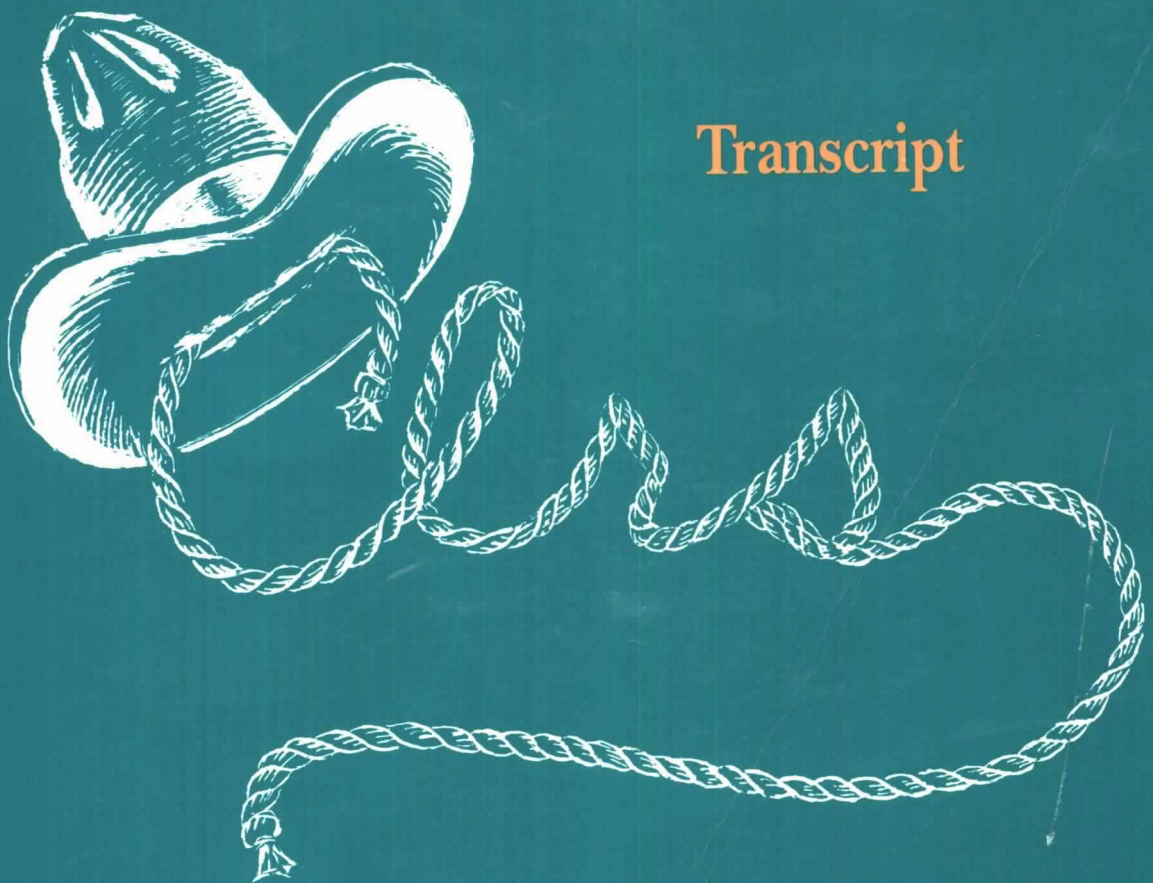

Transcript

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Cosponsored by the American Academy of Actuaries, Casualty Actuarial Society, and Conference of Actuaries in Public Practice

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1990 CASUALTY LOSS RESERVE SEMINAR

GENERAL SESSION

Opening Remarks

Patrick J. Grannan
Casualty Loss Reserve Seminar

Michael Fusco
Casualty Actuarial Society

MR. GRANNAN: Welcome to the tenth annual Casualty Loss Reserve Seminar. This seminar is jointly sponsored by the American Academy of Actuaries, the Casualty Actuarial Society, and the Conference of Actuaries in Public Practice. The presidents of two of those organization are before you right now, and the third will be joining us later this morning. On my right is Joe Brownlee, president of the American Academy of Actuaries, and on my left is Mike Fusco, the president of the Casualty Actuarial Society. Mike Fusco will start the seminar off with a few words on behalf of the sponsoring organizations.

Mike is executive vice president of Insurance Services Office, the nation's largest provider of property casualty advisory loss costs, serving more than 1400 insurance companies. Mr. Fusco has held various managerial and officer positions since he began his insurance career in 1970 as an actuarial assistant for the Insurance Rating Board, which was one of ISO's predecessor rating bureaus.

He was appointed vice president and actuary for personal lines in 1978, and over the next five years he moved on to head the Commercial Lines Actuarial and Commercial Lines departments. In 1983, he was named senior vice president and actuary. In February of 1987, he joined Ernst & Whinney, which is now Ernst & Young, as the principal in charge of the New York Casualty Actuarial and Risk Management Practice. He rejoined ISO in July of 1988 in his present position.

Mr. Fusco is a Fellow of the Casualty Actuarial Society and is currently president of the CAS, as I mentioned before. He is also on the board of directors of the American Academy of Actuaries. In addition, he has found time to become admitted to practice law in the State of New York and is a member of the American Bar Association.

He graduated cum laude in 1971 from the City College of New York as a Phi Beta Kappa, with a B.S. degree in mathematics. He received his J.D. degree from Fordham Law School in 1978.

Mike.

MR. FUSCO: Thank you, Pat, and welcome to all of you. Thanks to Pat particularly for mentioning the predecessor organization of ISO. After yesterday's New York Times article there may have to be successor organizations to ISO.

Welcome, on behalf of the three sponsoring organizations, to the 1990 Casualty Loss Reserve Seminar. Joe Brownlee will speak to you at lunch on behalf of the American Academy of Actuaries. I am speaking on behalf of the Casualty Actuarial Society. Wynn Kent will be joining us also at lunch, from the Conference of Actuaries in Public Practice.

Both Pat and I are particularly pleased at the number of attendees for this seminar. There are almost 700 of you in the audience, and among you are CAS members, Academy members, CAPP members, and others. And that "others" will become particularly relevant as we talk in a bit about the new definition recently passed by the NAIC of qualified actuaries, or what I will call QAs.

You might ask: Why has this seminar been repeated now 10 years in a row? The answer is simple: It is because of the importance of the seminar. It is important to various constituencies. It is certainly important to insurance companies because of solvency concerns. For those of you who are working for insurance companies, at times you might be asked a question by your bosses, or by your employees, or by your purchasers of insurance: How are you doing? This seminar should help you to answer that question.

It is also important to regulators, who are even more concerned with solvency issues. As a result, they may be approaching loss reserving from a more conservative viewpoint than others. If regulators are on the speaking program in the next two days, you might ask them that specific question.

It is important to the public, of which there are various types that I am referring to. There is the insurance-buying public, which includes you, me, businesses, and insurers, as well, who are buying insurance from reinsurers. Their concern is security. They would like to make sure that the company that they are buying from has the means to fulfill their obligations.

And to another public, and that is investors, who want to be sure that they have a true picture of financial strength, and if you do not give it to them, they will not hesitate to sue you later. We will be hearing from Herb Goodfriend later today on perhaps that particular subject.

The last group that this is important to is a group that I will call actuaries, professionals. All professional want to know the state of their art and to stay on the cutting edge. Many of you, I assume, are using this seminar as a way of gaining or retaining such knowledge. Research is done each year. I am pleased to see that many of the papers that were written in the past year are on the program, and that will help all of us increase our knowledge base on this issue.

From a public policy point of view, though, it is important to actuaries that they be aware that some are practicing in their field without a license. That is important to all the groups I have mentioned before: to insurance companies, to regulators, to the publics, but it is most important to actuaries who, as professionals, have an obligation not only to keep themselves current and to know what they are doing but also to monitor that others are not embarking upon what they should not be practicing

in. Those of you who are professional actuaries have an obligation to report those occasions to the appropriate bodies.

It also helps actuaries satisfy their continuing education requirements. Irene Bass unavoidably could not be here today. She asked me to talk about the continuation requirements of the three sponsoring organizations. They are each a little different.

The CAS has a policy of encouraging continuing education and, in fact, makes it mandatory for the individuals to do so. That is an individual responsibility, with the organization's responsibility being to provide continuing education opportunities.

The American Academy of Actuaries has continuing education requirements for those of its members who are signing public statements, such as casualty loss reserve opinions. The Conference of Actuaries in Public Practice has a formal continuing education requirement for all of its members.

To get more specifics on the ins and outs of all those particular requirements, I ask you to look at the yearbooks of the respective organizations. But remember, continuing education is the hallmark of a professional association and of a professional.

Irene also asked me to mention to you, as a commercial, the continuing education opportunities that the CAS will be presenting for you in the next year. In a couple weeks, October 1, there will be an environmental issues seminar in Boston. A week or so after that, there will be a seminar analogous to this one but with emphasis on Canadian requirements. I call to the Canadian Loss Reserve Seminar. That will be in Toronto on October 11 and 12.

The CAS's annual meeting is in New Orleans, November 11 to 14. Next year, in March, there will be a rate-making seminar in Chicago and two special interest seminars, with dates, times, places, and topics to be announced.

The recent NAIC action that I referred to earlier makes this program particularly timely. There used to be a definition of a QLRS or a qualified loss reserve specialist. To be one, one has to be a member of the American Academy of Actuaries or someone otherwise qualified by the regulators. This requirement to be a QLRS was applicable, not in every state, but in approximately 20 states, for signing casualty loss reserve opinions.

The changes made very recently are applicable to the 1990 blank and extend the signing requirement to all states and to all companies, with some exemptions. Throughout, the QLRS is replaced with a new term: qualified actuary, or QA, now defined as either (a) a member in good standing of the Casualty Actuarial Society, or (b) a member in good standing of the American Academy of Actuaries who has been approved to sign casualty loss reserve

opinions by the Casualty Practice Council -- one has recently been formed, by the way -- or (c) someone otherwise approved by the appropriate regulatory official.

Perhaps I could take a hand count to see which of you feel you are not either automatically qualified or could easily be qualified under either A, B, or C. Let me ask A First: How many of you are member in good standing of the Casualty Actuarial Society, by a show of hands?

(Show of hands.)

MR. FUSCO: Pat, you got the count on that?

MR. GRANNAN: Yes.

(Laughter)

MR. FUSCO: That was approximately 300. How about B, someone that is not in A now, but someone that is a member of the American Academy of Actuaries, who probably has not been approved by the Casualty Practice Council but who feels they could be approved by the Casualty Practice Council; any Bs in the room?

(Show of hands.)

MR. FUSCO: That I was able to count, Pat; I got two.

And C, not A or B, but someone otherwise approved by the appropriate regulatory official. Many of you may be in that category now or could be in that category. By a show of hands, anybody in C?

(Show of hands.)

MR. FUSCO: I counted three. Very interesting. We will see at the end of this seminar how many of you feel that you might fall into categories A, B, or C.

Changes are being suggested to the NAIC definition by the American Academy of Actuaries, and the CAS board will be considering those recommendations at its meeting next week. Let me at least mention that, while these changes are being proposed, the changes probably will not immediately affect those who are automatically qualified. For those of you who have raised your hands, today would be qualified under either of the two definitions: the one being proposed or the one that is currently in effect.

Rather, the new definition, the one being proposed by the Academy, would ensure ongoing proper protection of the publics that I have mentioned before.

A few comments on the program: From my review of it, the program is extensive. The faculty is excellent. There is a good blend of various tracks, and the program was able to accommodate practical, theoretical, and political topics. The program is longer today and tomorrow than it ever has been before, so congratulations are due to the committee, and to Pat Grannan in particular for doing such a fine job as chairman.

On behalf of all three sponsoring societies, let me welcome you again and hope you have a fabulous seminar. Thank you.

(Applause)

MR. GRANNAN: Thank you, Mike.

I have a few logistics to let you know about now...

We think we have a very exciting program planned for you. We certainly hope that you will find it worthwhile. The first session will start at 8:30. I think you have about 10 minutes to get there. Thank you.

(Applause)

1990 CASUALTY LOSS RESERVE SEMINAR

1A: CONSIDERATIONS IN SETTING LOSS RESERVES

Faculty

Alan M. Crowe
William M. Mercer, Inc.

Darlene P. Tom
Fireman's Fund Insurance Companies

MS. TOM: This morning, we have two speakers. I am Darlene Tom. I am a Vice President with Fireman's Fund Insurance Companies, and my major responsibility is setting loss reserves for my company. I have been associated with the insurance industry for 15 years.

My cospeaker is Alan Crowe and he is with William M. Mercer. He is an associate consultant and he has been with the insurance industry for six years. The purpose of this session is to review some basic definitions and concepts that are often encountered in loss reserving practices. First, we'll define what a loss reserve is, touch upon some key important accounting aspects, and discuss some key dates that are used when evaluating loss reserves.

We'll also get into some of the major elements of a loss reserve provision including loss adjustment expense. Next, we'll cover the basic principles that are used in evaluating loss reserves; what is an actuarially sound reserve, and the principle of uncertainty.

Lastly, we'll conclude with a discussion of some major considerations that are made when setting loss reserves: the data elements organization; and, the application of judgment.

(Exhibit 1)

Let us start by defining Loss Reserves. It is the amount a company sets aside to settle outstanding claims. When a company closes out an accounting period (a year, quarter, or month), the company must have a provision called loss reserves which represents all future payments to be made on claims that have occurred up to that pint, regardless of whether or not the company has been notified of the loss.

A key characteristic of a loss reserve is that it is an estimated liability. The precise amount is not known until the claims are finally settled. Consequently there is always a certain level of uncertainty in the estimation of loss reserves.

There are several reasons why loss reserves are important. They represent the largest financial obligation of an insurance company. Reserves are a major component in evaluating the financial condition of a company - whether or not the company will be around to honor its financial obligation to the claimants. Consequently, the accuracy of the financial condition of an insurer is dependent upon the accuracy of the loss reserve estimates.

Reserves are also important in the valuation of underwriting income - whether or not a company has made or lost money during the year.

And that leads us to an important accounting aspect of Loss Reserves.

(Exhibit 2)

Loss reserves fulfill the basic accounting principle of matching revenue and costs. In determining the statement of underwriting income for a given accounting time, you start with revenue, the amount of earned premium, and deduct from that the costs that are incurred in the period to arrive at the amount of profit or loss. The costs are equal to the overhead expenses plus losses from claims arising during the period, the amount paid on these claims as well as any future payments to be made, or a reserve amount. Thus, loss reserves helps to match your costs, a major component being the losses incurred in the period, to the revenue or earned premium generated in the same period.

When you add the amount of loss reserves for all claims that were incurred to date, you obtain the total amount of reserves for an insurer. That is the amount that appears on the balance sheet, the statement of financial condition.

The balance sheet is comprised on two parts. First is the assessment of economic worth, assets. The other part is the assessment of all financial obligations, or liabilities. For an insurer, the single largest liability is loss reserves, the financial obligation to the claimants. Typically, loss reserves represent 75% to 85% of the total liabilities. The difference between Assets and Liabilities is equal to Surplus.

Loss reserves play a major role in the measurement of surplus. The amount of loss reserves can range between 2 to 5 times the amount of surplus depending upon the types of coverages being written and the historical growth of the particular insurer. An error in the reserve estimate of 5% can impact surplus 2 to 5 times that amount of 10% to 25% of surplus.

What happens to underwriting income if there is a change in reserve estimates? Let's refer back to our equation for underwriting income of revenue less costs. A change in reserve estimates would affect the cost side of the equation. Your costs would now include another component, in addition to losses from claims which occurred in the current period. You must now add the change in assessment reserves for claims from prior periods. This is a very common accounting view of underwriting income where loss costs are measured as losses from current period claims plus the change in assessment of prior years' reserves. This view of losses is called calendar period losses.

When there is no change in estimate of prior years' reserves, calendar period losses are equal to accident period losses.

When the change from prior years is other than zero, calendar period losses are not equal to accident period losses. In this case, the underwriting income for a given year is distorted.

(Exhibit 3)

There are some important dates to keep in mind in evaluating loss reserves. The first is the accounting date. The accounting date defines the group of claims for which liability exists, that is, all claims incurred up to that point in time. The claims are the financial obligation for the insurance company.

The other important date is called the valuation date, which defines the time period for which information is included in estimating the reserve. This information typically includes all the actual loss transactions that were reported to that company as of the given valuation date.

An initial estimate of the reserves for a given accounting date can change at subsequent valuation dates, as more and more of the information is reported to the company. So, for example, an evaluation of year-end 1986 reserves valuated as of June 1990 would be an estimate of the reserve required for claims that occurred on or prior to 1986, based on all the reported loss transactions up through June of 1990.

That estimate would probably differ from the initial estimate which was based on claim transactions reported through year-end 1986. The reserve estimate can change at subsequent valuation points. Essentially, the estimate of reserves is revised as additional information is obtained.

(Exhibit 4)

Now I'd like to cover the difference between a carried loss reserve and an indicated loss reserve. The carried loss reserve is the amount of loss reserves shown in a company's published financial statement, such as the balance sheet. An indicated loss reserve is the estimated amount of what the reserve should be and is generally the result of a particular loss reserve evaluation procedure.

The indicated loss reserve amount, again, can change at subsequent valuation points.

The adequacy of the carried reserve is the difference between the carried loss reserve and the indicated loss reserve. When the carried loss reserve is substantially greater than or equal to the indicated loss reserve, the carried reserves are considered adequate and the difference between the carried and indicated reserve is called the reserve margin.

When carried reserve are less than the indicated reserve, the carried loss reserves are said to be deficient, with the amount of the deficiency equal to the difference between the carried and the indicated reserve amount. Usually, that number is expressed as a negative number.

We often hear the term reserve strengthening or reserve weakening. There is often some confusion about what these terms mean. Some would define strengthening or weakening as simple the change in the carried reserve from one accounting period to the other. If reserves have increased, then they must be 'stronger'. This is not necessarily true.

Reserve strengthening and reserve weakening refers to the change in the reserve margin from one accounting period to the next. So if the difference between the carried versus indicated reserve is minus $25 million at the close of one accounting period, a deficit of $25 million, and that difference narrows to zero, or no margin or deficit, then the amount of reserve strengthening is equal to $25 million. Your reserve margin has increased from a deficit position of $25 million to reserve adequacy.

If there is no change in the margin or deficit from one accounting period to the next, then there is no reserve strengthening or weakening. The change in your carried reserve is simply the initial carried reserve amount, minus the payments that were made during the year on prior years' claims, plus a new reserve amount for new claims incurred in the current year.

So, if there is no change in the reserve margin, the change in the carried reserve is simply the natural progression of reserves over time. You take your old reserves, make payments from those old reserves, then add in new reserves for the new claims that were incurred.

If you have reserve strengthening, the gap between your carried reserve and your indicated reserve increases over time, so either your deficit is shrinking or your margin is increasing. If you have reserve weakening, this gap gets smaller. Either your margin is decreasing from one accounting period to the next or your deficit is increasing.

With reserves weakening, calendar year results are better than your accident year results. The change in reserve is less than the change that would be required to support new liabilities.

(Exhibit 5)

Examine the elements of a loss reserve provision. Here is a list of the major elements. Typically, a company will value reserves based on some subgrouping of this list.

The first component is case reserves, and those are the estimates made by the claims adjusters for future payments on claims that have been reported to the company.

The next category is formula reserves. Formula reserves are an amount that is set aside for a specific group of claims. Oftentimes, they are derived by using an average value applied to all the claims with similar risk characteristics. For example, a

company may use an average value of $1,000 for all physical damage claims.

The next category is called development on known claims, often referred to as supplemental case reserves. If you were to track the estimates made by the claims adjusters on a group of claims over time, the estimates would probably change as more facts be come known to the claims adjusters. The change in the estimates is called development on known claims. Some companies will want to track this separately from the rest of their reserves because it gives them a report card of how well the claims adjusters are doing in estimating final settlement values.

Then you have reopened claims reserves. Reopened claims can occur when there is an initial settlement, but after the settlement has been made, an additional claimant comes forward or an additional injury is discovered. The overall loss reserve provision has to account for the fact that some of the claims that were initially settled will ultimately reopen at some subsequent date.

Next is pure IBNR or pure incurred but not reported claims. These are claims that have occurred but have yet to be reported to the company.

Lastly, there are claims in transit. Claims in transit are those which have been reported to the company, but have not yet been entered onto the company records. Again, some companies will want to track this to monitor the backlog in the field offices.

(Exhibit 6)

Let's take a look at the life cycle of the claim to get a better handle as to what these distinctions truly mean. In our illustration, an accident occurs when our insured is rushing off to start a week-long vacation. So, on April 2, 1988, an accident occurs.

The claim exists, but it has not yet been reported to the company, so it exists as pure IBNR. Our insured doesn't report the claim until he returns from vacation ten days later. Once it's been reported to the company, it's a claim in transit. It hasn't yet been entered onto the company books, but it has been reported to the company.

Four days later, that claim finally gets onto the company records and an initial formula reserve, an average value, is put up. The formula reserve exists until the claims adjuster has enough time to investigate the claim and set up an individual case reserve amount, which doesn't happen until about four to five weeks later.

The claims adjuster has to go out, interview the witnesses and claimants, review the medical reports, and repair costs

estimates, and doesn't come up with a case reserve estimate until four to five weeks later.

Three months have transpired and now we are into August. The claims adjuster has obtained additional information about the injury and the accident, and revises the case reserve amount.

Six months later, a settlement is reached; a payment is made four days later. It is not until the claim draft clears that the claim is closed and the case reserve is taken down. So, there is quite some time that can transpire between the settlement agreement and when the claim is finally closed.

Different companies may use different procedures as to when to close a claim. Some companies may not close it until the claim draft clears. Other companies may not close it until the release is signed by the claimant.

Even after the claim closes, there is a slight possibility that the claim may reopen. So, the company has to have included some amount for the slight possibility that the claim may reopen, and that amount is usually encompassed in a bulk reserve amount.

(Exhibit 7)

In addition to loss reserves, a company must have a provision for loss adjustment expenses, the expenses that are incurred in adjusting a claim. There are primarily two distinctions in loss adjustment expense.

The first category is allocated loss adjustment expense, those are costs that can be assigned to a specific claim. A major expense is attorney fees, the costs that are incurred in securing legal representation for defending the insured against claims in suit. This, by far and away, is the largest component of allocated loss expense and, furthermore, of loss adjustment expense, in general.

Allocated expense also includes the court costs associated with defending the claim in suit, and for some companies, the use independent adjusters. When the independent adjuster fees can be identified on a specific claim-by-claim basis, companies may choose to include these costs as allocated loss expense. Or the company may choose to include it as unallocated loss expense because the function performed is very similar to their own in-house adjusters.

The other type of loss adjustment expense is unallocated loss adjustment expense or costs which cannot be assigned to a specific claim, generally the cost that is associated with running the claims department. It would include salaries and benefits, over head costs, the cost of rent, the space the claim adjusters occupy, cars, supplies.

It would also include a provision for company overhead or their share of the corporate expense. For example, there are many support services within a company that are not directly assignable to either OA&G or loss adjusting functions, so the company may choose somewhat arbitrarily to assign part of their overhead to the claims adjusting function. Lastly, it may include independent adjuster fees.

The setting of reserves for loss adjustment expense has proven to be quite a problem for the industry and there are a number of reasons for this. One is that many companies do not capture case reserves on allocated loss expense, so the only information that you have got is the allocated loss expense payments. So, there is a lot less information available to set loss expense reserve levels than there is for losses where there exist at least the adjusters' case reserve estimates.

The other problem is that the increase in loss expense often outpaces the inflationary increase on losses. Many companies do not include a trend for the loss adjustment expense in setting their reserve levels, so loss adjustment expense has often proven to be deficient for many companies.

(Exhibit 8)

Now, I'd like to talk about some of the principles that are used in setting loss reserves. The first is a fundamental objective of the entire loss reserving process, achieving an actuarially sound loss reserve.

An actuarially sound estimate is a provision for the unpaid amount required to settle all claims, whether reported or not, for which a liability exists on a particular accounting date. Generally, this estimate is for a defined group of claims. It consisting of all claims that were incurred on or prior to the accounting date. The reserve estimate is measured as of a given valuation date, that date encompassing the reported loss transactions that have been reported to the company.

Most importantly, the estimates are derived from a reasonable set of assumptions and appropriate methods. It's possible that, say, five years ago, a reserve estimate was developed and based on the information that was available at that point. From that information, reasonable assumptions were formulated, and a set of methods which appeared appropriate at that time was selected.

Unfortunately, five years later, the reserve estimate is updated and the estimate is now twenty percent higher. Was the initial estimate actuarially sound? It depends on the conditions which caused the estimate to be off. Was there information that was available five years ago which could have led one to a more appropriate set of assumptions?

If the initial estimate, based on available information was based on a reasonable set of assumptions and appeared appropriate at that time, then probably the initial estimate was sound, despite the fact that the revised estimate indicates a twenty percent error and that the company was technically insolvent when the initial estimate was made.

A lot of actuaries and a lot of reserving specialists find themselves in the situation where with 20/20 hindsight, they see their estimate is now twenty to thirty percent off. It does raise the question: Why were you off and what should have been in place to prohibit that kind of inaccuracy or that amount of mis-estimation.

Another important part about this principle is the reference to the appropriateness of the actuarial methods. Not all methods provide the best estimate in every reserving situation. The greatest challenge in setting reserves is identifying the method that is most appropriate for the particular situation being reviewed. That is the hardest part of the whole reserving process.

You can see that the principle is not so much a standard for accuracy. It's impossible to determine what the level of accuracy in the reserve estimate is. It's more of a standard for maintaining discipline and integrity throughout the reserving process .

(Exhibit 9)

You have a similar principle for loss adjustment expense that parallels that for loss reserves. It's a provision for the unpaid amount required to investigate, defend and effect the settlement of all claims, whether reported or not, for which a liability exists as of a given accounting date.

Basically, it represents all the future payments to be made associated with loss expense for claims that were incurred up to the accounting date for a defined group of claims. It is measured as of a given valuation date and, again, the estimate of the loss expense reserve can change at subsequent valuation points.

Finally, the estimates are derived from a reasonable set of assumptions and appropriate methods, the most important aspect of the principle.

The next principle is uncertainty and, at this point, I'm going to turn this discussion over to Alan, but I'll leave you with this cartoon.

(Exhibit 10)

It depicts two reserving specialists, obviously discussing their reserve estimates. They are both working with the same set of facts, but their conclusions differ here. Nonetheless, in both cases, their conclusions are wrong. With that, Alan.

MR. CROWE: The problem with this slide is that if you ask two actuaries what a reserve estimate is, you'll get three answers, none of which is 100% correct.

What I'd like to talk to you today about is uncertainty in the loss reserve and, equally as important, the consideration that once you have an estimate, what are the parameters you can check it against. Also what are some ways you can say how confident you are in your estimate, given the assumptions you've made.

Today, you're going to talk about various methods of coming up with reserve estimates. I want to stress that these methods are very good, but they will probably all give you different estimates. You have to know what your underlying assumptions are, what impact they will have on your estimates, then kind of throw it all together and pick a number that you can stand behind and support.

There is always uncertainty in a reserve estimate and the reason for that is because you're trying to predict a future contingent event. The loss has occurred, but the claim may not have been reported yet. Since some claims are not reported yet, we are trying to estimate what is going to happen in the future.

(Exhibit 11)

The true value of liability for loss or loss adjusting expenses is only known when all claims have been settled. Even then, some claims reopen. There is a lot of variability in what you may pay for one claim versus another, who sets the reserves on it, and so forth.

I'll talk a little later about some internal factors that can affect your reserve estimate as well as some external economic factors that can affect your answers. The estimation of liability implies a range of reserves can be actuarially sound.

The range of estimates may widen based upon the line of business you are reserving. There are statistical methods to determine confidence intervals, which is basically a confidence range around that point estimate.

There are also reasonability checks, which I'll talk more about later. When you get your reserve estimate, what are the ways to check it against last year's and the year before to see what is causing changes?

As far as the confidence range; by using statistical measures you can obtain confidence intervals by looking at loss distributions

and finding some parameters, such as the average claim size, the average number of claims, the likelihood of new claims, and running simulation models, which generate random claims, based on your assumptions. Then you can pick 95 percent, 90 percent confidence levels and so forth.

I think I'd rather spend time on once you get a reserve estimate, what are some parameters you can check it against and what might influence it to change later. Generally, you will use several varying methods to estimate a reserve.

These methods will give you different answers, so you need to sort through your assumptions again and find which methods you think are capturing the right changes in your historical data. I'll also speak about those in a moment.

An appropriate reserve within a range depends upon the likelihood of the estimates and the financial reporting context in which it is used. I think the confidence that you need to put on your reserves may depend on who it's going to be provided to.

If it's for internal management, they may not worry as much if it's 96 percent confidence or 95 percent confidence if they want a range for planning purposes. There's also external views of reserves where the shareholders or the insureds view things a bit differently than the management, a bit differently than the regulators who may be worried about solvency.

You also need to estimate liabilities if there's an acquisition. You want to make sure you know what the true liabilities have been for the company, how they are operating, and so forth. Also, you probably need to estimate liabilities if you're performing a commutation.

If you're purchasing someone else's liabilities, it's similar to buying a car. You want to make sure you're getting a good deal, so you need a confidence range about that, but it might be a little tighter or a little looser than others. There's also liabilities that need to be analyzed for reserve certifications. When you certify reserves, you want to be fairly confident that the estimates are reasonable.

You also need to do project liabilities for pricing to find out what your past losses have been compared to the premiums you've collected, to arrive at a measure of rate adequacy.

(Exhibit 12)

A key date I'd like to discuss is the accident date, the date on which the loss occurred. The report date is when it's reported to the insurer. The recorded date is when it's recorded on the books of the company.

A claim may be reported to the claim department, but they haven't entered it into the books yet. We cannot get that information unless we talk to the claims people. We talked about the accounting date and the evaluation date.

Some of the methods we'll learn about this morning allows us to go back and test how well those methods have worked in the past. There is a means of altering your valuation date to see how well your methodology works and picks up changes in the data.

(Exhibit 13)

Some typical data elements for losses are paid losses which are how much you've actually paid for your claims. The case reserves are claims that the Claims Department know about. They may be set up on an average reserve or case by case basis.

For instance, they may set the average bodily injury claim at $5,000 as an initial estimate, or they may go through and set it on what they actually think it's going to settle at. You need to know your Claims Department and how they're reserving. We're trying to estimate what is going to happen to the case reserves and how they're going to develop through time. We use that data to project things that aren't even on the books yet, so we need to understand all the components that underlie it. Incurred losses would be the sum of paid plus the ending case reserves. This is how much you expect to pay on known claims.

On the expense side, there are paid allocated loss adjustments and allocated reserves. They follow the payments and estimate the future payments. There is also an unallocated section that she discussed. Basically, on unallocated reserves, we follow the paid unallocated patterns. It's difficult to set up unallocated reserves.

Reported claims are those that the Claims Department know about. Closed claims are those the Claims Department feels are closed and are not going to reopen. Reopened claims are those that the Claims Department thought had closed but were reopened. Pending claims are the claims still open.

The above are the loss components. A way of seeing if the estimated reserve made sense is to have some measures of volume to compare the reserves. These are; written premium; written exposures; earned premium and earned exposures. For earned exposures, you think of cars or houses; some measure of the volume of business you're doing.

Written premium and earned premium are also measures of volume. They have inherent in them rate adequacy, and it's another assumption that when you use premium, that you're using the same historical premium adequacy. You need to be able to account for that, so each assumption needs to be measured through time.

Now that we know what kind of data we need, how do we go about finding organizing data into some useful manner. Generally, you try to get claims that behave alike. I just have to subdivide the data that have the same characteristics.

(Exhibit 14)

For example, homeowners separated by coverage for homeowner's property versus homeowner's liability. For automobile, maybe auto bodily injury versus auto property damage versus comprehensive, versus collision.

We try to break out the data that's going to behave the same through time, because as we'll find in these next few sessions, using historical data to project what's going to happen in the future, we want data that's going to behave the same in the future that it did in the past.

That's all well and good, but I find that it doesn't always happen that way. There are other things that I'll talk about, the internal and external considerations that affect the way the past losses have behaved.

(Exhibit 15)

There is another factor to subdividing data that we try to use which is the credibility of data. Credibility is a measurement of the predictive value that is attached to data. Credibility is how credible is the data you're using, how confident do you believe that the data will behave the same, and so forth.

The group of claims should be large enough to be statistically reliable. Again, there are ways of statistically measuring the credibility. I look at it from a more judgmental perspective. We try to break the claims down as far as possible into groups that behave the same, but if you take a piece of pie and you cut it up into too many pieces, all we get are crumbs.

There comes a point where you have to measure the credibility versus the homogeneity and try to get the two to mesh together, so that you're working with good data that you think is going to behave the same, but it's still credible enough to use.

There are credibility measures that in the next few sessions may be discussed. There's a point of partitioning, where to divide the data into groups too small to provide credible development patterns is possible.

Development patterns refer to tracking a claim through time. At the end of one year, you may think that the loss is going to be "X" dollars. A year later, it's "Y" dollars. A year later, it's "Z" dollars. So, we try to make sure that that development stays consistent through time.

You can increase the consistency through using credible, homogeneous data. It's one of the tougher things, to see how to divide the data depending on the size of the company. Large companies can break their claim data down into a lot finer detail than a small company that just writes homeowners and auto. If it can't be broken into, say, uninsured motorist, medical payments and so forth, you may need to do various groupings with those sized companies.

(Exhibit 16)

Emergence in settlement patterns. Emergence is basically the delay between the occurrence of a claim and when it's recorded on the company books. A good analogy to the difference in emergence patterns might be between automobile bodily injury and homeowners.

If you have a claimant who gets hurt, say, he hurts his back and he has a claim. He doesn't know that he's hurt his back for a year or two. The date between the occurrence and when it's recorded can be two years, if you just started feeling bad after two years.

Whereas, a homeowner's claim, if a guy's house catches on fire, he pretty much knows that his house has caught on fire, so the reported date for that would be much faster.

The average BI claim may not be reported for a year and a half, and your homeowner's claim is reported shortly after it happens. This helps to gain an appreciation of why we don't group auto BI and property claims together. We would get a masking effect of what our losses look like and how they'll develop.

Settlement is the delay between the reporting of the claim and when it's settled. Let's use that BI and homeowner's claim again. With BI, even though it's reported, the insured may be incurring hospital expenses, medical expenses and so forth, so they may not be willing to settle until he is sure of what the claim is going to cost.

With homeowners, they notify you of the damage and replacement cost. They can monitor that very quickly. Settlement on the homeowners would come fairly quickly. There is still a time lag between what they estimate, perhaps, and what the final settlement is. It's a lot shorter for property than it is for liability lines.

(Exhibit 17)

Here's a chart of actual emergence and settlement patterns. Collision would fall into what we refer to as the short tail line, where the "A" stands for the accident date; the "E" is when the loss is reported or recorded; and, "S" is the settlement.

You can see for the collision line, you have an accident that's reported fairly quickly and settled fairly quickly.

When we go to the automobile bodily injury, it's a little longer between the accident date and the emergence date. In this chart, it's not significantly different. But, look at the difference between when it's recorded and when it's settled. There's a much, much longer settlement period.

When we go down to worker's comp, there is generally a larger gap between the accident date and the emergence date. There's even a longer gap between settlement and when it's reported. Then, we've got products liability which is a long time between emergence and settlement, and also a very long time, usually, between accident date and the emergence date.

As you move from a property-type coverage to a heavy liability line, the methods and assumptions you use will have an increased impact on the confidence levels because the uncertainty is much larger on these types of claims.

(Exhibit 18)

Now, I'd like to talk about some factors that affect loss reserves. We'll talk about internal considerations first, considerations within the company that may affect the changes. The first one is reinsurance plans. Reinsurance is basically the insurance of insurance.

Reinsurance is when you insure a certain risk, then get those risks insured for certain limitations. For example, if you have $100,000 excess of loss reinsurance, you maintain the first $100,000 of each claim; the excess portion goes to the reinsurer.

If you historically are at a $100,000 reinsurance limit and you set your loss reserves accounting for reinsurance, then every loss would be limited to $100,000. Suppose all of a sudden, the company goes out and buys $250,000 excess of loss reinsurance. Instead of maintaining the first $100,000, you now maintain the first $250,000.

So, you need to know what the reinsurance arrangements are when you look at the reserves, because the larger the losses are, the more erratic one-time losses become.

You also need to know how the program is structured. They may have certain occurrence coverages or aggregate coverages. You need to know how the loss adjustment expenses are treated. They may be covered proportionately to losses or they may not be.

Nowadays, it's probably a good idea to find out who is reinsuring the losses in case they can't come through with the financial backing that they thought they could. The reinsurer's financial strength should be analyzed.

Another component is structured settlements. Structured settlements are to account or to recognize the time value of money in the claims. That is, if you have a claim that is going to make dollars of benefit payments for a long time, they may discount those to account for the time value of money. You need to know if the data you are looking at already has a discount factor built into it.

Contract changes, also affects the reserve estimation process. You need to know what the contract for the reinsurance might be. You also have a variety within the policyholder contracts. For example the company may now be selling larger deductible sizes.

There might be a shift in policy limits. Perhaps, the historical policy limits were $50,000 and now they've shifted up to $100,000 or maybe $250,000. The losses basically had a built-in capping effect because the company usually wouldn't pay more than the policy limits. Now, those historical dollars are not at the same level as today's claims because you've taken out the limitation from the contract.

Perhaps, they've changed exclusions in the contract. Pollution liability usually comes to mind when thinking of an exclusion. You can try to exclude it. Whether the courts allow you to exclude it or not is maybe another issue, but you need to know if there are new exclusions in the contract for certain types of claims. Perhaps the contract covers less than they were historically.

There's also a variety of endorsements that go along with all of the different coverages. Perhaps now they write new endorsements. Basically, you need to find out what is it that's going into the loss data you're looking at and try to adjust for changes.

There's also organizational changes within the company that may affect the data. One type of an organizational change may be a new manager in the claim department. These people are the ones that are setting up the data that you're going to analyze, so you need to understand how their philosophy differs from that of the people who previously set the reserves.

They may include more people in the claims department. If files were sitting open on the claims department desk and you add more people, you'll see an influx of claims. You'll think, "Oh, things are just surely getting worse because look at the number of claims compared to what we used to have." The difference is, they're just getting them put into your statistical base faster. They're moving them from the desk into the record files.

We also need to consider the mix of business. In mix of business, I tend to think of the coverages you're writing. If you're a large insured and have a lot of data, you can look at BI

separately from property damage and so forth. A lot of companies are not large enough to look at it by coverage, so we might have to combine a few of the liability lines.

You can tell from the emergence pattern we had up before that, depending on the line of business, you're going to get a different emergence to settlement rate, the number of claims, how fast they're reported and so forth.

We should see if the distribution by coverage within our data set has shifted.

Case reserve adequacy. We talked about pending claim dollars, which is open case reserves. Case reserve adequacy describes the accuracy of the reserves. When a claim is reported and you think the claim is going to cost $1,000, does it settle for $1,000 or does it settle for 500 or does it settle for 3,000?

As long as case reserve adequacy is fairly consistent, you're okay, because most of the methods will throw in any development on case reserves as a component in IBNR. However, if the case reserve adequacy changes, we must adjust our methods and assumptions.

We need to see if the reserves are being set up, one, like they used to be; and, two, are they as adequate or inadequate as they used to be? We need to know how the case reserves are developing.

Business growth. Business growth would also depend on where you're growing at. Claims will vary for several reasons. For example, whether you're writing in Ohio or whether you're writing in Florida or Massachusetts, your claims behave certain ways depending on the way they're occurring at. We need to monitor where the growth in business is and what types of regulations and laws are in effect.

Additionally, if you're growing "away from home", you may have to get more external claims adjusters as you may not have the capacity to set up a shop to handle the claims processing.

This would be a case where you'd have to look at your allocated loss adjustment expenses in the cost of decentralization.

Claim handling practices might also fall under the organizational changes in the claims department. Different claims departments have different philosophies. Some claim philosophies are such that they say, "We're going to try to predict it to the dollar the first day we know about the claims."

Other philosophies are, "Well, we're going to set up an average reserve based on the type of claim. Then, we'll come back and revisit it in a month or two months or whenever we can get back to it." So, we need to know whether they are trying to set a

true estimate for the reserves or if they're just trying to set up an average reserve for what that average claim will pay.

Additionally we need to know if they switch from an average reserving method to a per case type basis. Claims handling practices are also an important factor. If you handle your claims faster and you pay them faster, then you'll see that come through your data, much like the number of claims. You say, "Oh, the number of claims are up." Then you say, "Oh, boy, the payments are up." Maybe historically at the end of the first year, you'd pay 25 percent of them and now you're paying 40 percent. You think, "Boy, I'm just going to pay lots more. I've already paid 15 percent more than I ever did before." Well, you need to make sure that it's not from some restructuring and that it is bad things happening and not just a switch in procedures.

(Exhibit 19)

Environmental factors and changes in underwriting practices also affect the estimation of loss reserves.

When reserving, you need to know from underwriting, if they are tightening the criteria? Are they making it pretty tough to be an insured? Are they loosening them to gain market share or entrance into the market?

Society can have a very large impact on the liabilities of an insurance company. Societal views is usually called claim consciousness. If they feel they're owed for any accident that happens, they put public pressure on the insurance company and consequently the industry. The states you write business in is very important. In some states, there's a higher average claim or claim frequency.

Regulation may have an effect on loss reserves. Regulators may have a higher or lesser need for confidence levels depending on their purpose of review.

For example, worker's comp may have a retroactive benefit clause, and even though the accident had occurred, anyone who had a claim or has a future claim for an occurrence back then may get new benefits. This makes it difficult to project reserves.

Judiciary decisions might include pollution liability, where it's more difficult for insurers to avoid paying certain claims. Judiciary decisions can set forth precedence to pay claims or not to pay claims, to determine what is an occurrence and when the occurrence date is.

If you have a policy that is to cover a certain timeframe and the occurrence date falls within that policy limit, then you're liable for it because it's occurred within the limits. If a court decides that the occurrence actually occurred prior to or after that data, the legal liability will vary depending on the decision and the definition of the occurrence.

There's seasonality effects when you set reserves. For example, some lines of business seem to incur claims closer to hurricane season. Consequently, we may need to account for the seasonality in claims.

The residual market also affects the reserve estimations. Losses are pooled so we need to understand the relationship as it affects the residual market.

Inflation is a key component to predicting reserves. It will probably cost more to settle a claim tomorrow than it did yesterday. We need to understand how a claim that occurred last year or two years ago or three years ago relates to the same claim occurring today. One thing we do with our data is to adjust the data for inflation if were estimating what the IBNR or reserves would be from past historical data.

Also, economic conditions will affect your losses and your liabilities and, consequently, the reserves. For instance, the increased fuel prices would probably cut down on the number of miles driven for vacation and so forth, which might cut down on the frequency of claims. When the economy is not going good, you sometimes have a period of increased claim consciousness. We should monitor the frequency and average claim cost to account for what the economic conditions of the period we are reserving for should reflect.

(Exhibit 20)

The last component is the application of professional judgment. We've talked about a lot of this, but the loss reserve is a point in time estimate of a company's outstanding liability. It's a point in time estimate because when you go back to do it at a later point, you are not estimating as much of the unknown.

If you look at all accidents that occurred in 1986, at the end of 1986, you had just a little bit of experience to work with. Now, if you go back and look at those reserves today, you've got an additional four years of development, so you're better able to project those reserves. The more experience you have, generally the better the reserve estimate.

The reasonableness of loss reserves should be measured against relevant parameters. I like to think of using these neat methods that we'll all learn about in the next day and a half or so, and getting a range of reserves from those methods. Then I have to pick an estimate that gives me confidence to say, "I think this is what your liability is going to be."

Before we can do that, we have to see if that estimate makes sense. We use the term "professional judgment." It's judgment. It's an educated judgment, experience judgment and so forth. What I like to do once I get my answer is to see what kind of inferences I can draw from it. For instance, we can take the

ultimate liabilities and divide it by earned premium and look at loss ratios. If you start to see loss ratios that change through time, then you need to be able to account for that. This is one way of seeing if your loss reserves caused something to change, or if the premiums cased the ratios to change.

We have a loss ratio parameter you can look at to see if the loss reserves are telling you what other indications are telling you. I like to know what sort or rate indications they need, and see if the loss reserves are similar to what the rate indications would imply. If they are similar, I feel better about my reserve estimates telling me what the rates are also telling me.

I also like to measure the loss reserve results on a pure premium basis. Pure premium is the average loss per exposure, whether it's a policy or car or sales. We can see if the resulting pure premium is explainable.

We'll talk the next few sessions more about other methods, but it gives you a good feeling if you can explain why the average loss is going up and so forth, instead of running through a method and saying, "Well, here's the answer". You need to explain your assumptions to everyone involved to make sure the reserves make sense.

I also like to look at severity of claims, which is the average claim size. If everything stayed the same and inflation was going up, you should see your average claim payment go up.

But, even in checking your severity and pure premium and so forth, you have to go back and adjust things for reinsurance limitations, policy limitations, etc., because these will drive your average claim size or your average loss per exposure. I also like to look at frequency, which is the expected number of claims per exposure. This differentiation helps to see if it's the average value of the claims coming in higher, or if we have more claims coming in.

If I see that the frequency is way up, I talk to the claims department and ask, "Do we have more claims coming in?" Is it truly more claims or did we change something in our claims processing which would cause this."

So, we get our estimate, then we work backwards to see if it makes sense with all the parameters and assumptions we've used. We can also estimate the average severity and the average frequency and if we think if follows some mathematical curve, we run simulations on it. This is a common approach to calculate our confidence intervals. We can ten say we are 95% confident that the estimate will fall in this range or 75% within another range.

I'd like to open the floor up for discussions now if anyone has any questions for me or Darlene. How many people here are from an accounting background?

(Show of hands.)

MR. CROWE: How many are from an actuarial background?

(Show of hands.)

MR. CROWE: How many from a legal background?

QUESTION: I have a question. My question is for the reserving, what is an occurrence-made policy versus a claims-made policy have an affect on your reserving?

MR. CROWE: An occurrence would basically date to when the occurrence happened. If you had the loss liability for that, you'd track it on when the claim occurred. Claims made is the tracking of your loss on when the claim is made. So, on an occurrence, there's no relationship or there's not as much of a relationship as to when the claim is reported to you as when it's occurred. Claims-made is based on when the claim is reported or made.

MS. TOM: I'd like to respond to the question. If you turn to Exhibit 17, that chart showed the different reference points between the accident date, the emergence date, and the settlement date. Under a claims made policy, you would see the grey part of the bar being a lot shorter, where there is relatively very little time between the date of loss and the date on which the claim was discovered or manifested itself, essentially when it emerged. Whereas, on an occurrence policy, that gray part of the bar can be very long, the date of loss or the date of whenever you want to define "occurrence" to be and date of the actual manifestation date, which can involve several years to several decades.

So, claims made basically speeds up the information flow of a loss. It can really shorten the development period. But even under claims made, the black part of the bar, which is the date of emergence to final settlement can be very long, so you can still have a very long tail under claims made.

Okay, thank you.

(Applause)

Exhibit 1

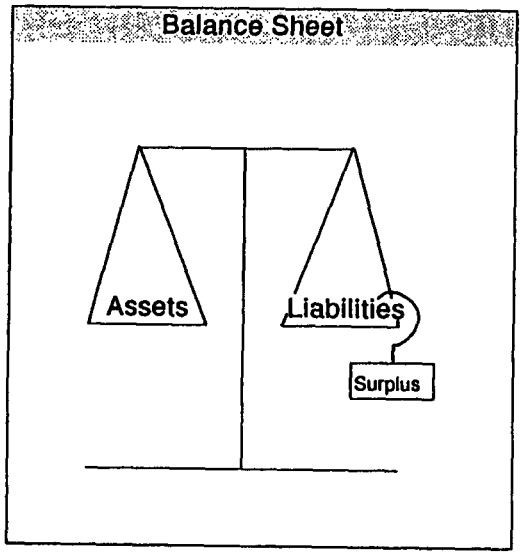
LOSS RESERVE

DEFINITION:	Amount set aside to settle outstanding claims.
CHARACTERISTIC:	Estimated liability.
IMPORTANCE:	Accurate evaluation of financial condition and underwriting income.

Exhibit 2

ACCOUNTING ASPECTS OF LOSS RESERVES

Fulfills Basic Accounting Principle of Matching Revenue and Costs



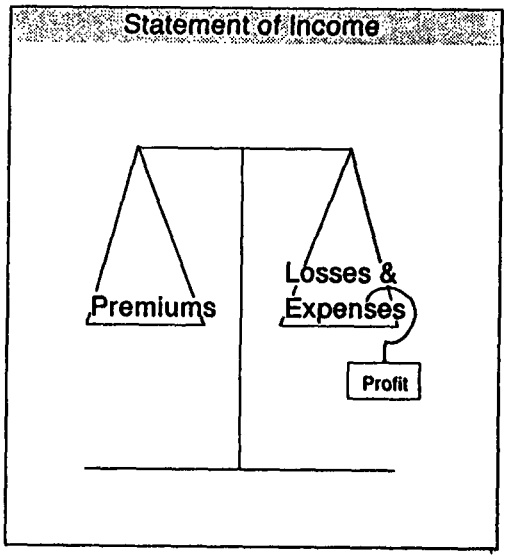


Exhibit 3

KEY DATES

ACCOUNTING DATE:	Defines a group of claims for which liability exists; namely, all claims incurred on or before the accounting date.

