAR	MONTHS OF DEVELOPMENT 12	24	36	48	60
1976	3100	6500	4100	4100	2100
1977	4200	9000	12600	6500	
1978	5700	20300	18600		
1979	16000	37400			
1980	22500				

ADJUSTED CASE LOSS RESERVES AS OF DECEMBER 31, 1980

ACCIDENT YEAR	MONTHS OF DEVELOPMENT 12	24	36	48	60
1976	5900	12000	8200	4100	2100
1977	8300	18000	12600	6500	
1978	11000	26300	18600		
1979	16000	37400			
1980	22500				

CUMULATIVE INCURRED LOSS AS OF DECEMBER 31, 1980

ACCIDENT YEAR	MONTHS OF DEVELOPMENT 12	24	36	48	60
1976	10900	21800	20800	17200	17200
1977	14100	28300	27100	25700	
1978	18300	38100	37400		
1979	23700	51000			
1980	31400				

ACCIDENT YEAR	MONTHS OF DEVELOPMENT 12	24	36	48	60
1976	2.000	0.954	0.827	1.000	
1977	2.007	0.958	0.948		
1978	2.082	0.982			
1979	2.152				
1980					
AVERAGE	2.060	0.964	0.888	1.000	

ULTIMATE LOSS BASED ON INCURRED LOSS DEVELOPMENT AS OF DECEMBER 31, 1980

ACCIDENT YEAR	CUMULATIVE INCURRED LOSS (1)	SELECTED DEVELOPMENT FACTOR (2)	CUMULATIVE DEVELOPMENT FACTOR (3)	ULTIMATE LOSS (1)X(3) (4)
1976	17200	1.000	1.000	17200
1977	25700	1.000	1.000	25700
1978	37400	0.888	0.888	33211
1979	51000	0.954	0.856	43658
1980	31400	2.060	1.763	55372

EXHIBIT 8

MOORE CAW SHUSH'S ANALYSIS

CUMULATIVE PAID LOSS
AS OF DECEMBER 31, 1980

ACCIDENT YEAR	MONTHS OF DEVELOPMENT 12	24	36	48	60
1976	5000	9000	12600	13100	15100
1977	5800	10300	14500	19200	
1978	6700	11800	18800		
1979	7700	13600			
1980	8900				

ACCIDENT YEAR	MONTHS OF DEVELOPMENT 12	24	36	48	60
1976	1.800	1.400	1.040	1.153	
1977	1.776	1.408	1.324		
1978	1.761	1.593			
1979	1.766				
1980					
AVERAGE	1.776	1.467	1.182	1.153	
WEIGHTED AVERAGE	1.770	1.499	1.229	1.153	
LINEAR TREND					
SLOPE	-0.012	0.087	0.284		
INTERCEPT	1.805	1.274	0.755		
R2	0.755	0.780	1.000		
PROJECTED	1.747	1.660	1.609		
EXPONENTIAL CURVE					
SLOPE	-0.649	6.673	27.360		
INTERCEPT	1.805	1.287	0.816		
R2	0.755	0.782	1.000		
PROJECTED	1.747	1.666	1.686		
SELECTED	1.776	1.467	1.182	1.153	1.154

ULTIMATE LOSS BASED ON PAID LOSS DEVELOPMENT
AS OF DECEMBER 31, 1980

ACCIDENT YEAR	CUMULATIVE PAID LOSS (1)	SELECTED DEVELOPMENT FACTOR (2)	CUMULATIVE DEVELOPMENT FACTOR (3)	ULTIMATE LOSS (1)X(3) (4)
1976	15100	1.157	1.157	17471
1977	19200	1.153	1.334	25613
1978	18800	1.182	1.577	29644
1979	13600	1.467	2.313	31459
1980	8900	1.776	4.108	36563

EXHIBIT 9

REVISING PAID LOSS PROJECTIONS FOR CHANGES IN THE RATE OF SETTLEMENT OF CLAIMS

RATIO OF CUMULATIVE CLOSED CLAIMS TO CUMULATIVE REPORTED CLAIMS AS OF DECEMBER 31, 1980

ACCIDENT YEAR	MONTHS OF DEVELOPMENT 12	24	36	48	60
1976	0.420	0.670	0.852	0.943	0.993
1977	0.395	0.653	0.831	0.932	
1978	0.372	0.621	0.814		
1979	0.344	0.599			
1980	0.313				

ADJUSTED CUMULATIVE PAID LOSS DECEMBER 31, 1980

ACCIDENT YEAR	MONTHS OF DEVELOPMENT 12	24	36	48	60
1976	3300	7900	12000	12900	14900
1977	4200	9300	14200	19200	
1978	5200	11300	18800		
1979	6700	13600			
1980	8900				

ACCIDENT YEAR	MONTHS OF DEVELOPMENT 12	24	36	48	60
1976	2.394	1.519	1.075	1.155	
1977	2.214	1.527	1.352		
1978	2.173	1.664			
1979	2.030				
1980					
AVERAGE	2.203	1.570	1.214	1.155	
WEIGHTED AVERAGE	2.146	1.594	1.260	1.155	

ULTIMATE LOSS BASED ON PAID LOSS DEVELOPMENT DECEMBER 31, 1980

ACCIDENT YEAR	CUMULATIVE PAID LOSS (1)	SELECTED DEVELOPMENT FACTOR (2)	CUMULATIVE DEVELOPMENT FACTOR (3)	ULTIMATE LOSS (1)X(3) (4)
1976	14900	1.151	1.151	17150
1977	19200	1.155	1.329	25525
1978	18800	1.214	1.614	30341
1979	13600	1.570	2.534	34460
1980	8900	2.203	5.582	49680

Exhibit 10

SCHEDULE P—PART 1B—LIABILITY OTHER THAN AUTO

Reserve for Unpaid LIABILITY OTHER THAN AUTO LOSSES December 31 of Current Year†

SCHEDULE OF EXPERIENCE

Years in Which Policies Were Issued	Years in Which Premiums Were Earned and Losses Were Incurred	Premiums Earned (See Notes (a) and (b))	(c) Liability Loss Payments	(d) LIABILITY LOSS EXPENSE PAYMENTS					Liability Loss and Loss Expense Payments (Col. 5 Plus Col. 6)	Ratio (7) ÷ (2) %	Number of Suits	(e) Total Estimated Reserve for Liability Losses: Case-basis	(d) (e) Total Estimated Reserve for Loss Expense Pertaining to Case-basis Loss Estimates	Total Liability Losses (Sums of Items in Cols. 7, 10 and 10½)	Ratio (11) ÷ (2) %
				Allocated	Ratio (4) ÷ (2) %	(f) Unallocated	Ratio (5) ÷ (2) %	Total (Col. 4 Plus Col. 5)							
1 Prior to 1967	Prior to 1969	73,155,438	30,188,951	4,699,514	15.6	4,327,845	14.3	9,027,359	39,216,310	53.6	193	408,804	40,880	29,665,994	54.2
2 1967	Prior to 1969	7,785,085	3,384,431	471,401	13.9	654,974	19.3	1,126,375	4,510,806	57.9	131	230,235	32,023	4,874,064	62.6
3 1968	Prior to 1969	2,761,624	1,726,575	300,793	17.4	549,165	31.8	849,958	2,576,523	68.5	102	327,385	32,738	2,936,696	79.1
4	1969	7,773,172	2,752,811	501,141	18.2	570,920	20.7	1,072,061	3,824,872	49.2	266	726,787	72,678	4,624,337	59.5
5	1970	7,408,177	2,815,138	392,037	13.9	411,021	14.6	803,058	3,618,196	48.8	323	1,132,974	113,297	4,864,467	65.7
6	1971	8,896,986	2,632,265	405,026	15.4	509,334	19.3	914,360	3,546,625	39.9	427	1,745,849	206,621	5,499,095	61.8
7	Total first period	108,780,482	43,500,171	6,769,512	15.6	7,023,259	16.1	13,793,171	57,293,342	52.7	1,442	4,672,034	499,237	62,464,613	57.4
8	1972	7,921,915	1,723,896	303,601	17.6	554,401	32.2	858,002	2,581,898	32.6	475	2,001,507	174,081	4,757,486	60.1
9	1973	7,765,704	1,312,949	234,364	17.9	588,283	44.8	822,647	2,135,596	27.5	590	2,589,193	511,234	5,236,023	67.4
10	1974	6,684,873	346,002	117,372	34.0	472,018	136.4	589,390	935,392	14.0	187	2,503,909	576,696	4,015,995	60.1
11	Total second period	22,372,492	3,382,847	655,337	19.4	1,614,702	47.7	2,270,239	5,653,086	25.2	1,252	7,094,609	1,261,809	14,009,504	62.6
12	Grand Totals	131,152,974	46,883,018	7,425,449	15.8	8,637,961	18.4	16,063,410	62,946,428	48.0	2,694	11,766,643	1,761,046	76,474,117	58.3

COMPUTATION OF RESERVE FOR UNPAID LIABILITY OTHER THAN AUTO LOSSES

	Years in Which Premiums Were Earned and Losses Were Incurred	60% of Earned Premiums Stated in Col. 2	Deduct Loss Payments and Expense Stated in Column 7	Remainder (Col. 13 Less Col. 14) If Negative Enter "0"	Estimated Reserve for Liability Losses and Loss Expense: Case-basis (Cols. 10 and 10½)	Carry Out for Each Year Amount Stated in Col. 15 or 16, Whichever is Greater	Total Incurred Liability Losses (Col. 12 Plus Col. 17)	Incurred Loss Ratio (Col. 18 Divided by Col. 2) %
8	1972	4,753,149	2,581,898	2,171,251	2,175,588	2,175,588	4,757,486	60.1
9	1973	4,659,422	2,135,597	2,523,825	3,100,428	3,100,428	5,236,025	67.4
10	1974	4,010,923	935,593	3,075,330	3,080,604	3,080,604	4,015,997	60.1
11	Totals	13,423,494	5,653,088	7,770,406	8,356,620	8,356,620	14,009,508	62.6
(20) Reserve for unpaid liability losses and loss expense, first period (sum of Cols. 10 and 10½, first period)						5,171,271		
(21) Reserve for unpaid liability losses and loss expense, second period (total of Col. 17)						8,356,620		
(22) Total reserve for unpaid liability losses and loss expense						13,527,891		

†Includes only Bodily Injury Liability prior to 1971.
SEE SCHEDULE P, PART 2 FOR FOOTNOTES

FAILURE OF THE ITEMS TO ADD TO THE TOTALS IS DUE TO THE DROPPING OF CENTS.

ANNUAL STATEMENT FOR THE YEAR 1978 OF THE

Years in Which Premiums Were Earned and Losses Were Incurred	Premiums Earned	Loss Payments	(d) LOSS EXPENSE PAYMENTS Allocated	Ratio 4÷2 %	(g) Unallocated	Ratio 5÷2 %	Loss and Loss Expense Payments (3+4+5)	Ratio 6÷2 %	Number of Claims Outstanding	Losses Unpaid	(d) Loss Expense Unpaid	Total Losses and Loss Expense Incurred (6+9+10)	Ratio 11÷2 %
1 Prior to 1971	99,993,498	43,512,730	6,803,219	15.6	6,691,248	15.4	57,007,797	57.1	154	379,717	37,972	57,425,486	57.5
2 1971	8,896,986	4,215,888	683,820	16.2	617,102	14.6	5,516,811	62.0	74	168,196	16,820	5,701,827	64.1
3 1972	7,921,915	3,781,634	633,084	16.7	701,228	18.5	5,115,947	64.6	139	319,934	31,993	5,467,874	69.0
4 1973	7,765,704	4,696,809	742,737	15.8	831,724	17.7	6,271,331	80.7	254	504,675	50,467	6,826,473	87.9
5 1974	6,684,873	3,161,461	529,033	16.7	729,128	23.1	4,419,623	66.1	302	653,610	65,361	5,138,594	76.9
6 1975	6,449,256	2,594,080	379,366	14.6	436,483	16.8	3,409,931	52.9	436	603,736	60,374	4,074,041	63.2
7 1976	8,322,894	2,521,920	341,329	13.5	558,169	22.1	3,421,420	41.1	702	1,695,103	246,378	5,362,901	64.4
8 1977	8,602,360	1,730,262	228,912	13.2	576,773	33.3	2,535,949	29.5	777	2,414,928	739,130	5,690,007	66.1
9 1978	5,876,848	698,594	154,361	22.1	563,261	80.6	1,416,216	24.1	899	3,033,430	657,005	5,106,652	86.9
10 Totals	160,404,337	66,913,382	10,495,866	15.7	11,705,780	17.5	89,115,030	55.6	3,737	9,773,329	1,905,500	100,793,559	62.8

COMPUTATION OF EXCESS OF STATUTORY RESERVE OVER STATEMENT RESERVES – OTHER LIABILITY

[illegible] 0 1977 $ 0 1976 $ 0 Total $ 0 Calculation Method— 0 % of Column 2, less Column 11, if negative enter zero. See Note a

ANNUAL STATEMENT FOR THE YEAR 1979 OF THE

Years in Which Premiums Were Earned and Losses Were Incurred	Premiums Earned	Loss Payments	(d) LOSS EXPENSE PAYMENTS Allocated	Ratio 4÷2 %	(g) Unallocated	Ratio 5÷2 %	Loss and Loss Expense Payments (3+4+5)	Ratio 6÷2 %	Number of Claims Outstanding	Losses Unpaid	(d) Loss Expense Unpaid	Total Losses and Loss Expense Incurred (6+9+10)	Ratio 11÷2 %
1 Prior to 1972	108,730,495	49,206,325	7,535,691	15.6	7,354,303	15.3	63,096,925	58.0	86	617,345	61,734	63,776,005	58.6
2 1972	7,921,915	4,103,521	679,466	16.5	732,563	17.3	5,515,550	69.6	69	333,743	33,374	5,882,667	74.3
3 1973	7,765,704	5,129,442	815,695	15.9	873,564	17.0	6,821,702	87.8	122	311,068	31,106	7,163,877	92.3
4 1974	6,684,873	4,047,714	625,348	15.5	[illegible]	[illegible]	5,487,839	82.1	172	347,416	34,741	5,869,997	87.8
5 1975	6,449,256	3,314,545	461,542	13.9	506,227	15.3	4,282,104	66.4	265	497,944	49,794	4,829,843	74.9
6 1976	8,322,894	[illegible]	446,510	11.7	[illegible]	17.9	[illegible]	59.5	373	946,944	94,694	5,994,936	72.0
7 1977	8,602,360	3,342,172	342,275	10.2	[illegible]	21.9	[illegible]	51.3	446	2,686,587	502,461	7,605,845	88.5
8 1978	[illegible]	[illegible]	253,624	13.6	720,490	37.7	2,311,809	47.3	346	2,399,510	737,385	5,984,705	101.8
9 1979	[illegible]	265,720	130,295	49.0	[illegible]	179.6	872,877	19.4	307	1,814,070	553,231	3,239,778	72.0
10 Totals	[illegible]	[illegible]	[illegible]	15.2	[illegible]	[illegible]	[illegible]	59.6	2,186	9,940,629	2,148,524	110,348,657	X X X

COMPUTATION OF EXCESS OF STATUTORY RESERVE OVER STATEMENT RESERVES – OTHER LIABILITY

1979 $ 0 1978 $ 0 1977 $ 0 Total $ 0 Calculation Method— 0 % of Column 2, less Column 11, if negative enter zero. See Note a

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ANNUAL STATEMENT FOR THE YEAR 1975 OF THE

Years in Which Policies Were Issued	(1) Years in Which Premiums Were Earned and Losses Were Incurred	(2) Premiums Earned	(3) Loss Payments	(d) EXPENSE PAYMENTS (4) Allocated	(5) Ratio 4÷3 %	(6) (g) Unallocated	(7) Ratio 6÷2 %	(8) Loss and Loss Expense Payments (3+4+6)	(9) Ratio 8÷2 %	(10) Number of Claims Outstanding	(11) (e) Losses Unpaid	(12) (d) (e) Loss Expense Unpaid	(13) Total Losses and Loss Expense Incurred (8+9+10)	(14) Ratio 11÷2 %
1 Prior to 1969	Prior to 1969	80,940,524	33,898,724	5,250,309	15.5	4,999,888	14.7	44,148,922	54.5	203	504,700	50,470	44,704,092	55.2
2 1969	Prior to 1969	3,761,624	1,813,915	317,634	17.5	553,751	30.5	2,685,301	71.4	64	200,885	20,088	2,906,275	77.3
3	1969	7,773,172	2,995,166	564,713	18.9	583,640	19.5	4,143,520	53.3	170	391,292	39,129	4,573,941	58.8
4	1970	7,408,177	3,308,437	460,038	13.9	436,894	13.2	4,205,370	56.8	214	667,492	66,749	4,939,612	66.7
5	1971	8,896,986	3,189,577	521,808	16.4	538,581	16.9	4,249,967	47.8	389	1,229,045	134,563	5,613,576	63.1
6	1972	7,921,915	2,255,053	405,072	18.0	582,264	25.8	3,242,389	40.9	594	1,253,350	136,994	4,632,733	58.5
7	1973	7,765,704	2,256,272	378,170	16.8	637,779	28.3	3,272,222	42.1	1,188	1,874,028	153,544	5,299,795	68.3
8	1974	6,684,873	1,065,996	215,324	20.2	534,414	50.1	1,815,735	27.2	1,514	2,029,993	471,633	4,317,361	64.6
9	1975	6,449,256	222,856	97,593	43.8	233,326	104.7	553,775	8.6	2,121	2,842,423	507,269	3,903,468	60.5
10	Totals	137,602,234	51,006,000	8,210,664	16.1	9,100,541	17.8	68,317,206	49.6	6,457	10,993,209	1,580,441	80,890,858	58.8

COMPUTATION OF EXCESS OF STATUTORY RESERVE OVER STATEMENT RESERVES—OTHER LIABILITY
1975 $ ...... 0 ...... 1974 $ ...... 0 ...... 1973 $ ...... 0 ...... Total $ ...... 0 ......
Calculation Method— ...... 0 ...... % of Column 2, less Column 11, if negative enter zero. See Note a.

FAILURE OF THE ITEMS TO ADD TO THE TOTALS IS DUE TO THE DROPPING OF CENTS.

See Schedule P—Part 1F for footnotes

ANNUAL STATEMENT FOR THE YEAR 1976 OF THE

Years in Which Policies Were Issued	(2) Premiums Earned	(3) Loss Payments	(4) Allocated	(5) Ratio 4÷3 %	(6) Unallocated	(7) Ratio 6÷2 %	(8) Loss and Loss Expense Payments	(9) Ratio 8÷2 %	(10) Number of Claims Outstanding	(11) Losses Unpaid	(12) Loss Expense Unpaid	(13) Total Losses and Loss Expense Incurred	(14) Ratio 11÷2 %
1 Prior to 1969	84,702,148	35,968,879	5,610,698	15.6	5,572,760	15.5	47,152,346	55.7	105	295,394	28,539	47,466,279	56.0
2 1969	7,773,172	3,173,212	593,573	18.7	596,904	18.8	4,363,690	56.1	67	120,652	12,065	4,496,407	57.8
3 1970	7,408,177	3,647,741	514,097	14.1	462,194	12.7	4,624,033	62.4	90	297,580	29,758	4,951,371	66.9
4 1971	8,896,986	3,489,420	598,744	17.2	560,949	16.1	4,649,114	52.3	192	660,640	77,515	5,387,269	60.5
5 1972	7,921,915	2,887,508	493,262	17.1	629,454	21.8	4,010,224	50.6	293	895,575	101,009	5,006,808	63.2
6 1973	7,765,704	3,144,566	513,999	16.3	704,029	22.4	4,362,595	56.2	606	1,185,200	129,971	5,677,766	73.1
7 1974	6,684,873	1,617,469	336,833	20.8	598,448	37.0	2,552,750	38.2	1,186	1,401,530	138,885	4,093,166	61.2
8 1975	6,449,256	1,120,832	189,761	16.9	311,510	27.8	1,622,104	25.2	942	1,817,199	473,915	3,913,219	60.6
9 1976	8,322,894	527,393	141,583	26.8	346,218	65.6	1,015,195	12.2	2,301	3,629,261	419,985	5,064,442	60.8
10 Totals	145,925,128	55,577,022	8,992,555	16.2	9,782,477	17.0	74,352,055	51.0	5,215	10,293,031	1,411,645	86,056,732	58.9

COMPUTATION OF EXCESS OF STATUTORY RESERVE OVER STATEMENT RESERVES—OTHER LIABILITY
1976 $ 0 1975 $ 0 1974 $ 0 Total $ 0 Calculation Method— 0 % of Column 2, less Column 11, if negative enter zero. See Note a.

ANNUAL STATEMENT FOR THE YEAR 1977 OF THE

Years in Which Policies Were Issued	(2) Premiums Earned	(3) Loss Payments	(4) Allocated	(5) Ratio 4÷3 %	(6) Unallocated	(7) Ratio 6÷2 %	(8) Loss and Loss Expense Payments	(9) Ratio 8÷2 %	(10) Number of Claims Outstanding	(11) Losses Unpaid	(12) Loss Expense Unpaid	(13) Total Losses and Loss Expense Incurred	(14) Ratio 11÷2 %
1 Prior to 1970	92,475,320	39,490,675	6,234,121	15.7	6,195,841	15.6	51,920,638	56.1	114	289,441	28,944	52,239,023	56.5
2 1970	7,408,177	3,730,242	551,117	14.7	468,368	12.5	4,749,729	64.1	60	252,016	25,201	5,026,956	67.8
3 1971	8,896,986	4,119,509	663,334	16.1	608,258	14.7	5,391,101	60.5	107	285,380	38,734	5,715,216	64.2
4 1972	7,921,915	3,512,014	561,947	16.0	676,354	19.2	4,750,315	59.9	205	486,548	59,851	5,205,715	66.9
5 1973	7,765,704	4,087,621	646,842	15.8	774,850	18.9	5,509,313	70.9	381	766,755	86,872	6,362,940	81.9
6 1974	6,684,873	2,378,389	434,922	18.2	655,611	27.5	3,468,923	51.9	445	1,002,960	110,492	4,592,376	68.5
7 1975	6,449,256	1,827,929	284,993	15.5	364,625	19.9	2,477,548	38.4	636	744,423	128,201	3,350,172	51.9
8 1976	8,322,894	1,391,853	238,880	17.1	452,040	32.4	2,082,774	25.0	1,069	2,229,585	435,597	4,747,947	57.0
9 1977	8,602,360	483,161	112,095	23.2	404,313	93.6	999,569	11.6	1,592	3,824,965	386,056	5,210,591	60.5
10 Totals	154,527,409	61,021,397	9,728,253	15.9	10,600,263	17.3	81,349,914	52.6	4,599	9,882,073	1,298,941	92,530,929	59.8

COMPUTATION OF EXCESS OF STATUTORY RESERVE OVER STATEMENT RESERVES—OTHER LIABILITY
1977 $ ...... 318,287 ...... 1976 $ ...... 599,248 ...... 1975 $ ...... 793,259 ...... Total $ 1,710,794 ...... Calculation Method— 64.2 % of Column 2, less Column 11, if negative enter zero. See Note a.

See Schedule P—Part 1F for footnotes

1975 1976 1977 1978 1979

(b) INCURRED BUT NOT REPORTED LOSSES UNPAID INCLUDED IN COLUMN 9 OF:

Years in Which Losses Were Incurred	Part 1B
1 Prior to 1969	9,200
2 1969	1,000
3 1970	1,380
4 1971	44,480
5 1972	84,774
6 1973	169,364
7 1974	872,648
8 1975	0
9 Totals	1,183,126

Years in Which Losses Were Incurred	Part 1B
1 Prior to 1969	0
2 1969	0
3 1970	0
4 1971	0
5 1972	0
6 1973	0
7 1974	0
8 1975	300,000
9 1976	1,178,601
10 Totals	1,478,601

Years in Which Losses Were Incurred	Part 1B
1 Prior to 1970	0
2 1970	0
3 1971	0
4 1972	0
5 1973	0
6 1974	0
7 1975	0
8 1976	375,000
9 1977	1,162,072
10 Totals	1,537,072

Years in Which Losses Were Incurred	Part 1B
1 Prior to 1971	0
2 1971	0
3 1972	0
4 1973	0
5 1974	0
6 1975	0
7 1976	0
8 1977	275,000
9 1978	983,940
10 Totals	1,258,940

Years in Which Losses Were Incurred	Part 1B
1 Prior to 1972	50,750
2 1972	0
3 1973	0
4 1974	0
5 1975	0
6 1976	0
7 1977	0
8 1978	275,000
9 1979	825,000
10 Totals	1,150,750

(i) ONE YEAR DEVELOPMENT OF IBNR LOSSES INCLUDED IN COLUMNS 3 AND 9 OF:

	Part 1B
1 Prior to 1969	3,685
2 1969	3,250
3 1970	5,102
4 1971	7,049
5 1972	37,950
6 1973	18,714
7 1974	130,095
8 1975	0
9 Totals	205,847

	Part 1B
1 Prior to 1969	0
2 1969	0
3 1970	0
4 1971	0
5 1972	0
6 1973	78,279
7 1974	92,530
8 1975	1,051,584
9 1976	0
10 Totals	1,222,393

	Part 1B
1 Prior to 1970	0
2 1970	0
3 1971	0
4 1972	0
5 1973	0
6 1974	0
7 1975	66,561
8 1976	925,206
9 1977	X X X X
10 Totals	991,767

	Part 1B
1 Prior to 1971	0
2 1971	0
3 1972	0
4 1973	0
5 1974	0
6 1975	0
7 1976	197,986
8 1977	1,996,813
9 1978	X X X X
10 Totals	1,754,739

	Part 1B
1 Prior to 1972	62,750
2 1972	11,946
3 1973	22,531
4 1974	14,179
5 1975	64,119
6 1976	75,118
7 1977	333,584
8 1978	532,395
9 1979	X X X X
10 Totals	1,116,722

SCHEDULE P – PART 2 – SUMMARY

Years in Which Losses Were Incurred	INCURRED LOSSES AND LOSS EXPENSE REPORTED AT END OF YEAR (000 OMITTED)						INCURRED LOSS AND LOSS EXPENSE RATIO REPORTED					
	1974	1975	1976	1977	1978	1979	1974	1975	1976	1977	1978	1979
Prior to 1974	(a) -	331,224	333,340	336,992	339,944	342,778	X X X	X X X	X X X	X X X	X X X	X X X
1974	(a) -	25,928	25,937	28,155	30,403	32,338	-	79.1	79.1	85.9	92.7	98.7
Cumulative Total	(a) -	357,152	359,277	365,147	370,347	375,116	X X X	X X X	X X X	X X X	X X X	X X X
1975	X X X	21,729	22,482	22,901	24,973	26,736	X X X	70.0	72.4	73.7	80.2	86.1
Cumulative Total	X X X	378,881	381,759	388,048	395,270	401,852	X X X	X X X	X X X	X X X	X X X	X X X
1976	X X X	X X X	23,849	23,338	23,942	25,796	X X X	X X X	63.2	61.9	63.5	68.4
Cumulative Total	X X X	X X X	405,608	411,386	419,212	427,648	X X X	X X X	X X X	X X X	X X X	X X X
1977	X X X	X X X	X X X	26,113	26,198	29,966	X X X	X X X	X X X	63.7	63.0	73.1
Cumulative Total	X X X	X X X	X X X	437,499	445,410	457,614	X X X	X X X	X X X	X X X	X X X	X X X
1978	X X X	X X X	X X X	X X X	29,664	31,663	X X X	X X X	X X X	X X X	67.9	70.9
Cumulative Total	X X X	X X X	X X X	X X X	475,075	489,277	X X X	X X X	X X X	X X X	X X X	X X X
1979	X X X	X X X	X X X	X X X	X X X	29,195	X X X	X X X	X X X	X X X	X X X	67.9

SCHEDULE P – PART 3 – SUMMARY

Calendar Year Premiums Earned, Accident Year Loss and Loss Expense Incurred

	DOLLARS (000 omitted)							PERCENTAGES						
	1973 (a)	1974 (a)	1975	1976	1977	1978	1979	1973 (a)	1974 (a)	1975	1976	1977	1978	1979
	Summary Data from Schedule P – Part 1 – Summary													
Premiums Earned	26,993	29,116	31,059	37,711	41,008	45,008	43,263	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Loss & Loss Exp Incl'd	25,442	29,332	26,735	25,794	29,965	31,661	29,198	94.3	100.7	86.1	68.4	73.1	70.3	67.5
	Loss & Loss Expense through 1 year													
Incl'd	5,213	6,611	6,962	7,561	8,310	10,472	8,199	19.3	22.9	22.4	20.0	20.3	23.3	19.0
Reserve (2)–(3)	20,229	22,651	19,773	18,233	21,655	21,189	20,999	75.0	77.8	63.7	48.4	52.8	47.0	48.5
	Loss & Loss Expense through 2 years													
Incl'd	11,826	14,445	15,425	15,285	16,697	18,939	X X	43.8	49.6	49.7	40.5	40.7	42.1	X X
Reserve (2)–(5)	13,616	14,887	11,310	10,509	13,268	12,722	X X	50.5	51.1	36.4	27.9	32.4	28.2	X X
	Loss & Loss Expense through 3 years													
Incl'd	16,139	19,064	19,890	19,875	21,927	X X	X X	59.8	65.5	64.1	52.7	53.5	X X	X X
Reserve (2)–(7)	9,304	10,268	6,837	5,919	8,038	X X	X X	34.5	35.2	22.0	15.7	19.6	X X	X X
	Loss & Loss Expense through 4 years													
Incl'd	19,314	22,991	22,837	23,758	X X	X X	X X	71.6	78.6	73.5	63.0	X X	X X	X X
Reserve (2)–(9)	6,129	6,441	3,898	2,036	X X	X X	X X	22.7	22.1	12.6	5.4	X X	X X	X X
	Loss & Loss Expense through 5 years													
Incl'd	21,991	26,171	25,375	X X	X X	X X	X X	81.1	89.9	81.7	X X	X X	X X	X X
Reserve (2)–(11)	3,452	3,161	1,360	X X	X X	X X	X X	13.2	10.8	4.4	X X	X X	X X	X X

SCHEDULE P – PART 2B – OTHER LIABILITY

1	Prior to 1974	72,457	72,667	72,984	74,638	75,421	76,A??	X X X	X X X	X X X	X X X	X X X	X X X
2	1974	4,015	4,317	4,093	4,582	5,13A	5,A70	60.0	64.6	61.2	68.5	76.9	87.0
3	Cumulative Total	76,472	76,984	77,077	79,220	80,559	82,692	X X X	X X X	X X X	X X X	X X X	X X X
4	1975	X X X	3,903	3,913	3,350	4,074	4,879	X X X	60.5	60.6	51.9	63.2	74.9
5	Cumulative Total	X X X	80,887	80,990	82,570	84,633	87,571	X X X	X X X	X X X	X X X	X X X	X X X
6	1976	X X X	X X X	3,064	4,747	5,362	5,994	X X X	X X X	60.8	57.0	64.4	77.0
7	Cumulative Total	X X X	X X X	86,054	87,317	89,995	93,515	X X X	X X X	X X X	X X X	X X X	X X X
8	1977	X X X	X X X	X X X	5,210	5,690	7,606	X X X	X X X	X X X	60.5	66.1	85.4
9	Cumulative Total	X X X	X X X	X X X	92,527	95,685	101,121	X X X	X X X	X X X	X X X	X X X	X X X
10	1978	X X X	X X X	X X X	X X X	5,106	5,984	X X X	X X X	X X X	X X X	86.9	101.9
11	Cumulative Total	X X X	X X X	X X X	X X X	100,791	107,105	X X X	X X X	X X X	X X X	X X X	X X X
12	1979	X X X	X X X	X X X	X X X	X X X	3,239	X X X	X X X	X X X	X X X	X X X	72.0

SCHEDULE P – PART 3B – OTHER LIABILITY

Calendar Year Premiums Earned, Accident Year Loss and Loss Expense Incurred

	DOLLARS (000 omitted)							PERCENTAGES						
	(1) 1973	(2) 1974	(3) 1975	(4) 1976	(5) 1977	(6) 1978	(7) 1979	(8) 1973	(9) 1974	(10) 1975	(11) 1976	(12) 1977	(13) 1978	(14) 1979
	Summary Data from Schedule P—Part 1B													
miums Earned	7,705	6,654	6,449	8,322	8,602	5,076	4,501	100.0	100.0	100.0	100.0	100.0	100.0	100.0
s & Loss Exp. Inc'd	7,103	5,869	4,829	5,994	7,606	5,984	3,239	92.2	87.8	74.9	72.0	88.4	101.8	72.0
	Loss & Loss Expense through 1 year													
id	1,057	935	955	1,015	999	1,416	872	13.6	14.0	8.6	12.2	11.6	24.1	89.4
erve (2)—(3)	6,106	4,934	4,276	4,979	6,607	4,568	2,367	78.6	73.8	66.3	59.8	76.8	77.7	82.6
	Loss & Loss Expense through 2 years													
id	2,135	1,815	1,622	2,082	2,535	2,811	X X	27.5	27.1	25.1	25.0	29.5	47.8	X X
erve (2)—(5)	5,028	4,054	3,207	3,912	5,071	3,173	X X	64.7	60.7	49.8	47.0	58.9	54.0	X X
	Loss & Loss Expense through 3 years													
id	3,272	2,552	2,477	3,421	4,417	X X	X X	42.1	38.2	38.4	41.1	51.3	X X	X X
erve (2)—(7)	3,691	3,317	2,352	2,573	3,189	X X	X X	50.1	49.6	36.5	30.9	37.1	X X	X X
	Loss & Loss Expense through 4 years													
id	4,362	3,468	3,409	4,953	X X	X X	X X	56.2	51.9	52.9	59.5	X X	X X	X X
erve (2)—(9)	2,401	2,401	1,420	1,041	X X	X X	X X	36.0	35.9	22.0	12.5	X X	X X	X X
	Loss & Loss Expense through 5 years													
id	5,409	4,419	4,282	X X	X X	X X	X X	70.9	66.1	66.4	X X	X X	X X	X X
erve (2)—(11)	1,694	1,450	547	X X	X X	X X	X X	21.3	21.7	8.5	X X	X X	X X	X X

1986 CASUALTY LOSS RESERVE SEMINAR

5F - ADVANCED TECHNIQUES II

Moderator: Michael A. McMurray, Consulting Actuary
Milliman & Robertson

Panel: Gary S. Patrik, Vice President & Actuary
North American Reinsurance Corp.

William H. Panning, Sr. Research Consultant
Hartford Insurance Group

Gregory C. Taylor, Principal
Mercer, Campbell, Cook & Knight

RISK THEORY AND LOSS RESERVING

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RISK THEORY AND LOSS RESERVING

INTRODUCTION

Good morning. I'm here to talk to you about risk theory and loss reserving. This is an especially timely topic for American actuaries since the IRS soon will take away our companies' implicit risk loading in our loss reserves by requiring us to discount loss reserves for tax purposes. We will lose our implicit risk buffer. Since this buffer will now flow into profits and thus be taxed sooner, our assets will decrease. This will clearly increase our companies' risk level.

Now, I'm not here to talk to you about how to specify a risk loading for loss reserves. For some ideas on this, you can refer to the transcript of the CAS Committee on Theory of Risk presentation entitled "Risk Theoretic Issues in Loss Reserving." It is available from me if you leave me your business card.

I'm here to discuss another part of our problem; how to measure the riskiness of our loss liabilities, and, at the same time, talk about how we might improve our estimates of these liabilities. I'm here to talk concepts, not numbers. I have

no cookbook formulas nor methods. I just have ideas and opinions.

What is risk theory? First of all, risk theory views the insurance loss process as best described as being stochastic. That is, the various financial results you might want to measure could be best considered to be random variables. The business is described by suitable probability models and certain questions are asked, such as:

1. What premium should be charged to assume a particular insurance exposure?

2. Given a certain premium level and loss exposure, what is the company's probability of ruin?

3. And the like.

You can see how these questions might translate into loss reserving questions:

1. What should the loss reserve be for a particular loss run-off exposure?

TYPICAL RISK THEORY QUESTIONS:

1. WHAT PREMIUM SHOULD BE CHARGED TO ASSUME A PARTICULAR INSURANCE EXPOSURE?

2. GIVEN A CERTAIN PREMIUM LEVEL AND LOSS EXPOSURE, WHAT IS THE COMPANY'S PROBABILITY OF RUIN?

RISK THEORY AND LOSS RESERVING

TYPICAL LOSS RESERVING QUESTIONS:

1. WHAT SHOULD THE LOSS RESERVE BE FOR A PARTICULAR LOSS RUN-OFF EXPOSURE?

2. GIVEN A CERTAIN LOSS RESERVE LEVEL AND LOSS RUN-OFF EXPOSURE, WHAT IS THE PROBABILITY THAT THE ACTUAL LOSS RUN-OFF WILL EXCEED THE RESERVE PLUS THE COMPANY'S SURPLUS?

2. Given a certain loss reserve level and loss run-off exposure, what is the probability that the actual loss run-off will exceed the reserve plus the company's surplus?

Since the focus of risk theory is on the financial risk arising from the loss process being stochastic, risk theory should have a lot to tell us about loss reserving. This slide illustrates what the traditional risk theory literature tells us about loss reserving. What you see is what you get. A problem with traditional risk theory is that claim report delays and loss reserving problems are assumed not to exist. Attention is concentrated upon the claims generation process itself, with claims at ultimate settlement values.

This situation is changing. Over the past decade there has been a lot of work on developing more sophisticated loss reserving methodology. You are seeing some of this in these Advanced Techniques seminars. But as far as I can see, it has not, as yet, been integrated into the mainstream of risk theory.

But yet, risk theoretic concepts and methods should be applicable in general to loss reserving. As an American corporate

WHAT TRADITIONAL RISK THEORY TELLS US ABOUT LOSS RESERVING:

actuary who has to explain loss reserve estimates to myself, to my management, to our auditors and to our insurance department; I am very dissatisfied with the current state of American actuarial reserving art. I would like to describe to you how I would like to see risk theoretic concepts and methods applied to loss reserving. Some of what I will say may be inflammatory some will be plain common sense. All in all, it will be highly opinionated. I hope the professors and the creative practitioners can help me reach the goals which I am about to describe.

The points or opinions I would like to discuss are displayed on this slide. They are:

1. Use explicit models (and serve intuition).
2. Use stochastic models.
3. Use fairly homogeneous exposure groups.
4. Model the loss payout process.
5. Model (4) via counts and amounts and lags.
6. Integrate as much information as possible.
7. Connect loss reserving and pricing.

The last point is, to me, most important. I considered listing it first, since it really underlies most of what I will say. But I decided to leave it until last as a wrap-up point to hammer upon at the end.

RISK THEORY AND LOSS RESERVING

KEY POINTS:

1. USE EXPLICIT MODELS (AND SERVE INTUITION).
2. USE STOCHASTIC MODELS.
3. USE FAIRLY HOMOGENEOUS EXPOSURE GROUPS.
4. MODEL THE LOSS PAYOUT PROCESS.
5. MODEL (4) VIA COUNTS AND AMOUNTS AND LAGS.
6. INTEGRATE AS MUCH INFORMATION AS POSSIBLE.
7. CONNECT LOSS RESERVING AND PRICING.

1. USE EXPLICIT MODELS AND USE INTUITION

What is an actuarial presentation without numbers? Here is a slide of RAA loss development numbers. I'm waiting for a Pavlovian response. What do American actuaries do when we see something like this? We start to do arithmetic. Without even thinking, we slap the numbers into our chainladder computer programs to compute link ratios or age-to-age factors. If we are sophisticated, we might even attack the columns of factors with some least squares regression program to see if there is some sort of trend, or we might measure the variance. American actuaries are mired in the muck of chainladder development, bashing numbers about with very little meaning. I believe the current state of American loss reserving art is best characterized as a lot of smart people doing dumb things.

Instead of doing arithmetic, why don't we instead, try to model the loss development processes? This is what science is about. Building and testing models and basing predictions thereon. Models should be constructed so that there are enough parameters to provide a reasonably close approximation to reality, and yet not so many as to befuddle attempts at understanding. The uses of an explicit parsimoniously parameterized model are listed on this slide.

GENERAL LIABILITY INCLUDING MEDICAL MALPRACTICE

BASIC DATA TRIANGLE

INCURRED LOSSES (000'S OMITTED)

EVALUATION POINT (MEASURED IN YEARS)

ACCIDENT YEAR	1	2	3	4	5	6	7	8	9
1956	1.431	2.320	2.842	3.462	3.684	3.880	3.834	3.537	3.586
1957	1.132	2.485	3.268	3.912	3.975	3.791	3.804	3.849	4.077
1958	1.430	2.406	2.727	3.346	3.547	3.421	3.259	3.639	3.579
1959	1.446	2.658	3.074	4.388	4.758	4.470	4.420	4.547	4.702
1960	1.441	2.611	4.030	4.734	5.446	5.869	6.140	6.256	6.379
1961	1.410	2.997	4.318	5.361	5.375	5.529	5.467	5.752	5.703
1962	2.414	4.081	5.022	6.602	7.208	8.019	7.851	8.936	9.150
1963	3.120	5.654	6.871	8.309	8.872	9.357	9.509	10.436	10.950
1964	3.081	5.399	7.348	8.707	9.539	10.642	11.144	11.193	11.879
1965	4.384	6.999	9.321	11.566	11.886	12.347	12.451	13.074	13.506
1966	2.447	7.207	10.583	13.210	14.563	15.378	15.686	16.131	17.393
1967	4.141	8.098	12.364	14.786	16.935	19.253	20.588	20.844	21.016
1968	5.808	13.171	17.684	22.892	26.610	28.344	28.443	27.521	27.506
1969	6.340	14.594	22.249	26.897	30.296	32.001	34.841	37.245	42.799
1970	8.015	19.037	28.422	36.387	42.542	46.784	47.767	54.986	55.782
1971	8.768	27.597	43.855	57.216	63.592	69.318	79.490	85.506	98.450
1972	8.858	28.280	41.766	58.410	71.927	79.625	94.717	102.119	106.764
1973	16.879	36.342	64.584	88.902	108.652	124.533	139.278	148.704	158.888
1974	21.859	46.268	69.144	91.039	107.299	121.911	139.665	156.599	169.827
1975	22.761	54.698	92.750	125.147	155.259	178.280	202.715	221.862	
1976	26.021	61.980	99.594	129.254	153.290	179.111	195.145		
1977	25.356	62.999	104.522	143.808	176.229	198.865			
1978	38.259	79.673	114.151	152.230	182.901				
1979	37.430	81.501	127.240	164.204					
1980	36.307	98.729	153.172						
1981	50.775	116.022							
1982	53.479								

EVALUATION POINT (MEASURED IN YEARS)

ACCIDENT YEAR	10	11	12	13	14	15	16	17	18
1956	3.662	3.871	3.857	3.880	3.975	3.999	3.947	3.926	3.917
1957	4.014	3.905	3.923	3.919	3.867	3.893	3.882	3.587	3.599
1958	3.295	3.374	3.317	3.357	3.351	3.307	3.357	3.382	3.370
1959	4.707	4.566	4.668	4.616	4.561	4.621	4.628	4.473	4.466
1960	6.434	6.645	6.720	6.663	6.769	6.974	7.081	6.656	7.072
1961	6.117	6.135	6.123	6.323	6.096	6.131	6.180	6.235	6.229
1962	9.018	8.896	8.784	9.020	9.388	9.276	9.128	9.227	9.159
1963	11.177	11.977	12.065	12.203	12.051	12.346	12.386	13.199	13.046
1964	12.189	12.628	12.445	12.437	12.494	12.551	12.459	12.682	12.973
1965	14.962	15.322	15.715	16.240	16.450	16.753	16.906	17.666	17.456
1966	17.761	17.754	17.669	17.318	17.366	17.761	18.236	18.470	
1967	21.058	20.896	21.869	23.162	23.067	24.133	24.585		
1968	30.109	30.165	30.735	31.545	32.110	33.367			
1969	46.404	45.583	48.073	49.191	49.092				
1970	56.027	60.375	65.811	69.978					
1971	94.721	103.378	105.482						
1972	111.298	121.911							
1973	168.046								

EVALUATION POINT (MEASURED IN YEARS)

ACCIDENT YEAR	19	20	21	22	23	24	25	26	27
1956	3.918	3.945	3.945	3.950	3.951	3.952	3.949	3.949	3.949
1957	3.894	3.912	3.945	3.920	3.920	3.920	3.920	3.920	
1958	3.595	3.659	3.660	3.727	3.727	3.727	3.727		
1959	4.472	4.472	4.485	4.822	4.818	4.765			
1960	6.988	6.960	6.985	6.936	6.930				
1961	6.668	6.752	6.873	7.032					
1962	9.234	9.196	9.220						
1963	14.498	14.501							

AN EXPLICIT PARSIMONIOUSLY PARAMETERIZED MODEL IS USEFUL BECAUSE:

1. IT CAN BE CLEARLY UNDERSTOOD
2. IT CAN BE TESTED
3. IT CAN BE EASILY ADJUSTED TO ANALOGOUS CASES
4. IT CAN BE USED TO COMPARE AND COMBINE VARIOUS SETS OF DATA

For example, think of a model for the report lag distribution, the time from claim occurrence until first report. The variable is intuitively clear to underwriters, claimspeople, etc. In describing the loss process, intuition must be served, or else we will never be comfortable with our answers. A probabilistic model for report lags would be clearly understood. It could be tested on various sets of data and goodness of fit statistics studied. The model for one type of exposure could be adjusted to another similar exposure by carefully adjusting the parameter values. Lag data from many different coverages could be compared via simple distributional characteristics such as moments, and combined in a consistent manner if desirable.

I want to be confident that I can explain my loss liability estimates and loss reserve recommendations in some logical fashion without getting lost in thousands of unconnected numbers.

2. USE STOCHASTIC MODELS

The processes we are measuring are best considered as being stochastic, that is, nondeterministic. There exists variability in results which can never be totally explained. I

USE STOCHASTIC MODELS:

1. LOSS DEVELOPMENT PROCESSES ARE BEST CONSIDERED AS BEING STOCHASTIC.

2. DETERMINISTIC MODELS ARE POOR MODELS.

3. POOR MODELS GIVE POOR ESTIMATES.

don't want to get into an argument about the existence or non-existence of probability, or whose probability when. It doesn't matter. What matters is that from our points of view, as observers, the loss development process is stochastic.

Thus, deterministic models are poor models for the loss occurring, reporting, reserving and paying processes. Poor models give poor estimates.

A common excuse for the use of deterministic models is that the processes we are measuring are so difficult to measure that we should be happy if we can even measure the first moment. Thus, we think it is enough to use simple deterministic techniques to derive some kind of number we vaguely call the expectation. This is nonsense. It may be true that the answer we should want is not given by a multiplication of deterministically estimated factors, but is based, for example, upon the maximum likelihood estimate of the appropriate model's parameters.

Another common excuse is that a simple deterministic model such as chainladder is already difficult enough to explain to nontechnical managers, auditors and regulators. I really sympathize with this one. But I still say "phooey;" we are not fulfilling our professional actuarial role if we mislead these

EXCUSES:

1. A SIMPLE ESTIMATE OF THE "FIRST MOMENT" IS ENOUGH.

2. SIMPLE CHAINLADDER IS ALREADY VERY DIFFICULT TO EXPLAIN.

GOOD MANAGEMENT INFORMATION:

RANGE AND ERROR ESTIMATES FOR THE ACTUAL CLAIMS RUN-OFF VERSUS THE RESERVE ESTIMATE

people with a simplistic wrong answer.

The next time I read a reserve opinion wherein the magic answers are derived via deterministic chainladder procedures and the actuary says that the actual claims run-off may differ from the estimate by plus or minus 10 percent (with, of course, no possible rational derivation of this seat-of-the-pants number), I'm going to vomit, and I'll try to do it on the actuary whose opinion I'm reading. As much as I want us to state opinions which incorporate the uncertainty in our answers, let us not fake it.

A serious measurement of the range (with attendant probabilities) of the difference between the loss reserve estimate and the actual claims payment run-off should be part of good management information for every loss reserve review. And you can only get there through use of stochastic models together with sample or other error estimation.

3. USE FAIRLY HOMOGENEOUS EXPOSURE GROUPS

American actuaries have too often been fooled by the lore of large numbers, forgetting that combining nonhomogeneous groups

of data can increase measurement error rather than decrease it. The hallowed myth of Longley-Cook's crumbly cake from his well-known (and justifiably so) paper on credibility has blinded us to the problems of combining heterogeneous exposures in order to gain (we think) greater credibility.

I believe that through the use of appropriate models together with the use of good statistical techniques, we can deal with small samples. Remember that part of the answer should be a technically honest appraisal of the uncertainty in the answer.

Reasonably homogeneous exposure categories for loss reserving have been discussed in the literature. They are usually not exactly the Annual Statement Lines of Business. The next time an auditor or regulator shows me the loss liability estimate he obtained from my reinsurance company's Schedule P General Liability loss numbers, I'm going to - you guessed it - and I hope I don't miss.

How do you determine what fairly homogeneous exposure groups are? Talk with your marketing people, underwriters and claims-people. See what the business is; see what the losses are. This is nothing new.

USE FAIRLY HOMOGENOUS EXPOSURE GROUPS:

1. THE LORE OF LARGE NUMBERS
2. LONGLEY-COOK'S CREDIBILITY CRUMBLY CAKE
3. GOOD MODELS AND GOOD STATISTICAL TECHNIQUES CAN DEAL WITH SMALL SAMPLES
4. REVIEW THE LITERATURE
5. DON'T USE SCHEDULE P AGGREGATIONS
6. ASK MARKETING, UNDERWRITING AND CLAIMS PEOPLE

4. MODEL THE LOSS PAYOUT PROCESS

What is really important is the run-off of the liabilities over time as loss payments. Period. This is best considered as a stochastic process. We should construct our stochastic model in the form of a time dependent stochastic process, a time series.

For example, consider the cumulative loss payments to be made for one homogeneous exposure group arising from one coverage year to be a series of random numbers L(t) where t is some time variable. Consider various probability statements such as:

1. the probability that for a fixed t, L(t) is less than or equal to x

2. given that L(t) equals x, what is the probability that L(t+1) is less than or equal to y? This is a transition probability question.

3. etc.

For our purposes it may be enough to consider a discrete sequence $\{L(t)\}$ for t = 1, 2, 3,... years or quarters, or months if you insist.