VALUATION DATE:	Defines the time period for which transactions are included when evaluating the existing liability.

Exhibit 4

CARRIED LOSS RESERVE:

The loss reserve amount shown in a published statement or in an internal statement of financial condition.

INDICATED LOSS RESERVE:

The estimated loss reserve that results from the application of a particular loss reserving procedure.

Exhibit 5

ELEMENTS OF A LOSS RESERVE

- Case Reserve
- Formula Reserve
- Development on Known Claims
- Reopened Claims Reserve
- "Pure" IBNR
- Claims in Transit

Exhibit 6

LIFE CYCLE OF A CLAIM RESERVE

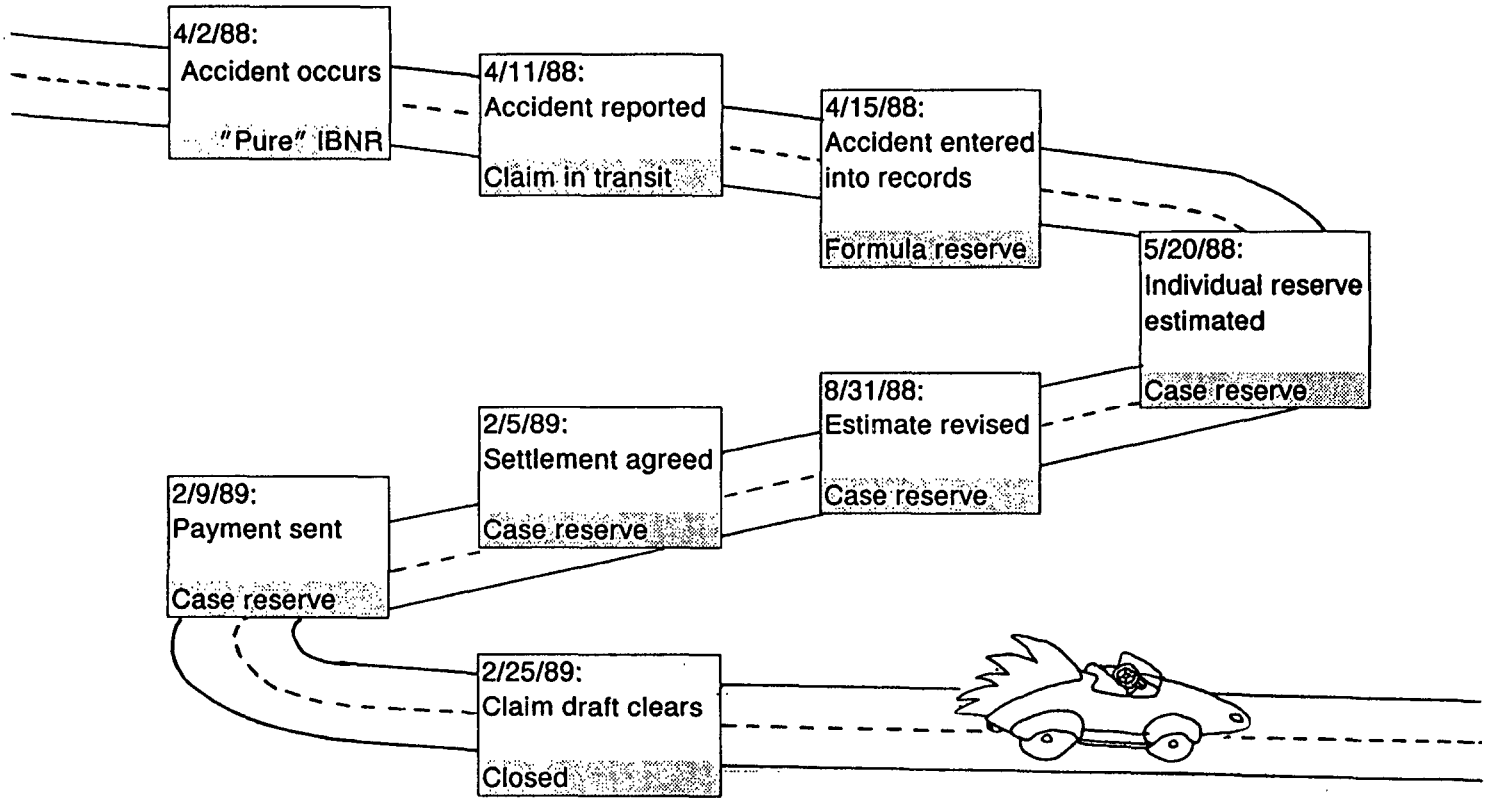


Exhibit 7

LOSS ADJUSTMENT EXPENSES

Allocated: can be assigned to specific claims

1. Attorney fees
2. Court costs
3. Independent adjuster fees*

Unallocated: cannot be assigned to specific claims

1. Claims department salaries/benefits
2. Claims department overhead – cars, rent, supplies, etc.
3. Company overhead
4. Independent adjuster fees*

* Depends upon billing detail

Exhibit 8

ACTUARIALLY SOUND LOSS RESERVES

DEFINITION
A provision for the unpaid amount required to settle all claims, whether reported or not, for which liability exists on a particular accounting date.

CHARACTERISTICS	
For:	A defined group of claims
As of:	A given valuation date
Based on:	Estimates derived from reasonable assumptions and appropriate actuarial methods

Exhibit 9

ACTUARIALLY SOUND
LOSS ADJUSTMENT EXPENSE RESERVES

DEFINITION
A provision for the unpaid amount required to investigate, defend, and effect the settlement of all claims, whether reported or not, for which liability exists on a particular accounting date.

CHARACTERISTICS	
For:	A defined group of claims
As of:	A given valuation date
Based on:	Estimates derived from reasonable assumptions and appropriate actuarial methods

Exhibit 10

UNCERTAINTY

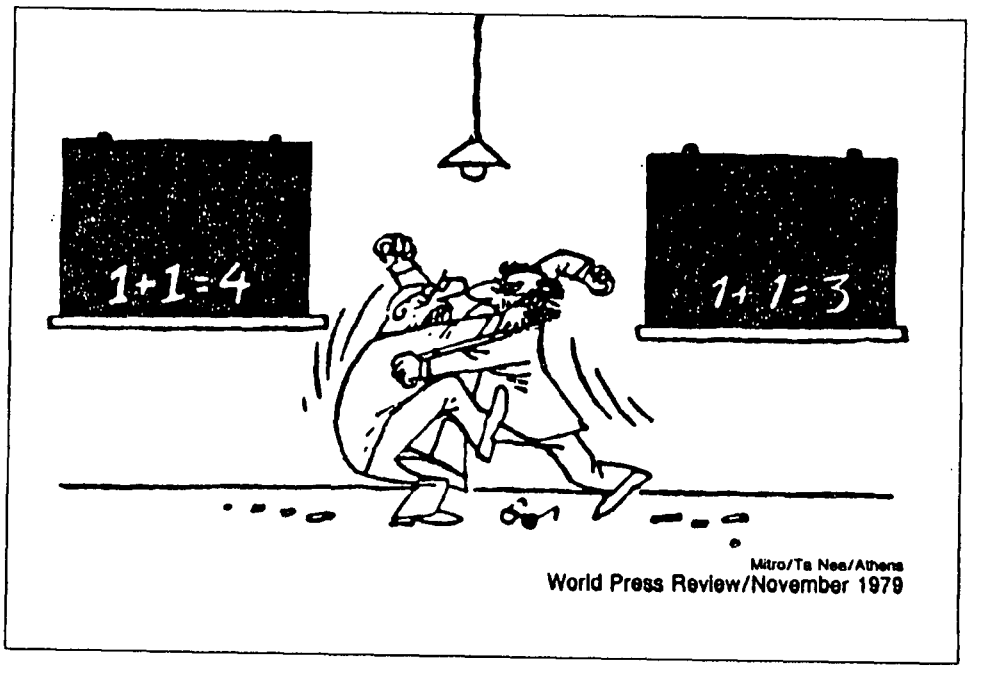


Exhibit 11

UNCERTAINTY

- The true value of the liability for loss or loss adjustment expenses at any accounting date can be known only when all attendant claims have been settled.
- The uncertainty inherent in the estimation of these liabilities implies that a range of reserves can be actuarially sound.
- The most appropriate reserve within a range of actuarially sound estimates depends on both the relative likelihood of estimates within the range and the financial reporting context in which the reserve will be used.

Exhibit 12

KEY DATES

ACCIDENT DATE:	The date on which the loss occurred.
REPORT DATE:	The date on which the loss is first reported to the insurer.
RECORDED DATE:	The date on which the loss is first entered into the statistical records of the insurer.
ACCOUNTING DATE:	Defines a group of claims for which liability exists; namely, all claims incurred on or before the accounting date.
VALUATION DATE:	Defines the time period for which transactions are included when evaluating the existing liability.

Exhibit 13

TYPICAL DATA ELEMENTS

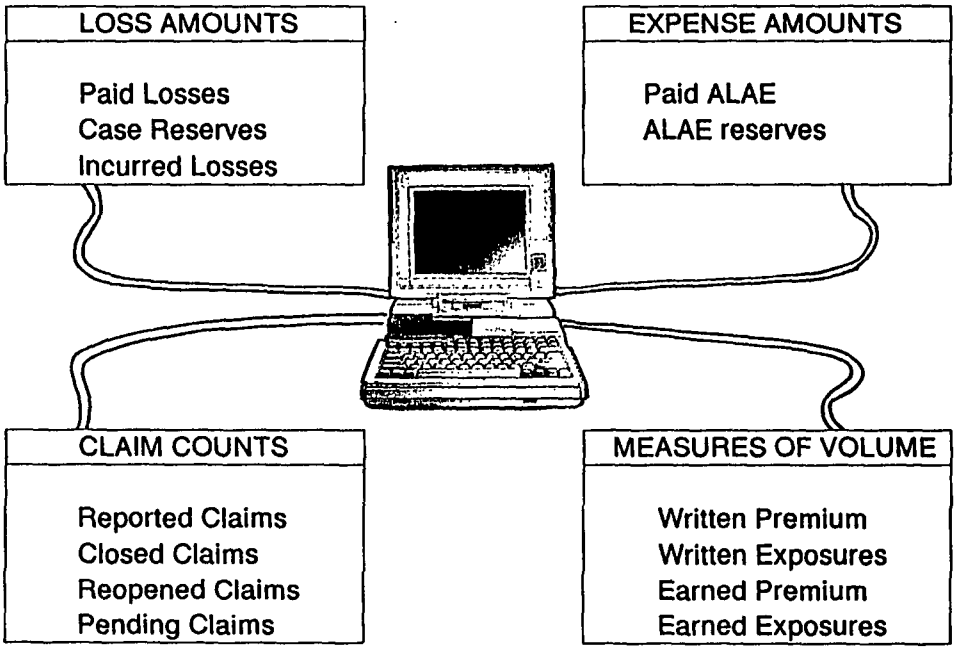


Exhibit 14

HOMOGENEITY

Loss reserving accuracy is often improved by subdividing experience into groups exhibiting similar characteristics. For example:

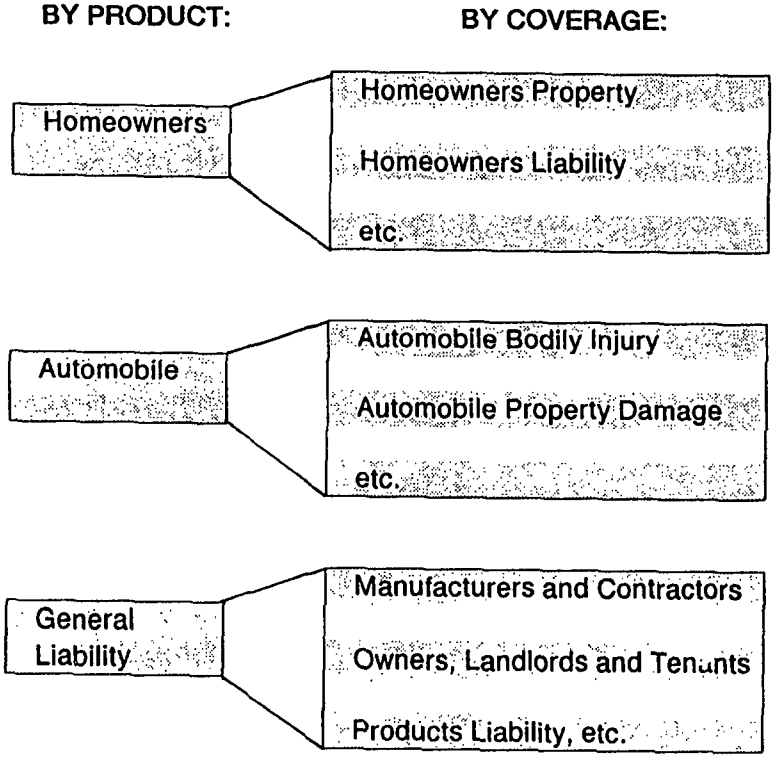


Exhibit 15

CREDIBILITY

- Credibility is a measure of the predictive value that is attached to a body of data.

- A group of claims should be large enough to be statistically reliable.

- There is a point at which partitioning will divide the data into groups too small to provide credible development patterns.

Exhibit 16

EMERGENCE AND SETTLEMENT PATTERNS

EMERGENCE

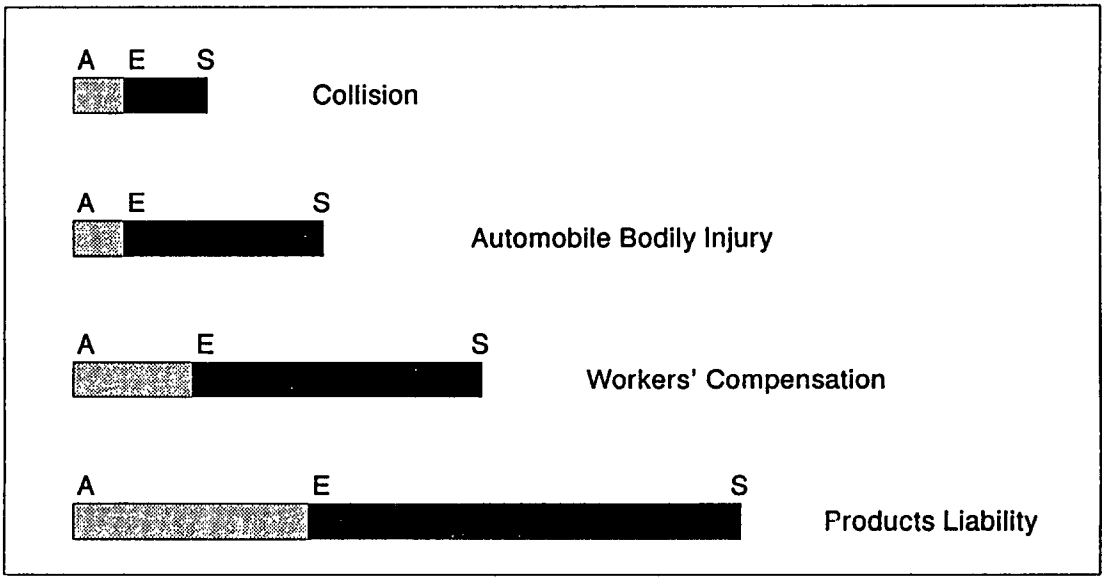
The delay between the occurrence of a claim and when it is recorded on the company books.

SETTLEMENT

The delay between the reporting of a claim and when it is settled (closed).

Exhibit 17

EMERGENCE AND SETTLEMENT PATTERNS



A = Accident E = Emergence S = Settlement

Exhibit 18

OPERATIONAL (INTERNAL) FACTORS CAN AFFECT SETTING LOSS RESERVES

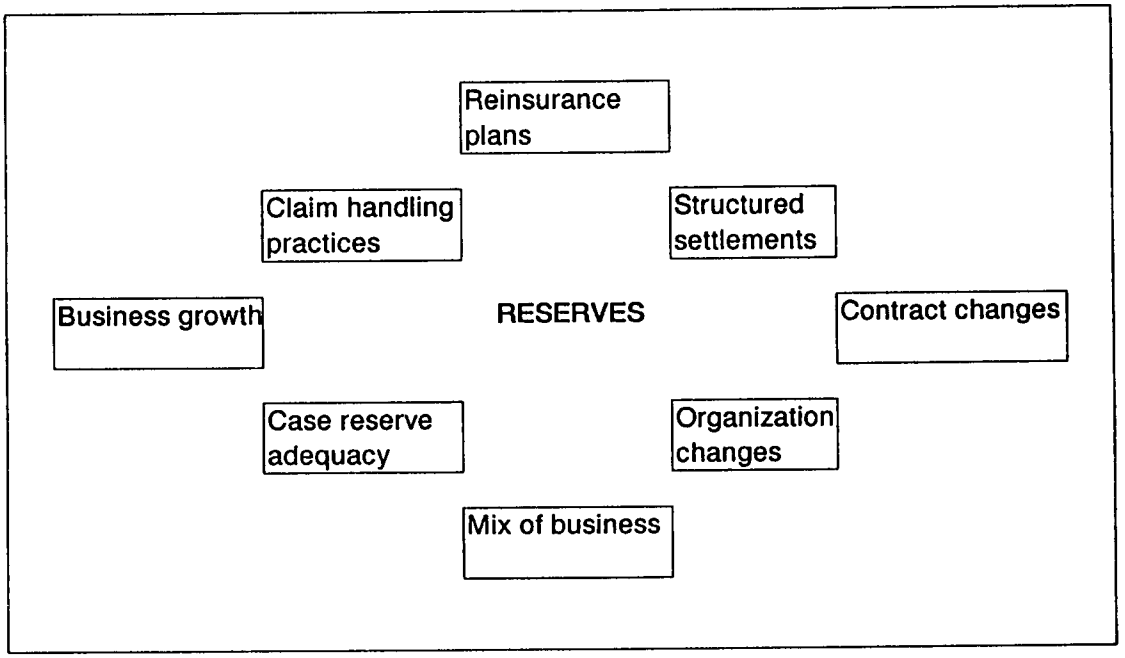


Exhibit 19

ENVIRONMENTAL (EXTERNAL) FACTORS CAN AFFECT SETTING LOSS RESERVES

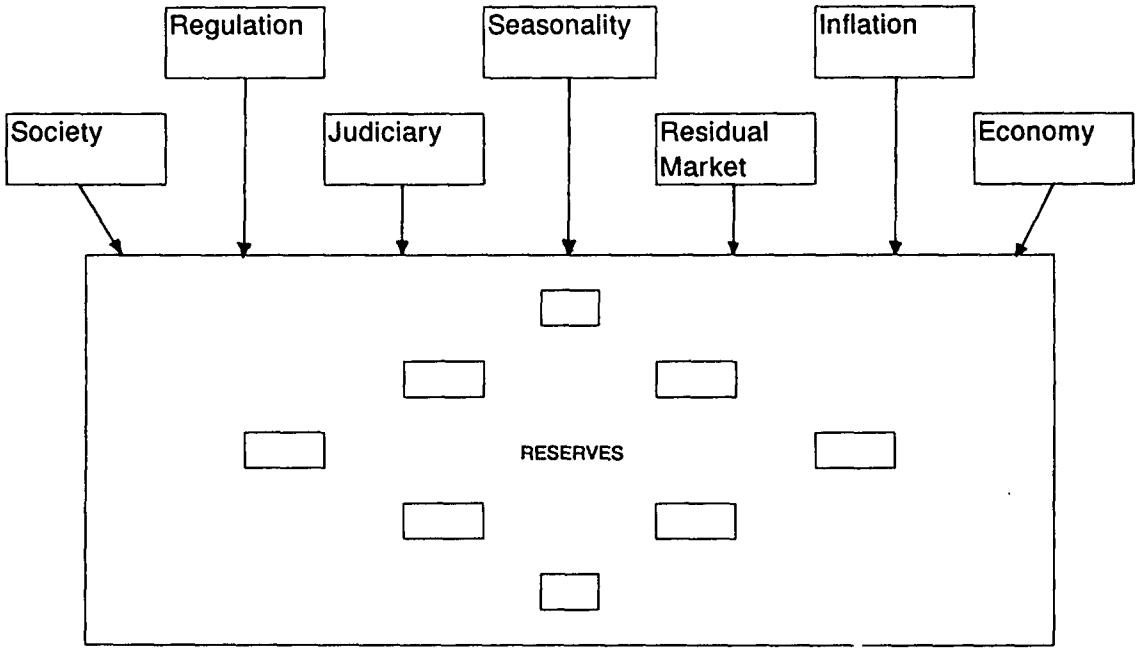


Exhibit 20

APPLICATION OF PROFESSIONAL JUDGMENT

- Loss reserve is a "point in time" estimate of a company's outstanding liability.
- Reasonableness of loss reserve should be measured against relevant parameters.
- Underlying assumptions and methods should be documented and subjected to sensitivity analysis.

1990 CASUALTY LOSS RESERVE SEMINAR

1B: DATA PROCESSING TRENDS/LOSS RESERVE DATABASES

Moderator

Howard L. Cohen
GEICO Indemnity Company

Panel

Michael C. Garner
Coopers & Lybrand

David L. White
St. Paul Companies

MR. COHEN: Good morning. Welcome to session 1B on data processing trends and loss reserve databases. First, let me introduce myself. I am Howard Cohen, Vice President and Actuary for GEICO Indemnity Company, a subsidiary of GEICO.

I know you'll enjoy this morning's session. We have two excellent speakers. The first is Mike Garner who is in charge of the Midwest insurance consulting practice for Coopers and Lybrand. The second speaker is Dave White who is in charge of Medical Malpractice reserving for the St. Paul companies. Dave is pitching in for Mike Larsen the St. Paul's actuary who was in charge of the project to modify their loss reserve database.

First, Mike will speak about the trends in data processing which have a tremendous impact on the data we use for loss reserving. Dave will then speak on St. Paul's project to modify their existing loss reserve data base. This was a very complex effort which took about two years to accomplish.

I'd now like to introduce Mike Garner. Mike is truly an expert on data processing trends as they relate to the insurance business. Currently, Mike is in charge of the Insurance Consulting Practice in the Midwest for Coopers and Lybrand. Prior to joining Coopers, he worked three years at Digital Equipment, where he was in charge of their insurance industry practices.

Prior to that, Mike worked 15 years for a major insurance software company, where he was involved in designing, implementing and marketing their insurance software. Please welcome Mike Garner who will discuss data processing trends.

(Slide 1)

MR. GARNER: Trends in technology. I will kind of chat for a few minutes so that all of you can have a chance to get used to my Midwest Chicago accent. I've moved around the country a few times.

Let me get a show of hands. I was surprised, when I went through the demographics that there were 42 people that were registered who say they were data processing professionals. When I signed up, I thought I was going to be talking to actuarial people about trends in data processing, so we can take this in a different direction if we're talking to data processing people about trends in data processing.

How many people here think you come out of the MIS environment?

(Show of hands.)

How many of you think you come out of the actuarial side of the house? Give me a show of hands.

(Show of hands.)

All right. For the rest of the hands, I assume you're just waiting for a connecting flight. We really have an actuarial crowd here today.

I am one of the strange people that actually majored in insurance. I do not consider myself a data processor. It's something I got into by accident and have absorbed through osmosis. I don't consider myself a data processor. I really don't want to be one; I want to be a business person that uses technology.

The Wall Street Journal in April of last year pointed out an interesting statistic, a little bit frightening. We now spend $12 billion a year on data processing, $12 billion a year on data processing, and we have not yet made a substantial reduction in our operating cost. I'm not really sure we are getting a return on data processing yet, but I want to tell you where we're going with that trend and see if we've got an opportunity to turn that curve.

(Slide 2)

I had an opportunity at LOMA -- I guess we're allowed to mention other environments, but I had an opportunity at LOMA last year to listen to Michael Tracy. I started off with that curve because of what he did. Where you think we're going with technology depends on where you think we are on that line right now.

If you think on the technology curve, we're already out here and that we've already gotten our "barg for the buck" out of technology and we're just moving into the maintenance side, then you've got one perspective on technology. On the other hand, I think we're kind of right there (indicating) on the technology table.

The explosion that we've had in technology has been in the data processing hardware networking environment, and we've now got the opportunity to do the things we really want to do with technology, and a lot of that is what we'll be talking about over the next 45 minutes as the groundwork for what we've got.

On the basic technology curve, everything is faster, it is cheaper, and we started out -- most of us are about the same age in here. We started out with the 360/135, and then we got things that sit on our desks that are faster than that, but a couple of things have changed.

(Slide 3)

Two words that I think have changed more in the past ten years than anything else are called expectations and complexity. I notice they printed on the back of the sheet. That's an

efficient use of paper, but it's going to make it tough for you, flipping back and forth. We saved a tree or two there. If you need copies, there's a stack of them in the back of the room. Maybe somebody could grab some and pass them down the aisles.

Two things that have really changed are your expectations and your complexity. Yesterday, you had a functional need for a system and you went out and built something. Once you got that done, then you wanted something else. When you looked at something like image processing coming about, while that looked wonderful, image processing, you said, "Gee, we might just end up having a very fast, expensive filing department unless we've got a working process software to go with it."

(Slide 4)

The next biggest change has been what is expensive and what is cheap right now. Hardware is cheap. We used to worry about that. We used to worry about running out of space on the disk drive. We used to worry about MIPs.

(Slide 5)

We don't worry about that anymore. What is really expensive right now is the software, what it takes to run it and the people it takes to maintain that. We didn't really talk about that ten years ago. There are a lot of new technologies that have shown up over the past ten years, with telecommunications, image processing, voice response, office systems, expert systems, and mediums like CD-ROM.

(Slide 6)

Those have complicated what we're doing right now. The net result is ten years ago, when we built rating systems, we built plain systems, we built functional -- not informational systems, but we built functional systems that we referred to as point solutions that solved a problem but they really didn't address what we were trying to achieve.

(Slide 7)

We've now got the technology in place. We've now got the capacity to achieve in a great way. The converse of that, which probably most of you have experienced, is that we've also got the opportunity to fail in a most spectacular way.

I used that one as an example, a joke we picked up in Detroit quite recently. We found that Pratt and Whitney really didn't make the mirror for the Hubbell telescope. It was actually made by one of the "big three" car manufacturers. If you'll notice, in the corner, it says, "Objects in this mirror are closer than they appear."

That is an example of a billion dollars worth of work where one thing didn't work and it's not there, all right? When you're talking about bringing an image together with the data processing and networking that, moving across 35 different branch offices all across the country and one thing in there doesn't work, then the whole thing doesn't work.

I'm not going to get into methodology, but if I had to preach on one thing that's really important as we go into the '90s, it is methodology. I don't care whose methodology, whether it's summits or one that you get from IBM or one that you get from somewhere else, but methodology is important.

When we used to do point solutions with five people on a project, we all got in there, we worked all night long, we built it and we made it work. The testing, we short cut at the end. We found a way to compensate around it.

When we're talking about bringing it all together, and it all has to come up at one end point at the same time, methodology is probably one of the most important things you can have right now.

We talk about three different levels in systems development. One is identifiable, where you know what it is that you did, and you can just figure out what it is you did. The second stage, maturity: Is it repeatable? Can you do it twice? The third stage in development is: Is it predictable?

Our opinion is that most data processing shops are in the identifiable stage. They can figure out what it is they are doing. Most of them couldn't go back and repeat the same thing if they had to do it. Very few of them are in the predictable environment.

(Slide 8)

The impact on the industry in the 1990s, you are going to be data rich and information poor. Based on the type of database that you've got out there. You're going to have 300 percent more data than you ever had before. We're going to have client information systems, we're going to have billing systems, we're going to have PCs located out there.

We've got expert systems where we're gathering all of this underwriting information. In the field, you're going to have 300 percent more data. It might be 500 percent; it might be 1,000 percent, but you are going to have an explosion in your data out there. You're going to have new formats. You're going to have new values.

You're going to have multiple files, more multiple files than you ever imagined, plus they're going to be on everybody's PC in every branch office all across the country, in multiple locations, and your challenge is going to be finding it so you

can use it. There is going to be a ton of data out there that you are going to want. You are going to be using new information that you never had before and that is going to be tough to get to it.

(Slide 9)

Our agenda. We're going to spend a few minutes talking about each one of these: databases; distributive systems; expert systems; languages; one thing that is absolutely becoming my favorite right now is re-engineering and then the implications of each of these. I don't think anybody in here when we walk out is going to be a database expert. The intent is to let you know where they're going, what the trends are, and what impact it is going to have on you.

Please, if there are any questions, stop us, join us. You are allowed to ask three questions in the back.

(Slide 10)

We've seen the evolution from flat files to network to relational moving into database machines. Technology-wise, we're right here right now. Let me ask a question, and it's probably going to be a little bit damning of our industry. How many of you have most of your systems on a VSAM environment?

(Show of hands)

Your operational systems out there, most everything you've got is a VSAM environment. You've just re-done your database, right, to a VSAM database? Remember I said, re-engineering that last one up there, that's one of my favorite topics.

We have got a huge dilemma in front of us. We've got millions of lines of codes out there. We've got millions of systems out there. Is anyone here from Aetna, yes. SAFARI is a wonderful system. It was built before CICS was available. You had to build your own telecommunications monitors. You've got multiple, multiple, millions of lines of systems of lines of code in there. I think Art Klee once told me there was ten million lines of code in there, that you don't know what it does or if it's used.

You used to be organized by life and property casualty. Now, you are organized by personal/commercial divisions. So, how you pull out commercial, automobile and worker's comp from automobile and all this stuff, what they did, over a three-week period of time was they copied it.

Now, we have two multiple, multiple, million line systems. That is not a criticism of the Aetna. It is because of the sheer size and the magnitude of the systems that we're all facing. We've got some behemoths out there that we don't exactly now what to do with anymore.

I used to describe the difference between hierarchal and relational, and somebody said, "Wait a minute, let's back up and describe the difference between a database and a flat file."

(Slide 11)

In a flat file, the information is absolutely linked to the program. If I want to go get a policy number in my program, I say, "Go find the 02 record and read spaces 7 to 22," and that's where you'll find the policy number.

If I change the policy number, a good example, I have to go in and physically modify every single program. I've got to modify every one of them. If I've got thousands of programs, which all of us do, somewhere in there, somebody is going to make a mistake.

The difference between a database versus a flat file is that we have separated data and the programs. The program says, "Go read a policy number," and it goes to the data file and it says, "Ah, the policy number can always be found here," so from a maintenance standpoint, we've had a tremendous separation, a major leap frog between these two, with tremendous flexibility.

(Slide 12)

The first cut of a database came out with a hierarchical database. It was a major step forward, but it was an interim step. The problem was that there was a direct linkage, what we referred to as the parent/child relationship.

Any data element that you set up, if it had a relationship, you tied them together in the data base. That relationship was there and if you wanted to get flexible and move it around and, say, point to this index or that index or point to this data element, a lot of changes then to your database and a lot of database demonstration. It wasn't quite the way we needed it.

The relational database lets you go in and dynamically change the relationships of data elements, again, without modifying the programs and without a lot of work to the database. That has the opportunity to change the way we're doing business in the insurance industry.

(Slide 13)

A relational database is easy to use, easy to modify, easy to interface to, SQL standards. There's a lot of flexibility there, particularly in your environment. One of the biggest impacts that you could have, is the new databases.

I'm jumping ahead to the conclusion of the talk. What is going to make a difference is not any one thing like a database or high level language. It is going to be how they all work together.

We're seeing a lot of our clients that are doing relational databases downstream from all their other processing systems. They are pulling that down into an actuarial relational database.

So, you are going to be one of the first implementors of relational databases. A lot of people are finding to go back and modify their automobile system and implement a relational database to it is too big a struggle without an identifiable benefit, so you are going to be one of the first users of a relational database.

(Slide 14)

The issue on relational database is still performance. It used to be security. I think they pretty well have got the security piece wrapped now, but for an on-line transaction processing system, I know I said hardware is cheap, but response time is still not what it should be. It's still not the easiest or the fastest, or the most efficient, and to do large searches on the database is sometimes a little bit cumbersome.

(Slide 15)

The next generation will fix the efficient issues. It's going to be the database machines. We're going to take that software management and the database management that's embedded in the software and physically hardwired that into the machines. Over the next two or three years, you'll see the evolution of the database machine, in which you're going to take your relational database and physically move it down to a machine that's going to do nothing but manage the data. It will not be an application machine. It will be a data management machine, and it will be fast. Are there any questions on relational databases?

(Slide 16)

Distributive systems. There are two parts to this definition. "Dumb" Terminal -- everybody knows what I mean by a "Dumb" Terminal, a 3270-type device, can do input and output, but we do not consider that a distributive system.

To be a distributive system, some part of the processing or the storage or something in addition to data entry and printing has got to be done out there. We have grown up in a mainframe environment. As soon as you start -- and the definitions of distributive processing are all over the place.

If you have a mainframe and a PC, you have distributive processing. Even if they're not linked together, you've got distributive processing, some processing done in one place and some done in another, so the definition is all over the board.

(Slide 17)

If you look in the past, you had basically environments which had a direct parent/child relationship to the mainframe. This machine didn't do a good job of talking to this machine or to this machine or to this machine. Basically, you did some processing down here and the end result was loaded to the mainframe. Again, I look to Aetna with lots of 8100s out there, as an excellent example of one of the first companies to use distributive processing.

(Slide 18)

Where we are right now, and I show my bias right here. I grew up in an IBM environment and I realize this is an IBM world, but I spent three years at Digital Equipment Corporation, and you'll see my bias showing up. Where we are at present is in an IBM-type environment, where we've got different devices out there. You have a mini and maybe it's a terminal attached to it or it's a PC attached to it, but if you've tried to get two AS-400s to talk together, they don't do that real well.

If you tried to get two different PCs to talk together or if you've tried to do Agency upload to the mainframe, it's not entirely there yet. We've still got that one-to-one relationship between son/servant and a parent up here. It's still data movement from one place to another and it's still cumbersome, but you are getting to see a heterogeneous mix of devices out there.

(Slide 19)

Where we're going, and I don't mean to put in a plug for Digital Equipment Corporation, but this is where we're going. That thing that runs down the middle is called the network. Today, we think about the mainframe as the hub of a wheel, with everything come into that hub, and you're going to need to change the way you think about that. That is going to be hard for us who grew up in a mainframe environment, to quit thinking about the mainframe as the hub.

Think about the network as the hub. I can take you -- is anyone in here from Carroon and Black? We did a lot of work with Carroon and Black, and you'll see it again on the next slide.

(Slide 20)

Jerry Kuzak is the head of MIS at Carroon and Black, and the way he got to be head of it was that they were doing a lot of acquisitions. The president of the company went out and wanted to do an acquisition. C & B went out and looked at a company and the head of MIS came back and said, "We can't acquire that company because their MIS system is not compatible with our MIS system."

Jerry said the next day, when he was now the head of the MIS Department, that he got the final word to go out and make it compatible. He said the way he started doing that was saying, "Forget the fact that my mainframe has got to rule everything. The network is the system. Anything from mainframes to micros to PCs should be able to attach to the network, and anybody can get anything which is on the network."

Think about that for a minute. Anybody can get anything which is on the network. The technology is there. Unfortunately, a lot of us are having to live through SAA, just so anybody can get anything on IBM's network; not anybody can get anything on THE network.

But, these should be independent business considerations, where the users sit, where the programmers sit, where the programs sit, where the computing power is and where the data is stored should be absolutely, totally independent of each other. They should be business decisions, not technical decisions.

Where we store the actuarial data, where we store the claims data, where we store the underwriting data, that should not be a technology decision; that should be a matter of convenience of how we want to store it and who needs access to it; and, that technology is available to do that.

(Slide 21)

Expert systems. Howard and I had an interesting discussion on this topic. Expert systems' promised a big impact five or six years ago when artificial intelligence first came out. Implementation didn't go well. Enthusiasm died. The statistics I'll show you come from our annual study of who is using the expert systems and what they are doing.

Once again there is an increased interest in expert systems, and I think it is because we've evolved and we understand what it is. Five years ago, expert systems came out and we organized expert system engineering groups. We went out looking for expert systems to build, and we tried to build large expert systems.

Their job was to go out and replace you. That was the way it was promoted: We're going to replace the underwriter. We're going to replace whomever. That was not the way you need to do expert systems. You envision a project. You're building an underwriting system. Right in there, I've got one little decision tree, and rather than writing COBOL code, I'll be able to use some expert systems technology to do that one little piece of that tree.

To have your existing systems today, where there is the decision tree or where somebody needs to look up a rule in a book. If you've got a junior underwriter or a junior actuary, and you want them to go refer to something at some point in time, build that expertise in the system rather than make them come to you and ask

you a question. Build the expert system right into your existing applications, so that it's a small module, rather than a large expert system.

(Slide 22)

Just flipping through these slides, property casualty versus life, who is using what? I'll give you some breakdowns over the top one hundred companies versus the mid-tier companies. In our survey, we interview companies -- "What are you doing with expert systems? Are you using it? What are you developing?"

I won't walk you through all the charts, but property casualty, 16 percent of the companies we surveyed said they are actively using some expert systems technology. Thirty-four percent said they are developing it. Six percent are in planning. Thirty-eight said, "No, we're not doing anything with it," and six percent said, "Our activity has been cancelled. We've dropped it."

(Slide 23)

The next one is not by property casualty or life. It is by mid-tier versus the top 100 companies. When we say mid-tier, by definition, we take the top 100 companies and then we took a sampling of companies down to 100 million in direct premium.

(Slide 24)

If you look at what mid-tier companies are doing, 92 percent of the people who are doing something, so we're looking at that subset, that wedge of the pie. Ninety-two percent of the people who are doing something in the top 100 companies say they are doing it in underwriting. 33 percent in sales support, and that's primarily on the life side; 19 percent in financial planning, again particularly on the life side.

One of the biggest uses that's increasing is using expert systems to design systems, using expert systems to manage the network. Data processing is starting to hold a mirror up to itself and saying, "Where, in our environment, can we use expert systems to help us?"

This is particularly true in smaller development shops where you don't have a master architect, and you're looking for somebody to scope out and design what that new system should look like. There's going to be some nice technology available that will help you design systems.

(Slide 25 & 26)

Then, we broke it down by property casualty, again, mid-tier, top tier, who is doing what on the life side, and, again, on the underwriting side.

We do this report annually. I'll stop here and say -- not to do a commercial, but if you would like a copy of this report and you would like to be put on the distribution for this report, I'm in the Chicago office. You can give me your business card and we'll add you to the distribution list and send that out to you every year, because that's an annual report that we do.

(Slide 27)

But, the impact, again: I broke it into two groups. One, you are going to have all kinds of underwriting and claims data out there that you've never had before and, unfortunately, it's probably going to be out in your regional office. You're going to have everything from income to blood type, data that you've never been able to get your hands on, that you probably haven't even thought about how you're going to categorize it yet, much less thought about how you're going to get to it.

If you go out and look at those sales illustration systems and go out and look at the underwriting systems that are out there and look at the data that those guys are capturing and that they're not giving you, I think you're going to see what we're talking about an explosion of data that quickly could be made available to you.

I don't want you to ignore export systems as direct support to you. Not that many companies yet are using the expert systems in the actuarial area. Is anybody in here using expert systems in the actuarial area yet?

I think that's an area that's not getting a lot of glamour, because everybody wants to do sales illustration then claims, then underwriting. They're doing the glitzy stuff first. I think your area is complicated. It requires an expert. If you list in all the things it requires in an expert system, you've got the potential of being an excellent user of expert systems technology, if you'll think small and think component.

(Slide 28)

I just had to put the word "theory" up there. High level language is a programing language that is not dependent on the physical data structure or any particular computer or operating system. It is independent. I don't think there are any, totally independent languages available.

I think there are some that are getting close or that will tell you that they are not machine-dependent, but they are dependent on their database. So, there are not a lot of people out there that can walk up and say, "I am truly independent," but there has been a tremendous improvement in high level languages.

(Slide 29)

I'll give you some examples of high level languages. There are dependent languages that we know, COBOL and Assembler. There are high level languages like D-base, Natural, Focus, Ramus, some of the ones you'll see out there, SQL, probably most of you here are very familiar with that one.

(Slide 30)

These are easy-to-use languages that the user can use languages that are transportable among different platforms that will run on PC's, it will run on mini, it will run on mainframe, it will run on IBM machines, it will run on Burroughs machines. It is transportable between different platforms. It will work with the databases that I have, be it a VSAM, flat file or DB2 relational database or an oracle-relational database.

My program, although I may have to recompile it, should be able to move between platforms and databases. Is COBOL dead? No, COBOL is not dead. We've got a lot of COBOL out there. It's going to be around for many, many years.

One of the things that's going to keep COBOL alive is COBOL generators, which are, again, high level type languages that translate into COBOL along with COBOL restructuring that will take our old COBOL systems out there and bring them up-to-date, take our spaghetti code and move it into something more structured.

(Slide 31)

Your advantages with high level languages and your disadvantages are great for prototyping, great for you writing your reports, great for off-loading data processing, not quite great yet for writing very large transactional processing systems and mainline systems, because the efficiency just quite isn't there. The machines are getting cheaper, but we still haven't gotten over that hurdle to get the machines out there, distributed.

The disadvantage is they're still relatively inefficient as compared to languages like COBOL, but the obvious benefit is how easy they are to use. You can use them rather than the data processing staff.

(Slide 32)

This is not talking about the insurance industry; this is worldwide. Worldwide, we estimate that there are 77 billion lines of COBOL code, valued at $2.3 billion. That is national data. If you look at Aetna alone, you've got millions and millions of lines of COBOL code and it's going to be around for awhile.

We've got a problem because all those 77 billion lines of code, everybody agrees that 80 percent of our programming effort has been on maintenance. Eighty percent of our programming effort is just keeping our existing systems alive, regulatory changes, bureau changes. It does not make the world better.

(Slide 33)

There is a two to four-year backlog of documented projects. In addition to that two to four-year documented list of projects, there's a hidden backlog that is at least as big. Users are saying, "I've just given up asking." Why put it on the list so I can have an eight-year backlog instead of a four-year backlog?

(Slide 34, 35 & 36)

There is something that is going to help. There's a lot of magazines out there and there's a lot of articles on it. James Martin has written several articles on it. If you are in the greater Chicago area, we're having a breakfast seminar on it in October, and I welcome any of you or your MIS staff to attend. It's re-engineering. You're going to hear of re-engineering, resystemization, redevelopment. You're going to hear a lot of different words and it starts out with "re."

Let me give you a definition of what it is that we can use. If you like your existing system, functionally, it's okay 60 to 70 percent. You like it. It's got the right things in it. It kind of does it in the right way but it's not flexible, or you'd like it on a PC or you'd like it out in a branch office or you'd like it in your particular location, but it runs on a mainframe and you can't distribute it out, or it's written in assembler or it's written in PL1. You basically like what it does, but something is wrong with it, then you are a candidate for re-engineering.

Rather than the traditional approach, which was forward engineering -- do any of you watch the show "This Old House" which I like, "This Old House"? Reengineering is about like that television show.

There's a lot more contractors in the world that go out and build new houses, because you get to start with a clean lot. You get to put the foundation up, then you put the frame up, then you put the wiring in it, you put the plumbing in, and you pretty much know everything that's going to happen.

In "This Old House," you don't know what's going to happen until you rip the walls down, you really don't know what's in there. That's what re-engineering is. Rather than going through planning-analysis-design-construction phases, we go through it in the reverse. If we've got an existing system that's on the wrong platform, we just run it through design and come back down.

I'll go to the next sheet to show you the example of if one is on a mainframe, but I'd like to run it in my branch office. Instead of it being on a mainframe, I'd like it on an AS-400. I'd like to do some things differently. We'll back up, run it through the design phase, and bring it down to the new platform. We can do about 80 percent of that without touching the code.

I need to change some functionality. It's basically okay. It's the core of what I've got. You've got a lot of knowledge in those systems. There's a lot of specifications in those systems. There's a lot of things in there, a lot of knowledge that is accumulated over the years that, if you go out and start all over, you're probably going to lose the benefit of a lot of that knowledge.

(Slide 37)

In this particular case, we can take it all the way back up to the analysis phase, figure out what is missing, -- not figure out what is in that, figure out what is missing from that -- add that and bring it back down. I can do that in about a 40 to 80 percent automated environment.

This is new. This is within the past two years. It's an outgrowth of the case technology, to be able to go in and take your old PL-1 system or your old Assembler systems and re-engineer them into a new platform in structured COBOL or bring that into case technology. That's new, and I think that's going to give us a fighting chance.

(Slide 38)

Last two slides. We've got all the tools. They're all in the toolbox now. We've got nice databases. We've got distributed systems. We've got expert systems. We've got high level languages. We've got re-engineering to take care of all the baggage that's out there. We've got a lot of tools in the tool kit.

(Slide 39)

What is bugging me is the next one, which is the last slide. To make a pyramid, pile blocks on top of each other. If you're not doing it right, you've got a Hubbell telescope. I worked with a software vendor that built a billing system and it took five years before we took the opportunity to start all over.

Your system will become more complex, the more technologies, the more locations you're bringing in, which is again why I come back to the methodology, which is a discipline, which is something -- pardon me -- a lot of MIS people don't have. We're known for being kind of hot-shot renegades who can stay up all night long, we'll write something and, "I'll make it work by 8:00 o'clock in the morning." When we're trying to make it all work together,

I'm afraid the mentality of "I'll get it done tonight" isn't going to get us there.

Questions? Yes?

MR. COHEN: If you could identify yourself and speak as loudly, or if you're really brave, go up to the microphone.

MR. LASEFIELD: David Lasefield with Keystone Insurance. You talked about the database machines as the next step from the relational database. Are you talking about, actually, a new generation of hardware or just a new application of existing hardware? Explain that, please.

MR. COHEN: Could you just repeat the question, Mike, please?

MR. GARNER: Database machines. Are you talking about a brand new machine or are you talking about a Cray, or are you talking about an evolution? Machines still add zeros and ones, so your basic computing logic is still going to be there, but they are going to change, modify, the functionality that the machine does.

If you look at the basic IBM processor -- I'm clearly not a hardware expert -- but the way the machine is designed is for transaction processing. Its design anticipated you were going to write application codes, and that it had to monitor CICS, and it had to do telecommunications.

This new machine will still do basically the same thing but it's not going to have to worry about I/O from the standpoint of worrying about disk drives, worrying about machines, worrying about locations.

It is now going to say, "My only customer is an application program. The only thing I have to do is go get its data. So, I've only got one mission in life. I don't have to be a general purpose machine that's prepared to do anything. I have one mission in life and that is, whenever you ask me where a piece of data is, my job is to know where to get it."

So, they'll take the existing machines and fine tune its capability to do that. I don't know if I answered the question, but I think so. Again, the article in yesterday's Chicago Herald yesterday was that even IBM was announcing that its mainframe sales are flat.

They are saying the new job of its existing mainframe is to manage the large amounts of data that are out there. So, even the machine they announced last week is an acknowledgment that most of our job now is to manage the data with requests coming from PCs on people's desks. That is going to become more important.

A terminal is going to ask for 15 or 20 pieces of information. A PC is going to ask for a lot of data, so it's going to have to handle that request much faster.

Next question? Okay. Thank you very much. I appreciate it.

MR. COHEN: Thank you, Mike.

MR. COHEN: Our next presenter is Dave White. As I said before, Dave is pitching in for Mike Larsen. Dave is one of the loss reserving actuaries at St. Paul. His primary responsibility is for their medical malpractice reserving and some other miscellaneous lines. Dave will discuss the recent decision that St. Paul made to take an existing, very complex, very big loss reserve database and, if you will, reengineer its design.

MR. WHITE: As with Mike's talk, I certainly encourage any questions you may have as we go along or, if you want to wait for them at the end, that's fine, too.

For the St. Paul, I'm going to give you a little bit of background here before I talk about the specific path we took and the specific problem we've had in terms of needing to change our loss reserve database. For those of you who don't know, St. Paul is a fairly large property casualty company. It probably ranks eighth or tenth overall.

We write well over $2 billion worth of business a year and carry about $5 billion plus of reserves. So, a very diverse company with a lot of medical malpractice, a lot of commercial lines business, not much personal lines. For us, the situation over time has sort of evolved, as sort of a background to why we needed to change things.

Maybe eight or nine years ago, before I joined the company, everything was very centralized. We had all the actuaries in one big room, all the underwriters nearby. Some underwriters worked on work comp, some were GL underwriters, et cetera, et cetera, but there wasn't a real concern about, "Well, I'm doing physical damage. I know I've got personal line coverages," but there wasn't a real concern about the specific profitability of the various segments. Everything was just centralized into the major lines of business.

Then, about six or seven years ago, they decided they needed to decentralize to specific profit centers, to physically take the underwriters dedicated to that type of business, put them out as a separate part of the company, and even put the actuaries out there, for the most part.

Well, what that led to was a big change in how we had to look at our business. Before, we could just look at work comp business, and if it affected the specific commercial lines area versus a package product, versus a specialty lines product or maybe an

ancillary line for our medical malpractice business, it wasn't a big concern. We knew it was there, but people's accountabilities and profitabilities did not depend on it.

So, when that changed to decentralization, we realized in the corporate department that we needed to be able to track that business in a better fashion. So, sort of linking up with Mike's talk, we were in a past environment and we got up to, as it turned out, not so great of a present environment.

So, now that we are decentralized and that decentralization has become more ingrained, we are becoming more diverse, writing more product niches, the system we had to sort of bridge that has become pretty untenable for it. I just want to give that as background, because if you'll see in your packets for the overall outline for the discussion, there are a number of different areas to talk about.

The other thing I've realized, since I've worked for several large insurance companies and as a consultant, is that every company is different. We have sort of a unique way we do things with our data. I've also worked with Traveller's, I've also worked with The Hartford, and every company I know has some fundamental aspect of their data processing that is unique.

We'll talk to actuaries among different companies and they'll say, "Well, wait until you hear what we do with our data. We do something very unique with our data." When I got to the St. Paul, they showed me what they did, and I went, "Gee, you really do this?" But, each company has that.

For my talk, it's really almost a dividing line here. I do need to talk a little bit about the actual environment we were in, but since the problem is so specific to the St. Paul, I'm not going to delve into it in any large detail, but I do need to give some background to give you just a sense of what we went through and why we had to change things.

The real meat of what I want to talk to in my time here is really the latter part, which I think has some very generic things that you might want to think about or keep in mind for the future, if you're thinking about making a radical change to one of your databases, a change in an existing one, building up a new one, merging two different systems.

When we went through the project to revise our loss reserve database, things like how to organize a team, how to set up a timeline, scope in funding. These are things, as actuaries, we hadn't thought about it.

We had this great idea. We need to change things but, gee, you've got to get funding for it? You've got to talk to management about it? Elements that we really hadn't taken into account were very educational.

One here that will, I think, be pretty generic to some things you might come across pertains to unexpected problems. We knew we'd have unexpected problems. We are actuaries. We know these things will happen, but, of course, we are not, at times, very good actuaries, so they were all unexpected, but we also got some unplanned benefits. So, even though you're thinking, "Gee, if I do a project like this, I'm going to have all sorts of problems I didn't anticipate," there will be some benefits, too.

In the spirit of networking with Mike, I stole one or two of his slides while he was talking. Since this is networking, this is okay.

(Slide 33)

I think this one is very applicable, the one about backlogs. Plus, I wanted to use it. I don't have any that have the nice boxes and stuff, so I had to have one of them. But, this is really the situation we were in. I mean, I think a lot of you can relate to that.

As we were even thinking about doing this project, which was a very major change to our database, the first thing that stuck in our mind was, "Gee, it won't be easy to get this done. We know we've got all these backlogs on our current processing system. We're putting in major deductible systems. Can we even do this at all?"

It turned out that that was part of the hard sell. It was, "Gee, you want to do this. It's a good idea, but there are an awful lot of other things going on." So, I wanted to bring this up because I think it was one of the key things that hit us immediately in trying to get our reserve system changed.

Now, back to my slides.

Briefly, I'll go through these first slides fairly quickly to get to what happened in our project. Why did we want to change our data organization? It was very expensive to administer. There should be a slash here. It also was increasingly difficult to control and understand.

Since St. Paul decentralized -- I'll use the phrase a few times here, but it's a thing that's very unique to the St. Paul -- we immediately came up with a mapping system that took the information and mapped it as best we could to a specific profit center. There were "A" codes and "B" codes.

As the company became more complex, it was just a bear to control and understand that. I joined St. Paul about two and a half years ago, and on my first day there, I was in a meeting with the reserve administration people and reserve analysts, and it was a weekly mapping meeting where just the strangest things would go on.

Somebody would report on, "Well, we got $8 million worth of premium in this dump code and we have no idea what it is." The solution invariably was, "Well, let's create a new "B" code to handle it." It just evolved to this monster. It was very difficult to understand. Controlling it was a nightmare and it was just getting out of hand.

Also, as the company was becoming more diverse, it was very tough for us to adapt to that. People would create new codes to segment a portion of their business. We wouldn't even find out why. There was no formal mechanism in the company that, say, if the commercial lines area wanted to create a new code to handle their new synthetics business, there was no mechanism except word of mouth to say, "Hey, Corporate, you've got to set up a new reserving piece for it." It just made communications very difficult.

To describe the reserving environment, the management focuses on results by accident year. We carry IBNR reserves and distribute it in very many ways. We have internal/external reporting. We actually report it down to the agency levels. We get agent calls about, "How come my IBNR is so big for this line of business?" We have to externally report for standard statements for GAPP. The underwriting areas have changed.

So, in this -- oh, a couple more descriptive things. Like I say, we write a very diverse product mix with a lot of medical services. We write ocean, bond, surplus lines. The other area that is of concern -- I don't know if they ever had sessions on these before, but I'd love to be involved in one, is a limited reserve area staff, outside the scope of this project.

So, given the old environment, what were the consequences? Well, controlling IBNR by an underwriting area was crucial. We distributed IBNR. IBNR drives the accountabilities of the decentralized profit centers. That was crucial. We had to respond to any changes in the underwriting system.

We still had to control things by annual statement line. There were problems at times. We needed an efficient mechanism to distribute IBNR to all levels. The existing A/B code with mapping tables wasn't a very efficient mechanism.

In the reserve analysis area, where I mainly come from, we had generic coverages like work comp and then had this interesting system network mapped out, really, in outstanding scope that would then split our analysis out to the different profit centers. The underwriting area dimension was very crucial and I'll get to that in a minute.

So, here are some of the specifics of what our system was like. I really want to go through these quickly because, like I say, every company is unique. We had these A/B codes. We had separate factors for IBNR by transaction, direct versus

aggregate, some special ones. Everything went down to an exhibit page and then a factor page.

We had these humongous mapping tables that we maintained. For those of you who know what happens when actuaries try to maintain tables, it can be a pretty nightmarish situation. Any time we wanted to adapt a table, we'd have to add new lines, so what initially started out as a fairly concrete set of A/B codes, slotted out to business, over the course of four to five years, it was like a James Michener novel. It was just huge.

Then, we carried the IBNR reserves we generated as a percentage of earned premium; that's maybe a fairly standard thing that happens in companies. You say, "Gee, my IBNR, to fit my plan, needs to be a certain percentage of premium, varying by accident year and these various segments," so a brief background on that.

(Slide 1)

Here is where, in my notes, I say, "go through quickly." Basically, you can just read this stuff later. We had an incredibly complex mapping system to get them down to where it was applicable to the agency level, the sub-line business level. One key thing, though, was we did use the same scheme to analyze our business as we did to administer the IBNR.

We changed that, but it sort of grew up together. As we decentralized and we needed these AB codes, it was logical that we analyzed the business the same way we distributed the IBNR. Over time, that has come to be not a wise thing for us to do. I'll leave that up for three seconds. You can read it later.

Here, the nightmare slide, if you will. I'm not going to go through this at all, but this is really a fairly -- I'll contrast one under the new system, all sorts of tables, all sorts of matching, getting down to our factor pages, where we could finally allocate IBNR, a very complex process.

(Slide 2)

A similar one which just shows a detailed example of actually doing the factors, applying them to an IBNR premium record file and the production IBNR file, again, unique to the St. Paul, not as pertinent to your needs for this seminar.

(Slide 3)

Here, though, is a key one. Because of the way we had things, when we wanted to distribute IBNR, it was sort of like pushing on a balloon one way and something else happens. If we wanted to affect the results for the plan for, say, sub-line one, well, we could change factor page 1. We could change the factors on factor page 2, but in each case, we were also impacting sub-line 4 and sub-line 2.

So, we got into the situation where we could control the IBNR, could control the results that the business centers got on a planning line basis, a build-up of the different sub-lines, but if sub-line 1 had a little bit more IBNR and sub-line 2 had a little bit less, the situation was so complex that we, in corporate, sympathized, but basically said, "We don't care."

Down in the business centers, the planning line person or the overall manager would say, "Okay, I got my planning line right." Well, the guy in sub-line 1 who got zinged, he is complaining, and surprisingly we never heard from the guy who got better results than he expected in sub-line 4. We had a lot of consternation and a lot of problems with that, people calling and saying, "You didn't get my sub-line target right for the plan but got my plan line right."

Because of the way we set it up, it's a very, very complex system to deal with. Now, of course, we've gotten to the place now where, in most cases, we would get pretty close, even at the sub-line level, but it's real ad hoc. We've got a couple of people who have been doing it for years. They know which pages they can tweak which way to get the results they want. It's management. If one of those people gets hit by a truck, we're doomed.

So, in the new scheme of things, we got rid of those A/B codes. We got rid of them entirely. Now, we can have two schemes. We can do IBNR pages directly to sub-lines. We just have pages that go by sub-lines and we can control sub-line results like that. Reserve analysis, we can do that in an entirely different way to better be able to communicate our results.

For the IBNR reserves, we do it mainly by underwriting area, annual statement line. We still have a factor page. That aspect of it is okay, just so long as we can get them directly in; that's fine. For our reserve analysis groups, we mainly go by annual statement line and then type of coverage and major line.

I'll slow down a bit when I get to the scope of the project, I think, but to contrast the earlier million dollar slide, now we have a very simple one.

(Slide 4)

We have coded elements that determine what factor page it goes to. That goes to the IBNR and that goes right to the system, so that works out very well for us now. More importantly, when we control the IBNR, it's very easy. Sub-line 3 might get impacted by factor pages maybe for direct business and ceded, but we can control that either way to match plan or change results as deemed fit, so it's a much, much better scheme for us now.

(Slide 5)

I'll take a breath, a sip of water, and talk about the more pertinent aspects maybe for all of you. Okay. So, we had it in our mind that we had to kill these A/B codes. I have a folder in my desk that says, "Kill A/B" that's been building over time.

We determined we needed to kill the A/B code, kind of knew what we wanted to do to change it and then set out and said, "Well, how are we going to do this?" Then, we got into the whole prospect of, "Gee, how long might this take? What might get affected? How much is it going to cost? What systems are going to be impacted?"

Even this initial stage was very educational for us. We'd never been involved actuarially in a big project like this. We didn't have any real idea how long it would take. It impacts a few things, but, gee, if we just eliminate it and put in something different, how long could that take, a year?

Well, as it stretched out, it's about a two-year project. Cost is another interesting element. I mean, we're actuaries. We're supposed to guess -- excuse me -- or estimate costs. For us with this, it was really a guess. Our first guess was half a million.

Well, when we finally started working with the DP people and realized all the things that are involved in building a project life cycle and other elements which at first we thought were pretty strange -- I mean, no disparity to the DP people here, but they loaded in tons of time, which ended up being necessary, for meetings, followup meetings. Their time is money, just like anybody else in the company, and the project costs were about a million.

So, the first thing we had to do was sell this stuff to management. One thing we are similar with many companies here is these days, we are in something of an expense crunch, you know. We try to get that expense ratio down. As I say, limited area reserve staff, can't get anymore actuarial staff, so for us to go up to upper management and say, "Please, give us a million dollars to change this," was a very hard sell, but we were able to do it.

Now, when we first started, we knew that this would affect our actuarial analysis systems. We knew, obviously, it would affect our IBNR production systems. Things we learned about that we weren't really sure of, but it did impact the premium reserve system. We knew it would impact our annual statement system somewhat, but it turned out that it impacted it a lot more than we had thought.

So, from what we initially thought would be a fairly simple thing, "Gee, maybe this will change our IBNR system, change our analysis system," turned into a ton of different systems, so that

was one real sort of unexpected benefit from that. It made us really understand all the interrelations of our data, how many systems it touched.

Maybe some of the aspects we learned are things that would make Mike cringe, about how interrelated everything is but not really tied together, but even with our A/B codes, we thought, "Gee, they only impact the two systems." They were everywhere. I mean, tons of things that we had no idea A/B would even touch were affected by A/B codes.

Then, our thought was, "Well, let's take A/B out of those programs." That part of it was very educational for us. Then we had to say, "Well, how are we going to have a project team to do this?" Well, the way it was set up was the project manager, Mike Larsen, who I am substituting for today, the loss reserve officer who devised the project, and he had the vision for what he wanted it to do, but at the same time, he has a ton of other duties to do, too, as the loss reserve officer.

So, we needed a customer project manager, and that turned out to be his reserve administration supervisor, who would be here to give the talk except she's six months pregnant and they don't allow flights at that stage. Then, something we didn't even realize before and maybe it's just because of our size, but you really needed two data processing leaders.

We had an overall project leader, who had handled big system changes like this before and also an actuarial data processing leader who had more familiarity with the individual actuarial systems it would hit. So, we didn't even know what form this project team would take, but it ended up being this and it worked out very well.

Then, we had to figure out what different responsibilities everybody would have. The next slide, project team.

(Slide 6)

Project manager, loss reserve officer, secure the funding, define the goals, answer most of the main end user questions, and the one that turned out to be particularly onerous was review the specifications, a very necessary part of the project.

Many times, we might have this 50-page report of very detailed specs and we'd say, "Oh, we've got to go through this again?" but it was a very necessary part of the project. Again, it's one of those things. You think, "Gee, we want to change the system. I'll propose it and it will get done." There's a lot of work involved while it's going on while we make it work.

The customer project leader was the real key person to run the whole thing, monitor progress, create the work flow charts, coordinate the activities, end user questions, review the specs,

make sure Mike reviews the specs, too, and then the DP project leader had sort of overall responsibility for making sure things ran and got coordinated. The last member, the actuarial person, had to assemble specs, design the system and do coordination on his part, too.

If anybody has questions as we go along -- So, how did this all work out? That's sort of the end part we get to. Well, the loss reserve officer, his project manager and his reserve administration person as the project leader had some obviously good and bad experiences, as everything does.

It's obviously very good to have the primary users here to answer questions. We obviously had high motivation to complete it, because we were the end users and we saw the direct benefits of this. The key one was, it was hard to find time to answer questions.

I mean, not only is wading through a 50-page report of specs not necessarily the most desirous thing to do, but if you're sitting with that in your hands -- and this came up many times -- and, at the same time, you've got to prepare a communication to the IBNR Committee to change the results for the plan in one subline because the results are going to hell, I mean, it's push/pull. That's just got to get done. So, this was an element that was maybe not as anticipated as well as it should be.

With the two DP project leaders, the actuarial leader, he had knowledge of all the actuarial systems in minute detail in separate systems, but he had never done an overall global project like this. Contrasting that, the overall DP leader had broad experience in managing large projects, but he didn't know a thing about what actuaries did and the actuarial systems.

So, both people were very necessary, but that led to some early conflicts. You know, one person was trying to do things in a certain way. The overall leader had his goals for things he needed to get done, and there were some clashes, but that got worked out.

(Slide 7)

Then, with our time line for the project, this is not any unique system to the St. Paul. This system-life -- that is two typos on the same line. I was going to put like a copyright up there to make it seem like we designed our own system, but it's a typo.

We followed a system life cycle and separated the project into different areas, as best we could. One of the keys was doing the actuarial versus the accounting systems. So, the accounting systems did a lot of things that would actually allocate the IBNRs to the sub-lines. The actuarial systems were the things we would do our analysis on.

One of the things which helped cut the time was by recognizing which tasks were interdependent. We had maybe 20 different things that needed to be done. At first, we thought, well, you've got to do them sequentially. We learned as we did it that, gee, some of them could kind of go on actuarial, they would affect the same things, and we'd save some costs at that point. We increased the coordination effort among all involved.

So, here was sort of the time scheme. In my substituting for Mike, I've got a little bit closer perspective on the analysis side of this. In December of '88, we proposed it, made a feasibility study, and then things kind of split off. All the accounting work to get the real allocation of IBNR in place, get the distribution systems tested and put them into production, which we're on track for, by 11/90, that was one aspect of it.

The other one was the actuarial system, the analysis side of things. From basically setting up the specs in June of '89, carrying through until March, all of us on the analysis side worked on it -- and, again, a very educational process for us. We had to actually spend virtually all our time, outside of doing our quarterly reserve review, in setting up the new actuarial system. We hadn't anticipated it. We had special projects we were working on.

We had to do things like define our new reserve codes. How do you want to define your data under this new scheme? Test individual claims. Are they going to fit the right triangles in your data? It's one thing to set up the specs and it's another to have very good, talented DP people do it, but it's got to be checked to see if it goes in the right buckets.

Also, we had to do a parallel test. It was almost a nightmare. We spent all of January doing our year-end reserve review under the old scheme. We turned around February 1st and we had to do it again under the new data scheme. So, we spent two solid months doing what normally we just do once per quarter.

So, for us, again, sort of an unexpected problem, although we did learn a lot from it, was for basically about six months, all the analysts, all the actuarial analysts, took time away from their normal work to set things up for this new system. Luckily, my accountabilities changed so I wasn't impacted too much.

Then we got into unexpected problems and benefits. The first thing that happened was, gee, data processing, they're real people, too. They don't want to change. They had the system. Yes, it had its quirks, but they knew it. They were comfortable with it. Kill A/B and bring in something new? They didn't want to do that.

They were very used to the old system, so it was a hard sell for them even though in one sense, gee, it's a big project. They were having expense crunch problems just like the rest of us and

then we got a new million dollar project and, in one sense, it's a plus, but for awhile, at least, they saw it as more of a headache than it was worth.

Plus, back to the slide I stole from Mike, you know, we had a two to four-year backlog on other projects. So, even if this could get pushed up through senior management to say, "This is a good project. Go ahead and do it," they weren't real thrilled about it because it would push off other projects. That got handled satisfactorily to all concerned, but, initially, we thought, "Gee, they'd like this, something new, something fun." They liked the old system.

The benefit that came out of it, was that it forced Mike to really clarify the benefits of the project to help sell it to the executives and to the data processing systems. So, that was something we hadn't anticipated.

The second one and, again, this is maybe fairly unique to us at the St. Paul, but you may come across a situation like this, too, A/B codes, in their own strange way, had one good benefit. They kept the size of our loss data files from our reserve analysis to a fairly manageable size.

When we initially went to this new scheme, they came back and said, "Well, here, the data you want is going to take up more reels than this company ever owned." There was panic on that. We had files that were way too big after we eliminated A/B codes. Again, a problem. Gee, we had to handle this and we had to get it down to a triangle file structure that was more efficient and manageable, and this has worked out quite well.

How, we solved it was, which was a very good thing for us, we borrowed the same file structure that the pricing people used to get their loss reserves. We always balanced in terms of the total dollars, but the systems were different. Now that we use the same type of file structure and basically the same type of language, we are much more in synch with it. The file sizes are very manageable.

One problem is a specific example here. We had eliminated some A/B codes that summarized things very nicely and now we had codes that didn't do it that way. We didn't anticipate that at all. Our example of that is our reinsurance operation out in New York, St. Paul Re. They write three or four hundred million dollars in business with an oversight capacity from the home office reserve department.

With the old A/B system, you got one triangle that matched virtually exactly to the St. Paul data. Now, with A/B codes with annual statement line as the key divider, St. Paul Re is divvied up among 16 different reserve groups. We've got a way to do it, but it's a problem we hadn't anticipated.

St. Paul Re used to be where we'd just get the data, square it and act as oversight to make sure things were reasonable, and now we have got to go through a number of machinations. So, that was the second thing that turned out to be sort of a good and bad news thing for us.

This one is fairly minor or maybe fairly obtuse, but it used to be we'd only define combinations of factor pages, so we could only use an "and" type logic. Now we have this new system and we can use "and/or" statements to get virtually any cut of the data we wanted. It's an unplanned benefit, entirely. Because we borrowed the structure from the pricing systems people, we're able to expand our ability to create combinations of data that we'd never had before. That was one thing -- I wouldn't call that a problem; that was pure benefit.

A fourth one which you may come across is, "Gee, this project is getting to be a million dollars." It makes you really sit back and re-evaluate if you really need all the subsidiary systems that your old scheme may have created. We determined for some of them, "Gee, we can do without them."

We had this very elaborate IBNR planning system for our planning cycle that worked on the mainframe. We could upload a bunch of stuff. It would come back down and it had to be checked 18 ways to Sunday. We had to re-upload it and back down. We eliminated that entirely and now all the planning stuff is on spreadsheets.

I won't say which vendor, but you can guess which one, has three dimensional spreadsheets now. This just becomes a very easy thing to do. You have a whole planning line with eight sublines all in one spreadsheet just layered three dimensionally. So we got rid of the mainframe system. Before, we thought we couldn't live without the mainframe system, but when we sat down and really evaluated it, we said, "Hey, we can do without it."

We got a calendar year Claim Department activity system, how many claims came in, how many closed without a payment, how many closed higher than the reserve. We eliminated that and can use the same data structure that we had for reserving the pricing to get us the same information. Again, it's more consistent. The pair of systems is working together. We don't have four different systems doing different things. That was another thing we didn't anticipate.

A few others that are not specifically on the slide that I do want to note. One problem, which is just, I guess, a reality of life, is you've got this project, fairly short-term, you need people, and in a situation like this, we had to hire contract programmers. Even though there was this two to four-year backlog for the projects, up to a point, those could get shunted aside, but up to a point.

So, in certain situations, we had to hire contract programmers to come in and do some of this work, very good people, very technically astute, but they are there for a short time and any knowledge or intimacy they gain with whatever they worked on goes right out the door when they leave. So, we got good people who did good things, but they're gone and if anything comes up, you know, we have to rely on the documentation -- very good documentation, but that was a troublesome aspect.

I expanded on this before, but it really hit a bunch of areas. The project leader and even the reserve administration person who was the project manager, time and time again, when push came to shove, normal work got precedence over the other aspects of the project.

Another thing, which you should be very well aware of, is that, obviously, when a project like this goes on, when you actually see the results of different testing modules, you say, "Oh, gee, I need to kind of change this spec a little," or "Is this really what this did? Oh, I really think this should do this."

You change things as you go along. We had a very good, coordinated team that would handle that. They didn't stop and say, "Well, it's not in the specifications. It's not in the life cycle, so we can't do it."

They were very accommodating, but the bad side of that was, you would say "Let's bang it out and get it done by 8:00 o'clock in the morning." It tended not to be documented very well. The changes, as such, were done, but the actual specifics of why we did it and why it was outside the scope of the original project weren't documented that way.

When it came time when we had some problems with cost overruns, when you go up to upper management and say -- actually, I think the original project was supposed to be about 900 and it got overrun to about a million. When you go up to upper management and they say, "Gee, you want an extra hundred grand from us?" Well, if you can't really explain why, then you have a hard time selling that extra money.

So, if you are in a situation like that, I would advise you that, as things come up ad hoc that you need to adapt to, just make sure you keep a real documentation of the items.

To sort of summarize, obviously, the first step is to define your needs. What do you really want to do? How long is it going to take? How much do you think it might cost and what are the benefits and problems you might anticipate?

Recognize very early on that you have to sell this project to assorted audiences, not just upper management, but the DP people, and the business center folks, although they were pretty pleased to know that their sub-lines will get the right IBNR now.

One thing we really hadn't anticipated for the end users, us in the corporate actuarial department, was a substantial time commitment. You can't just say, "I want this done," get the funding, and magically, it gets done. You have to be very actively involved in it from day one.

If it's something that's going to take two years and it's a very good system change, count on devoting, I would say, 25 percent or more of your time over two years. Given all the other things you've got in the coffer, that is sometimes a very difficult time commitment.

Obviously, as we saw in many cases, anticipate that what you originally specified for will have to be modified. It is oftentimes not a situation that your original specs were necessarily bad, but things come up that you didn't think about. Additionally, good aspects of the project that can help you, that you hadn't even really thought about it until you delved into it may arise. Just anticipate that you might have to ad hoc.

MR. COHEN: We have time for two or three questions. Before you ask a question, I would like to again make the plug that you all please fill out the evaluation forms, which are very, very helpful to the committee in trying to plan future seminars.

MR. LIEBERMAN: My name is Mike Lieberman (phonetic) and I am Vice President of (Inaudible) Compensation. One thing that interested me was you had a conflict in selling your plan. Did anything insightful materialize in the resolution of the conflict or did you appeal to upper management to enforce the sale of the project?

MR. WHITE: The question was when there was a conflict, were there any unexpected benefits or consequences of having to go up to upper management to get the situation resolved. I don't think there were too many situations where, once the project got going, we had -- if there was a conflict at sort of a working level amongst any of the team members or the programmers, there were very few situations -- I can't even think of any -- where we had to go back to upper management and say, "Hey, we've got a problem here and you've got to help us."

I think the key thing was that because of some of the resistance initially by the DP people to change things, it really made us have to sell it to upper management even more because, obviously, they are privy to the DP people saying, "Hey, is this really necessary? We've got a lot of other things going on." So, it made us have to have a harder sell.

I guess initially, that would be the only key place where it happened, to initially sell upper management on the idea that this was a very good thing and, even though you're getting complaints from the DP people, it really needs to get done.

Now, once the project got going, the coordination and working with the DP people was wonderful. That's been sort of another unexpected benefit. Here are people that, you know, we only go to when we've got a problem and now that we have worked with them on this overall system, we know them better and conversationally and just interactively within the company, and maybe when problems come up in the future, things won't be so confrontational and at least not as, you know, "You're only coming to us when you've got a problem."

MR. COHEN: Are there any other questions for Dave and Mike?

(No response.)

MR. COHEN: If you could all join me in thanking both Dave and Mike.

(Applause)

Trends in Technology

and Information Systems

Casualty Loss Reserve Seminar

September 1990

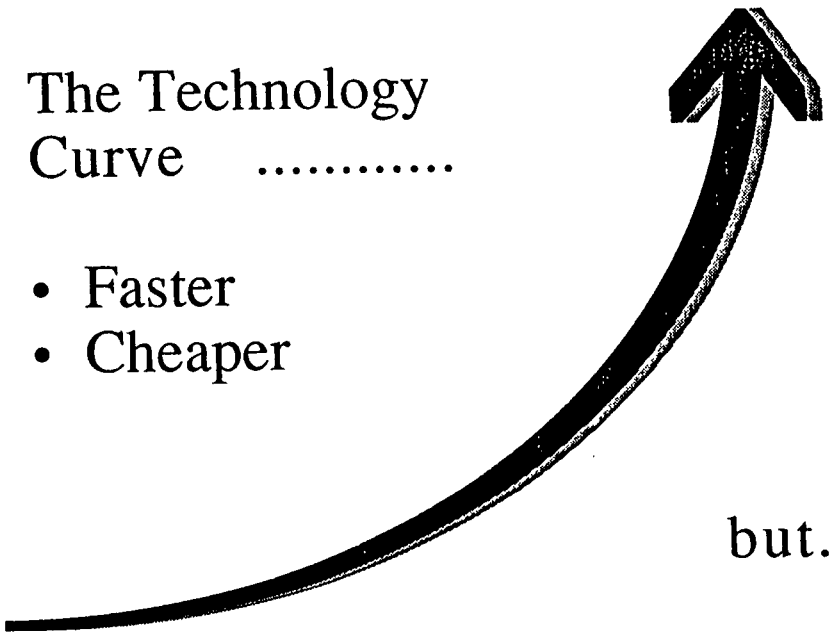
Michael Garner
Chicago

Coopers & Lybrand | Solutions for Business

Slide 1

The Technology Curve .....

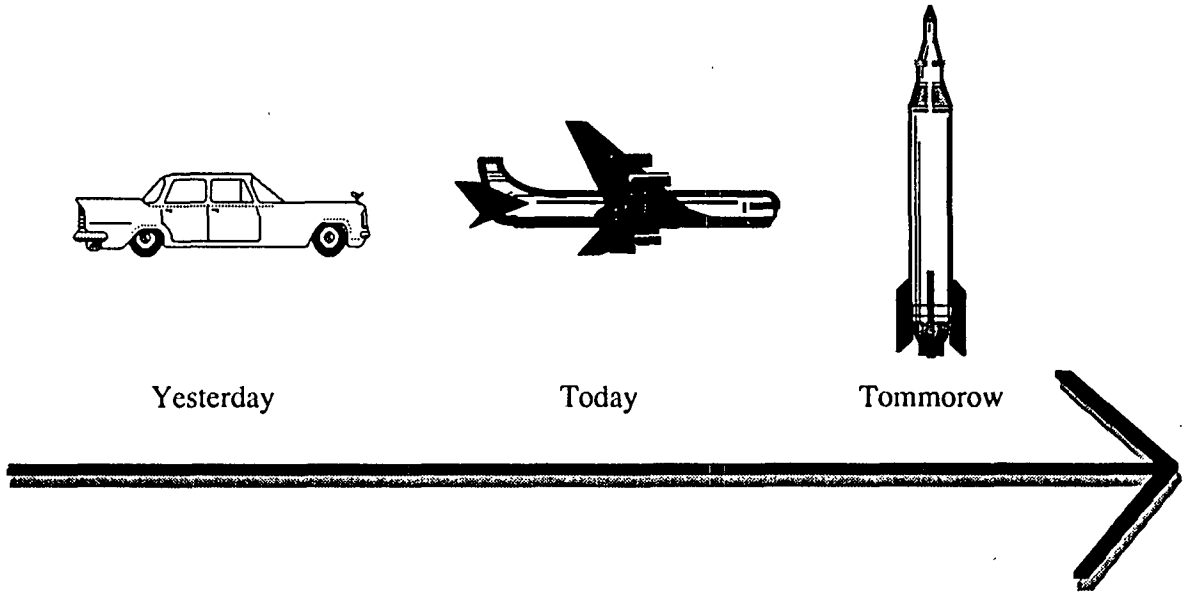
- Faster
- Cheaper



but.....

Slide 2

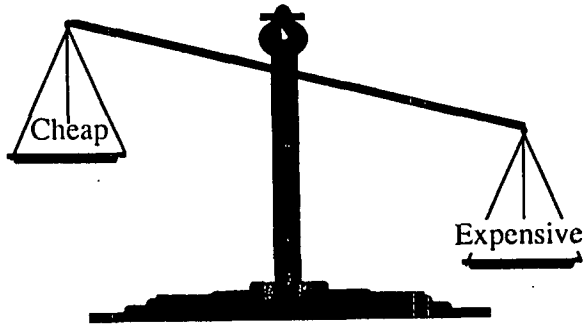
Expectations and Complexity



Slide 3

Components Change

Hardware **VS.** Software



Slide 4

NEW TECHNOLOGY

- Telecommunications
- Image Processing
- Voice Response
- Office Systems
- Expert Systems
- CD ROM

Slide 5

Net Result .....

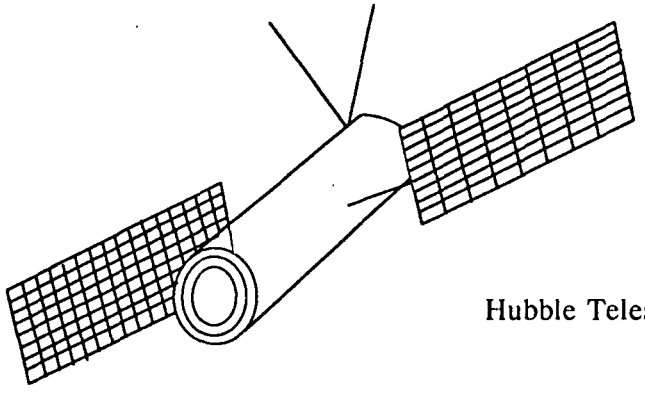
Great Capacity to achieve

Integration of Systems and Technology vs "Point Solutions"

Slide 6

Converse

Great capacity to fail in a big way



Hubble Telescope

"Objects in mirror are closer than they appear"

Slide 7

INDUSTRY IMPACT

Data Rich / Information Poor

- 300% more data
- New formats
- New values
- Multiple files
- Multiple locations

Challenge - get it and use it

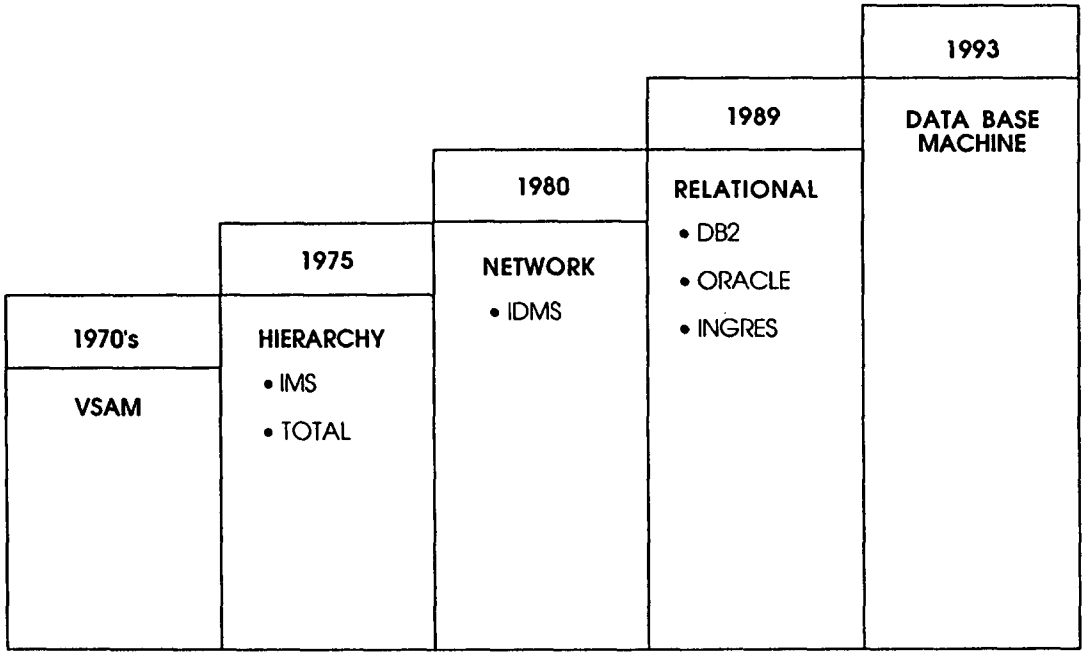
Slide 8

AGENDA : *Technology*

- Data Base
- Distributed Systems
- Expert Systems
- Languages
- Re-engineering
- Implications

Slide 9

DATA BASE TECHNOLOGY



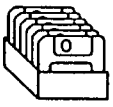
Slide 10

DATABASES -VS- FLAT FILES

FLAT FILE:

- Direct Linkage to Software
- Fixed Format

DATA BASE:



- Separation of Data and Software
- Flexible Format

Slide 11

HIERARCHICAL VS. RELATIONAL

Hierarchical

Logical "Parent - Child" Relationship

Relational

Flexible Relationship

Slide 12

RELATIONAL DATA BASE

BENEFITS == FLEXIBILITY

- Ease of use
- Easy to modify
- Ease of Interface
- SQL - ANSI Standard

Slide 13

RELATIONAL DATA BASE

ISSUES : PERFORMANCE

- Large Data Base
- On-line Transaction Processing

Slide 14

Data Base Machine

- Capacity to "X" Power
- Offload Database Overhead to Separate Processor
- Distribute Database and Processes

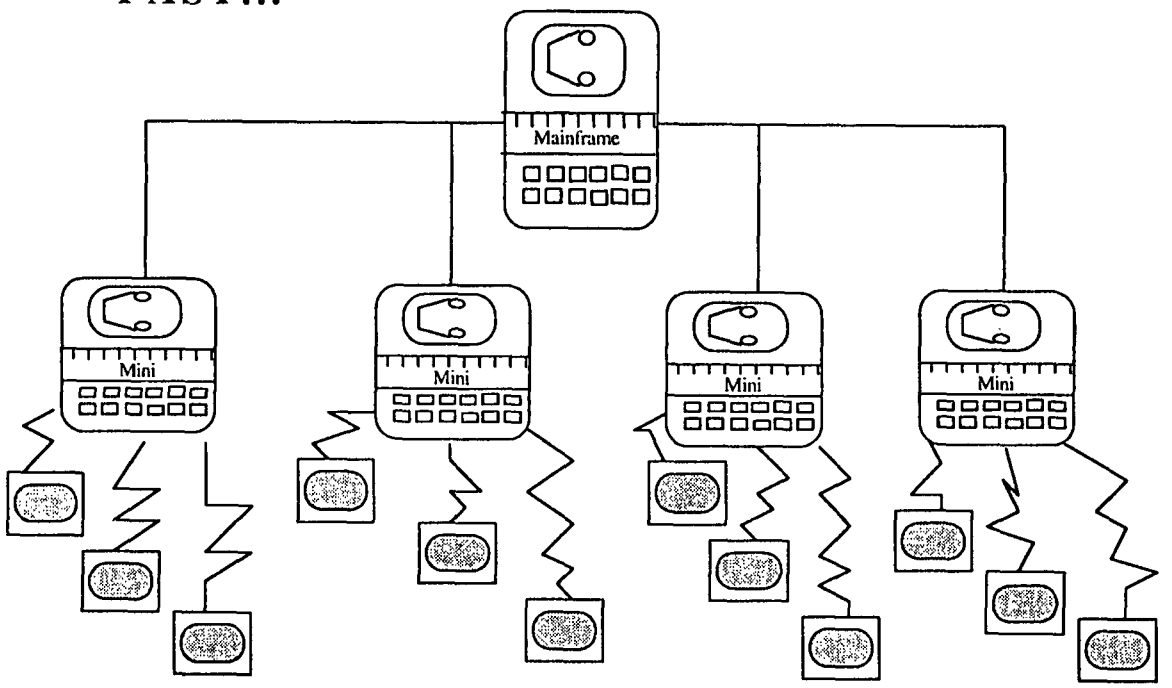
Slide 15

DISTRIBUTED SYSTEMS :

Processing in which some or all of the information processing, storage and central functions, in addition to input/output functions are dispersed.

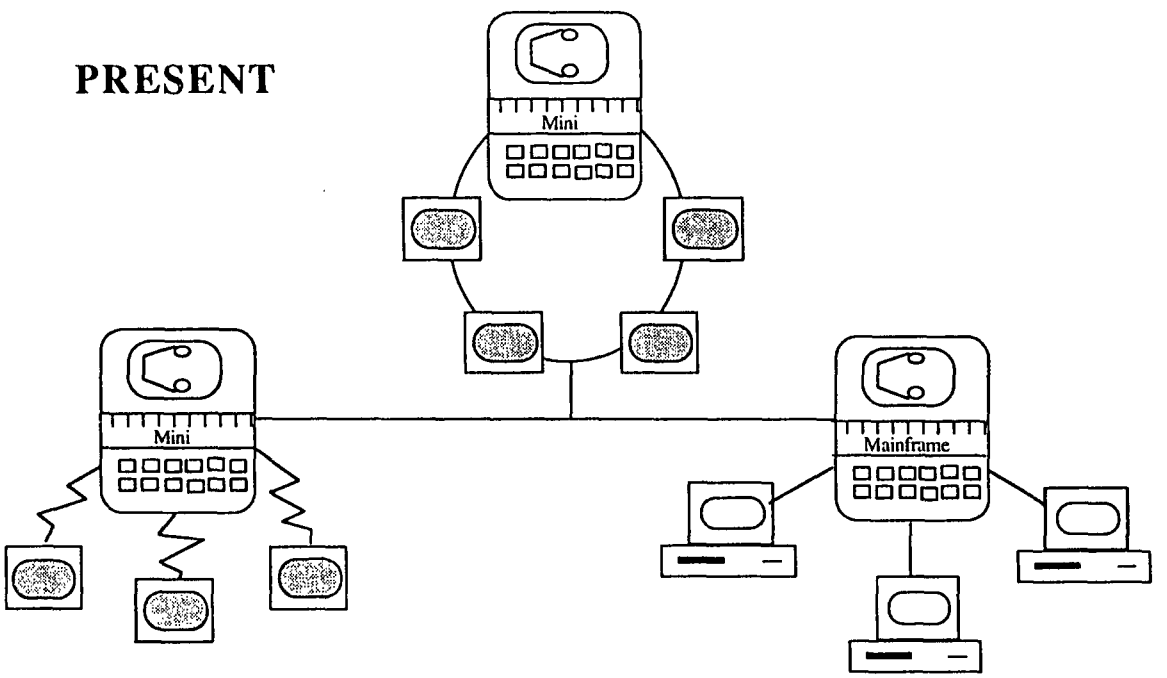
Slide 16

PAST...



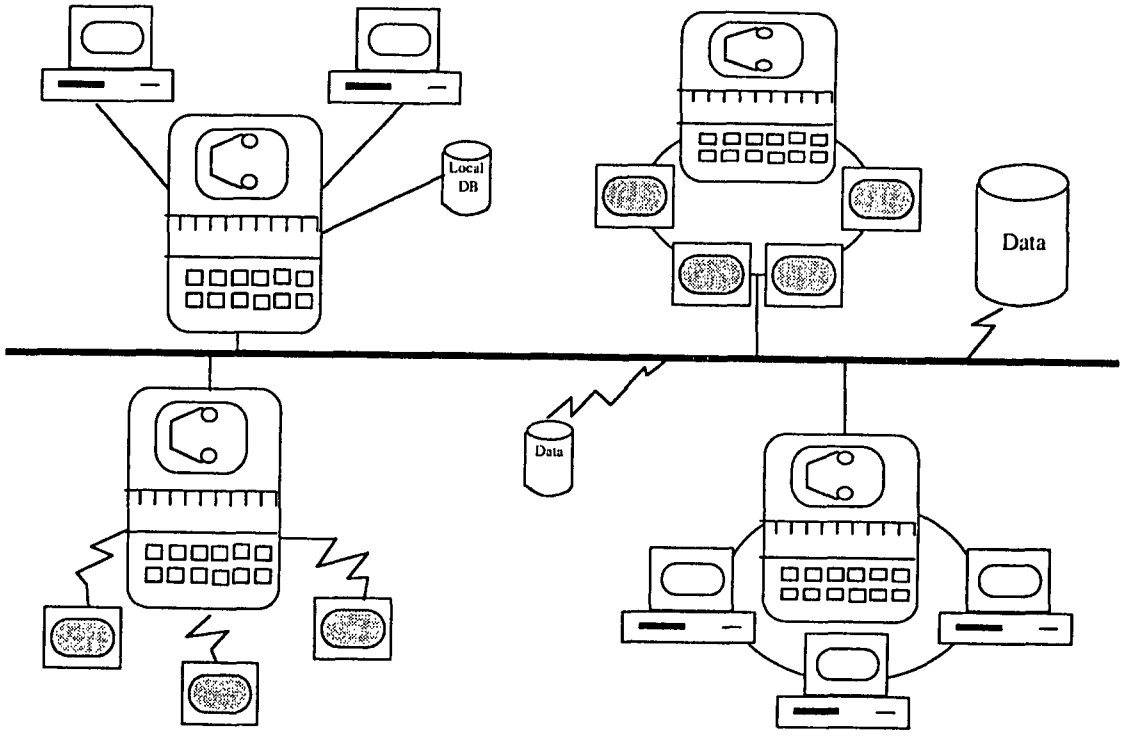
Slide 17

PRESENT



Slide 18

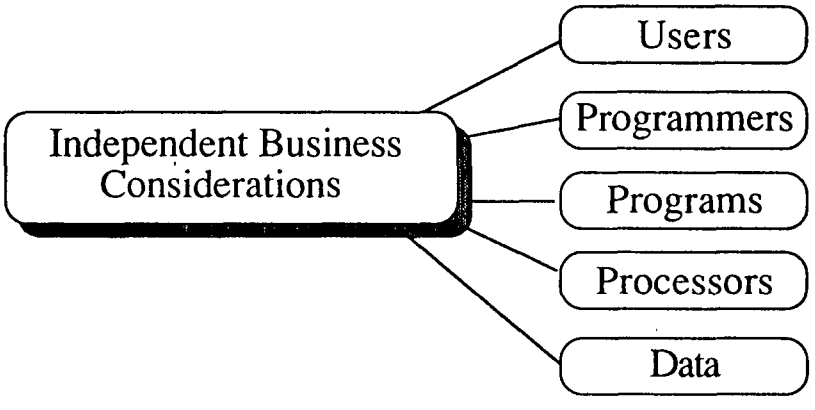
1990's DISTRIBUTED PROCESSING



"The Network is the System"

Slide 19

1990's DISTRIBUTED PROCESSING



Total Network Availability

Slide 20

EXPERT SYSTEMS

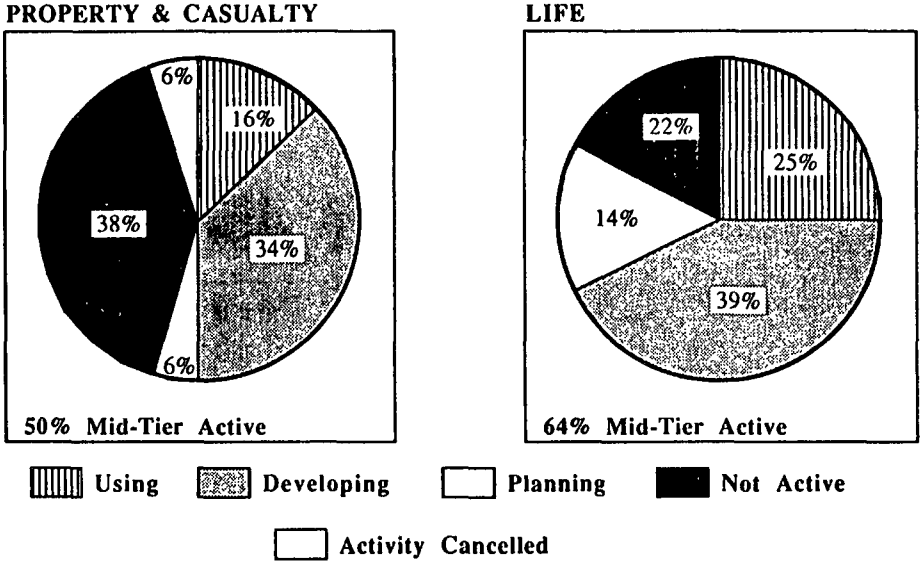
Focused on quality

"Expert systems" enable the computer to emulate the problem solving abilities of recognized human experts in a particular field. These systems allow a junior-level professional working on a computer to tap the same knowledge base - the same facts, logical processes and rules of thumb - that experts would use to reach an informed judgment or follow a particular course of action.

Slide 21

EXPERT SYSTEMS IN THE INSURANCE INDUSTRY

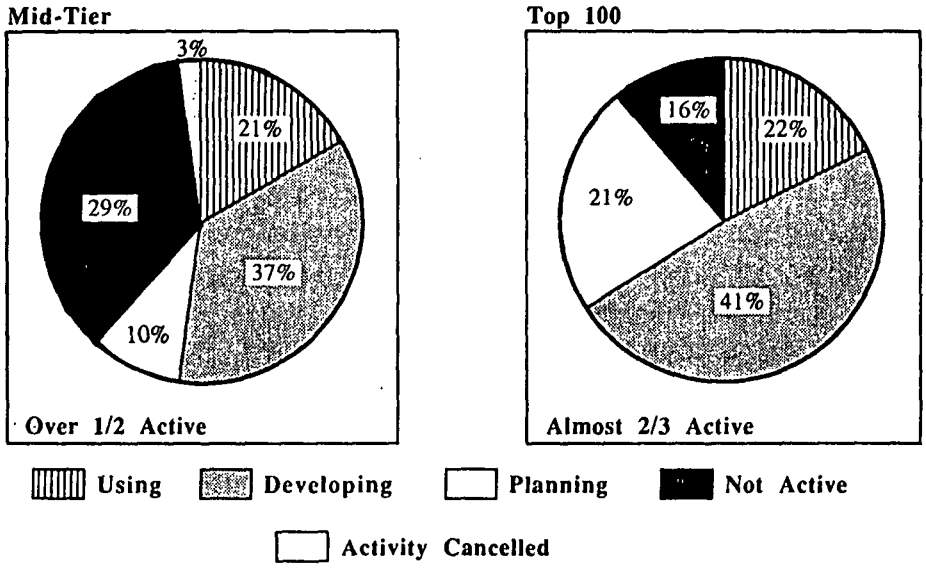
LEVELS OF ACTIVITY



Slide 22

EXPERT SYSTEMS IN THE INSURANCE INDUSTRY

LEVELS OF ACTIVITY



Slide 23

EXPERT SYSTEMS IN THE INSURANCE INDUSTRY

PRIMARY APPLICATIONS

	MID-TIER	TOP 100
UNDERWRITING	44%	92%
CLAIMS	18%	
SALES SUPPORT	15%	33%
FINANCIAL PLANNING	4%	19%
REFUSED TO IDENTIFY	15%	18%

Slide 24

EXPERT SYSTEMS IN THE INSURANCE INDUSTRY

PRIMARY APPLICATIONS
PROPERTY & CASUALTY

	MID-TIER	TOP 100
UNDERWRITING	48%	86%
CLAIMS	19%	50%
INVESTMENT	10%	14%
SALES SUPPORT	10%	11%
REFUSED TO IDENTIFY	16%	11%

Slide 25

EXPERT SYSTEMS IN THE INSURANCE INDUSTRY

PRIMARY APPLICATIONS
LIFE

	MID-TIER	TOP 100
UNDERWRITING	40%	97%
SALES SUPPORT	18%	31%
CLAIMS	17%	20%
PERSONAL FINANCIAL PLANNING	17%	23%
REFUSED TO IDENTIFY	14%	23%

Slide 26

BENEFICIAL IMPACT

CAPTURING NEW DATA

- Client
- Underwriter
- Claims

DIRECT SUPPORT

- Junior Actuary
- Quality Assurance
- Exception Notification
- "What If"

Slide 27

HIGH LEVEL LANGUAGES

Theory:

A programming language that is not dependent on the physical data structures of any particular computer or operating system.