MODEL THE LOSS PAYOUT PROCESS:

$L(t)$ = CUMULATIVE LOSS PAYMENTS MADE BY TIME t FOR A FIXED COVERAGE YEAR.

TYPICAL PROBABILITY STATEMENTS:

1. PROB $[\, L(t) \leq x \,]$

2. PROB $[\, L(t+1) \leq y \mid L(t) = x \,]$

This type of modeling allows us to use the rich statistics literature on stochastic processes. I don't believe any statisticians have solved our loss reserving problems for us, but at least they have provided us with the conceptual framework and many tools to use.

Speaking of the loss payout stream as being the item of interest doesn't mean that we should restrict our attention only to aggregate loss payment data. This gets me to my next two points.

5. MODEL (4) VIA COUNTS AND AMOUNTS AND LAGS

Traditional risk theory models the aggregate loss process by modeling claim counts and amounts and taking the obvious sum:

$$L(t) = X(t, 1) + X(t, 2) + \ldots + X(t, N)$$

where N = number of (paid) claims (or occurrences)

and X(t, i) = amount of the ith claim

Given appropriate models for N and X and suitable independence assumptions, we can write the moments of L in terms of the moments of N and X, and we can approximate the distribution of L.

MODEL COUNTS AND AMOUNTS:

$$L(t) = X(t,1) + \ldots + X(t,N)$$

WHERE N = NUMBER OF (PAID) CLAIMS

$X(t,i)$ = AMOUNT OF iTH CLAIM AT TIME t

There are many good papers in the actuarial literature about this.

An advantage of using a claims count/claims severity model is that we can contemplate intuitively satisfying models for various lag distributions, such as the time from loss event occurrence until first report as mentioned earilier. Some types of lags are listed on this slide. You might be able to connect these lags with appropriate models for the dollar reserving and payments on individual claims up through settlement. Which lags you model will depend upon available data, upon what is most important for the particular exposure/loss reserving situation, and upon whatever good models and convincing arguments the theoreticians can develop for us.

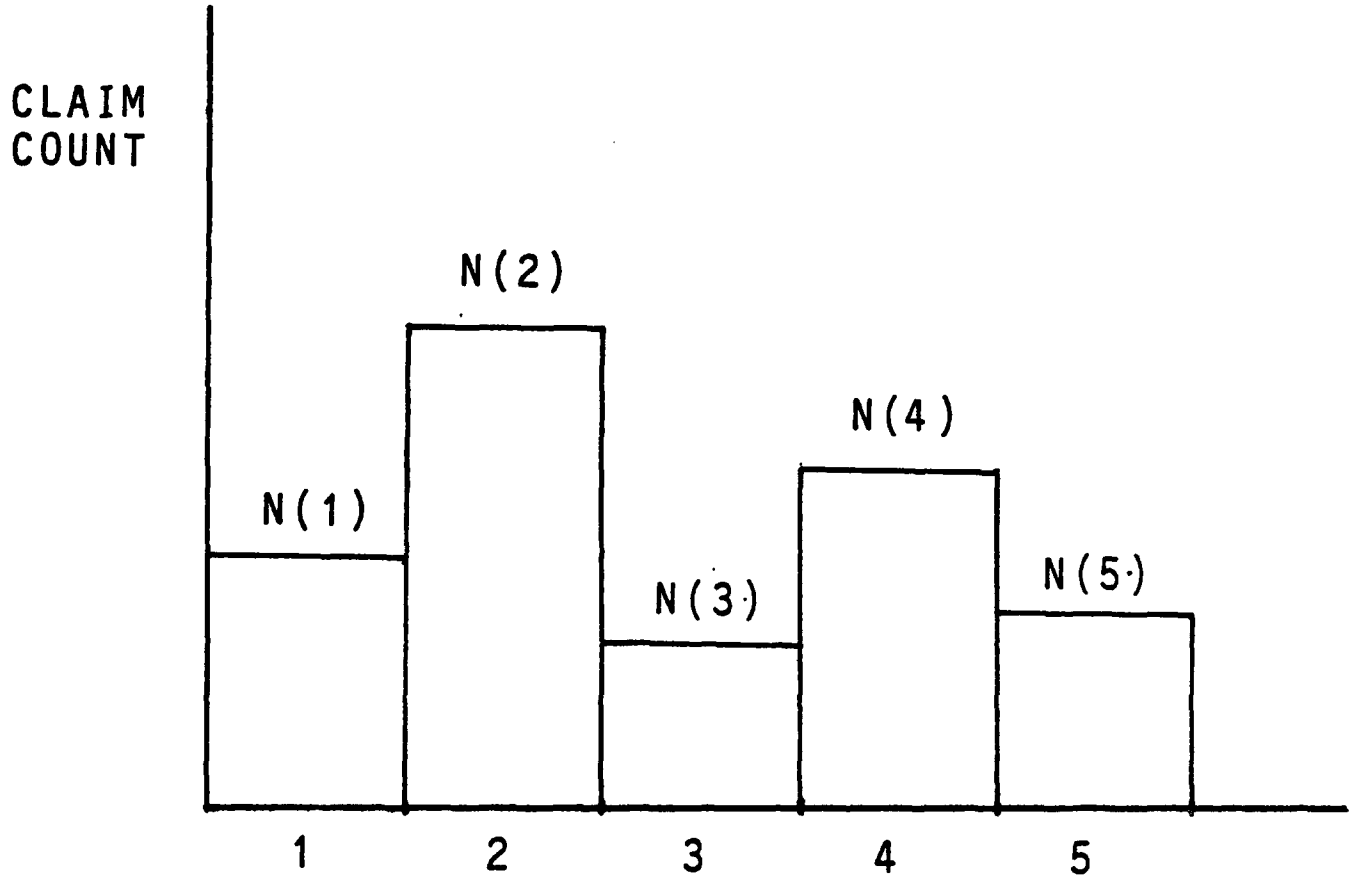
Let's look at a picture of claim count and settlement lags. Suppose that the commonly used Poisson distribution, with parameter n say, is a good model for the total claim count N. Then the number of claims settled in the ith year N(i) will also be Poisson with parameter n*p(i), where p(i) is the lag probability for the ith year. It is very simple. If you don't like Poisson, use a mixing distribution to kick in more variance. I would.

CLAIM LAGS:

1. TIME FROM LOSS EVENT UNTIL FIRST REPORT.
2. TIME FROM FIRST REPORT UNTIL FIRST RESERVE.
3. TIME FROM FIRST RESERVE UNTIL FIRST PAYMENT.
4. TIME FROM LOSS EVENT UNTIL SETTLEMENT.

ETC.

CLAIM COUNT PROCESS:



$N(i)$ = NUMBER SETTLED IN iTH YEAR

$p(i)$ = PROBABILITY OF BEING SETTLED IN iTH YEAR

$$N = \sum_i N(i)$$

$N \sim \mathcal{P}(n)$ POISSON

$N(i) \sim \mathcal{P}(n \cdot p(i))$ POISSON

Thus, the aggregate losses paid in the ith year of run-off can be modeled via the standard risk theoretic model under suitable assumptions for the claim sizes. This kind of model allows us to better understand claim size reserves under changing conditions, such as changing policy limits or changes in retentions net of reinsurance. This model is a powerful tool for describing loss liability. Let us use it instead of modeling and estimating loss liabilities in aggregate.

6. INTEGRATE AS MUCH INFORMATION AS POSSIBLE

Although the loss payout process is the one of interest, we shouldn't only use paid loss information to model it. We should use both paid and incurred loss information, counts and amounts as mentioned above, exposure information, price relativity information, our company's own statistics and suitably interpreted industry or other more general statistics, and various types of so-called soft information such as claimspersons' opinions on changes in claims reporting and reserving. All this and, I'm sure, more information is relevant to the proper evaluation of loss liabilities and loss reserving. So I believe we should aim at integrating it into our models.

INTEGRATE AS MUCH INFORMATION AS POSSIBLE:

1. PAID AND INCURRED
2. COUNTS AND AMOUNTS
3. VARIOUS LAGS
4. EXPOSURES
5. PRICE RELATIVITIES
6. COMPANY STATISTICS AND MORE GENERAL STATISTICS
7. SOFT INFORMATION

7. CONNECT LOSS RESERVING AND PRICING

Why do so many insurance companies divorce their actuarial pricing and loss reserving groups? Pricing inforamtion should feed into the reserving process and vice versa. As Bayesians, that is, as actuaries, we should consider that the risk assumptions built into the actuarial price (note the term "actuarial price," not the market or nonsense price) should be used as an a priori indication of the loss run-off and risk, to be updated as more information comes in.

The loss payment run-off and thus the loss reserves for a given coverage year should relate to the original pricing model distributions as conditional distributions. As of a any time t, the information on reported and paid and settled claims should conditionalize the original distributional assumptions in order to update future loss payment predictions.

As a reinsurance actuary, I have to tie loss reserving and pricing together for our large contracts since special contract terms dictate both pricing and reserving. I would claim that this should be equally true for primary insurance exposure as well. Anybody doing a reasonably sophisticated actuarial job of pricing will be using risk theoretic models which should

CONNECT LOSS RESERVING AND PRICING:

AT EACH TIME t, CONSIDER:

$$\text{PROB}\{\, L(s) \mid \text{GIVEN } s \geq t \text{, THE ORIGINAL PRICING ASSUMPTIONS AND ALL RELEVANT INFORMATION THROUGH TIME } t \,\}$$

conditionalize into loss reserving models and vice versa.

CONCLUSION

There is more that can be said on this topic. But I leave you now with, once again, my list of key points. In quick review they are:

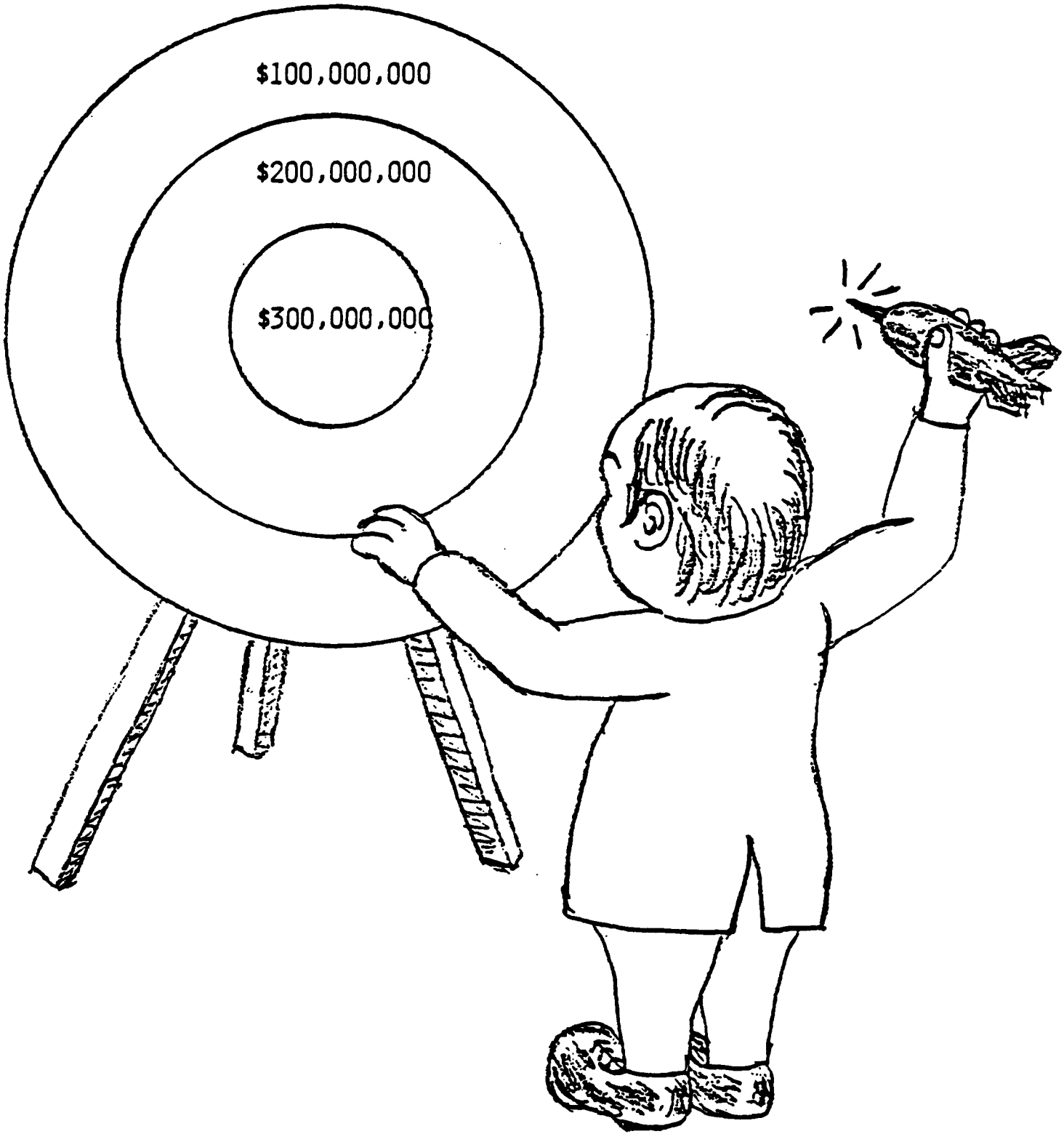
1. Use explicit models (and serve intuition)
2. Use stochastic models
3. Use fairly homogeneous exposure groups
4. Model the loss payout process
5. Model (4) via counts and amounts and lags
6. Integrate as much information as possible
7. Connect loss reserving and pricing

I also leave you with a snapshot of my poor frustrated reserving actuary trying to make sense of his company's loss liabilities and using his favorite loss reserve estimation technique. Thank you.

RISK THEORY AND LOSS RESERVING

KEY POINTS:

1. USE EXPLICIT MODELS (AND SERVE INTUITION).
2. USE STOCHASTIC MODELS.
3. USE FAIRLY HOMOGENEOUS EXPOSURE GROUPS.
4. MODEL THE LOSS PAYOUT PROCESS.
5. MODEL (4) VIA COUNTS AND AMOUNTS AND LAGS.
6. INTEGRATE AS MUCH INFORMATION AS POSSIBLE.
7. CONNECT LOSS RESERVING AND PRICING.



CASUALTY LOSS RESERVE SEMINAR: Advanced Techniques II
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ESTIMATED LOSS RESERVES AND THEIR CONFIDENCE INTERVALS

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1. OBJECTIVE: DETERMINING CONFIDENCE INTERVALS FOR ESTIMATED LOSS PAYMENTS

A. How can we estimate future loss payments?

B. Can we determine the precision of these estimates?

2. THE PROPOSED PROCEDURE: A STATISTICAL APPROACH

A. Formulate a statistical model of the accident-year by development-year loss payment matrix. Each entry in the matrix is considered to be a probability distribution.

B. Use linear regression to estimate the parameters of the model.

C. Use the residuals -- differences between actual and expected values -- to estimate confidence intervals.

3. A STATISTICAL MODEL OF LOSS PAYMENTS

A. Let P_{ij} denote the loss payment for accident year i and development year j. These are the entries in the usual paid loss triangle.

B. Assumption: $P_{ij} = T_i D_j$, where T_i is the expected total for accident year i and D_j is the expected percentage of the total paid in development year j. For example, if the expected total for accident year 1 is \$100 and 40% is typically paid in the first development year, then P_{11} = \$40.

C. Assumption: $T_i = T_1 A_i$, where T_i is the expected total for accident year 1 and $A_i = T_i/T_1$. Thus, $P_{ij} = T_1 A_i D_j$.

D. Assumption: The actual payments are randomly distributed about the expected value implied by the parameters just postulated. I will assume that this distribution is <u>lognormal</u> with a mean of 1. When this random error E_{ij} is included in the model we have

$$P_{ij} = T_1 A_i D_j E_{ij}.$$

E. A lognormal error term implies that error -- the difference between actual and expected payments -- will be proportional to the expected payment, and that equal percentage deviations -- plus or minus 10%, for example -- are equally probable. This makes intuitive sense, for we typically expect big dollar deviations when the expected payment is large, and smaller dollar deviations when the expected payment is small.

F. In order to estimate the parameters of this model by regression analysis, we need to make it additive rather than multiplicative. We do this by taking the natural logarithm of both sides, obtaining

$$\ln P_{i,j} = \ln T_i + \ln A_i + \ln D_j + \ln E_{i,j}.$$

G. If the loss payment data used in the analysis is net of salvage, subrogation, and reinsurance, some net payments may be negative, so that their logarithms do not exist. The solution is to use gross payment data and to separately analyze reinbursements. The problem of zero values in the data is handled more easily: the solution is to substitute for each zero entry a small positive number, and to give such entries a very small weight in the regression stage of the analysis (see section 4.C.3 below).

4. ESTIMATING THE PARAMETERS BY LINEAR REGRESSION

A. The parameters in the above equation can be estimated by a procedure that is sometimes called dummy variable regression. This procedure is equivalent to, but simpler than, the analysis of variance as typically practiced. To employ this procedure, we must first create a number of dummy variables -- so-called because they have values of either 1 or 0 -- one for each accident year (except for the first), and one for each development year.

B. Exhibit 1 shows an illustrative setup for regression analysis. On the left is the data -- decumulated, for reasons to be stated below. Note that for entry P_{14} we have substituted T_1, the total paid to date for accident year 1. On the right this data is repeated in the first column. The remaining columns are the dummy independent variables. The first one, a2, equals 1 whenever the corresponding payment is for accident year 2 and equals zero otherwise. The coefficient of a2 produced by the regression analysis will therefore pertain only to accident year 1. Likewise, d1 equals 1 when the data is from development year 1 and is zero otherwise, and so on. Note, by the way, that the dummy variables are denoted by lower case letters, and the corresponding parameters or regression coefficients by upper case letters.

C. An important property of using multiple regression is that it selects coefficients that maximize goodness of fit between model and data. More precisely, it minimizes the sum of the squared deviations between the actual (logged) values and those estimated

by the model. Furthermore, the regression coefficients are the best (i.e., minimum variance) linear unbiased estimates of the model's parameters. However, the correct use of multiple regression requires that certain assumptions be met, many of which have to do with the error term.

1. One requirement is that errors be normally distributed. If, as we have assumed, errors are lognormally distributed, then the term ($\ln E_{i,j}$) in the final equation will indeed meet this requirement. Tests for the normality of the error distribution exist, but will not be discussed here.

2. A second requirement is that the errors be independent of one another. Note that when the data is cumulative this requirement is violated, since an deviation in one payment will affect all subsequent accident year cumulative totals. A procedure called generalized differencing can be applied to meet this requirement, but for many purposes the use of decumulated data, as is done here, should suffice.

3. Finally, the errors must have constant variance. This requirement is seriously violated here. One would expect this to be so: if we think of the payment for each individual claim as a sample drawn from a distribution of possible payments, then the error variances should be larger in the later development years, which typically have fewer claims than do earlier years. (This problem of unequal variances is called heteroskedasticity -- a useful term for impressing one's colleagues.) Fortunately, there is a remedy: we weight each observation (and the corresponding values of the independent variables) by some number -- here the weight is $1/j$ -- that makes the variances approximately equal. After weighting the data, one then uses a variation on regression analysis called weighted regression (in which the weights are included as an additional independent variable and the intercept term is suppressed) or generalized least squares. Such a correction for heteroskedasticity is especially important because it affects the confidence intervals we will obtain.

D. Parameter estimation is an iterative process that requires careful scrutiny of the results obtained: Are the parameter estimates plausible? Are the results heavily influenced by a few extreme observations (outliers)? Are the residuals (deviations from predicted values) normally distributed? Are they independent? Do they exhibit constant variance? Do they exhibit a discernible pattern across accident, development, and calendar years? When problems are detected, corrective measures should be taken and new estimates obtained. A satisfactory fit between model and data thus depends more on the answers to these questions than on the value of some summary measure such as adjusted R-squared.

5. APPLICATION: ESTIMATING THE MODEL'S PARAMETERS

A. The data, shown in Exhibit 2, are a disguised weighted average of the countrywide paid losses for fifteen lines of business at the Hartford. Although the weights given to each line deviate from the Hartford's actual business mix, the data are intended to be typical of a large multi-line insurer. This has several implications:

   1. Goodness of fit will likely be greater, and confidence intervals narrower, for large insurers than for small ones, due to the larger number of claims involved.

   2. Confidence intervals will likely be narrower for all-lines data than for individual lines, since the residuals for the separate lines will not be perfectly correlated.

   3. Tail estimation will be more difficult for all-lines data than for individual lines taken separately.

B. The total paid to date for accident year 1974 -- 1,422 -- was substituted for the original value in development year 12, as described above. This is not reflected in Exhibit 2 or in Exhibit 3, which shows the logged data.

C. Estimation was first carried out on the unweighted observations. However, as expected, an analysis of residuals revealed the presence of heteroskedasticity. This is clearly evident in Exhibit 4, which shows the standardized residuals plotted against development year: errors are more widely distributed for the later development years. As a corrective measure, each observation was weighted by 1/development-year and new estimates were obtained using generalized least-squares.

D. The results are shown in Exhibit 5. R-squared (adjusted for degrees of freedom) is high for the weighted regression, and the value of 2.07 for the Durbin-Watson statistic indicates the absence of serial correlation (dependence between errors in successive development years). The column headed "Unwtd" displays the same statistics calculated for unweighted data but using the parameters obtained from the weighted regression. These parameters are shown on the right, separated into those that pertain to accident years and to development years, respectively. A T-statistic greater than 2.0 indicates that a coefficient significantly differs from zero. In this procedure, independent variables should <u>not</u> be eliminated when their T-value is low.

6. ESTIMATING THE TAIL

A. As shown below, the results obtained so far permit us to fill in the blank portion of the paid loss triangle in Exhibits 2 and 3. However, since payments extend beyond the eleven years to which the model applies, we need to estimate the tail. The procedure followed here is one of several that could be adopted.

B. The unlogged development year coefficients shown in the first two columns of Exhibit 6 pertain to eleven years. The first step is to adjust them so that they sum to 100%. To compensate, we also adjust the intercept coefficient so that it corresponds to the expected 11-year total payments for the first accident year. The adjusted intercept value is the log of 1,422 (total paid to date) times 99.08% (sum of unlogged development year coefficients). The initial intercept value is adjusted by -.0093 (the logarithm of 99.08%) to obtain this revised value.

C. The next step is to estimate the tail coefficients. Here I have assumed that each development-year factor (percent paid) beyond the eleventh year will have a constant ratio to the factor that preceded it. This property is almost perfectly exhibited by the first eleven factors, since their logged values (the regression coefficients) decrease almost linearly. On the right side of Exhibit 6 I estimate this ratio by finding the mean difference between the last N+1 logged factors, and I show the corresponding payment ratios. The tail factor is the size of the tail expressed as a multiple of the eleventh-year factor, and corresponds to the tail percent shown. Selecting N to be 4 produced the final development-year factors shown on the right. These factors are shown graphically in Exhibit 7.

D. The final step is to adjust the intercept so that it includes the tail. This adjustment, shown on the left of Exhibit 6, results in a final value that is the log of the expected ultimate payment total for accident year 1. Incidentally, none of these adjustments to the intercept or to the development-year factors affect the expected values obtained for the first eleven development years. This can be proven, but I won't do so here.

7. CHECKING GOODNESS OF FIT BETWEEN MODEL AND DATA

A. It is essential to check goodness of fit by examining residuals -- differences between the data and the values estimated from the (adjusted) regression coefficients. These estimated values are shown in Exhibit 8. The (unaltered) accident-year coefficients and the adjusted intercept are shown on the left, and the adjusted development-year coefficients at the top (these are the logs of the final development-year factors in Exhibit 6). The expected value in each cell equals the intercept plus the corresponding accident-year and development-year coefficients.

B. The residuals -- the actual values from Exhibit 3 less the expected values in Exhibit 8 -- are shown in Exhibit 9. On the margins of this exhibit I have divided the summed residuals by the summed expected values for each accident, development, and calendar year. These percentages are small and appear to vary randomly, as one would hope. Accident and calendar year percentages are displayed in Exhibits 10 and 11. The development year percentages are zero.

C. In Exhibit 12 the residuals and yearly totals are divided by the standard error of the estimated equation. Large (3.0 or above) positive or negative values indicate extreme values that could distort the results obtained. No such outliers are present. Incidentally, the standard error used here is that shown in the unweighted column in Exhibit 5, since we are concerned with the unweighted data and expected values.

D. One very useful property of the model used here is that it makes no a priori assumption that development-year factors or accident-year ultimates will exhibit a smooth pattern. The model should therefore achieve a better fit to the data than alternative models which assume that development-year factors conform to some given distributional form.

8. ESTIMATING ACCIDENT-YEAR ULTIMATES AND RESERVES

A. Now that we have obtained a satisfactory fit to the logged data, we can use the model to estimate expected future payments. This step is complicated, however, by the fact that simply unlogging the estimated values in Exhibit 8 will give us the median payment (rather than the mean) for each accident-yr development-year entry. Since we have assumed that the error distribution for the raw data is lognormal, using the median rather than the mean could be highly misleading.

B. The mean is equal to exp(expected log + variance/2), where the expected logs are the values in Exhibit 8. The variance of each entry in that exhibit is equal to (a) the squared standard error of the equation, plus (b) the variances of the coefficients that are summed to produce the expected log value, plus (c) the relevant covariances of these coefficients. In fact, the covariances (c), which are negative, almost perfectly offset the variances of the coefficients (b). (This may not always be true). Consequently, to simplify the analysis, I have used only (a) as the measure of the variance.

C. The resulting expected values (in dollars) are shown in Exhibit 13. The total for each row is the expected accident-year ultimate. The residuals (deviations from the original values in Exhibit 2) are shown in Exhibit 14. If the simplified procedure described above were seriously in error, the summed residuals would be large, which is not the case here. Total residuals are 0.3% of the summed expected values, as shown in the exhibit.

D. Exhibit 15 reproduces from Exhibit 13 the expected values for future payments. The total for each row is the estimated accident-year reserve, and the sum of all the values is the estimated total reserve.

9. ESTIMATING CONFIDENCE INTERVALS FOR ULTIMATES AND RESERVES

A. To estimate confidence intervals we first need to determine the variance of each estimated value in Exhibit 13. The transformation used here is variance = exp(2 x expected log + var)(exp(var)-1), where "var" denotes the variance of the logged value. But using this transformation introduces several problems:

1. This transformation would provide the correct value if we knew the exact variance of the estimated logged value. Since we have only an estimate of that variance, the result we obtain will be biased in an upward direction -- the estimated variance of the unlogged value will be too large. On the other hand, so long as the standard error of the fitted model is small (as here), the upward bias will be small. To keep the computations simple, I have not corrected for upward bias.

2. Using this transformation requires that we have an estimate of the variance of the logged value. Recall from section 8.8 that this consists of the variances of the coefficients that are summed to produce the mean plus their relevant covariances. Here again, to keep the calculations simple I have excluded these covariances from the calculations. But since these covariances are negative, another small upward bias is thereby introduced. Overall, then, the resulting variances are too large, although the distortion is not great.

3. Finally, it is difficult to determine the variance of the tail values, for that variance has two components. One is the variance around the expected value. This is easily computed, for if each tail payment has a constant ratio W to the payment in the preceding development year, then its variance is W-squared. This series of tail variances can be summed, and I have used this sum as the estimated variance of the tail payments. However, a second component of the tail variance consists of estimation error: the actual ratio W can vary around the value that we have very crudely estimated. This additional variance is difficult to estimate and has therefore been excluded from my calculations. Variances for the tail payments are therefore too small.

B. The resulting estimated variances are shown in Exhibit 16. If we add the variances in a particular row of Exhibit 16 we obtain the variance of the accident-year reserve. To obtain the variance of the total reserve we add all the variances in Exhibit 16. The standard deviation of a reserve is then the square root of its

variance. From this standard deviation we can then calculate whatever confidence interval we wish.

C. How accurate are the resulting standard deviations and the confidence intervals they imply? Various sensitivity tests not reported here indicate that they are upwardly biased (too large), but that this bias is small provided that there is a close fit between the model and the data, as indicated by a small standard error. Two comments seem appropriate. First, given our likely use of such estimates, the results appropriately err on the side of caution and conservatism. Second, since the fit between model and data is likely to increase with the number of underlying claims, the procedure used here to estimate confidence intervals is less appropriate for very small companies or lines of business with very few claims. (The procedure for estimating reserves can still be used in such cases, however.)

D. The final results are reported in Exhibit 17. The first column shows the expected ultimates seen earlier in Exhibit 13. Next are the residuals totaled from Exhibit 14. These are the deviations from expected payments that have occurred to date. The revised ultimate is the sum of these two values, and is also equal to the estimated reserve in the next column (reproduced from Exhibit 15) plus the payments made to date. Next is the standard deviation of the estimated reserve in dollars and as a percentage of the reserve and of the revised ultimate. Finally, shown on the right are the expected calendar-year payments from the reserve.

10. CONCLUSIONS

A. The procedure adopted here has two parts: (1) a statistical approach to estimating future loss payments, and (2) an extension of that approach to the calculation of confidence intervals. The first part can be used quite independently of the second.

B. The statistical approach taken here has an important implication for the way we think about expected ultimates. The fact that deviations occur so that we must revised our estimates does not necessarily mean that our original estimates were wrong. Consider the analogous case of a fair roulette wheel. If we plan to make a series of, say, a hundred bets on red or black, our initial expectation is that we will break even. But after fifty bets we may have a net loss of, say, five dollars. Because we still expect to break even on the remaining fifty bets, our revised expectation is to end with a net loss of five dollars. But although we have revised our expectation, our original expectation was nonetheless correct given the information available at the time.

C. For a typical large multi-line insurer, the standard deviation of its loss reserve is about 3% of the reserve. Although the method used to obtain this result is not exact, the estimate we have

obtained is consistent with the willingness of actuaries to state with high confidence that a particular company is underreserved. Not long ago one heard frequent and confident statements that particular companies were underreserved by about 10%. That is about three times the standard deviation obtained here, which implies a probability of about 99% that such a company is in fact underreserved by some amount.

D. The procedure employed here to estimate confidence intervals presumes a preference for simplicity over precision. The results will therefore have a small upward bias. However, a final and crucial caveat is in order. Any confidence interval estimated from historical data, by whatever procedure, implicitly assumes that the underlying processes in the world that create payment variability will remain stable. In fact, of course, the legal, regulatory, and company-specific processes that generate claim payments can change very rapidly in ways that render history obsolete as a guide. In particular, changes in these processes that affect all claims falsify the underlying assumption that the error distributions for separate accident- and development-year payments are independent of one another. When such changes occur, confidence intervals estimated from historical data, no matter how precise, will turn to be much too narrow.

I am greatly indebted to Mike Lovell, of Wesleyan University, for his many valuable comments and suggestions concerning the work on which this presentation is based. Papers and presentations by Steve Philbrick, Tapan Roy, Greg Taylor, and Robert Finger have also been extremely helpful. Specific citations will be supplied in a subsequent version of this paper.

Exhibit 1

VARIABLES	DEVELOPMENT YEAR			
	1	2	3	TOT
ACCIDENT YEAR				
1	P11	P12	P13	[T1]
2	P21	P22	P23	
3	P31	P32		
4	P41			

Pij = Paid loss (decumulated) for accident year i, dev't year j.

T1 = Total paid to date for accident year 1 [replaces P14].

Am = Accident-year dummy variable: 1 when m = i; 0 otherwise.

Dn = Development-year dummy variable: 1 when n = j; 0 otherwise.

	Independent Variables					
Pij	a2	a3	a4	d1	d2	d3
P11	0	0	0	1	0	0
P21	1	0	0	1	0	0
P31	0	1	0	1	0	0
P41	0	0	1	1	0	0
P12	0	0	0	0	1	0
P22	1	0	0	0	1	0
P32	0	1	0	0	1	0
P13	0	0	0	0	0	1
P23	1	0	0	0	0	1
[T1]	0	0	0	0	0	0

MODEL: (ln Pij) = (ln U1) + (ln Ai) + (ln Dj) + (ln Eij)

data | intercept | coefficents | error

Exhibit 2

PAID LOSSES		DEVELOPMENT YEAR											
ACC YR	TOTAL PD	1	2	3	4	5	6	7	8	9	10	11	12
74	1,422	611	350	134	98	62	52	38	26	16	13	15	7
75	1,364	617	307	132	87	63	44	38	28	14	16	16	
76	1,264	564	305	120	79	63	48	37	20	14	16		
77	1,261	560	301	128	88	69	46	30	20	19			
78	1,373	601	328	147	113	67	58	38	22				
79	1,559	706	380	177	122	80	58	36					
80	1,614	763	413	179	114	79	66						
81	1,659	841	430	174	124	90							
82	1,590	869	405	184	132								
83	1,608	829	546	233									
84	1,470	904	565										
85	982	982											

Exhibit 3

LOGGED VALUES	DEVELOPMENT YEAR											
ACC YR	1	2	3	4	5	6	7	8	9	10	11	12
74	6.415	5.859	4.901	4.585	4.123	3.955	3.637	3.267	2.765	2.528	2.718	1.909
75	6.425	5.728	4.883	4.471	4.150	3.794	3.632	3.341	2.669	2.794	2.750	
76	6.335	5.719	4.785	4.369	4.136	3.870	3.610	2.972	2.610	2.781		
77	6.328	5.709	4.854	4.472	4.230	3.833	3.399	3.014	2.938			
78	6.399	5.793	4.992	4.723	4.198	4.058	3.626	3.102				
79	6.559	5.940	5.178	4.807	4.383	4.055	3.591					
80	6.637	6.024	5.188	4.740	4.365	4.186						
81	6.734	6.065	5.159	4.817	4.499							
82	6.768	6.003	5.215	4.884								
83	6.720	6.302	5.452									
84	6.807	6.337										
85	6.889											

Exhibit 4

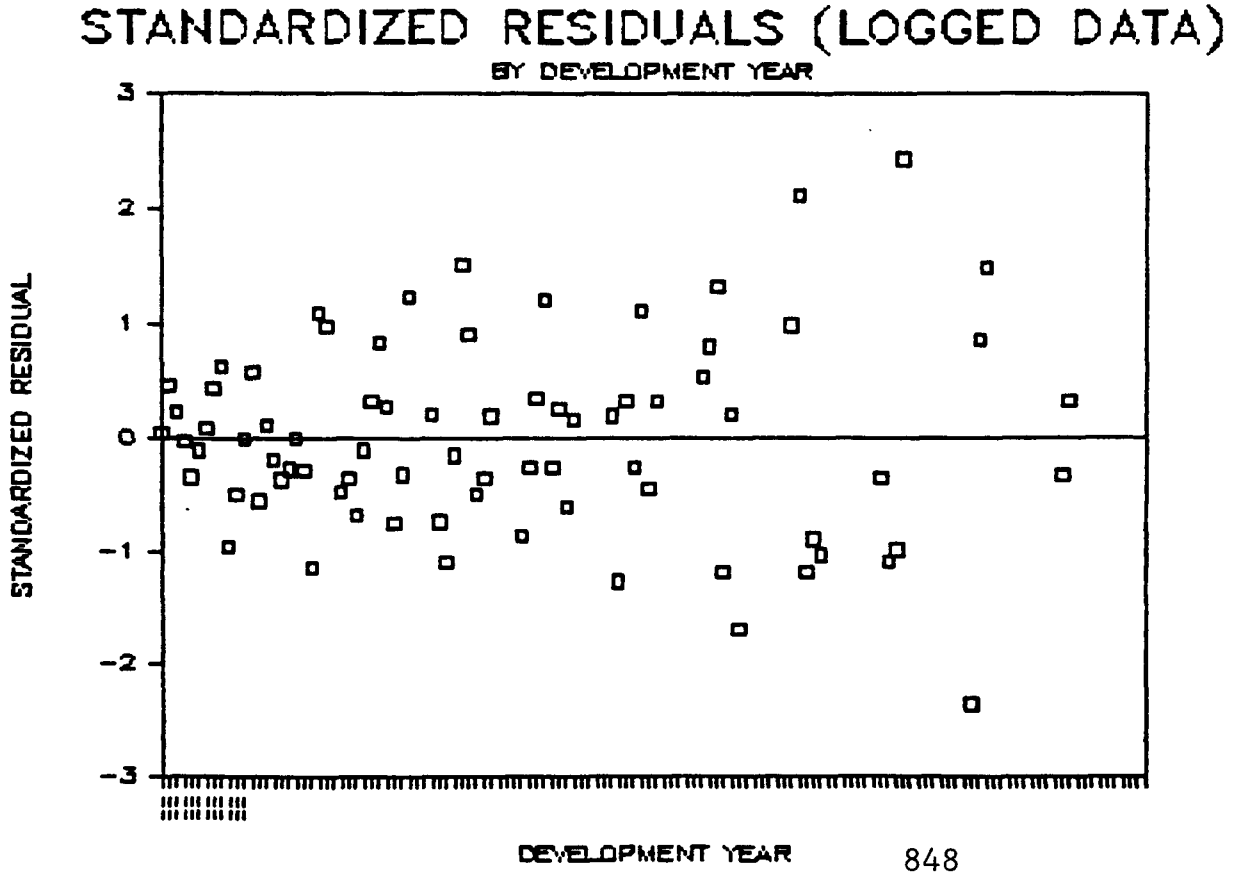

Exhibit 5

REGRESSION MODEL			Unwtd	Weighted
N =	78	ADJ R-SQ:	0.995	0.999
VARS =	22	ERROR SS:	0.453	0.099
DF =	55	D-W:	2.288	2.070
WEIGHT =	1/DEV YR	STD ERROR:	0.091	0.042

Weighted regression (generalized least-squares, or GLS) was used to correct for heteroskedasticity (the error variance increases with the development year). However, the standard error of the unweighted equation is used in calculating expected payments.

COEFFICIENTS					
ACC YR COEFS	STANDARD ERROR	T (COEF/SE)	DEV YR COEFS	STANDARD ERROR	T (COEF/SE)
7.2553	0.1472	49.3			
-0.0280	0.0346	-0.8	-0.8449	0.1497	-5.6
-0.0971	0.0350	-2.8	-1.4492	0.1503	-9.6
-0.0804	0.0354	-2.3	-2.3118	0.1509	-15.3
0.0197	0.0359	0.5	-2.6894	0.1518	-17.7
0.1584	0.0364	4.4	-3.0542	0.1528	-20.0
0.2185	0.0370	5.9	-3.3182	0.1541	-21.5
0.2837	0.0379	7.5	-3.6681	0.1559	-23.5
0.3005	0.0390	7.7	-4.0789	0.1583	-25.8
0.3967	0.0406	9.8	-4.4585	0.1618	-27.5
0.4417	0.0435	10.2	-4.5125	0.1676	-26.9
0.4791	0.0505	9.5	-4.5072	0.1786	-25.2

Exhibit 6

TAIL ESTIMATION			
DEVT YEAR	EST. PAID %	ADJ. PAID %	INTERCEPT ADJUSTMENTS
1	42.96%	43.36%	These adjustments do not
2	23.48%	23.69%	change expected values.
3	9.91%	10.00%	
4	6.79%	6.86%	
5	4.72%	4.76%	Initial value 7.2553
6	3.62%	3.66%	
7	2.55%	2.58%	Adj't for
8	1.69%	1.71%	11-yr total -0.0093
9	1.16%	1.17%	
10	1.10%	1.11%	Tail Adj't 0.0466
11	1.10%	1.11%	
			FINAL VALUE 7.2926
TOTAL	99.08%	100.00%	

VALUES SELECTED					VAR MULT
4	-0.2098	81.08%	4.28	4.55%	1.92

N	MEAN DIFF	PAYMENT RATIO	TAIL FACTOR	TAIL PERCENT	DEVT YEAR	FINAL PAID %
10	-0.3662	69.33%	2.26	2.46%	1	41.39%
9	-0.3398	71.19%	2.47	2.68%	2	22.62%
8	-0.2744	76.00%	3.17	3.41%	3	9.55%
7	-0.2597	77.13%	3.37	3.62%	4	6.54%
6	-0.2422	78.49%	3.65	3.90%	5	4.54%
5	-0.2378	78.84%	3.73	3.98%	6	3.49%
4	-0.2098	81.08%	4.28	4.55%	7	2.46%
3	-0.1428	86.69%	6.52	6.76%	8	1.63%
2	-0.0244	97.59%	40.51	31.08%	9	1.12%
1	0.0053	100.53%	-189.76	189.90%	10	1.06%
					11	1.06%
					12+	4.55%

Exhibit 7

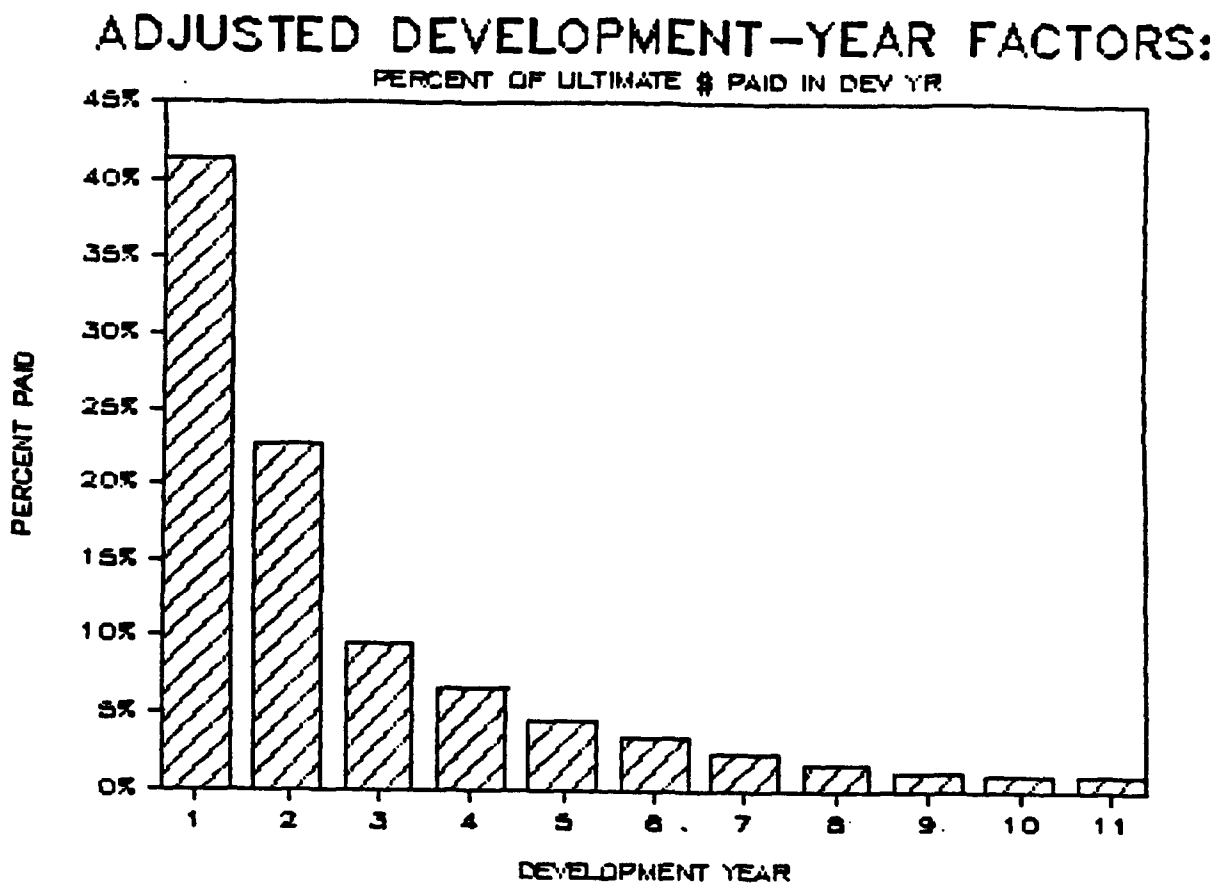

Exhibit 8

EXPECTED VALUES		DEVELOPMENT YEAR											
ACC YR	COEFF	1 -0.8822	2 -1.4865	3 -2.3491	4 -2.7267	5 -3.0915	6 -3.3555	7 -3.7054	8 -4.1162	9 -4.4958	10 -4.5498	11 -4.5445	12+ -3.0896
	7.2926												
74	----	6.410	5.806	4.943	4.566	4.201	3.937	3.587	3.176	2.797	2.743	2.748	4.203
75	-0.0280	6.382	5.778	4.915	4.538	4.173	3.909	3.559	3.148	2.769	2.715	2.720	4.175
76	-0.0971	6.313	5.709	4.846	4.469	4.104	3.840	3.490	3.079	2.700	2.646	2.651	4.106
77	-0.0804	6.330	5.726	4.863	4.485	4.121	3.857	3.507	3.096	2.716	2.662	2.668	4.122
78	0.0197	6.430	5.826	4.963	4.585	4.221	3.957	3.607	3.196	2.816	2.762	2.768	4.223
79	0.1584	6.569	5.964	5.102	4.724	4.360	4.095	3.746	3.335	2.955	2.901	2.906	4.361
80	0.2185	6.629	6.025	5.162	4.784	4.420	4.155	3.806	3.395	3.015	2.961	2.966	4.421
81	0.2837	6.694	6.090	5.227	4.849	4.485	4.221	3.871	3.460	3.080	3.026	3.032	4.487
82	0.3005	6.711	6.107	5.244	4.866	4.502	4.237	3.888	3.477	3.097	3.043	3.048	4.503
83	0.3967	6.807	6.203	5.340	4.963	4.598	4.334	3.984	3.573	3.194	3.139	3.145	4.600
84	0.4417	6.852	6.248	5.385	5.007	4.643	4.379	4.029	3.618	3.238	3.184	3.190	4.645
85	0.4791	6.889	6.285	5.423	5.045	4.680	4.416	4.066	3.655	3.276	3.222	3.227	4.682

Exhibit 9

RESIDUALS		DEVELOPMENT YEAR											CALENDAR YEAR
ACC YR	RES/EXP	1	2	3	4	5	6	7	8	9	10	11	RES/EXP
74	-0.4%	0.005	0.053	-0.042	0.019	-0.078	0.018	0.049	0.090	-0.032	-0.215	-0.030	0.1%
75	0.1%	0.042	-0.050	-0.032	-0.067	-0.023	-0.115	0.073	0.193	-0.100	0.079	0.030	0.2%
76	.0%	0.022	0.011	-0.062	-0.100	0.032	0.030	0.120	-0.107	-0.090	0.136		-0.4%
77	0.2%	-0.002	-0.017	-0.009	-0.014	0.110	-0.024	-0.108	-0.081	0.222			.0%
78	0.3%	-0.031	-0.033	0.029	0.138	-0.023	0.101	0.019	-0.094				-1.0%
79	-0.1%	-0.010	-0.024	0.076	0.083	0.023	-0.041	-0.154					-0.5%
80	-0.1%	0.009	.000	0.026	-0.045	-0.055	0.030						-0.1%
81	-0.3%	0.040	-0.025	-0.068	-0.032	0.014							1.5%
82	-0.3%	0.057	-0.103	-0.029	0.018								0.9%
83	0.7%	-0.087	0.100	0.112									-1.6%
84	0.3%	-0.045	0.089										-0.4%
85	.0%	.000											0.9%
	RES/EXP:	.0%	.0%	.0%	.0%	.0%	.0%	.0%	.0%	.0%	.0%	.0%	.0%

Exhibit 10

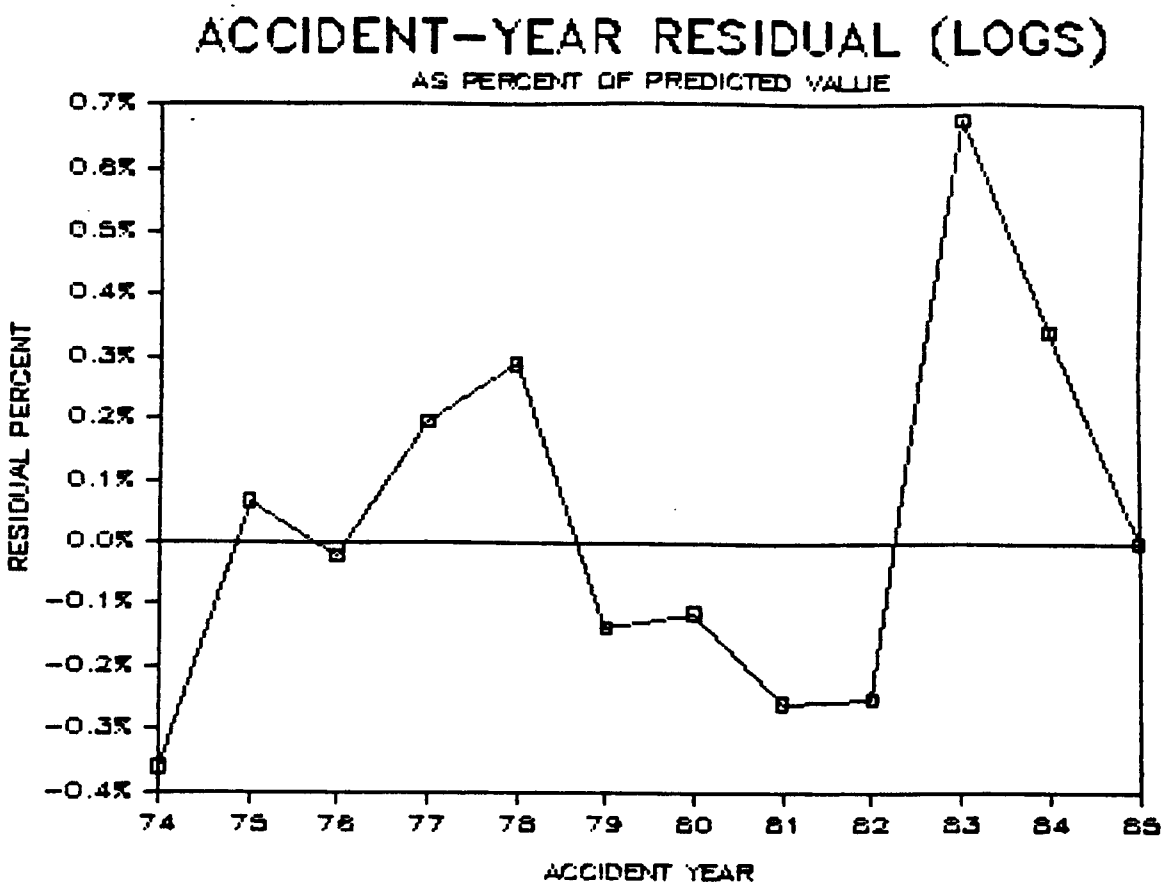

Exhibit 11

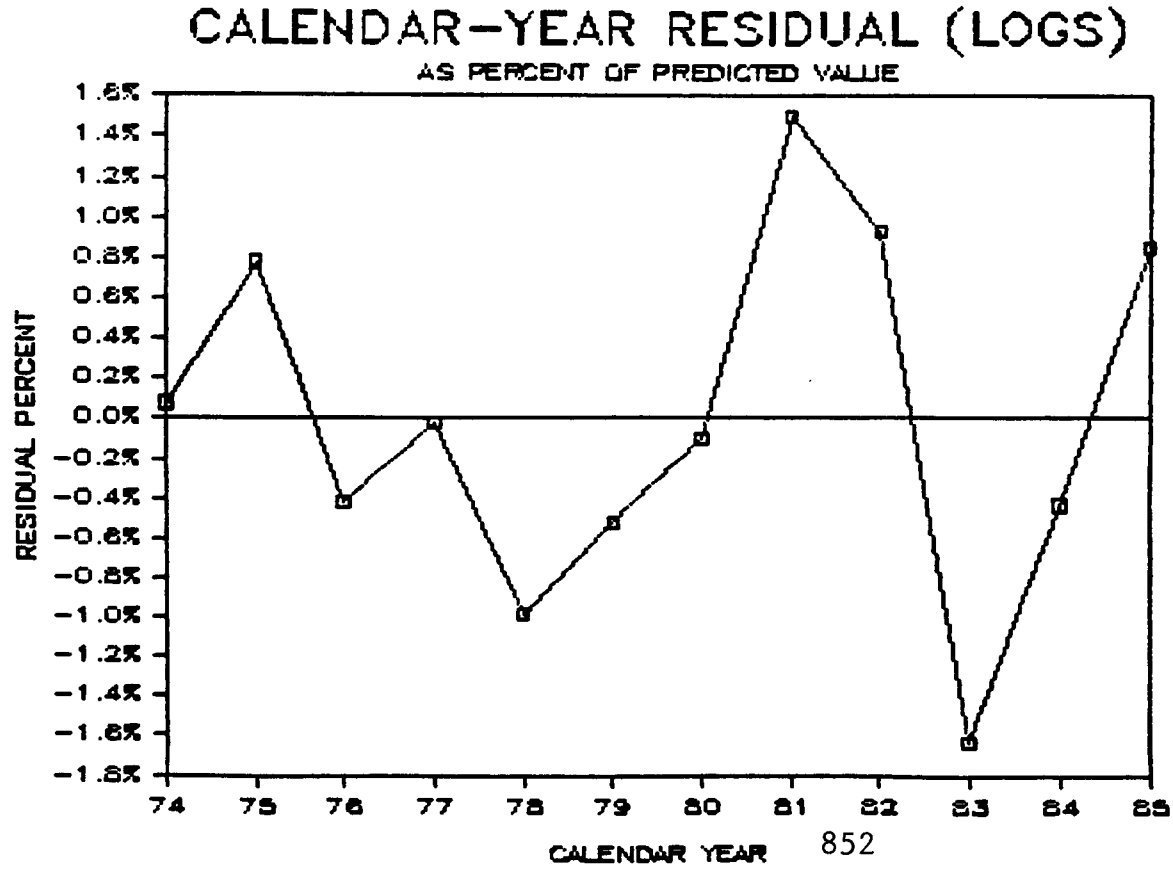

Exhibit 12

RESIDUALS/STD ERR		DEVELOPMENT YEAR											
ACC YR	AY TOT	1	2	3	4	5	6	7	8	9	10	11	CAL YR TOTAL
74	-0.5	0.1	0.6	-0.5	0.2	-0.9	0.2	0.5	1.0	-0.4	-2.4	-0.3	0.1
75	0.1	0.5	-0.5	-0.4	-0.7	-0.3	-1.3	0.8	2.1	-1.1	0.9	0.3	0.7
76	.0	0.2	0.1	-0.7	-1.1	0.4	0.3	1.3	-1.2	-1.0	1.5		-0.5
77	0.3	.0	-0.2	-0.1	-0.2	1.2	-0.3	-1.2	-0.9	2.4			.0
78	0.4	-0.3	-0.4	0.3	1.5	-0.3	1.1	0.2	-1.0				-1.3
79	-0.2	-0.1	-0.3	0.8	0.9	0.3	-0.4	-1.7					-0.7
80	-0.2	0.1	.0	0.3	-0.5	-0.6	0.3						-0.1
81	-0.3	0.4	-0.3	-0.8	-0.4	0.2							2.2
82	-0.3	0.6	-1.1	-0.3	0.2								1.4
83	0.8	-1.0	1.1	1.2									-2.5
84	0.3	-0.5	1.0										-0.7
85	.0	.0											1.3
	DEV YR TOT:	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0

Exhibit 13

EXPECTED VALUES		DEVELOPMENT YEAR											
ACC YR	ULTIMATE	1 41.39%	2 22.62%	3 9.55%	4 6.54%	5 4.54%	6 3.49%	7 2.46%	8 1.63%	9 1.12%	10 1.06%	11 1.06%	12+ 4.55%
74	1,475	611	334	141	97	67	51	36	24	16	16	16	67
75	1,435	594	324	137	94	65	50	35	23	16	15	15	65
76	1,339	554	303	128	88	61	47	33	22	15	14	14	61
77	1,361	563	308	130	89	62	47	33	22	15	14	14	62
78	1,505	623	340	144	98	68	52	37	25	17	16	16	68
79	1,729	715	391	165	113	79	60	43	28	19	18	18	79
80	1,836	760	415	175	120	83	64	45	30	20	19	20	84
81	1,959	811	443	187	128	89	68	48	32	22	21	21	89
82	1,993	825	451	190	130	91	70	49	32	22	21	21	91
83	2,194	908	496	209	144	100	77	54	36	24	23	23	100
84	2,295	950	519	219	150	104	80	56	37	26	24	24	104
85	2,382	986	539	227	156	108	83	59	39	27	25	25	108

Exhibit 14

RESIDUALS		DEVELOPMENT YEAR											CALENDAR YEAR
ACC YR	RES/EXP	1	2	3	4	5	6	7	8	9	10	11	RES/EXP
74	0.5%	0	17	-6	1	-5	1	2	2	-1	-3	-1	0.1%
75	-0.4%	23	-17	-5	-6	-2	-6	3	5	-2	1	0	4.3%
76	.0%	10	2	-8	-9	2	1	4	-2	-1	2		-1.3%
77	-0.7%	-3	-6	-2	-2	7	-1	-4	-2	4			-0.4%
78	-1.0%	-22	-12	4	14	-2	5	1	-2				-3.9%
79	-0.4%	-10	-11	12	9	2	-3	-6					-2.4%
80	-0.2%	3	-2	4	-6	-5	2						-0.5%
81	.0%	30	-13	-13	-5	1							4.1%
82	-0.4%	45	-46	-6	2								2.9%
83	-0.3%	-79	50	24									-7.8%
84	0.1%	-45	46										-0.8%
85	-0.4%	-4											3.2%
	RES/PRED:	-0.6%	0.2%	0.2%	.0%	-0.5%	-0.2%	-0.4%	0.5%	0.3%	0.2%	-0.4%	-0.3%

Exhibit 15

EXPECTED VALUES		DEVELOPMENT YEAR											
ACC YR	RESERVE	1	2	3	4	5	6	7	8	9	10	11	12+
74	67												67
75	65												65
76	75											14	61
77	91										14	14	62
78	117									17	16	16	68
79	163								28	19	18	18	79
80	218							45	30	20	19	20	84
81	301						68	48	32	22	21	21	89
82	397					91	70	49	32	22	21	21	91
83	580				144	100	77	54	36	24	23	23	100
84	826			219	150	104	80	56	37	26	24	24	104
85	1,396		539	227	156	108	83	59	39	27	25	25	108
TOTAL:	4,297												

Exhibit 16

VARIANCES

ACC YR	DEVELOPMENT YEAR 1	2	3	4	5	6	7	8	9	10	11	12+
74												15
75												14
76											6	12
77										7	7	13
78									9	8	8	16
79								25	12	11	11	21
80							65	29	13	12	12	23
81						149	74	33	15	14	14	27
82					263	155	77	34	16	14	14	28
83				666	321	189	94	41	19	17	18	34
84			1,583	744	359	211	105	46	22	19	20	38
85		8,814	1,570	738	356	210	104	46	21	19	19	37

Exhibit 17

SUMMARY

ACC YR	EXP ULT	RESIDS	REVISED ULTIMATE	ESTIMATED RESERVE	STD DEV	STD DEV AS % OF RESERVE	STD DEV AS % OF REV ULT
74	1,475	7	1,483	67	4	5.7%	0.3%
75	1,435	-5	1,429	65	4	5.7%	0.3%
76	1,339	0	1,339	75	4	5.8%	0.3%
77	1,361	-9	1,352	91	5	5.6%	0.4%
78	1,505	-14	1,490	117	6	5.4%	0.4%
79	1,729	-7	1,722	163	9	5.5%	0.5%
80	1,836	-3	1,832	218	12	5.7%	0.7%
81	1,959	1	1,960	301	18	6.0%	0.9%
82	1,993	-6	1,987	397	25	6.2%	1.2%
83	2,194	-6	2,188	580	37	6.4%	1.7%
84	2,295	1	2,296	826	56	6.8%	2.4%
85	2,382	-4	2,378	1,396	109	7.8%	4.6%
TOTAL:	21,502	-45	21,457	4,297	133	3.1%	0.6%

CAL YR	PAYMENT	% OF RES	STD DEV OF PMT
86	1,202	28.0%	9.0%
87	704	16.4%	7.7%
88	508	11.8%	
89	376	8.8%	
90	287	6.7%	
91	218	5.1%	
92	171	4.0%	
93	142	3.3%	
94	123	2.9%	
95	105	2.4%	
96	85	2.0%	
97	68	1.6%	
	3988	92.8%	

REGRESSION MODELS IN CLAIMS ANALYSIS

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PREFACE. The following is a highly condensed version of the paper "Regression models in claims analysis", presented to the Casualty Loss Reserve Seminar. The complete version of the paper has been submitted for publication in the Proceedings of the Casualty Actuarial Society.

In the following summary, the section and equation numbering of the full paper has been maintained. As a result, the equation numbers appearing here do not run consecutively.

Large tracts of the complete paper are omitted from the present condensed version. References here such as "Section 2 considers a couple of examples ..." relate to the contents of the full paper.

1. INTRODUCTION

Regression models have been less prevalent than might have been the case in claims analysis leading to loss reserving.

The scarcity possibly arises from the suspicion with which many actuaries regard such models. Their use does not have the "hands on" nature characteristic of methods based on age-to-age factors for example, and with which actuaries tend to feel at ease. There is a feeling perhaps, when such models are used, of abstractness and of loss of control in the estimation of parameters from the data.

Some expansion of this theme is given.

The following sections, which can hardly be regarded as an exhaustive coverage of the material, deal very briefly with such questions as:

(i) why use regression models as opposed to the "traditional" actuarial ones such as those using age-to-age factors?

(ii) precisely what criteria are to be satisfied, and how should the extent to which they are satisfied be assessed?

(iii) how many of the available predictors should be included in a regression model and how should the choice be made?

(iv) what procedures, other than ordinary least squares regression, are available for fitting the selected model to data?

(v) how might be impact on the fitting of isolated rogue data points be assessed, and how might the fitting procedures be modified to reduce this impact?

2. MOTIVATING EXAMPLES

Section 2 considers a couple of examples intended to motivate the use of regression in claims models. The details of these examples are omitted here, but they do raise two issues:

(i) generally, regression procedures involve estimation of smaller numbers of parameters than is the case for more traditional actuarial procedures;

(ii) because of this, regression models tend to be rather more crude representations of reality.

Losses of accuracy in the representation of reality mentioned in (ii) cannot be considered in isolation from possible gains in stability accruing from a reduction in the number of model parameters requiring estimation. In formal terms, the approximation of a realistic model by a simplified regression model may introduce some **bias** into the model, but this bias must be weighed against any reduction in **variability** of the model's predictions.

These matters are pursued in Section 4. A helpful preliminary to this is an examination and classification of the types of error that arise in the prediction of future observations on the basis of a model fitted to past data. This forms the subject to Section 3.

3. ERRORS OF PREDICTIONS

3.1. Illustrative example

An example is given of the sort of ad hoc analysis of second moments of loss reserves occasionally met in practice.

3.2. Component errors of prediction

Let Y denote an observable n-vector whose i-th component is, apart from random noise, some function of observable quantities $X_{i1},\ldots,X_{ip}$:

$$Y = f(X) + e, \tag{3.2.1}$$

where X is the nxp matrix with X_{ij} as (i,j)-element, f: $R^{np} \to R^{n}$ has the particular (possibly non-linear) form described above and e is a random error term with zero mean.

Suppose that the functional form f is unknown in this context and consider linear approximations Xb to f(X) where b is a p-vector of parameters. Then (3.2.1) becomes:

$$Y = Xb + [f(X) - Xb] + e. \tag{3.2.2}$$

Suppose further that the exact set of independent variables on which Y depends (the columns of X) is unknown, and that as a consequence Y is modelled as a linear function of a subset of Y, i.e. Y_i is modelled by

$$\sum_{j\in A} X_{ij}\, b_j \tag{3.2.3}$$

for some $A \subset \{1,2,\ldots,p\}$ instead of by $\sum_{i=1}^{p} X_{ij}\, b_j$.

Let (3.2.3) be denoted by $X_A\ b_A$, whereupon (3.2.2) decomposes as:

$$Y = X_A\ b_A + X_B\ b_B + [f(X) - Xb] + e, \tag{3.2.4}$$

where B denotes the set {1,2,...,p} - A.

Let $\hat{b}_j$ denote the regression estimate of b_j, where the term "regression estimate" is deliberately left vague for the moment. Let X^* denote an mxp matrix each column of which represents m further values of the relevant predictor. The task is to predict the m-vector

$$Y^* = f^*(X^*) + e^*, \tag{3.2.5}$$

where now $f^*: R^{mp} \to R^m$.

Corresponding to (3.2.4):

$$Y^* = X_A^* b_A + X_B^* b_B + [f^*(X^*) - X^* b] + e^* \tag{3.2.6}$$

Let $\hat{Y}^*$ be the regression prediction of Y^*:

$$\hat{Y}^* = X_A^* \hat{b}_A, \tag{3.2.7}$$

so that the **prediction error** is:

$$Y^* - \hat{Y}^* = X_A^*(b_A - \hat{b}_A) + X_B^* b_B + [f^*(X^*) - X^* b] + e^*.$$

$$= X_A^*(E\hat{b}_A - \hat{b}_A) + [X_A^*(b_A - Eb_A) + X_B^* b_B] + [f^*(X^*) - X^* b] + e^*. \tag{3.2.8}$$

In many applications X represents observation of the predictors in the **past**, and X^* values to be assumed by the same predictors in the **future**.

At this point it is convenient to stop and consider the components of prediction error appearing on the right side of (3.2.8). They are:

(i) the **specification error** $[f^*(X^*) - X^*b]$ essentially due to unmodelled nonlinearity;

(ii) the **selection error** $[X_B^* b_B + X_A^*(b_A - E\hat{b}_A)]$ due to incorrect selection of predictors;

(iii) the **estimation error** $X_A^*(E\hat{b}_A - \hat{b}_A)$ arising from the fact that even the most efficient estimators of the regression coefficients are still only random variables;

(iv) the **statistical error** e^* reflecting the inherent random noise in the process.

3.3. Prediction bias and mean square error of prediction

Let us now consider the **prediction bias** $E\hat{Y}^* - EY^*$ and the mean **square error of prediction** (MSEP)

$$E(Y^* - \hat{Y}^*)^2 = E(Y^* - \hat{Y}^*)^T (Y^* - \hat{Y}^*).$$

It is then shown that

$$\text{MSEP} = E(e^*)^2 + E[X^*(\hat{b}_A - E\hat{b}_A)]^2 + (\text{prediction bias})^2. \quad (3.3.3)$$

The MSEP is thus seen to comprise three identifiable contributions deriving from:

(i) statistical error;

(ii) estimation error;

(iii) prediction bias (incorporating specification error and selection error).

3.4. Components of selection error

Section 3.2 defined selection error as the term $[X_B^* b_B + X_A^*(b_A - E\hat{b}_A)]$ in (3.2.8).

It must now be recognised that $E\hat{b}_A$ has been implicitly regarded as an **unconditional expectation** in the above. Usually, A will be chosen because it produces a better fit of model to data than certain other sets.

In this case,

$$E\hat{b}_A = E[\hat{b}_A|P] + \{E\hat{b}_A - E[\hat{b}_A|P]\}, \qquad (3.4.1)$$

where $E\hat{b}_A$ is now explicitly the unconditional expectation of $\hat{b}_A$ and P denotes the procedure for subset selection. Substitution of (3.4.1) in the expression for selection error given at the start of this subsection yields:

$$\text{selection bias} = X_B^* b_B + X_A^*\{b_A - E[\hat{b}_A|P]\} + X_A^*\{E[\hat{b}_A|P] - E\hat{b}_A\}. \qquad (3.4.2)$$

There are now three contributions to selection bias:

(i) **omission bias,** consisting of the first two members on the right of (3.4.2), and representing the bias due to the omission of the set B of predictors;

(ii) **stopping rule bias,** consisting of that part of the final member of (3.4.2) which arises from the limitation imposed by P on the number of predictors included in A;

(iii) **competition bias,** consisting of that part of the final member of (3.4.2) which, for a given size of set A, arises from the manner in which P selects A from subsets of A∪B of that size.

A numerical example of competition bias is given.

Some posible remedies for competition bias are discussed. They are:

(i) using half of the data to select predictors and the other half to fit the model;

(ii) using jackknife or bootstrap methods (see Section 5 of the present paper);

(iii) using shrunken estimators of the ridge or Stein type;

(iv) using simulation to estimate bias;

(v) using maximum likelihood estimation of regression coefficients taking the subset selection procedure P into account in the likelihood.

4. SUBSET SELECTION

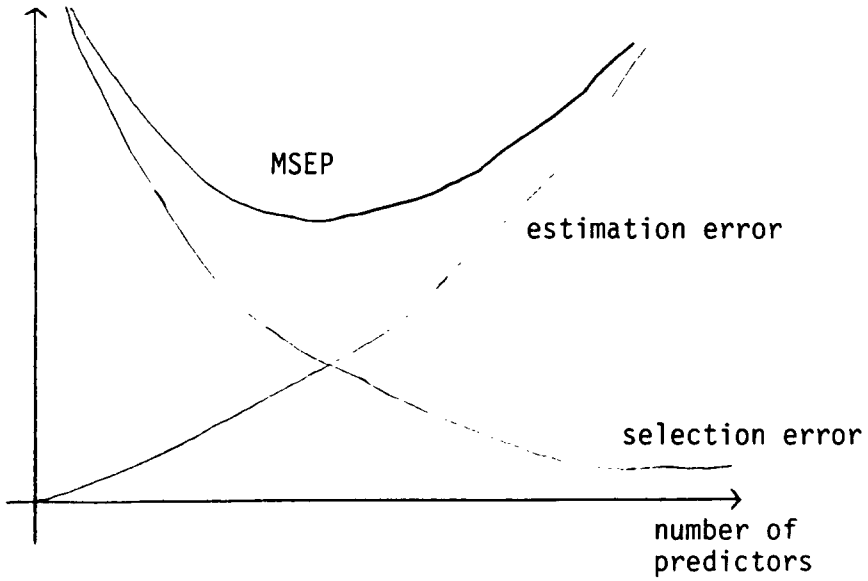
4.1. General

Consider the method by which the subset A of predictors (in the terminology of Section 3) might be chosen. What criterion might be adopted?

It turns out that, broadly, estimation error increases as the set of predictors increases. This is intuitive. The more predictors need to be fitted to a fixed number of data points, the more difficult the fitting becomes. As the number of predictors becomes too large, the phenomenon of over-fitting mentioned in Section 2 becomes more in evidence.

In the extreme case in which the numbers of data points and predictors are roughly equal, the whole fitting procedure is concentrated on achieving adherence of model to past observation. The model is then being fitted to the random noise of past observation as well as the underlying signal, with consequent loss of predictive power. That is, estimation error is increased.

The opposite effects on selection error and estimation error of increasing the number of predictors are illustrated by the following diagram.



This indicates the existence of an optimal subset of available predictors in the sense of minimizing MSEP. The next couple of sub-sections deal with simple statistics aimed at facilitating the selection of the subset which is optimal; or, more realistically, which is not too far sub-optimal.

4.2. Mallows' C_p statistic

A somewhat simplified version of (3.3.3) is:

$$\Delta = E(EY^*-\hat{Y}^*)^2 = E(\hat{Y}^*-E\hat{Y}^*)^2 + (\text{prediction bias})^2$$

$$= \text{estimation error} + \text{prediction error.} \qquad (4.2.2)$$

In the following, let a subscript q indicate that the quantity under consideration relates to a model based on q of the available predictors (one of them representing a constant term, i.e. a constant column of X).

Using the usual definition of residual sum of squares (RSS) is:

$$RSS = (Y-\hat{Y})^2,$$

and letting σ^2 denote the variance of each of the (independent) components of e, one finds that:

$$C_q = RSS_q/\hat{\sigma}^2 + 2q-n, \qquad (4.2.5)$$

with $\hat{\sigma}^2$ a suitable estimator of σ^2, will be an approximately unbiased estimator of Δ_q/σ^2. Then minimization of MSEP, equivalently of Δ_q, will be approximately achieved by selection of the subset of predictors which minimizes C_q defined by (4.2.5).

4.3. Breiman and Freedman S_p statistic

Breiman and Freedman (1983) consider a situation similar to that of Section 4.2. In their case, however, the elements of the design matrix X are random variables.

Just as in Section 4.2, the quality of the regression is assessed by reference to the MSEP, though in the presence of random variation of X this requires further definition. Breiman and Freedman define

$$MSEP = E[E[Y^* - \hat{Y}^*)^2 | X,Y]], \qquad (4.3.2)$$

where the outer expectation operator is unconditional, i.e. averages over the data X, Y.

Breiman and Freedman show that MSEP is estimated by:

$$S_q = (n-q)^{-1}(RSS)[1+q/(n-1-q)]. \qquad (4.3.6)$$

In application of S_p, the subset of regression predictors is selected from those available in such a way as to minimize S_p.

The paper considers the relative merits of C_p and S_p. The effect of competition bias on their application is also considered.

4.4. Spjøtvoll's goodness-of-fit

Spjøtvoll (1972) provides a test of the goodness-of-fit of one subset of predictors relative to another.

Spjøtvoll's measure of goodness-of-fit is

$$(Xb - X_A E\hat{b}_A)^T (Xb - X_A E\hat{b}_A)$$

$$= (Xb)^T(Xb) - (Xb)^T X_A(X_A^T X_A)^{-1} X_A^T(Xb). \qquad (4.4.1)$$

A modification of this measure suggested in the literature is discussed. Then different subsets of predictors, say M and N, are compared by means of the statistic:

$$G_{MN} = b^T C_{MN} b - (q_M - q_N)\sigma^2, \qquad (4.4.5)$$

where C_{MN} is an appropriately chosen p x p matrix.

Spjøtvoll goes on to develop maximum and minimum values for G_{MN} conditional upon b lying within a $(1-\alpha)$ confidence set of the form:

$$Pr[(b-\hat{b})^T X^T X(b-\hat{b}) \leqslant k] = 1 - \alpha,$$

where $\hat{b}$ is the regression estimate of b in the **full** model.

These limits on G_{MN} may be used to test whether M provides a significantly better or worse fit than N to the data.

5. METHODS OF ESTIMATION OF SECOND MOMENTS OF LOSS RESERVES

5.1. General

This section considers methods by which MSEP of loss reserves can be estimated.

Typically, in the context of (3.3.3), Y^* will be some vector of future claim payments, subdivided for example according to year of occurrence and development year. In such a case, the estimated loss reserve would be:

$$\hat{R} = 1^T\hat{Y}^*, \tag{5.1.1}$$

where 1 is an m-vector with every component equal to unity.

Then (3.3.3) is replaced by:

$$MSEP(R) = 1^T E(e^*)^2\, 1 + 1^T E[X^*(\hat{b}_A - E\hat{b}_A)]^2\, 1 + (\text{prediction bias})^2. \tag{5.1.2}$$

The usual situation is therefore that the first two members on the right of (5.1.2) can be evaluated in systematic manner but only informal allowance can be made for the third. There are several approaches to this evaluation. Brief details are given in the next few subsections.

5.2. Parametric estimation

The basic linear model:

$$Y = Xb+e$$

will be referred to here as the parametric model - parametric in the sense that the error term e is assumed to have certain (usually parametric) properties.

If e is well-defined, then its parameters (e.g. σ^2) may be estimated from the data, and hence the first two components of MSEP(R) in (5.1.2) estimated. Logically, this is straightforward even if the algebraic manipulation involved may be cumbersome occasionally.

The calculations involved in this procedure are quite manageable with just about any reputable regression package. Naturally, the results are reliable only to the extent that the parametric assumptions underlying the procedure may be relied upon. Care is therefore necessary in dealing appropriately with the covariance structure of e.

5.3. Jackknife

An outline of the jackknife algorithm is as follows. Suppose that some parameter θ is estimated by a statistic S. This statistic may be a complicated function of the data. The precise properties of S are either unknown or difficult to compute. It is known, however, that the bias contained in S is of order n^{-1} for sample size n.

Let S be denoted by S(n) for sample size n. Now, for each i=1,2,...,n, define $S_i(n)$ as the value of S based on the (n-1)-sample obtained by deletion of the i-th observation. Then define a **pseudo-value**

$$P_i(n) = nS(n) - (n-1)\, S_i(n), \quad i=1,2,\ldots,n. \qquad (5.3.1)$$

It is shown that

$$\bar{P}(n) = \sum_{i=1}^{n} P_i(n)/n = \theta + o(n^{-1})$$

contains a bias of order less than n^{-1} as an estimator of θ.

The variance of $\bar{P}(n)$ may also be estimated.

This algorithm may be applied to the present context by setting S(n) equal to the estimated loss reserve obtained from a regression claims model based on n data points (a single data point being, for example, the observed claim payments in a given development year of a given year of occurrence). Some generalizations of this are mentioned in the paper.

There are two shortcomings of the jackknife.

Firstly, the entire procedure is dependent on the assumption that bias in the statistic S is of order n^{-1}. In practical applications, this may not be known with any certainty.

Secondly, the variance estimates emerging from the jackknife algorithm are in fact estimates of estimation error only.

5.4. Bootstrap

The bootstrap is a procedure which makes use of **data resampling.**

A regression model is fitted to a given data set. The empirical distribution of the standardized residuals emerging from this fit is treated as the true distribution of those residuals. New sets of **pseudo-data** are then generated by simulation from this distribution, each set corresponding to the original data set. The original regression model is applied to each pseudo-data set, to obtain new estimates of the regression parameters.

This procedure results in an empirical distribution of those regression parameters, and of any desired functions of them, e.g. their means and variances, the means and variances of regression forecasts, etc. Confidence limits on each such estimate may be obtained. Other properties, such as non-normality of regression estimates, may be examined.

5.5. Comparison of the estimation procedures

The advantages and disadvantages of the three estimation procedures considered in Sections 5.2 to 5.4 are summarized as follows.

Parametric estimation: small number of calculations;
estimation error and statistical error available;
accurate if the parametric assumptions are correct;

Jackknife: influence of individual data points on the estimate is available;
only estimation error is available;
estimate of loss reserve possibly has reduced bias;

Bootstrap: non-parametric;
estimation error and statistical error available;
distribution of loss reserve given given.

6. ROBUSTNESS

6.1. Influence function

The influence function of data points $y_1,\ldots,y_n$ on statistic $S(y_1,\ldots,y_n)$ is defined as the vector,

$$I(y_1,\ldots,y_n)= \frac{\partial S}{\partial y}\,(y_1,\ldots,y_n), \qquad (6.1.1)$$

with y denoting the vector $(y_1,\ldots,y_n)$. It indicates the influence on S of small variations in the data points.

A single component $\partial S/\partial y_i$ of (6.1.1), plotted as a function of y_i, with $y_1,\ldots,y_{i-1}$, $y_{i+1},\ldots,y_n$ fixed at their observed values, provides the influence curve of y_i.

In the context of loss reserving by regression methods $S(y_1,\ldots,y_n)$ may be taken as the forecast (5.1.1):

$$\hat{R} = 1^T\hat{Y}^* = 1^T X^* \hat{b}_A, \qquad (6.1.2)$$

where

$$\hat{b}_A = \hat{b}_A(Y_1,\ldots,Y_n)$$

is the regression estimate of b_A and is a function of the data vector $Y = (Y_1,\ldots,Y_n)^T$.

6.2. Robust regression

Regression need not be carried out by means of least squares, weighted or unweighted. Indeed, the importance of least squares regression derives from the oft made assumption that random error terms in the data are normally distributed. When this assumption does not hold, least squares regression may not be appropriate.

Robust regression encompasses procedures for fitting linear models whose properties are relatively insensitive to the distribution of these error terms. **Resistant regression** includes procedures leading to estimates which are not greatly distorted by extreme cases.

Consider the model,

$$Y = Xb + e, \qquad (6.2.1)$$

where the notation is as in previous sections and in particular e is not necessarily normal although it is assumed to have zero mean.

Under weighted least squares regression, b is estimated by that $\hat{b}$ which minimizes the weighted sum of squares:

$$WSS = (Y - X\hat{b})^T W(Y-X\hat{b}), \tag{6.2.2}$$

for some nxn matrix W which is independent of Y. Under resistant regression (6.2.2) is replaced by:

$$WSS = (Y-X\hat{b})^T W(\hat{Z}) (Y-X\hat{b}), \tag{6.2.3}$$

where the weight matrix W depends on an estimate $\hat{Z}$ of the vector of standardized residuals,

$$\hat{Z} = \text{diag } (\hat{\sigma}_1^{-1},\ldots,\hat{\sigma}_n^{-1}) (Y-X\hat{b}), \tag{6.2.4}$$

with $\hat{\sigma}_i^2$ an estimate of $V[Y_i]$.

Some choices of the weight matrix W are mentioned in the paper.

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1986 CASUALTY LOSS RESERVE SEMINAR

5G - DISCOUNTING AND ASSET/LIABILITY MATCHING

Moderator: Charles L. McClenahan, Partner
Coopers & Lybrand

Panel: Bruce Bunner, Partner
Peat Marwick Mitchell & Co.

Fred Weinberger, Vice President
Salomon Brothers, Inc.

Recorder: John Aquino, Associate Consultant
Coopers & Lybrand

CHARLES L. MCCLENAHAN: Welcome to the panel on Discounting Loss Reserves and Asset/Liability Matching.

I'm Chuck McClenehan and I'm a partner with Coopers & Lybrand in Chicago. Joining me today are Bruce Bunner of Peat Marwick and Fred Weinberger of Salomon Brothers. Bruce Bunner is a partner in the New York offices of Peat Marwick Mitchell & Company. He received his B.S. Degree in Accounting from New York University. When I recruited Bruce to be on this panel he was still the California Commissioner. When he found out that Big Eight partners get to do exciting things like this he went straight to Peat Marwick. Bruce brings an interesting perspective to this topic and I am looking forward to hearing what he has to say.

Fred Weinberger received his M.E.E. Degree from the City College of New York, and his M.B.A. from McGill University. He worked for 4 years at Sun Life Assurance Company of Canada in the investment area. He joined Salomon Brothers in 1980 and he's currently a Vice President in the bond portfolio analysis group where he does a lot of work in the area of asset liability management as it applies to a variety of financial institutions.

Salomon Brothers has done more work on property and casualty asset/liability matching than any company I know of, and Fred is one of their chief gurus. I know you all have liabilities. If you have any assets left after asbestosis and the new tax bill, Fred is a good man to know.

Why are these two topics merged into one panel? Well, both deal with the assessment of future cash flows arising out of property and casualty liabilities. And major changes are occurring which have focused attention on these cash flows. These changes include: the new tax law; the introduction of financial guarantee products; the impact of reduced yields on economic pricing assumptions; the impact of developing reserve deficiencies on products and professional liability; and the realization that there is a credit risk as well as insurance risk associated with cash flow plans. The increased level of attention has produced better estimates of the runoff of the insurance liabilities which, in turn, allows both discounting and asset/liability matching.

We will start with Bruce, who will tell you everything there is to know about reserve discounting. Fred will then tell you even more about asset/liability matching. I will then jump in and make some comments about the options provided by the new tax law. Our schedule is a tight one so we ask that you hold questions to the end.

With that, it is my pleasure to introduce Bruce Bunner.

BRUCE BUNNER:

I'm sure you are all familiar with the discounting provisions of the new tax law. The methodology is simplistic, but computationally demanding. Rather than doing a how-to session on the methodology, I decided it would be easier to give you some IBM PC software we developed to calculate the discount factors. Copies of this software will be available outside the room from one of my associates after the session. One word of warning, however. The software was developed prior to the conference committee meeting. The conference committee made a minor change in the discounting methodology in the case where the implied loss payout in the penultimate year is negative or zero. The software will not produce the correct factors in these cases. This is not usually a problem, but you need to be alert to it.

If your company is among the top 90% of companies writing any line of insurance then you have the option to use your own experience to develop your own discount factors. This election can have a significant impact on your taxable income. Remember that the IRS will calculate factors on an industry average basis. If you are a personal lines writer then the average discount for the auto and multi-peril lines will be higher than that indicated by your own payout patterns. If you write occurrence-based medical malpractice the average discount will be lower than your own because of the impact of claims-made business.

These differences may lead you to the conclusion that, for example, the personal lines writer should use its own factors and the commercial lines writer should opt for the industry averages to minimize the impact of the discount assumption on taxable income. But what about the fact that the 12/31/86 discount, the so-called "fresh-start adjustment" will escape taxation altogether? Doesn't it make sense to try to maximize the initial discount? For the companies I have looked at, it does. So it may be that the best strategy for the personal lines carrier is to use the industry factors for the initial five-year period and then switch to their own experience-based factors thereafter.

The only way to make an informed election is to calculate your own factors, make some assumptions relating to growth and interest rates, and test the alternative strategies.

There are two other options which we need to consider. These are: level of reserve adequacy and distribution of reserves by line and accident year. Now I am certain that each of your companies has reserves which are exactly adequate on a line-by-line, year-by-year basis and that they will continue as such forever. These options are therefore of no value to you. Nevertheless, for the sake of completeness, let's look at how they may affect other companies.

The "fresh-start" adjustment will be based upon 12/31/86 reserves. However, as clarified by the conference committee, effects of "reserve strengthening" during 1986 will be eliminated. "Reserve strengthening" includes any increase in the undiscounted ultimate incurred losses for accident years 1985 and prior as well as changes in methods and assumptions

giving rise to increases in the 1986 accident year reserves. Reserve strengthening additions will be treated as though they occurred in 1987 for discounting purposes.

If a hypothetical company were faced with a situation where the 12/31/86 evaluation showed a mixture of developing redundancies and deficiencies, what would be the appropriate actions from the standpoint of impact or discount?

> First, to the extent indicated redundancies offset indicated deficiencies, neither would be recognized. If they were recognized, the deficiencies would be eliminated from the "fresh-start" adjustment with no offsetting credit for the redundancies.
>
> Second, to the extent redundancies required recognition, reserves would be reduced in lines with low discount impact first.
>
> Third, the 1986 accident year would be reserved to the highest possible level of adequacy consistent with 1985 reserving methodology.
>
> Finally, if the 1986 accident year could not be reserved to full adequacy for all lines, those lines with the high discount impact should be the most adequate.

The appropriate strategy would change for our hypothetical company in the second and subsequent years. The appropriate strategy would depend upon whether or not the company was using its own factors or the industry factors as well as the specific situation regarding overall adequacy.

Note that these strategies have been discussed only from the tax standpoint. Where Best's ratings and the NAIC IRIS test results are considerations the calculations tend to become too involved to provide any general guidance. The best thing to do is to turn the whole mess over to your actuary. But remember that the decisions on reserve levels need to be made for 12/31/86.

There are additional things which need to be considered in light of the tax law change to the use of discounted reserves. The first is that the methodology assumes that the company holds the funds. Where premiums are deferred, or under some retro or reinsurance arrangements, this is not the case. The use of discounted reserves may make paid loss retros and similar cash-flow deals less economical.

Second, where a company is using its own experience to generate discount factors, treating structured settlements as paid losses when the annuity is purchased, as opposed to as indemnity payments are made, will reduce the loss payment tail and the associated discount impact.

Finally, should the IRS allege reserve redundancy in the audit of a company using its own experience in the calculation of discount factors, the impact of the alleged redundancy on the discount factors should be considered.

While the net impact may be minor, the focus on a reserving period as much as four years to prior to that being audited may defuse the allegation of redundancy in some cases.

In summary, as with almost any tax law change, the use of discounted loss and loss expense reserves for tax purposes provides challenges and opportunities. Since reserving decisions at 12/31/86 will have a major impact on taxes for 1987 through 1991, it is imperative that your options be identified and considered now. We would now be happy to respond to any questions you may have.

RESERVE DISCOUNTING - BRUCE BUNNER: I'm not so sure I know all there is to know about discounting. I'm not sure any of us do. It's been a very controversial issue as you well know over the years and certainly one that has created a lot of attention on the part of regulators, accountants, actuaries, and certainly now the federal government, including the Treasury Department, and the GAO. Since you recruited me, Chuck, while I was still Commissioner. I think I'd like to pretend I still have a Commissioner's hat on. As an audit partner with Peat Marwick, I find I'm in a dilemma: I can't speak with such great authority and say, "This is the way it's going to be". Many of you that back in 1983 the insurance companies Committee of the AICPA prepared a draft issues paper on discounting, and it didn't go very far. It talked about discounting being acceptable and requiring disclosure. The Accounting Standards Executive Committee of the AICPA never accepted that draft but deferred it, thinking that we needed a much broader approach to the whole concept of discounting and the applicability to financial reporting. In 1984 the SEC came out with some additional guidelines and pronouncements relative to disclosures on loss reserves. Part of that disclosure requirement focused on the rates and the range of rates that were being used, and the amount of discount in the loss reserving process.

In 1986 the SEC came out with the position that pending authoritative guidance, they would accept discounting 1) to the extent that it was permissible and used for statutory purposes, and 2) for settled claims with fixed and determinable attributes using a reasonable rate at the time the claims are settled.

The NAIC has been sort of off and on this issue of discounting. While I was Commissioner, the NAIC surveyed what was going on in this area with respect to the industry. They didn't come to any definitive conclusion. There was a gut feeling, if you will, that discounting was inappropriate for statutory accounting. The NAIC left it to the 50 states as to which direction they would allow their companies to go. As the NAIC moved into the '85 year, the discounting issue was still an agenda item. Since I was chairman of the Accounting Procedure task force, I basically said: "Forget it". We're just not going to deal with the issue because the Commissioners and the industry basically were not willing to come to grips with whether discounting was acceptable or not, at least certainly from a statutory perspective." The companies were divided as usual; it is very difficult to get a consensus from them. This was tabled if you in the NAIC environment.

Of course in the meantime the GAO came out with their study, and so did the Treasury Department in connection with the proposed tax reform.

While I was the California Commissioner most people felt that I was just totally against discounting. But basically I precluded by regulation in California to accept discounting in any form. In a sense my hands were tied within the state as Commissioner. But it was a subject in which I was greatly interested. More importantly, in 1985, the Accounting Standards Executive Committee of the AICPA put together a task force to look at discounting and the time value of money, on more of a macro basis, not just focusing on insurance reserves but looking at the entire balance sheet as to applicability of discounting. The Committee has been working on this issue for the last year or so, and I think at this time it basically developed the relevant issues as to the recognition of the time value of money for financial reporting purposes. Just where it will go from here is uncertainty but it is noteworthy that much has been done and the relevant issues have been identified. The task force on discounting applications essentially came up with 5 basic issues. Those issues return to the whole accounting model, the relationships of discounting issues to financial reporting concepts, and the relevance and the reliability of information as it impacts the financial statements.

Issue one is the time value of money, a relevant attribute with respect to financial reporting? Issue two: Is the result we achieve when discounting sufficiently reliable for financial reporting purposes? Issue three: What discount rate, if any, should be used? Issue four relates to changes subsequent to the initial recognition of the time value of money in the financial reporting process. These changes may occur with respect to the amounts of the cashflow, the timing of the cashflow, and what is done when those changes transpire if anything. Issue five is the determination of the accounting nature of the creation of discounts. Touching briefly on each one of these issues, I will address some of the pros and cons under discussion.

As to the relevance of the time value of money, that's in future cashflows. The people that argue in favor of discounts essentially say it's better economics in the reporting process. That was my position as Commissioner, that we ought to get to the economic reality of the underlying process, and the measurement of accounting trends. Another argument holds that implicit discounting is not uncommon within the industry. Finally, in the life insurance model discounting is accepted practice; FASB 60 provides for it. Why shouldn't these concepts flow over in the property and casualty area? So the essential argument in favor of discounting is that it is a more realistic accounting measure. The people that argue against discounting contend that the relevant amount is nominal cost. As for adequate disclosures, the reader can make the appropriate adjustments in reading the financial statements. Furthermore there is a problem just settling on the discount amount, and there is an argument that the public really doesn't understand discounting.

Probably the bigger reason often faced over the years is the regulators. It is already difficult to estimate loss reserves and discounting just complicates that process even further. In spite of the cons, I think the general consensus is in support of the recognition of time value of money, that discounting concepts have relevance in the whole accounting model.

The next question, whether, is if we have discounting, the result will be reliable for a financial reporting process. I guess there are variations of its reliability issue. With respect to discounting the variation is in the amount and the timing of the cashflows. There are situations where timing is not fixed and determinable, such as life policy or a life contract, where we know the amount, but we don't know the timing. There are also situations where the amount itself is not fixed and determinable, but discounting under these circumstances is not too common in the industry today. Further, there are situations where both the amount and timing is not fixed and determinable. As an example, this is the situation that you run into with most claim reserves and loss adjustment expenses. The arguments the reliability of the discount concept is sort of implied in its recognition. As we go through the process of estimating loss reserves, for example, the fact is that we can estimate claim reserves under FASB 5. Inherent in the reserving process is the assumption that this reliability factor is in fact present. The argument against the reliability of the discount is based in APB 21, where we talk about interest on accounts receivable and payable, with are emphasis in that particular pronouncement that the discounted cashflow has to be fixed and determinable. Discounting yields imprecision to the accounting process: that's the argument against reliability. I think the direction again that we're heading as a profession is that discounting is reliable. There is a sub-issue associated with reliability: If we do move to discounting then do we use the shortest payout period, the longest payout period or something in between. There are differences of opinion, but the general assumption is a longer payout period for assets, and a shorter payout period for liabilities. This is an issue that needs to be addressed.

Assuming that discounting is relevant and reliable, what is the discount rate that we should be used? There are different views of the objectives reflecting the time value of money. Some would argue we would want to reflect the economic gain or loss at the inception of the transaction. Others come back to the emphasis of APB 21 which says what we want to do is reflect the fair value. Others would argue for a risk free rate of interest. Then some would argue for a mixed rate; investment rates for reserves and perhaps a borrowing rates for other types of liabilities such as in deferred income taxes. Others want to achieve some sort of matching between your investment rates of return or perhaps the borrowing rate. In the borrowing rate we have the opportunity type rates which reflect the market today, as opposed to an embedded rate based upon historical borrowing in your financial statements. Perhaps it's not a big issue in the insurance industry since there's not that much borrowing activity. Similar considerations apply to the investment rate. Would we use the actual investment rates that reflects our portfolio today, or do we use an opportunity rate as reflecting the market for new investments. Someone suggested the settlement rate -- these were the rates that it would take to

settle the liabilities today. Very much like we would run into with loss portfolio transfers and some reinsurance type transactions. Others would suggest a specified rate. A specified rate would not be arbitrary and that, perhaps, is why regulators might support it. In some states you are allowed to discount workers' compensation reserves, using rates of 3 or 4% typically. A final alternative to consider is the default rate, which is generally a risk free rate, or the rate on government obligations or high grade bonds. There is a great deal of mixed opinion as to which rate would be appropriate and applicable. The general feeling is moving towards sort of a settlement type rate and that can be objectively obtained. If not, then a default rate seems most likely.

The fourth issue in discounting applications is that if we accept the whole concept of recognizing the time value of money, and the initial recording of a transaction, then what do we do about subsequent changes. Those changes can revolve around the timing aspect of cashflows, the amount of cashflows or the rates. What we're driving towards in this are is whether some kind of a lock in principle applies. As to amounts and timing, most would agree that those kinds of changes transpire subsequent to the initial recognition, and that changes should be reflected. Where the real discussion comes in is if there is a change in the discount rate, and as such, we are tied to the direction the professions taken in the Audit Guide for Life Insurance Companies: a lock in principle. That's generally the direction that profession seems to be going.

The fifth issue, the accounting itself, is a little simpler issue isolate. You know what kind of accounting we have: the question is do we recognize the time value of money as an interest item, or is it a part of the losses incurred component? If we resolve the first four issues, this issue is not going to be too difficult to handle. Basically the method of recognition is optional and I think that's the direction we'll probably come from. Another aspect of this issue is disclosure: obviously we'd have to have disclosure, but that can be dealt with very simply if we can solve these first four issues.

I think perhaps what I'd like to touch on now is some of the experiences that I had with this topic as Insurance Commissioner. I may mention some company names, however, it is not my intention to discredit anybody. Frankly, I am glad these companies caused discounting applications to become regulatory issues. As such, it forced the California Insurance Department and other state departments to focus on the discounting problem that was transpiring within the industry. I think the first time I really became confronted with discounting was when Fireman's Fund had moved into some various loss portfolio type transactions. The staff within the Department really came down very hard and said there would be no discounting: that's what the law says in California. Yet when you analyze the contracts that underlying these loss portfolio transfers, it would be inappropriate to take the onerous step that the staff within the California Department examiners were in fact taking. Such an analysis forced me to focus on reinsurance, activities of the industry and the discounting inherent in some reinsurance transactions. We realized that in reinsurance there contracts there may be both a true indemnification of loss as well as

a financing agreement. Our approach at that time was to take the loss portfolio contracts and segregate the financing variety from the true indemnity type of contract. With the financing type contracts, I essentially approved the use of a discount in the reserves. But I took the position that we need to set aside assets settles the portfolio transaction under a given contract. In effect, we required the equivalence of in-substance defeasance. As I moved forward from Fireman's Fund I was trying to get reinsurers to focus on the concept of financing versus indemnity type reinsurance contracts and see if we could come up with a presumptive threshold as to some presumption a contract as the variety financing. In that case we would in fact follow the rules similar to that which we're talking about today.

Earlier this year, I was confronted with CIGNA and its tremendous increase in reserves of $1.2 billion. That posed some interesting issues for all of the regulators. I had a side problem going on at the time. I was Chairman of the NAIC Federal Income Tax Task Force. The industry really had come to the NAIC, and asked the NAIC to support them with respect to trying to override the position that the federal government was taking on the QRA, and also the position of the GAO with respect to the discounting methodology that they were recommending for tax purposes. As regulators, we were opposed to discounting within a statutory model. We felt that if discounting were to transpire within the tax code, then it would spill over into the statutory environment and cause some problems from a regulatory perspective: principally in the oversight function and in maintaining quality of statutory surplus. As you well know the industry marched over to Capitol Hill and accepted discounting. It was kind of a surprise to all of the regulators and especially to me since I wasn't forewarned. In the meantime, it became apparent that several companies were discounting the reserves; CIGNA in a very substantial amount. These events forced me, at that time, to disallow discounting in the State of California; any companies that were discounting would be required to refile their annual statements. I think the thing that is interesting about this is that when I first became Commissioner, some within the industry had approached me wanting to discount worker's compensation pension life reserves on a tabular basis. I wasn't generally opposed to that and I said: "you draft legislation and if you can get all of the industry to support you, the California Department will in fact support a change in the law". As a matter of fact I wrote the proposed law for a discounting of pension life reserves, and I even went so far as to say we could use a current investment rate subject to certain conditions. Strange as it may seem, as the bill began to take form for legislative hearing, the industry for the most part then said they didn't want discounting in any way, shape, or form. The bill died within the whole industry discussion ... In fact the very companies that are now discounting were the same companies that the bill at that time.

With respect to CIGNA, I said: "I'm really not opposed to discounting but if we're going to do it we're not going to do it piecemeal. We must look at the whole balance sheet with respect to the recognition of the time value of money". That's the only basis that on which I would consider going forward. There was a general agreement between CIGNA and I that this

was a sensible position. I suggested that they (CIGNA) go back East and solicit the insurance giants back there to return to California and bang on my door and say as an industry that we're behind the whole concept of dealing with the time value of money and that we're willing to look at this thing on a macro basis for the whole balance sheet. Further, I added that if I had their support I would make the time value of money an NAIC Agenda issue. As you can imagine it was very difficult getting any kind of industry consensus. About 2 or 3 weeks later I received a phone call saying that the industry didn't want to bring up this issue; it would be best to let sleeping dogs lie. That was tragic because I thought if the major companies would get behind the issue we could have done some very meaningful things.

Another issue which I confronted when I was in California was the financial guarantee legislation. We were the first state to move forward with any formal legislation. The law that I wrote and put into the California Code does in fact recognize discounting with respect to losses on financial guarantees. Furthermore it requires that if a company does discount, it could use an investment type rate. However, the company must identify the assets and clearly demonstrate that the assets will mature in some reasonable relationship to the obligation for the payout of the claim reserves. We had set the stage for the discounting concept, and I think some of the thinking that went into the legislation is what we want to consider in statutory environment.

I think this direction will continue, although I can't speak for the Department any longer. I wrote legislation involving accountants and actuaries: I felt very strongly that the Department ought to be relying more and more on independent actuaries and independent accountants providing that the Department has a disciplinary mechanism in place in the event there is a professional judgment failure on the part of an Actuary or Accountant. That bill recently passed through both legislative Houses in the State of California and is awaiting the Governor's signature. It provides the framework for the Commissioner to utilize the services of accountants and actuaries with respect to a GAAP financial statement. It goes further to suggest the utilization of supplementary reporting concepts. I think that's really the key. I kind of sense that it's going to take some time to change the basic statutory financial statements in the near future. The direction that we were going in the California Department was requiring additional supplemental data. You will recall that last year the California Department Required insurers to file supplemental financial information dealing in a concept which I call quality of surplus. I had 4 different ways of looking at (or modeling) surplus, but probably the most important element of that whole model that was being put together developing what I called the economic value of surplus. This introduced market values for all investments, discounting of loss and loss expense reserves, and asset and liability matching (immunization). The California Department has now imputed all that information to its data base and it is my hope that they'll release some kind of the results of their study. It will be very interesting to see what kind of information develops from the supplemental reports with respect to discounting of loss and loss expense reserves. I believe that California will continue to refine that

supplemental report, and that this direction that might catch on with some other states. Then we will have some form of reporting which reflects discounting.