Slide 28

LANGUAGES

DATA DEPENDENT

- COBOL
- Assembler

HIGH LEVEL

- Adabas
- Natural
- Focus
- Ramis
- IDEAL
- Oracle
- SQL

Slide 29

TRENDS

- Code transportable to any hardware platform
- Fits with existing database and teleprocessing systems (DB2, CICS)
- COBOL Generators and COBOL restructuring tools keep COBOL alive and well

Slide 30

IMPACT

Advantages:

- Prototyping tool
- End user reporting and data query
- Reduces application backlog

Disadvantages:

- Inefficient use of resources
- Poor transaction processor
- Ineffective with complex searches -- large data bases

Slide 31

REDEVELOPMENT ENGINEERING

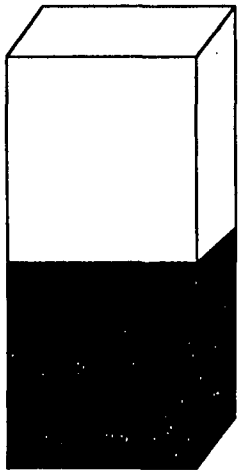
"The world-wide inventory of COBOL applications has grown to a staggering 77 billion lines, at an estimated investment of $2.3 trillion."

Richard K. Ball Management Institute

Slide 32

THE NEED

A Rapid Growth in Application Backlogs includes . . .



DOCUMENTED BACKLOG

2 - 4 year queue of approved projects awaiting DP resources in most American companies

(James Martin)

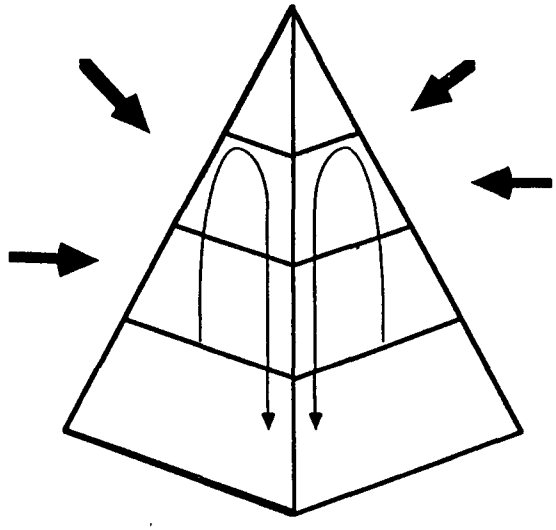
HIDDEN BACKLOG

On average, projects required by users but not formally requested equal 168% of documented backlog

(Sloan School of Management Study)

Slide 33

THE APPROACH



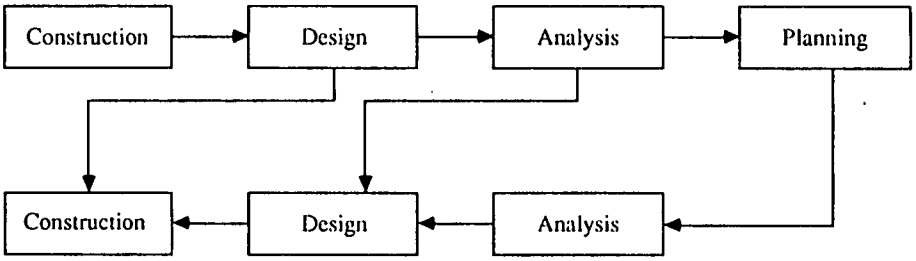
- Maximize the use of existing information
- Minimize demand on MIS and user communities
- Apply information engineering techniques
- Utilize automated tools

Slide 34

COMPARISONS OF LIFE CYCLES: Forward versus Redevelopment Engineering

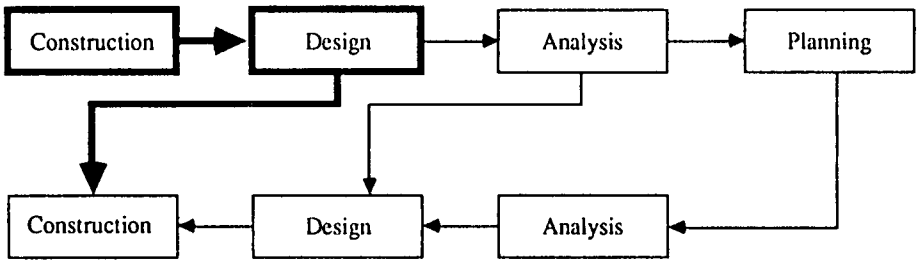
Forward Engineering:

Redevelopment Engineering:



Slide 35

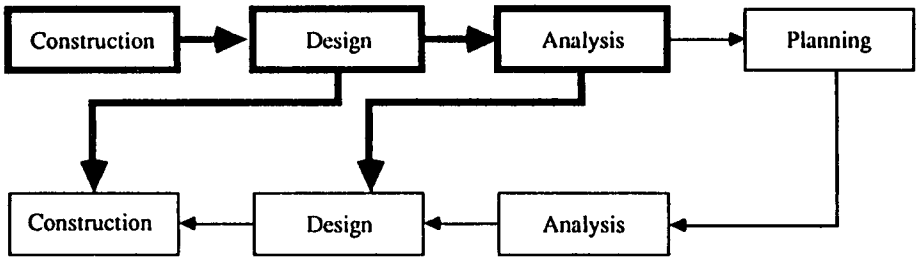
REDEVELOPMENT PHASE: Re-Systemization



- Using automated knowledge of existing functionality.
- Changing technology.
- Not changing functionality.
- Reinstall

Slide 36

REDEVELOPMENT PHASE: Re-Engineering



- Using automated knowledge of existing functionality
- Confirming and modifying functionality
- Changing functionality and technology (if desired)
- Reinstall

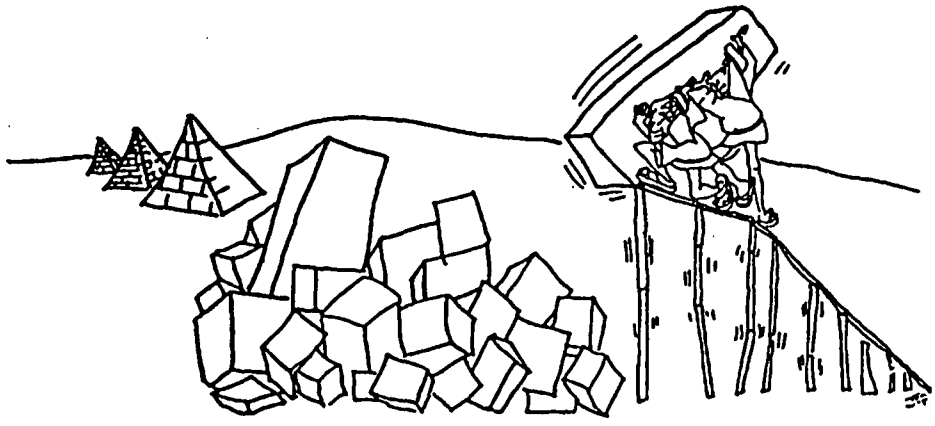
Slide 37

SUMMARY - TOOLS FOR SUCCESS

- Data Bases
- Distributed Systems
- Expert Systems
- High Level Languages
- Re-engineering

Slide 38

The Key is Integration



"To make a pyramid, pile blocks on top of each other."

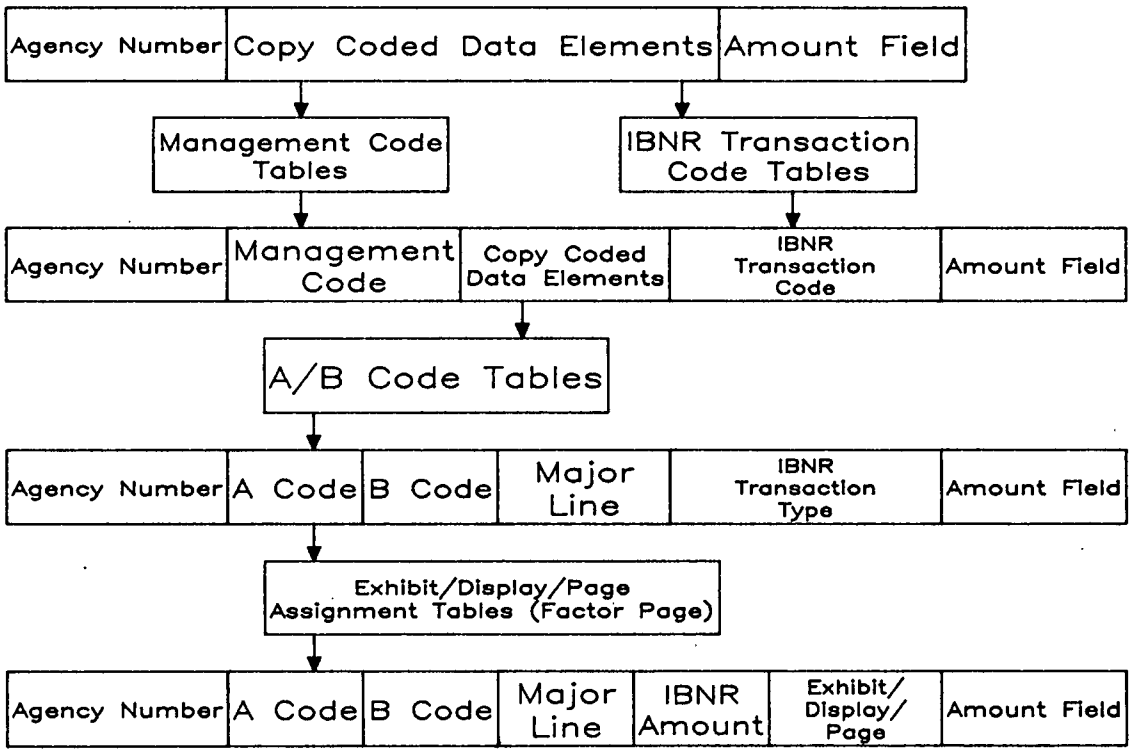
Slide 39

1B: DATA PROCESSING TRENDS/LOSS RESERVE DATABASES

Slides

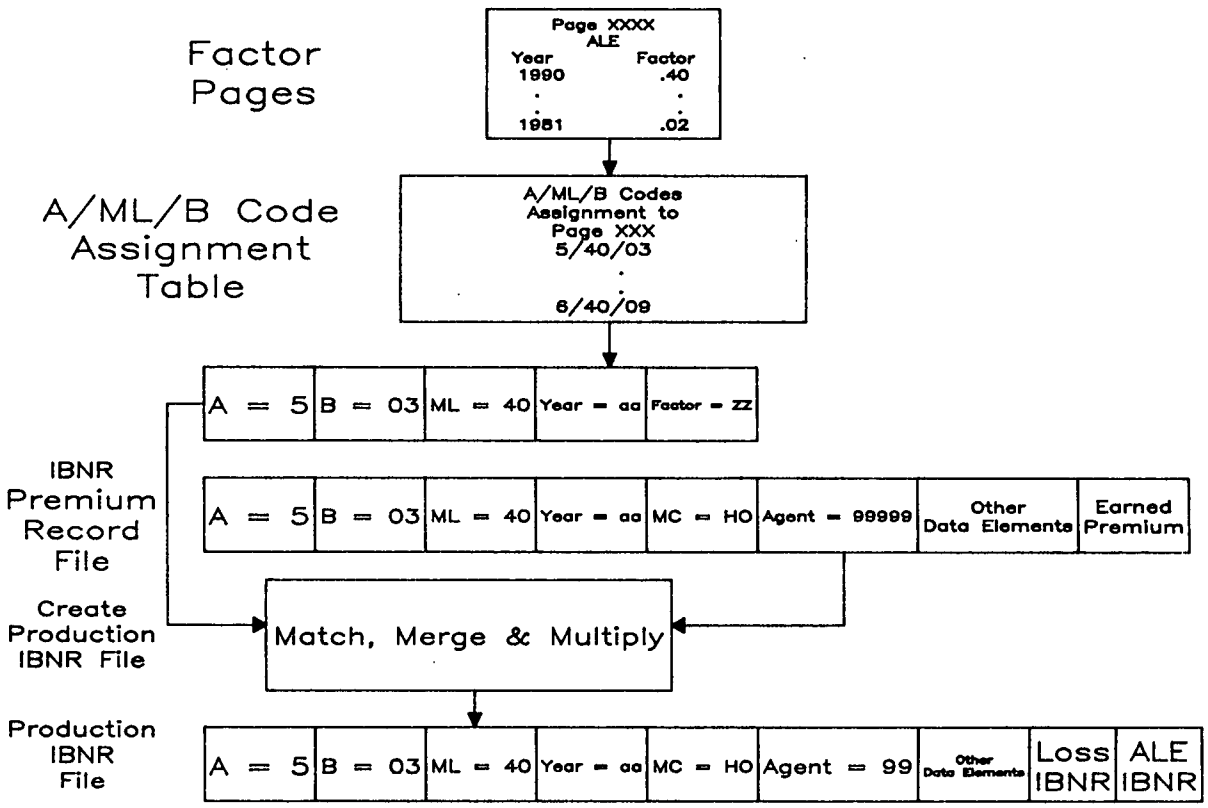
David L. White
St. Paul Companies

Old Assignment of Reserve Area Codes on Premium Records



Slide 1

IBNR Reserve Creation Diagram



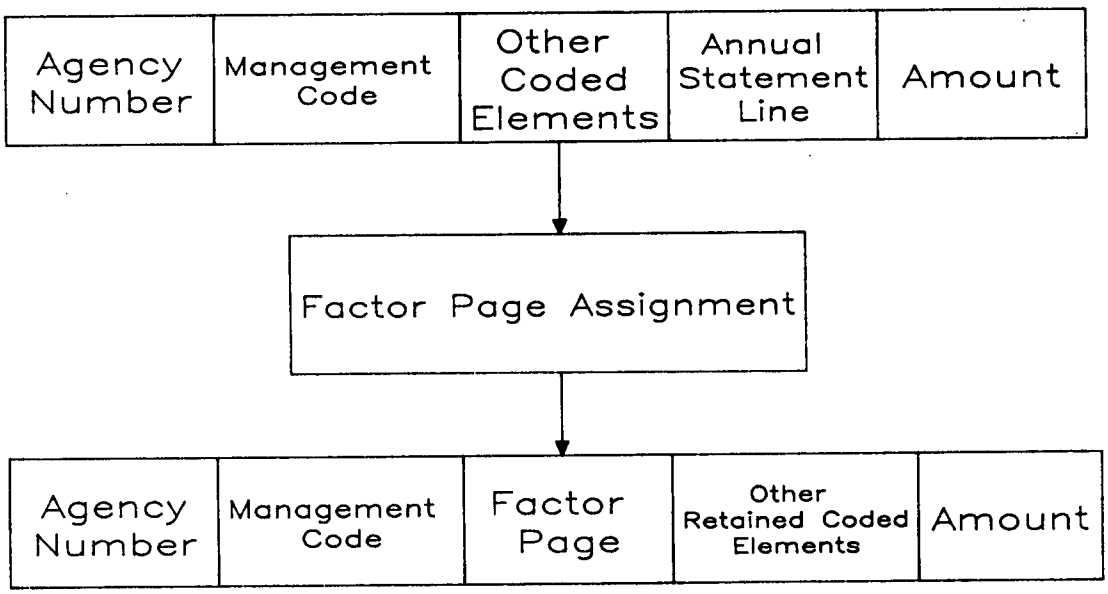
Slide 2

Old Relationship of Factor Pages to Sublines

	Factor Page 1	Factor Page 2	Factor Page 3	Factor Page 4	Factor Page 5	Factor Page 6..	Factor Page 1000
Subline 1	X	X					
2		X			X		
3			X				
4	X				X	X	
5			X				
⋮							
Subline 180		X				X	

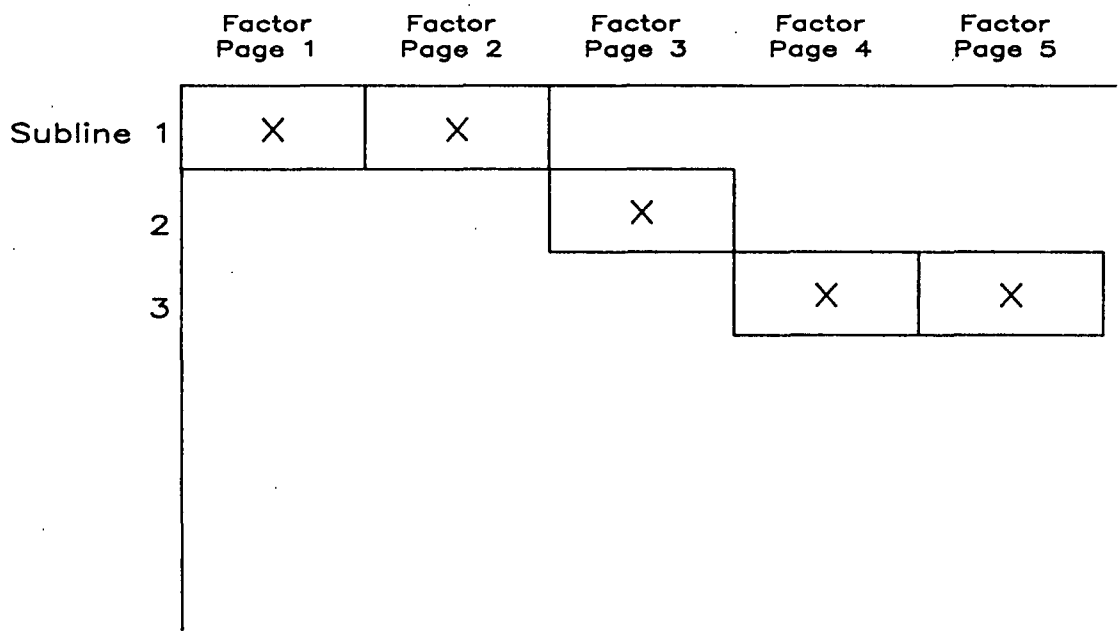
Slide 3

New Assignment of IBNR Factor Page Code on Premium Transaction



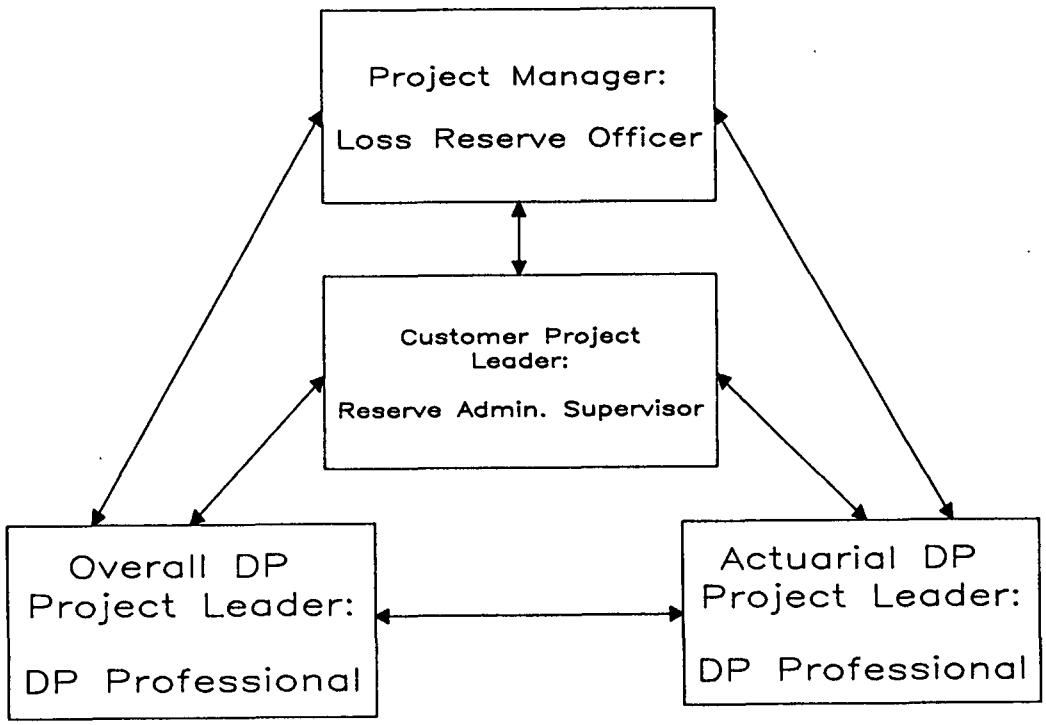
Slide 4

Relationship of Factor Pages To Sublines Under New System

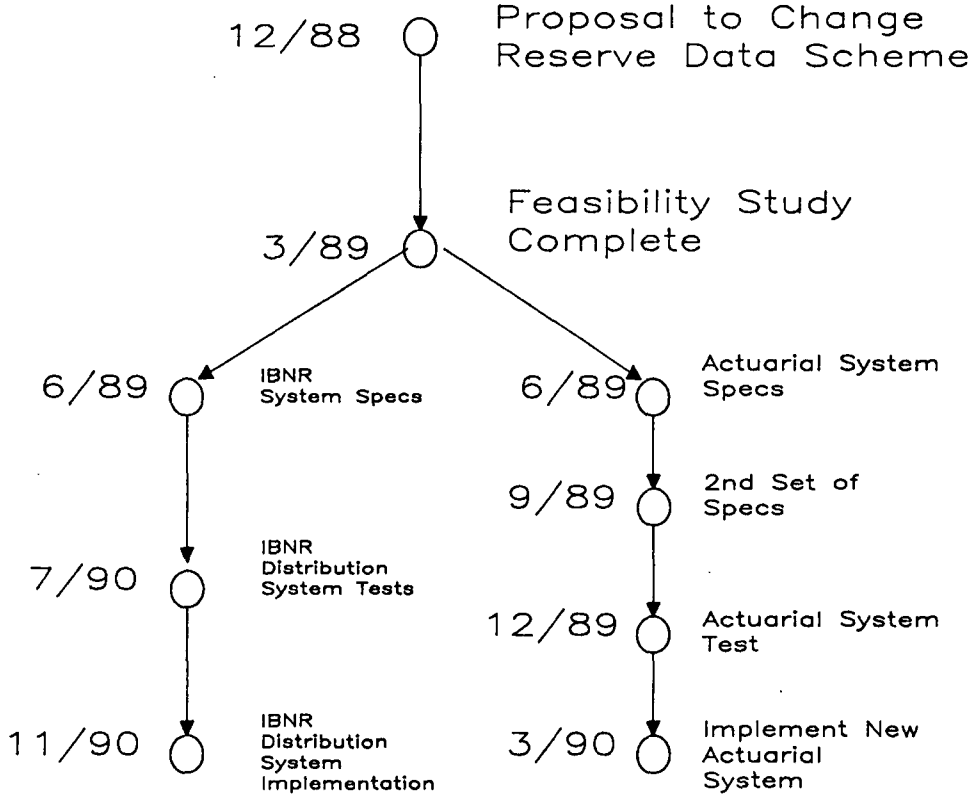


Slide 5

Project Team Organization



Slide 6


12/88
Proposal to Change Reserve Data Scheme
3/89
Feasibility Study Complete
6/89
IBNR System Specs
7/90
IBNR Distribution System Tests
11/90
IBNR Distribution System Implementation
6/89
Actuarial System Specs
9/89
2nd Set of Specs
12/89
Actuarial System Test
3/90
Implement New Actuarial System

Slide 7

1990 CASUALTY LOSS RESERVE SEMINAR

1C/3D: INTERMEDIATE TECHNIQUES I

Moderator

Larry A. Haefner, Actuary
American States Insurance Co.

Panel

Susan E. Witcraft
Milliman & Robertson, Inc.

HAEFNER: This is Intermediate Techniques I, Session 3D, and my name is Larry Haefner. I will be serving as both moderator and one of the two panelists for this session.

The other panelist is Susan Witcraft. Susan is a Consulting Actuary with Milliman & Robertson. She graduated from Stanford with distinction. She is a Fellow of the Casualty Actuarial Society and a Member of the American Academy of Actuaries.

As I mentioned my name is Larry Haefner. I am an Actuary with the American States Insurance Companies in Indianapolis. I graduated with a degree in math from Birmingham-Southern College. I am a Fellow of the Casualty Actuarial Society and also a Member of the American Academy of Actuaries. My current responsibilities at American States include the loss reserve analyses for both our primary and reinsurance companies.

We are going to talk specifically about three models today. Susan will be discussing two of the three, the first and the third. I will give her a break in the middle by discussing the second. Susan will start with the average hindsight method. Then I will talk about the Fisher-Lange report-year method. Susan will finish by discussing the Bornhuetter-Ferguson method.

As I mentioned before, the handouts match the slides or the overheads that we will be using, so you may find it easier, particularly in the back of room, to follow along through the handout. Each of these models has been around awhile, so the actuarial literature contains a great deal about each of the models.

Before we discuss the specifics of each model, we would like to give you some idea of what things to look for with whatever kind of loss reserving method that you are using. Most of you probably went through the basic track in some past year and ran into the paid loss development or the incurred loss development model. Like the three models we will be discussing, they can be categorized in four different ways.

First, we are interested in what kind of data the model uses. Does it use incurred loss dollars? Does it use paid loss dollars? Does it use some kind of reported claim counts or open claim counts? The incurred development triangles that you encountered in the basic track would use incurred loss dollars. The model that I will be talking about today, the Fisher-Lange model, uses paid loss dollars and reported and closed claims counts. Keep in mind the kind of data you need for each of these models.

Secondly, what type of time period are we using in each of the models? Can it be used for accident year data? Can it be used for report year data? Calendar year data? Policy year data? Accident year data, which is when claims are segregated by the date of the occurrence, can be used in the models that Susan will

be discussing, the Bornhuetter-Ferguson and the average hindsight methods. The Fisher-Lange model that I will be discussing is used for report year data. For report year, we will be looking at claims aggregated by the date they were reported to the company. So, the second category is the type of time periods we are using.

The third category is the types of projection methods you are going to use. Do you use age-to-age factors, i.e., link ratios? Do you do some kind of exponential trending? So, to repeat, what are the projection methods? In each model, we are trying to project data. What specific technique do we use for the projection?

Finally, the last category that we are interested in is what data are you projecting? Are you projecting estimated incurred losses? Are you estimating total reserves? Case reserves? It depends on the model. The Fisher-Lange model gives you an estimate of the reserves needed for known claims. The Bornhuetter-Ferguson method would give you total reserves or total incurred losses. So keep in mind these sort of things as we go through each of the models. To start us off, Susan will be talking about the average hindsight method.

(Slide 1)

WITCRAFT: In the average hindsight reserve method, the goal is to calculate what the average losses per outstanding and IBNR claim would have been at earlier maturities, given the additional information that is available today for the more mature accident years. That will become much clearer as we go through the calculations.

The estimates of average losses per outstanding and IBNR claim will be based on projected ultimate losses for the more mature accident years. You will get these estimates of ultimate losses for more mature accident years from the other methods that most of you are familiar with, such as the paid and incurred loss development methods.

(Slide 2)

The data we use to perform the average hindsight reserve method include a cumulative paid loss triangle and a cumulative closed or paid claim triangle. The closed claim triangle includes claims closed with no pay while the paid claim triangle excludes claims closed with no pay.

If you are looking at a book of business, such as automobile insurance, where there is a very high percentage of claims that will close with a payment, then you can simply use your closed claim data. However, if you are looking at a book of business, a professional liability book of business or some general liability books of business, in which there is a high percentage of claims

that will close with no payment, these claims will tend to distort the projections and you will want to look only at paid claims as opposed to closed claims.

On the cumulative paid loss triangle, you can either have data sorted as payments on closed claims or a total paid loss triangle which would include your partial payments. An alternative way to do this method would be to replace the paid loss triangle with an incurred loss triangle and to replace the closed or paid claim count triangle with a reported claim triangle. If you do this, you will get an average IBNR loss per IBNR claim. That way you will be relying on your case reserve information. The approach I will discuss today relies only on your payment information.

The other data that you will need includes an estimate of the ultimate number of claims for each accident year. Again, if you have a closed claim count triangle, you will want the ultimate number of reported claims. Whereas, if you use a paid claim triangle, you will want the ultimate number of claims to close with a payment.

Lastly, you will need the estimated ultimate losses for a few of the more mature accident years. As Larry mentioned, we are going to assume that most of you understand the basic data types and how to get ultimate claim counts and ultimate losses using the basic methods, such as paid and incurred loss development. If you have any questions, please to ask.

(Slide 3)

On the next slide, we find the cumulative paid losses for the XYZ Automobile Insurance Company as of December 31, 1988. I have also shown the ultimate losses for four of the more mature accident years. These could either be derived from your paid and incurred loss development methods or some other method, or you could use this method to estimate them, because this is an iterative method. In this method, you will use the information from a certain number of years, in this case four years, to project the ultimate losses for the fifth year. Once you have that estimate of the ultimate losses for the next, or fifth year, you can take that information and go back and get the estimate of the ultimate losses for the sixth year and so on.

(Slide 4)

The next slide shows the cumulative closed claim cost triangle and also our projection of the ultimate number of claims.

Before I go any further, are there are questions about the data?

(Slide 5)

The next slide shows most of the calculations in this method. In the first column, we show our estimated ultimate losses which

were just taken from the far right-hand column on the slide showing the paid losses.

In the second column, we show the paid losses as of 36 months of development. It is important to understand that these are the paid losses in the column labeled 36 months and are not the paid losses on the last diagonal. Most of the methods that you have worked with before probably dealt with the last diagonal. In this case, we are taking information, as of 36 months, for each accident year. We then can calculate our estimate of the outstanding and IBNR losses that we now think were outstanding at 36 months for each of those accident years. That is simply done by taking the current estimate of the ultimate losses and subtracting the payments that had been made for each accident year at 36 months of development. This estimate of outstanding losses will include our IBNR.

In Columns 4, 5 and 6, we do a similar calculation with the claim counts. We have our estimate of the ultimate number of claims in Column 4. Again, we take the column corresponding to 36 months in our closed claim count triangle and subtract to get an estimate of the outstanding and IBNR claims at 36 months for each accident year. We can then calculate an average outstanding and IBNR loss per outstanding and IBNR claim, as shown in Column 7, by dividing the outstanding losses in Column 3 by the outstanding claims in Column 6.

We then use a technique called an exponential curve fit or exponential regression to project what the average will be for accident year 1986. In this case, there is a very good R-squared and that is because it is contrived data. (I made it that way.) Most of the time you will find that the R- squared is probably between a half and maybe three-quarters. I have often seen it much lower than that, but if it is that low, the trend indication tends to not be very reliable.

For information about how to fit an exponential curve, I would recommend looking in a statistics textbook. If you have any questions, I will be more than happy to answer them later, but I find it difficult to answer them in an audience this large. If you don't know what an exponential curve fit is, assume it is a black box for right now.

In any case, I have fit our exponential curve through those four averages and calculated that the annual trend factor is about 9.3%. The fitted average for Accident Year 1986 is $2,551. If you have a very poor fit, then you might want to use some external industry data to try to estimate what that projected average will be. In that case, you would simply apply the appropriate number of years of trend to each average to get an indication for each accident year of what the Accident Year 1986 average should be and then select an average from there. The best source that I have found for industry trend factors is generally ISO rate filings. They include information about

trends. Also, if a similar book of business is written in a different state or in a different market, you may be able to use trend indications from that source of data. Before we turn the slide, are there any questions?

QUESTION: Why did you choose 36 months?

WITCRAFT: For illustration.

QUESTION: Which year would you have started with if you were doing an actual analysis?

WITCRAFT: If I were doing this, I probably would have taken my ultimate incurred loss development projection from Accident Years 1982, 1983 and 1984 and then I would have applied these calculations at 48 months. I would have gone through all the calculations, gotten an estimate for Accident Year 1985 and then come back and used that information to get Accident Year 1986 at 36 months. Then I would have continued on down to get the rest of the projections.

(Slide 6)

On the next slide, we will derive our estimate of the ultimate losses for Accident Year 1986. We can see our selected average per outstanding and IBNR claim of $2,550. I know it doesn't match the number on the previous page. I have a tendency to round things, in this case, to the nearest $10.

For Accident Year 1986, we projected that there were ultimately going to be 160 claims. There are 141 closed claims at 36 months, which leaves us with our estimate of the number of outstanding and IBNR claims of 19. We can then derive an estimate of the outstanding and IBNR losses by multiplying the claim count by the average and get $48,450. We can add this to the paid losses to date, which are shown as $226,374, to get our estimate of the ultimate losses. As I mentioned, we can now use this information to go back and do a similar calculation for Accident Year 1987 using all of the information for the prior accident years to estimate what the average outstanding losses were at 24 months. We can then similarly calculate the ultimate losses for Accident Year 1988.

(Slide 7)

I will finish up my discussion of the average hindsight reserve method by touching on some of the advantages and disadvantages of this method. First, it does not use case reserve data as I described it here. Often case reserves reflect a change either in the philosophy of the management or a change in personnel in the claim department, both of which can change the level of the case reserves over time. That can often cause distortions in your projection methods. By using a method based only on paid loss data you can get around that problem. Also, you can easily

adjust the trend assumption or test the sensitivity of the results to the trend assumption.

The disadvantages include the fact that, as with any paid loss method, it is sensitive to shifts in the payment pattern. Generally, we have observed that small claims tend to close quickly and large claims tend to take longer to close. Therefore, if your claim payment pattern or your claim closing pattern has slowed down, for example at 12 months of development you have more small claims outstanding than you might have had in prior years during which the claims closed quickly, the projected average outstanding at 12 months is likely to be too high given the fact that you have these extra small claims that are still open. You simply recognize this and try to evaluate its impact when you are making such projections.

Also, this method does not work particularly well when the averages are highly variable, particularly when there are only a very small number of outstanding and IBNR claims. For example, if you only have three or four outstanding claims and some information indicates that one of those is a $100,000 claim, but most of your claims average $2,000, then this type of method is going indicate the average is $2,000 and you are not going to recognize the fact that there is that large claim out there. Therefore I generally recommend using this method only when there are more than a handful of outstanding and IBNR claims.

Before going on to the next method, are there any questions about this one?

HAEFNER: I guess we're a tag team today. So it is my turn in the ring now.

(Slide 8)

We are now going to look at the Fisher-Lange model. As I mentioned earlier, the Fisher-Lange model is used to estimate reserves and incurred losses on known claims. It is a report year approach; i.e., we will be looking at claims that are known. We are not going to try to estimate IBNR claims, hence we are not going to try to estimate reserves for those claims.

The average hindsight method that Susan just talked about used an accident year basis. We will be working with a report year basis for this model.

Types of data that this model uses: reported claim counts by year, the number of closed claims by report year and settlement interval, and the paid losses associated with those closed claims.

What we will not be using, for example, are case reserves. Therefore, any change in the reserve adequacy by the claims adjusters will not influence our model. We will be working with

concrete data, reported counts, closed counts and paid loss dollars. So let's get started with the method.

(Slide 9)

I am looking at Page 2 in the handout. I will give you a minute to try to find that. The page numbers I will be referring to start with the Fisher-Lange model in the handout. Not at the beginning.

This slide shows the number of reported claims for each year. For example, we have 432 claims that were reported in 1983 and 511 claims that were reported in 1987. These are fixed counts. This value will not change over time. That is one of the advantages of the Fisher-Lange model. We don't have to estimate the ultimate number of reported claim counts. We have this number soon after the end of each of these report years. As we go through this model, we are assuming that we are looking at this data shortly after the end of 1987. I want you to keep that in mind.

We want to forecast two separate items associated with these claim counts. We want to know when these claims will settle. For example, we had 511 claims in 1987. How many claims will settle or close in 1988? How many of those will close in 1989? And so on. We want to project the settlement rate.

Secondly, we want to project how much it will cost us to close those claims. This model assumes that the average cost per closed claim is dependent upon how long it takes to settle those claims.

Once we estimate those two pieces, we can put them together and come up with our estimate for the ultimate incurred losses and the indicated reserve for known claims.

(Slide 10)

Let's look at Page 3. What we see here is a claim count triangle. We have the number of claims closed by settlement interval for each report year. In this contrived example, i.e., it is not real data, we are going to make the simplifying assumption that all claims are closed within 60 months of reporting. In 1983, for example, all 432 of the claims that we had reported in 1983 are closed at the end of 60 months. If we summed each of those five entries in the column labeled 1983, that's report year 1983, we would have 432.

Again, this is historical data. These numbers are fixed and they won't change over time. The last diagonal of the triangle shows each report year as of the end of 1987. Any questions so far?

(Slide 11)

The next triangle shows paid losses, broken down by report year and settlement interval, corresponding to the closed claims that we saw in the last triangle. For example, let's look at 1983. What exactly does this number $355,000 mean? If you look back on Page 3, we can see the number of claims that are closed in that interval and it cost $355,000 in aggregate to close those claims. Again, this is an historical triangle and we have this data as of the end of 1987.

(Slide 12)

The next exhibit calculates the average cost per closed claim by using data from exhibits on Pages 3 and 4. Let's look at a specific example. On Page 4, you'll see that we had $355,000 in paid losses in 1983. From exhibit 3, you can see that we closed 260 claims in that interval. The ratio of those two gives us the average cost per closed claim of $1,365. So, on average, each of the 260 claims that we closed in that interval cost us $1,365. Again, this is all historical data. We haven't done any projections yet. We simply manipulated the data that we have at hand. Our goal is to try to estimate this bottom part of the triangle. How do we do that?

(Slide 13)

We are going to use the method that Fisher and Lange used in their paper on this particular model. We are fitting an exponential curve to each of the settlement intervals. We are going to fit across the rows, i.e., we look at each settlement interval and fit an exponential curve to these points. The reason is that we want to estimate the average cost of claims to be settled in the future for Report Years 1984 through 1987 by calculating an average percentage increase. That gives us a picture of what is happening with inflation.

The reason that Fisher and Lange used an exponential fit is that by fitting a curve we assume a constant rate of inflation. If we wanted to simply fit a line, that would give us a constant dollar increase in inflation and most of you have noticed that most inflation rates are measured in percentages. We don't usually say that the rate of inflation is $100 per year. An exponential curve provides a constant percentage rate of inflation.

Let's look at a specific example. If we look at the 25 - 36 month interval, we have three points of actual data. For this interval for Report Year 1983, it cost $3,700 to settle each claim; for Report Year 1984, $3,788; and for Report Year 1985, $4,375. You simply fit a curve to those three points to project the two points for Report Years 1986 and 1987.

The exponential fit also gives us the percentage increase in inflation. For this particular example, we can take $5,070 and

divide it by $4,663 to yield 8.7%. Notice that these average percentage increases vary by settlement interval. That was one of the beliefs that Fisher-Lange had when they developed this model. They wanted to examine their hypothesis to see if it was really true. The reason they fit a curve across the rows is that they think that the population of claims by settlement interval has a great deal of similarity across report years. That is why they are doing the fit across the report years.

Again, this is contrived data and we won't see things quite like this. Also, notice how the average paid per closed claim increases over time. That was something that Susan alluded to earlier. Again, this is contrived data, but we use this model at American States and we see the same pattern. Perhaps not quite as perfectly, but the pattern is certainly there.

For the last settlement interval, 49-60 months, I have used a 6% inflation factor. I selected that judgmentally. One thing you can do is look at these rates of inflation by settlement interval. Now 6% is sort of a rounded average of those amounts. The reason you have to select a percentage is because you only have one data point. It is hard to fit a curve to one point.

If you don't like the 6%, you could use some of Susan's suggestions. You could look at ISO data. You could look at industry wide data. You could look at your own data for a different book of business that is similar. Any questions yet? Everyone is asleep after lunch, I guess.

QUESTION: I have a question about the percentage in the last column. They've got in there a mix of inflation which for any given calendar year is a combination of factors. All I'm saying is that the percentages in the last column bounce around more than you would like to attribute to changes in inflation between years. How can claims of different accident periods be affected by the same inflation?

HAEFNER: Okay.

QUESTION: What I'm doing is asking you to comment on is the relationship between rates of inflation for claims from different accident years.

HAEFNER: Yes. I agree that it is somewhat disconcerting, but the assumption that Fisher and Lange used, or what they believed, was that the longer a claim is open, the more it is subject to different kinds of inflationary pressures, besides monetary inflation. When you talk about calendar year inflation, as measured by some fiscal amount, like the Consumer Price Index went up by 8%, then often we think all claims should perhaps be impacted by 8%. However, the assumption in the model is that the longer the claim is open, the more it is subject to, not only monetary inflation, but other types of inflation as well. There may be a liberalization in the interpretation of the contract in

that time period or other similar factors that can drive up the cost for these claims that are open for longer periods of time. I'm not really sure that that answers your question, but...

QUESTION: Why are you assuming that the longer claims are open, the higher the inflation rate?

HAEFNER: I don't necessarily endorse their particular method of doing this, but we do tend to see that claims that are open longer are impacted by more pressures that have different rates of inflation. Okay?

(Slide 14)

We will look at Page 7. What we have done so far is project the average cost to settle each claim by settlement interval and report year. What we need to know is how many of those claims we are going to close. This goes back to Page 3 where we showed the triangle of the number of closed claims by report year and settlement interval. You might want to flip back to that briefly. We will also use Page 2 which shows the total number of reported claims for each report year. For each report year, we have taken the number of claims closed in each settlement interval (for that report year) and divided by the total number of claims reported in that year. For example, in 1985, we have a .586 ratio for settlement interval "0-12." That is simply the number of claims that were closed in 1985 divided by those reported in 1985. That is, for the 0-12 month interval, for Report Year 1985, the .586 is simply 266, the number of claims we closed, divided by 454, the number of claims reported in 1985. Does everybody see those numbers?

Again, our intent in looking at a triangle is to try to complete the bottom right hand section of it. How do we do that? We are going to use claims disposal rates, which are the number of claims settled relative to how many were available to be settled. This rate depends not only on the report year but the settlement intervals of prior report years.

(Slide 15)

Let's look at 1986. Looking at the triangle on Page 7, we have a .551 factor for the 0-12 month interval, which means we settled 55.1% of the claims reported in 1986 in the first 12 months, i.e., in 1986. The .259 is simply the claims that were settled in the 13-24 month interval or 25.9% of the total reported claims. Now what we are after is something a little more specific. We want to determine what percentage of claims were settled in this 13-24 month period from those that were available to be settled. Well, it is not quite .259 because we have already settled 55.1% of those. We simply take the .259 and divide it by the compliment of .551, which is 1 - .551. That's simply the ratio of the claims that were settled to those that were available to be settled.

Let's flip back to the prior exhibit for a moment. We are going to use the method that we just talked about to complete this bottom right portion of the triangle. We are going to look at the latest report years that are available and use the latest available year to do this projection. If we look at this data, it appears there is some slow-down in the claims settlement pattern. We seem to be settling claims more slowly than we had in the past. We are going to assume that will continue in the future so we only want the latest settlement rates in order to project these parts of the triangle. If we thought that this was a random process, we might go through the same procedure for several different years and then take the average just to reduce the randomness. In this particular example in the handout, we are going to assume that the latest year contains more information about what will happen in the future than does the average.

(Slide 16)

Flipping ahead to Page 9, we have completed this triangle, squared the triangle, based upon the methods shown on Page 8. We have two specific examples. Where did this .249 come from? We are using information in Report Year 1986, these two points, to predict this point in Report Year 1987. The .249 is simply the percentage of total reported claims in 1987 expected to be settled in this interval for Report Year 1987.

We are assuming that the ratio of claims settled in this interval for Report Year 1986 will apply in Report Year 1987. What was the percentage of claims closed in that interval for Report Year 1986? That was .259 divided by 1 - .551. That's the example on Page 8. Then we take the product of this number and the percentage of Report Year 1987 claims available to be settled, 1 - .568, which gives us .249. Okay?

How do we get to .091? We go through the same procedure but to get these two points we have to go back to Report Year 1985, because that is the first year where we have enough points to predict the 25-36 month interval. We go through exactly the same procedures, only now we settle .07 divided by one minus the sum of these two, the percentage settled in the 0-12 and 13-24 month intervals. How many claims were left open at the 25 month period for Report Year 1985? One minus these two. That was the portion of claims that were still open. Of that we closed 7%. That is the portion of claims that were available to be settled in the 25-36 month interval that were settled? Any questions there?

What was available to be settled for Report Year 1987? 0.183, which is one minus .568 (what was actually settled in 1987) minus .249 (our projection of what we will settle in the 13-24 month interval). We just go through this in each part of the triangle each year. As we go down a settle row, we have to move over a report year so that we have enough points to do the estimate.

Once again we assume that our claims were settled after 60 months, so if we summed each of these columns, these numbers would add up to 1.000 indicating that we have settled all the claims.

We have almost done what we set out to do. We have projected how much it would cost us to settle each claim by settlement interval and we have projected how many claims we will settle in each settlement area. All we have to do now is put the two together.

(Slide 17)

We have one example for Report Year 1987. We used the same technique for each of the other report years. These are the settlement rates for Report Year 1987. Those were taken from the prior page, Page 9, looking at the last column for Report Year 1987. Everybody can flip back and see those numbers.

The second column is the average cost per closed claim. Those numbers are taken from Page 6 which has the projections for the average paid cost. To get the overall average for each claim reported in 1987, we take the product of each of these two numbers, the number of claims closed and average paid per claim. We sum across all the different settlement intervals because we want an overall average for the report year. We estimate that, on average, it will cost us $2,796 to settle every claim that was reported in 1987. You conduct the same procedure for each of the other report years, 1983 through 1986. Okay? Is everybody with me so far?

(Slide 18)

What has been our goal from the outset? We wanted to estimate the ultimate incurred losses for Report Years 1983-1987. We also wanted to derive an indicated reserve. We have all the different report years. For Report Year 1987, we see that $2,796 which we just derived on the exhibit on Page 10 is the expected average cost per claim reported in 1987. We know from Page 2 that we had 511 claims reported in 1987. So what is the estimated ultimate incurred loss for Report Year 1987? That is simply the product of the two. Once again, these numbers are rounded in thousands. So we expect our estimated incurred loss to be $1,429,000 for all claims reported in 1987. We do that for each of the report years. Then our total estimated incurred loss for Report Years 1983 through 1987 is the sum of the estimates.

The estimated ultimate is one item we wanted, but the other item that we wanted was an to indicated reserve for the claims that were still open. How do we get that? We subtract the paid-to-date losses. If we go back to Page 4 we have a triangle of paid losses. By summing every entry in that triangle, we get total paid losses which is this column amount. Okay? So sum every item in the triangle. Then the indicated reserve for all report years is simply the difference between the estimated ultimate incurred losses and the paid to date.

We could have calculated an indicated reserve for each report year, 1984 through 1987. We don't need a reserve for Report Year 1983 because, in this particular example, we have assumed that all payments have been made and all those claims are closed. Okay? Yes. A question?

QUESTION: How were our reopened handled in this? Did that cause any problems?

HAEFNER: Yes. They do cause a problem. Workers' compensation is perhaps the line having the biggest problem in using this particular method. Not only reopened claims cause problems, but the many partial payments also cause problems. The triangle that we had on Page 4, the paid losses, were only losses paid on those claims settled in that settlement period, so we had to pick up partial payments and include those in the interval in which the claim was actually settled.

QUESTION: So if you had to reopen it, you would reshift dollars from one development period to another?

HAEFNER: That's right. You'd have to restate your triangle. Let me give you a specific example. If we had a claim that was reported in 1985 and we thought we had closed it in the 0-12 month interval for $1,000, then we had one closed claim count, 0-12 months, and $1,000. If that claim is subsequently reopened and closed in say the 25-36 month interval for an additional $30,000, we would have to remove the claim count from the triangle and move it to the 25-36 month interval and also move the $1,000. So we'd have $31,000 and one closed claim in the 25-36 interval. Fisher and Lange's approach suggests you have to restate your triangle and put the closed claim in with the correct settlement interval. Okay?

QUESTION: Doesn't this cause a problem because the claims that will ultimately reopen are included as closed for the more recent report years?

HAEFNER: Yes, reopened claims do cause problems with this model. Any other questions so far? Yes. One other approach to handling repopened claims is to record the reopening as a new reported claim. Hence, the paid losses will not change once they have been set.

QUESTION: Are you saying that each time a claim is reopened, the paid loss amount is moved from one place to another through your triangle?

HAEFNER: That's right.

QUESTION: So that every time you redo this thing, if there are any reopened or if there are any partial payments, you don't put them into your triangle until they become closed.

HAEFNER: That's right. Now, this model works well with a line of business like private passenger auto bodily injury, which doesn't have too many partial payments. Therefore, if it is a line of business with partial payments and reopened claims are not significant, then you can use the model without making the modifications. The results will not be distorted. A line like workers' compensation, which causes problems with both situations, can cause you to restate in your triangles. Any other questions so far?

(Slide 19)

Let's summarize what we have discussed. First of all, recalling one of the first slides that mentioned the ways to categorize models, what types of data did we use for the Fisher-Lange report year model? We used report year data. Specifically, we needed three items, we needed the number of claims reported in each year, the number of closed claims by settlement interval and report year, and paid losses associated with each of those closed claims, again, by settlement interval and report year.

Category two was the kinds of projection techniques. We want to project two amounts. For the first one, average cost per closed claim, Fisher and Lange use an exponential trend fitting across settlement intervals. Secondly, we project the percentage of claims closed by settlement interval for each report year. To do this, we use the latest year's claims disposal rate, which is the percentage of claims closed divided by percentage of claims available to be closed. We use the latest year's ratio to project the next year or the future.

Finally, when we were done what had we estimated? We estimated the case incurred losses and the reserves for known claims. IBNR reserves are specifically excluded under this method.

(Slide 20)

Let me talk briefly about some of the advantages and the disadvantages of the Fisher-Lange model. One of the nice things about this method as opposed to, say, the incurred loss development method that you first encountered in the basic track, is that you can see the components of the total loss process. You can separately see the effect of cost inflation and changes in settlement ratios or settlement patterns. In the incurred loss model, you just see aggregate data and you can not really tell what is driving the results. In the Fisher-Lange model, we can break aggregate data apart and see what components have the most impact.

Secondly, the model allows us to make subjective modifications. If we don't like the inflation rates that we get by fitting curves to our actual data, we can use some kind of external data or ISO data or something else as an inflation rate. The model allows us to do that very easily. Or, if we don't like the

claims disposal rate or if we think it will be different in the future, we can very easily incorporate that into our results. By breaking into the parts it allows us to make modifications to each of those.

Thirdly, the model uses known data. We have reported counts which are constant, we have closed counts which are historical data, and we have paid losses which are historical. We don't have to use estimates of case reserves established by adjusters in the model. For example, if there has been a change in case reserving philosophy and, perhaps, they are establishing more adequate case reserves than in the past, that has no effect on our model. We don't have to make any adjustments to handle that. Essentially, we are estimating reserves for known claims. When we are done, we can calculate an average case reserve and compare that with what the claims department has been establishing. This provides a check on what the claims department is doing, since we can compare our estimates to theirs. We can do that over time to see if there any changes in case reserve accuracy.

Since IBNR is excluded from the model, that means that we do have to make a separate projection of IBNR. That's an advantage and a disadvantage. Obviously, that is a disadvantage because it is something else you have to do. You have to have a different model to make those projections. However, if for some reason you believe that the population of IBNR claims is significantly different than the population of known claims, then it is an advantage. You break the data into more homogenous groups.

What are some of the disadvantages of the model? Most of us, at least my company, sell occurrence-based policies, i.e., coverage is based on the occurrence date of the claim. For the occurrence-based policies you really need accident year reserves. Since this model estimates report year reserves, we somehow have to take the report year reserves and convert them into accident year reserves for our pricing purposes. That is a separate step.

The final disadvantage is that if you are trying to review the reserves of another company and you only have access to external data, say the annual statement or the Best's Loss Development Reports, then you only have accident year data. Unless you have access to internal company data there is no way to use this method. You must have access to internal company data.

That's the Fisher-Lange Method. Do you have any questions on this particular method? Okay. Susan will finish with the Bornhuetter-Ferguson method.

(Slide 21)

WITCRAFT: The Bornhuetter-Ferguson method was described in the paper by, not surprisingly, Mr. Bornhuetter and Mr. Ferguson. It is a commonly-used method, particularly in situations where it is

a new company, where there is only a low volume of exposure, or the data are highly variable. The result that is derived from the Bornhuetter-Ferguson Method is incurred-but-not-reported reserves, often called IBNR reserves. The IBNR reserve is calculated as a function of either earned premium or exposure. Exposure is defined as a measure of risk. For example, for private passenger automobile insurance, it is generally car-years. How many cars were insured during the year? For general liability it is often sales or gross receipts. For medical malpractice, it is the number of doctors insured or the number of occupied beds for a hospital.

One also needs a loss ratio or pure premium assumption. Pure premiums are defined as the loss cost per unit of exposure.

(Slide 22)

Before going into the method, we need to review what IBNR means. It can mean any one of a large number of things. If we use either of the terms true IBNR or pure IBNR, we are referring to the losses on claims that are truly not reported to the company. We can add to that the dollars on claims that are in transit. A claim in transit is a claim that has been reported to the company, but has not gotten on the computer system. As far as we are concerned with our actuarial databases, it is really not a reported claim yet. Therefore, we could say that IBNR reserves will cover true IBNR plus dollars of loss on claims in transit.

We can also add the development on known claims. In most books of business that I'm familiar with, the case reserves will develop upwards. There are some exceptions but they tend not to be what consultants get to see. In any case, the development on known claims is generally going to be upward, because as additional information is received by the company, the adjuster will more often than not increase the reserve rather than decrease it. There will be many individual situations where we can show that the case reserve was decreased, but in general, the long term trend is that the increases will outweigh the decreases. We can define our IBNR reserve to be true IBNR plus reserves on claims in transit plus development on known claims.

In the fourth definition, if we think of a reopened claim as a new claim rather than existing claim that is being reopened, we could define IBNR reserves to include the items in number 2, plus reopened claims.

Lastly, the most general or broadest definition of IBNR reserves is probably the most common definition and that is the sum of all the things that we have talked about. In fact, in the annual statement, most companies use the last definition of IBNR. I am aware of a couple of companies that put pure IBNR in their annual statement under IBNR, but that is unusual.

Most methods based on accident-year data, including the Bornhuetter-Ferguson method, will produce the IBNR estimate as defined in number 5 on the slide.

(Slide 23)

There are really only two basic formulas for this method. The first is used to calculate an IBNR reserve as an IBNR factor times the expected losses. By adding the incurred losses to date to the IBNR reserve, we will get an estimate of the ultimate losses. The IBNR factor will be a function of the incurred loss development factor. I will show you the database of that factor shortly.

Another way that this method could be applied is to use paid loss data rather than incurred loss data. If paid loss data are used, then we will get an estimate of the total outstanding and IBNR reserve at any point in time. By adding the paid losses we will get an estimate of ultimate losses. In that case, rather than an IBNR factor, we will have an outstanding reserve factor that will be a function of your paid loss development factor.

The second formula is for expected losses. Expected losses will either be derived as a loss ratio times earned premium or as the pure premium times exposure.

(Slide 24)

The IBNR factor formula is actually fairly straightforward, but to get an understanding of where it originates, we will go through a step-by-step derivation.

If we rearrange the first formula, on the previous slide, we get our IBNR factor equal to our IBNR reserve divided by our ultimate or expected losses. If we restate IBNR, using its definition of ultimate losses minus incurred losses to date, then we get the formula shown on the second line. If we separate the numerator into its two pieces and cancel the ultimate losses divided by the ultimate losses in the first term to get one, then we get what is shown on the third line.

Further expanding the formula so that the ultimate losses are calculated as incurred losses to date times the loss development factor gives us our fourth formula. Then, by simply cancelling the incurred to date in the numerator and the denominator of that fourth formula, we get our IBNR factor equal to one minus one divided by our loss development factor to ultimate. Again, if we are going to use paid loss data then we will want to have our paid loss development factor in the denominator. If we are going to use incurred loss data, then we will use our incurred loss development factor.

(Slide 25)

The calculations of the method are actually fairly straightforward. I have shown an illustration using four accident years. In Line (1), we show the earned premium. In the second line, we have shown our expected loss ratio. Again, if you were using the pure-premium-based method, you would show exposure instead of earned premium and a pure premium instead of an expected loss ratio.

In this particular example, I have assumed that we have some information from our pricing and underwriting counterparts indicating that, for example, the market is softening and, therefore, we expect the loss ratio to go up over time. That is not all that different from what we actually saw between 1985 and 1988 when prices tended to either flatten out or decrease and loss trends continued to impact the experience.

We then get our expected losses by multiplying the earned premium by the expected loss ratio. In Line (4), we have shown our selected development factor. Since we have already said that we do not have a lot of data, we can't derive the selected development factor from our own historical experience. We, therefore, need to start looking at other sources. Several places where we may want to consider looking are ISO rate filings, rate filings of our competitors in the same states in which we are reviewing the business or Best's Loss Development Reports. For reinsurance lines of business, the Reinsurance Association of America produces a book each year or every other year that shows loss development patterns. Also, your company may write a similar book of business in a different state or a related book of business and we may be able to draw some conclusions regarding development factors from that related book of business.

We calculate our IBNR factor by taking one minus one divided by our development factor. For example, for Accident Year 1985, our development factor is 1.25. Taking one divided by 1.25, we get .8. Subtracting that from one, we estimate that 20% of losses are expected to be outstanding and are expected to be IBNR losses at that point in development. We calculate the IBNR reserve by taking the IBNR factor and multiplying by expected losses. Adding this to the incurred losses to date, we get our estimated ultimate losses in Line (8). Are there any questions about how the calculations are performed?

(Slide 26)

This method is particularly sensitive to the selection of the loss ratio or pure premium assumptions. Therefore, we need to take several things into account in establishing these amounts. For example, in determining the expected loss ratio we need to review premium adequacy and the underlying pricing of the book of business. What we want to look for is whether the changes in

rates match the trends underlying the losses. To the extent that rate changes differ from trends in losses, we will want to reflect that in our loss ratio assumptions.

Also, changes in operations can affect both our pure premium or loss ratio. For example, for a book of business that has reinsurance, we will probably want to do an analysis net of reinsurance. Our pure premium will have to reflect the appropriate retention. If we are using a loss ratio approach rather than a pure premium approach, we will need to determine if our net pricing has stayed relatively constant over time. For example, if we are going into a hard market and our reinsurance becomes much more expensive, then we might retain less premium relative to the losses. Therefore, our net loss ratio will go up, whereas our gross loss ratio may not be going up.

For pure premium projections, in particular, we need to pay attention to changes in the underlying limits and deductibles. As either one increases or decreases, it will have an impact on our pure premium. Also, we need to find out whether or not there has been a shift of business between occurrence policies and claims-made policies.

Lastly, any change in the mix of the book of business, for example, by territory or class, may change the pure premium or the loss ratio.

(Slide 27)

Moving on to the strengths and weaknesses of this method, I think its biggest advantage is that it is easy to use. The arithmetic is straightforward. That also makes it a fairly good method to explain to management. I have found that management much prefers it when they can understand something about what you are doing. If you use a method and can say that you just multiply and add, it is a little more attractive to them. Also, it compromises between loss development methods and expected loss ratio methods in that it avoids an overreaction to unexpected incurred losses to date. I will give you an example of that in just a minute.

It is also one of the few methods that I have found that is suitable for new or particularly volatile lines of business. It can also be used in situations where there is no internal loss history. I have been involved in many assignments in which the company has never had an actuary come in before and they just don't have development triangles. They may have been writing automobile insurance for 20 years and they may even have written oodles and oodles of it. If they had triangles, the information would be very good to use and the experience would be very predictable. However, that data is not available in many companies and this method can be used even without the historical data.

The disadvantages: I think the biggest one is clearly the uncertainty regarding the projected ultimate loss ratio or pure premium. Also the selected development factors ignore the incurred losses to date in determining the projection. For example, if you think of an incurred loss development method, it takes your factor and multiplies by the incurred losses to date. If the incurred losses to date are particularly high and that's a precursor of a bad accident year, then your incurred loss development method will reflect that, whereas your Bornhuetter-Ferguson method gives you the IBNR reserve regardless of what has happened so far. Similarly, it assumes that the case reserve development is unrelated to reported losses. Again, the case reserve development has been included in our estimate of IBNR and we are saying that is unrelated to current case reserves.

(Slide 28)

We will go back to the illustration of the tempering effect of this method. If we look in the first column at the expected losses, we show in the first three lines, what we would call an expected loss ratio approach in which we take our earned premium, multiply by our expected loss ratio, and get expected losses of $1.5 million. If our incurred losses to date are $750,000 and our development factor is 2, then our loss development approach will also give us $1.5 million.

Lastly, if we use our Bornhuetter-Ferguson projection with our IBNR factor, we also get a projection of $1.5 million. If losses are as expected, then all three methods will produce an identical result.

If, for example, one extra large claim of $150,000 has been reported, then our expected loss ratio approach, which ignores our incurred loss to date completely, will come up with the same estimate of ultimate losses. As you can see in Row (4), our incurred losses to date are $150,000 greater. After we have applied our loss development factor, we get our loss development projection of $1.8 million which is 20% higher than if things had gone as expected, maintaining the same relationship as the incurred losses. The $900,000 incurred-to-date is 20% greater than the $750,000 shown in the first column.

Lastly, if we use our Bornhuetter-Ferguson method, the estimate of $1.65 million falls between our expected loss method, which ignores everything that has happened to date, and our development factor method, which leverages off what has happened to date.

You might want to know how I decide which of those ultimate losses I truly believe for this particular accident year. What I generally consider is whether I think that this is a fortuitous loss. Is it just by chance that I happened to get a large loss in this year? If that is the case, I will probably want to use the Bornhuetter-Ferguson method, because we happen to have a big

loss but we don't think this is telling us anything more or providing additional information.

If we think that it is a precursor of things to come and that things have gotten bad and they are just going to keep getting worse, then we probably want to use our loss development projection.

Lastly, if we think or we know that we are going to get one large claim in every year and it really is a question of whether it gets reported in the first 12 months or the second 12 months, but we know it is going to come sometime, then the expected loss method is probably the most appropriate because we have already accounted for that as part of the total. We just didn't know when it was going to be reported.

The last thing that I would like to do is to introduce one of the many variations on the Bornhuetter-Ferguson method. In this particular variation, we are going to use the information for the incurred losses to date for all years combined to refine our IBNR reserve estimate. What I have found is if I have very little or no data available, then this variation on the Bornhuetter-Ferguson Method is not going to do very well and we probably just want to rely on the method that has been described so far. If, over several years, we find that we have a credible amount of data, that no one accident year has a credible amount of data, then this is when this particular variation works well. If we have credible data for each of many accident years, the paid and incurred loss development methods and some of the average claim cost methods will tend to work well. And in those situations, I personally, at least, tend not to use the Bornhuetter-Ferguson method. Many other actuaries do, so that is just a matter of personal preference.

(Slide 29)

What I have shown in Column (1) is our expected losses that we derived earlier as our earned premium times our loss ratios. I have also shown our loss development factors to ultimate. From these two we can calculate what we would expect would be incurred to date for each accident year. That is calculated by taking our expected ultimate losses and dividing by our development factor. For example, for Accident Year 1985, we expected there would be $520,000 reported losses incurred to date. This compares to our actual incurred losses to date of $600,000. As you can see, the difference between the expected losses and the actual losses varies a fair amount by accident year. What we have determined from our vast experience as actuaries is that this is a credible difference in total and we are going to say the actual incurred losses to date are 14% higher than what we would have expected based on our initial assumptions. Therefore, we are going to use that information to adjust our IBNR reserve estimate. The 14% is derived by taking the $2.9 million that has actually been incurred to date and dividing by the $2.55 million that we would have expected, given our initial assumptions.

(Slide 30)

On the last slide we are going to adjust our IBNR reserve estimate for this difference. We calculated the IBNR reserve on an earlier exhibit and that is shown in Line (1). Now we are going to increase each accident year's IBNR reserve estimate by 14%. That is shown in Line (2). We then add the incurred losses to date to derive an alternate estimate of the ultimate losses based on this method.

Those were our prepared remarks. We have plenty of time for questions. I'm sure there must be some. Don't be bashful. I welcome any questions either on this method or on the other methods that we have discussed this afternoon.

QUESTION: In the paid loss triangle that was shown on Page 4, I believe, are those paid losses associated with the claims closed in any settlement interval for each report year as well?

HAEFNER: Yes. The Fisher-Lange method wants that to be the case. It can be, at times, very difficult to get. You can, for some lines of business, not like for maybe Private Passenger BI or something where you don't have a lot of structured settlements, then you can make the assumption that there aren't very many partial payments going on. For a line like workers' compensation, you really need to track things down by claim, individual claims, to associate the paid losses with the claims.

Any other questions? You guys are making this too easy for us.

WITCRAFT: Yes.

QUESTION: In your example you assumed everything was closed after five years. Is there a sort of a standard that you use for reserving out by line as far as number of years?

HAEFNER: It's not very reasonable, especially for most lines of business. Maybe 25 years ago it wasn't too bad an assumption, but claims seem to take longer to settle now. What you really have to do is sort of track that over time. You might find that the answer is maybe ten years for some lines of business. Maybe even longer than that. You just keep recording the data as long as possible and you can see how many claims remain open after 60 months.

For one thing, your claims department may have a better handle on those types of claims at the end of 60 months, so you could make the assumption that the reserves established for those claims are exactly adequate or, you know, ten percent over adequate, and use that to come up with your incurred losses.

WITCRAFT: That, again, is going to depend on your line of business. That is probably more true for an automobile line of business. My background is more in more esoteric lines of

business, like professional liability and at 60 months the claims department still doesn't know a lot about some of those claims.

Any other questions? Yes.

QUESTION: You said that you sometimes use development factors from the ISO or Best's and RAA. What did you find the tail factor,

WITCRAFT: In the Best's data, for the tail, I often look at the company's estimates of what the ultimate losses are and compare that to their paid losses and incurred losses. That is often the best information you have available. They show that for ten years. So that will help you with the tail factor.

Any other questions? Thank you for coming.

AVERAGE HINDSIGHT RESERVE METHOD

Goal:

Calculate What Average Per O/S And IBNR Claim Would Have Been

Based on:

Projected Ultimate Losses For Mature Accident Years

Slide 1

DATA NEEDED

- Cumulative Paid Loss Triangle
- Cumulative Closed (Paid) Claim Triangle
- Estimated Ultimate Number Of Claims
- Estimated Ultimate Losses For A Few Of The Most Mature Accident Years

Slide 2

XYZ AUTO INSURANCE COMPANY

Cumulative Paid Losses

Accident Year	Months of Development							
	12	24	36	48	60	72	84	Ultimate
1982	50.0	80.0	98.2	107.8	113.2	117.2	119.7	119.7
1983	60.2	97.0	118.5	130.7	136.6	141.0		143.8
1984	75.5	120.1	147.0	162.4	171.0			178.7
1985	91.9	147.1	180.2	197.0				220.1
1986	115.0	184.1	226.4					
1987	146.5	233.4						
1988	181.1							

Note: 1. Amounts are in thousands of dollars.

Slide 3

XYZ AUTO INSURANCE COMPANY

CUMULATIVE CLOSED CLAIMS

Accident Year	Months of Development							
	12	24	36	48	60	72	84	Ultimate
1982	50	75	88	94	97	99	100	100
1983	55	83	97	104	107	109		110
1984	63	94	110	118	122			125
1985	70	105	123	131				140
1986	80	120	141					160
1987	93	139						185
1988	105							210

Slide 4

XYZ AUTO INSURANCE COMPANY

Calculation of Average Outstanding Losses

Accident Year	(1) Estimated Ultimate Losses	(2) Paid Losses	(3) O/S Losses (1)-(2)	(4) Estimated Ultimate Claims	(5) Closed Claims	(6) O/S Claims (4)-(5)	(7) Average O/S (3)/(6)
1982	$119,700	$ 98,200	$ 21,500	100	88	12	$1,792
1983	143,800	118,479	25,321	110	97	13	1,948
1984	178,700	147,010	31,690	125	110	15	2,113
1985	220,100	180,172	39,928	140	123	17	2,349

Exponential Curve: R-squared = 0.996

Trend Factor = 1.093

Fitted = $2,551

Note: O/S is "outstanding" and includes IBNR. H/S is "hindsight."

Slide 5

XYZ AUTO INSURANCE COMPANY

ESTIMATED ULTIMATE LOSSES - ACCIDENT YEAR 1986

(1) Selected Average Per O/S and IBNR Claim = $2,550

(2) Number of O/S and IBNR Claims = 19

(3) Estimated O/S and IBNR Losses = $48,450
(1) x (2)

(4) Paid Losses to Date = $226,374

(5) Estimated Ultimate Losses = $274,824

Slide 6

AVERAGE HINDSIGHT RESERVE METHOD

ADVANTAGES

- Does Not Use Case Reserve Data
- Can Easily Adjust Trend Assumption

DISADVANTAGES

- Sensitive To Payment Pattern Shifts
- Averages Highly Variable When Only A Few O/S And IBNR Claims

Slide 7

FISHER-LANGE REPORT YEAR RESERVE MODEL

- Test of reserves on known claims.
- Does not consider IBNR.
- Estimates reserves and incurreds by report year.
- Uses claim counts and paid $.

page 1

Slide 8

NUMBER OF CLAIMS REPORTED BY YEAR

Report Year	Claim Counts
1983	432
1984	444
1985	454
1986	532
1987	511

REPORT YEAR = Year in which the claim was reported to the company.

Slide 9

NUMBER OF CLAIMS SETTLED BY REPORT YEAR AGE

Time Since Beginning of Report Year	Report Years				
	1983	1984	1985	1986	1987
0-12 Months	260	261	266	293	290
13-24 Months	115	120	124	138	
25-36 Months	30	33	32		
37-48 Months	17	19			
49-60 Months	10				

Slide 10

PAID SETTLEMENTS BY REPORT YEAR AGE
(Amounts in $000's)

Time Since Beginning of Report Year	Report Years				
	1983	1984	1985	1986	1987
0-12 Months	$355	359	380	440	479
13-24 Months	345	371	397	462	
25-36 Months	111	125	140		
37-48 Months	68	81			
49-60 Months	55				

Slide 11

AVERAGE COST OF CLAIMS SETTLED
BY REPORT YEAR AGE

Time Since Beginning of Report Year	Report Years				
	1983	1984	1985	1986	1987
0-12 Months	$1,365	1,375	1,429	1,502	1,652
13-24 Months	3,000	3,092	3,202	3,348	
25-36 Months	3,700	3,788	4,375		
37-48 Months	4,000	4,263			
49-60 Months	5,500				

AVERAGE COST = [$ PAID (page 4)]
/ [NUMBER OF CLAIMS (page 3)]

Slide 12

AVERAGE COST OF CLAIMS SETTLED
BY REPORT YEAR AGE

Time Since Beginning of Report Year	Report Years					Average % Increase
	1983	1984	1985	1986	1987	
0-12 Months	$1,365	1,375	1,429	1,502	1,652	4.8%
13-24 Months	3,000	3,092	3,202	3,348	3,459	3.7%
25-36 Months	3,700	3,788	4,375	4,663	5,070	8.7%
37-48 Months	4,000	4,263	4,543	4,842	5,160	6.6%
49-60 Months	5,500	5,830	6,180	6,551	6,944	6.0%*

Projections were made using an exponential fit of prior values.

* This % was judgmentally selected.

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Slide 13

PORTION OF REPORT YEAR CLAIMS SETTLED
BY REPORT YEAR AGE

Time Since Beginning of Report Year	Report Years				
	1983	1984	1985	1986	1987
0-12 Months	.603	.588	.586	.551	.568
13-24 Months	.266	.270	.273	.259	
25-36 Months	.069	.074	.070		
37-48 Months	.039	.043			
49-60 Months	.023				

RATIO = [NUMBER OF CLAIMS SETTLED (page 3)]
/ [NUMBER OF CLAIMS REPORTED (page 2)]

page 7

Slide 14

ESTIMATING FUTURE SETTLEMENT RATES

From page 7

	1986
0-12 Months	.551
13-24 Months	.259

1.000-.551 = Portion of claims open at beginning of 13-24 Month period

.259 = Portion of claims settled in 13-24 Month period

.259/(1.000-.551) = Proportion of open claims settled in 13-24 month period

page 8

Slide 15

PORTION OF REPORT YEAR CLAIMS SETTLED BY REPORT YEAR AGE

Time Since Beginning of Report Year	Report Years				
	1983	1984	1985	1986	1987
0-12 Months	.603	.588	.586	.551	.568
13-24 Months	.266	.270	.273	.259	.249*
25-36 Months	.069	.074	.070	.094	.091**
37-48 Months	.039	.043	.045	.061	.058
49-60 Months	.023	.025	.026	.035	.034

Fill in each column from the top down.

* .249 = (1.000-.568) x [.259/(1.000-.551)]

** .091 = (1.000-.568-.249) x [.070/(1.000-.586-.273)]

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CALCULATION OF AVERAGE INCURRED LOSS
BY REPORT YEAR AGE

REPORT YEAR 1987

Time Since Beginning of Report Year	Portion of Reported Settled		Average Cost		
0-12 Months	.568	x	$1,652	=	$938.34
13-24 Months	.249	x	3,459	=	861.29
25-36 Months	.091	x	5,070	=	461.37
37-48 Months	.058	x	5,160	=	299.28
49-60 Months	.034	x	6,944	=	236.10
			Overall Average	=	$2,796

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Slide 17

ESTIMATED INCURRED LOSSES
ON REPORTED CLAIMS

Report Year	Average Incurred Loss		Number of Reported Claims		Estimated Incurred (000)
1983	$2,159	x	432	=	$ 933
1984	2,253	x	444	=	1,000
1985	2,383	x	454	=	1,082
1986	2,658	x	532	=	1,414
1987	2,796	x	511	=	1,429
				Total =	$5,858
				Paid-to-Date =	$4,168
				Indicated Reserve =	$1,690

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Slide 18

SUMMARY OF METHOD

Data: (1) Number of Claims by Report Year

(2) Number of Claims Settled by Report Year and Age

(3) Paid Claim $ by Report Year and Age

Project: (1) Portions of Reported Claim Counts Settled in Future Periods

(2) Average Severities of Paid Claims

Estimating: Incurred Losses and Reserves for Reported Claims

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Slide 19

ADVANTAGES OF FISHER-LANGE REPORT YEAR RESERVE MODEL

- More revealing than age-to-age factor methods.
  a. Payment patterns
  b. Inflation

- Relies on known data.

- Can be used to monitor claims department case reserving.

- IBNR can be modeled separately.

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Slide 20

BORNHUETTER-FERGUSON METHOD

- Result is "Incurred-but-not-Reported" Reserves
- Calculated as a Function of Earned Premium or Exposure
- Uses Loss Ratio or Pure Premium Assumptions
- Applications:
    - New Company
    - Low Exposure
    - Highly Volatile Data

Slide 21

IBNR RESERVES

1. "True" IBNR = Unreported Losses
2. "True" IBNR + Claims in Transit
3. (2) + Development on Known Claims
4. (2) + Reopened Claims Reserve
5. (2) + Development + Reopened

BORNHUETTER-FERGUSON AND MOST ACCIDENT YEAR METHODS PRODUCE IBNR AS DEFINED IN (5).

Slide 22

BASIC FORMULAS

IBNR Reserve = IBNR Factor X Expected Losses

Expected Losses = Loss Ratio X Earned Premium

or

Expected Losses = Pure Premium X Exposure

Slide 23

IBNR FACTOR DERIVATION

IBNR Factor = IBNR / Ultimate Losses

= (Ultimate - Incurred To Date) / Ultimate

= 1 - (Incurred To Date / Ultimate)

= 1 - (Incurred To Date /
Incurred To Date X LDF To Ultimate)

= 1 - (1 / LDF To Ultimate)

Slide 24

BORNHUETTER-FERGUSON EXAMPLE

Accident Year	1985	1986	1987	1988
(1) Earned Premium	$1,000	$1,250	$1,600	$2,000
(2) Expected Loss Ratio	0.65	0.65	0.70	0.75
(3) Expected Losses (1) x (2)	$ 650	$ 813	$1,120	$1,500
(4) Development Factor	1.250	1.350	1.650	2.000
(5) IBNR Factor 1 - [1 / (4)]	20%	26%	39%	50%
(6) IBNR Reserve (3) x (5)	$130	$211	$437	$750
(7) Incurred To Date	600	600	700	1,000
(8) Estimated Ultimate (6) + (7)	$730	$811	$1,137	$1,750

Slide 25

CONSIDERATIONS IN ESTABLISHING EXPECTED LOSS RATIO OR PURE PREMIUM

- Premium Adequacy
- Underlying Pricing
- Changes in Operations, e.g.
  - Reinsurance
  - Underlying Limits, Deductibles
  - Claims Made vs Occurrence
- Changes in Mix of Business

Slide 26

ILLUSTRATION OF "TEMPERING" EFFECT

	Expected	One Extra Large Claim
(1) Earned Premium	$2,000	$2,000
(2) Expected Loss Ratio	0.75	0.75
(3) Expected Losses (1) x (2)	$1,500	$1,500
(4) Incurred To Date	$ 750	$ 900
(5) Development Factor	2.00	2.00
(6) Loss Development Projection (4) x (5)	$1,500	$1,800
(7) IBNR Factor 1 - [1 / (5)]	50%	50%
(8) Bornhuetter-Ferguson Ultimate (4) + (3) x (7)	$1,500	$1,650

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BORNHUETTER-FERGUSON METHOD

ADVANTAGES

- Easy To Use
- Compromises Between Loss Development And Expected Loss Ratio Methods
- Avoids Overreaction To Unexpected Incurred Losses To Date
- Suitable For New or Volatile Lines of Business
- Can Be Used With No Internal Loss History

DISADVANTAGES

- Uncertainty of Projected Ultimate Loss Ratio or Pure Premium
- Ignores Losses Incurred to Date
- Assumes That Case Reserve Development is Unrelated To Reported Losses

Slide 27

Adjustment Factor

Accident Year	(1) Expected Losses	(2) Development Factor	(3) Expected Incurred To Date (1)/(2)	Actual Incurred To Date
1985	$ 650	1.250	$ 520	$ 600
1986	813	1.350	602	600
1987	1,120	1.650	679	700
1988	1,500	2.000	750	1,000
Total	$4,083		$2,551	$2,900

Adjustment Factor = $2,900/$2,551 = 1.14

Slide 29

Adjusted Bornhuetter-Ferguson

Accident Year	1985	1986	1987	1988
(1) IBNR Reserve	$ 130	$ 211	$ 437	$ 750
(2) Adjusted IBNR Reserve 1.14 x (1)	$ 148	$ 245	$ 498	$ 855
(3) Incurred to Date	600	600	700	1,000
(4) Estimated Ultimate	$ 748	$ 845	$1,198	$1,855

Slide 30

1990 CASUALTY LOSS RESERVE SEMINAR

1D: MEDICAL MALPRACTICE: IS THE CRISIS OVER?

Moderator

Frederick O. Kist
Coopers & Lybrand

Panel

James D. Hurley
Tillinghast/Towers Perrin

Allan M. Kaufman
Milliman & Robertson, Inc.

James J. Olzacki
General Reinsurance Corporation

MR. KIST: It is 8:30. Good morning, and welcome to Session 1D. This is the "Medical Malpractice: Is the Crisis Over" session. I'm Fred Kist, a principal with Coopers & Lybrand and will be monitoring this session this morning.

Before we begin, I want to address a few housekeeping and other items. First of all, the session will be recorded and will be transcribed as part of the transcripts. In order to capture questions from the audience, I would like you to use the microphone in the middle of the room. If questions are not being recorded, I'll try to repeat them to make sure we do get them into the transcript.

Secondly, in your package, you received evaluation forms. We would appreciate it if you could complete an evaluation form at the end of this session. I believe you either leave them here or perhaps at the main desk.

Thirdly, I think this is a little different than prior years in that you received a bunch of tickets that had session number blank. For those of you that need to worry about CPE credits, these little tickets will be picked up at the end of the sessions so that CPE credits can be given to you for attending the sessions.

Finally, the opinions expressed by the panelists are those of the panelists and not the opinions of the American Academy or the CAS. With that, we can perhaps get started here.

The medical malpractice industry has struggled continuously over the last 13 to 14 years to achieve adequate rate and reserve levels. Changes in the last several years in trends and improvements in loss experience have resulted in an industry segment today that appears to be in better shape than in any prior period. Our panelists are experts who will be discussing that and providing us with their observations.

In addition to financial stability, we've also noticed prices in many areas have stabilized. Does this mean that the crisis is over or does this mean that we are in the eye of the hurricane? Will price levels of today foster and encourage competition that previously would never have been considered by the various medical professional carriers?

In today's panel, we've brought together three experts to discuss the observations of the industry. To my far left is Jim Olzacki. Jim is a Vice President and Facultative Account Executive with Gen Re. He is responsible for marketing reinsurance to the medical malpractice market segment and has been active in medical malpractice for the last 13 years.

Jim will be presenting perspectives from an underwriter's perspective, underwriting medical malpractice reinsurance. Prior to working for General Re, Jim also spent six years with the

Travelers. He graduated with a BA in Marketing from the University of Connecticut.

Next to Jim is Allan Kaufman. Allan is a principal with M&R, responsible for directing the New York office. Allan is a Fellow of the Casualty Actuarial Society and a Member of the American Academy of Actuaries. Allan has over 20 years of experience in the property casualty industry, 15 of which have been as a consultant.

Allan has worked extensively in the medical malpractice industry. He graduated from -- he has a BA in Math and Physics from what university, Allan?

MR. KAUFMAN: Brooklyn College.

MR. KIST: Brooklyn College. Thank you. Allan also has a Master of Physics from the University of Wisconsin. I assume he is also going to relate physics to medical malpractice in his section this morning.

Thirdly, we have Jim Hurley. Jim is a consultant and principal with Tillinghast. He is an Associate of the Casualty Actuarial Society and a Member of the American Academy of Actuaries. Jim has a BS in Actuarial Sciences from the College of Insurance and Jim also has been in the consulting field for over ten years, the majority of which has been spent in the medical malpractice area.

All three of these people have seen significant changes in the industry. All three have viewed a large number of different companies, so I think their perspectives today will be very interesting for us. With that, I would like to turn the podium over to Jim Hurley, who will speak from his perspectives on the medical malpractice industry. Thank you.

MR. HURLEY: Thanks, Fred. I'm going to work from down here with the slides, with the overhead machine, if that's okay. If you can't hear me in the back, that's too bad. I'll try and speak a little louder, so let me know.

The handouts that you have are, hopefully, faithful recreations of the overheads I'm going to use. They were when we started, but you never know what happens between the time you put them in the box and I get up here and put these slides up. Hopefully, they will be consistent.

It is interesting that we're talking about medical malpractice here as an industry that we can know a lot about and speak about cycles and things like that, given it's a business that really has been actively looked at and a lot of separate data has been identified only over the last probably 15 years. I think we've seen a lot in that 15 years, and it's been an area we've focused on during that 15 years.

In order to talk about whether the crisis is over, I think what we need to do is to define what we mean when we say "crisis." There are two areas that I've looked at it from, and the first is in the area of medical services.

Are we talking about the crisis that relates to something that Senator Hatch referred to recently in his bill and that is, that there are billions of dollars spent on "useless" defensive medicine? Are we talking about the fact that, at a very real level, many surgeons and physicians are dropping the OB portion of their practice and things like that?

Well, those are all crises of a type, but that's not the type of crisis we're going to talk about today. What we're going to talk about is the insurance crisis. In the area of insurance, I think that, from my perspective, anyway, there are probably two major issues that occur about crises.

One is the crisis of availability and the other is affordability. You've probably heard those words many times before in reference to the crisis in the context of medical professional liability. I think those of you who are familiar with medical professional liability and got involved probably in the late '70s are well aware of the fact that the first major crisis occurred in the '74-'75 period. That was indeed a crisis of both affordability and availability.

By that, I mean coverage was not available and when it was available, it was probably pretty much determined or perceived that it was not affordable as well. I think that was one crisis that spawned the growth of companies. We'll see a little bit of their results in a few minutes. It also spawned the change in coverages and things like that that we'll talk about.

Probably, though, in the most recent crisis -- I think there probably has been a more recent crisis, if you're not aware of it. Most people believe that there has been another crisis since that time, probably in the mid-'80s. That particular crisis, I think, was one of affordability, rather than availability.

As I said, there were captive companies that were spawned in the '74-'75 era. Those companies were there operating during the mid-80's, but the trend levels and cost levels, as a consequence of the trend, were going up so rapidly that there became a crisis of affordability. I think Jim Olzacki will talk to you a little bit about it from the reinsurance perspective. There was a problem as far as availability in terms of the reinsurance area.

What are the manifestations of crisis? Well, one of them is capacity. In the "big one", the '74-'75 period, there was a complete withdrawal of commercial capacity, almost across the board, say, with probably two exceptions. Medical Protective was a specialty company, so I'll try and segregate them. They only wrote physicians and surgeons, and they stayed in the market at

that point in time. St. Paul was a company that wrote occurrence coverage up until that point in time and then converted to claims made at the '74-'75 period, and stayed in the marketplace.

Most other commercial coverage disappeared, and the commercial companies -- The Travellers, The Hartford and the other big commercial companies -- basically withdrew from writing professional liability. So, one of the manifestations of crisis is capacity. I think in the latest round, in '85 and '86, we didn't see a capacity problem except, to some extent, in the reinsurance area.

Another manifestation of crisis is in coverage. I think probably up until '74-'75, claims made was not a coverage of predominance in medical professional liability, but as of '74'75, there was a rather precipitous change to claims made coverage from occurrence; such that probably 80 percent of the business, maybe more, is written on a claims made basis now.

In the most recent last couple of years, we've now heard about a coverage called claims paid, believe it or not, and that means you pay for claims as they are paid. You don't continue to pay your premiums; they don't continue to pay your claims, so a new type of coverage, details to follow.

Another manifestation of crisis, of course, is in price and rates. I think that in '74-'75, we saw a major trauma in terms of price and rates. We also saw that in the '85-'86 crisis, so that's been one where we've seen the prices and the rates escalate dramatically in response to frequency trends and severity trends.

What are the actuarial issues that relate to this particular crisis or to these crises? They are reflected in pricing, reserves, and in financial results. Hopefully, I'll address all of those over the next couple of minutes that I'm going to speak to you, and I think Allan will pick up that and expand on it, and Jim will talk to you more from the reinsurance perspective.

What are the issues? Well, the issues from an actuarial standpoint is we're talking about a low frequency-high severity line, very few claims, but very severe claims, so you're talking about a typical and peculiar actuarial problem. You don't have a large body of claims to work with, although it is ever increasing in terms of the number of claims you're dealing with, and you're talking about a very high severity related to those very few claims.

We are also talking about a type of business that had what we call a very long tail. Most of you are familiar with that term. It means that it takes a long time to get the claim reported and then, after it is reported, it takes a long time to get the claim resolved.

The average duration may be five, six or seven years for a given occurrence year, so you're talking about a long time between the time something occurs triggering coverage on an occurrence basis, until it gets reported, and then once it gets reported, you're talking about a long time until it gets resolved. So, you are projecting over a long period of time in terms of estimating what your ultimate loss costs are, another difficulty from an actuarial standpoint.

The level of trend is also a particular problem. In the '74-'75 period, there was very little data available in the general and public arena to look at, but the companies who were looking at this information on a coverage basis saw trends in the 15 to 20 percent neighborhood.

Those trends ameliorated during the late '70s but then picked up again as we moved into the '80s and again got into the 20 -- actually, the 20 to 25 percent neighborhood, in terms of the measures that were used to measure that, and that's pure premium trend, the combined effect of frequency and severity, so the level of trend was also a problem.

As a consequence of the major crisis in '74-'75, there was this movement of claims made by many companies who hadn't been writing this coverage before and were now going to write a new type of coverage. It wasn't occurrence anymore; it was something different, claims made coverage, so you had a new coverage to price, something that people weren't familiar with.

You also had issues that related to tort reform. What was tort reform going to do to the level of trend? What was it going to do to the level of severity? Would tort reform hold up? So, you had more actuarial issues about what reserves needed to be, what prices needed to be charged.

Then, you had high leverage. For a lot of these new captive companies that came into being, there was a low level of capital and, as you can well appreciate, because of the long tail, there was a vast and quick accumulation of reserve levels.

Obviously, the surplus is the buffer you have against the inadequate reserves, so the leverage of those companies, reserves to surplus, was very high. So, a mistake in reserves would rapidly eat through your surplus, so you needed to have a bigger cushion in terms of your surplus in order to protect you from inadequate reserves.

So, those are some of the actuarial issues. What were the methods that we were looking at? I guess in terms of priorities, I have them listed here. Pure premium models were looked at, because they lent themselves better to analyzing claims made coverage, as is true of what I've got here in acronym form, accident year/report year development methods.

These methods allow you to more accurately develop claims made prices. Accident year/report year development methods allowed us to use occurrence coverage data to price claims made products and to reserve for claims made products, because when you broke it down into accident year and report year cells, we could tell where the losses were coming from and when the occurrence date was relative to when the claim was reported. It is a distinction you need to make when you are pricing claims made coverage.

So, we are able to use occurrence data to price claims made coverage and we continue to do that, because it separates development of losses, case reserve development, from what is emergence of losses, the actual reporting of claims.

So, we use methods that are related to pure premiums and exposures and accident year report year development methods in order to be able to price and reserve claims made accurately, allowing us to use the long history of occurrence data that we have, in order to evaluate claims made exposure and claims made losses.

We also look at frequency and severity models because they, again, lend themselves more appropriately to pricing claims made coverage, the predominant coverage available today. Bornhuetter-Ferguson approaches are used because of the long tailed nature of this business.

You get very little reported and you find out very little about that reported loss experience in the early going, because of the long tail, and, therefore, rely a lot on our prior estimates, using the Bornhuetter-Ferguson or a quasi-Bornhuetter-Ferguson approach to give some credence to reported experience, but probably more credence to our prior information and our prior evaluations, then gradually move over to the actual experience as it gets more mature.

Probably one that we become less comfortable with when we look at this is just straight accident year or report year development. Because of the gradual change to claims made, you couldn't use just straight report year development and, of course, with claims made coverage, you couldn't use accident year developments at all. So, there is less reliance on accident year statistics.

In terms of the crisis or the issue of a crisis, probably one of the biggest problems in this business that actuaries deal with is identifying turning points. With this particular coverage, the turning points are even more difficult to identify because of the long lag between the occurrence, report and settlement of claims.

So, what I've tried to do is illustrate a little bit of this with some St. Paul, publicly-available data. If this is not visible to you in the back, it should be one of the slides. I think it's page 6 of the slides. It doesn't show up very well.

(Slide 1)

What you have is a set of actual data that actually goes through 1986. They are the squares on your slide there. What those are, are $200,000 limited pure premium indications for St. Paul on a country-wide basis, so it is the losses divided by the class 1 physicians over that period of time on a reported basis at $200,000 limits. It is the actual data.

QUESTION: It is physician and surgeon data.

MR. HURLEY: It is physician and surgeon data, right. So, as you can see, going from the 1979 report year on up to 1985 and 1986, one would not draw comfort from the trend indicated. In fact, if one were to fit, as has been done here, an exponential trend line to that set of data, you can see what the indication is.

It is that if you were trying to make rates in 1987 or 1988, you are looking at twenty-plus trend; that's like a twenty-plus percent trend line at that point. It's a difficult problem. You're going to go to some physicians and surgeons and tell them they're looking at an annual trend of twenty percent.

In terms of what happened in the '85-'86 period, this is the difficulty we have in identifying trend points. I left that trend there through '86 and you can see that the actual data came in and just turned on us. So, that's the difficulty you have in identifying trend points.

This is part of the change that has occurred in this business in the last two or three years, the fact that no one would have projected those changes. Now, what happened in that period? There was tort reform. There was a lot of attention focused on this, but how could you predict what was going to happen as far as that's concerned?

You can see what happened in terms of the pure premium indications relative to what one would have guesstimated based on the data through 1986. Incidentally, I would suggest or submit that a 22 percent annual trend is probably close to a crisis. I don't know about you, but having gone out and talked to a lot of physicians over this period of time and faced them with the prospect of a 22 percent trend, they thought it was a crisis, that's for sure.

(Slide 2)

Corresponding to the physician data, I am also showing you some hospital information. Again, this is pure premium information. The line along the bottom is report half-year rather than report year, which is what you saw on the prior one. Again, we are looking at pure premium per bed, per occupied bed, over time.

You can see through '86 the very same phenomenon, a very good fit for an exponential trend line starting in '79, going up through '85-'86, and then the bottom fell out. I think Allan is going to talk about this a little more, but in case he doesn't, it was really a frequency phenomenon, which I think we'll see in the next graph.

The frequency was going up at a clip of seven or eight percent per year during this period and then just stopped and, in fact, decreased after 1986, almost like tort reform had an immediate impact, one might speculate, but it's hard to tell.

Another piece of information that is available, we do have some information about frequency and severity separately, and this is just a graph of the frequency.

(Slide 4)

This is St. Paul country-wide frequency data on two bases, and it's per class one equivalent, so it's physician data. We are looking at the change in frequency levels over this period of time, starting with '81 and going up through '88.

The first set of data with the blocks is the actual data. It's the actual recorded country-wide frequency that St. Paul was reporting. See, up through '85-'86, the frequency was moving up dramatically and then in '86-'87, as I mentioned to you earlier, the frequency just fell down. It just came way down.

But, St. Paul was also doing something else at that point in time. In reaction to this crisis, St. Paul was contracting in certain markets, so they had a phenomenon in their country-wide data base which would give it a bias in terms of this frequency measure, and that is, that they were writing in some markets in the early '80s and not writing in those markets in the later period of time.

One dramatic example is they wrote a substantial book of business in Florida in the early '80s and stopped writing that book of business in the later '80s, and that influenced their data. So, what they did was they adjusted -- or normalized, as they said it -- for the change in state mix over that period of time.

Now, you can see that they have a drop actually or a flattening actually occurring here in their data in '85-'86. It came down and has now, according to their measures on a normalized basis, started back up again. So, is the crisis over? I don't know. It's not at the '85-'86 levels, but it has turned, according to their reading of that data.

So, that's a little bit about trends. I think Allan is going to tell you a little bit more about that. What about financials? Well, I've got some retrospective looks at reserve developments and I'll go through them quickly. This is just information

extracted from Schedule Ps to see if we see anything of a crisis type showing up in the data for Schedule P.

(Slide 5)

All it is, is the far left hand is statement evaluation year, the initial incurred losses that companies reported at that point in time for that year and all prior years, so it's kind of like an accident year and all prior years, as of 1981, as of 1982, as of 1983, et cetera. All that we're doing as we go across the page is we're watching how they restated that incurred subsequent to the statement year.

So, now, what we're doing is taking Schedule P data and, in the case of 1981, we're looking at the initial incurred as of 12/31/81 they reported for 1981 and all prior report years. It's out of Schedule P, Part 3, I believe it is. All we're doing is watching what happened to that incurred loss over time.

You can see St. Paul reported initially a $618 million incurred loss for '81 and all prior periods which has subsequently been revised down to $519 million. The same phenomenon is true as you go across here. You can see in the early '80s, everything was looking great. In fact, they seem to be, at this point, indicating that they were a little bit high relative to their initial incurred losses, again recognizing that this is a very uncertain business.

You can see in the middle here that that range kind of tightens. There isn't the same type of redundancy manifested, at least at this point in time, relative to their initial estimates. You can see, during this period, the second crisis, the margins look to be a little tighter.

If you move down here, you can see -- and this is data through 1988 for St. Paul -- that their experience doesn't look quite as good. Excuse me. Actually, it's starting to look better here in the '86-'87 period relative to the '83, '84 and '85 periods, where they are reporting a slight redundancy on the '87 period.

Again, this is all what they are saying in their financial statements as of this point in time. Given the long tail, you've got to wait this out and see what is going to happen in subsequent periods.

(Slide 6)

I've also got an exhibit like this for Medical Protective. I believe there are probably some Medical Protective people here. I hope it's a faithful recreation of the Schedule P. This one goes through actually 1989. I happen to have a statement through 1989 and, again, we're looking at the same information.

I believe it's safe to say that Medical Protective is probably one of the few companies that is still writing substantially occurrence business. I estimate -- I guess I would estimate that two-thirds to three-quarters of their business is still written on an occurrence basis; that's probably a reasonable estimate.

They've got a different problem than St. Paul which is writing only claims made. They have to worry about getting it reported as well as running it off. You can see again that the developments are here, upward development in this case. Again, it is more difficult to reserve occurrence business, but the ranges tighten a little bit as you get down to the more recent years.

There is still some upward development on the Schedule P, but certainly nothing that's a crisis. It's not a crisis number. In fact, in these charts, I didn't detect anything that indicated to me that there was a crisis as far as reserve developments were concerned.

(Slide 7)

This slide shows you a consolidation of what I've labelled as PIAA companies. That's Physician Insurer Association of America. These are active companies formed to cover physicians and surgeons. In the main, they are companies that are writing in single states for physicians and surgeons coverage only.

I consolidated their information. You can see upward developments in '82, '83, '84, but if you look down here, you can see the developments aren't quite as dramatic in terms of their upward movement, so the developments look like they've improved in the last couple of years, again, possibly a sign that the crisis has lessened and the pressure of the trends are less.

For other financial indicators you can look at, besides just the retrospective review of developments, what have the loss ratios been that they've been showing us? In the '86 year, the earliest year I have this information available for this PIAA group, a group of about 43 companies writing country-wide, the '86 loss ratio was in the neighborhood of 114 percent. In 1989, that had improved to 93 percent.