Another change for which I was pushing may yet be successful. I've been proposing that the Emerging Issues Task Force of the NAIC, which I had originally set up, come back and suggest that we should transition to GAAP principles in the statutory reporting process to the extent that the GAAP principles are not inconsistent with statutory accounting principles. My desire in that regard was to create a framework within the statutory environment to enable regulators to deal with all emerging accounting and reporting issues on a timely basis.

I have not given you many answers this morning. We're just getting on the table a number of the current issues relating to discounting with respect to where the AICPA, perhaps the SEC, and perhaps some of the regulators might be heading. Discounting is a hot topic and it's one that we really do need to address and on which we need to move together, and move smartly. If I were going to make any comment to you as a group, it is that we should get on the ball as an industry. Not only on this issue but on so many other issues, the industry should at least come together and focus on them. I don't know of any group that could do this better than this group sitting right here. To really focus in on what we're trying to do at least in the statutory reporting environment and this is really relevant. How best do we incorporate the discounting concept into the statutory model? If you don't take more of a proactive approach, then you're going to end up with something being laid on you and it's probably going to be unacceptable. I would encourage you to keep moving on discounting. I think the time is write on the part of regulators; they're willing to listen and to try and come up with something better. The statutory model isn't working today. There needs to be a great improvement on the whole reporting process. These are the issues that need to be considered; we need to get down to the economic reality of what in the world is going on, and the time value of money is certainly relevant in the circumstances. I thank you very much and, Fred, I'll turn it over to you.

Asset/Liability Matching - Fred Weinberger

Thank you Bruce. It is a pleasure to be here this morning. I have broadened the advertised topic from asset/liability matching to asset/liability management. It's not absolutely clear that we do want to match and I want to explore that question with you this morning. I'm going to address you this morning from the other side of the balance sheet compared with everything you've been hearing so far at this seminar. My approach to this subject is from the asset side. I'd like to begin this discussion with a look at traditional practice in the area of asset/liability management for property and casualty companies. Basically, the asset strategy was to buy long-term tax-exempt securities, typically hold them until maturity, and that was it. Why did we have this kind of traditional investment practice in the P&C industry? There were probably some good reasons for it. We had a traditional environment which consisted of fairly stable interest rate levels and a very steeply positive yield curve, especially in the tax-exempt area. By investing in 20 or 30 year municipal bonds you could achieve a rate of return of 2 or 3% more than you would get if you were going to match investment maturities with the typical pattern of your liabilities. Given the stable rate environment, there was a large incentive to actually go long. But of course this practice did have underlying it certain unwritten assumptions. First, it was assumed that interest rates would remain stable, second that the institutions would always be taxable, therefore the investment in tax-exempt securities, and third, that in

terms of liquidity, one would not have to liquidate securities because premiums and investment cashflow would always be sufficient to cover claims and expenses. What stands out in all this is that the investment process paid no attention to the liability side of the balance sheet. The strategy was the same regardless of what the liabilities looked like, and perhaps this was not inappropriate until certain things began to change.

Today what we have rather than just an independent asset strategy, is a new focus on asset/liability management. What do we mean by asset/liability management? On the one hand that the asset decision must pay attention to the liabilities, and on the other hand, that the liability decisions ought to have a view toward the asset side of the balance sheet as well. What brought about this new focus? As with most changes, there was a series of wrenching experiences with the old ways of doing things that brought it about. The unwritten assumptions of traditional practice that I talked about were suddenly and jarringly no longer true. Suddenly there was volatility everywhere. The capital markets exhibited volatility on the asset side. On the business or underwriting side there was new volatility as well, in terms of the extremes of the underwriting cycle. Whether this new underwriting volatility began with a rise in interest rates, thereby putting assets under water and forcing "cashflow underwriting" (or as Warren Buffet calls it, "asset maintenance underwriting"), or whether it began with larger than expected losses creating a cashflow problem, interruption of the cashflow which was always assumed to be sufficient resulted in the "cashflow underwriting" requirement. Either way, both from the tax efficiency point of

view and the maturity point of view, portfolios on the asset side were terribly out of synch with what was going on in the business.

From the asset side what is it we're looking at when we're discussing asset/liability management? What are the decisions we need to make on the asset side? I'm focusing on the asset decision but really we are looking towards the liability in making these decisions, particularly in terms of matching and not matching. The options for a maturity strategy are these: 1) you can decide to match; 2) you can decide not to match but at least know what your mismatch is and consciously assume the attendant risk; 3) you can look toward the total rate of return investment management philosophy, which, tends not to focus on the liability and involves an activist approach to managing the assets to achieve capital gains and a larger rate of return. The other issues in the asset decision involve a tax strategy and a quality or credit strategy.

In the remainder of my talk I would like to focus largely on two points: the maturity strategy and the tax strategy. I'll talk about the maturity strategy first and then discuss a model that we've developed at Salomon regarding tax strategy, particularly in view of the new tax bill. In discussing the maturity decision I'd like to begin by suggesting that, with all due regard to the unique aspects of their business, property and casualty companies face the same problem as all other financial institutions. That problem is to earn a spread between their cost of funds and the available returns in the asset marketplace. With banks or with the interest sensitive products or GIC's of life insurance companies, the cost of funds to the institutions are quite explicit. With property

and casualty companies we need to dig a little but the cost of funds and what I call the "effective spread" can be found. Of course we must acknowledge that we have here a risk situation wherein the ultimate payments that property and casualty companies make are indeterminate up front. If we make allowance for certain risk charges to cover that uncertainty and work with the expected payout pattern, perhaps we can determine what the cost of funds is to the property and casualty company, and what in fact is the interest spread that it is earning. The recipe looks like this: you start with the expected payout pattern and create a matched bond portfolio at currently available yields. In so doing we can match the payouts hopefully with a bond portfolio whose cost is less than the money available for investment up front, premiums less expenses. If at today's interest rates we have a positive difference between premiums net of expenses and the present value or the cost of the bond portfolio, then this is the present value of the profit that we have earned for the business written. Again, this profit is before the extra risk charges to cover the uncertainty of the ultimate payouts. Let us now artificially lower investment rates. Let's say we just take the existing yield curve and shift it down so that we're earning less on the assets. Eventually we'll come to a point where the matching portfolio will cost exactly what we've received from policyholders to cover payouts. At that point there is no longer any profit, we'll just be able to cover the payouts with that bond portfolio. We can define the "effective spread" as the amount of yield curve shift to move from existing yield levels to the point where there is no profit.

I thought it might be interesting to look at a sampler of

what these effective spreads might look like as a function of a couple of variables (figure 1). Along with the effective spread number I also show the present value of the profits implied by the business written. What we're going to do is vary the combined ratio at the top. Let's focus first on the 100% combined ratio column. This is where discounting the ultimate payouts at exactly 0% would give us the premiums we took in. Therefore, the effective spread column, starting with 5.6,5.7,5.9 is simply a reflection of the available investment yields. If we had zero investment rates we would just cover the payouts. Therefore the spread is from zero to available investment yields. That column of spreads is therefore roughly a reflection of the existing yield curve. As we move down the column, we have longer and longer liabilities and because today the yield curve is positive you get a higher and higher implied spread.

We now move to a combined ratio of 105. The spread there under the S column again reflects the investment yield available as it did under the 100% column. But it also reflects the period over which we get to amortize that additional 5% of cost implied in the combined ratio of 105. So, when writing at 105 for an average duration of 1.5 years we basically wipe out most of our spread. On the other hand if we're writing at 105 and the payout duration is 7 years, that 5% gets amortized over a much longer period and hardly impacts the spread that we achieve at all. In fact the spread earned goes up with increasing duration. On the other hand if we're writing at 95 we get the opposite effect. The 5% of extra earnings is in effect contributed by the underwriting side of the business. If that gets taken in immediately or very

quickly under a short duration liability, it boosts the spread that we've earned on that business. On the other hand, if we extend it over a 7 year duration, for example, that 5% extra income is much less meaningful. Obviously then, the cost of funds in the business that we're writing is directly related to the combined ratio, but with differing impact depending upon the duration of the liability.

As we approach the question of matching or not matching I think there are some questions that ought to be addressed to determine the philosophy of whether or not it makes sense to match and under what circumstances. One important question, now that we've established this cost of funds idea for a property and casualty company, is what is the correlation between a property and casualty company's cost of funds and general market rates? I think that this question has not been decisively answered. I've heard both sides, and probably in fact, both sides are true. In some instances the ultimate insurance costs are not related to prevailing interest rates. In other instances they may be very much related to prevailing interest rates. They may vary from line to line and company to company. But it's an open question. If there is a strong correlation between the property and casualty cost of funds and market interest rates, I think we would tend to stabilize earnings, and the spread earned year to year, by pursuing a matching policy. As the cost of funds and the combined ratio rises, the available investment rate rises. Given that we're pursuing a matching policy we would have available all of the premiums received on new business to invest at these new higher rates, due to previously matching our payouts with existing portfolio flows. So new cashflows would be available to

refresh the portfolio yield to levels that are current. So I think that the desirability of matching does somewhat turn on answering this first question affirmatively, saying that yes there is at least a reasonable degree of correlation between the two sides.

If in fact there is no correlation or very little correlation, then I think we have to go a little bit further and ask some additional questions. What are the independent volatilities of these two measures? What is the expected volatility of combined ratios, the cost of funds? What is the expected volatility of market rates, the investment opportunity? Given that there is no correlation, the volatility of total results for the company will be almost independently a sum of these two volatilities. So the decision as to how to manage assets and liabilities turns on the question of where we want to be in the total volatility spectrum. Then we would try to set our investment policy to give us a total volatility of results that would conform to our requirements.

What follows (figure 2) is one cut at trying to determine whether to match or not match in terms of this question of correlation and the independent volatilities of the two sides. It is not intended to be definitive. The top specifies the correlation between combined ratios and investment rates, zero or high, and on the left we have interest rate volatility. We're just looking at these two dimensions. The interest rate volatility is the volatility in the capital markets. How fast do investment rates change year to year? If we focus on the top left hand box, this is where we have no correlation between the cost and funds and prevailing interest rates, and where

prevailing interest rates in general tend not to be too volatile. I think under these circumstances it does make some sense not to match. Better returns are available further out on the yield curve. Given the relatively low volatility of investment rates, there's not too much risk to being long relative to the liabilities. We do achieve incremental yield by going long without inducing too much risk on the balance sheet and probably do a good job of maintaining fairly stable earnings because of long-term stable investment yield. In fact this probably characterizes the traditional practice that we examined earlier. Of course we got into trouble with that because we thought we knew what the environment was going to be but in fact it changed suddenly.

On the other hand in the bottom right corner, we feel there's a very high degree of correlation between combined ratios and the interest rate environment in general. That would in fact be reflective of so-called "cashflow underwriting" or "asset maintenance underwriting". If in fact we have a relatively high degree of interest rate volatility, as no one would dispute we have had in recent years, then there is a very persuasive argument for matching. I think the risks of not matching are much too high, and I think the advantage of matching are there because the correlation is there. What in effect you can accomplish is that as one side moves up in terms of cost of funds, so too asset returns move up, and you lock in a spread that tends to be more stable over time.

As for the other two boxes, the bottom left and top right, we could have a discussion about these I think, and it's not clear as to what strategy you might pursue. I just basically wanted to open up this kind of framework and hope to do some

more work on this question.

If you do match, what will you accomplish? You preserve your mark to market surplus or the economic surplus that Bruce was discussing earlier. You write some business and you create a matched portfolio. You are in fact assuring that you will achieve the present value of the effective spread, you'll assure that this is earned. If you match in a situation where you've written at too high a combined ratio, and you cannot achieve investment yields that will cover those payouts, you've locked in that loss. There are two things that you could look at in deciding whether to match. You could look at the volatility of earnings each year. In other words, how does the spread that you earn each year change. Or you could look at a static mark to market picture. With a static mark to market picture there's no question that matching is the only way to go. If you did not have a matched book of assets and liabilities, and if cashflows and interest rates were at all volatile, then you would find some pretty severe volatility with respect to mark to market surplus. But on the other hand, under certain circumstances I'm not sure that matching achieves consistency of earnings, particularly where there is low correlation between cost of funds and investment rates.

If you decide to match then how do you go about it? Well there are several techniques out there. Cashflow matching from a book constrained point of view, as would be the case for an insurance company, is probably the only way to go. Duration matching would require a lot more management intensiveness. It would require the taking of capital gains and losses as you continually have to rebalance the duration of your assets to the duration of your liabilities. Some of that might be

achievable by managing the liability side as well. But I wouldn't count on it. What happens with duration matching is that you just match the duration and do not match the entire cashflow pattern, then the duration of the assets and liabilities tend to drift apart, necessitating a rebalancing. This rebalancing quite likely would involve taking gains and losses which have book and tax implications. Cashflow matching might make more sense and it also gives you the most assured results, albeit probably at somewhat lower yields. But there's no rebalancing required. The only proviso is that you've got to concern yourself with taxes. You can't ignore them, they're part of your cashflows. You may be paying taxes or you may not be paying taxes as you move forward, you've got to look at that carefully.

What about the question of discounting of loss reserves? Well firstly, are we talking about going all the way, with the assets too? That's marking to market the entire balance sheet. Certainly it would put the spotlight on mark to market surplus with such intensity that there would be absolutely no choice but to match. On the other hand, there are certain partial measures. One might be to mark to market the liabilities only, meaning that every year as rates change, redo the discounting. This makes no sense at all. It makes no sense to mark to market one half of the balance sheet and not the other. Another approach is vintage year discounting, meaning that you just continue to carry the discount rate that you used when you originally put the business on. If that's all you do, it does rearrange the accounting somewhat, the recognition and the timing of the profit. I don't think it does much else. That basically wraps up the first part of my

remarks regarding the maturity or matching question. I'd like to talk now about the tax question.

Some of the key features in the joint conference committee formula which is soon to be the final tax bill include taxation of tax exempt income, discounting of loss reserves for the tax calculation, and a corporate minimum tax, which is at a 20% rate and is applied to 50% of the business untaxed reported income. The business untaxed reported income is the difference between the reported income and the statutory taxable income. In effect what happens is that municipal income gets taxed at 11.5%. There's also some additional taxation on the existing unearned premium reserve and on future unearned premium reserves. Overall this bill definitely does raise the level of taxability of the P&C industry. In view of this, how do you manage the asset portfolio? The rules of the game have changed; traditional practice may no longer be warranted. In fact your current portfolios may not be the most optimal going forward, in view of the new tax bill.

The model that I'm going to discuss involves the asset allocation decision between the taxable and tax exempt markets, and also the question of where along the two yield curves, in terms of maturity, should you invest. Hand in glove with this decision is the question of how to use existing net operating loss carryforwards. Some of the obvious factors influencing these decisions and included in the model are the existing portfolios, the existing net operating loss carryforward positions, and the forecast of operating results in the form of combined ratios and cashflows. Views on the investment markets can be incorporated in the form of interest rate scenarios for both taxable and tax-exempt securities. Finally there is a

facility for maximizing either statutory or GAAP operating income. It is a linear programming based model that seeks to maximize after tax operating income over a multi-year horizon, typically 5 years. The primary results of the model are decisions about how to allocate cashflows today and going forward over the horizon between the two markets, taxable and tax exempt securities. It also determines whether it makes sense to restructure the current portfolio.

I think this diagram (figure 3) is vivid and goes a long way to explaining what some of the tradeoffs might be under the new tax law, especially in view of the minimum tax. Consider this as one year in the life of the property and casualty company. Let's think of the company as having great flexibility to do what it likes this year and then go back to do something else next year. The choice to be made is asset mix: we can go anywhere from 200% taxables on the left to 100% tax exempt securities on the right. The question is where should we be? We can plot several lines as a function of that mix decision. The top one is labeled pretax earnings. At the top left, let's say we have $100 to invest, and let's further say that taxable yields were 10%. If we invest $100 at 10% we would get $10 of pretax income investing in the taxable market. As we shifted that mix from taxable to tax exempts at the far right of the top line, assuming

a tax exempt yield of 8% -- $100 at 8% would give us pretax earnings of $8.00. The line decreases to the right having a slope of $2.00 over that range from taxables to tax exempts. We can now also plot the two tax calculations that will be required under the new law. Once is a regular calculation and the other is a minimum tax calculation. The regular tax line is the steeper one. At 34% on all of your taxable inclome at the far left you'd be paying $3.40 of taxes, because we had $10 of fully taxable income. At the far right that regular tax calculation, the dotted part at the bottom there, would result in about 40 cents of tax as we shifted into tax exempts. However, we don't get away with paying only 40 cents in taxes because the minimum tax calculation at that point is higher. The minimum tax at the far left would $2.00 -- 20% of all of the taxable income. At the far right you're paying an effective rate in the minimum calculation of about 11.5% on tax exempt income, so that looks like about 90 cents there. That explains the relationship of these lines.

The relationship of these lines is very important to determining what stretegy ought to be pursued. The way they're oriented here, givent he spreads assumed for the markets and given the operating situation of the companym you can see that in fact there is an optimal mix between taxable and tax exempt markets at the point labeled "optimal". It's at this point that

there is a maximum vertical distance between pre-tax earnings and the tax payable. However, if the lines were oriented differently due to different market or operating conditions, you might find that the optimum would be all the way to the right. This would be the case if for some reason the ratio of yields available in the tax-exempt and taxable markets were 1--% providing the same pretax level of income. That would clearly, and intuitively, indicate we should go all the way into tax-exempt securities. Conversely, and this goes back to the credit decision, if we were willing to invest in so-called junk bonds, at least for part of the portfolio, that would give us a much greater slope down to the right. In other words, taxable yields would be a lot higher. And in such a situation the slope might be sufficiently steep so that the maximum would always be to go 100% into taxable securities at the far left -- again, an intuitive result. But for a wide range of reasonable values, we will find that the optimal situation is somewhere interior or in other words some mix of taxable and tax exempt securities. So far we've only discussed one year. If you imagine these diagrams sequenced one behind the other for 5 years, each with its own forecast of underwriting results, cashflows and the rest, what the model does is seek to position the portfolio so that year after year it's operating with soem efficiency or as near to optimality as can be achieved within the constraints that are

applied. And speaking of constraints, this is where we tie the two sides of this story together, the maturity question and the tax question. The maturity question is where you examine from the asset/liability perspective discussed earlier, where we want to be positioned maturity-wise. We can then use that decision as a constraint in this model to determine the optimal taxable/tax exempt split within that maturity duration constrains.

Thank you very much.

A SAMPLER OF 'EFFECTIVE' SPREADS

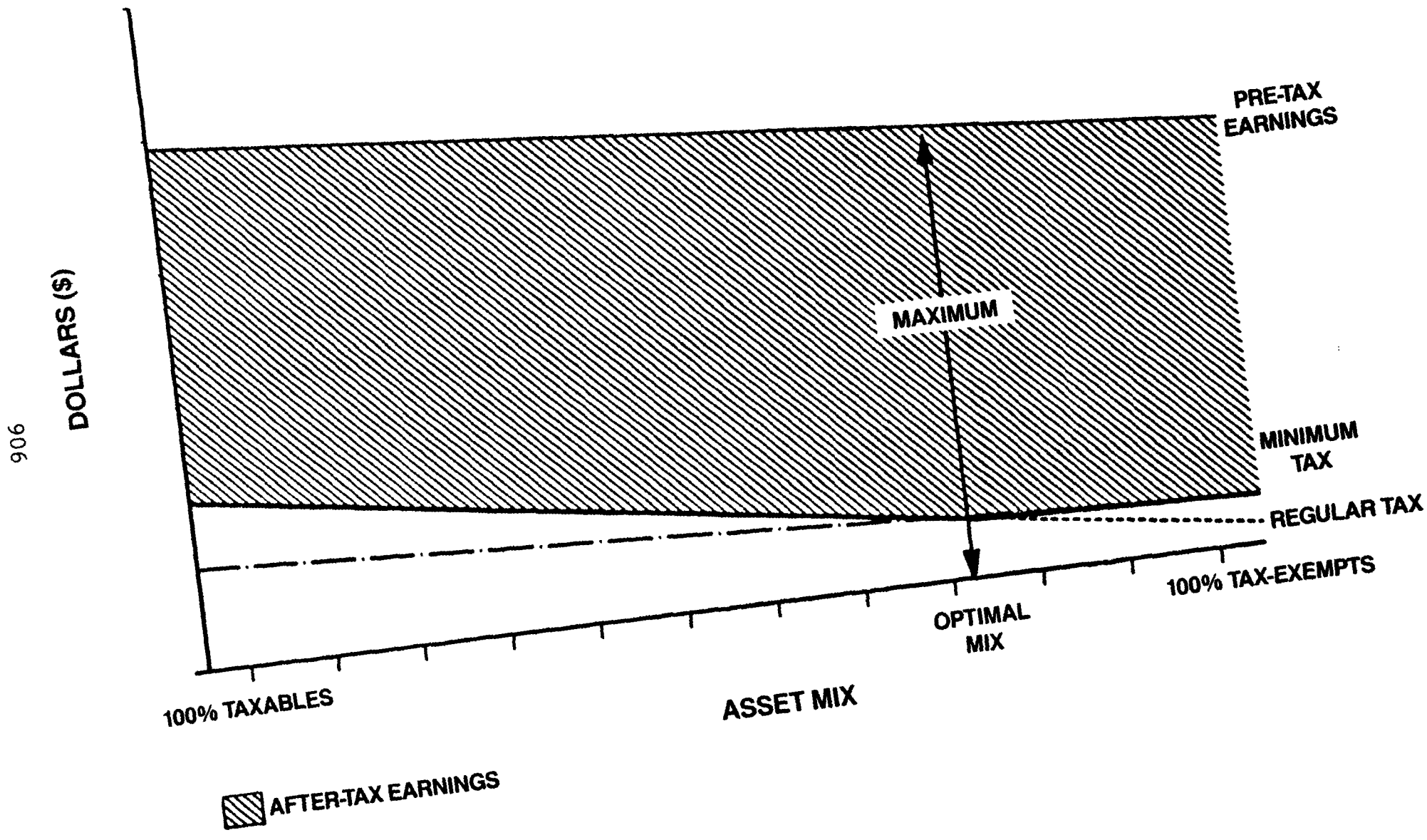
S = 'Effective' Spread
P = PV of Profits

Approximate Payout Duration	Combined Ratio 95 S	95 P	100 S	100 P	105 S	105 P
1.5 Years	10.7%	$ 9.7	5.6%	$ 5.1	.5 %	$ .44
2.5	10.3	10.2	5.7	5.6	1.05	2.32
3.7	9.8	11.4	5.9	6.9	2.0	3.71
4.75	9.3	13.2	6.2	8.9	3.15	4.48
5.5	8.9	15.7	6.6	11.5	4.2	7.33
6.1	8.7	18.7	6.9	14.7	5.0	10.79
6.5	8.5	22.1	7.1	18.5	5.65	14.78
7	8.3	34.8	7.6	32.1	6.8	29.36

A POSSIBLE PARTITION
ρ = CORRELATION

σ: INTEREST RATE VOLATILITY	0	HIGH
LOW	Invest Relatively Long to Gain Higher Yields	Judgement Call
HIGH	Judgement Call	Match

OPTIMIZING ASSET MIX



1986 CASUALTY LOSS RESERVE SEMINAR

6A - LOSS RESERVE REPORTS AND DATABASES

Moderator: David C. Forker, Vice President
Shand Morahan & Co., Inc.

Panel: Richard J. Fallquist, Director
Coopers & Lybrand

Ronald F. Wiser, Sr. Actuarial Officer
St. Paul Fire & Marine Insurance Co.

Recorder: Roger Griffith, Sr. Professional
Shand, Morahan & Co., Inc.

DAVE FORKER:

The purpose of this panel is to try to lead you through the process of setting up a database to set up reports to help evaluate the experience you have, and then thirdly, we're going to give some examples of means of showing that information to management. Our panel today is made up of Dick Fallquist, Ron Wiser, and myself. I'm Dave Forker. Ron is going to start off this morning talking about setting up databases. Ron is the Senior Actuarial Officer at St. Paul Fire & Marine. He is a Fellow of the Casualty Actuarial Society, and a member of the American Academy of Actuaries, and is on the Casualty Loss Reserve Seminar Committee. He has helped to set up these meetings today. Following Ron, Dick Fallquist will be speaking to you on using data. How to array it, how to evaluate it, and not necessarily getting into techniques, but showing you various arrays you can use to assist you in evaluating the business. Dick is Director of Insurance Consulting with Coopers & Lybrand in their Seattle office. He's also the author of the Exhibit Maker Software Package. I'm Dave Forker, I'm a Fellow of the Casualty Actuarial Society, and also a member of the American Academy of Actuaries. All of our experience has been initially with insurance companies and then in the consulting area. And now Ron and I are both back in the insurance company area, but Dick has continued as a consultant. I'd like to start it off with Ron Wiser.

RON WISER: Good morning. What I want to do this morning is to give you an actuarial presentation, but you won't see any numbers and you won't see any triangles. I think Dick will follow with the triangles. What I want to do is talk more about database concepts and how you might organize a company database if you're responsible for loss reserving.

The first slide comes from the Statement of Principles regarding property and casualty loss and loss adjustment expense liabilities. I hadn't read that statement for several years, I just happened to look at it within the last six months. And I was struck by this sentence that they have in there in which I think is very appropriate and is good direction for all of us who are responsible for company loss reserve estimation. That is, it is the actuaries responsibility to assure that the necessary data for establishment of proper reserves is available. What that means to me is that the actuary or the individual responsible for loss reserving in the company has to be the advocate within the company to get allocated the proper amount of data processing resources to support the loss reserving function. No one else is going to do it for you. You have to convince management that is important and that you need that to support what you're trying to do if you certify the reserves or if you set the reserves and you analyze the reserves. The point I'm going to be making here is how do you do that. This is very good instruction for all of us who are responsible for reserve setting. Our first priority is to get management's attention that we need the resources to support reserve analysis. And we shouldn't be satisfied living off a financial database or a claims department database because those have different functions and different purposes.
Here is my extremely over-simplified systems diagram just to help me to explain the stock process here. At the top you have the claims processing system which there's some sort of claims processing system in every company. That kind of feeds a claim processing database and I'll talk more

about what that does later. Generally once a month for a financial reporting, or for a statutory reporting reason, your financial department will strip a tape of records off that claim database and that will go into the financial reports. The first 3 boxes I think are pretty common and probably generically true in some sense in every company. It's the fourth item at the bottom that may not exist in every company, but that's what I call the actuarial claim database. That is instead of the loss reserve specialist relying somehow on the claim processing database to get its history or somehow relying on corporate financial reporting or bureau reporting files to get a history. What I'm advocating here is that the loss reserve specialist or a company actuary tap into this processing stream to feed his own database that's set up to meet the specific needs of loss reserving also useful for pricing purposes. But I'm going to concentrate on loss reserving.

First I showed the claim processing system. That's really the originator of all of the statistics that we used. Let's think for a moment about what's the purpose of that. It's to serve the claim function. What sort of things does a claim function need? What they need is an on-line distributed input mechanism because they've got claim offices generally over a wide geographic region and they need a way of daily imputing updates on claim information. They need reports on status of open claims daily. The status of an open claim may change as payments are made or reserve changes are made. They don't have a need to keep closed claims on their file very long. They may have some reopened activity, but generally they would not look very kindly upon you if you asked them to keep closed claims for 10 years on their claim database. Because they really don't have a need for that in what they do. The claims system is processing oriented. It generally has to issue drafts, and to keep records that allow the accounting department to reconcile those drafts. It prints paper documents that can be used to document claim files. That's its purpose. In terms of the information it keeps it should be set up so that it supports the claim adjuster in adjusting claims. That is, the name of the insured, address, name of the claimant, information about the type of loss. Also, the claim adjuster who is working with a system daily needs at least a daily update of the status of each individual claim. He's always interested in the current financial evaluation of what's on that claim and current claim statistical information. Finally, the claim processing system is the front end, it feeds all of the other corporate systems that get claim information, such as the actuarial systems. Let's compare the claim system to the needs for a loss reserving database. First of all I don't need daily updates of a loss reserving database, monthly, or even quarterly might be sufficient. Because I'm more interested in history. I'm not interested in keeping up-to-date with what's happening on a daily basis. However, unlike the claim adjuster I'm interested in keeping a history of all claims even after they've been closed. I may be interested in keeping closed claims detailed in history for 10 years or longer depending on the line. I don't produce paper documents on any daily basis. I don't issue drafts. I don't need to printout status reports to put in claim files. I need to produce reports on a monthly or a quarterly basis. I require premium data elements as well as loss coding. I am very interested in the type of policy that this claim arose from so I will generally be more

interested in keeping as much of the policy information as I can. More than the claim department would need. Also we know that the claim status can change daily as people work on it. I'm not really interested in the daily status of individual claims. I'm more interested in the estimated reserve or payment on a claim as of the end of the month or at the end of a quarter. I'm willing to give up all the detail. I'm not interested in keeping a history of daily changes but I am interested in keeping history at the end of each month or maybe at the end of each quarter. Finally, I'm also interested in keeping a record of statistical coding. That is, I would like not only to know what the current coding is, but I'd like to have a track record of how a statistical coding may change over time as errors get into the database, and they get backed out. How does that effect my loss reserve estimates. Generally the claim department is willing to work from the current characterization of the claim in their database. Second from the last point, for loss reserving I often need to get to the individual claim information. I don't often look at individual claims except possibly for large losses. This is very different from what the claim adjuster does. He's always looking at individual claims and never looking at summary aggregate financial data. While the claim department system is the front end, the loss reserving database system is driven by the claim department system and the issue is to keep it in balance with other corporate databases. Especially the financial information, what's published in the annual statement and on the company's financials. We summarize the comparison in the claim processing needs to the loss reserving needs by saying the following: Obviously I need claim data, it's essential to the loss reserve actuary, but there are very important differences that indicate to me that I shouldn't try to live off what the claim department has in their file. The loss reserve actuary has a strong interest in developing his own data processing file and data processing stream. There are some benefits on that -- one it lessens the burden on the claim system and allows the programmers supporting the claim system to worry about claim service issues, and not about actuarial loss reserving type issues. You can get a better allocation of expenses because you're not trying to get the claim department to carry the expense of data elements or data processing that is only useful for the loss reserve actuary. If your company allocates your system department expenses to department this will give you a good idea of how much it is really costing you to establish a loss reserve database. You can allocate the actuarial database activities back to the actuarial department. It also gives more flexibility to the needs of the loss reserve actuary. And that's basically because you don't get into situations of conflicting priorities. If you try to live off the claim department file you may often find yourself in that situation where you just naturally aren't going to get first priority for your needs. The last point on the benefits -- things that you need if you have your own processing stream do not have the potential of disrupting claims service priorities. If you do have an actuarial claim database, over time the history that builds up can be extremely important asset to the corporation. Especially if you are a specialist in a certain line, you are gathering data on that particular line that no one else has available and that should help you to plan and manage much better. I think a good example may be for a lot of companies when the FCC required stock companies to publish a 10 year history of their reserve development. Probably not

all companies had 10 years worth of data in a file that they could go back to. If you had this kind of database that would have been fairly simple to do.

I want to go over some suggested kinds of data elements that you might want to have in this database. There's not much new here but I just thought for the purpose of completeness we would go through it quickly. Obviously you'd want a policy number on it. You'd want your claim numbering system, and generally this varies by company. The claim numbering system I'm familiar with assigns an occurrence number to an occurrence of a claim. Now when a claim occurs you can have multiple claimants within an occurrence so you'd want to have a claimant number within that occurrence, and then any claimant can have several claims. For instance personal auto claims could have a collision claim and a medical pay claim. Generally within claimant you'd want to have some kind of claim number identifier. Dates are extremely important for anything we do on loss reserving. With the advent of claims made policies, you need to pay even more attention to what are dates you need to pick up based on your policy wording. Obviously, the date the loss occurred, the accident date, or the date of loss. You need that so that you can put your triangles on the accident year format that a lot of people have shown in the seminar. Date of notice to the company -- our claims made policies are triggered by the date the company gets notified of the claim. We capture that within the database. There's a general lag between the time your service centers get notification of a claim and a claim hits your monthly financial processing systems. That lag can add up to sizeable amounts of money. We call that the pipeline lag or the recording lag. It's a component of the IBNR. That is, the claim is already in house but it hasn't hit our records yet. Policy inception and expiration date are also important. You may want to use those for restating some of your loss history on a policy year basis. You'll want to record the dates of payments, the dates the reserve is open, the date the reserve is closed, whether the claim has been reopened, and any time that a reserve is increased or decreased. Then you'll want some kind of territorial or geographic codings -- state, county, territory, and major line annual statement line. Then you reflect your own company's structure. That is, your profit center structure? Do you have various companies in your group? Do you have divisions, departments, profit centers, service centers, claim offices? Coding reflects your company's structure. For reserving you need to take reinsurance into account. You'll want to do a loss reserve analysis on a direct basis but you also need to know what ceded and assumed transactions are, and you need to be able to get to a net bottom line from your database. Catastrophe code-- there still is a catastrophe coding system that assigns cat codes to significant weather related events. And you'll want to capture that because that can significantly distort your data and you don't want to be fooled by catastrophe data. This is important because we're talking about a 10 year history. You may know about the catastrophe that happened 3 months ago, but what about the catastrophes that happened 5 years ago as new people come in and look at the data, they need to have the capability of separating catastrophes from the data. Cause of loss, type of injury codes -- these are often used by claims departments and you'll want to capture those for whatever value you can get out of them. Usually these

are useful for special requests or special studies. Subrogation and salvage -- when you're getting money returned to you through subrogation or salvage efforts. Generally whatever is coded on the premium record in terms of identification, you'll probably want to carry on your actuarial database. Even if it means matching by policy number and copying the entire identification field that you have on your premium record to your claim database record. Let's say we've gone through that, what do you have now? What you have is a huge volume of data. In a way you have satisfied priority one. You have the data that you need for loss reserving. But now you're going to run into another problem. How do you really manipulate that data? How do you get at it? How do you somehow efficiently tap into it? The larger the company is and the longer you keep the data, the greater the size of this file. What I suggest is that you have some kind of user friendly entry and request processing mechanism to allow you to get into this data base. I have an example of just a simple screen that we use to get into our database. Generally, loss reserving in most large companies requires at least 3 different kinds of outputs which I've got up there. Mainframe files, people are using SAS, people are using FORTRAN, they're using decision support languages like FOCUS. You'll want to be able to go into your database and be able to pull out files that are specifically set up for whatever your favorite mainframe language is so that you don't get into the programming business. I guess I'm not in favor of saying loss reserve analysts somehow has got to figure out the JCL to get into his data file to pull out data. To me that's not acceptable. I want him to spend his time analyzing data. He's got to have a mechanism to get that data. PC spreadsheets are very common now, you've got LOTUS and SUPERCALC. A very effective way to do a reserve analysis is to be able to tap into your mainframe database. Use a downloading capability to get your data triangles on a diskette, and plug it into your spreadsheet. Your potential is unlimited you can do anything you want with it. You don't have to be a programmer to analyze it. And finally there are a number of loss reserve analysis systems available. We have our own that we've built in-house that works on a PC. What I would suggest that your database produce an input file specifically geared to the loss reserve analysis system that you're using in-house. After you've struggled with this volume of data for a while you'll see why I believe in the last point. Some automated loss reserve analysis capability is essential to really work with the vast amount of data, the different kind of triangles that you have available, and to do it in some cost effect manner. Because you have limited human resources, and you have a limited amount of time to do whatever analysis you're going to do before financial statements are published. And Dick will talk more about the automated loss reserve analysis capabilities. Here's a simple example of the kind of mainframe screen that we have available to allow our loss reserve analysts to tap into the database. It's very simple, they don't need to know any programming, all they need to know is how to sign on to the mainframe to get to the screen. They have about 14 different choices of types of identifier codes which they can type at the bottom. You see the five lines at the bottom. We ask them the ID code that you and then type in the values they want. The machine then processes output file. If we need to go back to run some tapes it may be available overnight. This insulates the loss reserve analyst from having to know a lot of what I call overhead

mainframe programming information. This is what I consider a somewhat user friendly english language extract capability. You need to know the company that uses this. You need to know what these identifier codes are. And you need to have a manual and need to be able to define your business. If you want to look at commercial auto business in the state of Tennessee you need to be able to know how to define that within your company. Once you know that, you're ready to go in your reserve analysis. Here's just a simple little chart that shows at the top how we go through the selection procedure. The word "IRA" stands for Interactive Reserve Analysis System. That's our own internal reserve analysis system that we've built that runs on PC's. This is how we get data from the mainframe down to the PC so the analysts can use an interactive reserve analysis capability to manipulate that data and come out with his opinions. We have some special encounter catastrophe data. We ask them if they want to include or exclude that. Then he sees the select data screen where he defines the data. Then the system actually does all of the overhead work for going to the database and pulling out the data that the analyst needs. There is a verification screen that asks you to verify the request. If you didn't, you can go back to change your definitions. And finally, the important thing at the bottom -- downloadable triangles on a PC diskette. That's what you get and that's what you do to your loss reserve analysis with. Let me just show you what we currently get on our downloaded data that we use for reserve analysis. First of all we have 10 years of quarterly histories. We're looking at triangles that are 40 by 40. Our software can compress it into semi-annual, annual, or quarterly. It's up to the reserve analyst how he wants to look at it when he gets it quarterly. He doesn't have to look at it quarterly to do his reserve analysis. We can request 15 types of triangles. I can't claim that we actually make full use of all of these 15 triangles. A triangle just showing closed paid loss dollars, partial paid loss dollars, paid loss expense on closed claims, paid loss expense on open claims, paid loss expense on claims closed with payment. Then we have the outstanding loss or the reserves that are outstanding as of each point in time, and separate triangle to isolate salvage and subrogation effects. And then we get into claim counts. We have counts for claims closed with payment, claims closed with loss expense, outstanding claims count, and claims closed without payment. We have things called zero reserves where the adjuster can set up a precautionary reserve but not put up any dollars. I want to keep those counts separate, and I don't want them mixed with real claim counts. Partial paid loss counts where I keep track of partial payments. You can often have partial payments on a claim. These are 15 triangles that I have available on an accident date basis. I have the same 15 triangles available on a report date basis. My data set has 30 triangles showing dollars and counts by accident date or by report date. Generally this gives us the capability to do analysis both on losses and loss expenses. It's very important to be able to look at loss expenses separately. We've found that on liability lines that we can be very easily fooled if we look at combined loss and loss expense to do our projections. When you separate them, the world looks much differently when you look at loss versus loss expense. That's basically why we have all of these extra triangles that give us the capability to look at loss expense.

The next slide gives you some idea of what this costs. I call this the dimensions, the actuarial claim database right now is running about 30 reels of high density tape, almost 7 million records. Our records are of variable length but they average about 1,000 characters per record. We're talking maybe 7 billion bytes. It costs us on an internal billing system about $3,500 a month just to update the actuarial database. And ongoing maintenance costs of course are driven by how other systems change. If somebody changes a premium processing system or a claim processing system, you're going to have to respond and change your claim database. Your actuarial database can cost anywhere from $10,000-100,000 per year. That's to capture the data. To access the data we find it necessary to process a number of smaller files to allow the user friendly entry into the database. Generally that's been running about $12-15,000 a quarter just to do that. And we haven't reduced the numbers of reels of tape but we have summarized files to allow us to get at what we need. The access software makes the decision as to which of the summarized files it needs to get your request. Finally, as I said before, you need some sort of automated reserve analysis capability. We call it IRA's (Interactive Reserve Analysis System) to allow you to manipulate the triangles once you've got them. Because if we've got 30 triangles and you hand them to a reserve analyst with paper and pencil you won't see him for a long time, because he'll lot's of data to play with. Costs can vary, you can have an internal package or by a 3rd party vendor's package. They can be mainframe or PC. We opted for the PC because it's easier to build a user-friendly system on a PC. It can be batch versus interactive. We have a tendency to go with the interactive system, saying we're not going to build a lot of defaults. We want somebody looking at these numbers and making projections based on his best judgment. With that I'm going to turn it over to Dick to talk more about the automated reserve analysis capabilities.

DICK FALLQUIST:

It's a pleasure to be here today and we're happy that you chose this particular session. As Dave explained, my role is to examine the various ways that one can arrange data. In talking about arranging data I'm primarily going to concentrate on triangle arrays. I would like to begin by thinking of estimating reserves as a process or a sequence of steps. It's a difficult process, yet it can involve a set of very simplistic exhibits to assist you. It's essentially a circular process rather than a dockport game. We'll speak of this process and it involves three stages: 1) an input stage, a set of imput arrays, 2) output stage, we could refer to as a set of output exhibits, 3) your analysis stage, or your method stage where you apply various techniques to estimate ultimate loss costs and ultimately come up with your reserve estimates. I like to think of this as a circular process because essentially, once you come up with your ultimate estimate you want to take those ultimate estimate against your historical data base for appropriateness. For example, you might want to test your payments against your ultimates, or your reported counts against your reported ultimates to see if your ultimates fit with your historical statistics. What are some of the inputs that we look at? Ron has talked about some of these in his presentation such as loss payments, incurred loss, incurred plus IBNR, paid allocated loss expense, incurred allocated

loss expense, exposures, paid premiums, counts closed with payments, closed counts, reported counts, and as I mentioned earlier ultimate paid allocated loss expense. We could probably list between 20-30 possible input type elements that would go onto a system. These can be arranged by many different exposure periods, accident year, report year, policy year, calendar year, or fiscal year. The statistics can be arrangeable from an incremental basis and on a cumulative basis. What happens next once you've essentially identified and gathered these critical pieces of information that you're going to put into the system. Where do we go from here? We go to the second stage which I refer to as your output exhibit. What needs to happen now is to review this data for its consistency, for its trends, for its inconsistencies, for errors in the data, for shifts in the data caused by both internal and external. Internally it could be closed claim patterns are shifting. Externally it could just be the results of social inflation. These are called the output exhibits. Stated another way we need to arrange the data so that we can truly understand it or at least to attempt to understand it. I would like to repeat that because it is very critical to the reserving process. And we need to arrange this data so that we can truly understand what's going on or at least begin to understand it. Too many times we see databases that we really can't cut through to truly understand what's going on. A classic example is calendar year loss statistics. Many times they can be very distorted. Many times they've put companies in serious trouble from the recent past. The series of output exhibits are a very key part to understanding this data. And we need to look at development factors, we need to look at ratios, and we need to look at averages. Development factors include, for example, paid loss development factors. I've got a slide that shows incremental paid loss, this is by accident year beginning in 1981. You can see it's developed at year end. You can see it's a symmetrical paid loss triangle. From there we go and cumulate that paid loss to come up with cumulative paid loss development. We've added these incremental payments that lead to accident year and development year. And finally we come up with what I was talking about, which we all know and learned to like, paid loss development which is essentially the first column divided into the second column, that is 12-24, the second column divided into the 3rd column, that is 24-36. The first number 2.174 is nothing more than in the very first row, 500 divided by 230. Essentially all we're doing is just dividing each column by the prior column. Then we've got development factors, other development factors that we want to look at are incurred loss development, incurred plus IBNR development, closed claim development, reported claim development, paid allocated loss expense development, incurred allocated loss expense development, premium development factors, and the lists can go on and on. We need to look at ratios such as loss ratios. I've got several ratios here also. This is the ratio of CWP which I've entitled claims closed with payments to closed claims. We can see that for 1981 as of 12 months essentially 52.5% of the closed claims at that point were closed with payment. As of 24 months that number is moved 60.1%. What we're looking at is just the relationship of closed with payment and closed claims at different accident years at similar type stages of development. That's one ratio we might want to look at. Another ratio is the ratio of closed to reported claims. This is often referred to as a settlement type of ratio which shows the number of claims that have closed compared to the

number of reported at any point and time. Here for 1981 you can see as of 12 months, 48.8% of the reported claims have been closed. This is moved to 70.0% as of 24 months and to 87.6% as of 36 months. We can look down this triangle and we can see that 1982 seems to be an aberration in that group. In 1982 you can see that as of 12 months there's been a larger percentage in the reported claims that have been closed as of 12 months and also as of 24 months. If you feel this is critical, obviously what you're going to want to do is go back in and adjust your payments to reflect the fact that your closing patterns are not consistent. And that's obviously going to distort your payment patterns. And of course there's a number of different ways to accomplish that. Another ratio would be a reported to ultimate claims. This is one which shows your reporting distribution. Here we're saying that as of 1981, 79.8% of the claims have been reported as of 12 months. It's gone to 89.6% as of 24 months you can see that there's some sort of reporting tail in this particular database. The thing that is unusual about this exhibit is this one involves imputing your ultimate reported counts. In other words you've made those estimates, you've now gone around the circle and you've put those back into your input arrays and you're now printing new exhibits that include your ultimates. Again, from this a lot of times you're able to go back and test your ultimate reports to determine whether or not they're appropriate. It's an interrelationship between these different databases that you're imputing and will give you additional information. Hopefully it will get you to the right estimate.

This is actually cumulative even if it doesn't show that. In other words, as of 12 months allocated loss expenses are approximately 14.3% of loss payments at that point. At 24 months for accident year 1981 that's gone to 17%, and as of 60 months you can see allocated loss adjustment expense of 21.2% of loss payments. We can look for consistency in this type of exhibit, here you can see in 1982 that if we're lagging a little bit as of 12 months in paid expenses, that may be due to a large loss payment or the fact that expenses are just a little old for that particular year. It could be some other problems, it could be an error, but it will give you a reason to investigate the data.

The third type that I mentioned was averages. We've talked about development factors, we've talked about ratios. Now let's move on to average. We've got a couple of averages here -- one is paid loss per closed claim. This is nothing more than just the total payments at each development point divided through by the total closed as of that point. That's pretty interesting because what we can do now is take a fit down each of those columns to get an estimate as to what the average paid severity is. This is very nice because we're essentially getting different looks at the claims severity at different points of development. As of 12 months you can see it and down at the bottom you'll see that full percentage which is the second line up. That's saying that that first group of numbers is going at 9%. And as of 24 months it's going at 11% and as of 48 months it's going as of 11%. This is a very nice database that we've put together here. If I were doing reserving or if I was thinking of doing some pricing I might select 10% as a reasonable estimate of the average claim severity using the paid statistics as a guide. Let's throw in the case loss reserves to these paids and we come up with another

average that we might want to look at incurred loss per reported claim. This is the same thing, it's exposure period and a claim count at different development points. What we're doing is we're adding the case loss adjustments to the payments. Now in this case of as 12 months we're seeing 7% as of 24, it's gone to 13% as of 36, ... it breaks down because there really isn't much in the way of data. Now I'm not so sure this could support that 10% estimate. The important point here is that we're looking at two separate and distinct databases. We're looking at a paid per closed, and we're looking at an incurred per reported. These are totally different and they're both giving us essentially the same type of indication. Now I may choose 10% and Ron may disagree and choose 12, Arty may choose 6%. But the point is here that we'll all try -- we can put these numbers in and we can use these as 3 separate assumptions of what the true trend is. What we need to do then is to relate these datasets together to create meaningful statistics. What we're talking about is with 10-15 different types of inputs which we listed earlier, you can produce up to 100-150 output exhibits if you so desire. That's really a tremendous amount of data which you have at your disposal. It produces a very wide volume of information and new information that you don't see if you're just looking at calendar year statistics. Where does this take us? So far we've reviewed various data sets, we've looked at accident year statistics such as payments and claim counts. We've referred to these as input array. We've also reviewed various output exhibits such as this one which were created by the inputs such as development factors, ratios and averages. The final step in the process that we talked about was the analysis stage where we applied the actuarial methods to project the ultimate loss cost, the ultimate counts, and ultimately the reserves. What methods are available to us? For counts you've got closed claim development, you've got reported claim development, you've got various claim frequency techniques if you've got both claims and exposure. And those three are all separate and distinct. Based on those 3 you may be able to come up with a reasonable estimate of what your ultimate counts are. For losses you have many methods. You have paid loss development, you have an incurred loss development, you have incurred plus IBNR development. You've got loss to premium development, burning cost ratios. You've got average claim costs approximators, you've got pure premium approaches. You've got loss ratio approaches, various runoff approaches. You've got Bornhuetter-Ferguson techniques which could include both using premium versus paid and incurred development or exposure versus paid and incurred development. And you've got the hindsight technique which an excellent technique for testing your assumptions that you've put together in an initial ultimate using paid incurred and some of these other techniques. For allocated you've got paid allocated approaches, paid allocated development. You've got incurred allocated. You've got paid-to-paid ratios, and paid allocated to paid loss ratios. You've got incurred allocated to incurred ratios. You've got many techniques, you can also limit your data. There are a tremendous number of techniques that you could look at, and the nice thing about it is that they're all separate and distinct. Each one of those techniques that I mentioned is a technique that essentially is using its own set of data. The paid uses the paid, the incurred uses the paid and the case. The average technique uses counts in loss estimates. The pure premium technique uses frequency times severity over exposure. The Bornhuetter-

Ferguson uses development statistics versus exposure to premium. The Hindsight Technique looks at what the average should have been if you'd had today's knowledge then. They're all separate and different. At this point let me reiterate what I consider to be an important point of the reserving process and it's critical again that I think it consists of 3 stages and they're very simplistic stages. One is the input arrays, two is the output exhibits, and 3 is the method section. I'd like to say that probably the most critical of these 3 is number 2, the output exhibits. This is because we need to arrange the data so that we can truly understand or at least begin to understand what's going on in that data. This is the really critical point in which you can evaluate the data for consistency, inconsistency, trends, and shifts. This is again the point from which you select those methods which are most appropriate, and which databases you feel are most appropriate. I think too many times in today's insurance practice we see one input array and we see one method. We may see somebody taking payments and applying the paid loss development technique and stopping. What we need is we need 5, 6 and 7 inputs and we need 50-60 output exhibits which attempt to array all of this data. And then we need 5-6 different types of methodologies so that you can throw those 6 or 7 different methodologies up to produce a different range of ultimates and from there you can then judge which ones are the best estimators. Let's gather paid loss, incurred loss, closed counts, and reported counts. Let's get exposures, paid allocated, and then let's produce all sorts of exhibits -- paid development exhibits, incurred development exhibits, closed claim development, reported development, paid per closed, paid per reported, incurred per reported, one year runoff, case as a percentage of cumulative paid. The list can go on and on. Finally let's try a number of different methods; paid development, incurred development, ultimate average claim size, pure premium methods, Bornhuetter-Ferguson and end it with the Hindsight Technique. I guarantee that you will have attempted your best guess as to what the true reserves are. Maybe out of my speech there's really nothing new. I challenge each of you to reach that stage of development in your own systems where you've produced a large array of information, and that you've attempted to cross-classify that data so that you can truly begin to really understand what's going on. Once you've reached that point you can then go back in and adjust the data to use setting your reserves and ultimately in setting your pricing so that we can get these premiums right on today's market. Try to remember these three stages. Try to remember that the second stage is the most critical. If you're not doing that today I hope you will begin to do it. I've got one final slide. This guy tried his best and he got the reserve right on the money.

DAVE FORKER:

Thanks Dick. I think one thing you can bear in mind in setting up your databases and in your analysis process is that there may be some things unique to the way you handle your business, that you've got to make sure to build into those databases. And there may be some things unique to your business that you have to imput into that analysis process. One that comes to mind to me right now is the advent of claims made coverage. That is probably one of the elements you want to make sure that you provide in your coding process so that you can identify not only policies that are written on a claims made basis, but also what you're providing is nose coverage, or

the actual policy period coverage, or tail coverage. And then be in a position to analyze those pieces separately if you feel it's necessary. I think these are things that in the process you've got to make sure of. Once the process has been completed setting up the database. You've got to consider such things as coverage breakdowns, exposure periods, the frequency that you're evaluating data, the types of data you have and various triangular formats. Once you're done with that and have your database set up and you start the analysis process you've got to go through what Dick talked about as part of that loss reserve analysis process. You've got to look at the types of data you have, the sorts of ratios and development factors that you have. The sorts of trend statistics that you have internally or externally, and the types of analysis that you're doing. This whole loss reserve seminar is directed at the last part. What we're trying to do is to lead you up to that point to establishment of the database. Give you some tools to help the analysis process and now we're going to try to close this with some suggestions or possible ways of reporting the results of your analysis to management. Obviously when you are reporting to management of any company you have a lot of people that you have to serve, they have varied interests. The information that you put together has to depend on whose getting the information and for what purpose they're using that information. That dictates to a great extent the form that you're going to give it to them. I'd like to go through a few slides and ideas that might help you in designing reports that are appropriate for your particular companies and your particular lines of business. You generally have a number of areas to serve. You obviously have the executive level where they're looking at the big picture. They're trying to get some ideas of how things are going on an overall basis. Generally speaking that's a lot more limited in the level of detail they want. You show an overall results, you're showing where we are versus where we expected to be and the changes. The reports that you would design for this purpose are generally more of a summary level report. Accounting needs enough detail to satisfy internal accounting requirements, and annual statement requirements. It generally is going to have to be by line of business, sometimes by state or geographical location. You have to be in a position to split IBNR and development reserves. You've got to give them estimates of such things as open claims, which they have to use in some of their reporting. Financial planning, like the executives, is concerned to a great extent with the overall results and not so much the detail. You need only overall reserves. Very often you will need detail by line of business and year to help in the planning process. Depending on your operation you may well need some estimated payout patterns, particularly I think in this day and age where companies are very acutely aware of the cashflow aspects of our business. And you need to keep the planning process up-to-date. You've got to make them informed about changes in the historical and projected loss ratios. In the claim area it's more a matter of count. I don't think any of us want to try to cause the claim operations to change their process. We don't want them to distort the data. I think in a number of sessions you've heard comments that you want to interface with the claim department but you're best served if there is a consistency in that data. We want to keep them informed of the critical areas but we don't necessarily want to try and influence them to change the way they are operating. Underwriting is not so concerned about reserves,

they're more concerned about what the overall loss ratio is. And that gets to the pricing side of things. I'd like to go through a few sample reports covering a substantial portion of this.

This first exhibit is intended just to show you where we are and to show you what's happening in the reserves. We're using a 12 month earned premium as a base here just to keep people abreast of what's going on. But we're looking at the paid losses, the changes in the reserves both on a paid and incurred reported basis resulting in incurred loss and reserve levels. One basis for measuring reserve levels is to relate it to a 12 month moving earned premium. This could be 12 month paid losses, it could be policy counts, you could use a myriad of things as a base for looking at these ratios. Having a base will enable you to see patterns as time goes on as to what's happening. This particular exhibit is set up to try to give you a flavor of what your current reserve status is.
On the next slide we're trying to do something else. We're trying to take one program and to show the historical development of losses and the historical patterns of these reserves over time. What's happening to the earned premiums, the paid losses, the incurred loss reserves, looking at the ratio of the IBNR. Again, on this basis we're doing it on a 12 month moving basis to see if there are any patterns in the IBNR reserve to earned premium, or the paid losses to earned premium. The intent here is still to try to inform management on an overall basis what seems to be happening. But in this case rather than looking at it on an overall basis we're really looking at in on a by-line basis.

The next slide we're trying to test the year end reserves. What change has taken place? How adequate were our reserves at the prior year end. But the intent here is to try to show what's actually happened in relation to the reserves that you had set up. In this case I've just shown one line and the intent of these is that this sort of an array would be shown for all lines of business and would be shown as a total. But in this particular case the indication would be that the reserves set up at 12/31/85 were actually somewhat excessive. We also use an internal document something we call an impact study. The intent of the impact study in our operation is to tell management what we think the effect of the current year activity is going to be. We're starting from our estimate of the ultimate losses from the prior year and we're trying to work through changes on a particular program to build in what we think is going to happen this year in the way of inflation. What benefit we're going to get from earnings from prior years. Based on a certain assumed rate increase, what's going to happen to the loss ratio for the year. This is a tool to help you go through the process of determining whether the steps that are planned will get you to where you want to go. And I think a lot of people just say we're going to reunderwrite or we're going to get a 20% increase. They don't necessarily take into consideration the level of losses they're at now and whether the steps they plan to take will be adequate to get to the desired goals. That's the packet for things we show to the executives. Obviously there are a lot of specialized reports that go beyond that. It gives you a sample of things that are on a summary basis but will assist management at the top level to make decisions.

This next report is one that we put together for accounting. Here we have to provide more detail, we have to provide detail by accident year. Again we have to provide some information on the reserves broken in this case between the loss and the expense portion, and also the number of open claims. And also an estimate of the incurred but not reported claims. Some of these configurations will change if you were on a claims made basis because then you would not anticipate things like a bunch of IBNR claims. Most of them would be reported. Also if you're writing programs on a claims made basis you might want to provide information like this separately for tail coverage to help you in further estimating where you're going to go as tails mature. From an accounting standpoint satisfying current needs, this level of detail will generally suffice. And it could be by layer of insurance if, for instance, you write various layers of insurance and different reinsurance arrangements. All these things should also consider what your reinsurance requirements are. In our company most reinsurance adjustments are made by the accounting area and we make our projections on a gross basis so it somewhat simplifies it for us.

In the claim department our claims people are more concerned about claim counts. They want to know how many claims are reported, what is the claim payment patterns. This is also true in the financial area where they're really looking at areas to see how the cashflow is. What are our cash needs going to be? What do we have that's investable? We put together a set of exhibits that try to give our best estimate of what we expect to be the payout pattern. And we again do this by major program group or line of business. This is an example of one way to array this information. In the claim department this becomes important just to give them a feel of how they're doing in relation to what they would expect to do. Claim counts are more important to the claim department than the payout patterns. One thing we try and do there is to show them the actual claim counts as they occurred and to try and give them some feel as to what they should expect in the way of claim count activity. In this case there is average severity to give them a feel of that. Hopefully things like this will help them to monitor the business without influencing them to change the way they're operating. Because as I said at the outset if you change the way the claim department is setting up the reserves you may have to make a lot of very substantial adjustments to your data in order to make valid projections. This exhibit does give severities and gives the patterns of severities for the claim department.

The next exhibit is another set of information. I think you might see as you look at some of these, this is stuff that Dick was talking about. As far as some of the arrays you ought to be looking at in trying to evaluate what approaches are appropriate. This is the percent of claims closed trying to show the pattern in claims closed over time. This should help the claim department in determining how they are doing in closing claims. It also, from an actuarial standpoint can help you identify where there were claim closing drives or something like that that might change the patterns. It might also show up in your claim payment patterns or your incurred loss patterns. This is a summary that we provided the claim department that basically tries to show them the status by accident period. It shows the open claims, the claims that have been closed with or without

expense payments, the total number of reported claims, our estimate of the claims yet to be reported and a total claim count. At some point as you go back it doesn't become too critical other than the number of open claims and the estimate of the number of IBNR claims. Because eventually the data gets to be too old to really use effectively in the projection of what's happening today. At some point I believe you can cutoff your exhibits and just show the critical information like here the number of outstanding claims broken between those that are reported and those that you expect to be reported in the future. I've also included one exhibit of information that would be interesting in many of the underwriting areas. And that's the loss development history on workers' compensation insurance, or probably any line. But as underwriters are evaluating particularly large risks, they ought to have some feel as to how the experience is and what is expected to happen on that. For a small risk where you either have a claim or don't have a claim, you really have to base your evaluation on the risk characteristics. If you get large enough, you can use some sort of experience rating plan, particularly if it's sensitive to the dollar amount of loss. I think you also want to make sure the underwriters are aware of what he can expect in the way of future increases in the known values of those losses. Because I think one of the problems that a lot of people tend to have is that they'll look at the data as it's reported today and say this particular risk or this particular block of business only has a 30 loss ratio so it's good business. Not taking into consideration the fact that by the time all the losses are closed it might well end up being a 70%, or an 80%, or a 100% loss ratio. It gives them a particular different perspective. This is an attempt to try and make them aware of the patterns without putting them in a position of really having to go through the whole process of looking at very detailed reserve projections. I think that we can open the floor up to any questions that you might have in setting up databases, developing reports to analyze those databases, or reporting that information to management. If there are any questions please use the microphone because we're trying to record this and address your questions to either Ron, Dick, or myself.

Ron my question is in setting up the database or your separate database for your actuarial department, are you using the claim department to input all of that data. Is the claim department doing that? Where does all that data come from?

The data actually starts off from the claim department processing system. There's a certain amount of data that they have to input for them self. But once you get them to input the policy number then it is certainly possible to match with the policy record and just strip off all the information that's been put on the policy record and create an output record that goes into your actuarial database. I guess I would say you wouldn't want to burden the claim department with imputing manually a lot of information that they don't see any need for, for their function. I think you have to solve that problem through use of systems technology. I agree with you, you don't want to be imputing the same information multiple times. Because first of all you're going to have an error correction problem, it can't be input twice the same way. What it comes down to is

that the best solution is to go up against your premium file and strip off the premium information that you want after you've matched the records.

ED WEISNER: I'm with a reinsurance company. I guess I have a little different perspective on setting up a database. We're currently trying to set up the end all deluxe ultimate database at Pru Re. I would disagree that you should set up different databases. The word setup I think is key. We have gone through an exhaustive analysis of all of the data that everybody needs to do their job. And we intend to set up one company owned database. Nobody owns the database. We will set that database up feeding everything into it and then we will decide what each person needs for output. And I think the slides that Ron had clearly show that there were different needs for different people. But all of that data is in the one database. In fact he used an interesting term called "summarized databases." I think that's really the way to go as one database. In fact the new technologies that are out now, and they're not so new anymore, the IBMS Relational Databases would have you set up databases just once and then summarize for whatever people's needs are. I also challenge the fact that triangles are where we want to be. I think there's enough discussion going on in other places here today that triangles, while they're very interesting, are not going to be around forever, or they may be but they'll be lots of other things. Again realizing I'm a reinsurance company and not a primary company we are going to capture all of the detail on every claim. That's not the same for me as it is for you. But I really challenge this notion of summarizing your data. Once you summarize it, you can never get it back. And I think you really need to think about whether you want to summarize. I just had one other point. This idea of these relational databases, I think if you're setting one up you ought to look at it. You saw in the records that were suggested that you would keep something like dates, date of loss, the incident date, the report date. When you start hearing that there's a list of dates. In a relational database you would have a lot of little records called date records. And each record would have dates like June 30, 1985 and then another field called date type. Then you'd put the date, then you would put the date type -- like oh, this is a date of loss. And for the next claim which is claims made you might even put in two or three date records with date and date types. When you start thinking about relational databases you don't have to go to records which have these fixed formats. I have to say if you'd set up a database when you only knew about occurrence data and suddenly claims made came at you you're in trouble. Under this theory you can absorb claims made and if tomorrow somebody else wants to have a whole new thing that has 16 new dates, no problem, just set up that table with date types and I just have to load into my table. I think it's something you want to think about and I think the idea of flat files and separate systems is really gone. I think the new technologies are just going to push it away. However I think all the comments were made really goes into it, it's just a question of how you set it up.

RON WISER: Basically I agree with you and theoretically that's the way to do it. Although I think practically the situation very quickly just becomes too complex. Because you can't go out and hire a programmer that can deal with the complexities that we find with the new database

technology in trying to build one multi-purpose database that is all things to all people. I'd like to see that but I guess I'd vote on the side of practicality. I want to see some data so I can do loss reserving. This was our compromise as to how to get that. Secondly, maybe I didn't make the point clear on our actuarial database. But it is a claim-by-claim database. We always retain the individual claim information essentially forever which is why we get up to the huge sizes. But then in terms of getting accessability to that huge database we run off a summarized databases. But behind it the complete claim detail is always maintained in the actuarial database.

ED WEISNER: I agree with almost everything you've said. Just to give you an idea, we had to go to England to hire some programmers to do this technology the IDMS as it's called -- that's one of the integrated system techniques. However in the reinsurance company we've found out the claims detail is the least of our problems. The so called premium one that you alluded to has required us to set up an entire contract system. And if you know reinsurance contracts are individualized so we have had to figure out what a reinsurance contract looks like and be able to load it in any shape or form that it comes. If you're designing something today, if you're not at the front, you're not in the game. If you've got something going and it works, great. But if you're starting to think about going forward we're it's at is integrated systems.

1986 CASUALTY LOSS RESERVE SEMINAR

6E - STATUTORY EXAMINATION OF INSURANCE COMPANIES

Moderator: Bertram A. Horowitz, Special Deputy
Superintendent & Financial Actuary
New York Dept. of Insurance

Panel: Robert M. Solitro, Chief Examiner
New Hampshire Dept. of Insurance

Richard J. Roth, Asst. Insurance Commissioner
California Dept. of Insurance

Recorder: Coloria Huberman, Associate Casualty Actuary
New York State Department of Insurance

BERT HOROWITZ

Good morning. My name is Bert Horowitz and I am Special Deputy Superintendent and Financial Actuary for the New York Insurance Department. This morning we are going to discuss the issue of statutory examination of insurance companies. We are very fortunate that we have two distinguished members of the regulatory community as our panelists - Robert Solitro, Chief Examiner of the New Hampshire Insurance Department, and Richard Roth, Jr., the Assistant Commissioner of Insurance for the California Insurance Department. Before we begin with our first speaker, I'd like to review the difference between insurance and general business. Insurance is not regulated like a candy store, grocery store, or a supermarket. The difference can best be explained by an analogy. When you walk into a supermarket and buy a can of peas, you stand in line and you pay your $.79 for your can of peas and you walk out. If the supermarket can't pay its bills or burns down, you're still whole. You paid your $.79, you walked out with your can of peas, and you still have it. Insurance is different. In insurance, you walk in through an agent and hand him $2,000.00, and receive a document that says, in the event you have a loss, the insurer has given you a promise to pay. One of the major reasons that regulation, and, in particular, solvency regulation, exists, is because someone has to monitor that the insurance company keeps its promise to pay. Thus, insurance is akin to banking, wherein a bank might give you a passbook or a card along with a promise to pay. A whole regulatory framework has grown up largely because of this promise to pay aspect, which is differs from general business.

Solvency regulation, generally considered the primary function of an insurance department, is our topic of discussion. The primary focus of solvency regulation is loss reserves. Our first speaker, Robert Solitro, is the Chief Examiner for the New Hampshire Insurance Department. Bob is responsible for the licensing, examination, admission and overall solvency regulation for all insurance companies doing business in New Hampshire. New Hampshire is a very active regulatory state. Some of the companies domesticated in New Hampshire include the Home Insurance Company, Continental Insurance, and some of the AIG Companies. Bob is a certified public accountant and has been with the New Hampshire Insurance Department since 1977. He is a graduate of Bryant College with a Bachelor of Science Degree in Accounting. Bob is also an accredited financial examiner of the Society of Financial Examiners. Bob.

Thank you, Bert. I would like to give an overview of the insurance industry solvency and the regulator's response. We all know what brought the insurance industry to the bottom of this cycle, be it cashflow underwriting, irresponsible price cutting, or regulators who helped the companies get to where they are today.

Like everything else in life, one must first make a mistake before one can develop the solutions to the problem. It is impossible to set all rules and regulations to safeguard against all problems, and still allow the companies the ability to do business. Therefore, the regulator's response are based upon reactions to the problems we have today. First, I would like to talk about the regulatory process. Traditionally, it is broken into two areas: 1) regulation of domestic companies and 2) foreign

companies licensed within that state. The domestic company review would include an in depth review of the annual statements filed with the insurance departments, which would include a review of Schedule P results that Bert will discuss today. Normally, quarterly financial statements and holding company filings are also reviewed throughout the year. Statutory provisions also provide for in depth reviews conducted by examiner teams on either triennial or quadrennial basis. During the examination, the examiners have traditionally used limited techniques to project loss and loss adjustment expense reserves. Currently, many departments are utilizing either the services of independent consulting actuarial firms or the services of newly created actuarial divisions within the insurance departments to aid the examiners in the projection of losses and loss adjustment expenses. As far as foreign companies licensed in the state, a company's annual statements and Schedule P results are reviewed when a company is considered for admission into a state. In some cases, foreign companies are required to submit holding company filings. This information is then supported by domestic insurance company examinations.

As a result of scarce resources, many states are falling behind on examinations of their domestic companies. The period between examinations continues to lengthen. Regulators feel that the period of time between insurance department examinations must be reviewed by either outside consulting actuaries or third party accountants. The company financial statements must be supplemented by these third party opinions. As a result, a number of states now require an annual CPA audit opinion and/or an opinion by a qualified loss reserve specialist be filed as a supplement to the annual statement.

Recent insolvencies have proven that this regulatory process is not working. As a result of the number of insolvencies during the years 1984 and 1985 within the property and casualty industry, state legislators, at the request of insurance departments, are responding with new legislation to tighten existing regulations. The new legislation will provide regulators with additional information for review. Examples of some of the new legislation include: (a) the State of Maine now requires CPA audits to be filed by all licensed companies in the State of Maine as part of the annual statement filing. (b) The states of New Jersey currently requires loss reserve certifications to be filed with the annual statements of all property and casualty companies licensed in that state. (c) The NAIC surveyed the states in 1984 and found that 7 states were requiring loss reserve certifications of one form or another. This survey was done again in 1985, and the results indicated that 8 additional states, for a total of 15 states, currently require loss reserve certifications. (d) Approximately 15 states, including the State of New Hampshire, have recently passed "credit for reinsurance" legislation, which attempts to address the issue of reinsurance insolvencies, which leads to the possible uncollectability of reinsurance. (e) A number of states have enacted regulation regarding letters of credit and the provisions which must be included within the LOC, which would provide protection when the reinsurer becomes insolvent and the uncollectability of reinsurance is a problem. (f) The NAIC is currently studying the possibility of issuing a list of

approved entities who issue letters of credit. Again, this is an attempt to indirectly regulate reinsurers.

These are some of the actions regulators and legislators have taken as a result of the increase insolvencies. I believe regulators realize that the so called safety net, the guaranty funds, are currently being stretched out of limits in that they may not be able to support additional insolvencies.

Therefore, legislators have decided to shift some of the regulatory burden, rather than increasing insurance department budgets. The burden of regulation of solvency is passed on to independent actuaries and CPA firms by requiring the aforementioned opinion. A session at this conference discussed actuaries' professional responsibilities when issuing these opinions. The AICPA's Statement on Auditing Standards No. 47 provides the accountant with guidelines regarding audit risk and materiality in conducting an audit. Both actuaries and accountants know the audit risk is implicit with the phrase, "in my opinion".

As Chief Examiner for the State of New Hampshire, I authorize the use of consulting actuarial firms during the examination of our domestic companies. I expect that the actuaries will complete their review in a professional manner and be prepared to stand behind their findings. For the period that the consultant is under contract with the Department, it is viewed as a quasi-division of the Department and it will be held accountable for its work. The traditional examination process of matching insurance examiners against company actuaries, does not hold up in court when one attempts to get an order of liquidation or rehabilitation. I believe the courts are requiring a higher standard of expertise on the regulator's behalf. Therefore, the State of New Hampshire has engaged, and will continue to use consulting actuaries with problem companies.

In addition, the Legislature of the State of New Hampshire now requires the Insurance Department to review loss and loss adjustment expense reserves on an annual basis. We are working with our domestic industry to supply the Department with the proper loss data on a quarterly basis in order to fulfill this statutory requirement.

The Actuarial Society must be prepared to review the work of its members and be prepared to ensure that professional standards and quality of work are upheld. If, as a result of the review, negligence is discovered, the Society must be prepared to take action against that member or members. As regulators throughout the country begin to rely on the actuarial profession more and more, they will require this self discipline within the Society.

Regulators are currently fighting with a weak and underreserved insurance industry, and, at the same time, are faced with federal tax reforms that may force loss reserve discounting. This topic has been covered by many seminars here. Most regulators currently believe that the property and casualty industry may be 15-20% underreserved. If the federal regulations would now require discounting of already discounted reserves -- it may be cause additional insolvencies. Regulators have always shied away from discounting as a result of their conservative approach, and what dictated

by statutory accounting principles with the exception of certain cases of specific long tailed lines which requires discounting in the rate-making processes. Regulators believe that the projection techniques utilized were of a more exact science, and could eliminate the risk of inadequate reserves, the theory behind discounting might be acceptable. Most regulators have taken the position against explicit discounting, but the insurance industry has achieved implicit discounting by underreserving. The need to recognize the time value of money is already considered by the company management when they purposely underreserve. The theory of discounting raises a number of questions in the regulator's mind, such as: (a) should there be a standardized discounting formula for all companies, regardless of the products sold? (b) What lines of business should be discounted? (c) What rate of interest should be utilized in its calculation? (d) What happens when interest rates change and how does one adjust for the discount? (e) Should we discount both indemnity and expense reserves.

With the inability of an actuary to hold a crystal ball regarding future interest rates, inflation, federal action, tort reform, and jury awards, I believe regulators will continue to fight explicit discounting on top of the already implicit discounting which is prevalent in the industry.

Company profits and stockholder returns have also adversely effected loss reserves. I wonder how many insurance companies establish loss reserves based upon their actuary's recommendations? Capacity is one of the larger forces causing implicit underreserving today. As prices continue to increase and the probability of a company making a profit becomes greater, many companies are implicitly underreserving to generate the additional surplus for capacity.

Because of the prohibition of explicit discounting, companies have used other methods to achieve reduction of reserves such as selling of loss reserve, and reinsurance portfolio transfers. A number of regulations have been passed and accounting directives issued regarding the accounting for loss reserve portfolio transfers. The regulations have established certain standards of disclosure and requirements concerning arrangements whereby an insurer realizes an increase of its surplus as a result of the transfer of loss and loss adjustment expenses for considerations less than the amount of such application. The regulators are concerned that there is a transfer of risk and that the transfer is not a pure funding arrangement.

Both companies and consulting actuaries must be aware of these material transactions when projecting loss reserves, and must review the contracts to determine if a transfer of risk has taken place. The AICPA has issued accounting treatment requirements for loss portfolio transfers that are financing arrangements. Some of the provisions to consider when the arrangement is reviewed include: (a) There should be no provisions that pre-determine payment schedules or any delayed payment clauses which bear no relationship to losses paid by the ceding insurer. (b) The amount paid by the ceding insurer should be limited to a fixed amount or rate in the agreement, and there should be no provision in the contract for the payment of an amount greater than the specified amount. (c) The agreement must not

include a guarantee of profit to the assuming insurer. (d) The agreement should not be cancellable retroactively toi the effective data by any of the parties. If the arrangement is determined to be a financing agreement, then there is no transfer of risk and should be accounted for as such.

In closing, the "regulator's response" includes a number of new statutes, new regulations and the inclusion of independent third party reviews as a new regulatory tool to help monitor the insurance industry or to help make the decision as to whether to liquidate or rehabilitate. Thank you.

BERT HOROWITZ:

Thank you, Bob. I would like to review some of the actuarial tests that regulators, and, in particular, the New York Insurance Department, perform in the preliminary review of insurance companies. The major regulatory framework for solvency regulation is the statutory financial examination system. Under law, each insurer is generally subject to a statutory financial examination once every 3 or 5 years. The examination is usually directed by the insurer's domiciliary state and sometimes accompanied by other states where the insurer is licensed. Under certain circumstances, for example, when the insurance department has serious doubts concerning an insurer's solvency, it may call for a special examination.

The starting point for the financial examination is, of course, the filed annual statement, as Bob mentioned. The balance sheet contained therein represents a year end snapshot of the insurer's assessment of its financial condition on a statutory accounting basis. The immediate purpose of the statutory examination is for the insurance department to independently reassess each asset and each liability as of the examination date. The process restates the statutory surplus (statutory assets minus the statutory liabilities) as of the examination date. The result is documented in a formal report on examination which is filed with the insurer's domiciliary state insurance department and each licensing state insurance department. The formal report remains on file and open for public inspection. Some or all of these insurance departments might deem it appropriate to take regulatory action based on the results of the examination. For example, of course, the finding of a deep uncorrected insolvency might cause the domiciliary superintendent or insurance commissioner to seek a court order to rehabilitate or to liquidate the distressed insurer.

It is important to recognize that statutory accounting has adopted certain practical rules to value many of the assets and liabilities. For example, typical asset items are stocks and bonds. The statutory value for stocks is generally taken as the market value. On the other hand, the statutory value for bonds is generally taken as the amortized value. Typical liability items are the unearned premium reserves and the loss and loss adjustment expense reserves. The statutory value for the unearned premium reserve is generally determined by a relatively standardized pro rata formulas. On the other hand, in property and casualty insurance, there are three characteristics of loss and loss adjustment expense reserves which differentiate them from other balance sheet items. First, these liabilities are generally the most difficult balance sheet items to value. In contrast to most other balance sheet items, there are few guidelines in

the state insurance codes as to the appropriate statutory value for loss and loss adjustment expense reserves. The New York law is fairly typical in this regard. For example, Section 1303 of the New York Insurance Law provides that "every insurer shall maintain reserves to provide for the payment of all losses and loss adjustment expenses incurred on or prior to the date of statement, whether reported or unreported, which are unpaid as of the statement date". Section 4117 of the New York Insurance Law, which is also fairly typical prescribes certain minimum statutory reserves what are called excess of statement reserves. However, perhaps more importantly, within that Section, it also grants discretionary powers to the Superintendent or Commissioner in providing that he may modify the formulas for calculating such reserves, or prescribe any other basis which will produce adequate and reasonable reserves. The final report on examination put out by the insurance department ultimately rests on this authority.

The second characteristic is that loss and loss adjustment expense liabilities are generally the largest liabilities. This is especially true for insurers concentrated in the long-tailed lines of business such as workers' compensation, medical malpractice, excess of loss liability and other liability coverages. Since these liabilities are so large, a relatively small percentage change in their valuation may mean the difference between a solvent and an insolvent insurer. This is also known as leverage.

The third characteristic is that the statutory value selected for loss and loss adjustment expense liabilities by the insurer in its filed annual statement, and by the insurance department examiners are necessarily estimates. This means is impossible to eliminate all of the uncertainty in the value of these liabilities. As a by-product of this uncertainty, if a company wishes to hide its financial troubles, the easiest way to accomplish it is by understating its loss and loss adjustment expense liabilities and thereby overstating its statutory surplus. Related to this kind of purposeful understatement is the "wishful thinking "of a management which is unduly optimistic in its estimate of loss and loss adjustment expense liabilities. The task facing insurance department solvency regulators is to try to choose the most reasonable estimate of these liabilities without undue optimism or undue pessimism.

As a result of these three characteristics, Schedule P has been required by insurance departments to be included in each insurer's filed annual statement. Prior to 1969, Schedule P was constructed solely on a policy year basis, but it currently is stated on an accident year basis. While it has evolved through several other changes and refinements, it has been and continues to be a useful starting point for regulators to evaluate loss and loss adjustment expense liabilities. You have been handed a packet which contains extracts of 1974 through 1979 Schedule P's and other related exhibits from an illustrative company. I intend to refer to these exhibits throughout the remainder of my discussion. Some of the schedules and exhibits that appear in your handouts will also be presented on the slides. Hereafter, will assume that the examination date of this illustrative company is 12/31/79.

Schedule P is currently divided into 4 parts. Each part is further subdivided into other subdivisions. The lines of business subdivisions are A) auto liability b) other liability c) medical malpractice d) workers' compensation, and e) which includes the following 6 sublines: farmowners' multi-peril, homeowners multi-peril, commercial multi-peril, ocean marine, aircraft, and boiler and machinery. Parts 1 through 1E, which are the first three pages of your annual statement handouts, present the premium, loss and loss adjustment expense experience-that is, cumulative payments and all reserves by accident year. The second to last column, column 11, displays the total loss and loss adjustment expenses incurred by accident year as of the statement date. The first 3 pages of the handout show other liability. The incurred value is defined as the cumulative payment through the statement date plus the reserves at the statement date. It is important to realize that these incurred values are the company's estimate of accident year ultimate loss and loss adjustment expense reserves. If the reserves for each accident year were perfectly correct at each statement date, then the Part 1, Column 11 incurred value of any particular accident year would be identical at every statement date. Any increase from the initial incurred value at subsequent statement dates is called upward development and represents an insurer's acknowledgement of underreserving of that initial value. A decrease from the initial incurred value at subsequent statement dates is called downward development. And represents the insurer's acknowledgement of overreserving of that initial value, resulting in a savings in those reserves.

The top portion of the 4th page of the handout displays extracts of Schedule P, Part 1F which gives the insurers accident year distribution of incurred but not reported losses included in the insurer's total loss and loss adjustment expense reserve at statement dates 1975 through 1979 for other liability. A one year development of IBNR by accident year appears on the bottom half of your page. Footnote (a) of the instructions to Part 1, which has not been provided in your handout, provides instructions for calculating the so-called excess of statutory reserves over the statement reserves.

The top part of the 5th page of this handout displays the 1979 Part 2-Summary. Parts 2 through 2E are simply a summary of Part 1 accident year incurred values for the current statement date and the prior 5 statement dates. The right hand side of Parts 2 through 2E similarly recap the loss and loss adjustment expense ratios. The top portion of the last page of the handout displays 1979 Part 2 other liability. The prior page is a summary of the entire company including all lines. The bottom portion of these final 2 pages displays the 1979-Part 3 and Part 3B respectively. Parts 3 through 3E show the cumulative payments and their relation to earned premium for the current and six prior accident years. Payments and reserves to earned premium ratios are also calculated from the incurred loss and loss adjustment expenses as of the statement date for each accident year at annual intervals.

Now, I would like to turn to some specific uses and limitations of Schedule P using figures of our illustrative company. Turning our attention to

Schedule P, Part 2 Summary (the second to the last exhibit sheet in your exhibit handout) will give us a retrospective test of the adequacy of prior loss and loss adjustment expense reserves. For example, on Row 4 of Part 2 in the 1979 annual statement, the company shows an incurred loss and loss adjustment expense figure for accident year 1975 at the 1975 statement date and each subsequent statement date through 1979. It is the 4th row of figures. In this example the company originally estimated the ultimate incurred loss and loss adjustment expenses for accident year 1975 at $21,729,000. At the end of each subsequent year the company totaled its cumulative payments for accident year 1975 and re-estimated its remaining outstanding liabilities. In general, an ever increasing portion of the total incurred is comprised of actual payments rather than reserve estimates. At the end of 1979, the company estimate of the ultimate incurred loss and loss adjustment expense for accident year 1975 developed upward to $26,736,000. The $5,007,000 increase over the original $21,729,000 represents a deficiency in the original reserve established at year end 1975. Therefore, if there were no more developments beyond 1975, the company should have shown $26,736,000 as of its 12/31/79 accident year incurred loss adjustment expenses at every valuation. This is a retrospective acknowledgement that they were $5,007,000 underreserved as of 12/31/79.

Similarly, the total loss and loss adjustment expense reserves -- that is, of all accident years -- as of the statement date can be retrospectively tested using the cumulative total row of Schedule P, Part 2. For example, on Row 5 of the Part 2-Summary in the 1979 annual statement, the company showed incurred loss and loss adjustment expenses for accident year 1975 and prior at the 1975 statement date and each subsequent statement date through 12/31/79. In this example, the company originally estimated the ultimate incurred loss and loss adjustment expense for accident years 1975 and prior at $378,881,000. At the end of each subsequent year, the company totaled its payments for accident years 1975 and prior and re-estimated its remaining outstanding liabilities. In general, each subsequent incurred evaluation should similarly become more and accurate because a higher proportion is comprised of payments rather than estimated reserves. At the end of 1979, the company estimate of ultimate incurred loss and loss adjustment expense for accident year 1975 and prior developed upward to $401,852,000. The $22,971,000 increase from the original figure to the final figure represents the company's, acknowledged deficiency in its original reserve established at year end 1975 for accident year 1975 and prior. Therefore, if there were no further developments beyond 1979, the company, by its own admission, should have shown $401,852,000 as the ultimate accident years 1975 and prior loss and loss adjustment expenses at every statement date. In addition, we can say that the loss and loss adjustment expense liabilities reported in the 1975 annual statement balance sheet should have been $22,971,000 higher than was actually reported. Going down on the Schedule to the 1978 reserves, we can see that a one year development of approximately $14 million has occurred. That is, the $475,075,000 as compared to the $489,277,000. On your handouts, as well on the slide, the right hand side of Schedule P, Part 2 recast the dollars shown on the left hand side by accident year in terms of loss and loss adjustment expense ratios to calendar year earned premium.

Paralleling our earlier analysis, if we focus again on 1975 (and assuming the reserves at year end 1979 are correct), then the company should have established reserves for accident year 1975 such that an 86.1 loss ratio would have resulted. Therefore, the 1975 accident year reserves as of year end 1975 were deficient in loss ratio terms by 86.1% minus 70.0%, or 16.1%, of the calendar year 1975 earned premium. Similar deficiencies are evident in all accident years. These trends might suggest, subject to some limitations, that the most recent years reserves may be inadequate. In this case, most recent is refers to 12/31/79.

A secondary regulatory concern is the absolute level of these loss ratios. It's apparent from the Schedule that the developed loss and loss adjustment expense ratios are in excess of 85%. It would be very difficult for many companies to survive this state of affairs for very long.

Another area for review is the accident year loss ratios at their first evaluation. A review of the loss ratios might indicate that the company might have strengthened or boosted its reserves in recent years, and that possible past trends may not apply. For example, assuming the same relative adequacy of earned premium, if accident year 1979 had a loss ratio of 90%, instead of 67.5% (the lower right hand figure), a comparison to other years at their first evaluation would show 1979 to be much higher, and the company had possibly more accurately estimated its reserves for that year. A lot of this is also a function of the adequacy of the earned premium.

A sharp general decline in accident year incurred loss and loss adjustment expense ratios at the current statement date may also signal reserve deficiencies. For example, the Schedule shows a fairly consistent fall from a 98.6% high down to 67.5% for accident year 1974 to 1979 respectively. Of course, consideration should be given to rate adequacy and distorting influences, such as change in mix, reinsurance agreements, and other potential mitigating or aggravating factors.

Another variation of the retrospective test can be directly obtained from Schedule P, Part 2. This is illustrated in the first exhibit of your legal sized handouts, and is titled "Retrospective Solvency Testing." The purpose of this test is to retrospectively restate prior year end surplus in view of the company's subsequent loss and loss adjustment expense reserve developments. Since the statutory surplus equals the statutory assets minus the statutory liabilities, a dollar increase in the estimate of the liability for loss and loss adjustment expense should correspond to a dollar decrease in surplus. Of course, there are possible exceptions to this, such as the excess of statement reserves over statutory reserves, federal income tax offsets, unauthorized penalties, etc. This exhibit by-passes the excess of statutory reserve problem by considering the statutory reserve as part of the surplus, but ignores any tax or other consequences, such as the unauthorized. In reviewing our retrospective analysis of the statement date reserves, consider the 1975 surplus. The company reported a statutory surplus of $6,163,000 at year end 1975. The incurred loss and loss adjustment expenses for accident year 1975 and prior were valued at $378,881,000 at year end 1975. You'll recall that this is a similar to

what we just did on Schedule P, Part 2. The incurred loss and loss adjustment expense for accident year 1975 and prior evaluated 1 year later -- that is in 1976 -- developed to $381,759,000. The increase of $2,787,000 -- the difference between the two figures -- represents the company's acknowledged deficiency through 1976 in the original reserve as of 1975 on accident years 1975 and prior. Therefore, in view of the company's own development through 1976, the company, by its own admission, should have stated its reserve $2,878,000 higher. Therefore, its surplus should be $2,878,000 lower and the revised retrospectively restated surplus is $3,285,000, that is, $6,163,000 of the original, minus the upward development of $2,878,000. Continuing this process for another year reveals that this company has retrospectively declared itself insolvent by $3,004,000 as of 1975 in view of developments through 1977. Skipping to developments through 1979, the last statement available, this company has retrospectively declared itself insolvent by $16,808,000. Exhibit 1 shows that even though a company has reported itself in a solvent condition in every statement and in every balance sheet, subsequent developments of their reserves have caused the company to, in effect, retrospectively declare itself statutorily insolvent each year. It is also significant to note that the insolvency and the reserving problem appear to be worsening because, 1974 developed a retrospective insolvency after 3 years, 1975 through 1977 after 2 years, while 1978 actually developed a retrospective insolvency by the company's own admission after only 1 year. Actually, this exhibit represents adaptation and expansion of one of the most widely disseminated regulatory tests. The final 3 ratios of the Insurance Regulatory Information System financial ratios consider 1 and 2 year reserve developments divided by surplus. Any upward development in excess of 25% of surplus is considered failure of the test and cause for regulatory concern. I probably should mention at this point that IRIS' forerunner was called the NAIC Early Warning Test. It is clear from Exhibit 1 that the company was unable to pass any of the tests for any year displayed.

Up to this point, we have been looking at Schedule P, Part 2 Summary only. That is, all the Schedule P lines ("A" through "E") combined. The "A" through "E" subdivisions of Schedule P, Part 2 allow for a similar analysis by line. The by line analysis is very important because shifts in business for one line to another affect the ability to conclude that prior trends apply to recent years. Of course, subline shifts within a line can also have this effect.

As an example, I will briefly discuss other liability for the by line analysis. Note we just did the summary of all Schedule P lines combined. The top half of the last page of your Exhibits shows a generally consistent upward development by accident year and by statement year on the left-hand side. As a consequence of this, the right hand side, those left hand side figures divided by a fixed earned premium within each accident year, shows the expected generally upward trend in the accident year loss and loss adjustment expense ratios.

We now move to Schedule P, Part 3 on the bottom of your final exhibit, as well as on the slide. The left-hand side is a compilation of the calendar

year earned premium, accident year cumulative loss and loss adjustment expenses paid, and the company's current accident year incurred loss value. Cumulative loss and loss adjustment expenses are displayed at 1, 2, 3, 4, and 5 years from the inception of the accident year. These payments do not change at subsequent statement dates once included in Part 3. The reserve figures displayed on the Schedule are the loss and loss adjustment expense reserves that "should have been" established at year end 1, 2, 3, 4 and 5 years from the inception of each accident year under the assumption that the company's current incurred values are correct. For example, the loss and loss adjustment expense reserve for a particular accident year that "should have been" established at the end of 2 years is computed as the current incurred value minus the cumulative payment through those two years. Of course, these should have been reserve values will change at subsequent statement dates by the same amount as the subsequent re-estimated incurred values, unless, the company perfectly estimated its ultimate incurred values at each statement date.

Parts 3 through 3E provide a prospective test of loss and loss expense reserves. I will focus on Part 3B, other liability, in more detail. The prospective attempt to determine the adequacy of the reserves set at the current evaluation rather than set at prior evaluations as done in the retrospective tests in Parts 2 through 2E.

Current reserves are tested by reviewing and comparing several ratios which are made available by the organization of Parts 3 through 3E. One such ratio which is directly available to us is the "should have been" reserve to earned premium ratio given in the right hand side in Columns (8) through (14). If the last reserve ratio in each row is significantly lower than other ratios within a row, this might suggest that current reserves are inadequate. This is somewhat analogous to what we did in Schedule P, Part 2. For example, in Row 4, the last ratio corresponding to accident year 1979 is 52.6% whereas the average of all the other ratios in the Row is 72.2%. In Row 6, the last ratio corresponding to accident year 1979 is 54.0%, whereas the average of the other ratios in the row is 56.2%. In Row 8, the last ratio corresponding to accident year 1977 is 37.1%. The average of the other ratios in the row is 41.8.%. In Row 10, the last ratio is 12.5% corresponding to accident year 1976, versus an average of 31.3%. Finally, in the last Row 12, the ratio corresponding to accident year 1975 is 8.5% versus an average of 21.5% in every case, the last ratio is lower than the average of its predecessor evaluated at a common point in time. This certainly suggests that the current reserves, that is, the reserves held in the 12/31/79 statement are inadequate. Some of the important implicit assumptions in this test are that the payment pattern, the adequacy of earned premium and the ratio of the required reserves to earned premium are relatively constant for all years. Limitations which apply to Part 2 through 2E also apply to Parts 3 through 3E, such as reinsurance. Their impact will be reflected in both the incurred loss and loss adjustment expense ratios and the payment pattern for each accident year.

I want to mention a brand new discounting Schedule which I know has been discussed in several other sessions. I would like to give New York's view

of discounting. Schedule P, Part 4, which is a brand new schedule to be included in the 1985 annual statement, provides information on the amounts of discount of the gross loss and loss adjustment expenses unpaid. This does not in any way mean that the insurance department of any state is sanctioning or approving discounting. This is merely for disclosure purposes. Parts 4A through 4E display the interest rate, loss and loss adjustment discount amounts adjusted or in the process of adjustment, as well as the incurred but not reported amounts of discount for each line.

The superintendent asked me to annunciate the Department's policy on discounting. It is based on a long tradition of statutory accounting and relies on Section 4117(g) of the Insurance Law, which adopts the NAIC Accounting Procedures and Practices and Procedures Manual rule which states:

"Generally, a company is required to determine what the value of its claims will be when they are ultimately set. Excluding certain types of losses in which the settlement consists of periodic payments of specified amounts and which may properly be discounted with conservative interest assumptions, statutory accounting practice require that for every dollar of unpaid losses the company reserve a whole dollar for future payment of those losses."

Under Section 4117(d) of the Insurance Law, Workers' Compensation determinable and estimable future loss and loss adjustment expense payments are computed on an individual case basis shall be discounted at the very conservative interest rate of 3.5% per annum. This discounting is applicable to Workers' Compensation tabular reserves, which, following that general NAIC rule, are reserved for periodic payments of specified amounts. In addition, the Superintendent of New York has made one exception. Using his discretionary power that I referred to earlier, he has made exception to the general NAIC rule in the area of Medical Malpractice reserves at an interest rate that is appropriate for the particular company under consideration.

Note that Portfolio Transfer Regulation 108, which New York promulgated about 2 years ago, implicitly permits discounting of reserves, although they are not explicitly shown as discounting in the new Part 4 schedule.

The most useful part of Schedule P for loss reserve specialists is Part 1. Part 1 provides the database for every subsequent part of Schedule P--Parts 2 and 3. You can construct Schedule P, Parts 2 and 3 from having successive Schedule P, Parts 1 of historic annual statement dates. Some specific applications of Schedule P include payment development triangles, incurred development triangles (excluding IBNR), and expense reserve analyses. The New York Insurance Department includes these methods as part of their preliminary analysis. Prior seminars have reviewed that material. Exhibit 6, the payment development through 12/31/79, indicates a $12,352,000 deficiency. Exhibit 8 indicates an $8,381,000 deficiency as per the incurred development method. The loss reserve specialists attempt to narrow the difference between the payment development indication, the incurred developments indication, as well as any other methods. Often, an

extensive actuarial analysis of several methods are performed for purposes of comparison to arrive at what we consider the appropriate report on examination figure.

Up to this point I have described certain tests based on Schedule P that can be done in a kind of cookbook fashion. I cannot over emphasize the fact that these are really just early warning or preliminary tests. There is no sure fire recipe that always cook up the correct reserves. Understanding the trends and changes that affect the database is a prerequisite to the application of sound reserving methods. Data contained in Schedule P is generally only sufficient to gain preliminary insight into what is going on. Knowledge of changes in underwriting, claims handling, data processing, and accounting, as well as changes in the legal and social environment, can affect the experience and are essential to an accurate interpretation and evaluation of the observed data and the choice of reserving methods.

My colleague, Richard Roth, Jr., will elaborate on some of these points. And he will also discuss the California perspective or discounting as well as loss reserve opinions filed with the State of California.

Dick Roth is the Assistant Commissioner of Insurance of California and Chief of the Property Casualty Bureau. He oversees all property/casualty issues within the Department of Insurance, including workers' compensation, professional liability, especially malpractice, mortgage guarantee, and automobile. He is directly involved in issues of financial analysis, solvency, and all matters related to the overall viability of insurance companies. Dick is a fellow of the Casualty Actuarial Society. He has graduated with a Bachelor of Science in Mathematics; a Master of Arts in Economics; and a Master in Science in Statistics, all from Stanford University. As well, Dick has a law degree from the University of Connecticut. Dick.

DICK ROTH:

As my part of the presentation, I would like to cover some of the actuarial problems that we have with Schedules O and P. These schedules provide the basic material for the actuarial projections of the loss and loss expense reserves. First, Schedule O. Prior to 1985, losses incurred for fidelity and surety did not include IBNR. Therefore, companies writing heavily in fidelity and surety always showed an adverse development on Schedule O. This affected the NAIC early warning test. However, in 1985 this was corrected in Schedule O, as well as in Schedule G. The reinsurance line should not be in Schedule O. It is a long tail line and it is difficult to test the IBNR. What happens in reinsurance often buries what happens in the other lines of Schedule O. For this reason, we often manually remove the reinsurance lined from Schedule O when making an actuarial projection of the combined lines of Schedule O. The development on the international line can be greatly affected by changes in foreign exchange rates. There may appear to be serious adverse development in the losses. Actually, the foreign currency is strengthening against the U.S. Dollar. There is no simple way to solve this problem and it can affect the NAIC early warning test. The true development can only be obtained by examing the lost statistics in the original currency.

Schedule P is intended to enable a more detailed analysis of liability or long-term lines. However, Schedule P can be distorted by reinsurance contracts. In fact, any reinsurance contract, other than a quota share contract, can distort Schedule P. Particularly damaging are loss portfolio transfers and contracts where retentions change from year to year significantly. In a loss portfolio transfer, a block of the outstanding losses is ceded out. This means that a section of the loss development projection triangle will be missing and the losses cannot be projected. The reverse problem occurs when a block of outstanding losses is assumed. The loss development factors cannot be determined because the old losses cannot be separated from the new losses to see the trends. A more subtle problem occurs when the retention provisions of a reinsurance contract change or when the provisions of a surplus contract change. The loss development factors would be directly affected by such changes and adjustments may be necessary in using these factors to project the ultimate losses. Very large insurers commonly report on a pooling basis. In other words, group of companies will pool all of their losses together and then allocate the losses to each company based on a certain percentage. If the percentage allocation changes from year to year, the member company's annual statement then becomes worthless because a year to year comparison cannot be made. In such a case, only the groups consolidated annual statement can be used. The trend in regulation is more and more relying totally on the consolidated annual statement and less and less on the individual companies.

Another problem is fronting. In a fronting situation, almost all of the risk is ceded to another reinsurance entity, quite often an offshore insurance company. The problem is that the fronting company receives only a small portion of the premium but could be liable for all of the risk if the offshore insurer becomes insolvent. Schedule P, of course, will not show this potential liability at all. It only shows the retained fronting portion which can be quite small. I have been pushing the NAIC Blanks Committee to add additional schedules which would give the basic data in Schedules O and P on a direct basis as well as on a net basis. This would remove the problems with reinsurance and particularly those of the fronting business. However, the NAIC Blanks Committee has been reluctant to add any more schedules to the blanks. Also, while reporting on a direct basis will solve many problems it will not solve all of the problems. One great advantage to reporting on a direct basis is that this will give the profitability of the whole book of business and, by implication, the profitability of the business ceded. It is important for the regulatory authorities to know the profitability of the business ceded because if it is not profitable then we know that that primary company will have trouble with its reinsurers down the line.

Some of the other problems with Schedules O and P are among the following: (a) A shift from occurrence policies to claims made policies will invalidate any analysis of Schedule P. In such is a case, an actuarial analysis would have to be based on historical report year information. Although a Schedule P asks for accident year data, most companies writing claims made policies ignore the heading and present the report year data.

The problem is that occurrence losses will have an IBNR in the development, whereas claims made policies do not have an IBNR. Thus, if a shift has occurred the projected losses will be greatly overstated. (b) Another problem occurs when any of the losses are reported on a discounted basis. Then there will be an adverse development by the amount of the discount. This sometimes happens in workers' compensation and medical malpractice. To deal with this problem, a supplement, Schedule P, Part 4, is required which shows the amount of the discount of the losses and expenses unpaid. Schedule P should give the number of claims reported. It currently gives only the number of claims outstanding. This would enable average incurred losses to be determined. The present annual statement gives the number of claims outstanding which is not very helpful from an actuarial point of view. The loss expense reserves should be split into allocated and unallocated. The methods used to calculate these different expenses are very different. Also this would make sure an insurer has put up an unallocated expense reserve which unfortunately some companies do not. (2) In Schedule P, Part 1E, homeowners and commercial multi-perils should be split out separately. These two important lines are different from each other. Also, more and more losses are now being incurred under their liability coverage of their homeowners policy than ever before. (e) The mortgage guaranty insurance industry has been having many problems. You may have read about TyCor which is under conservatorship in California. However, due to the nature of the claim reporting and loss settlement procedures in mortgage guaranty insurance, the Schedule O data is of limited value for analyzing that line. (f) There is often a mismatch between the losses and premiums which will distort the loss ratio. This mismatch arises when retrospective rating is used or when the premium base is subject to audit after the policy term. However, the advantages of using accident year data outweigh whatever distortions might arise in the annual premium reporting.