It showed a fairly stable trend moving down during that period, so that you saw 114 as the high, moving gradually down to 93 percent in 1989. That may seem like a high loss ratio, but it's a typical loss ratio for companies of this type. Ninety to 95 percent is probably favorable relative to their target loss ratio, and it's not an unusual loss ratio for them. One hundred and fourteen is probably getting a little uncomfortable for them, although some of them write at 125.

Another indication of what the financials are showing us is information publicly available on the St. Paul rate activity.

I've shown it here as rate reductions, because in the last two years, in contrast to what happened in the mid to early '80s, St. Paul, like a lot of the other companies who are writing this coverage have actually been taking rates down, responding to that frequency line you saw and the pure premium lines you saw earlier.

On a combined basis over the two years for hospitals, rates have been reduced about 12 percent by St. Paul and, on the physician and surgeon side, rates have actually gone down 20 percent in the last two years. So, all the signals are that there is good news for these companies.

So, what are they looking at now? What are the big issues now? Is the crisis over? The issues today for a lot of these companies, particularly these captive companies is: How much dividend do we pay? This is what these companies are talking about. What kind of dividends are we going to pay?

How much federal income tax are we going to pay? Because of the change in the tax law in 1986, these particular companies were particularly hard hit by that change in the law. It's a long tailed business. It's all they wrote, and the tax discount rates are huge relative to other coverages, so they were hit particularly hard by federal income tax.

A lot of their attention is focused right now, given the amelioration in the trends, to trying to avoid paying federal income tax and to try and figure out whether they should pay dividends or not.

Then, thirdly, the other thing that they're focusing on most recently is competition because what has happened is, since 1986-1987, you see risk retention groups forming in this area and also, in combination with that, we've seen a more active interest from the commercials again.

The commercial insurance companies are now becoming more interested in this business. It has been profitable, apparently, over the last few years for all the companies that are writing it. The rate has been generous, apparently, relative to the losses.

So, you see a lot of commercial companies coming back into the business, either on a primary basis -- CNA has been very active in coming in on primary in some states -- or an excess basis, where we've seen several of the commercial carriers, names which will be familiar to all of you from the '74-'75 period of medical malpractice, getting back into the business. So, competition has become a big issue for these companies and these three areas are where they've been spending a lot of their time looking at in the last couple of years.

At least from my perspective, it certainly looks like the financial indicators all say that there is good news currently, but I refer you back to that one graph, that one St. Paul graph that says frequency was down. It started back up, so who knows? I think I'm done with that, and I'll turn it over to Allan.

MR. KAUFMAN: That was Jim's 15-minute talk and, if you're lucky, we'll let you out by lunch.

(Slide)

This is one of my favorite slides. Fred promised you a short lecture in physics. This looks like it's upside down. The words are upside down. This is a chart of claim frequency. Is it really upside down? Down, up, level, or is this the right way to look at the slide?

One of the interesting questions in physics is whether time has a direction. Most commonly, when we are looking at actuarial data, we can tell which way is towards the future, because that's the way it goes up, but which way is the right way? There will be no answer to that question. I will not answer two questions today.

The question for the panel was: Is the crisis over? So, naturally, I have three answers to that question. Yes, no and something like maybe. In terms of "yes," there are symptoms of yes -- trends, crisis, coverage, reinsurance; in terms of "no," there is actuarial uncertainty; there is the reversibility of these trends.

Remember, does time have a real direction? There are a lot of hidden variables in malpractice analysis. Then, I'd like to say some words on the long-term outlook on cycles and talk about the MPL cycle and what that might be like.

Let's talk about trends first, some more views of trends. I think if you talked to anyone who is in malpractice about the cycle nowadays, everybody has some graphs that they'll pull out of trends, because it's just so outrageous relative to what we're used to seeing.

(Slide)

Here is one of many views of it. We have here five states. I'm looking at pure premiums. State 4 and State 5 at the bottom, they've had very stable trends over most of the period that we're now looking at the data. State 3 has relatively stable trends, so at least three of these states look good.

State 1 stabilized later than the others and then there is State 2, which still looks like it's headed up. In terms of the crisis in trends, there is some degree of state specificity to the problem, but at least based on this, one might say four out of five of the sample, the chosen sample of states, trends are

stable. That was pure premium trend, and it's actually more interesting looking at frequency and severity separately.

(Slide)

Here is a composite of eight states on a report year basis ending with 1988. This has a peak in frequency in '85, stable, up, at a fair clip, more than a 50 percent increase in frequency from '79 to '84 and then a drop-off, very sharp and then flatter. Whether that is turning up right now as the St. Paul chart shows or flat or still a little bit down, that's a question to be dealt with by data set by data set.

(Slide)

A one-state view of claims severity shows also what I see as a rising trend, somewhat like that, certainly not turned down by frequency, but some degree of stabilization in severity; that's almost whatever you'd like it to be. I'll come back to that issue.

We have trends that are clearly better than they used to be and that has some relevance to whether or not there is a crisis. But, what is going on with the trends? Why are they doing that? There's a lot of stuff one could talk about with frequency, but I'm not talking about that. I'm talking about severity here.

External factors that affect malpractice trends, going from the most global and working down. CPI numbers usually, I think, are currently irrelevant to malpractice because I never used to see in malpractice even as low as 13 percent, so times change. The CPI trend, as we know, has been down, where double digit trends are now down to single digit CPI increases.

Health care, that's a little bit closer to medical professional liability, double digit trends moving down to single digit trends, but these CPI health care numbers, again, who knows how relevant that is to malpractice, because they don't really measure what malpractice covers.

So, let's get a little closer. Jury Verdict Research publishes some statistics and then they disclaim any responsibility for those statistics, but their statistics are very interesting, nonetheless. First, estimates of average personal injury verdicts, all types of personal injury -- civil suits, product liability, malpractice and so on, automobile claims making up the largest piece of the data set -- but, there, also, trends are down from 15 percent per year down to eight percent per year.

Getting a little bit closer to what is going on in malpractice and still sticking to Jury Verdict data, here are a whole bunch of numbers. The mid-point verdict is this first column, 200, 300, 260, 200, 400, 800, in 1986; 600, 400, 300, that's the middle of the range, so maybe that jumps around a lot.

They do an average value -- 400, 800, 900, up to 600, a million, a million and a half in '86, dropping to 900, 900. The average here rose to 1.4 million based on a very high single verdict. There was one about 54 million, the largest verdict in their study. If you leave out that single $54 million verdict, then that number drops quite a bit.

There was a sharp increase, and it's not as clear that the increase continues. That's one of the possible messages from this data, particularly in what they looked at as the probability range. They think claims are probably smaller, this 200 to 400,000 claims are now probably smaller jury verdicts than they used to. What effect that has on a plaintiff attorney's desire to pursue a claim is a very interesting subject.

(Slide)

The last picture on trends, perhaps, one that I think is the most telling of these is large verdicts. Jury Verdict Research does something that I think I don't really understand when it comes to these numbers, but they do something in terms of getting a normalized view of the large verdicts.

One of the things they do, these percentages are the changes on some normalized bases, so you can't get to these changes from those counts. Looking at the changes, what they think has happened is that after double-digit increases in these million dollar plus verdicts, there was a drop in '86. It has been '87, '88, and '89, what I see from them, continuing in that vein.

The public has expressed, through juries, their willingness to award verdicts is much reduced from what it used to be, and fairly stable. Again, how that affects an attorney's desire to pursue a potential claim is rather interesting.

What this does to reserve development is probably clear. Settlements in 1988 are derived from '84 and prior claims, primarily, especially for these big ones, so what we're seeing in reserve issues is you can settle claims for less than someone could have thought likely back then. The development history that we have, which reflects this sort of increase in large claims, is not really relevant when you're seeing this history. So, that's trends.

What is happening on the price front? Well, not too many numbers, but new headlines from Medical Liability Monitor that reports on a lot of things among physician companies, in particular. Basically, companies paying dividends, stock splits, dividends, rate increases, even the New York doctor filed for no crease in rates. That company was the headline. Actually, they reduced rates. They wanted to hold the premium line; the insurance company wanted to reduce rates.

So, what are physician companies doing? Well, they have various ways of cutting prices. Those companies typically had some form of surplus contribution from an insured and generally those are being reduced, eliminated. Those surplus contributions from the original insureds, they are being paid back.

Companies are starting to pay dividends and the last stage in that process is actual premium reductions, and even that is happening. Prices are much quicker than trends; they are not as interesting as trends. Anybody can make up a price but to figure out a trend, it requires an actuary.

Coverages. Just like in the commercial market, when things get looser, people become more creative, so what is happening in the medical malpractice environment? Well, some of the traditional things are being sold by companies. Physician companies are going into the hospital business and some hospital companies are going into the physician business.

The physician piece is so much larger than the hospital piece that what is more visible is physicians going into the hospital business. Second, physician groups. Just like for the commercial market, there is a pursuit of the account with a lot of premium in one chunk. Physician groups represent one form of large risk.

Any other grouping of doctors or specialties represents a large risk, and there is an increased pursuit of those large risks. Emergency room groups are one example of that. There are quite a few insurers aiming at emergency room groups, pricing it more on a per unit basis and not on a per doctor basis, for example.

The automatic coverage that claims made companies offer, is being broadened reducing the difference between occurrence and claims made coverages. Another group of physicians that some companies pursue are doctors who are in some form of part-time practice. So, companies are trying to be creative in making their product fit the insurance market and maintain or increase their market share. So, I view that as another sign of decrease in the crisis.

The last of those symptoms is reinsurance and what is happening in that arena, first of all, commercial insurance is readily available. When Weavers dropped out of the market, it created barely a stir compared to what might have happen had Weaver dropped out in 1985. So, commercial reinsurance is there.

Besides the fact that commercial reinsurance is there, the individual companies are keeping higher retentions.

They have the surplus to deal with more risk for the kind of reasons that Jim was describing. The risk is less than it used to be. That area of coverage looks more profitable because of the decrease in large claim frequency.

There is talk, but nothing really that substantial yet, of new reinsurance companies, PIAA companies have talked several times about trying a pooling method so they'll create their own reinsurance pool among themselves. So, the reinsurance area is another one where it looks like there is reason to say that the crisis is over.

Enough of the good news. What is the bad news? Good news is boring without some interesting pictures of trends. So, let's have some bad news with some more interesting pictures.

(Slide)

Two views on the bad news that I'll call actuarial uncertainty. Certainly, there is the crisis from the point of view of the customer; that's the most important part. There is still the crisis from the point of view of the actuary. How do we know what is going on out there?

Here, we have some historical average claim costs from which we're going to draw a trend line. This shows the uncertainty in the forecasted average value. There is a substantial amount of uncertainty, enough, if it goes on for several years, enough to drive a company into deep trouble. So, the crisis in terms of trying to get the rates right is still there.

(Slide)

Another view of that question, that's the uncertainty view to projecting trends. Here is uncertainty view to development. This was sort of a process of trying to explain how, when you have data points that look like this, that it's still reasonable to project a pure premium someplace up here (indicating), an argument we'll win here.

QUESTION: Which the insurance department wants to believe.

MR. KAUFMAN: The insurance department, I think, wants us to believe it. So, while the points go this way, we really don't know whether the points are going that way. Just based on the variation in development factors, two standard deviations around the point, by this set of bars, so when you look at points that happen to look like that, it is still not unreasonable to -- or it is still within the statistical realm of what could happen to have a trend like that. If it happens to miss those two points, well, who knows where those points really are?

As time goes on, of course, the curve comes down, but there really is a lot of development uncertainty on early points in malpractice. This is occurrence data, so that gives you a sample of more uncertainty than there would be with claims made. So, we've certainly got uncertainty in the actuarial projections. I want to go back to this slide.

(Slide)

Another factor in "Is the crisis over?", what I call the reversibility question, I won't show my curve, but I'll go back to this million dollar verdict one. That minus 28 happened in 1986 and I'd say all the public awareness of the court system problems at that point in time must have had something to do with that, but there's nothing to prevent this thing from reversing itself in 1990 or 1992 -- 1990 is almost over, so 1992 to 1994. Whatever happens, it will flow back to old years, so from a financial point of view, we're not done yet and almost anything can happen.

(Slide)

In terms of what is happening, we look at the data, but there are lots of things that happen in malpractice data that are not fully visible. We are trying to deal with what will happen when all the claims close. We can see how many are reported, but the fraction that are going to close with payments can change.

As our claim frequency has dropped 30 percent, then are we still looking at claims where maybe half close with payments or are we now looking at claims where maybe three-quarters will close with payments? You can't really tell that until the claims start to close in significant numbers, and that can kind of reverse itself, and the very attitudes can change.

That's another uncertainty in the data and, similarly, reporting patterns, development patterns, all the things that we look at to make those projections, can change in ways that we won't see until we have looked farther down the road. When we add all that up, it probably means that, from most perspectives, the crisis is over.

What is the outlook? Jim talked about 1975 data, the first crisis. He didn't quite say that, but it's just what I remember him saying. In 1975-'76, I read an article, which I wished I'd saved, but what it described was the history of the malpractice crisis back in 1923. I don't think it started in 1923, but that's what the author had remembered or had heard stories of.

So, we've got medical malpractice cycles that are there, just like the property casualty cycles are there, and the history goes way back. Certainly, there was clearly a crisis in 1969 for medical malpractice that happened at the same time as the other P&C cycle happened.

One of the symptoms then was the development of physician-sponsored programs in many states. Some states had programs for a long time. New York had theirs since like 1949, which another date of an earlier crisis, but Pennsylvania had a program that started in 1969-'70 in response to a crisis that was ending, making coverage available through that program.

The cycles used to pretty much follow the P&C cycles and I think what we're going to see in the future is medical malpractice cycles that are not concurrent with the property casualty cycles. There is a market that is specific to medical malpractice.

These PIAA companies write the bulk of the business, and then there are very much 90 percent to 100 percent medical malpractice, usually single state, although that's changing. They write the bulk of the business. Who else writes it? Well, Med Pro writes it and St. Paul writes it, but they are small compared to the physician-specific companies.

So, there is a separate market for MPL coverage that is going to react differently than other companies. They are going to react differently to investment cycles and so on. Also, medical malpractice, when looked at specifically, actually, in some ways, is more like personal lines than commercial lines.

There is a nice exposure if you can look at things per doctor as compared to general liability. When we look at sales per area in the old days or payroll, it really doesn't mean anything because the risks vary so widely in that pool.

When you get down to medical malpractice, you can tell a fair amount just by knowing what the doctors are, at least to a factor of two or three; whereas, in GL, it might be a factor of ten or more, in terms of what the right answer is. For reinsurance, who knows what the factor is?

So, the system, I think, will be more MPL-specific. There are companies who are focused on MPL. There is an exposure base which is more solid than for some of the commercial lines, so I think they will have to react quicker. They did go through a cycle in the mid-'80s when things were harder for them with some tightening, and they came out of that cycle. That was a cycle totally different from the P&C cycle; that's another picture happening in the future.

So, anyway, that was my ten-minute talk. I think, is the crisis over? Well, yes, no and maybe. Thank you.

MR. KIST: Thank you, Allan. Our next speaker is Jim Olzacki, a underwriter from Gen Re who will present the reinsurance underwriter's perspective on the crisis or the lack thereof. Jim.

MR. OLZACKI: My perspective comes in two flavors. As a reinsurer, we get to see numerous companies' reserves, financials and rate data across the country. This gives us a window on the world. Being as large as we are, we have our own set of excess reserves and rate data that is primarily severity driven. From these we can reflect upon the differences or experience differences, between our data and the primary data.

In general Re's view, the primary carrier reserve picture is healthy and it would, indeed, suggest that the crisis is over. This is different from the '85-'86 crisis when, as you well know, the trends were getting a little bit out of hand. From a reinsurance perspective, when I talk a little bit later about the leveraged effect on the excess, you can see why a reinsurer would be cautious, if not lending a strong hand, in the affordability or availability problem that took place then.

The dynamics that act on the excess can be very different, and I'll talk about that later. From our perspective and that of a primary carrier, in recent years, the dynamics that have been acting on frequency have also been acting on severity.

I think many carriers are trying to find out a politically acceptable way of returning dividends without admitting to their constituents that they were overpricing the business. The unexpected decline in frequency created this situation, and it resulted in the reserve redundancies in the more conservatively reserved companies.

I tend to think it probably saved some of the less conservatively reserved companies. There were a lot of companies that, from our perspective were on the edge of survival or at least scrambling to come from behind, and with a little bit of luck, the change in trend has made everybody understand the dynamics a little better.

Everyone has his own favorite explanation for why the frequencies declined. Some of those have been mentioned here: better risk management; tort reform; public backlash; and, others. I offer a couple of additions. I believe the expertise on the defense side of claims management has caught up with plaintiffs' Bar.

I think in the early times of the crisis, it was plaintiffs' Bar that was able to go out there, stir the pot and find some interesting scenarios to be challenged by, and the defense side of the house, both from a law firm standpoint and a corporate standpoint, were not prepared for those defenses and were caught a little unprepared or maybe didn't have some of the best talents out there.

I think today we find that many companies are willing to pay better dollars. They are a little better at finding people whose knowledge and expertise in this area has gotten stronger and, in fact, defense counsel insurance company lawyers are now specializing in specific types of cases -- misdiagnosis, heart attacks, birth-related injuries. It has made life very different for the plaintiffs' Bar.

As a consequence, I think today we find plaintiffs' Bar also looking in other areas, other than malpractice, that is, for their caseload. There is good money in other personal injury areas and they are chasing those, as well. Allan showed the chart where personal injury verdicts are still sizeable, as well, and may be at a trend that is beyond malpractice.

Another possible explanation for the frequency decline could be related to the wave effect or calendar year effect. What we have seen in the past, is that in addition to reviewing malpractice claims' dynamics from an accident year/report year basis, we notice that claims come in calendar year waves.

In other words, when it became socially acceptable to sue your obstetrician, all of a sudden, we saw a large wave of birth-related cases coming in. They came in from all years, all different accident years and time periods once that became prevalent.

Also, as mentioned before, we started to find a lot of OB/GYNs giving up obstetrics. Plaintiffs' Bar started specializing in obstetrics, and enlisting expert witnesses, and all of those cases were brought to court in a compressed calendar year time period. Again, related to the crisis question, it is very possible that now, these cases have worked their way through the system and if there is something we could call more normal frequency, that is starting to take hold.

The important point here is the unexpected decline in frequency that has extinguished the crisis has two frightening characteristics. One, it is not well understood, and its magnitude is sizeable. I think that relates to what Allan mentioned, in that the decline has been sizeable in its magnitude, but we could certainly see a wave swing back up the other way, and we should all be cautious about taking that warning and keeping with the trend as it possibly goes up again.

So, is the crisis over? I'll add a big "for now." I think there is no question that the crisis is over from a reserve -

(Audio interference.)

Did I do something? Maybe the crisis just got started again. (Laughter)

To get back to the crisis or if there will a crisis in the future. What happens if something simple, like mammographies has created some serious side effects? What is going to happen with the AIDS crisis and how will the enormous problem work its way through the medical system?

The surprises of the past were certainly unforeseen. There could be -- or, I should go out on a limb and say there probably will be -- some form of crisis in the future. I think much of what has been alluded by these panelists is the question: What will the size of the crisis be?

But, there is certainly going to be something and it may be something already starting to bring the swing up in frequency. Of course, the other side of the pure premium equation is severity. That has been continuing along, I think, for a number

of years at ten or 12 percent and even larger than that in crisis years.

The future environmental factors could bump this up. Some of these things that are out there on the horizon -- for instance, there is a National Practitioners Data Bank. This is a system where doctors who have had loss activity will be reported, a little bit like your auto driving record, and it will go against their record and, theoretically, it could cause their rates to go up personally.

I suspect that in the future, we will see a lot of finger pointing between doctors who will not want their losses reported to the data bank and charged to their record. Physicians with less than a 50 percent negligence in their eyes or even in their company's eyes will be less likely to settle.

Any case, for that matter, is going to be less likely and harder to settle. Companies without consent-to-settle language in their company's favor in their policies should certainly expect problems. This will not only affect the frequency but I think, more pointedly, will affect the severity of these losses.

Another area that could be bumping the trend up in the future, again primarily, maybe in the severity area, is the growth in self insurance. As you have all of these favorable results taking place, there is more and more self insurance going on and as more and more insurance retains significant amounts of risks themselves, reserve adequacy will be harder to monitor and maintain both from an actuarial standpoint and reinsurer's excess standpoint.

The diligence of non-risk bearing third party administrators when setting reserves in the face of a dramatic shift in frequency and severity will be severely tested. Of course, I think another thing we have to remember is that, as the self insurance process grows and the number of people self insuring themselves grows, you will find fewer and fewer qualified third party administrators available. At least, there will be a lot of on-the-job training going on.

I suppose now is a good time to talk about reserves from General Re's perspective and what it tells us about the crisis. The picture -- I guess I expected to have something different to say, as my pitch is always that the excess acts differently and the reinsurers act differently, but from our reserving standpoint, the same dynamics seem to be taking place in our reserves as in the primary frequency area.

The same benefits that our clients have felt from the decline in frequency have emerged in our book. On both our occurrence run-off reserves and our current claims made reserves, we have a sense of comfort. We are not posting reserves as high as we once did during the crisis.

Building a conservative reserve position, of course, is one of the cornerstones of General Re's philosophy and strategy. I suppose in kind of a sideways fashion, we are always looking for a way to post stronger reserves. Even we are admitting that things are looking pretty comfortable right now.

The only caution we have is I mentioned about the leveraged effect and the dynamics. Our reserves are in line with the current trends and not building up the kind of steam that would lead to a tougher reserve scenario, even according to our head actuary, Lee Steeneck.

He says, "The crisis for occurrence malpractice is indeed over, and we are comfortable with our reserves allocated for it." I've got to tell you, that's a pretty strong statement at General Re, because for years and years and years, we sat down and figured out just how much more we were dumping in the pot for occurrence reserves.

As I noted earlier, we are also comfortable with our claims made reserves. Of course, this comes from our affiliation with long-term claims made carriers, resulting in 15 years of experience and data associated with it. So, again, our reserves look good but we have our concerns.

As stated earlier, frequency can jump around with volatile movement. Our problem is still a little related to the occurrence problem, in that we have a time lag scenario in reporting. Most of the primary carriers, by the end of the following year after their report year, have a pretty good idea of what their loss scenario is going to look like; General Re's situation is very different from that.

Looking at that lag from General Re's perspective, if you took a company that had, say, ten losses or twenty losses for $100,000 and they've been in it for a long period of time, they figure that these are all going to go for $100,000. They put a reserve up for $100,000. Some of the losses are closed without payment; some of them go for a million dollars.

When the scenario ends, they've paid out $2 million. They are right on the money. The $100,000 reserve looks good on each of them. They've reported nothing to their excess reinsurer. The reinsurer is sitting there four or five years later, and they report the four or five cases that went for a million dollars. As a consequence, our trend is looking pretty ugly, because we only have those five cases.

So, is the crisis over? Yes, it's over, but from a reinsurance perspective, we have to stay cautious and concerned about the communication with our clients and try to identify how many of those cases are out there, because they are in every day malpractice.

The lag between our results makes it more difficult to draw conclusions and to figure out trends, whether they are up or down. Another area of concern for the excess carrier is the ever-increasing severity trend, as I mentioned. Any trend rate applied to the fixed retention will result, in the long run, in a need for a higher rate increase in the excess than in the primary.

This is another problem that we have, mostly from a rating standpoint as opposed to a reserving standpoint, in explaining to our clients that even though it may be reasonable to have a five percent trend on their whole book, the components for that may be a five percent decrease for the frequency area and a ten percent increase in the severity area or the reinsurer's rate. Try selling that one in the marketplace; that's what we call the leveraged effect of inflation.

In closing, as I've mentioned, it certainly appears that the crisis is over. That is not to suggest that the mechanics of loss activity are not out there working right now; it's just that it seems to be more controlled, more understandable, and more predictable, at least from a rate making and reserving standpoint.

We are not caught up in a run-away trend, making your work that much harder or impossible. Our environment and society seems to exist from one cycle to another. Insurance is no different, and malpractice has been a volatile subset of that with deserved concern and attention.

Will there be an uptake in the future? I think so. Will it be controllable and predictable? I hope so, if we are willing to accept and respond to the early signs. Will there be another crisis? I think that is really what nobody knows, and only time will tell. Thank you.

MR. KIST: We have completed the speakers' portions. If there are any questions from the audience, we can get started with a few questions. If not, I have got a few up here just in the event that nobody does have a question, although I think you folks will begin to have -- yes?

QUESTION: My point is in regard to the comment that --

MR. KIST: Would you mind phrasing it in the microphone so we can get it on the transcript? Thank you.

QUESTION: I don't think it's on, but I'll do it anyway.

MR. KIST: Yes, it's on.

QUESTION: With respect to health costs relating to med-mal, it would seem that there should be some sort of inverse relationship in the sense that the more preventive medicine that is done, the

more likely that frequency will be affected the opposite way. The overall cost to the public would be about the same, but the med-mal costs would go down. Has anybody looked at that, or is that just a possibility?

ANSWER: If your comment was directed at my comment about the health care CPI, I was really talking about a different issue, although I'll come back to your question. The health care CPI measures consumer out-of-pocket expenditures for health care. It does not measure the insurer's cost for health care, so it doesn't have much in the way of hospital cost trends. It doesn't have -- it may have some long-term care in it, but not hospitals, and a mixed bag on physicians.

So, when you look at CPI numbers, health care, the relationship of those numbers to increases in health care and sort of true health care costs, it's not a close relationship. In terms of defensive medicine, that's kind of a big area. In terms of orders of magnitude, the AMA estimated that defensive medicine might cost $40 or $50 billion a year.

The malpractice system for physicians is perhaps $4 or $5 billion a year, so that the leverage there on the defensive side is enormous compared to health care systems. From that perspective, it's probably not true that defensive medicine is the inexpensive way to control malpractice costs.

MR. KIST: Glenn, go ahead.

MR. MYERS: Glenn Myers, ISO. A couple of months ago, I read an article by a couple of UCLA law professors called "The Quiet Revolution in Liability Claims." The thesis of it is that eight years of Reagan judges, Reagan-appointed judges, is starting to have an effect. It's a slow effect, but it's there. I think that provides a rationale, if true, of what we are seeing.

Would any of our panelists care to comment?

ANSWER: This is a nonpolitical speech. No, I don't have any comment about that.

MR. KAUFMAN: I've heard another discussion in terms of a specific related to that in terms of what sort of scientific evidence is permitted in courts. Historically, courts used to be very skeptical of scientific evidence, and what they would admit was mainstream science. Then, they moved to admitting more of current events science. Cold fusion, for example, is current events science as distinct from a "that's not possible" kind of science, and let the jury decide.

They were saying there is sort of a trend back towards mainstream science as being what is admissible. Certainly, in terms of creating new cutting areas in malpractice law, you need some medical science to go with it and, the more confined the judge

is, the more control there will be over the system. I think that is one example of an area where the judge could have an impact.

On the other hand, that big shift in 1986, I can't believe that is related to a turning point in the appointment of judges as distinct from a turning point in the public's perception, then expressed through juries.

ANSWER: I think, also, in conjunction with that, you can probably look back over several years and see the type of case that was being presented -- RLF is a good example of that, where oxygen deprivation was found, subsequently, to be a cause of blindness in babies.

That was a thesis that was allowed to be used in cases, following up on Allan's thought, whereas, nowadays, I don't think that's happening quite as much -- i.e., retrospective looks at what could have been done, what is being done today is being applied to a practice that was done four or five years ago, so it's not a retrospective application of new technology to past circumstances when that technology was not available.

QUESTION: A question regarding loss adjustment expense. We've had a lot of graphs showing severity-frequency trends, but we really haven't talked too much about the allocated loss adjustment expense cost component here, and that is a significant piece.

A question to the panelists: What are your observations on the allocated loss adjustment expense cost trends? Have they levelled off or reduced or are they continuing to increase?

MR. HURLEY: I think in what I have seen, it's probably an oversight on my part, that's probably another area where many of these captive companies are focusing their attentions today. They view that as one of their uncontrolled costs.

They feel comfortable with where I think they are from the standpoint of trend and pricing and things like that, at this point in time, but one place where they believe they can do many things and one place where they have, I think, done things inadequately in their own eyes is in the area of managing allocated loss adjustment expense.

In a way, one can view it as giving the keys of your car to the defense attorney and letting him drive your car off. I think they feel a lot of this has been out of control. It has been a source of deficiency and a source of -- I think in their eyes -- mismanagement, because they haven't managed that more effectively.

I think actually there is a study that ISO released probably a year ago now, where they identified allocated loss adjustment expense as a more important source of reserve deficiency than

indemnity reserves. So, I think in most people's eyes at this point, it's an area of great focus.

They are focusing on that issue. A lot of these companies are entering into arrangements with law firms to affect more economies, given the club they now wield in terms of the dollars they manage. So, yes, I think it's an area that they're looking at and it has been an area where there have been problems.

MR. KIST: Allan.

MR. KAUFMAN: I think I find that to be a mixed bag. It depends, state by state. In some places, it seems to be under less control than others. You asked the right question, as I have a slide. There could be one state where it looks like there is increasing stability in the allocated costs.

MR. HURLEY: Are you sure you've got it the right side up now? We could turn it upside down.

MR. KAUFMAN: On the other hand, it is also true that, in estimating allocated expense costs, that's a longer tail line of business than indemnity is. A lot of the cost is expended on the final weeks in the life of a claim and on the bigger claims, so that you've got a real long tailed line of business here, so those projections at the end of '87 and '88 are very suspect. We didn't draw any confidence bounds on this one.

MR. KIST: Jim?

MR. OLZACKI: Our views at General Re are much the same as Jim and Allan mentioned. What I mentioned in my speech, with the expense amounts that are now being spent for defense counsel and building up a case preparation, I don't know if I'd call it run away, but it's distinctly one of the things that is increasing at an increasing rate and, in some companies or states, getting enough out of control, where it will put our emphasis on risk management.

In our underwriting reviews and visits, we get a lot of comments coming back on our reports, where information is referred to as "abandoning case to counsel," or the run away pocketing the keys to the car. I think that's the biggest control problem now, and I see some operations bringing in personnel whose job is litigation management and litigation control, to try to control their defense counsel.

QUESTION: Does any of these data include claims against holistic practitioners, and how might a movement towards more holistic health care affect trends in the future, and how may it have affected trends in the past?

MR. HURLEY: All the charts that I have are -- well, I guess they vary. Typically, physician company data, which may or may not

include -- it would include physicians going at things that way, but not non-MDs. Some of it includes some JUA information, which would have whatever is permitted by state law.

So, as to what is in the pictures you saw, it is probably a mixed bag. As to what you are really asking, how that will affect it, maybe I could pass the ball to somebody else. What is the correct answer to that question?

ANSWER: Taking the question and perhaps generalizing a little bit, I think there has been a trend in the way in which the practice of medicine has changed, where there has been a trend, for example, to midwives and things of that type, where there is a different level of expertise and perhaps a different level of expectations.

It is not clear that, over time, that adjustment will be made equitably and reasonably and, therefore, it may contribute to trends, losses and things like that, in the future, disproportionate to what is expected. Right now, I think that the trend is for nurse assistants and midwives and things like that to be out there and be covered by insurance, and it's not clear what effect that will have in the future.

MR. KAUFMAN: I defer to the questioner.

QUESTION: I don't know if I can give an answer. I think there is more active participation by the patient rather than the (Inaudible)
and also a treating of injury to certain parts of the body.

MR. KIST: Additional questions?

QUESTION: Just a comment. Maybe the patient can sue himself, then. I did want to follow up on sort of the same line, the change to HMOs. Of course, the purpose of an HMO is to control medical costs, but if you control it too much, there may be the possibility of increased malpractice claims.

Does anybody have some data or see any indications on that?

MR. OLZACKI: I can't respond to it from a data standpoint, since I mentioned, reinsurers get the data so much later, anyway. But with the reimbursement problems that hospitals are having and issues like that, I mean to say they are not overbedded. They are trying to get beds for people that they are going to get reimbursement from.

They are pushing more people out of the hospital and into the HMO environment and, as a consequence, I think there are people who need to be in a hospital that we're finding in an HMO environment, and I think that's going to lead to more problems.

ANSWER: It has been a concern for oh, five years or more, expressed among clients that I've had. There are still very few examples of, "Here's the case that derived because the patient got less than what was retrospectively viewed as the appropriate level of care." So, I think that is one where the jury is still out.

MR. KIST: There is a question in the back. Al?

QUESTION: I'll stay here and just stand. The trends in frequency, the graphs of claims

(Inaudible).

I'm wondering if there is any track record of claims reported for occurrence year. Has reported speeded up or down? Could we analyze the shifts in frequency against the occurrence year?

MR. KIST: Let me restate this for the transcriber. Have we reviewed the frequency trends on an accident year basis, and are they consistent with what we've seen in the report year data? Is that it?

MR. KAUFMAN: I have looked at accident year data and I think, generally, there is no consistent shift in reporting patterns that I've seen. Then, it gets down to individual data sets and what is an individual company doing. In my experience, there's no clear pattern of a change in reporting patterns.

ANSWER: I guess I see different states' data that have reflected different results. These companies that were formed as an outgrowth of capacity problems in the mid'-'70s in particular are extremely focused on risk management. One feature of that program is early reporting of claims.

They are managing themselves in that regard and, as a consequence, in some cases, you can see an acceleration is observable in the data. I would say that it is not consistent, as Allan was saying, across all companies.

I don't think a lot of the companies have been as successful as some others, but it's clearly a feature of their risk management programs and an intent on their part, so I would expect that that should happen over time. In some companies, it's very obvious that it has been accelerated.

It is also difficult, because now you don't have good accident year data anymore. It's hard to layer that stuff back and get at it.

QUESTION: Let me ask the question a different way. In a report year, how many claims are occurring in accident year, in prior accident year, in prior accident year? Am I seeing the tail here fall off in the early years (Inaudible).

MR. KIST: I can't hear very well. I think what you asked was: Do you see the long tail shortening?

QUESTION: Are the reports coming in faster or are they shifting forward into the early reporting periods?

ANSWER: I think in one case I can think of, that's true.

MR. KIST: Yes, Chris?

QUESTION: I'm looking at the medical field and some of the technological developments such as

(Inaudible)

for anesthesiologists, better scanning tools like MRIs. Is that apt to cause more of a one-time phase shift in frequency and severity or can we expect that maybe technology will push the trends down further in the long term?

MR. KIST: How will technology affect it or will technology affect the reduction or frequency of claims and how might that change in the future. Would that be fair?

QUESTION: Yes.

ANSWER: The pulse oximeters is a prime example. Anesthesiologists' rates have finally been going down, I don't know, would you say for the last two or three years? Much like the community, you would talk about looking at trends and say, "Is this an aberration and anesthesiologists' should come down."

Mass JUA (phonetic) I think did a study and a couple of other studies that were done, as distinctly between a pulse oximeter and carbon dioxide measuring equipment. There is no question that that technology has made that a much better field. I think that's probably a safe generalization across the board.

MRIs on the other hand, I think are a little bit related with loss or defensive medicine and expenses. I see IC physicians out there ordering MRIs for sore muscles and bones and, you know, that's like an $800 or $900 visit. So, technology is certainly going to make things better. It may cause some costs to go up. I think people have to figure out when to use them and when not to use them.

MR. KAUFMAN: On the technology, the anesthesia is an example that all the specialties would like to be able to duplicate, because the technology has been so clearly helpful in reducing frequency, severity and rates.

When you get to diagnostic technology, that usually comes in a mixed bag. The first thing that happens is you get some new claims related to the failure to use it, the interpretation of

it, so you get a body of new claims. At the same time, you may eliminate some of the older kinds of claims because the technology has helped identify and make more routine an accurate diagnosis.

So, it is not clear. Some technology is good from a malpractice perspective. Some may be good from the health care perspective but bad from a malpractice perspective and maybe from the health care cost perspective.

QUESTION: From a financial statement standpoint, because companies have perhaps collected more premiums than necessary to cover expected losses, and perhaps they don't want to return them in forms of dividends, has anyone noticed a trend or a change in undiscounting by companies, either reducing the discount assumption or just eliminating the discount by increasing the reserves? Any observations on the panelists' part on that?

ANSWER: I would guess that the fact that these companies have had more favorable results has influenced, to some extent, their attitude about discounting loss reserves. If you were to survey the 40 or so captive companies that write physician coverage out there, I would say that probably between ten and 15 of them are discounting. Their insurance departments have allowed them to do that and they have done so.

Of that ten or 15, I would say that probably half are moving away from discounting. Whether it's a function of new found riches or some puritan ethic about discounting or whatever, I'm not sure you can point at one and say that that is the actual reason, but it's clear that there is a tendency towards trying to undiscount those reserves, and it probably does relate, to some extent, to better financial results.

MR. KAUFMAN: I'd agree with the trend that Jim is describing. Another one of the factors that is contributing to it is the interest of these companies in doing mew things, so now they are interested in -- one example, a company wants to expand its authority, and the insurance department then says, "Okay, but we want you to reduce the discount." So, because they want to do something new, they are under department pressure to reduce the discount, and they can afford to do so.

In another situation, a company starts to get interested in having a Best's rating, whereas, they were perfectly happy with the nonapplicable type rating that best used to give them, again, because they want to do new things.

So, related to increasing financial strength comes their company's desire to do new things, and that kind of has some various forces, then, drive them more into the mainstream.

ANSWER: I guess I agree with most of what has been said. I don't see undiscounting going away. It appears to me it may be

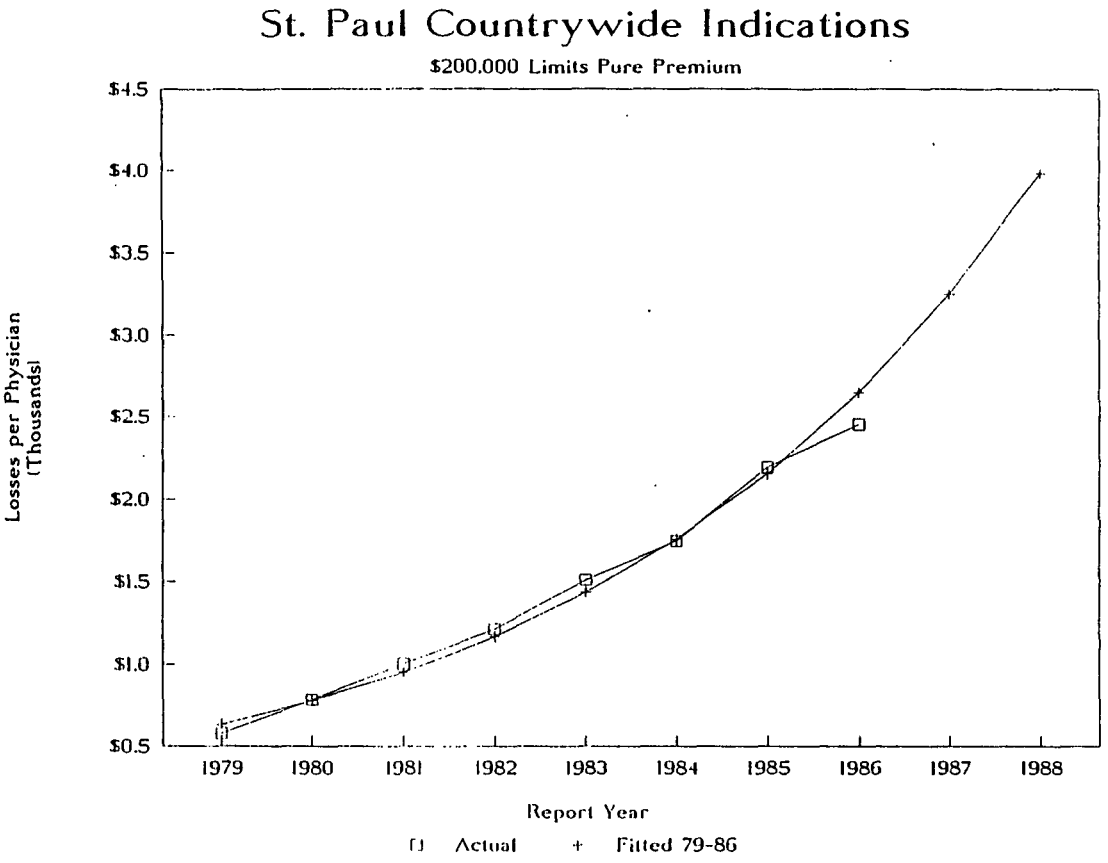
tied to what has been happening in interest rates, where company's philosophy and maybe their feelings financially towards conservatism are not, and they can all afford things a little better now.

It would seem to me that as long as, for tax purposes, they have to discount, that they'll continue to discount otherwise, as well.

MR. KIST: Any more questions from the audience?

(No response.)

MR. KIST: In closing this session, I'd like to ask you to join me in a round of applause for our panelists.



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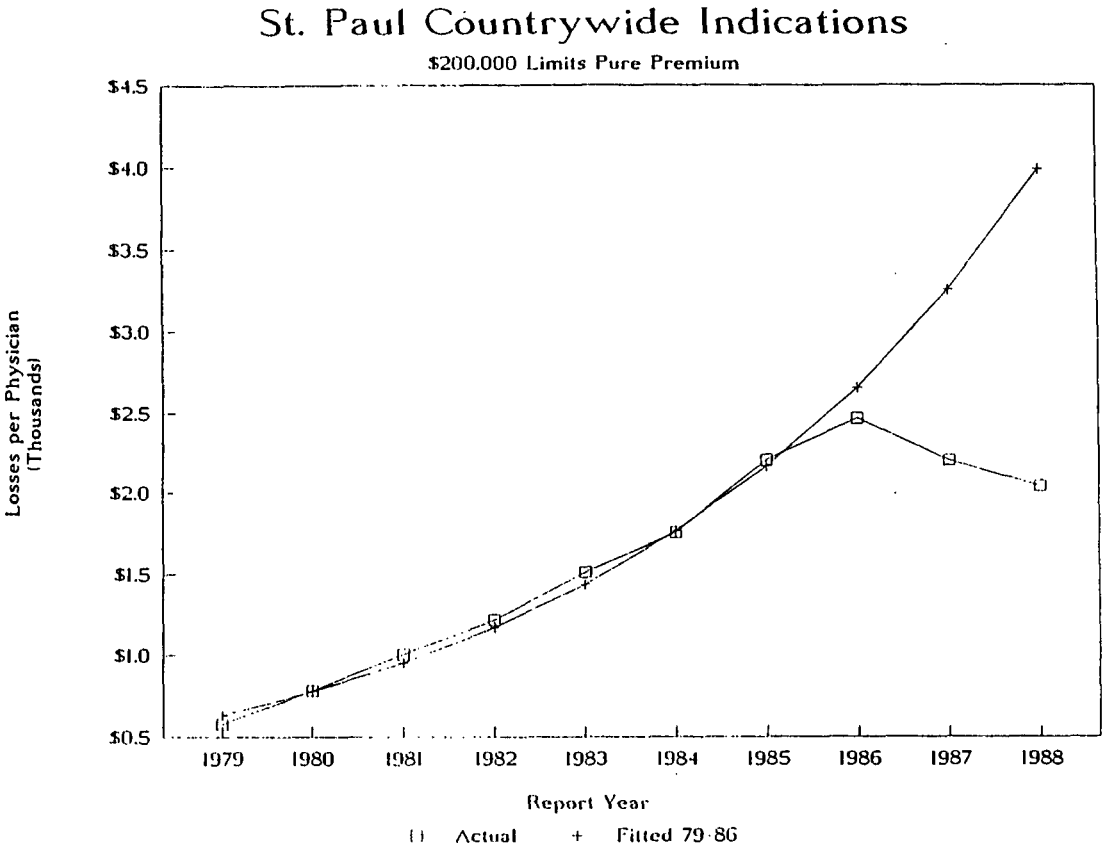

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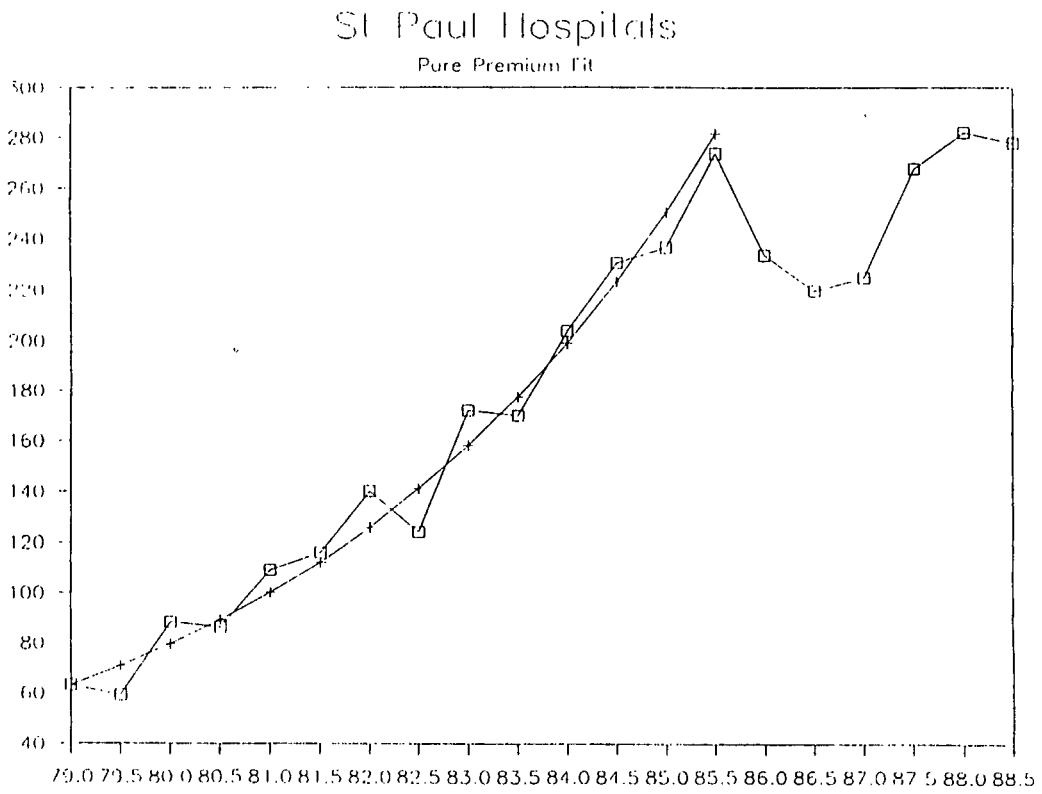

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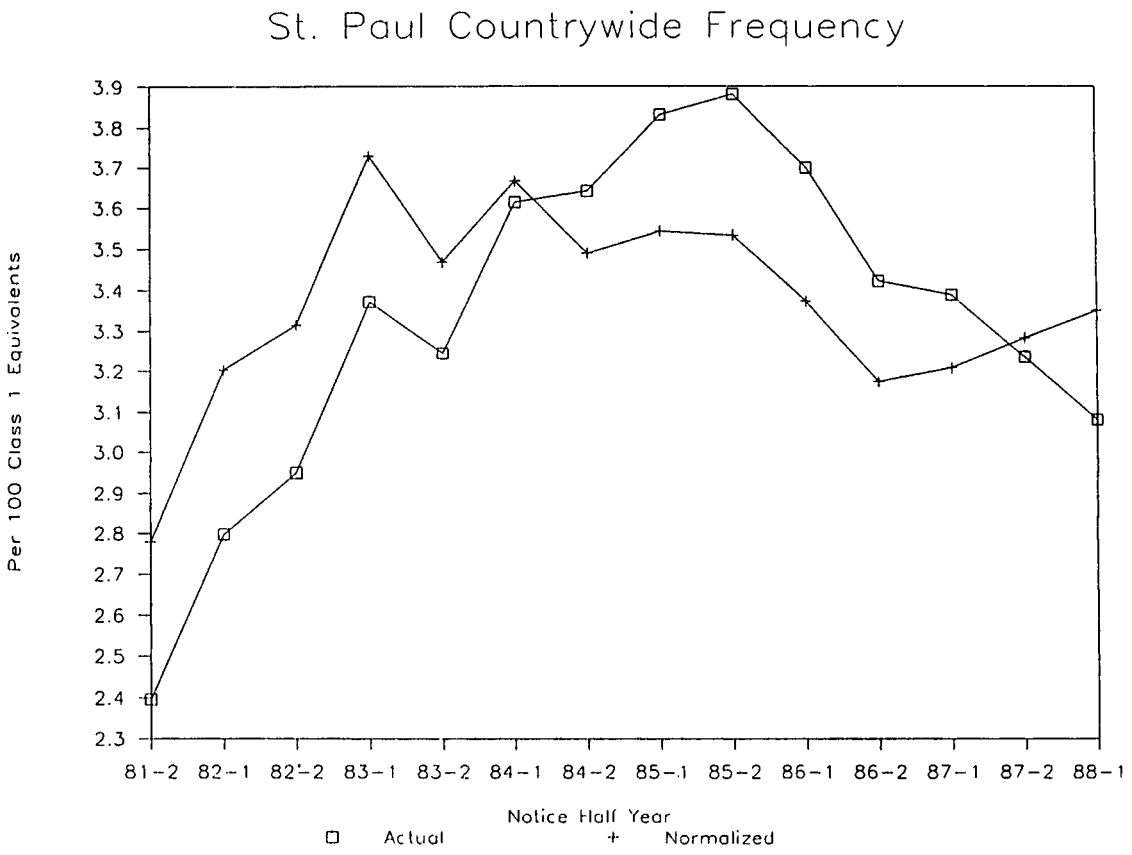

Slide 4

ST. PAUL FIRE AND MARINE INSURANCE COMPANY (CONSOLIDATED)

RETROSPECTIVE RESERVE TEST (MILLIONS)

Statement Valuation Year	Initial L&LAE	Restated Incurred Subsequent to Statement Year Number of Years						
		1	2	3	4	5	6	7
1981	618	550	509	524	512	518	518	519
1982	814	752	766	741	743	744	744	
1983	1,087	1,098	1,070	1,084	1,081	1,085		
1984	1,452	1,468	1,501	1,507	1,507			
1985	1,989	2,038	2,041	2,045				
1986	2,723	2,687	2,683					
1987	3,467	3,441						

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MEDICAL PROTECTIVE INSURANCE COMPANY

RETROSPECTIVE RESERVE TEST (MILLIONS)

Statement Valuation Year	Initial L&LAE	Restated Incurred Subsequent to Statement Year Number of Years					
		1	2	3	4	5	6
1983	742	723	742	770	818	860	873
1984	819	838	860	910	960	980	
1985	959	961	1,019	1,087	1,115		
1986	1,131	1,165	1,216	1,253			
1987	1,309	1,343	1,391				
1988	1,505	1,540					

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PIAA CONSOLIDATED*

RETROSPECTIVE RESERVE TEST
(MILLIONS)

STATEMENT VALUATION YEAR	INITIAL L&LAE	RESTATED INCURRED SUBSEQUENT TO STATEMENT YEAR NUMBER OF YEARS					
		1	2	3	4	5	6
1982	1,760	1,797	1,818	1,854	1,922	1,928	1,958
1983	2,292	2,324	2,399	2,480	2,500	2,537	
1984	2,920	3,026	3,120	3,141	3,197		
1985	3,777	3,877	3,923	3,977			
1986	4,736	4,774	4,812				
1987	5,683	5,685					

*EXCLUDING NEW YORK

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1990 CASUALTY LOSS RESERVE SEMINAR

1E: REINSURANCE RESERVING

Moderator

Gregory T. Graves
Milliman & Robertson, Inc.