Because of these problems, the main use of Schedules O and P is for the historical development. Although Schedules O and P show the runoff or development for losses and expenses combined, it is possible to manipulate the data in Schedules O and P to take the adverse runoff and separate it into the runoff due entirely to losses, runoff due entirely to expenses, and the runoff due totally to IBNR, separately identifying each area. When the adverse development occurs, the problem is usually expenses. Schedule O and P still remain quite useful to the regulators for the personal lines -- homeowner, automobile, and workers' compensation. In California when an insurer comes under examination, we ask for the loss and expense information on a direct basis to avoid the reinsurance problem. We have a claims and underwriting department that answers detailed questions so that we can learn about insurance claims and underwriting activities that will affect the loss reserve projections. It is because of these problems that the regulator must now rely more and more heavily on the actuarial certifications of the loss and expense reserves.

I would like to make a few comments on the subject of loss and expense reserve discounting, a topic which has been discussed heavily at this meeting and has also been discussed for the past several years. The California Department does not allow discounting on any business written in

California and does not allow discounting for its domestics. Obviously, there is a time value of money. The problem is that you must estimate the undiscounted reserve, a payment pattern, and the interest rate. From a regulatory standpoint we have enough problems determining just what the undiscounted reserves should be without these additional problems. The many reasons for the current positions of no discounting are as follows: 1) these three estimates have to be made, and this gives rise to additional areas of dispute between companies and the regulatory officials. 2) A company in trouble usually has an inadequate reserve anyway. 3) The discount usually only amounts to 10-15%, a small amount. 4) Perhaps most importantly from a regulatory standpoint, in a case of insolvency. When we liquidate a company, the investment income is almost always used to pay overhead expenses. Very little of the investment income during an insolvency is used for losses. The overhead expenses are much larger than the provisions for the unallocated loss adjustment expense reserves.

Even if reserves were discounted, the regulatory officials would find ways to get around it and to adjust. For instance, the change in the guidelines with respect to premiums to surplus or reserves to surplus can neutralize the impact of the discount.

The new IRS position on discounting for federal income tax purposes would have the following impact: 1) It would encourage companies to set higher reserves. 2) The impact on income taxes will really affect only one year. That is, the first year of the discount. For every year thereafter, it only impacts the incremental increase in the business thereafter. The government thinks that they have done a great thing by introducing the concept of discounting. However, regulators think the triumph is somewhat exaggerated.

In the future, I would predict that the full loss and expense discount amount would be allowed to be calculated, but it would be reported as an off balance sheet item, for informational purposes only. This is what is presently occurring in California with respect to the difference between the market value and the amortized value of bonds. We require a reporting of the difference between the two and it is reported as an off balance sheet item. I might add that in a previous session -- Asset Liability Matching -- the issue was raised that if you discount, you also have to have the assets at market value as they would rise together. If you discount the reserve, the amount of the reserve is going to rise and fall with changes in the interest rate. To offset that you have to state bonds at market value so that the bonds rise and fall together. One problem is that the changes in the liability run through the income statement, whereas changes in the market value of bonds do not run through the income statement because they are unrealized income. This is a very complicated problem and there does not seem to be any simple way to satisfy the practical needs of the regulatory authority on this issue.

Lastly, I'm going to conclude with some comments on certification. California requires the certification of loss reserves for domestic companies writing Schedule P. The certification can be signed by a member of the Casualty Actuarial Society or another reserve specialist. In

practice, approximately half the companies have an actuary sign it and the other half are signed by the chief financial officer. I know many of the chief financial officers. Many of them are every bit as good at loss reserving as certified actuaries. For medical malpractice, I require an outside consulting certified actuary. I pay particular attention to who certifies the long-tailed lines -- reinsurance, commercial liability, workers' compensation, auto liability. Less important are auto/physical damage, and homeowners insurance. Where there is less of a tail, I'm less concerned about who signs the statement. One of the most disconcerting things, is when we will ask for an actuarial report during an examination and find that there is no report available. Somebody has signed the actuarial certification, but have absolutely no paper work. We provide a written actuarial report when a company is under examination, so others should do so accordingly. That concludes my portion of this session.

QUESTION: Should a reinsurance company writing reinsurance business do so by underwriting year or policy year?

MR. HOROWITZ: The question is, often a reinsurer defined the accident year and reports on an underwriting year basis. We often come across that situation and we then evaluate on a policy year or underwriting year basis. Some insurers make an official allocation of the policy or underwriting year in order to fill out the actuarial statement. We actually prefer that. Each reinsurer should take its best shot at filling out the Schedule P on the basis that it was intended, which is by accident year, rather than to assume accident year equals underwriting year. When we do a detailed evaluation, we will evaluate in the most appropriate manner, which is by underwriting year for reinsurers.

QUESTION: One of the assets on the balance sheet is reinsurance recoverable. If a reinsurer goes bust, is the whole amount or 20% disallowed?

MR. SOLTO: In the state of New Hampshire, first we age all reinsurance recoverables 180 days from the entry date. Then, the assuming insurer is put on notice. We automatically will discount 100% of the recoverable from an insolvent reinsurer. In the primary area, he is going to be paying those responsibilities first. It will be a long time before the company will realize any collection from the ceded reinsurer.

MR. HOROWITZ: The New York Insurance Company also completely disallows a recoverable from an insolvent reinsurer.

QUESTION: Is the recoverable shown as unauthorized reinsurance in Schedule F?

MR. SOLITRO: If the company is domiciled in the state that calculates an unauthorized reinsurance penalty, that's true. One of the standards would be that it be licensed in a state with substantially similar regulations. If the reinsurer has been declared insolvent by its home state, then most it probably would not qualify anyway. An automatic penalty would be applied. Given the calculation if LOC's have been posted to reduce that

amount to the extent that they cover the losses, unearned premium, IBNR and LAE, then that portion could be admitted. The New Hampshire Insurance Department would take the position of not admitting it.

QUESTION: Is written documentation required to support loss reserve certifications?

MR. ROTH: In the event case reserves are changed, detailed calculations should be provided, as well as a reconciliation to the annual statement.

QUESTION: Is that for each line?

MR. ROTH: Essentially, yes. Workpapers should be provided to support Schedule P, especially when the printed reserve differs from the opinion rendered, no documentation from meetings has been provided and such workpapers are necessary to perform a reasonable review.

QUESTION: Given your hypothetical example in the package, would you, based on the pattern of gross underreserving in 1978, a small surplus, and a pattern of insolvencies, send in a team after they are insolvent?

MR. HOROWITZ: We tell them they're insolvent.

QUESTION: Is RAA data used in the examination of a reinsurance company?

MR. HOROWITZ: Yes, to supplement company data, especially if the company is new or small.

MR. SOLITRO: It can be used as a regulatory tool to measure performance, not used as a golden rule.

EXHIBIT 1

ALL SCHEDULE P LINES

RETROSPECTIVE SOLVENCY TESTING ($000 OMITTED)

(PART 2 -- SUMMARY)

ANNUAL STATEMENT/ EVALUATION DATE	SURPLUS AS REGARDS POLICYHOLDERS PLUS STATUTORY RESERVES AS REPORTED BY COMPANY	INITIAL INCURRED LOSSES		AFTER 1 YEAR	AFTER 2 YEARS	AFTER 3 YEARS	AFTER 4 YEARS	AFTER 5 YEARS
1974		354113	Incurred Losses	357152	359277	365147	370347	375116
			Savings	- 3039	- 5164	- 11034	- 16234	- 21003
	8548		Rev. Surp.	5509	3384	- 2486	- 7686	- 12455
1975		378881	Incurred Losses	381759	388048	395270	401852	
			Savings	- 2878	- 9167	- 16389	- 22971	
	6163		Rev. Surp.	3285	- 3004	- 10226	- 16808	
1976		405608	Incurred Losses	411386	419212	427648		
			Savings	- 5778	- 13604	- 22040		
	7927		Rev. Surp.	2149	- 5677	- 14113		
1977		437499	Incurred Losses	445410	457614			
			Savings	- 7911	- 20115			
	9363		Rev. Surp.	1452	- 10752			
1978		475075	Incurred Losses	489277				
			Savings	- 14202				
	11003		Rev. Surp.	- 3199				

EXHIBIT 2

OTHER LIABILITY

HISTORIC RECORD OF LOSS AND LOSS ADJUSTMENT EXPENSE RESERVE ADEQUACY ($000 OMITTED)

(PARTS 1B, COLUMNS 3, 4, 5, 9 AND 10)

ANNUAL STATEMENT/ EVALUATION DATE	INITIAL RESERVE		AFTER 1 YEAR	AFTER 2 YEARS	AFTER 3 YEARS	AFTER 4 YEARS	AFTER 5 YEARS	CALENDAR YEAR PREMIUMS EARNED	INDEX 1: INITIAL RESERVE ÷ PREMIUMS EARNED	RES. ÷ PAID AFTER 1 YEAR
1974	13528	Cum. Pd.	4618	8768	12843	15387	17976	6685	2.024	2.808
		Rem. Res.	9224	5365	3432	2230	1771			
		Devel. Res.	14042	14133	16275	17617	19747			
		Savings	-514	-605	-2747	-4089	-6219			
		%	-3.8%	-4.5%	-20.3%	-30.2%	-46.0%			
1975	12573	Cum. Pd.	5019	9949	13424	16886		6449	1.950	2.505
		Rem. Res.	7656	4304	2894	2319				
		Devel. Res.	12675	14253	16318	19205				
		Savings	-102	-1660	-3745	-6632				
		%	-0.8%	-13.4%	-29.8%	-52.8%				
1976	11705	Cum. Pd.	5998	10811	15806			8323	1.406	1.951
		Rem. Res.	6970	4835	3361					
		Devel. Res.	12968	15646	19167					
		Savings	-1263	-3941	-7462					
		%	-10.8%	-33.7%	-63.8%					
1977	11181	Cum. Pd.	6350	13226				8602	1.300	1.761
		Rem. Res.	7989	6550						
		Devel. Res.	14339	19776						
		Savings	-3158	-8595						
		%	-28.2%	-76.9%						
1978	11679	Cum. Pd.	8272					5877	1.987	1.412
		Rem. Res.	9723							
		Devel. Res.	17995							
		Savings	-6316							
		%	-54.1%							

EXHIBIT 3

OTHER LIABILITY

HISTORIC RECORD OF LOSS RESERVE ADEQUACY ($000 OMITTED)
(PARTS 1B, COLUMN 3 AND COLUMN 9)

ANNUAL STATEMENT/ EVALUATION DATE	INTIAL RESERVE		AFTER 1 YEAR	AFTER 2 YEARS	AFTER 3 YEARS	AFTER 4 YEARS	AFTER 5 YEARS	CALENDAR YEAR PREMIUMS EARNED	INDEX 1: INITIAL RESERVE ÷ PREMIUMS EARNED	INDEX 2: INITIAL RES. ÷ PAID AFTER 1 YEAR
		Cum. Pd.	3900	7046	10435	12485	14604			
		Rem. Res.	8151	4847	3083	2026	1609			
1974	11767	Devel. Res.	12051	11893	13518	14511	16213	6685	1.760	3.017
		Savings	-284	-126	-1751	-2744	-4446			
		%	-2.4%	-1.1%	-14.9%	-23.3%	-37.8%			
		Cum. Pd.	4044	8140	10956	13795				
		Rem. Res.	6664	3827	2630	2107				
1975	10993	Devel. Res.	10708	11967	13586	15902		6449	1.705	2.718
		Savings	+285	-974	-2593	-4909				
		%	+2.6%	-8.9%	-23.6%	-44.7%				
		Cum. Pd	4961	8907	13047					
		Rem. Res.	6057	4325	3054					
1976	10293	Devel. Res.	11018	13232	16101			8323	1.237	2.075
		Savings	-725	-2939	-5808					
		%	-7.0%	-28.6%	-56.4%					
		Cum. Pd.	5193	10945						
		Rem. Res.	6740	5741						
1977	9882	Devel. Res.	11933	16686				8602	1.149	1.903
		Savings	-2051	-6804						
		%	-20.8%	-68.9%						
		Cum. Pd.	6911							
		Rem. Res.	8127							
1978	9773	Devel. Res.	15038					5877	1.663	1.414
		Savings	-5265							
		%	-53.9%							

OTHER LIABILITY

EXHIBIT 4

HISTORIC RECORD OF LOSS ADJUSTMENT EXPENSE RESERVE ADEQUACY ($000 OMITTED)

(PARTS 1B, COLUMN 4, COLUMN 5 AND COLUMN 10)

ANNUAL STATEMENT / EVALUATION DATE	INITIAL RESERVE		AFTER 1 YEAR	AFTER 2 YEARS	AFTER 3 YEARS	AFTER 4 YEARS	AFTER 5 YEARS	CALENDAR YEAR PREMIUMS EARNED	INDEX 1: INITIAL RESERVE ÷ PREMIUMS EARNED	INDEX 2: INITIAL RES. ÷ PAID AFTER 1 YEAR
		Cum. Pd.	918	1722	2408	2902	3372			
		Rem. Res.	1073	518	349	204	162			
1974	1761	Devel. Res.	1991	2240	2757	3106	3534	6685	.263	1.918
		Savings	- 230	- 479	- 996	-1345	- 1773			
		%	-13.1%	-27.2%	-56.6%	-76.4%	-100.7%			
		Cum. Pd.	975	1809	2468	3091				
		Rem. Res.	992	477	264	212				
1975	1580	Devel. Res.	1967	2286	2732	3303		6449	.245	1.621
		Savings	- 387	- 706	-1152	- 1723				
		%	-24.5%	-44.7%	-72.9%	-109.1%				
		Cum. Pd.	1037	1904	2759					
		Rem. Res.	913	510	307					
1976	1412	Devel. Res.	1950	2414	3066			8323	.170	1.362
		Savings	- 538	-1002	- 1654					
		%	-38.1%	-71.0%	-117.1%					
		Cum. Pd.	1157	2281						
		Rem. Res.	1249	809						
1977	1299	Devel. Res.	2406	3090				8602	.151	1.123
		Savings	-1107	- 1791						
		%	-85.2%	-137.9%						
		Cum. Pd.	1361							
		Rem. Res.	1596							
1978	1906	Devel. Res.	2957					5877	.324	1.400
		Savings	-1051							
		%	-55.1%							

EXHIBIT 5

OTHER LIABILITY -- PAYMENT DEVELOPMENT METHOD

HISTORIC CUMULATIVE LOSS PAYMENTS BY ACCIDENT YEAR ($000 OMITTED)

(PART 1B, COLUMN 3)

CCIDENT YEAR	1st		2nd		3rd		4th		5th		6th		7th		8th		8th+8th O/S
1969											2753	1.088	2995	1.059	3173	1.038	3294
1970									2815	1.175	3308	1.103	3648	1.022	3730	1.068	3982
1971							2632	1.212	3190	1.094	3489	1.181	4120	1.023	4216	1.040	4384
1972					1724	1.308	2255	1.281	2888	1.216	3512	1.077	3782	1.085	4104	1.081	4438
1973			1313	1.718	2256	1.394	3145	1.300	4088	1.149	4697	1.092	5129				
1974	346	3.081	1066	1.517	1617	1.471	2378	1.329	3161	1.281	4048						
1975	223	5.027	1121	1.631	1828	1.419	2594	1.278	3314								
1976	527	2.641	1392	1.812	2522	1.516	3823										
1977	483	3.582	1730	1.932	3342												
1978	699	2.658	1858														
1979	266																

	1st-2nd	2nd-3rd	3rd-4th	4th-5th	5th-6th	6th-7th	7th-8th	8th-Ult.
LECTED FACTOR:5 YR.AVG., ". 1 HI, 1 LOW (*4 YR. VG.)	3.107	1.720	1.428	1.286	1.180	1.094	1.047*	1.057*
MULATIVE FACTOR	14.020	4.513	2.624	1.837	1.429	1.211	1.107	1.057

EXHIBIT 6

OTHER LIABILITY -- PAYMENT DEVELOPMENT METHOD

ANALYSIS OF PROJECTED ULTIMATE SAVINGS ON 12/31/79 LOSS RESERVES ($000 OMITTED)

ACCIDENT YEAR	(1) CUMULATIVE LOSS PAYMENTS AS OF 12/31/79	(2) FACTOR TO ULTIMATE	(3)=(1)x(2) PROJECTED ULTIMATE LOSSES INCURRED	(4) ACTUAL LOSSES INCURRED @ 12/31/79	(5)=(4)-(3) PROJECTED ULTIMATE SAVINGS ON 12/31/79 LOSS RESERVES
1971 & PRIOR			48823	48823	0
1972	4104	1.057	4338	4438	+ 100
1973	5129	1.107	5678	5440	- 238
1974	4048	1.211	4902	4395	- 507
1975	3314	1.429	4736	3812	- 924
1976	3823	1.837	7023	4770	- 2253
1977	3342	2.624	8769	6029	- 2740
1978	1858	4.513	8385	4244	- 4141
1979	266	14.020	3729	2080	- 1649
TOTAL			96383	84031	-12352

OTHER LIABILITY -- INCURRED DEVELOPMENT METHOD

HISTORIC INCURRED LOSSES EXCLUDING IBNR BY ACCIDENT YEAR ($000 OMITTED)

(PART 1B, COLUMN 3)+(PART 1B, COLUMN 9)-(PART 1F, COLUMN 3)

ACCIDENT YEAR	1st		2nd		3rd		4th		5th		6th		7th		8th
1969													3385	.973	3294
1970											3974	.993	3946	1.009	3982
1971									4375	.949	4150	1.061	4405	.995	4384
1972							3443	1.099	3784	1.057	3999	1.026	4102	1.082	4438
1973					3961	1.093	4330	1.121	4855	1.071	5202	1.046	5440		
1974			2223	1.358	3019	1.120	3381	1.128	3815	1.152	4395				
1975	3065	.861	2638	.975	2572	1.243	3198	1.192	3812						
1976	2977	1.091	3247	1.299	4217	1.131	4770								
1977	3146	1.230	3870	1.558	6029										
1978	2808	1.413	3969												
1979	1255														

		1st-2nd	2nd-3rd	3rd-4th	4th-5th	5th-6th	6th-7th	7th-8th	8th-Ult.
SELECTED FACTOR :	4 YEAR AVERAGE	1.149	1.298	1.147	1.135	1.057	1.032	1.015	1.000
CUMULATIVE FACTOR		2.150	1.871	1.441	1.257	1.107	1.047	1.015	1.000

EXHIBIT 8

OTHER LIABILITY -- INCURRED DEVELOPMENT METHOD

ANALYSIS OF PROJECTED ULTIMATE SAVINGS ON 12/31/79 LOSS RESERVES ($000 OMITTED)

ACCIDENT YEAR	(1) INCURRED LOSSES EX. IBNR AS OF 12/31/79	(2) FACTOR TO ULTIMATE	(3)=(1)x(2) PROJECTED ULTIMATE LOSSES INCURRED	(4) ACTUAL LOSSES INCURRED @ 12/31/79	(5)=(4)-(3) PROJECTED ULTIMATE SAVINGS ON 12/31/79 LOSS RESERVES
1971 & PRIOR			48823	48823	0
1972	4437	1.000	4437	4438	+ 1
1973	5440	1.015	5522	5440	- 82
1974	4395	1.047	4602	4395	- 207
1975	3812	1.107	4220	3812	- 408
1976	4770	1.257	5996	4770	-1226
1977	6029	1.441	8688	6029	-2659
1978	3969	1.871	7426	4244	-3182
1979	1255	2.150	2698	2080	- 618
TOTAL			92412	84031	-8381

1986 CASUALTY LOSS RESERVE SEMINAR

6F - ADVANCED TECHNIQUES III

Moderator: David Skurnick, Vice President & Actuary
F&G Re, Inc.

Panel: Glenn A. Evans, Senior Consultant
Coopers & Lybrand

Stephen W. Philbrick, Consulting Actuary
Tillinghast/TPF&C

Recorder: D. Lee Barclay, Associate Consultant
Coopers & Lybrand

DAVE SKURNICK: Today more and more actuaries and other people setting reserves are providing ranges of reserve estimates or reserve confidence intervals with the point estimates of the reserves. It just seems to be a very rapidly growing thing. Many of the finest consultants routinely provide a range of reasonableness along with the point estimate of the reserve. More and more company actuaries are using ranges or exploring the use of ranges along with the point estimates of their reserves. Why is it that we're having such a growth and an interest in this topic of using range of reserves? There are a number of reasons and some of the reasons. One is a kind of a defensive reason. We know that when we set a reserve it isn't going to be exactly right, so we want to give some kind of a range. That range serves the purpose of explaining how certain or uncertain we are of the loss reserve. A reserve of $100 million, if it were hospital malpractice, would have a much wider range than if it were automobile physical damage. A few companies are following a theory of booking a risk loading. They book a loss reserve as a point estimate of (their best estimate the reserve) plus an additional loading for the risk. This risk would somehow follow the statistical distribution of the loss reserve estimates. Ranges permit performance evaluation of a company actuary. You can't ask a company actuary to get the IBNR correct to the dollar, but you can ask the actuary to get it correct within a certain range, and see if it turns out that way. It came up yesterday in a standard of conduct discussion. The question everybody was asking was: "Suppose the actuary comes up with a reserve estimate and management won't book that. At what point is it improper practice for the actuary to sign the annual statement?" And the answer given by one of the speakers was to provide a range of reasonableness and sign the statement as long as the booked reserve was within the range. These are some of the reasons why these range of estimates are becoming so interesting to so many people.

We have two panelists today. And I'm really very pleased to have Glenn and Steve because they both work extensively and in practice with the use of ranges of estimates in their work. Both are fellows of the Casualty Actuarial Society and members of the American Academy. Glenn is a Senior Consultant with Coopers & Lybrand in San Francisco. He's been Chief Actuary at Argonaut Insurance and worked at TransAmerica. He's President of the Casualty Actuaries of the Bay Area. Glenn has contributed to the loss reserve seminar in prior years. He's written a paper for the paper program. Steve is with Tillinghast. He's worked for Hartford Insurance Group and consulted with a brokerage firm and an accounting firm prior to Tillinghast. Steve has authored a number of papers on exposure bases, credibility theory, reinsurance reserving, the Pareto distribution. Steve is active in the CAS. He's Chairman of the Papers Committee. He's a member of the Risk Theory Committee, and he's working on a chapter in the upcoming CAS Textbook. He also authors a column the actuaries in the room read called "Brainstorms." And he has asked me to use this forum to advertise that he is soliciting additional ideas for that column. We're very fortunate to have Glenn and Steve to talk about the techniques for measuring these loss ratio variability estimates and our first speaker will be Glenn Evans.

GLENN EVANS: Good morning. As David mentioned it is becoming more common for actuaries to be called upon to provide a measure of confidence in their point estimate as part of any pricing or reserving project. I plan to spend the next few minutes briefly discussing some of the procedures that have been proposed for this use. My intent is to provide an overview of these methods without going into a great amount of detail. References are available that will give you a much more complete explanation of the procedures and techniques than I'd have time for this morning. However, I will try to provide an example of each of the techniques and a quick indication of some of the advantages and disadvantages of each. Throughout my talk today I'll be addressing procedures that add a margin of safety to the reserves. Obviously it's also possible to talk about the probability that the reserves will come out at a level lower than indicated. We're going to ignore that case!

There are two types of error that arise as part of any reserve estimate. First of all there is process error. This is the variation between the actual losses and the expected losses that results from the stochastic or random nature of frequency and severity. The other type of error is parameter error. It is the result of an actuary's inability to correctly estimate the expected losses in the first place. We're going to have to deal with both of these types of errors as part of confidence analysis.
One approach that is frequently used to increase an actuary's confidence that a particular reserve estimate is sufficient is to develop several point estimates of the appropriate reserve level using different actuarial techniques, and then pick one of the higher ones. There are a lot of different ways to develop these estimates. One may consider using methods that are somewhat dependent. Such as picking the high and low age-to-age factors in an incurred loss development approach. I have a quick example here picking the average, the 12 month loss development factor would be 1.204. Had I picked the high age-to-age factor it would be 1.288 and the low factor would give me a 1.142. The result is an IBNR that varies considerably from the average. The high estimate is 154% of the average, the low is 61% of the average. This is a line that matures at 48 months. For lines of business that have longer development patterns, hospital malpractice for example, you'll see a much wider variation or difference between the two methods. In fact I did once apply this technique to a book of hospital professional liability. The difference between the high and low estimates was astounding. I gave some thought at that point to leaving my actuarial a position and starting a chicken farm. Alternatively you can use estimates that were obtained from a number of independent methods. Examples include incurred loss development, paid loss development, claim count times severity, exposure times pure premium, etc. Similarly you could use the same technique and vary some of the assumptions. An example is claim count times projected ultimate severity where you vary the trend factor using two or three different trend estimates. Regardless of the source of your estimates, the confidence band can be estimated by simply taking the high and the low values. Some of the advantages to this method an that it's easy to understand and that it's reasonable in the sense that the estimates can be developed directly from patterns arising out of actual past loss experience. The confidence band narrows as the years mature.

Clearly, you will generally want the size of the confidence band to decrease as a given accident year matures, at least as a percentage of ultimate loss. This is the case because a progressively larger portion of the ultimate loss will be paid as time passes. And the unpaid portion should be subject to less change. However, it is not necessarily true that the confidence reserve should decrease as a percentage of IBNR or even of unpaid loss. The most fundamental disadvantage is that there is no clear way to estimate the level of confidence using this procedure. Is the high estimate equivalent to a 60% confidence margin, is it equivalent to an 80% confidence margin. There's no way of knowing. Occasionally it happens that several different methods produce results that are very close together. You know that the results simply cannot be that good.

Another technique uses year to year variation in ultimates to estimate a confidence band around the projection. Here I've looked at the variance around the initial 12 month valuation of ultimate loss ratio. I've made the convenient assumption that ultimate loss ratios are normally distributed. With standard mathematics we can come up with an estimate of variance and deviation and for the 95th percentile aloading of 12-1/2% is calculated for the 12 month valuation. Clearly the same approach can be used starting at 24 months, 36 months, etc. This method is also easy to calculate as long as you assume a convenient distribution such as a normal distribution. As a given year matures the confidence band will automatically narrow. The older the year the more accurate and stable the estimate of ultimate loss. A disadvantage is that you may need a number of years of data before you can apply this method. The variation that exists might prove to be difficult to quantify. The width of the confidence band might vary significantly from year to year, simply because of the way the loss ratios move. You should be able to solve this problem through some sort of reasonable smoothing technique. Finally the procedures used to develop prior estimates of the ultimate may not be consistent with the current procedure. If this happens, you'll be confronted with a choice of either restating prior points or just using the results as they fell out of your calculations.

Still another technique is to use the variance of the loss development factors to estimate the variance of the projections. Roger Hayne wrote a paper on this subject not to long ago. In it he suggested the use of the lognormal distribution for age to age factors. The lognormal distribution is quite convenient for this purpose. It's always positive, it's skewed, yet even for a large factor it stays positive. And in most situations the product of two lognormally distributed variables is also lognormally distributed. The mean of the product is the sum of the means; the variance of the product is the sum of the variances. As a result the lognormal assumption for age to age factors will allow you to conveniently calculate confidence intervals for the loss development factors. In this example are some rather ordinary looking age-to-age factors. They're actually the same ones that you saw in the first slide. By calculating the appropriate factors the average loss development factor at 12 months -- 1.204-- increased to 1.309 by multiplying the age to age factors at the 95th percentile. This is going to be higher than the loss development factor at the 95th percentile. The product of the age-to-age factor at the 95th

percentile will generate a higher LDF in the 95th percentile. Actually I calculated that factor here and it's 1.268, roughly halfway in between. The method is relatively easy to use as long as you assume a lognormal distribution. Also, as the year matures, the confidence band will automatically narrow. Among the disadvantages is that we have no clear indication that the age-to-age factors are in fact lognormally distributed. It's a reasonable distribution but is it the right one? We don't know. It's not clear what you should do for a tail when there are an insufficient number of factors to perform the calculations. Finally, the age-to-age factors may not be independent, and that generates some additional problems. I realize that in his paper Roger did address this issue.

Before we begin our discussion of some of the procedures that rely in the use of an aggregate loss distribution. I'd like to mention just in passing one procedure that's been around as long as any of us in this room, and that's judgment. When all else fails you should consider using it. I'd like to show you an example but for obvious reasons I can't.

There are a number of different ways to use aggregate loss distributions to estimate confidence levels for reserves. One is to use an external base of experience. An example might be to use the distribution underlying the NCCI's Table M. I have a very brief example here. I don't want to go into a lot of detail. Steve Philbrick is going to follow me in a minute and talk about this procedure in somewhat greater detail. In this example, the risk distribution underlying Table M is used to find the entry ratio corresponding to the desired level of confidence. In this case I picked the 75th percentile. The entry ratio is then used to calculate an IBNR loading as a percentage of ultimate loss. In this case it is approximately 18 or 19% of the ultimate loss for each year. Now if I stopped right here, I would run into a problem because the load doesn't vary very much by year, but 1984 is a good deal more mature than 1986. It should take a much smaller load as a percentage of ultimate loss. There are at least two ways to respond to this situation. One is to apply the surcharge factor to the unpaid losses instead of the ultimate losses. In that situation the surcharge will automatically fall as the year matures. Alternatively, one can make up a reasonable-looking curve and gradually reduce the surcharge as a percentage of ultimate. This is the approach I've taken in the example. The approach was presented in a paper written by C.K. Khury a few years ago. Note that the surcharge drops as a percentage of ultimate. But at least in this case it does not drop as a ratio to IBNR. The basic problem in using this technique is finding a suitable base of experience. Table M might work very nicely for workers' compensation. It is not at all clear what to do for other lines. What expected loss group is appropriate for a book of products liability that has expected losses of $5 million?

There are a number of other techniques that can be used. Simulation has been used for a number of years now. To apply simulation you start with an assumed frequency distribution and an assumed severity distribution and begin taking samples. Initially you randomly select the number of claims from a frequency distribution. And then for each one of those counts, pick a claim size from the claim severity distribution, add the pieces together and you have an aggregate loss amount. Repeat this a number of times

depending upon the type of distribution you're working with, maybe 10,000 or maybe 100,000 times. Put all the pieces together and you have a reasonable approximation of the aggregate loss distribution. The type of problems that you'll encounter here is first of all determining the appropriate frequency and severity distributions. For frequency distribution Poisson, binomial and negative binomial have all been used. For severity pro rata seems to be the distribution of choice although gamma and lognormal are both also used. It's also possible that you'll be confronted with a very diversified book of business. I've seen at least one company that attempted to set IBNR for a book of growing business that included everything from automobile physical damage to products liability. The use of Monte Carlo simulation in this situation would have presented some rather formidable problems. Simulation can also be quite time consuming, even with the availability of some of the faster micro-computers today. I can recall several instances when we left the simulation program running all night, only to find the next morning that some unknown person had played with the keyboard, unplugged the machine, or disrupted the program in some other manner. It was frustrating in those situations where the next day we decided that we wanted to change some of the underlying assumptions. We were forced to begin the program all over and our results were postponed for another 24 hours. There are, however, some instances when Monte Carlo simulation is probably the best available choice.

The final technique that I'd like to discuss was presented in a paper written a few years ago by Philip Heckman and Glenn Meyers. They developed a rather clever way of estimating the aggregate loss distribution for a given frequency distribution and severity distribution. Their model permits the use of 3 commonly used frequency distributions: the Poisson, binomial, and negative binomial. They require, however, that the severity distribution be piecewise linear. This is not a serious constraint since virtually all of the distributions in common use can be approximated to any desired degree of accuracy through a piecewise linear cumulative distribution. The technique has several advantages over the other methods that we've discussed. It permits the combination of aggregate loss distributions for several different lines into a single composite aggregate loss distribution. It allows for parameter uncertainty in both the claim size and the frequency distributions. It finally allows for both positive and negative contagion. I'm going to digress for a moment. The Poisson distribution is one that is frequently used. Three assumptions are implicitly made any time it's used. One is that the claims occurring in two disjoint time intervals are independent. Another is that the expected number of claims in any given interval is dependent only on the length of the interval and not on the starting point. Finally, no more than one claim can occur at any given time. It's quite common for all of these to be violated in insurance. A situation where a higher than expected number of claims in an early period can lead to a higher than expected number of claims in the later period is positive contagion. An example might be a successful products liability suit against a manufacturer. It frequently results in a number of additional claims against that same manufacturer. Negative contagion is the opposite. It's a situation where a higher than expected number of claims in an early period lead to a lower number in the later. The example there would be a group life policy. Since most

individuals can die only once, a higher number of deaths early on should generate a lower number of deaths at later policy points. I have no intention of going through a detailed example using this technique. However, I will show you a quick sample application.

At Coopers & Lybrand we've done a good deal of work helping municipalities put together JPIA's (Joint Power Insurance Authorities). These authorities permit the pooling of excess liability losses. These pools frequently provide coverage up to $10 million over a basic deductible of about $50,000. Before going into such an agreement, the individual municipalities are interested in finding out how large a fund is going to be required to give them a certain level of confidence that the pool will be capable of responding to the losses that actually take place. Here I'm looking at a layer from $50,000 to $1 million. The mean severity in this layer is $145,000. Approximately 50% of the losses we expect to fall in the zero to $50,000 interval. Or, in terms of ground up losses that would be $50,000 to $100,000. Starting with this severity distribution we can apply the Heckman-Meyers technique and end up with an aggregate loss distribution that might look something like this. 50% of the time losses will be less than $1.4 million. Here I assumed an expected claim count of 11.5. Roughly 75% of the time aggregate losses will be less than $2.2 million. And 95% of the time losses will be less than $4 million. The expected loss times the expected loss amount is $1.7 million, approximately. The expected claim count of 11.5 times the mean severity of $145,000. Looking at the table you see that this equivalent to a confidence level of approximately 60%. In other words, the expected value is quite a bit above the 50th percentile, which is not at all uncommon with a skewed distribution such as this. As an extreme example, consider a situation with the chance of loss is 0.1%. If a loss occurs, the payment of $1 million is going to be required. Obviously the expected loss is going to be $1,000. I could claim that a $1 reserve puts me well above the 99% confidence level, because more than 99% of the time there won't be a loss. A dollar is bigger than that. Now to continue the original example, what we have here is the aggregate loss distribution for a single year's losses. A question might come up as to what the loss distribution is over a five year period. To solve that problem we can then take this aggregate loss distribution and call it the severity distribution for a single event: one year's worth of losses. Put this back into Heckman-Meyers with a claim count of 5 and produce a five year result, which might look something like this -- 50% of the time losses over the five-year period would be less than $7 million. The Heckman-Meyers approach can be applied to loss reserves in a similar manner. As in the situation that we encountered in Table M, you'll have to deal with the fact that a portion of the ultimate loss will be paid on older years as they mature. The same solutions are possible. You can apply a curve that will take you from the maximum amount of confidence down to zero in a reasonable fashion. Or you can apply a surcharge factor to the unpaid losses.

At this point I would like to give the microphone back to David Skurnick so that he can introduce our next panelist. I thank you for your attention.

STEVE PHILBRICK: Thank you, Dave. Good morning. Let me first cover quickly what I'm going to try to accomplish, and then we'll go through it. I'm going to briefly discuss some reasons why we should analyze loss variability, although Dave Skurnick covered that subject fairly well. Then I'm going to briefly describe some techniques that are used to analyze variability in pricing situations. Then I'm going to try to show why or how these can be used in reserving situations. For those of you that have picked up the handout, many of these slides you're going to see are reproduced in the handout. There are a few tables that are in the handouts that I didn't think would show well on the slide so you're welcome to follow through the handout as we go on.

Why should we analyze loss reserve variability? I recently gave this presentation at a CANE meeting and I asked for a show of hands how many people explicitly put ranges around their reserves. And I think there was about 1-1/2 hands. I guess one person wasn't quite sure whether he did or not. It's still not all that common. Let's talk about why we should. First it provides information to management. They can take two situations, one company writes auto physical damage and the other writes medical malpractice. They both have reserves of $10 million. Both of them ... and our best estimate of reserves is $10 million. But that doesn't exactly explain the situation. Those are very different situations, and it takes ranges or some measure of variability to explain the difference between those two situations. I've heard some people say that when you have a situation such as medical malpractice or reinsurance or other situations. It's very difficult to come up with a <u>mean</u> estimate. How can we possibly be talking about putting <u>ranges</u> around numbers? We have enough trouble come in with the mean. Why should we take the time and effort to come up with something that's substantially more difficult. Greg Taylor I think has explained that point very well in his book. He points out that this is precisely when you want to put ranges. The ranges provide a measure of how bad your estimate is. If you can come up with your estimate precisely don't bother with ranges. Although I don't think there are many cases where we feel precise about our results. In most cases we should be putting ranges. The worse our estimate is, the more important it is to point that out by specifying a range. They can provide a basis for performance measurement. In a few months some people are going to put up an estimate of reserves -- say, $100 million is the estimate of outstanding reserves. A few years later that amount is going to run off at maybe $90 million, but more likely $110 - $150 million. At what point do we decide that the original estimate of $100 million was incorrect? If it runs off at $103 million, I think we'd all agree that the person did a remarkable job or has a lot of luck. If it runs of at $200 million, I think many of us would agree that something went wrong. But where in there do we decide that it was random influctuation rather than some fundamental errors? I suggest that if you specify your ranges this won't perfectly answer the problem but at least it will give you some help in answering this question. If you specify that the best estimate is $100 million and you specify the range of $90-$115 million, then if the results are within $115 million that tells you something and if the answers are outside it tells you something else. Another thing we can do is use them to compare to other companies. Of course this won't be helpful until we have a number

of companies specifying ranges formally. But if we could get more companies to specify ranges that would be very interesting to all of you trying to set a range to look at what other companies are doing for similar books of business. Finally there is something that I'm calling true surplus requirements. Everyone is familiar with the so-called surplus requirements that relate to premium-to-surplus measures and things like that. But surplus is really there to provide a buffer against adverse fluctuations. You'll understand that the need for surplus relates as much to reserves as it does to the original premiums. In fact I'd suggest that we probably should be measuring the needs for surplus as a function of reserves. And it's not simply a function of the level of reserves. Again, if I had two companies who had $10 million reserves each, and one was auto physical damage. I'd say I need less surplus to provide against potential adverse deviation than I do for medical malpractice or excess reinsurance.

I'll briefly go over some of the techniques used in calculation of aggregate distributions. I've grouped them into three categories. First, actuaries who make an assumption that the aggregate distribution will follow some well known statistical distribution such as the normal, the log normal, the gamma and there may be others. These are very crude methods. Although they can be used, aggregate distributions don't tend to fit these particularly well. Then there are what I call approximation techniques where one goes a step beyond and does follow some techniques to approximate the aggregate distribution a little bit better. There are some techniques called Bowers-Gamma. There's an Edgeworth approximation -- one I failed to put up but should have is the normal power approximation -- which is used. Many of these have been used, but I think they're falling into disuse but only because better methods are coming along. At the bottom I've got what I call exact techniques. The Monte Carlo or computer simulation approaches, and the Heckman-Meyers approach which was outlined briefly by Glenn and can be found in the actuarial literature. These are techniques used almost solely in pricing. At the beginning of the year you estimate the expected losses and you're estimating the aggregate distribution around those losses because you may, for example, need to provide reinsurance. You may be providing some sort of retro coverage and you're interested in the various percentiles above that point. What I'm suggesting today is that we can use these techniques to estimate the variability of reserves. I think some of them can be applied directly. In a sense Glenn went over a whole range of methods, whereas I'm focusing on a particular method or subset of methods. What are the advantages of these techniques? And when I say "aggregate loss distribution techniques", I could refer to any of the ones we were talking about earlier, but I'm particularly focusing on the Monte Carlo techniques and most especially on the Heckman-Meyers approach. It's objective: if I specify a few parameters, the calculation of the range is quite objective. One simply does some mathematics and comes up with a result. It's not subjective to any degree. There is some subjectivity in the choice of some of the parameters. Once the parameters are specified it's straightforward mathematics. It's reproduceable. If someone in this room happened to have put a range around reserves five years ago. You might be hard-pressed to explain how you came up with that number. Five years ago you said, "I think it is going to be $100 million or maybe $90 million". That might have been all that went into it, but if you had done

a variety of other techniques you might find it difficult to specify exactly how you came up with that. And that would be important if you were trying to compare ranges from year to year. You'd want to be able to say that the ranges were calculated in a similar manner by having your calculation documented. If you decide to use the Heckman-Meyers model, you can simply specify the severity distribution you used, the b and c parameters, and then from there it all falls out. You could easily keep track of all of the underlying assumptions used to calculate your ranges. It's fairly simple. There's a one time cost you have to put together a model if you don't have one. You have to build a computer model, for once it's built, you can simply sit down, type in parameters and results will come spewing out. It's robust. Maybe not everyone is familiar with the term robust, which is a statistical term. Whenever one builds a model you have to estimate parameters. A model is considered robust if small errors in the input parameters will tend to produce small errors in the actual results. On the other hand, the model would not be considered robust if a small error in the input assumption generated a large error in the potential results. I'll try to illustrate an example of that in a few minutes.

Let's get more specific. Assume I want to use an aggregate distribution. And for those of you who are familiar with Table M, I'm going to use the aggregate distribution underlying Table M. If there are people who aren't familiar with Table M, don't worry about it. Just consider any arbitrary aggregate distribution. I'm simply choosing this one because it's so well known and because it is applied not just to workers' compensation for which it's designed but it's also applied to all casualty lines. In fact some people argue that it is more appropriate to casualty than to workers' compensation. The procedure used to put it together very much considers the fact that it generally is used for things other than workers' compensation. Let's take a hypothetical example where our expected losses are $5 million -- where at the beginning of a year we're about to price a book of business and our estimate is that the ultimate losses will be $5 million. We also have an expected payout pattern: we expect 25% to be paid at the end of the first year; 50% by the end of the second year; and 80% by the end of the 72 months. This payout pattern roughly corresponds to a workers' compensation distribution. So far we're not into reserves, we're still talking about pricing. If I had this information I could say I'll go and look up the loss group that corresponds to $5 million and I can look in Table M and I can get Table M charges and savings. These would be useful if I wanted to write a retro plan, or I could back off and get the underlying aggregate distribution and I could calculate the 75th percentile, the 90th, etc.

What we really want to do is to work with the reserves. Let's talk about what we do in the model. Heckman-Meyers, as I've described, is a model that requires some input. It requires the severity distribution and some parameters -- a b and a c parameter. There's a mixing and a contagion parameter. For one of them, as Glen pointed out, you would put in a zero if you wanted the Poisson distribution and you would put in a number greater than zero if you thought it was going to be negative binomial, and the larger the number the larger the spread in the frequency distribution.

Then you would also have a contagion parameter depending on whether you thought there was positive or negative contagion. The other parameter relates to parameter error. As Glenn pointed out, if you are concerned that your estimate is off, depending on how much error you think there might be this will determine the parameter factor. I'll stop right here and point out one problem. If one assumes that there is parameter error, how does one translate that into selection of a particular parameter? That is quite difficult. That's one of the reasons I'm using Table M. Because the Table M we have was generated so that it would match actual experience. And then what I have done is to solve for the b and c parameters. I shouldn't say that I have done it, the National Council actually solved for the b and c parameters. I have obtained from them b and c parameters for several different loss size amounts. The page immediately following this has a number of parameters and I basically use some interpolation techniques to come up with b and c parameters. For example the first line says loss amount $100,000. The b parameter for $100,000 is .263 and the c parameter is .07. If you had a Heckman-Meyers program you could run it with that information.

We also have to specify the severity distribution. This is a workers' compensation severity distribution. The x-axis has the claim size, and I've got the log of the claim size along it. If you just put dollars it's hard to read -- it all ends up in the upper left hand corner. Then we've got the cumulative percentage associated with each claim. This is, as near as I can tell, the claim size distribution that underlies Table M. It can be found in the Heckman-Meyers paper or the Meyers-Schenker paper. I'm not sure which. Both of them are dealing with the same problem. Here's my severity distribution and I've got b and c parameters, so now I'm ready to run my program. Here's the first result. Here's my aggregate distribution ... in other words, before the year starts. Again this would be the situation even if we weren't interested in reserves. My expected losses are $5 million. Note (as Glenn noted) that the $5 million does not correspond to the 50th percentile but something above it. That's because our distribution is skewed. The 25th percentile is $3.37 million. There's one chance in four that given expected losses of $5 million, the actual losses will turn out to be less than about $3-1/3 million. The 90th percentile over here is 7.99. If you'd remember that number, we're going to compare it to another number. We're going to compare it to several other numbers and then one at the end of the presentation. This says that there is one chance in ten that given expected losses of $5 million they could be as high as $8 million. We're still talking about the beginning of the year pricing. Now suppose that we're at 12 months and what we're trying to come up with is the estimated ultimates or reserves. Right now we'll focus on estimated ultimates -- $3.75 million is expected to be outstanding. We look up our b and c parameters for $3.75 million, we run it through the Heckman-Meyers program and we get an aggregate distribution. And then I add in my fixed losses of $1.25 million and here's how things change. As we might expect, the 90th percentile has moved down, instead of 7.99 it is now 7.45. The 90th percentile is closer. I expect most of you can see where this is going now at 24 months, when half of it's paid. I'm looking at the distributions for the $2.5 million outstanding and then adding in the fixed $2.5 million. The last one that I have here is 72

months. Now we would say that our estimate is $5 million but we are 90% certain that the ultimate losses for this group will not exceed $5.8 million. This should conform very much with what you expect. But now let's tear out the paid amount. We've got this variability on $5 million, but $4 million of it is paid. If we compared the variability to the $1 million of outstanding we actually have more variability as a percent compared to the outstanding than we do compared to the ultimate. I think that should conform to what you might expect. Now we have to make a little bit of a shift here. Here's our $5 million of expected loss. If I run my Heckman-Meyers routine I can pull up all kinds of percentiles. But I'm pulling out three of them. I'm pulling out the 25th percentile and this is the ratio to the expected loss. If the expected loss is $5 million, the 25th percentile is around 60% of that. The 75th percentile is 120% of that, and the 90 percentile is 160% of that. This can be done it separately for various different loss sizes. This is what I was just talking about. If we just ran it for $1 million, we see that everything is spread out more. The variability around $1 million is greater.

ROGER HAYNE: How do you address parameter uncertainty?

STEVE PHILBRICK: I know there is a lot of parameter uncertainty in a particular problem. There's a lot of parameter uncertainty a factor of .02 or .2 or 2.0? That's a question I don't have good answers to, and so far I've taken the easy way out and said I at least know what the parameter is for a workers' compensation line of business. I know what the parameter uncertainty is for Table M which is applied to workers' compensation and casualty lines of business. Carrying that on I'd say one has to do a lot of math. But in fact, what one can do is analyze empirical results and do the same procedure they did in Table M. Play around with the parameters until you get something that fits reasonably close and those might be the appropriate parameters. It's, of course, crude and one might be quite concerned about doing something that crude, but then I look back at the alternatives and find that the preferred approach for selecting ranges is to say plus or minus $10 million etc. And I think that this is still a quantum leap perhaps.

I would also give the same answer that I think Gregg Taylor gave when he was going through something and he threw out specification error. If I can figure out how to improve my specification I'll do it. But if I don't there's nothing I can do.

[Question, Inaudible].

But that should be measured in Table M, because Table M is put together by expected loss groups, and things are put into the expected loss group based on somebody's estimate. Consider the loss group that contains $5 million. They took all of the risks that had expected losses of $5 million and analyzed the results. The true underlying expected for some of those may have been $2 million. But they're in there, so the empirical results are skewed more because that should have been $2 million but it was called $5 million. To the extent that they've done that they have measured it. You may be getting at another point also. There still may be more errors than

that. A simple answer is to increase the parameter that measures parameter error. And then I'm back to my question. How much? Do I double it? Do I have to multiply it by 10? I'll just say that I haven't done enough statistical work. I'm not able to do well enough to tell you how to do it. There are other people in this room and in this Society that I hope will tell me how to go from a situation nice and clean, auto physical damage, to excess reinsurance and tell me, at least within an order of magnitude, where the parameters ought to be.

MARK SOBEL: I'd just like to focus a little bit on the $5 million number which is an expected loss number that you get by some means to get the expected loss number. Then you're using this approach to get some variability around that externally derived mean. I'm wondering what kind of tests you've done -- and after you've applied Heckman-Meyers assuming Table M kinds of underlying distributions, see what kind of verification you get from this model of that $5 million mean, because there are always two ways you can get at that mean. One, you can get it through some development approach or Bornhuetter-Ferguson approach and then just get a variability around it. Alternatively you can use Heckman-Meyers directly to get that mean by using other methods for determining the parameters used in the Heckman-Meyers model. I guess my question, is what kind of verification have you gotten of this approach of that externally derived mean?

STEVE PHILBRICK: I'm afraid I missed something, because I'm not aware of how to run Heckman-Meyers without specifying the mean in advance--maybe not directly because you may not type the mean in. In fact the way we've written the model you do type the mean in. You could re-write it so that you type in a number of claims and the severity distribution instead of the mean. But the $5 million is inherent in that. From the input I can calculate directly the mean. I think that one has to go through the step of applying the development factor approach, Bornhuetter-Ferguson, tail models, and anything else and come up with number, and that's where I start using Heckman-Meyers. One question -- and maybe this is the point you're getting at -- one question that bothers me is that it would seem to me that my variability is very dependent on how I arrived at that. If I used the tried and not very true method of loss ratio to come up with my estimate, I should have lots of variability. If, on the other hand, I used 16 different methods and they all gave me very similar results, I might expect a lot less variability. That troubles me somewhat, and again I think there's some statistical issues there that I'm not fully aware of. But I also back off and say it's still a better approach than anything else that I've run across. Greg?

GREG TAYLOR: I think your last comments were hitting on the points that the previous question was driving at. My paraphrase of what they're asking is, when you use a method to estimate the mean of your loss reserve and then you're concerned with the confidence interval, the way in which you estimate your confidence interval must in some way reflect the method which has gotten the mean. In particular if your mean is estimated by a very bad means, then your confidence interval should be large and if it's estimated very efficiently, then your confidence interval should be small. For

example, if I choose my mean loss reserve by taking the order number of the first Smith in the phone directory, and I give you that number and you put your confidence interval about it, your confidence interval should reflect the fact that I've used a very bad way of getting at the estimate. It seems that if you use this Heckman-Meyers technique for getting the confidence interval. Then it's appropriate to the extent that the assumptions leading up to it have been used in the derivation of your new loss reserve. That was very much dependent on your 50% and 25% and any other runoff percentages you had. I think you really need to address the question of how this should be modified to reflect the underlying estimation technique.

STEVE PHILBRICK: I would say I fully agree with that. Let me suggest that the practical problem from my standpoint, and others may not have this practical problem -- is that as I try in real life to follow that path I find myself finding it very difficult. As Greg is well aware, we in the U.S. are less inclined to formally specify our models. He has pointed out on several occasions that's a flaw in what we do. I agree but we are not going to do that in the next 5 or 10 years -- whether we should or should not is another issue. I find myself saying I agree. I ought to specify the model that I use to estimate the mean and then I'd do some further math and I can use that to specify the confidence interval. If I could do that I would. I am trying to come up with what I consider to be a stop-gap measure. I am outlining a procedure that I fully hope that some people will consider but I fully hope that 5 years from now we discard it because we're doing exactly what Greg suggests. We're putting together formal models to estimate our results and then we're simultaneously saying the confidence intervals implied by these models are as follows. And if we use models that are crude, then we'll have wide confidence intervals and if we use methods that are much more sophisticated we'll have narrow confidence intervals. To repeat, I would say that what I'm putting together is maybe a stop-gap, because I think the U.S. is at least 5 years away from doing those types of things even if we all get together and agree that's what we should do. And we're practically speaking, probably more than 5 years away from doing that.

GARY PATRIK: What I'm understanding of what you're doing is that when you're pricing you can calculate what you would expect your reserve variability to look like after one year, after two years, etc. I think what Greg and a few other people were asking about is that this is not adaptive. How do I conditionalize my one year reserve estimate distribution to take into account the actual claims that I have seen already? There are paid and incurred counts and amounts and all that jazz. That's what I understand you're doing. I like it so far. There's no question there, it's just a comment.

STEVE PHILBRICK: I agree with Gary. In fact some people consider it a plus and others will consider it a minus. But with the table I showed you, we don't have to wait until the end of the year to come up with a reserve distribution. I can tell you right now based on this table, if your reserve is $50 million, what the confidence interval around that is. That's an advantage and that sure makes life simple. It's a disadvantage

as I think Greg would point out, because by definition there's something wrong there. I haven't even told you how I'm going to come up with the reserve estimate and you told me what the confidence interval around it is. I'd say that effectively this assumes that there is an implicit method that underlies what I've done. I don't know what it is but I hope you're coming close to using it. Gary also mentioned the problem that some others have pointed out. I haven't used a lot of the information. I haven't used the actual case reserves in any way. I hope that that would mean that maybe the estimates in here could be considered as conservative estimates in that the true confidence interval would always be less than that. If there are those of you who believe that, then you could consider these as conservative estimates and then you might do something to come up with shrinkage factors that reduce it. But again I just reiterate that I hope that this is a stop-gap method at best and that we go on to doing better procedures. Thank you.

Why Analyze Loss Reserve Variability?

- Management Information
- Measure of Uncertainty
- Basis for Performance Measurement
- Comparison to Other Companies
- True Surplus Requirements

Aggregate Distribution Calculation

o Distribution Assumptions

- Normal
- Lognormal
- Gamma

0 Approximation Techniques

- Bowers' Gamma
- Edgeworth
- Esscher

o Exact Techniques

-Monte Carlo

-Heckman/Meyers

PROPOSAL

Use aggregate loss distribution techniques to estimate variability of reserves.

ADVANTAGES

- Objective
- Reproducible
- Documentation
- Simple
- Robust

Example

Assume Aggregate Distribution Underlying Table M applies to Outstanding Claims.

Expected Losses are $5,000,000

Expected Paid at:

12 Months	25%
24 Months	50%
72 Months	80%

THEN:

Distribution at 0 months is the distribution consistent with the $5,000,000 loss group.

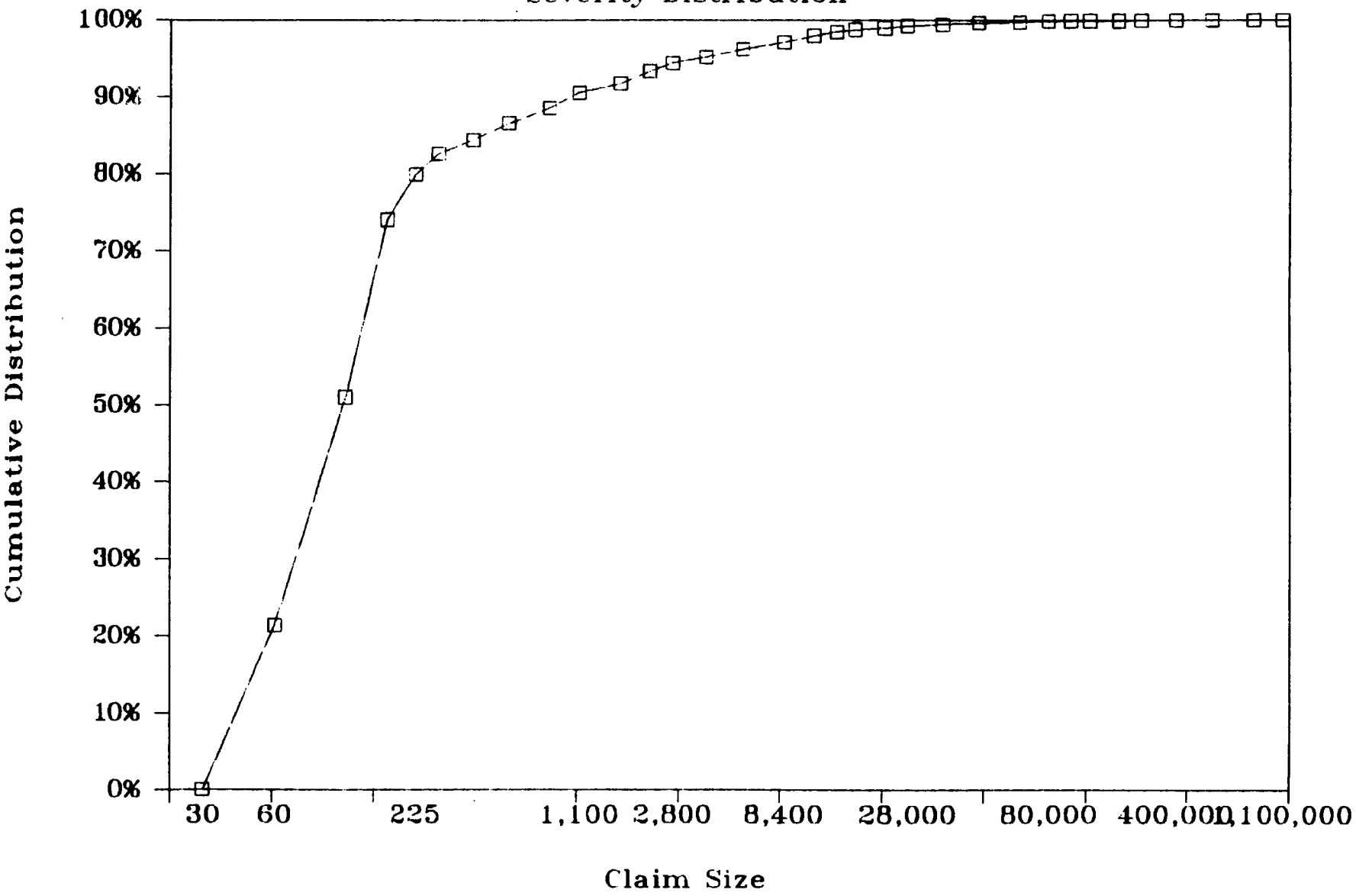
Distribution at 12 months is the distribution consistent with the $3,750,000 loss group plus actual paid.

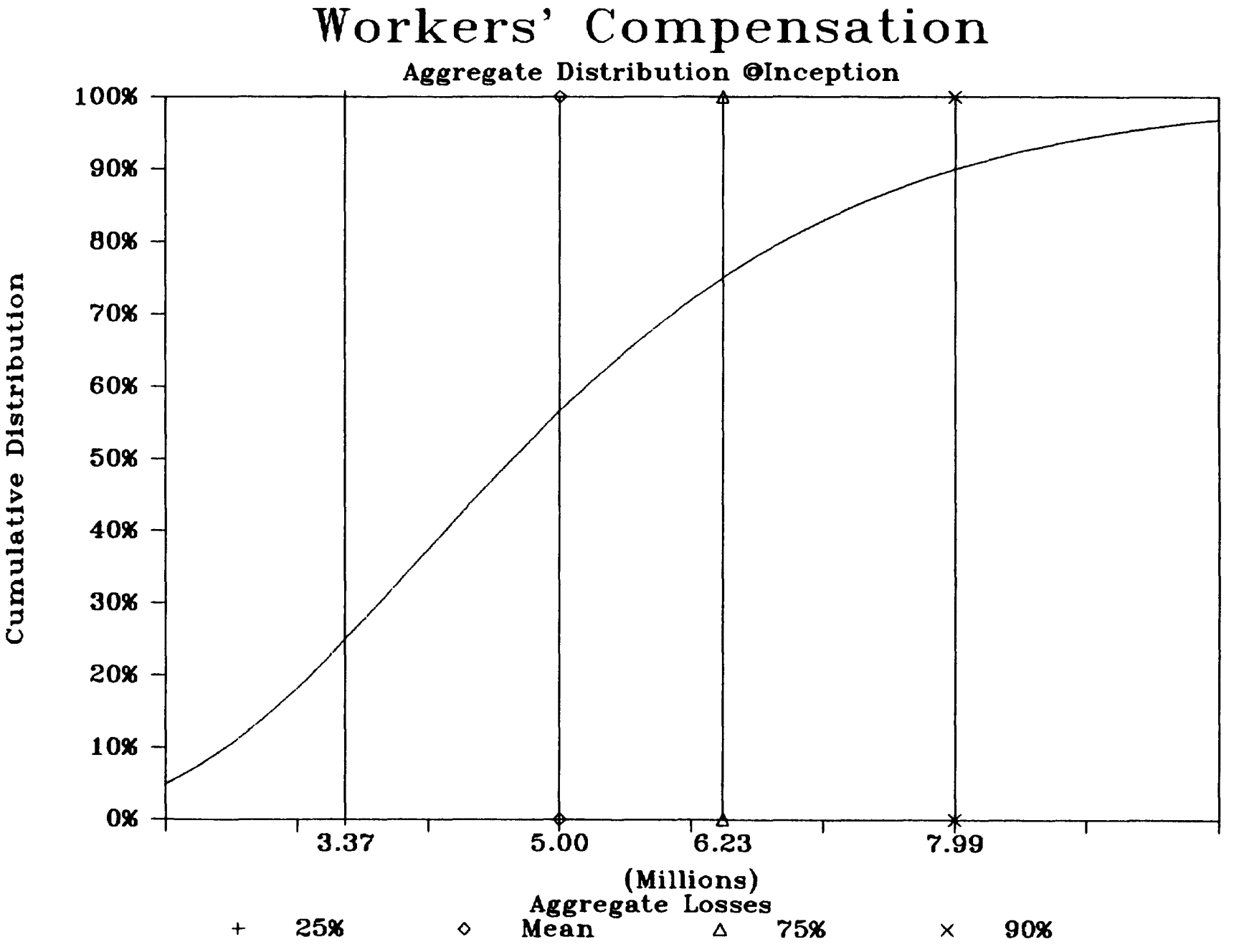
Heckman/Meyers Parameters
Consistent with Table M

Loss Amount	Ln Loss	Parameters b	c
100,000	11.513	0.263	0.070
200,000	12.206	0.263	0.065
300,000	12.612	0.263	0.062
400,000	12.899	0.263	0.060
500,000	13.122	0.263	0.058
600,000	13.305	0.263	0.057
700,000	13.459	0.263	0.056
800,000	13.592	0.263	0.055
900,000	13.710	0.263	0.054
1,000,000	13.816	0.263	0.053
1,100,000	13.911	0.263	0.053
1,200,000	13.998	0.263	0.052
1,300,000	14.078	0.263	0.051
1,400,000	14.152	0.263	0.051
1,500,000	14.221	0.263	0.050
1,750,000	14.375	0.253	0.048
2,000,000	14.509	0.241	0.046
2,250,000	14.626	0.230	0.044
2,500,000	14.732	0.221	0.042
2,750,000	14.827	0.212	0.040
3,000,000	14.914	0.204	0.038
3,250,000	14.994	0.196	0.037
3,500,000	15.068	0.190	0.036
3,750,000	15.137	0.183	0.035
4,000,000	15.202	0.177	0.033
4,250,000	15.262	0.172	0.032
4,500,000	15.320	0.166	0.031
4,750,000	15.374	0.161	0.030
5,000,000	15.425	0.157	0.029
6,000,000	15.607	0.151	0.027
7,000,000	15.761	0.145	0.025
8,000,000	15.895	0.140	0.023
9,000,000	16.013	0.135	0.022
10,000,000	16.118	0.131	0.020
11,000,000	16.213	0.127	0.019
12,000,000	16.300	0.123	0.018
13,000,000	16.380	0.120	0.017
14,000,000	16.455	0.117	0.016
15,000,000	16.524	0.114	0.015
16,000,000	16.588	0.112	0.014
17,000,000	16.649	0.109	0.013
18,000,000	16.706	0.107	0.012
19,000,000	16.760	0.105	0.012
20,000,000	16.811	0.103	0.011
21,000,000	16.860	0.101	0.010
22,000,000	16.907	0.099	0.010
23,000,000	16.951	0.097	0.009
24,000,000	16.994	0.095	0.008
25,000,000	17.034	0.094	0.008

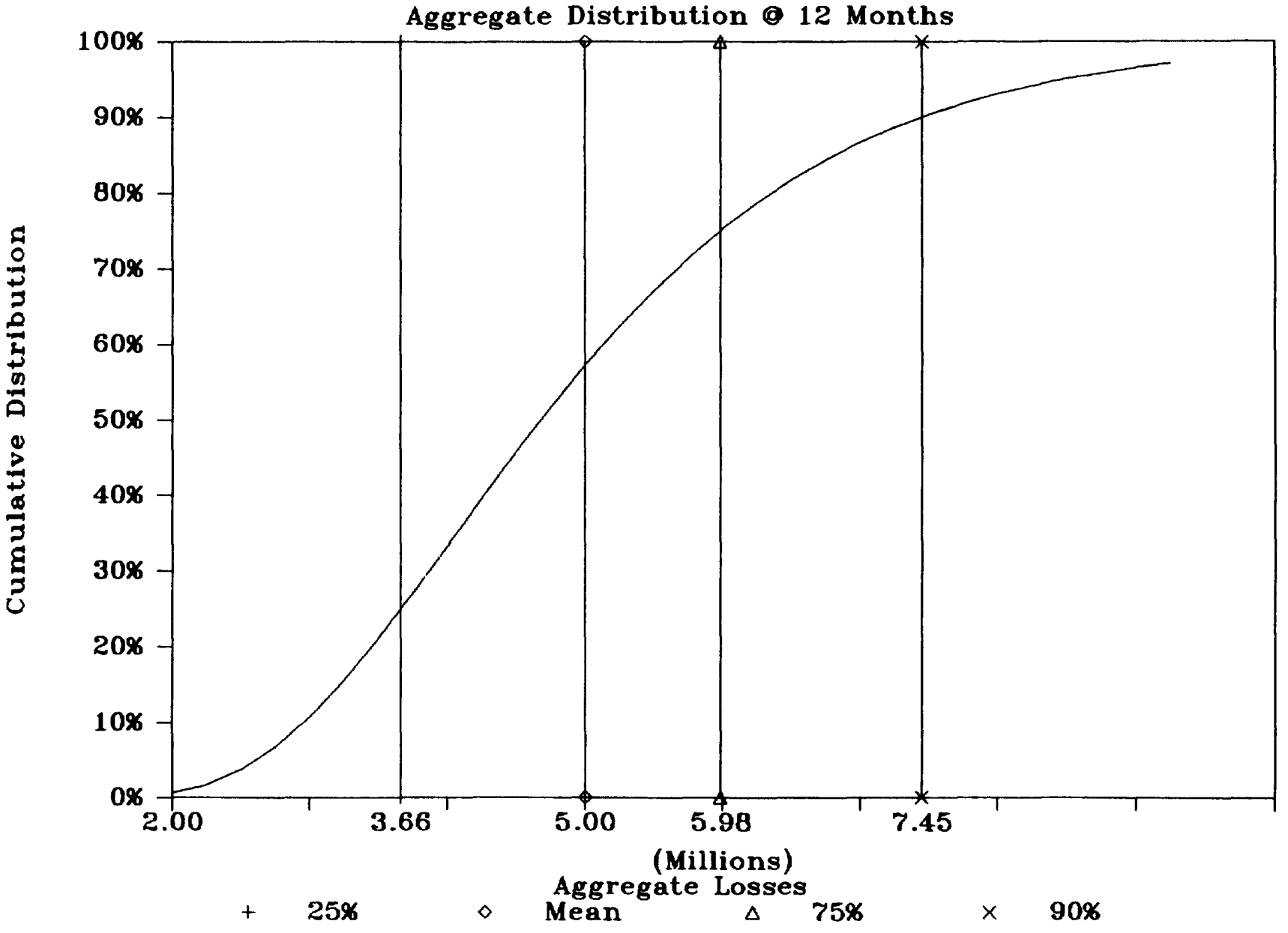
Workers' Compensation

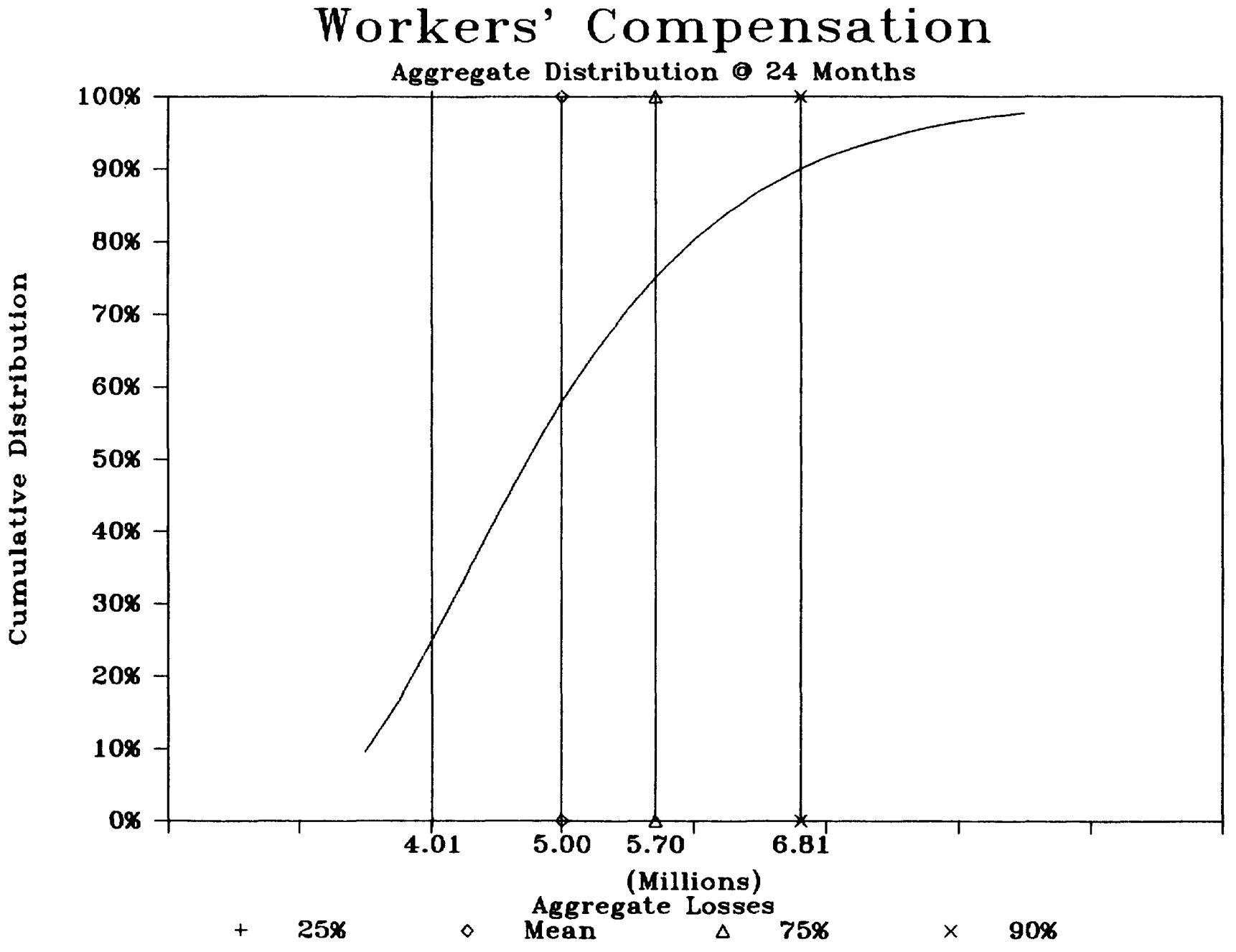
Severity Distribution

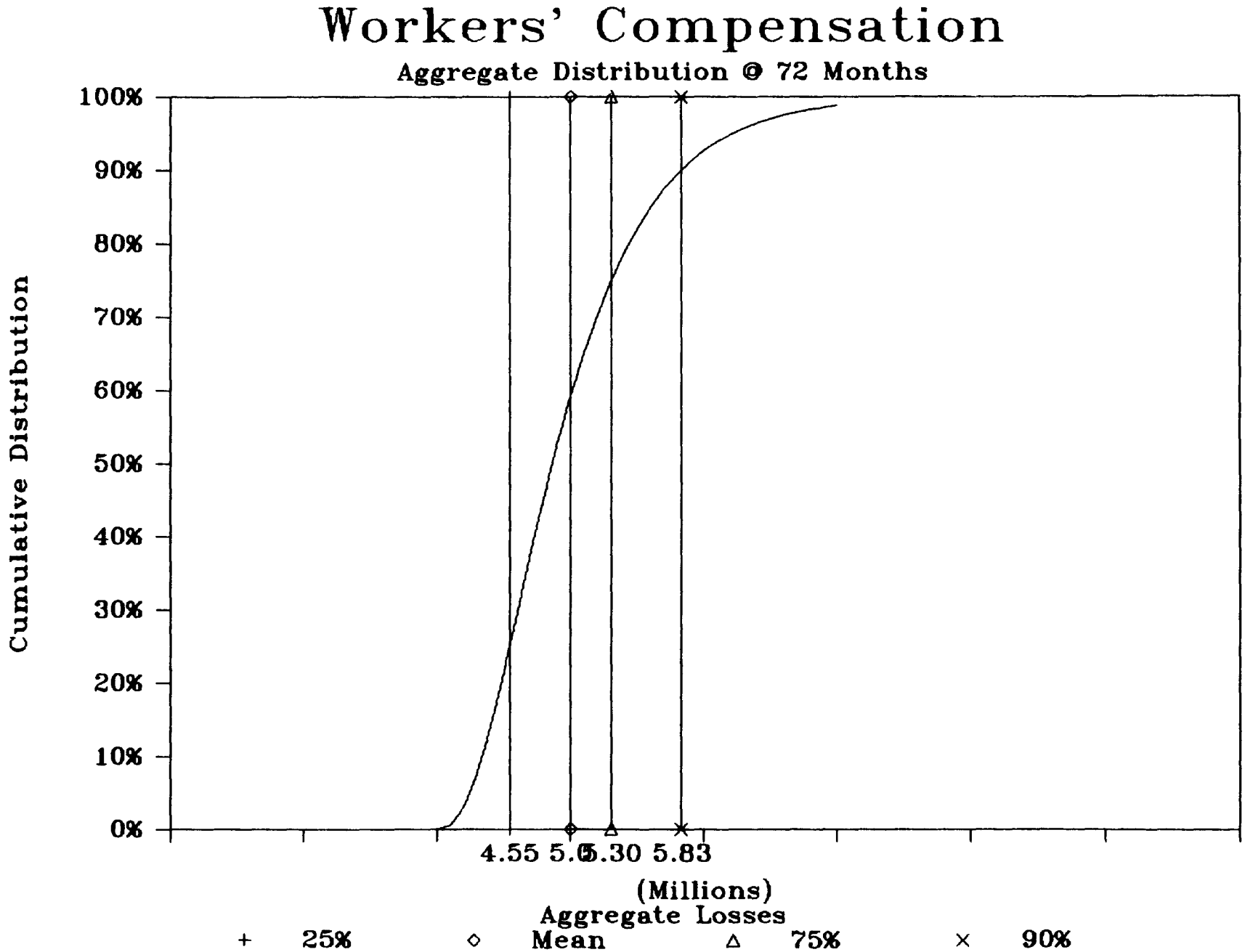



Workers' Compensation
Aggregate Distribution @Inception
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
Cumulative Distribution
3.37
5.00
6.23
7.99
(Millions)
Aggregate Losses
+ 25%
◇ Mean
△ 75%
× 90%

Workers' Compensation

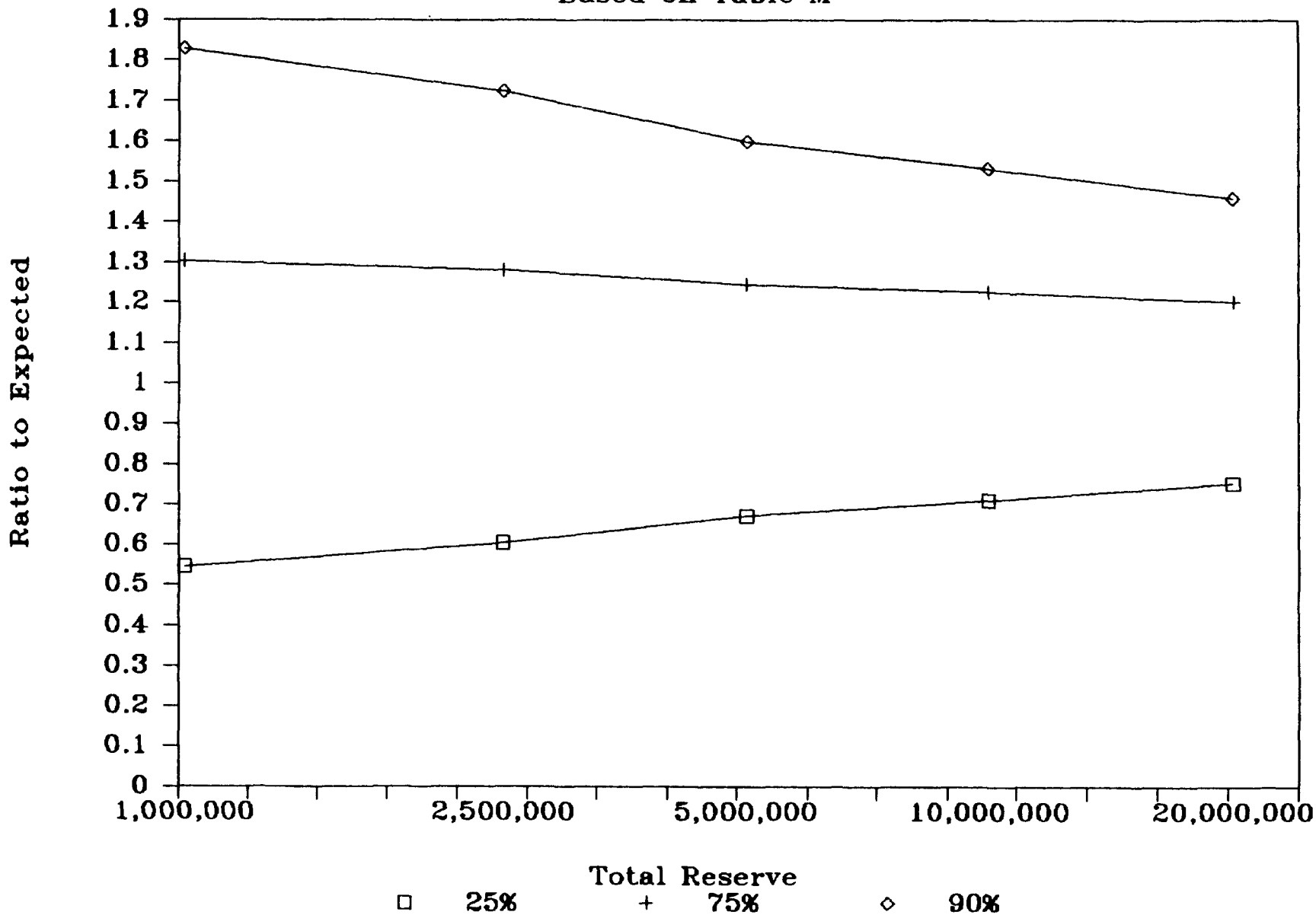



Workers' Compensation
Aggregate Distribution @ 24 Months
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
Cumulative Distribution
4.01
5.00
5.70
6.81
(Millions)
Aggregate Losses
+ 25%
◇ Mean
△ 75%
× 90%


Workers' Compensation
Aggregate Distribution @ 72 Months
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
Cumulative Distribution
4.55
5.30
5.83
(Millions)
Aggregate Losses
+ 25%
◇ Mean
△ 75%
× 90%

Percentiles of Aggregate Distribution

Based on Table M



Expected Reserve Amount	PERCENTILES CONSISTENT WITH TABLE M Ratio to Expected 25%	75%	90%	Dollars 25%	75%	90%
1,000,000	0.547	1.306	1.827	547,000	1,306,000	1,827,000
2,000,000	0.596	1.282	1.739	1,191,000	2,564,000	3,478,000
3,000,000	0.624	1.268	1.688	1,873,000	3,804,000	5,063,000
4,000,000	0.645	1.258	1.651	2,578,000	5,032,000	6,605,000
5,000,000	0.660	1.250	1.623	3,302,000	6,251,000	8,115,000
6,000,000	0.673	1.244	1.600	4,039,000	7,464,000	9,599,000
7,000,000	0.684	1.239	1.580	4,789,000	8,670,000	11,063,000
8,000,000	0.694	1.234	1.563	5,548,000	9,872,000	12,508,000
9,000,000	0.702	1.230	1.549	6,316,000	11,069,000	13,937,000
10,000,000	0.709	1.226	1.535	7,093,000	12,263,000	15,352,000
11,000,000	0.716	1.223	1.523	7,876,000	13,453,000	16,755,000
12,000,000	0.722	1.220	1.512	8,665,000	14,640,000	18,146,000
13,000,000	0.728	1.217	1.502	9,461,000	15,824,000	19,526,000
14,000,000	0.733	1.215	1.493	10,262,000	17,005,000	20,897,000
15,000,000	0.738	1.212	1.484	11,068,000	18,184,000	22,259,000
16,000,000	0.742	1.210	1.476	11,879,000	19,361,000	23,612,000
17,000,000	0.747	1.208	1.468	12,694,000	20,535,000	24,957,000
18,000,000	0.751	1.206	1.461	13,513,000	21,707,000	26,295,000
19,000,000	0.755	1.204	1.454	14,336,000	22,878,000	27,626,000
20,000,000	0.758	1.202	1.447	15,163,000	24,047,000	28,950,000
21,000,000	0.762	1.201	1.441	15,994,000	25,213,000	30,268,000
22,000,000	0.765	1.199	1.435	16,828,000	26,379,000	31,580,000
23,000,000	0.768	1.197	1.430	17,665,000	27,542,000	32,886,000
24,000,000	0.771	1.196	1.424	18,505,000	28,705,000	34,186,000
25,000,000	0.774	1.195	1.419	19,348,000	29,865,000	35,481,000
26,000,000	0.777	1.193	1.414	20,194,000	31,025,000	36,772,000
27,000,000	0.779	1.192	1.410	21,042,000	32,183,000	38,057,000
28,000,000	0.782	1.191	1.405	21,893,000	33,340,000	39,338,000
29,000,000	0.784	1.189	1.400	22,747,000	34,495,000	40,614,000
30,000,000	0.787	1.188	1.396	23,603,000	35,649,000	41,885,000
31,000,000	0.789	1.187	1.392	24,462,000	36,803,000	43,153,000
32,000,000	0.791	1.186	1.388	25,323,000	37,955,000	44,416,000
33,000,000	0.794	1.185	1.384	26,186,000	39,106,000	45,676,000
34,000,000	0.796	1.184	1.380	27,051,000	40,255,000	46,932,000
35,000,000	0.798	1.183	1.377	27,918,000	41,404,000	48,183,000
36,000,000	0.800	1.182	1.373	28,787,000	42,552,000	49,432,000
37,000,000	0.802	1.181	1.370	29,658,000	43,699,000	50,677,000
38,000,000	0.803	1.180	1.366	30,531,000	44,845,000	51,918,000
39,000,000	0.805	1.179	1.363	31,406,000	45,990,000	53,156,000
40,000,000	0.807	1.178	1.360	32,283,000	47,135,000	54,391,000
41,000,000	0.809	1.178	1.357	33,161,000	48,278,000	55,622,000
42,000,000	0.811	1.177	1.354	34,042,000	49,421,000	56,851,000
43,000,000	0.812	1.176	1.351	34,924,000	50,562,000	58,077,000
44,000,000	0.814	1.175	1.348	35,807,000	51,703,000	59,299,000
45,000,000	0.815	1.174	1.345	36,692,000	52,843,000	60,519,000
46,000,000	0.817	1.174	1.342	37,579,000	53,983,000	61,736,000
47,000,000	0.818	1.173	1.339	38,467,000	55,121,000	62,950,000
48,000,000	0.820	1.172	1.337	39,357,000	56,259,000	64,161,000
49,000,000	0.821	1.171	1.334	40,248,000	57,396,000	65,370,000
50,000,000	0.823	1.171	1.332	41,141,000	58,533,000	66,576,000

```
Enter a RUN TITLE (<=16 chars)
Enter the MIXING PARAMETER
Enter the number of Industry Lines for the agg. model
Enter the EXPECTED LOSSES for this line
Enter the CONTAGION PARAMETER for this line
Enter a name to identfiy the CSD
10 Million      COLLECTIVE RISK MODEL

LINE #  1  CLAIM SEVERITY DISTRIBUTION
NAME: csdun

    LOSS AMOUNT     CUMULATIVE PROBABILITY

          .00              .00000
        27.79              .21384
        56.13              .51025
       112.28              .74056
       168.41              .79959
       224.54              .82665
       280.67              .84450
       392.94              .86657
       561.35              .88626
       842.02              .90606
      1122.69              .91797
      1684.04              .93388
      2245.39              .94464
      2806.72              .95223
      3929.43              .96242
      5613.46              .97156
      8420.19              .97998
     11226.93              .98476
     14033.65              .98785
     16840.38              .99001
     22453.84              .99281
     28067.30              .99452
     39294.21              .99649
     56134.60              .99790
     84201.90              .99890
    112269.13              .99934
    140336.49              .99956
    168403.75              .99970
    224538.37              .99983
    280672.97              .99990
    392942.21              .99996
    561345.69              .99998
    842018.76              .99999
   1122691.83             1.00000


 SUMMARY STATISTICS:

  SEVERITY MEAN =        898.76
  SEVERITY STD DEV =    7816.64

ONLY 32 LINES ALLOWED


Which type of Aggregate Loss input would you prefer?
 (enter just the number)
```

1 ... Aggregate Loss amount as input from a file (heck2.in)

2 ... Entry Ratio as input from a file

3 ... Specify min., max., and interval amount in dollars

4 ... Specify ER change below and above the mean and the
min. and max. ER

5 ... Specify the change in SD about the mean and
min. and max. SD

Enter the min., max., and interval amounts
for the Aggregate Loss (i.e. 50000 2000000 50000)

10 Million COLLECTIVE RISK MODEL

LINE	EXPECTED LOSS	CLAIM SEVERITY DISTRIBUTION	CONTAGION PARAMETER	CLAIM COUNT MEAN	CLAIM COUNT STD DEV
1	10000000	csdun	.1310	11126.475	4028.489

MIXING PARAMETER .0200
AGGREGATE MEAN 10000000
AGGREGATE STD DEV 4008065

AGGREGATE LOSS AMOUNT	ENTRY RATIO	CUMULATIVE PROBABILITY	EXCESS PURE PREMIUM	EXCESS PURE PREMIUM RATIO
5000000.00	.5000	.0740	5069055.61	.5069
5500000.00	.5500	.1066	4613944.55	.4614
6000000.00	.6000	.1455	4176734.92	.4177
6500000.00	.6500	.1900	3760395.30	.3760
7000000.00	.7000	.2388	3367430.46	.3367
7500000.00	.7500	.2910	2999770.74	.3000
8000000.00	.8000	.3451	2658719.35	.2659
8500000.00	.8500	.3999	2344950.70	.2345
9000000.00	.9000	.4544	2058549.00	.2059
9500000.00	.9500	.5075	1799075.31	.1799
10000000.00	1.0000	.5584	1565651.37	.1566
10500000.00	1.0500	.6067	1357050.65	.1357
11000000.00	1.1000	.6517	1171788.82	.1172
11500000.00	1.1500	.6934	1008208.21	.1008
12000000.00	1.2000	.7314	864552.66	.0865
12500000.00	1.2500	.7659	739031.08	.0739
13000000.00	1.3000	.7969	629868.97	.0630
13500000.00	1.3500	.8245	535348.43	.0535
14000000.00	1.4000	.8490	453837.54	.0454
14500000.00	1.4500	.8705	383810.45	.0384
15000000.00	1.5000	.8893	323859.61	.0324
15500000.00	1.5500	.9057	272701.68	.0273
16000000.00	1.6000	.9199	229178.40	.0229
16500000.00	1.6500	.9321	192253.72	.0192
17000000.00	1.7000	.9426	161008.23	.0161
17500000.00	1.7500	.9516	134631.76	.0135
18000000.00	1.8000	.9593	112414.94	.0112
18500000.00	1.8500	.9658	93740.18	.0094
19000000.00	1.9000	.9714	78072.53	.0078
19500000.00	1.9500	.9760	64950.81	.0065
20000000.00	2.0000	.9800	53979.09	.0054

10 Million COLLECTIVE RISK MODEL

TECHNICAL INFORMATION
H= 1.259
NUMBER OF INTERVALS= 13
ESTIMATED TRUNCATED ERROR IN EPP RATIO= .000002

TEST FOR ROBUSTNESS

TRUNCATED SEVERITY DISTRIBUTION @ $8,400

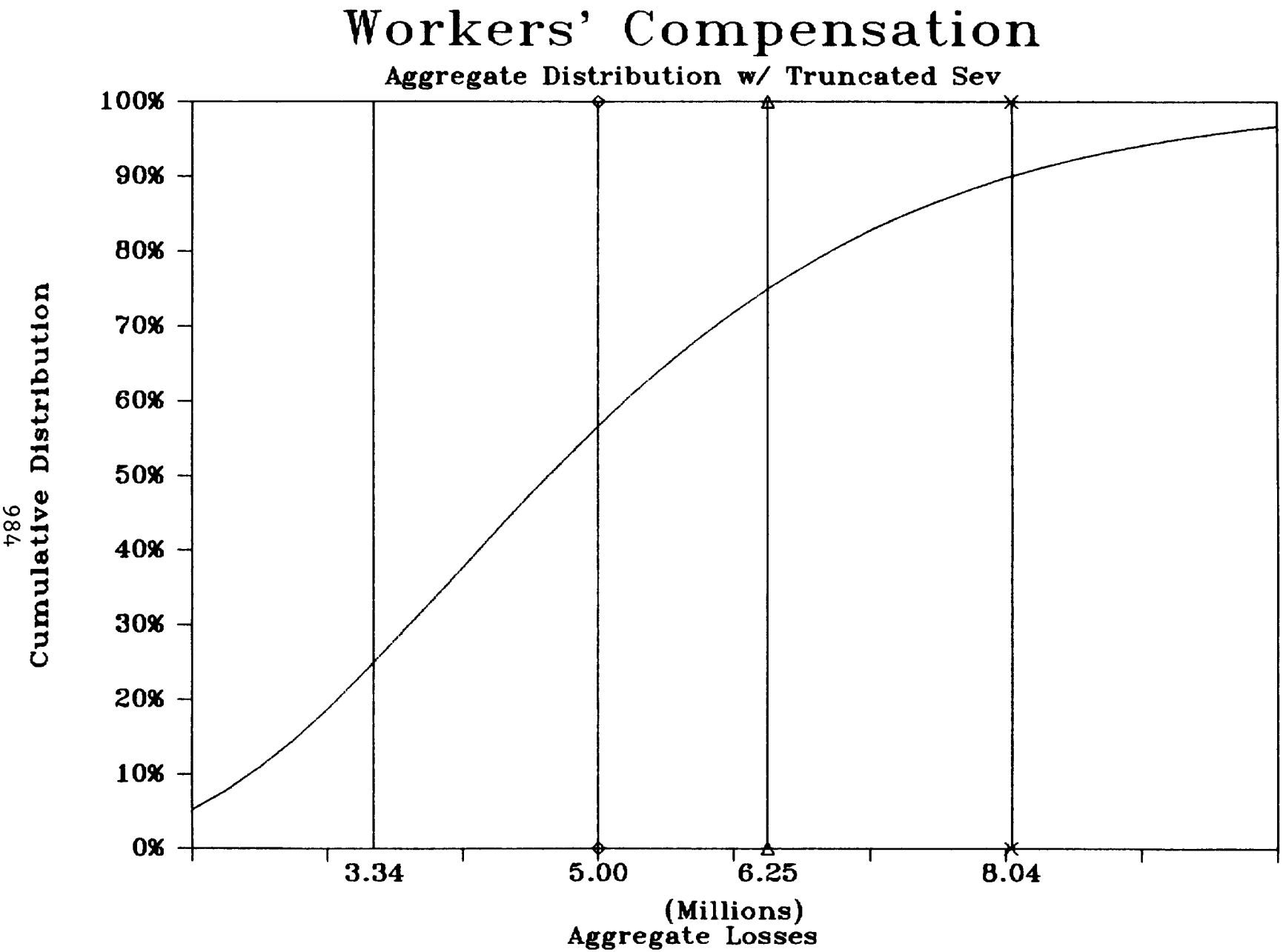
This Eliminates 97% of Claims

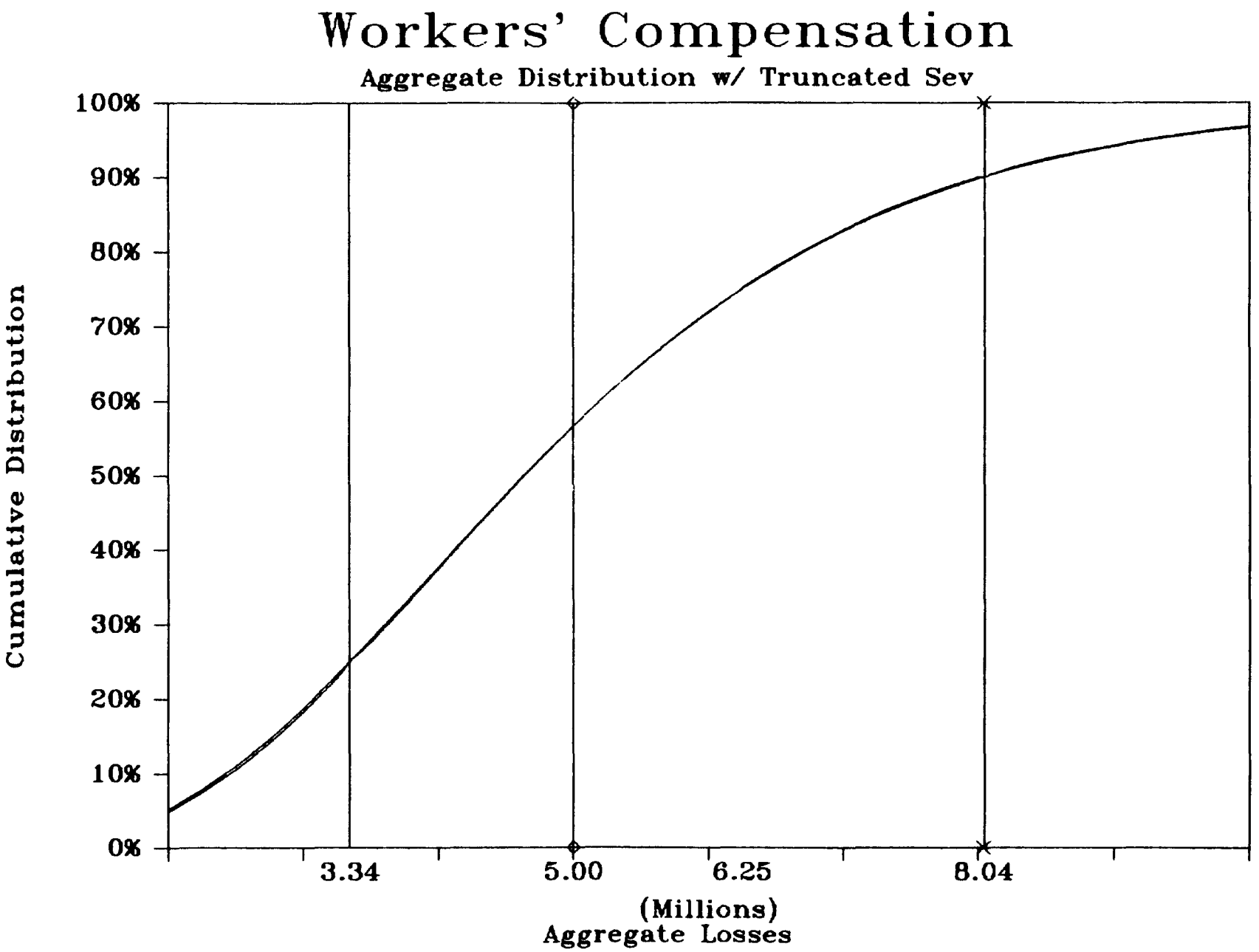
Original Avg. Claim Size: 900

Truncated Avg. Claim Size: 22,000

Original Number of Claims: 5,600

Truncated Number of Claims: 200


Workers' Compensation
Aggregate Distribution w/ Truncated Sev
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
Cumulative Distribution
3.34
5.00
6.25
8.04
(Millions)
Aggregate Losses


Workers' Compensation
Aggregate Distribution w/ Truncated Sev
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
Cumulative Distribution
3.34
5.00
6.25
8.04
(Millions)
Aggregate Losses

1986 CASUALTY LOSS RESERVE SEMINAR

6G - CONSEQUENCES OF UNDERRESERVING

Moderator: Walter J. Fitzgibbon, Jr., Vice President Actuary
Aetna Life & Casualty

Panel: Hugh R. Blodget, Second Vice President
Phoenix General Insurance Co.

Stephen P. Lowe, Consulting Actuary
Tillinghast/TPF&C

G. Allan Zimmerman, Vice President
Kidder Peabody & Co.

Recorder: James Yow, Sr. Actuarial Assistant
Aetna Life & Casualty

WALT FITZGIBBON:

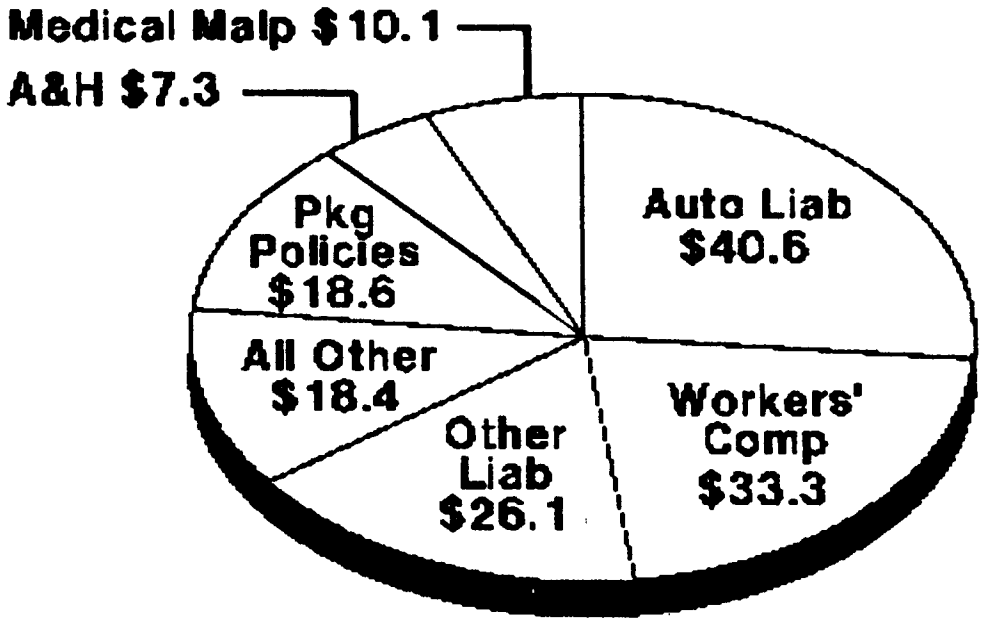
This morning we expect to cover some of the consequences of being underreserved which suggests there must be ways to measure them. And if you were underreserved, one question is -- under what? What is the reserve you should have had?

Hopefully at the end of the session we'll have time for questions. We're not going to interrupt the speakers or pause between the presentations for questions. Before introducing the first speaker, I would like to present a very brief overview of the reserve and surplus situation of the industry. For those of you who do not follow the total industry numbers very closely, maybe this will give you some feel as to why there is so much focus on evaluating loss reserves.

Exhibit 1 shows the property/casualty industry's year-end 1985 loss and loss expense reserves as published by the A.M. Best Co. The total reserves for the industry amount to just over $154 billion. The slices of the pie show you those lines of business that generated the most reserves. Auto liability is in first place with about a $40 billion reserve. Workers' compensation is second with $33 billion and other liability is 3rd with $26 billion. If we had included the medical malpractice with the liability, it would have been in 2nd place; and I suspect that if we had fully reserved that liability, it would have vaulted into first place.