Panel

John A. Pagliaccio
MONY Reinsurance

Marvin Pestcoe
Milliman & Robertson, Inc.

MR. GRAVES: Welcome to Reinsurance Reserving I. This session is designed to provide a basic understanding of loss reserve principles, considerations and techniques as applied to reinsurance assumed. We also should note that this session is not intended for experienced reinsurance actuaries.

My name is Greg Graves. I am a consulting actuary with Milliman & Robertson and I'll be the moderator.

I'd like to start by a show of hands if you have background in reinsurance, not necessarily reserving, but if you have any background in reinsurance, could you raise your hand? Most of you. Okay.

We're going to try to address four objectives in this session. We will be having four mini-sessions, if you will, to cover each one of these.

First we'd like to start with a brief review of the types and forms of reinsurance and then we would describe generally how reinsurance reserving differs from primary reserving. Our third objective is to describe some of the more common methods used in reserving and we'll have a reinsurance example to illustrate some of those. And finally then we'll discuss some of the problems and considerations that one needs to keep in mind when you are applying these methods to a reinsurance problem.

I'd like to introduce the panelists to you. To my immediate right is John Pagliaccio and John is currently vice president and actuary of MONY Reinsurance Corporation in New York. He has the responsibility for loss reserving there. He is an Associate of the CAS and a member of the American Academy of Actuaries. Over the last eighteen years John has held positions in both pricing and reserving of primary companies, as well as having experience in actuarial consulting before joining MONY Reinsurance.

Our other panelist is Marvin Pestcoe. Marvin currently is working in the New York office of Milliman & Robertson. Before starting at M&R in January of 1989, he worked for six years at Prudential Reinsurance. He has a degree in economics from Yeshiva University and he became an Associate of the CAS in 1989.

We have a lot of material to cover, so we think if you could hold your questions on each individual session until the speaker is finished, that would expedite things a bit. But please feel free to ask questions at the end of each of our four mini-sessions.

So without further adieu, our first mini-session will be the brief review of types and forms of reinsurance and John Pagliaccio will give us that. John.

MR. PAGLIACCIO: This is a brief review of the types of reinsurance that you have to pay attention to for reserving purposes. When you think of defining the scope of a loss

reserving review for a reinsurance company, it can be arbitrarily divided up. A bout one-third of the job is just getting at the issues, trying to figure out what types of business the company has done. About one-third of the job is collecting data for whatever types are defined. And the last third is the actual actuarial calculations.

You can start off by dealing with the first third of the scope. Can you all see this?

(Slide)

PARTICIPANT: I can see it.

MR. PAGLIACCIO: The first distinction you should be making when you set reserves for a reinsurer is between treaty and facultative business. If we could have a show of hands for people with some amount of experience in reinsurance? Let me define facultative as a certificate providing coverage on one specific risk. An individual risk coverage. An example would be, say property and business interruption coverage on the Bay Bridge in San Francisco.

The risks are not necessarily homogeneous in facultative, but it would be limited to coverage on individual risks as opposed to treaty. In each treaty you have a collection of risks, whether you are covering a program or department or some other collection of risks from a ceding company. It could be an entire line of business. There is going to be obvious differences between treaty and facultative when you are reserving. Not the least of which is that the data may be collected differently for treaty versus facultative business. You must pay a lot of attention to how the data is collected. Facultative data it is going to look like primary data since you have an individual risk and individual claims information. In the treaty data you may or may not have claims information.

The next distinction you want to draw is between domestic and international business. The international business presents the extra difficulty of the translation and transaction currency problems. We are going to talk about domestic business and all U.S. denominated currency only. But when you have domestic and international business both you have an extra amount of work.

The third distinction we have is for brokered business versus direct business. In the reinsurance market today, there are basically two sources, two methods of marketing reinsurance. One is through the independent brokers and the other method is direct. The largest reinsurer, Gen Re, is a direct reinsurer. Others are exclusively broker. Some reinsurers are mixed.

If you are a consultant and you are working on two reserving jobs simultaneously, one for a direct reinsurer and one for a broker market reinsurer, you would undoubtedly find differences in loss

development patterns between the two sets of data. There is extra time lags obviously in brokered business with an intermediary in the reporting process.

There are also quality differences. Generally, direct companies have better quality data than the broker market companies do.

The fourth distinction we are making is between a primary company or another reinsurer who is ceding business to the reinsurer. Are they reinsuring Aetna or State Farm or is their business retro coverage on another reinsurer. In the latter instance of retro protections, there obviously is an additional time lag in the reporting. We will focusing in our example, on business ceded from a primary company. Generally, you have to at least consider in the beginning reserving separately business ceded from primary companies and business ceded from other reinsurers.

The first four categorizations are unique, in effect, for reinsurers. The last two are: casualty versus property and proportional versus nonproportional coverage. Casualty versus property lines may be the most important distinction that primary companies will focus on. However, like everything else in the reinsurance world, it's going to be different for reinsurers than for primary companies.

When you define lines, casualty versus property, to do your reserving exercise for a reinsurer, the problems will be with treaty business. You will find normal lines covered on some treaties, for instance, the treaty that would cover medical mal or a D&O program and that would be the sole subject of the treaty. Then there would be multi-line casualty occurrence excess that combined auto and workers comp all in one treaty, for example. You can have treaties covering umbrella business with poorly defined lines. Finally, you have mixed casualty and property treaties, perhaps an auto quota share combining liability and physical damage all within one treaty.

What you find in practice when your objective is to set reserves is a mix-and-match situation. You need loss development to reach the objective. You have to, in some sense, sort all these lines to try to find homogenous and credible groups for loss development purposes even when the lines are not well defined in your data or mixed in your data. Again, part of the problem or the solution is kinds of data you collect, and part of it is a function of what the underwriters have been reinsuring and what they tell you they think they have been reinsuring.

The last and perhaps the most important distinction is the form of reinsurance. Generically, there are two forms. One is sometimes called proportional or prorata, and the other called nonproportional or excess coverages. Proportional comes in two flavors, quota share or surplus share. Generally it's just the ceding company sharing with the reinsurer some percentage of the business of premiums and losses. Obviously it can get more

complicated than that, but proportional is basically that. It has some of the "symptoms" of primary development.

The nonproportional excess comes in a variety of flavors, of which this lists just a few: written on a per risk or per occurrence excess basis, or with aggregate retention and/or aggregate limits, and clash coverages. Let me define the last two for you or give you examples of the last two. The most frequent of the aggregates is product aggregates. While the treaty may be written on a per occurrence basis, there may be a provision for the ceding company to keep and aggregate retention and a single aggregate limit on drug products, for example.

Clash covers usually involve retro protections. The ceding company's retention is greater than any single limit that they are writing on a coverage. So you need a pledge. You need two of their risks to be involved in the same occurrences for recovery under the reinsurance clash coverage.

Without getting into detail on the forms of excess coverages, each one of them differs from the development perspective and from the ultimate loss ratios anticipated. You are going to have to sift-and-sort. Sift through all the different areas to get the homogenous groupings, in order to organize the task of loss reserving, before you do any calculations. You have to sort through all the history of the business to figure out what you are reserving on.

That is basically the outline of the first step of the reserving task.

MR. GRAVES: Any questions for John on definitions, types of reinsurance? Yes.

QUESTION: I'm running across reinsurance contracts and some of them are types of occurrence contracts and others are (inaudible) contracts. They have to be separated in reserving?

MR. PAGLIACCIO: In all cases you have to deal with these things practically. The first step is for you to understand what is in there. The second step is to see what kind of data you have available. And the third step is just to see what's feasible.

I work at a reinsurer that's really not very big. We have a relatively long history, ten or twelve years, but it is not Gen Re. I run into the problem that you run into by finding contracts that fall in this category and contracts that fall in that category that conceptually should not be grouped, but I don't really have much choice. At least I know what I'm grouping though.

I mean, the obvious example...suppose you have one risk attaching and all the rest of them are written on an occurrence basis.

QUESTION: (inaudible)

MR. PAGLIACCIO: Well, there is timing differences. You can actually make an adjustment for that. But, I think you're in for in a...

ANOTHER PARTICIPANT: But in the real world sometimes you can't.

MR. PAGLIACCIO: You can, but you can't reserve for them individually.

The first and greatest burden of reserving for a reinsurance actuary is understanding what the book of business is. And whether you are a consultant or an inside actuary, you should be doing investigative work, trying to understand what that book of business is and how losses conceptually should be emerging and what the development patterns and the loss ratios should be. And after you get it all done you can start all over again, because whatever the underwriters have told you, it may not be wrong, but it left something out.

MR. GRAVES: I'm sorry, you were talking about...(inaudible).

(Slide)

MR. PESTCOE: Well, I'm going to talk about some of the things that make reinsurance reserving different from other reserving. I guess the natural place to start is the report delay. Obviously, the first significant differences between reinsurance reserving and primary reserving is that reinsurance claims generally take significantly longer to report.

There are several causes to that. For excess reinsurance a claim must be reported first to the primary company (inaudible) ceding company that stays (inaudible). But in addition to that the claim has evolved to a level where the retention is what? So now you have an additional (inaudible) that goes on and (inaudible). Finally, (inaudible) you have the claim reported from the ceding company to the insurer. So you have an additional (inaudible).

I think it's obvious to most people involved in reinsurance reserving that excess of loss reinsurance has a considerably longer delay than primary insurance. I wanted to mention that even for proportional reinsurance where you cover first dollar. Even that has a delay. That delay is caused by reporting from the primary company to the reinsurer. Now often the (inaudible) for property reinsurance, the reports are made on a quarterly basis and so it is not a (inaudible) of the year even for property (inaudible). It has a much longer report delay. It has a number of implications. The first is that very often the...you'll have internal data available that will allow you to figure out the ultimate value of claims (inaudible) to loss development terms, all the way from the inception of the accident year to ultimate. In other words you will have approximately

(inaudible) tail factor. A tail factor where you won't have internal data to guide you or where the internal data is so old that it is no longer re levant to your own book.

Another implication of this report delay is that you are going to have immature years, not even the most recent accident year, but what possibly several accident year where (inaudible) may not be reasonable. (Inaudible) usual pattern (inaudible) of ten or fifteen when you are dealing with reinsurance. And obviously if you are trying to leverage off of five or ten percent of the ultimate losses you are a small change in (inaudible), you have a leverage impact and make a (inaudible) somewhat unreliable.

(Slide)

Another important difference, although you have to (inaudible) special consideration for reinsurance is in how you group your data for reserving analysis. Now, in the farming reserving environment, probably most important (inaudible) is line or subline (inaudible) for reserving. For reinsurance, first of all that's something not possible for a reinsurer for writing insurance. You often can't get that final breakdown. Now, not just (inaudible) for reinsurance. For excess reinsurance, even if you could break it (inaudible) which you sometimes can, often that is not the most important breakdown. Often the accountants (inaudible) particularly the (inaudible) is at least as important as line of business. If you get...for certain layers, it is true that, you know, if this is a high excess auto treaty it would probably drop more like a high excess general liability treaty than it will like a working auto treaty. So it is more important to group things based on the casualty point than it is to even to do things by line.

One other thing to note about reinsurance data grouping that I don't have on the slide is that you often need to be more conscious of exclusion. It is sometimes more important what you exclude than even what you include in reinsurance. Things like asbestos, pollution, the (inaudible). There are a number of types of claims rather than types of exposure which in reserving you have to be aware of your data and meanwhile want to exclude before you do your analysis, because your developing patterns are so different for other things within the group.

The implications of some of these issues are that the data groupings in reinsurance are less homogenous than for farmer. For farmer if you want a grouping (inaudible) you can pretty much do that. For reinsurance it bothers me, as John said a moment ago, talking about the difficulty if not impossible to get a chronical database on a homogenous basis for reinsurance, because there are so many things that affect the report dates. On this line that is the (inaudible) point (inaudible) on the basis of (inaudible) and also what type of claim it is, an asbestos claim. So you often end up with less than homogenous or less creditable groups than primary.

And finally I just want to reiterate, and I know that I mentioned (inaudible) reiterate, that it is very important to analyze excess reinsurance by (inaudible) point. As I said, often that is the most important. It sometimes better to get things high excess (inaudible) and low excess. Even if you can't (inaudible) low than you can by line of business.

(Slide)

Now the next issue is something which doesn't take long when you are analyzing reinsurance reserving to notice that this development considerable instability in the historical development. John is going to be talking about this a little more in the next section, but I just wanted to mention a couple of things about it. Obviously, in primary reserving to use (inaudible) encounter instability in historic development factors, but I think that it is significantly more of an issue for reinsurance. And I just wanted to mention a couple of reasons for that.

One reason has to do with...I'm going to skip the second one...the reason is that (inaudible) that you often have a (inaudible) to make a difficult choice between a homogenous group and a (inaudible) group or you end up with sparse data. So if you end up with the (inaudible) you don't have any claims, it is going to be something to go into the (inaudible) fluctuation.

But another issue which is perhaps more important is more specifically (inaudible) to reinsurance, is that a lot of reinsurance laws are what they call low frequency/high security. There is a relatively small chance of having a claim. If you have a claim it can be a huge claim, a jumbo claim. And on a case like that it is not so much that you have earning fluctuation as it is that the practice itself is unstable. The presence or access of a civil claim within the insurance group (inaudible) triangle can have a huge impact on the development factor so the line (inaudible) it provides very limited (inaudible) you don't have any (inaudible).

Now I've missed the two possible solutions. I put them in quotes because really there is no way that you are going to pull this off for a final like this. The first is sort of a continuum of types of positions from smoothing on the one end the lowest level of complexity and modeling on the other end with curve fitting somewhere in between. We are going to be doing a little bit (inaudible) as far as curve fitting in this session and in other sessions not in this particular CLRS session, but in other ones they talk about modeling. Often reinsurers are the ones that are most interested in modeling (inaudible) processing and the reason for the stability that they (inaudible). But probably what we'll talk about is smoothing as well as curve fitting (inaudible). We'll do that later on.

The second method is one that used a fair amount in reinsurance, and that is the accounts and albegin method. In this method, what you do is break up your losses into two pieces. One of them is you hope that it is stable and one of them that isn't stable. The stable party (inaudible) account development. I guess it is particularly true in something where there are very high severity lines. You hope that you can develop (inaudible) you use a multi-balance approach on your accounts and you have (inaudible) to get the ultimate number of claims and then you model the average size and (inaudible). It is sort of a partial model and perhaps you (inaudible) to ultimate and then you have some private loss distributions to model your average claims out. And what you do is any...the difference between your ultimate costs (inaudible) so far, your unreported counts still (inaudible) average rather than an average based directly on the data. We are not going to be talking about that method today though that is used fairly often.

(Slide)

The next issue is the use of ceding company and case reserves. Typically, what will happen is the known incurred for a reinsurer will be based on paid losses plus the (inaudible) by the ceding company rather than (inaudible) his claims problem is set on an individual case basis. Now, what (inaudible) the problem is that is already fixed based by primary insurers. The primary reserving actuary needs to know if there have been changes in the claims (inaudible) philosophy so that he knows the ultimate value of the case reserves has changed. Had the same problem with the reinsurance basis, but now it is much harder because now he is not just dependent on the reserving policies of one department, the billing department, but he is dependent on the reserving philosophy of the number of claims department referrals. Each of the ceding companies. So it is much harder to take information and there is much more information to get.

So there are a number of ways that reinsurers try to address that problem. One is to use what is called BTR traditional cases, although the reinsurer will soon use (inaudible) from the ceding company and report it to him, but now will add on the additional reserve which his (inaudible) department as (inaudible) ceding company (inaudible) claim by claim basis. Additional reserve (inaudible) report by the ceding company brings it up to a level his claim department comfortable with. So now what you have is you now have all your reserves on the same level. The same level (inaudible) inadequate, it is at least on the same level of adequacy.

Now the next...I'm calling it a solution, but actually the reason that I have that here is that it is more important for a reinsurer to closely monitor the data for evidence of change, because he can't just sit around at the conference table and ask the claims manager, well, who is going to change your philosophy (inaudible) he often has to use the data itself to adjust

they tend to be smaller and make it more homogenous and also be cause an injury to a contract can (inaudible) claims. And so what often happens is reinsurance reserving actuaries who will often split out the bad contracts into a separate group to be analyzed separately.

I wanted to mention a couple of things about that practice. And that may be appropriate to do, but you have to be careful. The first thing is, obviously, that being bad...in fact the contract is much worse than expected is not enough of a reason to exclude its data from the group. And if you keep (inaudible), is it unrepresentative of the (inaudible). It may very well have other contracts with are about to blow-up in your data, which you don't know about. Obviously, including all the bad contracts are not going to be representative.

The second thing is that typically this method is biased. It is fairly unusual. I don't think I've ever seen a separate IBNR group for mutually (inaudible). That's just not done. So it is something to bear in mind. It is almost (inaudible). But one thing can be said, if you do this you may have other bad contracts working with the data, one thing you might do if you are using (inaudible) you might allocate some of the premium or (inaudible) generalizing to some (inaudible). In other words, even if you (inaudible) back in 1984, you might say, well, 10% of our premium for 1985, 1986 and 1987 are the (inaudible) loss ratio. (inaudible) just to account for the fact that there may be other (inaudible).

And finalize...whether you mentioned that for some lines of reinsurance the pattern is that you have one bad coverage from (inaudible) you are really not expecting losses, but when you do get losses you'll get loss ratios of 300 or 400 or more percent. So if you run around excluding all of the contracts that have loss 300 or 400 percent (inaudible) zero (inaudible) facultative (inaudible) and you weren't (inaudible section).

The next consideration is whether you analyze your book gross or net of retrocessional...of retrocessions. I don't think there is a right way or wrong way to do this and for a (inaudible) normally do this (inaudible) but I just want to mention a couple of advantages and I guess the advantage of using gross data is that (inaudible) retrocession program, so if your...you think your retention...that you are retroceding or the limit in on and you don't have to go back and try to make adjustments for that. A disadvantage of using gross data is that if you use it and get your ultimate, the IBNR, you'll still have to bring it back to net. So you may use (inaudible) factors or some other approach to get back in there. And normally you'd use the gross data that you are probably the most (inaudible) to shock losses, in the sense that you don't have your retrocessional limit after your losses to some level.

(inaudible) the change. And so I think (inaudible) reinsurers more than (inaudible) looking at report year triangles to try to see ahead of a change in case adequacy. And if they feel that it is the adjusted case to an ultimate level.

Another method that is have periodic claims audits to (inaudible). An involved point that I wanted to mention is that it is very important to keep in close touch with your own claims department, even if you don't have ACR and they are not setting the reserve, they are often an excellent source of information about what different ceding companies are doing. Whether one ceding company has had a change in management. And, in general, they are probably your best source, even in reinsurance (inaudible).

One possible solution to some of the problems that I have discussed so far is to allow more on loss ratios rather on loss development because there are problems with the data that you have to reinsure. But I just wanted to mention that there are a couple of problems, even with loss ratios, from a reinsurance point of view, and probably most importantly is that reinsurance is much more sensitive to market strengths than the primary insurer.

(Slide)

We are going to be talking a little bit later on about how you can actually try to, in a sense, (inaudible) the sensitivity of the reinsurer to (inaudible) try to estimate what the market sensitive type will be on his loss ratio. I wanted to mention a couple of things now. First is that there is the leveraged effect. The reinsurer is subject in an (inaudible) market to getting a (inaudible) that is (inaudible) the subject (inaudible) is also going down, so he has that leveraged effect. And there are also hidden (inaudible). It has the same rate from year to year. You know, you have exactly the same programs, (inaudible), same retentions, same rate. You've actually gotten it (inaudible) because your retention (inaudible) with inflation. And in addition to the reinsurance (inaudible) adequacy is the terms and conditions, the aggregate factors, exclusions, and so on. So there are a lot of things to bear in mind even if you are trying to figure out what (inaudible) loss ratio (inaudible) loss ratios for recent years. We're going to be talking about some of this in a little more detail in the last set. And then finally I just wanted to cover a couple of miscellaneous items. How am I doing on time?

MR. GRAVES: Fine.

(Slide)

MR. PAGLIACCIO: First is bad contracts. Unlike (inaudible) one contract can estimate reinsurance contracts can help restore the loss develop or the loss ratio to an entire group, partly because

Finally, I just want to mention an issue which came up earlier about an underwriting year versus the accident year. According to this reinsurance was written on an underwriting year basis and I assume most of you have known about the basic underwriting year is (inaudible) written in your positive (inaudible) term. So, in a sense, it is sort of like the difference between policy and accident year. And so when there is a (inaudible) underwriting years is any (inaudible) insured if you can (inaudible) from the beginning of the career than an accident year would be. And I think the issue is mostly for the first few evaluations as you get further and further up it becomes less and less important if you are looking at 15 to ultimate...15 years to ultimate, there probably isn't that much difference in the year you are looking at underwriting your accident year basis, but you are looking at one or two ultimates (inaudible).

One problem thing about that is that for the underwriting year data (inaudible) as well since (inaudible) at the end of the period not all premium has been earned to show how the subject premium has been earned (inaudible) reinsurance.

Are there any questions on this section? If there are any other questions that you could preview as we go along (inaudible) we'll always have time at the end.

MR. GRAVES: Now John will show us an example called Made-Up Re, which will illustrate some of the common reserve methodologies you could consider using.

(Slide)

MR. PAGLIACCIO: If you can look at the handout with Made-Up Re's development data. Just in the last 42 minutes you have been totally educated in all the concepts that you need to know about reinsurance. And now we're going to do a live sample.

MR. GRAVES: Does anyone else need a handout? Because if you don't have one already you will really want one for this section.

MR. PAGLIACCIO: I'm going to try to present this sample data to you. We'll run through a couple of alternative calculations and compare the results of the alternatives. We'll try to explain the differences and then there will be a quiz afterwards.

So, in any case, you have a description here on page 1 of the company, Made-Up Re, which is intended to be a typical professional domestic U.S. reinsurer. It started business in 1975 and has 15 years for history now. It has about 100 million in surplus at the end of 1989. It has about 100 million in premium in the 1989 year.

The data that is provided in the package is for a casualty excess treaty book of business for that reinsurer. It's only part of the entire book of business. The relationship of this one piece

to the total is described in the hand-on. The biggest part of IBNR is about 125 hundred dollars worth of carried IBNR associated with this book of business. It is domestic U.S. only. There are only primary company ascedents and it is per risk or occurrence excesses. Nothing fancy. Mostly first and second excesses. There is a pattern of limit and retentions averages shown on the second page. And it's casualty business, all casualty business, mostly GL and auto.

This two page description is a lot easier, honestly, to make-up than do for real, but it is the kind of thing that you actually should be doing in a lot more detail, obviously, when profiling the book of business.

After the profile is defined, you see the development triangle. First is incurred development, you have the dollars at the top in thousands and, the triangle of dollars, next the triangle of factors and some averages. Nothing magical, by the way, about the averages shown, not to endorse those averages over any others. After the incurred is the paid and the paid to incurred triangle. I forgot to mention that we are excluding asbestos and pollution losses to the extent that the company could identify so me of the data.

Now let me read you the last paragraph on the second page of the profile. It says "note that the development pattern shown are typical in terms of the average development for the above described type of business, the inherent variability given the size of the book of business and the presence or absence of any trend as evidenced by industry treaty development statistics."

Now we're going to do reserving on it by a few of the most basic methods starting with the development method.

We'll find this exhibit, hopefully find this exhibit in the package, called Incurred Alternative A. The basic development method shows the accident years, the months of development to allow you to align yourself against the triangles, and the reported incurred losses which is the last diagonal off the incurred triangle. Then we'll find part of the development method, namely the selected age-to-age incurred development factors. Those factors have been selected based on the company's experience shown on the triangle, with my own particular preferences as to what I think factors should look like. And if you take any one of them, the big one at the bottom say, 2.4, that's the age to age factor to get you from 12 to 24 months worth of development. And so on up and down the column.

There is a different factor, obviously. The 1.195 is the tail factor that is intended to bring you from 180 months to ultimate. Again, it's taken from the company's data and some curve fitting techniques which Marvin volunteered to discuss. It is a reasonable or typical tail factor.

(Slide)

The first thing you have in the Bornhuetter-Ferguson method is what is labeled here as the initial loss ratio. In most of the literature it is called an expected loss ratio. And also in most of the literature, they were a little hazy on how you came up with it. It was relatively clearly defined. It was to be the ultimate loss ratio that you would have expected to have emerged on the book of business. And you could go back to your pricing data and various other sources to come up with an independent estimate of that initial expected loss ratio. Another way to think of it would be as the loss ratio that you would use in a loss ratio method of loss reserves. Marvin is going to try to show the intelligent way of generating that loss ratio. But, again, without any value judgments, this set of loss ratios was taken from an external data source. It was taken from Best's Casualty Loss Reserve Development Reports for Reinsurance Companies, which is a compilation of Schedule P's for reinsurers. The report shows what reinsurers currently carry and the resulting loss ratio along with some other data off of Schedule P. And without comment as to how good, bad or indifferent that might otherwise be, at this point, here's a set of loss ratios. If you apply those loss ratios to the earned premiums, multiply the two of them together, you come up with a set of expected ultimate losses.

Now comes the fun in the Bornhuetter-Ferguson technique. Column E is the development factor to ultimate that you found on Alternative A, which is the same development factor selected on the basis of the company's development history.

If you perform the calculation, one minus the quantity, one divided by the development factor in E, it will generate what's called an unreported ratio. Conceptually, it represents the percentage of ultimate losses which have yet to be reported as of the maturity date corresponding to the development factor. There is an explanation of the algebra how that unreported ratio is generated in the notes to this exhibit. In simple terms, what you are doing is using the development factor to ultimate to split ultimate losses into two components: what I expect to have had reported at this point in time and the residual, what is supposedly unreported at this point in time.

In the first case, you have 16.3% of ultimate losses supposedly unreported, as of the end of 1989, for the 1975 accident year. What you can do then in the Bornhuetter-Ferguson method is that you apply these unreported ratios to the Column D expected ultimate losses and you generate the unreported loss, which in an incurred method, such as this, is equivalent to an IBNR figure. Bornhuetter-Ferguson is basically a mixture of a loss ratio method and a development method to generate unreported losses. The other columns that are on your exhibit show the reported losses again and the ultimate losses to get back to expected ultimate.

In terms of calculations, then, you take the tail factor times the 1.02, you get the 1.219 coming down this column and the chain multiplication produces all the other factors in column E, which are the development factors to ultimate.

Again, calculation wise, if you take those development factors to ultimate, Column E, and multiply them by the corresponding entry in Column C you get developed losses, Column F. Voila! Ultimates. And Column G is the IBNR which results from subtracting the developed losses in F and the recorded losses in C. A basic straightforward development methodology. The obvious critical elements being Column D and E.

A second example is the same basic incurred development method, however, instead of using the company's factors the D column factors are based on industry development patterns. More specifically, they are selected from the RAAs development study. You have an alternative set of factors then in D and E and obviously alternative developed losses and alternative IBNR. Same basic methodology, but we have it two ways of getting the incurred development factors, either your own company data or some external data source, in this case the RAA, which is as far as I know is probably about the only external data source with factors. So there are two alternatives for you.

A third alternative for development is selected paid factors. Not something that I would generally recommend. The calculation all works the same in Column D and E. Instead of taking incurred development factors, you go back to the company's paid loss development triangle. You scrutinize the factors, scrutinize the averages, do whatever smoothing or other techniques you'd like to, and try to take factors off of it. It's an extremely tough job. The magnitude of the factors is obviously large. I'll let you know a little secret. I had to cheat at the end on my selections so that this number here didn't quite reach 100 because I didn't have enough room in the size of the columns.

(laughter)

PARTICIPANT: (Inaudible)

MR. PAGLIACCIO: Some degree of difficulty in...

PARTICIPANT: (inaudible)

MR. PAGLIACCIO: All nice, simple, straightforward, widely used, on each component of the book of business of reinsurers. We're doing a reserving exercise. And when you get done using development methods what you generally do, at that point, is to use a Bornhuetter-Ferguson method. You have a lay-out of accident years and earned premium, sidestepping the issues of how do we do a premium development and all the rest? We're giving you the earned premium which is presumed to be the right one for loss reserving purposes. And we start off.

These are the two most basic, most widely used methods. I doubt you would ever find anybody not using these two methods. Company actuaries or consultants, they all look at the loss reserving guidelines and you have to use multiple methods. We are supposed to be using multiple methods. The development method and the Bornhuetter-Ferguson are the two best choices for a reinsurer. And now that they are making us sign loss reserve opinions, everybody is going to do multiple methods or at least these two and stick them in their work pile somewhere.

The question obviously is, what happens when you are all done? I'm going to go out of order slightly on the slides, but you have seen alternatives A, B and C development methods. A is company factors. B is industry factors. C is paid development. And then D is an incurred Bornhuetter-Ferguson. This company was carrying about 125 million in IBNR for this business. First you see the ultimates and the difference to the carried reserves. And then you see the indicated IBNR and percentage difference to the 125 million in carried IBNR.

To focus on this line for a second, you have two methods, Alternative A, which was the company's own development and Alternative D, which was the Bornhuetter-Ferguson development, showing negligible differences. You have industry development off by a healthy chunk of change, if you remember the company only has 100 million in surplus. If you are really off that 25 million you've got some problems to deal with. And you have the paid method coming out about 25% less than the 125 million and that is obviously the favorite method of the management, and the underwriters compensated on performance incentive programs.

This range in estimates for a single book of business is typical. In fact, it may be understated. For a company this size, even though we're taking out asbestos and pollution, this kind of range is not at all uncommon. But you obviously can take great comfort that this A and D are relatively consistent.

However, instead of looking at bottom line numbers, you can look at ultimate loss ratios generated by the reserve methods. You know already that B and C are going to be far apart. A and D are relatively close together on a bottom line basis. You start looking down by accident year at the loss ratios and you wonder if it is an accident that the answers were the same? Actually, it could be a feature of the Bornhuetter-Ferguson methodology if you play with the loss ratios you select. With this degree of variability between the loss ratios by accident year the tax accountants discounting our loss reserves, are going to definitely favor one or the other of these two alternatives. I'm not quite sure which one, I have a feeling they would like A better than B, because it shows more reserves in the older years. When you go and look at this kind of comparison it raises the question of whether the fact that the bottom lines are close has any real meaning or relevance. You can't take a whole lot of comfort in the fact that the two numbers turned out to be about

125 million because they are telling you two entirely different things about your performance over time.

Here I pause for a second. This has all been a typical example. The question is, why do you get typically bad answers like this?

In terms of basic development, the answer to why I've always felt should be found by going back to the beginning and looking at what you were given for data. You won't find this in the handout by itself. If you go back to the first development triangle that is provided in there, it is an extract of the 24 to 36 factors going up to the 60 to 72 factors of the incurred development exhibit.

On the development triangle there are 13 24 to 36 factors. A minimum and maximum of those factors are shown and the range. You have the average and standard deviation. A quite sizable standard deviation for me, especially since to measure it properly you look at the average and slash the one off to compare the standard deviation to the actual increment part of development. You have a weighted average all years and a five year, three year, shorter term averages, mid three of five, and a three year weighted. I don't know what help they are going to be to you. Look at the actual factors and decide for yourself. Realize that you are starting with a set of numbers and the historical development that just hasn't been consistent or smooth.

QUESTION: (inaudible) years at the end of 1985 (inaudible) development of the defined (inaudible) incurred losses are always higher and the early reserves (inaudible).

MR. PAGLIACCIO: You are looking at A versus D?

QUESTION: (inaudible) that A and D (inaudible) A needs a higher incurred loss and D is the lower...

MR. PAGLIACCIO: One feature of Bornhuetter-Ferguson in the D alternative (inaudible) in immature years, have low reported losses are not uncommon. It will hold the ultimate (inaudible) especially in immature years and certainly everything from 1985 down to the immature year. You get the end result that fairly closely approximates the expected loss ratio that you pumped into the Bornhuetter-Ferguson formula.

MR. GRAVES: I think at this point we need to move on to the final session. Hopefully there will be time at the end, so keep any additional questions that occur to you now or during Marvin's final session.

MR. PESTCOE: Okay. I guess I'm going to base this on two of the aspects of the method that John spoke about. We're going to talk about loss development tails and loss ratios. Because I think

this is an area where most judgment came in in John's discussion and an area where analysis can really improve the estimate.

First thing that I want to talk about is the tail. Now one thing (inaudible) ultimately selected. Ultimate (inaudible). I just want to point out that in the example that John just went through you end up having a loss development factor in 1975 year of 20% approximately. Obviously you need to use a reasonable method when you are dealing with numbers that large. By comparison a primary development might be virtually complete after four or five years. So bearing that in mind, I guess this is a crucial area for reinsurance reserving actuary.

The first question is where does the tail begin? It's not just the point after which you lack loss development data. There's going to be instability for the last several factors, probably, for the reinsurer. And, basically, what you need to decide where the actual factor should be replaced by fitted factors. One of the key determinations of where that starts, is where you start seeing instability in the factors. We can talk about a little more with the example in just a minute.

Let's begin with how you select the fitted factors or tail. There are basically two methods, as John mentioned, there is industry data and then there is extrapolating from the internal data. I'm going to talk a little bit about the available industry sources. But for the most part I'm going to focus on using internal data and I'll mention why in just a minute.

I guess there are two basic sources for industry data for the reinsurer. RAA, Reinsurance Association of America, is probably the best known. Basically the RAA is a compilation of historical incurred development for approximately 30 reinsurers. It is excess of loss, and has a great deal of history. It goes back as far as 1956. That is obviously a lot of data. RAA data is shown by lines and there are a couple of other subdivisions shown including Treaty vs. Facultative. This is an extremely popular source for loss development tails among people who are setting reinsurance reserves. But, there are a number of caveats that you need to bear in mind when you are using this approach. In fact, the RAA booklet itself has an introduction which lists number of caveats and it is definitely worthwhile reading it before you use the RAA. I'm going to discuss two of the caveats that they mention now.

The first is that the data that goes into the RAA studies are all excess of loss, but it is an aggregation of many different underlying retentions. That creates a number of different problems. The first is that it is not going to be representative for any retention because it is an aggregation of quite a few. And what is more, the average retention is fairly low in RAA data, but even for a low retention the data is not really representative because it is an industry aggregation. Once an individual company's limit is hit, someone else's retention

begins. So really what it is representative of is a fairly low retention and an unrealistically large limit. And so there is some reason to think the RAA development might be too high even if you yourself have a fairly low retention. The problem may be ever more significant if you do not have the same average retention as the average underlying RAA does. As I mentioned before, retention is one of the key determinants of (inaudible) loss you have, so this is a significant problem.

The second issue is that UANCES industry data and presumably it is a large body of data, their developments are cross dated, you can tell, (inaudible) where you are typically going to use it. In fact, it is dominated by a handful of very large (inaudible) and their development may be erratic for reasons that are not at all appropriate for your company. That is something to bear in mind, that even though it is industry data it is reinsurance industry data and that means that (inaudible) crossing the tail.

The second source, is the Best's casualty loss reserve development report. And, basically, what that is is the compilation of the Schedule P data for approximately 35 companies involved in reinsurance. Just to compare it to RAA, since RAA is the one that people are most familiar with, The Best's compilation is both excess and prorata combined and that is a great limitation right there. It shows considerably more data than the RAA loss development study in the sense that it has paid losses and earned premiums, so that is useful in the sense that it might help you somewhat with payout patterns and loss ratios. And the other thing is that it shows fewer years than RAA, since it is basically Schedule P compilations.

So those are the only two industry sources that I'm aware of. Each has significant problems. So what I'm going to do is focus more on using your company's own data fit to select the tail, and basically by curve fitting.

Now, there are two fundamentally different approaches to curve fitting on loss development factors. I believe there is a session later on that is going to talk somewhat about this, but basically you have a choice between fitting the percent report or fitting age to age factors. If you fit the percent reported then you have a limited sample of the percent reported, and therefore you need to fit a censored distribution. There are ways of getting around that with maximum likelihood estimators and we're not going to go into that much at all. But that is a valid method which some reinsurers use.

The second approach is to just directly fit the age to age or link factors. There are a lot of curves that people think fit age to age factors all the way from exponential curves to Bondy development to what we are going to be focusing...we are going to be using our example which is the Sherman Inverse Power Curve but it really doesn't matter how you fit the link factors. There are a number of considerations that are common whenever you fitting to link factors rather than percent reported.

There are two basic questions that you need to ask yourself. One is do you want to smooth the factors before you fit? Do you want to exclude factors that are unusually high or low? And the other question is how far should you run the curve off? And we have...we can talk about an example now. In your handout, in the next two pages show a fit that we have done to an example company that John produced.

(Slide)

First, let me start with the graph of the fit. If you look at the diamonds, those are the actual selected factors that John discussed for the Made-Up Re Company and then I show two fits against those actual factors. Before we go into the fits I want to talk about a couple of things about the graph itself.

First of all, if you compare the boxes, for instance, which should fit to all factors against the diamonds, you see that the fit looks pretty good. It actually looks like a fairly good fit to the data. There appear to be two significant outliers. There is one outlier at 96 months, an unusually low factor. And then the more obvious outlier at 168 months, which is a significant outlier. It really stands out. So basically the question is going to be what should be do with those outliers? Should be exclude them? Should you smooth them? Or should we just leave them in when we fit the data? As an aside, I just want to mention that you'll notice that I graphed...I've shown this graph starting with the 36 to 48 factor rather than the 12 to 24. Typically when your fitting curves you are interested in the tail and so it is important to get the scale of the graph set in a way that will allow you to see if the curve fits in the tail. And because the factors from early are so large, including them in the graph would make it impossible to have any sense at all for whether the tail was fitting. So that is something you should bear in mind about the scale when you are dealing with reinsurance age to age factors.

In the first place, when dealing with outliers there are no rules, but I think there are two things that you want to bear in mind. If taking out or leaving in any one factor has a significant effect on the development, it is a candidate to be smoothed out. And if you look at it, for instance, the 168 to 180 factor, the fitted tail factor went from 1.2 to 1.164 when we took out that (inaudible) factor. It had a dramatic impact...one single factor under the fit had a dramatic impact on the tail. So that is one thing that you might want to consider that (inaudible) at smoothing out, (inaudible) any single factor has a dramatic impact on the fit.

The second thing which you might consider is whether taking out a single factor has a dramatic impact on the quality of the fit. And if you look at, again, the 168 to 180, the R squared which is certainly one measure of the quality fit went from 94, a pretty good fit, to 98 which is an excellent fit. So taking out that

one factor had a dramatic impact on the quality of the fit. Now if you do those same two tests on 96 to 108 you see the tail factor going from 1.2 to 1.215 and so only a fairly slight change and the R squared went from 94 to 96. Again, only a slight change. So based on this, again there are no rules, but you might say that it is much more legitimate to take out the 168 and 180 than to take out the 96 to 108. And you might ask, well, if taking out the 96 to 108 doesn't have much of an impact, what difference does it make? I can leave it in or I can take it out. But the thing to bear in mind is that you want to do this type of review on each of the outlines individually. And while any one of them may not have that particular impact, if you took out all the slightly high factors that might very well have a dramatic impact on your fitted curve. You want to do this factor by factor leaving in or taking out has a significant impact.

And quickly let me mention the last, the second consideration I've had is how far to run off the...there is actually a hidden parameter that you need to be aware of when applying fitted factors and that is how far out you carried it. Many of the curves fit to age to age factors do not converge. The curve will generate link factors at age one million to one million twelve and the accumulative impact of all those factors is dramatic. I've shown the percent reported for the same two curves with the same parameters run to twenty-six years and then run to thirty-eight years. And you can see that there is a dramatic impact with the tail factor at 180 to ultimate...from 83% to 75% so that does have a very significant impact. Again, there are no rules to decide how far out you should run it, but one thing that you might do is review RAA data to see how far out there really is development.

(Slide)

The next two exhibits show the two options. The only thing I should mention is that the only premier factor. You probably should continue learning the development with or without that factor just to see how big an impact it has. The (inaudible) is excluded and then not look at the factors (inaudible) including it again. And this shows the calculation of just the loss development approach with these two methods. I won't go into this too much, but...John did it (inaudible) that approach.

(Slide)

If you turn to...I think you have it as page D7 in your handout. We'll talk about the next big issue. Something which got a lot of attention in John's talk and that's selecting loss ratios. And obviously as we've mentioned a couple of times, for a rein surer for the most recent year you really desperately need some feel, some independent feel, for what the loss ratio is going to be. In fact, there are two uses for the loss ratio. One is to set the initial loss ratio for the Bornhuetter-Ferguson, even for the older years, but perhaps even more

important is to use the loss ratio to set the ultimates directly for immature years. So I'm going to talk a little bit about that. There are two basic methods for estimating loss ratios. Again, the loss ratios should be based on information completely independent of the losses themselves. The first method is industry. The same two basic sources exist, RAA and Best's.

Again, they have had similar problems in using industry data for loss development, but there is an additional problem in that the variability of the loss ratio for any one company is going to be significantly larger than the variability for the entire industry.

The second method is to select loss ratios based on internal pricing information for the reinsurer itself. Pages D-8 through D-13 show one method for converting pricing information into loss ratios. Time does not permit a detailed discussion of that met hod. Basically it involves three steps. In step one a pricing estimate is made of the yearly changes in rate adequacy. These changes can be due to rate changes, loss trend, or changes in coverage - retention or policy limit changes, for example. The second step is to pick a year for which the ultimate loss ratio developed by a reserving approach is fairly reliable. Given the loss ratio of that base year and the changes in rate adequacy developed in step one, step three is to estimate the ultimate loss ratio in each subsequent year.

MR. GRAVES: Well, if there is nothing else, let's have a round of applause for our two panelists.

REINSURANCE RESERVING I

Section A

Types of Reinsurance

1990 CASUALTY LOSS RESERVE SEMINAR

1E: REINSURANCE RESERVING

HANDOUT

Session 1E – Reinsurance Reserving I
Part A. Types of Reinsurance for Reserving

Reinsurance for Reserving Purposes

treaty vs. facultative
domestic vs. international
broker vs. direct business
primary vs. reinsurer ceding company
casualty vs. property
proportional vs. non-proportional

Proportional or Pro Rata

Quota Share or Surplus Share

Non-Proportional or Excess

Per Risk or Per Occurrence Excess
Aggregate Retention and/or Limit
Clash Covers

Casualty vs. Property Subject Business

monoline e.g., medical mal or D&O program
multi-line e.g., casualty occurrence excess
umbrella with poorly defined exposure by line
mixed casualty & property e.g., auto quota share

REINSURANCE RESERVING I

Section B

Special Consideration

REINSURANCE RESERVING I

SPECIAL CONSIDERATIONS

I. REPORT DELAY

II. DATA GROUPING

III. INSTABILITY OF FACTORS

IV. USE OF CEDING COMPANY RESERVES

V. MARKET SWINGS

VI. MISC.

A. "Bad" Contracts

B. Gross vs. Net Data

C. U/W Year vs. AY

REINSURANCE RESERVING I

SPECIAL CONSIDERATIONS

I. Report Delay

A. CAUSES

- Report and Development to Excess Layer
- Bordereau Delay

  or - Even Property Pro Rata can have IBNR!

B. IMPLICATIONS

- Tail Factor - Internal data often not available
- Immature Years - Loss Development approach may not be useful

REINSURANCE RESERVING I

SPECIAL CONSIDERATIONS

II. Data Grouping

A. PRIMARY VS. REINSURANCE

- Primary
  Usually most important grouping is by line/subline, by territory

- Reinsurance P/R
  Often can't breakdown exposure and/or losses that finely

- Reinsurance Excess
  Attachment Point (ATP) and limit may be at least as important as line for reserving

B. IMPLICATIONS

- Data groupings are often less homogeneous than primary

- Very important to try to analyze excess losses by ATP

REINSURANCE RESERVING I

SPECIAL CONSIDERATIONS

III. Instability Of Historic Development

A. CAUSES

- Low frequency/High Severity
- Sparse Data

B. POSSIBLE "SOLUTIONS"

- Smoothing/Curve fitting/Modeling
- Counts and Average Method

REINSURANCE RESERVING I

SPECIAL CONSIDERATIONS

IV. Use Of Ceding Company Case Reserves

A. PROBLEM

- Dependant on the reserving policies of more than one claims department

B. POSSIBLE SOLUTIONS

- Addition Case Reserves (ACR's) - now all reserves are similar level of adequacy
- Report Year triangles
- Periodic claims audits
- Keep in close touch with your own claims dept

REINSURANCE RESERVING I

SPECIAL CONSIDERATIONS

V. More Sensitive To Market Swings

- Leveraged effect - deteriorating rate on deteriorating base)

- Hidden rate cuts

  - Retention fails to keep pace with inflation

  - Loosening terms and conditions

REINSURANCE RESERVING I

SPECIAL CONSIDERATIONS

VI. Misc

A. "BAD" CONTRACTS

- Should such contracts be excluded and analyzed in a separate group?

- May be appropriate but use with caution because:

  - Being bad is not enough reason to exclude - needs to be unrepresentative of current book. May be other "bad" contracts lurking in data

  - Method is biased - typically don't excluded unusually good contracts.

  - May find that the pattern is one bad contract for every 100 good ones

B. GROSS VS. NET DATA

- Advantage of Gross data - uneffected by changes in retrocessional program

- Disadvantages of Gross data

  - Have to adjust it back to Net

  - More susceptible to shock losses

C. UNDERWRITING YEAR VS. ACCIDENT YEAR

- Maturity

- Premium development

REINSURANCE RESERVING I

Section C

Description of Methods

Made-Up Re, Inc. - Development Data Exhibits

The three data exhibits attached present the development history for the casualty excess treaty assumed book of business of Made-Up Re, a "typical" U.S. professional reinsurance company. The loss experience is gross (excluding the effect of any ceded retro protections) accident year data, includes allocated loss adjustment expenses to the extent covered by the treaty contracts, and excludes asbestos and pollution losses to the extent identifiable.

The casualty excess treaty book of business is comprised of 100-300 domestic, mostly per risk or per occurrence, excess treaty contracts by year, no one of which is "large" enough to set reserves for separately. The gross earned premium by year ($ millions) is as follows:

75-80*	1981	1982	1983	1984	1985	1986	1987	1988	1989
$11.0	$8.5	$8.5	$9.0	$10.0	$13.5	$19.0	$28.0	$34.0	$36.0

* Gross earned premium is $11 million in each year from 1975 to 1980.

An examination of losses coded by statutory Annual Statement line suggests that between 70%-85% of the reported losses are general (other) liability, with auto liability as most of the remainder.

Made-Up Re 1989 year-end statutory surplus is $100 million roughly; while 1989 total premium volume is also $100 million roughly. Casualty excess treaty is therefore only a portion of Made-Up Re's total book of business, albeit the most significant in terms of loss reserves with $125 million in casualty excess treaty carried IBNR.