PROPERTY/CASUALTY INDUSTRY 12/31/85

Loss & Loss Expense Reserves



Total Reserves = $154.4 Billion

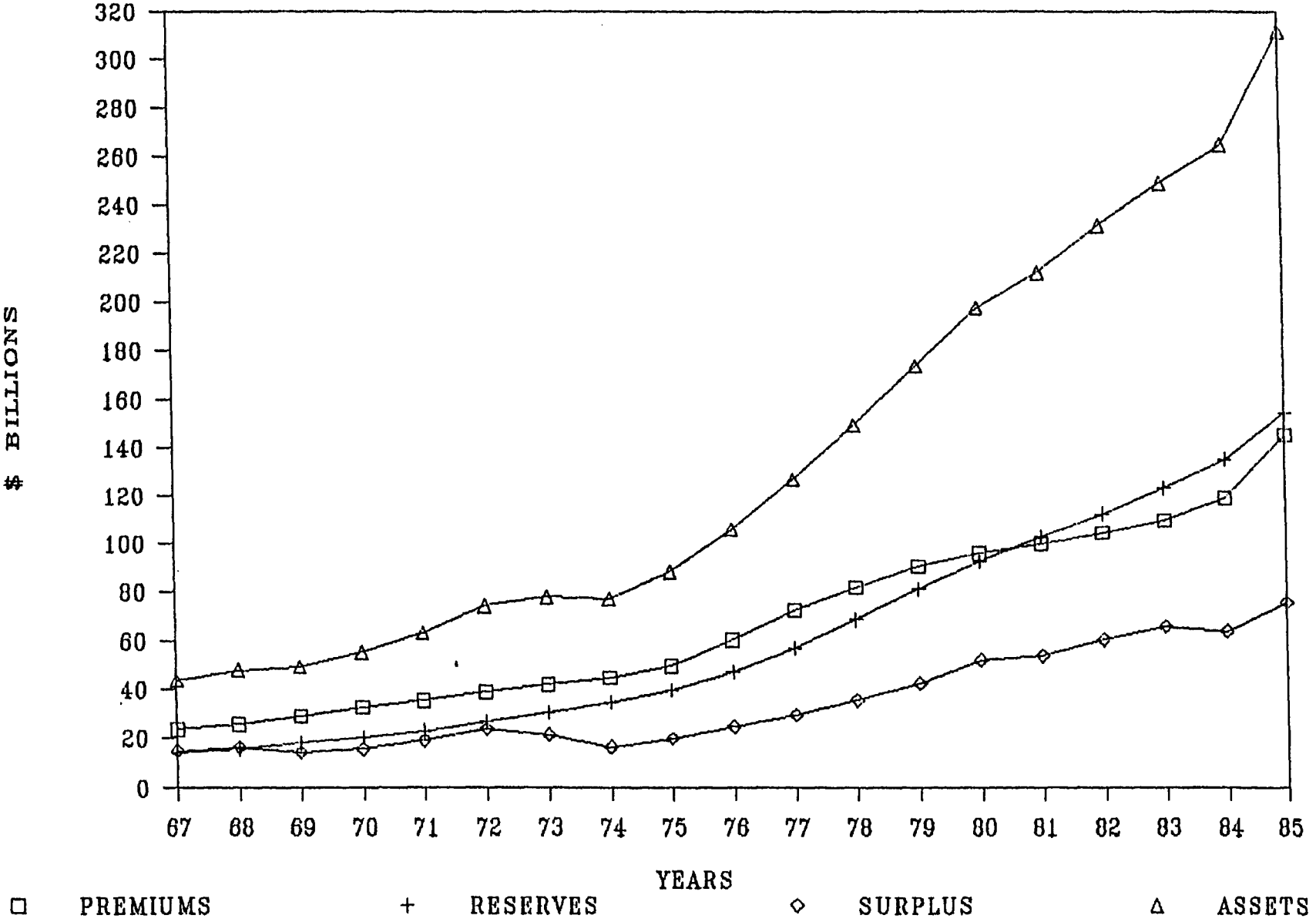
Source: A. M. Best

Exhibit 2 shows some time lines starting with 1967. These graphs reflect total industry summaries of the assets, the premiums, the reserves, and the surplus over time. The functions of surplus include such things as protecting the assets against default, protecting companies against reinvesting at lower interest rates than they had anticipated and the various risks that come from interest rates fluctuating. Surplus essentially protects against underpricing, and it is what covers reserve inadequacies. We can see by the way the lines have moved over time that the surplus is working harder now than it used to. For example, if we look at the relationship between the assets and the surplus, the assets were about 3 times the level of the surplus in 1967, and in 1985 are 4 times the level of the surplus. The premium to surplus ration was 1.6, and it is now 1.9. The reserves used to be a little bit smaller than the surplus, but now the reserves are twice the size of the surplus. Each of these simple measures shows that there is more strain on surplus now than there used to be. If you consider that the reserves are probably understated, and if you are going to shift money out of the surplus and into the reserves, then you can see that each of the ratios that we have just discussed is going to have an adverse movement.

Exhibit 3 shows what A.M. Best has published in an annual statement that they put together representing the total industry (those companies, nearly 2,000, that provide data to them). Using the Schedule P lines, this exhibit shows how with 1 year's hindsight the reserves held at the end of 1984 have developed. As can be seen, the loss reserve held of $111 billion at the end of 1984, has developed upward one year later, because of inadequacies <u>already</u> perceived, by more than $8 billion, which is 8% of that reserve. Many believe that there exists the potential for even more significant development.

PREMIUMS, RESERVES, SURPLUS, & ASSETS

TOTAL INDUSTRY - AMBEST AGGREG & AVGS



TOTAL SCHEDULE P LINES

($ Billions)

Line of Business	12/84 Held Reserve	Development*	%
Auto Liability	$ 35.3	$ 1.4	4
Other Liability	21.1	2.8	13
Medical Malpractice	8.1	2.2	27
Workers' Compensation	31.1	0.5	2
Package Policies	15.4	1.6	10
Total	$111.0	$ 8.5	8%

*Losses Incurred During 1985 on Occurrences of 1984 and Prior

Yesterday at two of the sessions and then at the luncheon, I heard some comments that I thought may be worth repeating. For example, Jim MacGinnitie, at one of his sessions challenged the audience to tell him now many companies today have reserves that are too high. He looked for a show of hands. "How many know of more than one company that might be in that position?" There was not a big response. Jack Byrne, at lunch, stated that he perceived the reserving problem to be only 30% a technical problem and 70% a management problem.

At a session where the heads of the claims departments of 3 of the biggest companies, Aetna, Travelers, and Liberty Mutual, reviewed what is going on today with respect to the tort system and some recent decisions, the head of the Aetna claim department discussed 3 important examples of recent court decisions. In the first case, a court held that a manufacturer was liable in a products liability suit, where the defect could not have been determined at the time the product was manufactured. There was no scientific test at the time that could have revealed whether or not there was anything wrong. This means there really was no fault as there was nothing the manufacturer could have done that he did not do.

The second case he talked about was one where there was no defect in the product; the product operated perfectly. The product in question was a handgun (Saturday Night Special), that was used in a robbery in which someone was shot. The judge concluded that the manufacturer should have known that the weapon could have been used in this way and, therefore, there was liability.

The third case was one where the court held that a certain group of people,

that had been exposed to a toxic substance, now faced an increased risk and that at sometime they might suffer an injury.

Now if we summarize what those decisions mean with respect to the problem of reserving for products liability, we might b forced to pay a claim where: 1) there was no fault 2) there was no defect in the product, and 3) there was no injury. Still claims might have to be paid when these are the circumstances. These are things that the actuaries have to think about when they set up the reserves. It is really a tough job.

There are many views on what constitutes an adequate reserve, and each panelist has been encouraged to express his own views. I think that rather than getting duplication in the presentations, we are probably going to hear several different points of view.

On our panel this morning we have a company actuary, a consultant, and a security analyst. Our first panelist is our company actuary, Hugh Blodget. He is a fellow of the Casualty Actuarial Society, and a member of the American Academy. He has spent 30 years in the insurance business beginning his career with Aetna Life & Casualty, where he served at various times in areas that were responsible for overall reserve adequacy, and for actuarial services in the property lines of insurance. Hugh was at one time in charge of underwriting for personal lines, involved in corporate planning and data processing where he directed major projects and served as Director of Investor Relations for Aetna. He is currently responsible for all financial and actuarial functions for Phoenix General Insurance Company in Hartford where he is Vice President. He also teaches actuarial courses at the University of Hartford, and those courses include Parts 7 and 8.

HUGH BLODGET:

I am going to ask you this morning if you will raise your hand if your company is underreserved. I am going to talk about underreserving from a smaller company standpoint. This company is a small personal lines company that does not have to worry about things like DES, products, asbestos, and malpractice; they write auto, homeowners and other personal lines. It is a happy company. The first thing I am going to tell you is a little bit about why it is a happy company. Secondly, I am going to talk about the adequacy of their loss reserves, and what their IRIS tests indicate. Then I am going to move from a small company perspertive which I call the U.R. (Under Reserved) Insurance Company, and talk in general about underreserving and what can happen to cause underreserving. I have been exposed to several cases in my career, and tney are all very different. Finally, I am going to talk about a company which has had the bravery and foresight to unmask to the world how it sets its loss reserves and publish that information in a booklet which they make available to both the public and the other companies. I suspect the primary reason it does this is to protect itself against other companies which do not understand reserving as well as they do.

Because I am going to make underreserving look a little positive, I certainly hope that there is no reporter from the Washington Post here who will go and put out a headline tomorrow and say, "Actuary Recommends Underreserving." Actually there are a lot of reasons why you might want to consider underreserving. The following is some background information about the UR

Insurance Company: 1) Their sales are terrific. Their sales compared to the industry's sales growth rate are a lot higher. 2) Their rates are good. They are lower than the industry. #) Their profits are good -- above the industry.

There is a reason why they are doing so well. They did not do it all by themselves, they are underreserved. Everything was going smooth for the company until they make the terrible mistake of hiring an actuary who digs in and finds out that they are underreserved. Actually in the long range I am sure it is a good thing, but temporarily they are facing a major problem.

What then should we do? The first things I would think about are how underreserved are we? How significant is it in our pricing and surplus situation? Is there really a band of adequacy rather than a point of adequacy? Every time you read about a company going broke it is very specific -- How many dollars down to the lat dime they are underreserved. Is it really a realistic situation? It is a problem, because it affects everybody.

Up until now their agents have been happy because the prices were low, the sales were increasing, and their policyholders have been happy with low prices. The stockholders are happy because their profits are good and all of a sudden this company's management has to consider whether or not to make all of these people unhappy immediately.

I listened to Jack Byrne yesterday at lunch time, and I suspect most of you did. He has a very easy answer -- 'Jack up the reserves to where they ought to be'. There is a lot going for that unless perhaps this action leaves you without enough surplus to stay in business.

Another consideration is how does my held reserve compare with the discounted indicated loss reserves? If I discounted my reserves at least I have an argument that I will build up enough money to pay for my obligations when the time comes. Maybe you want to consider a band around your most likely loss reserve need with the lower part of the band being the discounted value. I will talk later about some of the benefits of discounting. I know Steve Lowe has done a fair amount of work over the years in the benefits of discounting. I am currently going to represent the position of a small company that likes things stable, that likes things safe, and likes things reliable. I have some reservations myself about whether it is a little bit head in the sand to just hope discounting will go away in other than taxes. It is a little late for taxes.

During a discussion about what to do with the loss reserve shortage, the President might turn to you, the actuary, and say, "Why didn't I know about this? Isn't there something called an early warning test that is supposed to tell me if I have a problem?" The answer is yes, and these are currently called the IRIS tests. Based on annual statement data certain relationships were established that were indicative of those companies about to fail. The states involved in examinations would utilize these tests as a tool to identify those companies that appear to be in trouble.

IRIS Test #1 is the premium to surplus ratio. How does the underreserved insurance company do on this test? The company's premium is probably going to be a little lower than it should be and is already lower than the industry. The numerator is, therefore, too low. What about surplus? You put up less loss reserves than you need so you have overstated surplus. You have reduced the numerator and added to the denominator which gives you a lower premium to surplus ratio. So much for Test 1.

Test 2 measures changes in writings. Since your premiums are somewhat depressed, based on experience which has underreserving as a part of it, you are going to show less of a change in writings and, therefore, have less likelihood of failing that test.

Surplus Aid (Test 3) is a relationship to surplus. Your surplus is bigger, and your aid is less. You are going to look better there.

Test 4 -- 2 year operating ratio. Your loss reserves are less than they should be, therefore, your incurred losses are less than they should be and the operating ratio is better than it should be.

Investment yield (Test 5), I am glad to say, does not seem to be based on numbers which are affected by underreserving.
Test 6 is change in surplus. You are not going to have the problems which a company in trouble might have with decreases in surplus.

Liabilities to liquid assets (Test 7) reflects your understated loss reserves. Therefore, you are going to find a better ratio of liabilities to liquid assets.

Agents' Balances to surplus (Test 8); once again the surplus is the denominator and your ratio is going to look better.

So far, of the first 8 tests, you have done better than you should have on 7 of them. Now you say wait a minute, there are 3 tests in there for loss reserve runoffs. That has to be a factor. Text 9 is a 1 year runoff; Test 10 is a 2 year runoff; and Test 11 is the overall current inadequacy based on the 1 and 2 year runoffs.

To understand how Tests 9, 10, and 11 can be affected, we need only realize that one and two year runoffs can be controlled by management especially in the long-tailed lines of business where much of the remaining payments are not made until well into the future. In other words, management dictates when prior inadequacies are to be recognized. You now have ended up with 10 out of 11 tests looking better than they should.

Let us talk about three specific cases of underreserving. We are getting away from the J.R. Insurance Company and into other companies now. The first and most dramatic one that I was involved in was a case of fraud. The Company was siphoning off money to some of its officers, was not reporting claims when they were legitimately presented to the company, and finally was underreserving the cases they represented. There is not much you can do about that, and I do not think our session is going to help anybody in that position this morning.

Let us go on to the second case. The second case of underreserving was caused by high level management optimism. Tailoring reserves to match the earnings needs of the company is a real way to become underreserved. The reserve position pamphlet published by the Progressive Insurance Company makes a very

good point. This company does not let management get involved in the process of setting loss reserves which are set by technicians. The technicians are not influenced by earnings considerations. This is a good solution to the second case of underreserving.

The third case involved 2 examples of changes in the claim department's approach which affected the data that I observed. The first change was many years ago when Walt Fitzgibbon and I were working together. The new head of our division said as he took over that the claim adjusters are working against too easy a target. The claim department was responsible for overall adequacy of the loss reserves and had a lot of ways of making sure there was plenty of money in the loss reserves. The most important way in which adequacy of loss reserves were ensured was that the adjusters set reserves based on the way the case would be paid if it went to a jury and a verdict was decided against the company. The worst possible scenario was assumed for all cases with no reduction for the probability of winning the case; even trivial claims were reserved in large amounts.

The immediate problem with this approach is that the claim adjuster sets a reserve on the case himself which he can easily beat tomorrow, as far as a settlement is concerned. He had no rough targets to work against in settling that case and the feeling was that it was costing us a lot of money. As of 1/1 that year, all reserving adequacy responsibility was shifted to the actuarial department. The adjusters were told to set reserves or estimates based on the facts of the case, what you could settle for today, i.e., what you think it is worth with estimates discounted for the probability of winning. Of course that left the poor guy in the actuarial department, who

happened to be me, holding the bag as far as how much reserves we ought to put up as a company. First of all, we had no statistics established on the new system, because this Claim Department program just went into effect with the intention of making a dramatic difference in how much we needed to reserve cases for.

We sat around the table before this all started and said to each other, "Is it really going to have any effect? Is the claim adjuster really going to change his way of living because of the mandate or is he going to go on in the merry old way?" It turned out that some did and some did not. It was many years before the full effect of this program was felt. However, the reserves started dropping precipitously. All during that year when the new method was introduced the case basis reserves headed toward zero, and we had to put up additional reserves based simply on maintaining continuity with the past and judgment to ensure enough money in the overall reserves.

The other example of change occurred some years later when a new settlement technique was introduced. Here the claim adjusters were told to talk to the claimant about his needs, advance him some money, and make a friend of him. Do not send him to an attorney with phrases such as, "We won't give you a nickel until you sign on the dotted line." This is the way people operated for years. What was the impact of that? Paid losses went up immediately. We started paying at the beginning of cases right on toward the end. Once again the overall objective, and it was successful, was to reduce the entire cost of the case. However, any data that we had, both on a paid loss development basis or on an incurred loss development basis was out the window. As in the first example of change, we had to exercise considerable judgment for a while.

I want to talk a little bit about full value reserving versus discounting. If you look at the lines of business which I talked about, there is not nearly as much difference as there is when you consider lines with long settlement claims. The first commend in this business of whether to discount or not came from Jack Byrne. He said, "Do not discount. It is as simple as that." He gave his reason as naive capital and its easy entrance to the business. Discounting is an additional way to make things possible for naive capital. Every time I hear "don't discount the reserves," I am reminded of the number of times that I have heard "we've tried for an underwriting profit" as much as you used to, and you are not going to hear "don't discount the reserves" as much as you used to.

However, there are some good reasons for not discounting, particularly in the convention statement. The convention statement has many places where solvency is prime and accuracy of earnings in the current period is not as important. There are plenty of places where you have to hold 90 day balances rather than a real bad debt reserve. There is nothing inherently wrong with reserving full value even though you may be earning some investment income on the reserves. Another reason for not discounting is shooting against a target that has a safety margin in it, and without this margin, we might do as badly as we are today at having enough money on the basis we are supposedly operating on. That would be disastrous. There would be many more insolvent companies than there are now. There is a long history of loss development patterns or Schedule P runoffs which would all be destroyed if we suddenly went to a discounting basis. Continuity with the past is a very critical need in this business. And finally, what happens when you set the reserves last year at 10-12% interest, while this year all of a sudden it is down

to 6%? Do you take that loss of investment income that you thought you had and mark it up as negative development on reserves?

Finally, a little bit more about the Progressive report. I mentioned that they do something bold. They announce to the world how they set their reserves. It is quite a substantial booklet which tells you a number of things that I have never seen in print before with any other company. They describe the way they set reserves for automobile in 1971-1976. Their approach back then was to take the current month's loss ratio and compare it to the 36 month trailing loss ratio. If it was higher, they would lower it; and if it were lower, they would adopt the 36 month trailing loss ratio. Now think about that a minute. What does that do? If everything is even, then it does not do very much. But suppose you are having an awful year with each moth getting progressively worse. You are constantly adjusting the current month's loss ratio to the 3 year average. I am surprised that they put that in the booklet especially since they dropped that method about 8 years ago. To me, it sounds like a weakness in what otherwise is a very solid book. They also put subrogation and salvage reserves as a net to the loss reserves. Since you cannot reduce loss reserves for subrogation and salvage in the statutory statement, they have a factor to remove it.

Progressive explains their report in how line managers are required to reserve within plus or minus 15%, and on the overall reserve their goal is plus or minus 2%. On top of that they have a safety reserve added on, without affecting the results of the individual managers and underwriters, to make the company more adequate.

Lastly, Progressive has something that many of you might want to think about in these days of growing profits. We are coming into the 7 fat years from the 7 lean years. Our whole management thinking has to change, and one of the things you might want to think about is the assigned risk business. They have a high percentage of it compared to most companies, but they reserve today for the losses they are going to have 2 or more years in the future based on today's volume. Since this is how the assessments are based, they charge today's results for that. If you have profits that look too good, you might want to recognize this future commitment. Thank you.

WALT FITZGIBBON: Our second panelist this morning is Steve Lowe. Steve is a fellow of the Casualty Actuarial Society and a member of the American Academy of Actuaries. He is the Chairman of the Academy's Committee on Financial Reporting Principles, and is a member of the CAS Educational Policy Committee. He is a past president of the Casualty Actuaries of New England. Steve started his career at Aetna and currently is a consulting actuary with Tillinghast, a Division of TFP&C. He recently authored a paper on discounting which was published in the July issue of The Journal of Insurance Regulation.

STEVE LOWE: I want to make a couple of introductory comments, and then I have to conduct a poll, the obligatory poll. Jack Byrne did make a comment yesterday at lunch that I thought was kind of interesting. He said when you recognize an

underreserving situation do the only right thing: react immediately, fully, address the problem head on. I would suggest that that is fine in principle but not in practice.

As Hugh pointed out, and I think experience would tell me, most of the monitoring systems, whether you are talking about regulatory agencies or rating agencies such as A.M. Best, are systems that operate based on ratios, and those systems do not respond well to abrupt changes in ratios for individual companies. I think it is important for management to recognize the problem fully. I am not so sure that it is appropriate for the financial statements to recognize those problems immediately, although the experience of Cigna was fairly positive in that their stock took a nose dive the day after the announcement and then rebounded fully the next day. Apparently the market did not feel that shock was all bad news, at least not after a little bit of hindsight.

My poll is a little bit different from the previous polls. I would like to know of all the companies represented here, how many companies have an explicit margin in their reserves currently, that is either positive of negative. In other words, you calculate the indicated reserve and then choose to hold something other than the indicated reserve either positive or negative within some kind of tolerance. Any hands? How many are negative?

To me, the critical issue when we are talking about underreserving, is the issue of margins. That is really the fundamental problem. To start out I want to pose an initial question, that we cannot evaluate whether were are underreserved until we define what it means to be underreserved. What does it mean to be underreserved? The traditional view is that you are underreserved

if your estimate of the ultimate liability rises. The idea here is that the reserve is equated with the estimated ultimate liability. This approach has some very nice features. It is a traditional approach as Hugh pointed out. Schedule P and other runoff tests are all based on this approach. It is easy to understand and to test retrospectively. I would argue that it includes an explicit margin of conservation equal to the difference between the nominal value of the liabilities and their present value or their discounted value. I think it is important, however, to draw the distinction between the two quantities that are in that equation. The estimated ultimate liability is an estimate of how much the company will ultimately have to pay out, and the reserve is a balance sheet provision for that estimate. They do not necessarily have to be equal and they are not the same thing.

I want to suggest that a more modern view of the reserve is that it is a liability entry representing the assets available to discharge the ultimate liability. This is not quite the same as discounting. It is a second cousin. The idea here is that the company has a pool of assets, and it is going to use those assets as they mature to discharge the liabilities. In economic terms, we are really interested in whether or not they have enough in the bank and in assets of other kinds, particularly bonds, such that the cash flow from the asset side will produce enough funds to discharge the liabilities as they mature.

I think that gives you a clear view of my perception of adequacy. My reserve is adequate if the underlying assets make a good and sufficient provision for the ultimate liabilities under conservative assumptions. I think that is a reasonable way to test in economic terms whether our reserves are really adequate.

There are a couple of points relating to this modern view. This modern view has also been expressed in materials coming out of the life insurance industry and beginning to hit the casualty side of the actuarial area. It is referred to as the valuation/actuary concept. Where you have to look at cashflows, you have to look at the assets, and the overall situation of the company.

Yesterday in his speech Jack Byrne also said that now is the time to put bonds to their market value. I am no advocate of that and disagree with Jack on that point. I would say let us not adjust the assets from their amortized cost to market, but instead put the liabilities on an amortized cost basis which is what this concept is really all about.

A couple of key points on this approach. First there is an emphasis on conservatism. I wrote a paper on discounting as Walt mentioned. I am an "advocate" of discounting under certain circumstances. I am not an advocate that the industry should rush out right now and bleed the money that is in its reserves out; that they should bleed margins out of their current reserves. I do not believe in that at all. I do not believe that the correct reserve is the discounted value of the liabilities at current market yields. I believe that it is essential that there be conservatism in the reserves. That conservatism has to provice for all reasonable fluctuations in the various parts of the estimates including higher ultimate liabilities than you expected.

I do not necessarily think that the reserves should be based on the best estimate of ultimate liabilities. They ought to perhaps be based on a conservative estimate of the ultimate liabilities. Timing is also a factor.

I think it is appropriate to consider the possibility that the payments will take place more quickly than historical patterns suggest. In addition, you have to consider the effects of a mismatch. If the assets mature sooner or later than the liabilities, then you need to take into account the interest rate that you are actually likely to yield, given the fact that you have to either sell the bonds prematurely or you have to reinvest some of the maturity of the assets.

By way of example, I want to contrast this approach with discounting. I have a client that has small Workers' Compensation self insurance program. They have their assets invested very conservatively in 2 and 3 year note that are currently yielding about 8 or 9%. They want to discount their reserves using 7%. My response to them was you are going to earn that 8 or 9% for the next couple of years but after that you are going to have to reinvest the money. If interest rates have gone down you simply will not have that same opportunity to get 8 or 9% over the life of the maturities.

In concept, the assets and the reserve ought to cover reasonable fluctuations and then surplus should be available to cover plausible fluctuations which presumably is a broader confidence band. The actuarial profession has not determined what are reasonable or plausible fluctuations and what these terms mean. I think that is a matter of critical importance to us. I would just offer as my opinion that reasonable fluctuations might be 80% of the time, and plausible fluctuations might be 95% of the time.

If we are going to adopt this new approach, it seems to me there are 3 possibilities (I do believe that in different contexts each possibility could exist). The first is that under the valuation approach it is possible that the valuation might product a reserve that is higher than the estimated ultimate

liabilities. I think that is a real possibility and now just unusual. I would say that in new product situations, or surplus lines of business, or high level excess business, it is quite possible that a reserve that I would want to say is good and sufficient to provide for reasonable fluctuations might be higher than just simply my best estimate; my point estimate, my 50/50 value of the estimated ultimate liabilities.

Another possibility is that the two come out to be exactly the same. I think there are some actuaries who would argue that this is more often not the case using the best estimate as an implicit margin in the resulting reserves. Some people believe that that implicit margin is about right. I think for

some lines it may very well be acceptable, however, I would prefer a more explicit analysis than just blind faith. I would also point out that 10-15 years ago when interest rates were 3%, and the liabilities were relatively short in their duration, that margin of conservatism was at a level of X. Now in today's interest rate environment and the longer duration of the liabilities that margin is 3 times larger. I am not convinced that we need to continue to have a margin that is 3 times larger than we had historically.

The last case which I think is probably of most interest is that the modern valuation reserve produces a lower answer. Those companies which adopt this approach might find themselves in a position where their actuaries believe that the assets are sufficient to discharge the obligations under reasonably conservative assumptions, and that the liability that they wanted to establish on that basis was less than the full payout amount because of the future appreciation of the portfolio of assets.

What are the consequences if this is the case? Assume that we have a situation where we are going to reserve below full value. There are several consequences. The first is lower capital requirements. The margins for reserves are a necessary part of the overall capital structure of the industry. The capital that is embedded in those margins is hidden and remains tied up in the reserves until the liabilities mature, at which point the capital is released. Companies that operate with lower reserve margins, for example, by discounting, or by adopting a valuation approach, have lower overall capital requirements than their competitors who stay on a full value basis. These lower capital requirements create the opportunity either for lower prices or higher returns, and that is a competitive advantage.

Finally, as I pointed out in the beginning, and certainly as Hugh has amplified thoroughly, underreserving produces better ratio test results given the current systems. That also can yield a competitive advantage. Thank you.

WALT FITZGIBBON:

Our third panelist this morning is Alan Zimmerman. Alan is Vice President of Kidder Peabody & Co. in New York where he is a security analyst specializing in the insurance industry. Prior to joining Kidder in 1984 he was a general partner in Conning & Co. in Hartford. He has been active in securities industry affairs and is a board member and secretary of the Association of Insurance and Financial Analysts in New York. He is going to talk about how the market evaluates reserves.

ALAN ZIMMERMAN:

As you heard in the introduction I am a security analyst, and I want to give you a little perspective on what that means when you think in terms of industry seminars like this. Basically, my world is to look at the insurance industry from the outside. I guess it has always struck me that I really do not care particularly if the industry is doing a good job or a bad job. I really do not have an absolute of what is good or bad. I always sort of view things in their relationship to how the stock market may or may not interpret

Table 1
Aggregate Reserve Development Data
Accident-Year Basis

— — Total Reserves (dollars in millions) — —

	1976 & Before	1977	1978	1979	1980	1981	1982	1983	1984	1985
Balance at end of initial year	22,451	11,969	13,236	14,824	16,443	17,773	18,338	20,332	22,802	26,861
Subsequent year:										
One	23,197	11,495	12,807	14,507	16,162	17,448	18,415	20,688	23,892	
Two	24,330	11,626	13,041	14,796	16,290	17,299	18,745	21,821		
Three	25,062	11,623	12,881	14,565	15,977	17,254	19,184			
Four	25,915	11,664	12,856	14,463	15,930	17,478				
Five	26,379	11,651	12,745	14,417	16,058					
Six	26,843	11,624	12,739	14,437						
Seven	27,454	11,616	12,778							
Eight	28,111	11,663								
Nine	28,794									
Cumulative change	6,343	-306	-458	-387	-385	-294	846	1,488	1,090	

— — As % of Initial Reserves — —

Balance at end of initial year	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Subsequent year										
One	103.3	96.0	96.8	97.9	98.3	98.2	100.4	101.8	104.8	
Two	108.4	97.1	98.5	99.8	99.1	97.3	102.2	107.3		
Three	111.6	97.1	97.3	98.3	97.2	97.1	104.6			
Four	115.4	97.5	97.1	97.6	96.9	98.3				
Five	117.5	97.3	96.3	97.3	97.7					
Six	119.6	97.1	96.2	97.4						
Seven	122.3	97.1	96.5							
Eight	125.2	97.4								
Nine	128.3									
Cumulative change	28.3	-2.6	-3.5	-2.6	-2.3	-1.7	4.6	7.3	4.8	

Source: Company data; Kidder, Peabody & Co. Incorporated.
Note: Aggregate includes following companies: Aetna Life & Casualty; American General Corp.; American International Group; CIGNA Corp.; CNA Financial Corp.; Chubb Corp.; Continental Corp.; Fireman's Fund Corp.; GEICO Corp.; General Re Corp.; Home Group, Inc.; ITT Corp.; Kemper Corp.; Ohio Casualty Corp.; SAFECO Corp.; Sears, Roebuck & Co.; St. Paul Companies, Inc.; Travelers Corp.; USF&G Corp.; and Xerox Corp.

Property-Casualty Insurance

Table 2
Aggregate Reserve Development Data
Calendar Year Basis
(Dollars in millions)

	1976 and Before	1977	1978	1979	1980	1981	1982	1983	1984	1985	Total
Calendar year:											
1977	746	—	—	—	—	—	—	—	—	—	746
1978	1,133	-474	—	—	—	—	—	—	—	—	659
1979	732	131	-429	—	—	—	—	—	—	—	434
1980	854	-3	234	-317	—	—	—	—	—	—	768
1981	463	42	-160	289	-281	—	—	—	—	—	353
1982	464	-13	-25	-231	128	-324	—	—	—	—	-1
1983	611	-27	-111	-102	-312	-150	78	—	—	—	-14
1984	657	-8	-6	-46	-48	-45	329	356	—	—	1,190
1985	683	46	40	19	128	224	439	1,132	1,090	—	3,802
Cumulative	6,343	-306	-458	-387	-385	-294	846	1,488	1,090	—	—

Source: Company data; Kidder, Peabody & Co. Incorporated.

them. In my world there really is no reality. It is more just a perception of reality as it is interpreted in the stock market.

I have always thought that the stock market is a particularly good indicator of how people were being judged, because when you think about it, the stock market is one of the few mechanisms in the world where you actually put up

your money to support your opinion. We all have opinions and we all have numbers, but in the stock market, people actually put up money to buy and sell stock based on convictions. Even though there is no reality, that perception is a very interesting mechanism. The thing to keep in mind is that, pure and simply, I view the world from the outside. There is no absolute as I do not care if it is good or bad. I just care about my interpretation or my ability to interpret it. That is how I judge things.

With that, let me give you a conclusion, just in case some of you may want to drift off to sleep or catch a plane, or do other things. The conclusion is that the stock market penalizes companies with poor reserving histories. It is not as simple as saying that when a company makes a reserve announcement, the stock goes up or down the next day. I think an important thing to keep in mind is the stock markets react over time and often times in anticipation. If you look at stocks over time you will find that the market does react plain and simply to poor reserving histories. I will work you through a sequence that I think shows you that. I want to talk about two specific topics that will weave you toward that conclusion. One, is that I would like to give you my overview of what the reserve situation is in the industry. And second, I want to show you some stock market experience with some companies.

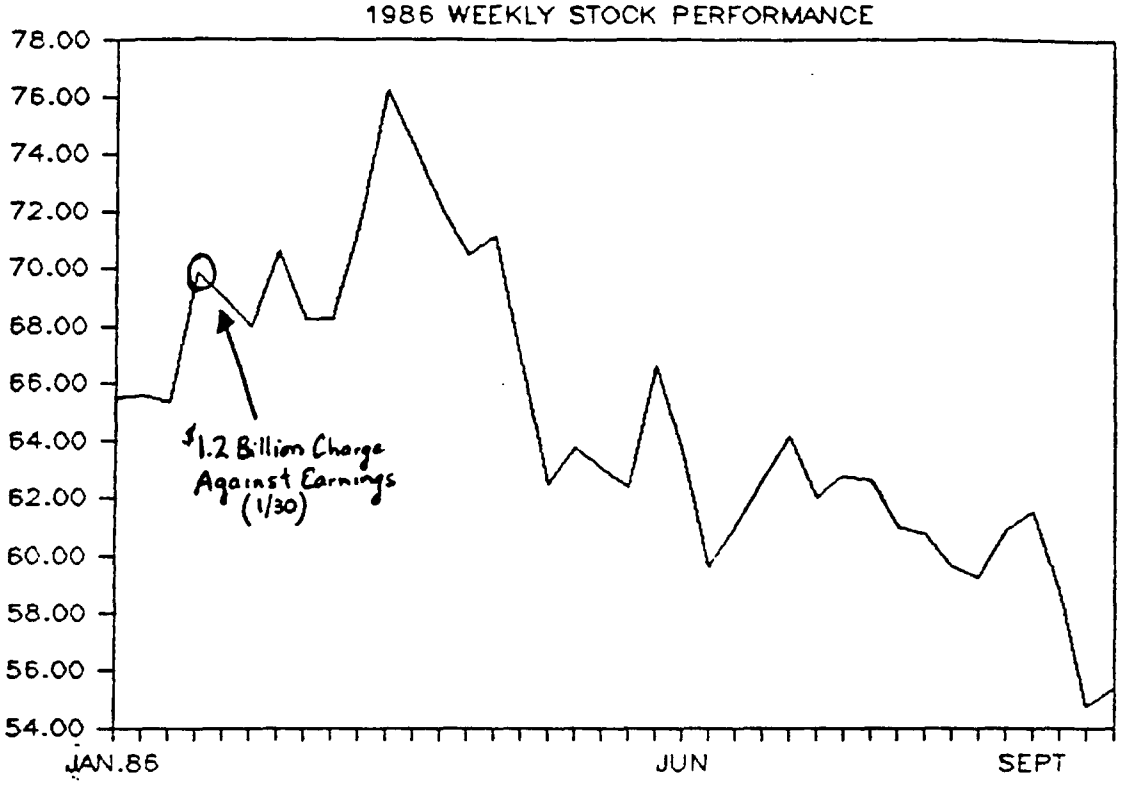
Tables 1 through 3 are part of a bigger study that I do annually using 10K data. Some of you might be familiar with 10K data as opposed to Schedule P data. I find the usefulness of the 10K data is that you can get it quickly and that within a few weeks after it is available, you can get at least an overview of what is going on in the industry. The data is not nearly as good as Schedule P data, because it is not as detailed, but I do think that putting it on an accident year basis, you can get a quick overview and a good feel for what is going on in the industry. Table 1 and

Table 4

Table 5

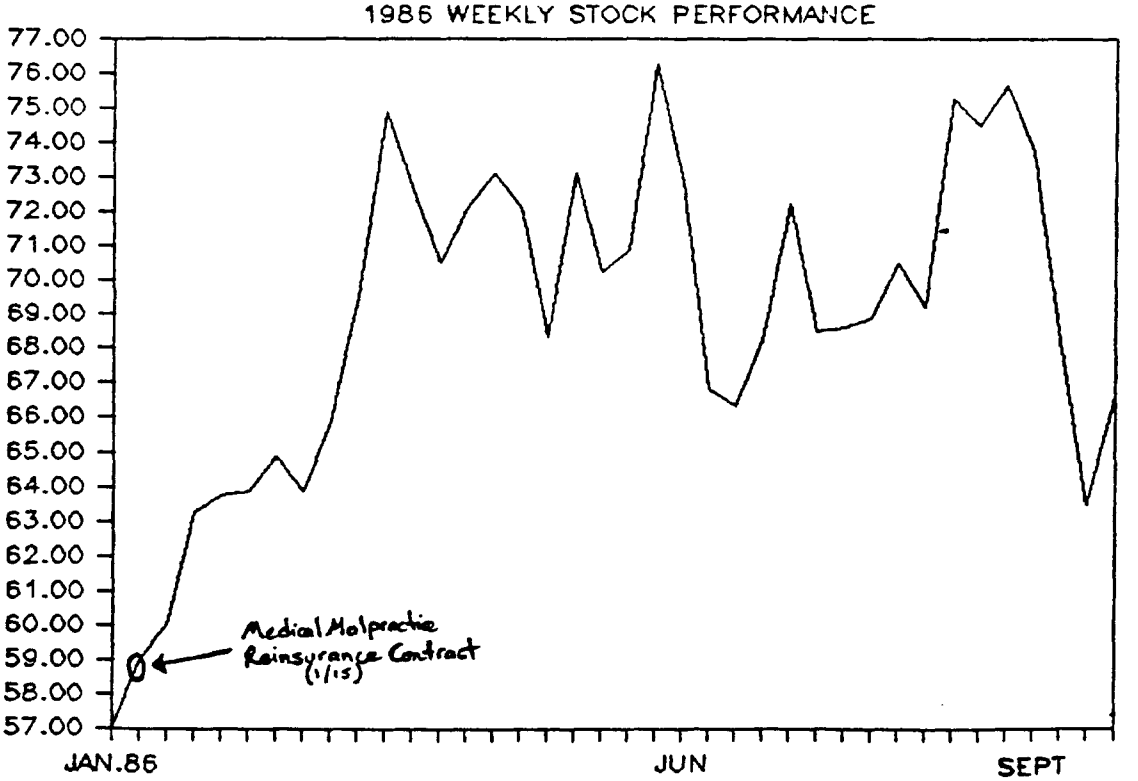
CIGNA

1986 WEEKLY STOCK PERFORMANCE



CHUBB

1986 WEEKLY STOCK PERFORMANCE



and Table 2 give you some history. I think it sets a lot of tone for the way I think about the world. It becomes clearer if you just look at the accident year development (Table 1). The real problem the industry has and everybody know it is in the 1976 and prior accident years. As you can see in Table 1, there is a very dramatic upward development over the last 10 years. In fact, the indicated reserves are probably 128% of where they were initially set. That is not going to go away for a long time and I think it is pretty clear that there is still a fairly big deficiency in there.

If you look forward across the accident years you can see the influence of the cycle working on it. The 1977 through 1981 years have steadily developed downward, and then there is the dramatic upward development of 1982 through 1984 years. I think most importantly that is a function of many companies' natural tendency to try and cushion earnings in the good side of the cycle, and then release reserves in the bad side of the cycle.

Everyone says that reserves are managed, and Table 2 proves that they are to me. If you look across the calendar year development, what you see is that in the good years, in this case 1977 through 1981, companies were adding very dramatically to reserves, and that as results deteriorated starting in late 1981 or 1982, companies started releasing reserves. You can tell me maybe that is how reality is, but I will tell you this is just to cushion earnings. This tendency is also influenced somewhat by an inability to recognize how bad things were really getting. The only thing that got thrown out of sync in this cycle is that the cycle lasted a lot longer than expected. All of a sudden, what you had in 1984 and 1985 was a period where companies had to start adding back the reserves at a time when earnings where terrible. As far as I can check back in the past, you have not seen that happen

Table 3
Estimates of Reserve Deficiencies
Year-End 1984 and Year-End 1985
(Dollars in millions)

	1976 and Before	1977	1978	1979	1980	1981	1982	1983	1984	1985	Total
Reserve balance at year-end 1984	4,030	1,160	1,551	2,215	3,125	4,889	7,316	11,268	22,802	—	58,356
Estimated deficiency or redundancy at year-end 1984:											
In dollars	2,000	0	0	0	−200	−150	800	1,500	2,450		6,400
As % of reserves	50	0	0	0	−6	−3	11	13	11		11(a)
Reserve changes in 1985	683	46	40	19	128	224	439	1,132	1090		3,801
Reserve balance at year-end 1985	3,804	988	1,209	1,690	2,292	3,456	5,438	8,464	14,072	26,861	68,274
Estimated deficiency or redundancy at year-end 1985:											
In dollars	1,600	0	0	0	−50	−100	500	600	1,600	1300	5,450
As % of reserves	42	0	0	0	−2	−3	9	7	11	5	8
Estimated ultimate reserve as % of initial estimate:											
At year-end 1984	134.1	97.1	96.2	97.8	95.9	96.0	106.6	109.1	110.7	—	—
At year-end 1985	135.4	97.4	96.5	98.1	97.1	97.1	107.3	110.3	111.8	105.0	

Source: Company data; Kidder, Peabody & Co. Incorporated.
Note: All data are dollar items unless otherwise indicated.
(a) Midpoint of 10%-to-12% range.

Table 4

Property-Casualty Insurance

Stock Performance

Name	Year-to-date Price Change
Hartford Steam Boiler	26%
Chubb	20%
Farmers Group	20%
SAFECO	18%
Cincinnati Financial	17%
Kemper	17%
Hanover Insurance	15%
Amer. International Group	14%
General Re	14%
Amer. General	13%
S&P500	11%
GEICO	11%
Fireman's Fund	11%
Ohio Casualty	9%
Aetna Life & Casualty	5%
Continental	-4%
USF&G	-4%
Orion Capital	-6%
Travelers	-6%
St. Paul Cos.	-8%
CNA Financial	-14%
CIGNA	-16%
Fremont General	-22%
Home Group	-23%

Source : Kidder, Peabody & Co. Incorporated.

very often. Usually the big reserve strengthening is or almost always is in the good earnings years.

The question now becomes -- given this pattern and given the significant amounts of reserve strengthening that had to be done in 1984, how has the stock market reacted to this? To support my view that the market does react to poor reserving, first look at Table 4 which shows the year-to-date 1986 Property-Casualty Insurance stock performance. There is an interesting pattern here which shows that of the companies in 1985 that did the most significant reserve, you would find that of the broader group of stocks, only Chubb has managed to out perform the market in 1986. I would say that was not a coincidence that 5 out of the 6 companies with the biggest reserve strengthening did not perform as well as the rest of the market. Keep in mind my basic fundamental belief is that markets react to poor reserve histories.

Table 5 supports the fact that it is never simple to determine how markets will react. In contrasting the Cigna stock performance against the Chubb stock performance, it is interesting that the Cigna price was around $69 per share the day they announced the reserve strengthening. It is hard to say what the exact price was, because the news leaked out ahead of time. Steve pointed out for the next couple of days the stock was really strong, and in fact four or five weeks later it was up around $78. However, since that time, the stock price has fallen.

Nevertheless, I think there is an interesting lesson in what happened to Cigna. Over time there was a very dramatic loss in confidence in the management of Cigna. It did not happen the day they announced the reserve strengthening. It take time for things to settle in. They had underreserved, capital got weak, and they had to sell stock. The worst thing you could ever do in the stock market is tell the

world that you are going to sell stock 3 months from now. It puts tremendous pressure on your stock price. The best thing to do when you are selling stock is just surprise people and announce it that minute. Here there was an entire investment world knowing that stock had to be sold. People started beating on the stock hoping to get it cheaper, but at the same time the fact of adding $1.2 billion to reserves in one shot started to hit people. Anybody that has to do that probably is not in control of other parts of the business.

Rightfully or wrongfully that is the view of the stock market, and I think there is an interesting coincidence that Cigna which was at $69 per share when all of this started is now at $55. I think this demonstrates what I am saying that somewhere along the line you get penalized for this, although it is not always as simple as you think.

The main thing I wanted to call to your attention is Table 6. Whenever you are looking at stocks, cause and effect is a hard thing to get a fix on. Let me tell you the methodology in Table 6 because it is part of the thinking. I took a group of companies, divided them into large versus small, because the small stocks over the last 5 and 6 years have done far better than the big stocks, and then further divided them into companies that have better than average or above average reserving histories, and those that had below average reserving histories. I do recognize that the definition of what is good and bad, and what is above and below is vague, but basically I went back and looked at the histories of the companies relative to the industry and said -- who seems to be doing a little bit better and who seems to be doing a little bit worse in the industry. I am not even sure the titles "above average" and "below average" are right. I think the point is they seem to be different. One seems to be a little better than the other.

Table 6

Reserve History vs. Stock Price Performance

Large Companies

- Above Average - Company	5 Year Price Change(%)	Average Combined Ratio(%)	- Below Average - Company	5 Year Price Change(%)	Average Combined Ratio(%)
Aetna	29	115.7	CIGNA	12	125.4
Travelers	99	113.4	Continental	61	113.7
American General	187	111.9	Fireman's Fund	-	113.6
CNA	275	119.4	Home Group	-	123.1
American International Group	140	103.4	St. Paul	64	113.3
Chubb	211	110.2	USF&G	89	113.0
General Re	187	107.4			
Kemper	157	110.4			
Average	160	111.5	Average	57	117.0

Small Companies

Company	5 Year Price Change(%)	Average Combined Ratio(%)	Company	5 Year Price Change(%)	Average Combined Ratio(%)
Zenith National	223	99.1	Orion Capital	212	112.7
W.R. Berkley	406	108.2	Guaranty National	-23	112.8
Hanover	385	105.6	Piedmont Management	231	120.8
Hartford Steam Boiler	372	94.8	Selective Insurance	198	104.1
Progressive	545	97.7	Seibels Bruce	-28	119.1
			Fremont General	136	117.6
Average	386	101.0	Average	121	114.5

I want to show you two things that I think are really fascinating and which document my point. Look at the 5 year absolute price changes of the above average companies and the below average companies in Table 6. The point I am trying to make is that somewhere over time without having a complete sense of cause and effect, the better reserving companies have done better. Now they have not done better only because they are better reserving companies, but they have done better because the companies that do a good job of reserving tend to be better run in a lot of other parts of their business, whether it be in pricing, marketing, or claim settlement. Once again, the companies that are better reserved over time have better stock performance. When you really get down to it that is what it is all about.

Loss reserves in and of themselves may not be a message, but what is a message is that the quality of a company's loss reserving is a demonstrator of the quality of the other ways they run their business. From my world, which is stocks, those are the stocks which are going to do better over time. It is an interesting observation how this really has played itself out. With that, let me stop and thank you for your time.

WALT FITZGIBBON:

Thank you very much Alan. Since we seem to have quite a bit of time left before we get to the questioning, I thought I would just take a couple of minutes and say a few things about a reserving model we have at Aetna and give you some views we have on how the industry reserves.

I made a comment in the introduction that Miscellaneous Liability would vault into first place if it was adequately reserved. We believe that line of business is substantially short. Aetna has a reserving system containing data taken from the consolidated statements of the 50 largest writers in the country. We look at a profile of the major stock companies, because we like to see how we are doing. We look not only at what we think our absolute position might be but how this position compares with the competition. When we explain our situation to various rating groups and analysts we try to talk in those terms and show that there are some things that we can see happening and there are ways we think we are a little different.

The first time we made this information public, we presented it to the financial analyst group that Alan is associated with in New York. At the end of 1983, we looked at 33 stock companies and concluded that if the reserve standard is the full pay reserve (i.e., the reserve now is equal to all the payments that will be made in the future on the claims that have been incurred), 31 of the companies did not have enough reserves. Two were thought to have enough, but neither one had a margin of more than 1%. One year later these same two companies that we thought might have had enough reserves both had significant upward development. Often we find that while reserve

assessments change, the positioning of companies relative to each other does not change. Companies may all shift, as we may have been a little optimistic, but there is a tendency not to jump around very much. We found that of the 33 companies, two that we had judged to be slight underreserved look like they might be adequate. We also estimated that the industry held reserve would take 8 years before it was all paid out, after which the payments would eventually take the companies far past the held reserve. At the end of 1984, we updated our rating and said, using this same methodology, there really was not much change in the position.

There was something else that we wanted to learn about besides the question of a full pay reserve. We wanted to know the likelihood that the reserve was okay and how it would pay out. We wanted to learn what the present value was.

We devised some techniques to measure this. First, we called the most probable reserve "50/50" (i.e., half the time you are going to pay out more than the reserve and half the time you are going to have a margin). We found a way to move the 50/50 up to what we felt was a 90% chance of being adequate. The payout pattern was estimated for the 90/10, then discounted using the portfolio rates.

We then looked at what the situation was for the whole industry and determined an index number that was equal to what you need on that discounted basis versus what you are holding. The results showed that the industry group being monitored had an index number that was <u>exactly</u> 1.00. That meant that the whole industry had a discounted reserve but with just enough money set aside counting investment income to pay the claims.

However, there was a vast difference in individual company positions. There were many companies that were significantly short, and there were some that looked pretty good. During 1985, not surprisingly, the industry reserve position improved somewhat. One company in particular had a big increase in its adequacy. The results of Aetna's study have not been made public yet but will be soon. I do not want to give a premature announcement of something that we will present to the analysts at the end of the third quarter. That is all I wanted to say about reserving. We now have some time for questions.

STEVE LOWE:

The question asked was, "If I were to go to a valuation approach to reserve testing, what would happen to Schedule P?" I think very clearly Schedule P would have to be revised or supplemented. The critical ingredient is the estimated ultimate liability. I think it is still appropriate to have a testing mechanism that focuses in on the estimated ultimate liability. Personally, I think it would be good for companies to estimate their ultimate liabilities and then have an explicit adjustment to move from that estimated ultimate liability to their valuation of their reserve. I think that it is appropriate for Schedule P to continue to be tested on a full value basis because as has been suggested from some of the materials presented, that still remains a difficult and challenging task, and one that is worth monitoring very closely. What I am really suggesting, and I think what Walt is suggesting with what the Aetna has done with some composite Schedule P data, is that it ought to be carried one step further: In knowing what the estimated ultimate liabilities are, how can we value them based on the

portfolio that we have constructed. I would suggest that there needs to be a supplement to Schedule P which shows that adjustment and decomposes the answer into some component pieces where each can be tested.

WALT FITZGIBBON:

Any further questions? If not I'd like to say thank you very much to our panelists.

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