The casualty excess treaty book of business has grown from 25% of Made-Up Re's total premium in the 1975-1980 period to 35% in the most recent year. Made-Up Re exercised some degree of underwriting prudence during the soft market which began in 1980-1981 and lasted until 1984-1985, as seen in the premium by year.

Shown below are the average treaty (100% not just Made-Up Re's share) reinsured limit and ceding company underlying retention for the more recent years ($thousands):

Average $000	1983	1984	1985	1986	1987	1988	1989
Limit	$319	$389	$395	$464	$545	$642	$755
Retention	$110	$129	$158	$232	$246	$257	$287

The casualty excess treaty book of business is a mix of working and higher layer excess covers (First and Second Excesses) predominantly. The trend has been to higher underlying retentions over time and larger limits.

Exhibit #1 presents the incurred loss development defined as gross assumed case-basis incurred losses and allocated loss adjustment expenses by accident year excluding asbestos and pollution losses. Exhibit #2 presents the corresponding paid loss development, and Exhibit #3 the cumulative paid-to-incurred ratios. Both dollar-value amounts ($ thousands) and age-to-age development factors are shown on Exhibit #1 and #2, as well as some particular averages of the age-to-age factors.

Note that the development "patterns" shown are typical in terms of the average development for the above described type of business, the inherent variability given the size of the book of business, and the presence or absence of any trends as evidenced by industry development statistics.

Made-Up Re, Inc. - Development Data Exhibit #1

Casualty Excess Treaty ($000) Gross Assumed Incurred Loss+ALAE Excluding Asbestos + Pollution Losses

A.Y.	12	24	36	48	60	72	84	96	108	120	132	144	156	168	180
1975	1,204	3,401	4,657	5,645	6,613	7,223	7,738	8,182	8,390	8,650	9,137	9,248	9,438	9,748	10,345
1976	795	1,921	2,953	4,066	5,356	6,045	6,605	7,180	7,496	7,787	8,135	8,541	8,989	9,187	
1977	1,000	2,405	3,745	4,780	5,646	6,494	6,978	7,607	8,294	8,881	9,452	9,530	9,888		
1978	1,219	2,460	3,599	4,644	5,759	6,328	7,183	7,945	8,166	8,555	8,716	9,222			
1979	1,312	2,739	3,859	4,795	5,398	6,204	6,963	7,581	7,883	8,212	8,448				
1980	1,426	3,234	4,875	6,141	7,594	8,625	9,494	10,336	10,443	10,713					
1981	1,159	2,561	3,645	5,115	6,285	7,210	8,012	8,344	8,505						
1982	1,644	3,087	4,458	5,728	7,202	8,063	8,699	8,933							
1983	1,323	3,292	5,963	8,190	10,088	12,485	13,800								
1984	1,194	5,513	8,369	12,113	15,114	17,119									
1985	1,164	4,383	7,009	10,220	13,178										
1986	703	1,367	2,425	3,156											
1987	1,933	2,899	4,387												
1988	1,359	4,412													
1989	2,666														

A.Y.	12-24	24-36	36-48	48-60	60-72	72-84	84-96	96-108	108-120	120-132	132-144	144-156	156-168	168-180
1975	2.824	1.369	1.212	1.171	1.092	1.071	1.057	1.025	1.031	1.056	1.012	1.021	1.033	1.061
1976	2.417	1.538	1.377	1.317	1.129	1.093	1.087	1.044	1.039	1.045	1.050	1.052	1.022	
1977	2.404	1.557	1.276	1.181	1.150	1.074	1.090	1.090	1.071	1.064	1.008	1.038		
1978	2.019	1.463	1.290	1.240	1.099	1.135	1.106	1.028	1.048	1.019	1.058			
1979	2.088	1.409	1.243	1.126	1.149	1.122	1.089	1.040	1.042	1.029				
1980	2.267	1.508	1.260	1.237	1.136	1.101	1.089	1.010	1.026					
1981	2.209	1.423	1.403	1.229	1.147	1.111	1.041	1.019						
1982	1.878	1.444	1.285	1.257	1.120	1.079	1.027							
1983	2.489	1.811	1.373	1.232	1.238	1.105								
1984	4.618	1.518	1.447	1.248	1.133									
1985	3.766	1.599	1.458	1.289										
1986	1.945	1.773	1.302											
1987	1.582	1.513												
1988	3.247													
Average	2.554	1.533	1.327	1.230	1.139	1.099	1.073	1.037	1.043	1.043	1.032	1.037	1.027	1.061
Std Dev	0.793	0.127	0.078	0.051	0.038	0.021	0.026	0.024	0.014	0.017	0.022	0.013	0.005	-
Wgtd All	2.519	1.527	1.343	1.235	1.143	1.099	1.072	1.035	1.042	1.043	1.031	1.036	1.028	1.061
5 Yr Avg	3.031	1.643	1.373	1.251	1.155	1.104	1.070	1.038	1.045	1.043	1.032	1.037	1.027	1.061
3 Yr Avg	2.258	1.629	1.402	1.256	1.163	1.098	1.052	1.023	1.038	1.037	1.039	1.037	1.027	1.061
Mid 3-5	2.986	1.630	1.374	1.246	1.139	1.106	1.073	1.029	1.043	1.043	1.032	1.037	1.027	1.061
3 Yr Wgt	2.228	1.598	1.432	1.257	1.162	1.099	1.054	1.022	1.037	1.038	1.038	1.036	1.027	1.061

Made-Up Re, Inc. - Development Data Exhibit #2

Casualty Excess Treaty ($000) Gross Assumed Paid Loss+ALAE Excluding Asbestos + Pollution Losses

A.Y.	12	24	36	48	60	72	84	96	108	120	132	144	156	168	180
1975	193	958	1,904	3,302	3,942	4,963	5,647	5,689	6,110	6,328	7,093	6,677	7,692	8,272	8,896
1976	130	551	1,295	2,442	3,681	4,155	4,422	5,816	5,959	6,195	6,005	6,876	6,106	6,469	
1977	71	446	1,387	2,200	3,197	4,120	4,921	5,21[illegible]	5,784	6,411	6,497	6,900	7,409		
1978	90	592	1,139	2,209	3,204	3,909	4,700	5,455	6,135	6,692	7,016	7,323			
1979	331	954	1,800	2,786	3,602	4,143	4,860	5,512	6,348	6,705	7,171				
1980	410	1,301	2,616	3,417	4,680	6,309	7,337	8,579	8,845	9,014					
1981	76	1,205	2,031	3,508	4,274	5,456	6,221	6,820	7,127						
1982	662	1,361	2,815	4,107	5,203	6,195	6,879	7,519							
1983	0	732	1,792	4,493	6,523	8,638	10,326								
1984	506	1,886	3,707	5,788	8,480	11,928									
1985	318	1,381	3,715	6,052	8,382										
1986	166	294	971	2,067											
1987	159	221	1,406												
1988	0	1,543													
1989	69														

A.Y.	12-24	24-36	36-48	48-60	60-72	72-84	84-96	96-108	108-120	120-132	132-144	144-156	156-168	168-180
1975	4.952	1.987	1.735	1.194	1.259	1.138	1.007	1.074	1.036	1.121	0.941	1.152	1.075	1.075
1976	4.229	2.349	1.886	1.507	1.129	1.064	1.315	1.025	1.040	0.969	1.145	0.888	1.059	
1977	6.317	3.110	1.587	1.453	1.289	1.195	1.059	1.110	1.108	1.013	1.062	1.074		
1978	6.614	1.923	1.940	1.451	1.220	1.202	1.161	1.125	1.091	1.048	1.044			
1979	2.381	1.887	1.547	1.293	1.150	1.173	1.134	1.152	1.056	1.069				
1980	3.175	2.011	1.306	1.370	1.348	1.163	1.169	1.031	1.019					
1981	15.841	1.685	1.727	1.218	1.276	1.140	1.096	1.045						
1982	2.054	2.069	1.459	1.267	1.191	1.111	1.093							
1983		2.448	2.508	1.452	1.324	1.195								
1984	3.724	1.965	1.561	1.465	1.407									
1985	4.346	2.690	1.629	1.385										
1986	1.771	3.307	2.128											
1987	1.386	6.365												
1988														
Average	4.774	2.600	1.751	1.369	1.259	1.153	1.129	1.080	1.058	1.044	1.048	1.038	1.067	1.075
Std Dev	3.696	1.184	0.313	0.104	0.084	0.043	0.086	0.046	0.032	0.051	0.072	0.111	0.008	-
Wgtd All	4.312	2.237	1.683	1.369	1.278	1.155	1.125	1.075	1.055	1.045	1.044	1.037	1.068	1.075
5 Yr Avg	2.807	3.355	1.857	1.357	1.309	1.156	1.131	1.093	1.063	1.044	1.048	1.038	1.067	1.075
3 Yr Avg	1.579	4.121	1.773	1.434	1.307	1.149	1.120	1.076	1.055	1.044	1.084	1.038	1.067	1.075
Mid 3-5	1.832	2.815	1.773	1.368	1.316	1.159	1.130	1.093	1.062	1.044	1.048	1.038	1.067	1.075
3 Yr Wgt	6.320	3.214	1.657	1.432	1.324	1.155	1.121	1.067	1.051	1.044	1.081	1.037	1.067	1.075

Made-Up Re, Inc. - Development Data Exhibit #3

Casualty Excess Treaty ($000) Gross Assumed Paid/Incurred Loss+ALAE Excluding Asbestos + Pollution Losses

A.Y.	12	24	36	48	60	72	84	96	108	120	132	144	156	168	180
1975	0.161	0.282	0.409	0.585	0.596	0.687	0.730	0.695	0.728	0.732	0.776	0.722	0.815	0.849	0.860
1976	0.164	0.287	0.439	0.600	0.687	0.687	0.669	0.810	0.795	0.796	0.738	0.805	0.679	0.704	
1977	0.071	0.185	0.370	0.460	0.566	0.634	0.705	0.685	0.697	0.722	0.687	0.724	0.749		
1978	0.073	0.241	0.316	0.476	0.556	0.618	0.654	0.687	0.751	0.782	0.805	0.794			
1979	0.252	0.348	0.467	0.581	0.667	0.668	0.698	0.727	0.805	0.816	0.849				
1980	0.287	0.402	0.537	0.556	0.616	0.731	0.773	0.830	0.847	0.841					
1981	0.066	0.471	0.557	0.686	0.680	0.757	0.776	0.817	0.838						
1982	0.403	0.441	0.632	0.717	0.722	0.768	0.791	0.842							
1983	0.000	0.222	0.301	0.549	0.647	0.692	0.748								
1984	0.424	0.342	0.443	0.478	0.561	0.697									
1985	0.273	0.315	0.530	0.592	0.636										
1986	0.236	0.215	0.401	0.655											
1987	0.087	0.076	0.320												
1988	0.000	0.350													
1989	0.026														
Average	0.168	0.298	0.440	0.578	0.631	0.694	0.727	0.762	0.780	0.782	0.771	0.761	0.748	0.776	0.860
Std Dev	0.134	0.102	0.098	0.078	0.054	0.046	0.046	0.065	0.052	0.043	0.055	0.038	0.055	0.072	-

Reserving Methods Exhibits #4-#6 - Development

Exhibits #4, #5, and #6 present three alternatives for the Development Method of loss reserving. The format of these three exhibits are the same:

[a] Accident Year (A.Y.)
[b] Valuation Months (Mos)
Valued as of 12/31/89, the months correspond to the last diagonal on the development triangles.
[c] Reported Losses ($000)
Either incurred or paid, reported as of 12/31/89, are taken from the last diagonal on the development triangles.
[d] Age-to-Age (Age-Age) Development Factors
Selected incremental development factors, incurred or paid.
[e] Age-to-Ultimate (to Ult) Development Factors
Cumulative development factors to ultimate from chain multiplication of age-to-age factors in column [d].
[f] Developed Losses ($000)
Reported losses developed to ultimate by application of the appropriate age-to-ultimate factor i.e., column [c] times [e].
[g] Indicated IBNR ($000)
Developed losses in column [f] minus reported incurred losses.

Exhibits #4 and #5 are based on reported incurred losses (column [c]); while Exhibit #6 is based on reported paid losses. Exhibits #4 and #5 differ in the selected development factors shown in column [d] and [e], and the resulting calculations.

Made-Up Re, Inc. - Basic Reserving Methods Exhibit #4

Development Method - Incurred Alternative A

[a]	[b]	[c]	Development Factors		[f]	[g]
		Reported	[d]	[e]	Developed	Indicated
A.Y.	Mos	Losses	Age-Age	to Ult	Losses	IBNR
1975	180	10,345	Tail Factor =	1.195	12,363	2,017
1976	168	9,187	1.020	1.219	11,198	2,011
1977	156	9,888	1.025	1.249	12,354	2,466
1978	144	9,222	1.030	1.287	11,868	2,645
1979	132	8,448	1.035	1.332	11,251	2,804
1980	120	10,713	1.040	1.385	14,839	4,126
1981	108	8,505	1.050	1.454	12,370	3,865
1982	96	8,933	1.060	1.542	13,772	4,839
1983	84	13,800	1.075	1.657	22,872	9,071
1984	72	17,119	1.100	1.823	31,209	14,090
1985	60	13,178	1.140	2.078	27,387	14,209
1986	48	3,156	1.210	2.515	7,936	4,780
1987	36	4,387	1.320	3.319	14,564	10,176
1988	24	4,412	1.550	5.145	22,702	18,289
1989	12	2,666	2.400	12.348	32,915	30,249
	Sum	133,959	-	1.938	259,598	125,639

Made-Up Re, Inc. - Basic Reserving Methods Exhibit #5

Development Method - Incurred Alternative B

[a]	[b]	[c]	Development Factors		[f]	[g]
		Reported	[d]	[e]	Developed	Indicated
A.Y.	Mos	Losses	Age-Age	to Ult	Losses	IBNR
1975	180	10,345	Tail Factor =	1.208	12,497	2,152
1976	168	9,187	1.034	1.249	11,475	2,288
1977	156	9,888	1.030	1.287	12,723	2,835
1978	144	9,222	1.022	1.316	12,133	2,911
1979	132	8,448	1.047	1.377	11,631	3,184
1980	120	10,713	1.044	1.437	15,393	4,681
1981	108	8,505	1.053	1.513	12,872	4,366
1982	96	8,933	1.054	1.595	14,246	5,313
1983	84	13,800	1.081	1.723	23,780	9,980
1984	72	17,119	1.097	1.890	32,348	15,229
1985	60	13,178	1.137	2.149	28,325	15,147
1986	48	3,156	1.216	2.613	8,246	5,090
1987	36	4,387	1.346	3.517	15,429	11,041
1988	24	4,412	1.769	6.220	27,446	23,033
1989	12	2,666	2.813	17.496	46,637	43,971
	Sum	133,959	-	2.129	285,180	151,221

Made-Up Re, Inc. - Basic Reserving Methods Exhibit #6

Development Method - Paid Alternative C

[a]	[b]	[c]	Development Factors		[f]	[g]
		Reported	[d]	[e]	Developed	Indicated
A.Y.	Mos	Losses	Age-Age	to Ult	Losses	IBNR
1975	180	8,896	Tail Factor =	1.300	11,565	1,219
1976	168	6,469	1.030	1.339	8,662	(524)
1977	156	7,409	1.035	1.386	10,267	379
1978	144	7,323	1.040	1.441	10,555	1,333
1979	132	7,171	1.050	1.513	10,852	2,404
1980	120	9,014	1.060	1.604	14,461	3,748
1981	108	7,127	1.075	1.724	12,291	3,785
1982	96	7,519	1.100	1.897	14,263	5,330
1983	84	10,326	1.130	2.144	22,133	8,333
1984	72	11,928	1.160	2.486	29,658	12,539
1985	60	8,382	1.250	3.108	26,053	12,875
1986	48	2,067	1.400	4.351	8,995	5,839
1987	36	1,406	1.750	7.615	10,703	6,316
1988	24	1,543	2.600	19.799	30,542	26,130
1989	12	69	4.700	93.054	6,401	3,736
	Sum	96,648	-	2.353	227,402	93,443

Reserving Methods Exhibit #7 - Bornhuetter-Ferguson

Exhibits #7 presents the Bornhuetter-Ferguson loss reserving methodology using reported incurred losses. In the Bornhuetter-Ferguson methodology, the calculations of the Loss Ratio method and the Development method are combined, in the following format:

[a] Accident Year (A.Y.)

[b] Earned Premium ($000)
In an accident year reserving exercise, calendar year premiums are used. For simplicity, premium development is ignored.

[c] Initial Loss Ratio (LR%) as a Percent
Most commonly called the "expected" loss ratio, this column should represent the ultimate ratios that would be selected in the Loss Ratio reserving method.

[d] Expected Losses ($000)
The initial expectation of losses calculated by applying the initial loss ratio [c] to the earned premium [b].

[e] Age-to-Ultimate Development Factors (Factor to Ult)
Cumulative development factors to ultimate taken from Exhibit #4, column [e].

[f] Unreported Ratio (Unrptd Ratio%) as a Percent
The unreported ratio is derived as follows:
1) The reported losses (RL) are developed to ultimate (UL) by the application of the appropriate age-to-ultimate development factor (LDF) i.e., RLxLDF=UL in the loss development method calculations.
2) Therefore, the development factor (LDF) is the ratio of ultimate losses (UL) divided by reported losses (RL), or LDF=UL/RL.
3) The inverse of the development factor (1/LDF) is the ratio of reported losses divided by ultimate losses (RL/UL) i.e., the proportion of ultimate losses which are supposed to be reported as of a given age according to the selected development factors.
4) The complement of the reported ratio 1-[1/LDF]=1-[RL/UL] is the unreported ratio i.e., the proportion of ultimate losses which have yet to be reported as of a given age according to the selected development factors.

Exhibit #7 - Bornhuetter-Ferguson continued

[g] Unreported (Unrptd) Losses ($000)
Combines the initial expectation of losses from the Loss Ratio Method with the unreported ratio from the Development Method, calculated by applying the unreported ratio [f] to the expected losses [d].

[h] Reported Losses ($000)
Incurred losses, reported as of 12/31/89, are taken from the last diagonal on the development triangles.

[i] Expected Ultimate ($000)
The sum of unreported [g] and reported [h] losses.

If, as in this example, the age-to-ultimate factors [e] represent incurred loss development, then the unreported losses [g] are indicated IBNR. If the age-to-ultimate factors [e] represent paid loss development, then the unreported losses [g] are indicated case and IBNR reserves i.e., total unpaid losses.

Made-Up Re, Inc. - Basic Reserving Methods Exhibit #7
Bornhuetter-Ferguson Method - Incurred Alternative D

[a] A.Y.	[b] Earned Prem.	[c] Initial LR%	[d] Expectd Losses	[e] Factor to Ult	[f] Unrptd Ratio%	[g] Unrptd Losses	[h] Reprtd Losses	[i] Expectd Ultimate
1975	11,000	85.0	9,350	1.195	16.3	1,526	10,345	11,871
1976	11,000	85.0	9,350	1.219	18.0	1,679	9,187	10,866
1977	11,000	85.0	9,350	1.249	20.0	1,866	9,888	11,754
1978	11,000	85.0	9,350	1.287	22.3	2,084	9,222	11,307
1979	11,000	85.0	9,350	1.332	24.9	2,330	8,448	10,778
1980	11,000	105.0	11,550	1.385	27.8	3,212	10,713	13,924
1981	8,500	125.0	10,625	1.454	31.2	3,320	8,505	11,825
1982	8,500	160.0	13,600	1.542	35.1	4,779	8,933	13,712
1983	9,000	190.0	17,100	1.657	39.7	6,782	13,800	20,583
1984	10,000	205.0	20,500	1.823	45.1	9,255	17,119	26,374
1985	13,500	110.0	14,850	2.078	51.9	7,705	13,178	20,882
1986	19,000	80.0	15,200	2.515	60.2	9,156	3,156	12,312
1987	28,000	80.0	22,400	3.319	69.9	15,652	4,387	20,039
1988	34,000	80.0	27,200	5.145	80.6	21,913	4,412	26,326
1989	36,000	100.0	36,000	12.348	91.9	33,085	2,666	35,750
	232,500	101.4	235,775		52.7	124,343	133,959	258,302

Made-Up Re, Inc. - Basic Reserving Methods Exhibit #8

Comparison of Ultimates by Alternative Methodologies

[a]	[b]	[c]	[d]	[e]	[f]
	Earned	Projected Ultimate Loss Ratios %			
A.Y.	Prem.	Alt. A	Alt. B	Alt. C	Alt. D
1975	11,000	112.4	113.6	105.1	107.9
1976	11,000	101.8	104.3	78.7	98.8
1977	11,000	112.3	115.7	93.3	106.9
1978	11,000	107.9	110.3	96.0	102.8
1979	11,000	102.3	105.7	98.7	98.0
1980	11,000	134.9	139.9	131.5	126.6
1981	8,500	145.5	151.4	144.6	139.1
1982	8,500	162.0	167.6	167.8	161.3
1983	9,000	254.1	264.2	245.9	228.7
1984	10,000	312.1	323.5	296.6	263.7
1985	13,500	202.9	209.8	193.0	154.7
1986	19,000	41.8	43.4	47.3	64.8
1987	28,000	52.0	55.1	38.2	71.6
1988	34,000	66.8	80.7	89.8	77.4
1989	36,000	91.4	129.5	17.8	99.3
Sum	232,500	111.7	122.7	97.8	111.1

Made-Up Re, Inc. - Basic Reserving Methods Exhibit #9

Comparison of Ultimates by Alternative Methodologies

	Alt. A	Alt. B	Alt. C	Alt. D	Carried
Projected Ultimate	259,598	285,180	227,402	258,302	258,959
% Carried	0.2%	10.1%	-12.2%	-0.3%	
Indicated IBNR	125,639	151,221	93,443	124,343	125,000
% Carried	0.5%	21.0%	-25.2%	-0.5%	
(Deficit)/Redundant	(639)	(26,221)	31,557	657	-
% Surplus	-0.6%	-26.2%	31.6%	0.7%	-

REINSURANCE RESERVING I

Section D

Practical Application

REINSURANCE RESERVING I

PRACTICAL APPLICATION

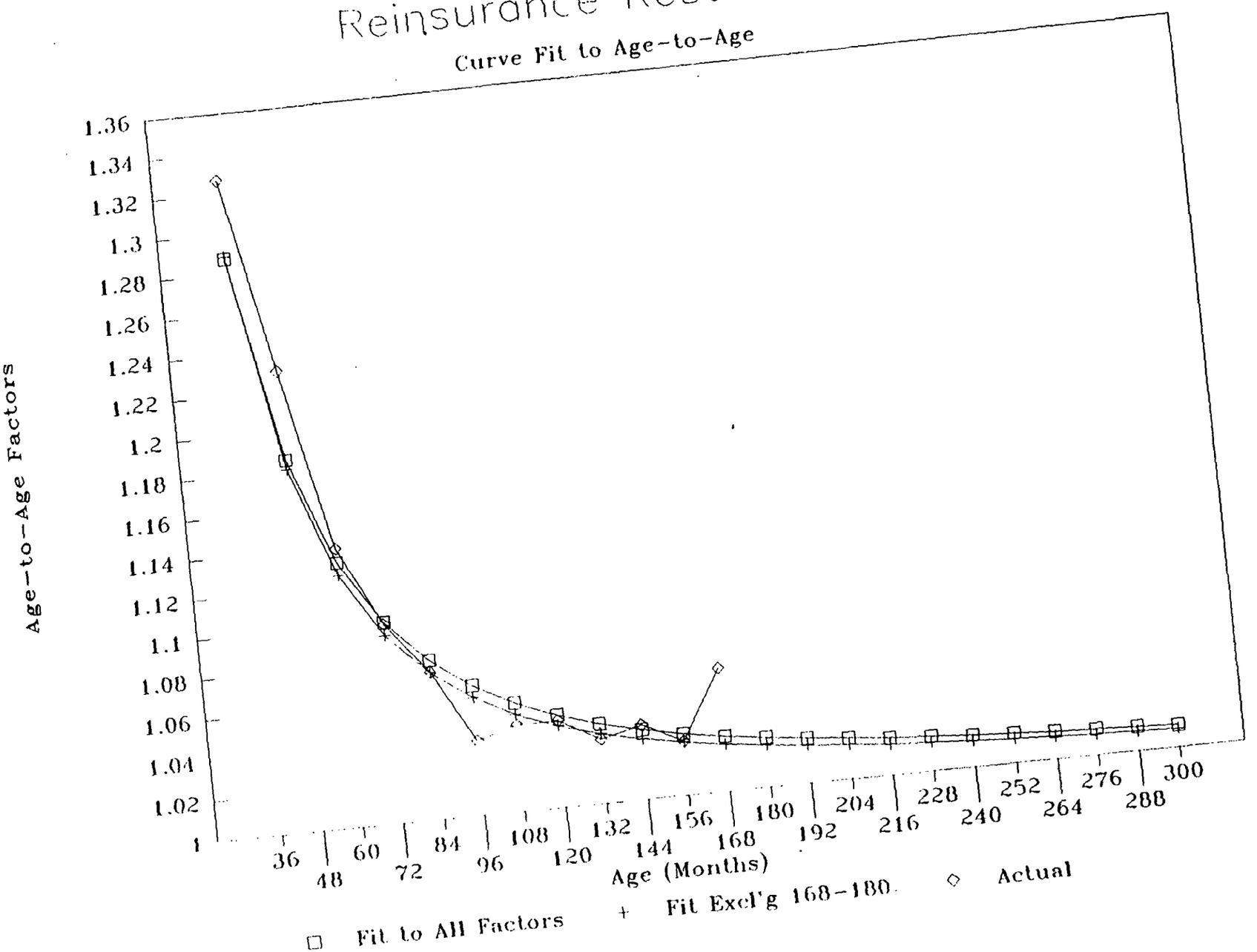
I. Loss Development Tail

A. WHERE DOES THE "TAIL" BEGIN?

B. METHODS

- Industry Data
  - RAA
  - Best's Casualty Loss Reserve Development
- Curve fitting
  - Fitting to % reported vs Age to Age Factors
  - Smooth before fitting?
  - How far should curve be run off

Reinsurance Reserving I



REINSURANCE RESERVING I

Tail Factor Selection

Curve Fit to Age-to-Age Factors

	(1)	(2) Y	(3)	(4) X	(5)	(6)	(7)
	Selected Link Factor	@ln(Link-1)	"Time"	@ln(1/Time)	Fitted Loss Development All Factors	Excl'g 168-180	Excl'g 96-108
12 - 24	2.554	0.441	12	-2.485	2.539	2.730	2.545
24 - 36	1.533	-0.629	24	-3.178	1.534	1.559	1.544
36 - 48	1.327	-1.118	36	-3.584	1.288	1.289	1.296
48 - 60	1.230	-1.470	48	-3.871	1.185	1.181	1.192
60 - 72	1.139	-1.973	60	-4.094	1.132	1.126	1.137
72 - 84	1.099	-2.313	72	-4.277	1.100	1.093	1.104
84 - 96	1.073	-2.617	84	-4.431	1.079	1.073	1.083
96 -108	1.037	-3.297	96	-4.564	1.064	1.058	1.068
108 -120	1.043	-3.147	108	-4.682	1.054	1.048	1.057
120 -132	1.043	-3.147	120	-4.787	1.046	1.041	1.048
132 -144	1.032	-3.442	132	-4.883	1.040	1.035	1.042
144 -156	1.037	-3.297	144	-4.970	1.035	1.030	1.037
156 -168	1.027	-3.612	156	-5.050	1.031	1.026	1.033
168 -180	1.061	-2.797	168	-5.124	1.027	1.023	1.029
			180-312		1.200	1.164	1.215
			180	-5.193	1.025	1.021	1.026
			192	-5.257	1.022	1.019	1.024
			204	-5.318	1.020	1.017	1.022
			216	-5.375	1.019	1.016	1.020
			228	-5.429	1.017	1.014	1.018
			240	-5.481	1.016	1.013	1.017
			252	-5.529	1.015	1.012	1.016
			264	-5.576	1.014	1.011	1.015
			276	-5.620	1.013	1.010	1.014
			288	-5.663	1.012	1.010	1.013
			300	-5.704	1.011	1.009	1.012

== ALL DATA ==

Regression Output.

Constant	4.22
Std Err of Y Est	0.31
R Squared	0.94
No. of Observations	14.00
Degrees of Freedom	12.00
X Coefficient(s)	1.53
Std Err of Coef.	0.11

== EXCLUDING 168-180 ==

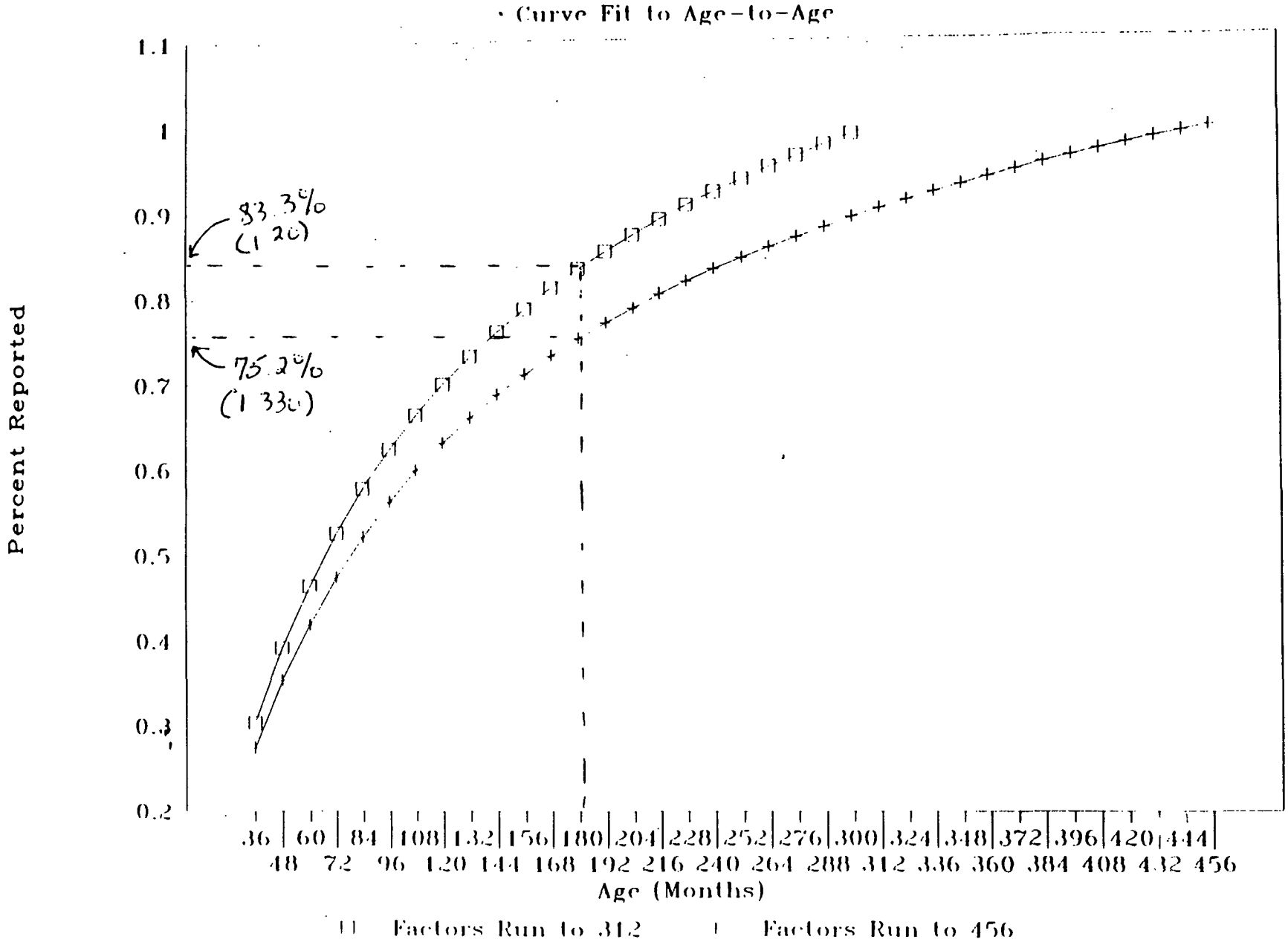
Regression Output:

Constant	4.59656
Std Err of Y Est	0.18459
R Squared	0.98031
No. of Observations	13
Degrees of Freedom	11
X Coefficient(s)	1.6292
Std Err of Coef.	0.0696

== EXCLUDING 96-108 ==

Regression Output:

Constant	4.17400
Std Err of Y Est	0.27051
R Squared	0.95589
No. of Observations	13
Degrees of Freedom	11
X Coefficient(s)	1.5046
Std Err of Coef.	0.0974


• Curve Fit to Age-to-Age
Percent Reported
1.1
1
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
83.3%
(120)
75.2%
(1330)
36 60 84 108 132 156 180 204 228 252 276 300 324 348 372 396 420 444
48 72 96 120 144 168 192 216 240 264 288 312 336 360 384 408 432 456
Age (Months)
Factors Run to 312
Factors Run to 456

REINSURANCE RESERVING I

Smoothed Development Factors

	(1)	(2)	(3)	(4)	(5)
	Reported	Selected Age-to-Age		Cumulative Factors	
A.Y.	Losses	Option 1	Option 2	Option 1	Option 2
1975	10,345			1.200	1.164
1976	9,187	1.027 *	1.023 **	1.232	1.191
1977	9,888	1.031 *	1.026 **	1.271	1.222
1978	9,222	1.035 *	1.030 **	1.315	1.258
1979	8,448	1.040 *	1.035 **	1.368	1.302
1980	10,713	1.046 *	1.041 **	1.431	1.356
1981	8,505	1.054 *	1.048 **	1.508	1.421
1982	8,933	1.064 *	1.058 **	1.604	1.503
1983	13,800	1.073	1.073	1.721	1.613
1984	17,119	1.099	1.099	1.892	1.773
1985	13,178	1.139	1.139	2.155	2.019
1986	3,156	1.230	1.230	2.650	2.484
1987	4,387	1.327	1.327	3.517	3.296
1988	4,412	1.533	1.533	5.392	5.052
1989	2,666	2.554	2.554	13.771	12.904
	133,959				

Notes :

* Based on a curve fit to all factors.

** Based on a curve fit excluding 168-180.

REINSURANCE RESERVING I

Smoothed Development Factors

	(6)	(7)	(8)
	[(4)-1]x(1)	[(5)-1]x(1)	
	Indicated IBNR		%
A.Y.	Option 1	Option 2	Diff.
1975	2,069	1,697	18%
1976	2,135	1,753	18%
1977	2,676	2,192	18%
1978	2,906	2,383	18%
1979	3,106	2,555	18%
1980	4,613	3,812	17%
1981	4,319	3,580	17%
1982	5,399	4,496	17%
1983	9,956	8,460	15%
1984	15,268	13,229	13%
1985	15,219	13,431	12%
1986	5,209	4,682	10%
1987	11,043	10,071	9%
1988	19,377	17,879	8%
1989	34,047	31,735	7%
	137,341	121,954	11%

Option 1 : Curve fit to all factors.
Option 2 : Excluding 168-180.

REINSURANCE RESERVING I

PRACTICAL APPLICATION

II. Projected Loss Ratios

A. USES

- Initial Loss Ratio for Bornhuetter-Ferguson
- Set ultimate for immature years

B. METHODS

- Industry
  - RAA
  - Best's
- Internal Data
  - Estimate yearly changes in rate adequacy (Rates and coverage)
  - Select base year for which loss ratio estimate is reliable
  - Apply rate adequacy changes to base year to estimate subsequent loss ratios

REINSURANCE RESERVING I
Loss Ratio Estimation

	(1)	(2)	(3)	(4)	(5) [(1)'83]x(3)	(6) [(1)'84]x(4)	(7)
	Developed	Rate Level Index			Indicated Loss Ratio		Selected
Year	Loss Ratio	'89 Base	'83 Base	'84 Base	'83 Base	'84 Base	Loss Ratio
1983	259.2%	3.54	1.00	0.83	259.2%	262.2%	260.0%
1984	317.8%	4.29	1.21	1.00	314.1%	317.8%	315.0%
1985		1.57	0.44	0.37	114.9%	116.3%	115.0%
1986		0.71	0.20	0.17	52.0%	52.6%	52.0%
1987		0.86	0.24	0.20	63.0%	63.7%	63.0%
1988		0.93	0.26	0.22	68.1%	68.9%	70.0%
1989		1.00	0.28	0.23	73.2%	74.1%	75.0%

Col (1) is 50/50 weighting of Alternative A and B.

Col (2) is from attached exhibit.

MADE-UP RE INC.- Rate Level Index

INPUTS

CLASS : Treaty Working - Liability

	(A)	(B)	(C)	(D)	(E)	(F)
		RATES			COVERAGE	
Year	Average Premium Recieved	Average Adjusted Subj.Prem	Primary Adequacy Index	100% Average Limit	100% Average Retention	Excess Loss Trend
1983	60,000	901,220	0.698	318,823	109,939	1.974
1984	66,667	1,139,786	0.669	387,865	129,288	1.762
1985	135,000	1,140,874	0.815	394,746	157,898	1.574
1986	190,000	1,076,325	1.054	464,221	232,111	1.405
1987	186,667	1,235,519	1.093	545,924	245,666	1.254
1988	226,667	1,451,349	1.045	642,007	256,803	1.120
1989	240,000	1,538,348	1.000	755,000	286,900	1.000

Notes :

Col (A) : Reflects reinsured share.
Col (B) : Reported subject premium x share.
Col (C) : From Back-up Exhibit 1.
Col (D) : Annual trend rate = 12%

MADE-UP RE INC.- Rate Level Index

OUTPUTS

CLASS : Treaty Working - Liability

	(1) (A)/(B)	(2) (A)/(B)x(C)	(3) (2)/(2)'89	(4) (D)x(F)	(5) (E)x(F)	(6)	(7) (6)/(3)
		Avg. Rate		AVERAGE COVERAGE ($1989)			
Year	Average Rate	on 1989 Level Subj. Premium	Rate Index	Limit	Retention	Coverage Index	Rate Level Index
1983	6.7%	4.6%	0.298	629,300	217,000	1.055	3.54
1984	5.8%	3.9%	0.251	683,551	227,850	1.075	4.29
1985	11.8%	9.6%	0.618	621,140	248,456	0.971	1.57
1986	17.7%	18.6%	1.193	652,197	326,099	0.852	0.71
1987	15.1%	16.5%	1.058	684,807	308,163	0.907	0.86
1988	15.6%	16.3%	1.046	719,048	287,619	0.971	0.93
1989	15.6%	15.6%	1.000	755,000	286,900	1.000	1.00

Notes :

Col (6) : From Back-up Exhibit 2.

MADE-UP RE INC.- Rate Level Index

BACK-UP EXHIBIT 1

CLASS : Treaty Working - Liability

	(1)	(2)	(3)	(4)	(5) (1)x(2)+ (3)x(4)	(6) [(5)'89]/(5)
	Primary Loss Ratio		Selected Weights			
Year	Gen.Liab.	Auto	Gen.Liab.	Auto	Weighted Loss Ratio	Primary Adequacy Index
1983	125%	93%	0.85	0.15	120%	0.698
1984	130%	100%	0.85	0.15	126%	0.669
1985	105%	95%	0.80	0.20	103%	0.815
1986	77%	90%	0.80	0.20	80%	1.054
1987	73%	88%	0.75	0.25	77%	1.093
1988	77%	90%	0.75	0.25	80%	1.045
1989	80%	93%	0.70	0.30	84%	1.000

Notes :

Col (1) & (2) were judgementally selected after a a review of the loss ratios shown for Best's selected 200 primary companies.

Col (3) & (4) reflect the distribution of Made-Up Re's exposure by year.

MADE-UP RE INC.- Rate Level Index

BACK-UP EXHIBIT 2

CLASS : Treaty Working - Liability

	(1)	(2)	(3)	(4)	(5) [(3)-(4)]/ [(3)-(4)]'89
	Coverage ($1989)		Selected ILF		
Year	Limit	Retention	Limit+Ret.	Retention	Coverage Index
1983	629,300	217,000	2.62	2.18	1.06
1984	683,551	227,850	2.64	2.20	1.07
1985	621,140	248,456	2.63	2.23	0.97
1986	652,197	326,099	2.67	2.31	0.85
1987	684,807	308,163	2.67	2.30	0.91
1988	719,048	287,619	2.68	2.27	0.97
1989	755,000	286,900	2.69	2.27	1.00

Limitation of Coverage Index Method

- Only reflects changes in limit and retention. Does not reflect other changing terms and conditions.

- Method works best if limits and retentions for each year are clustered around the average for that year.

- The limit used should be the effective limit. If ceding company policy limits do not expose the treaty, an adjustment must be made.

Possible Enhancements

- Further subdivide reserve group. Apply method to the subgroups and reweight indications.

1990 CASUALTY LOSS RESERVE SEMINAR

1F: USING THE ANNUAL STATEMENT AND OTHER EXTERNAL DATA IN LOSS RESERVING

Moderator

David N. Hafling
American States Insurance Companies

Panel

James G. Inkrott
William M. Mercer, Inc.

Gary R. Josephson
Milliman & Robertson, Inc.

Gail E. Tverberg
Tillinghast/Towers Perrin

JAMES G. INKROTT

USING ANNUAL STATEMENT AND OTHER EXTERNAL DATA RESERVES FOR NEW COVERAGES

Good morning. My topic is "Using Annual Statement and Other External Data for Reserves for New Coverages". I'm going to discuss my subject in a rather general way, and I have no formulas in my presentation. It seemed to me that a generic treatment of several concepts would be more helpful than the arithmetic involved. However, I will be happy to provide more details of any of the thoughts presented, and if you would call or write with specific questions, I will be happy to respond to any individual questions that you may have.

SLIDE 2 - APPLICATION TO EXISTING COVERAGES, TOO

I'd also like to preface my presentation with the thought that many of the concepts for using external data for new coverages can also be useful for "checking" results of reserve projections for existing coverages. It has occurred to me more and more that we ought to review our underlying assumptions for validity when we develop

projections for existing coverages, since even existing products are being changed to include new coverages. Claimants, attorneys, and courts are providing new interpretations to old coverages which mean that development patterns change, and we should recognize this trend in our reserving assumptions.

Two examples which may be useful to keep in mind in regard to developments occurring in existing coverages are underinsured motorists coverage, and the continuing increases in defense costs. We're finding it helpful to isolate these types of "changes in coverages", and to compare these developments to "external data" to help refine our estimates for reserves for existing coverages.

SLIDE 3 - SOURCES OF EXTERNAL DATA

What are the types of external data which may be helpful when setting reserves for a new coverage?

Annual Statement Data - Best's Aggregates and Averages

This source of data is particularly helpful in quantifying LAE payment patterns and average ALAE ratios by line of business. I will develop the concept later of showing these payments as ratios to premiums, rather than as ratios to losses to help quantify and communicate the payment patterns for these costs.

This source is also helpful for developing a pattern for loss payments, and I have had some success in using this type of aggregate data for loss reporting (IBNR) patterns. I try to adjust the incurred loss development patterns contained in the Best's Aggregates and Averages to exclude IBNR (bulk) reserves and then separately estimate case reserves developments to provide an idea of "pure IBNR" emergence. The adjustments for case reserve development is a judgmental adjustment based on experience from other companies.

Reinsurance Association of American (RAA) Data

This source of data can be of help in determining patterns for certain coverages, but I've used it mainly to ge a sort of "out of bounds" framework for interpreting reporting patterns for primary coverages

NAIC Malpractice Data - Bickerstaff's Articles

I've found this data to be very useful for interpreting reporting and payment patterns for both losses and loss adjustment expenses; particularly, for professional liability coverages. This data has been published by the CAS in two different call papers, and I would recommend this as a useful reference for understanding and quantifying reporting patterns (both the number of claims by report period, as well as the average costs of unreported claims by development period). It is particularly helpful to note that the claims reported after the first year of development have average costs that are double the cost of claims reported in the first year of development. Bickerstaff's tables also provide patterns of ALAE development which are very helpful.

ISO Filings

These can be helpful in determining ALAE ratios and in developing reporting patterns for basic limits vs. total limits. However, since ISO filings do not usually contain separate payment patterns, and the incurred development triangles do not separate case reserve changes from "pure IBNR" development, and I've not been able to use the data for other than general interpretations.

Peer Company Rate Filings

Sometimes company rate filings will contain very useful information such as ALAE vs. loss development patterns, developments of number of claims, etc. If the "new" coverage being reserve is already written by a competitor, it may be advisable to check if a rate filing from the competitor contains loss development information which may be useful in setting reserves.

Data From Other Lines of Business and Other Coverages

This is a "catch all" to suggest that we keep our eyes open for any other data which may be useful. I try to copy any studies which may

be useful for reserving purposes, and try to refer to these studies as I look at reserves for a new product or for a new company.

SLIDE 4 - APPLICATIONS

I've used these concepts and methods in a number of projects. For instance, parts or all of these methods were used to project reserves for the following coverages, where the data was not sufficient to set reserves based on the development available for the particular coverage involved.

Reinsured Pool for Municipalities

A Company Multi-Peril Package

Motorsports and Special Events Coverages

Hospital Professional Liability Funding Studies

A Self-Insurance Trust for Auto and GL Coverages

**** A New Company is Like a New Coverage**

SLIDE 5

As an example of how to use external data, suppose we have less than one year of development available for a new coverage, and we must establish reserves for the coverage. We will develop three separate reserves and will use external data to guide us in our estimates. The three components are:

"Pure IBNR"

Unpaid ALAE

Case Reserve Developments

SLIDE 6 - ESTIMATING PURE IBNR DEVELOPMENT

First, I would suggest we establish an assumed reporting pattern for claims for the coverage. This would be determined based on the expected number of claims to be reported by year of development, times the expected relative cost of the claims by year of development. We might look at the reporting pattern already available by accident quarter and report quarter to help quantify our expected reporting pattern. The expected percent of ultimate claims which are unreported

could be multiplied by an expected average claim cost to determine an IBNR provision. These unreported percentages will probably be difficult to obtain from external sources, but reference to Bickerstaff's article may be helpful, and other external data on reporting patterns could be useful in establishing our expected percentages of unreported numbers and dollars of claims.

It may be helpful to separately estimate a reporting pattern assumption for "large" vs. "average" claims. That is, you may find it helpful to "reserve" a separate percentage for unreported large losses based on excess limits charges, and a separate percentage for basic limits losses. We have had some success in separating basic vs. excess limits reporting patterns by using a model (Lognormal or Pareto) to predict the dollars of limited or excess claims based on the relative average cost of claims by reporting period.

The basic idea is to develop a "mindset" which separately estimates unreported losses based on assumptions of expected unreported losses for the coverage involved, and the unreported percentage is a

function of external reporting patterns times the premiums or exposures for the coverage involved. This is a sort of Bornhuetter/Ferguson approach, where the loss development factor is a "pure IBNR" factor obtained from external data, and the factor is applied to the company's coverage premium.

SLIDE 7 - ALAE PAYMENT PATTERNS

The next step is to establish an ALAE payment pattern.

This step often relies primarily on payment data from Best's Aggregates and Averages. I would suggest showing separate payment ratios for loss and ALAE as percentages of premiums, and developing a required reserve for ALAE based on this external data. The one year of data will not be particularly helpful in determining a company-specific ALAE reserve, but the industry ratios of ALAE to premiums could be judgmentally modified to account for assumed relationships of ultimate ALAE for the coverage involved compared to the industry ultimate ALAE ratios.

Almost every reserving project I've been involved with has turned up higher ALAE reserves than expected by the company, and it is useful to calculate and communicate the assumptions for ALAE as a separate component of total reserves. It is often beneficial to establish "budgeted" provisions for this component by calendar year to use as a monitor of the reserving assumptions.

SLIDE 8 - CASE RESERVING ASSUMPTIONS

Establishing modifications to case reserves is probably best accomplished by reference to case reserve development from similar claims at the company, rather than reference to external data. This component of development can probably be monitored fairly early in the reserving process, and development of claims by quarter may indicate the general direction of a modification factor, although the magnitude of the adjustments may not be known for some time. However, separately estimating developments on known claims is helpful for a new coverage (and for old coverages), and can be useful ingredient in determining more accurate company specific development factors.

SLIDE 9 - CONCLUSION

We have discussed the use of external data from several sources to determine reserves for new coverages. The basic concepts can be applied to existing coverages as well. The basic ideas are to develop assumptions for (1) the reporting pattern for the number and sizes of claims for the coverage involved based on data from industry studies; (2) ALAE payment patterns and the ultimate ratio of ALAE to premiums, based on Best's Aggregates and Averages or peer company ALAE ratios and payment patterns; and (3) modifications to case reserves by use of the historical developments of case reserves from similar coverages written by the company. The case reserve modifications can probably be developed fairly quickly by analyzing quarterly data for the coverage involved.

SLIDE 1

USING ANNUAL STATEMENT AND OTHER EXTERNAL DATA

RESERVES FOR NEW COVERAGES

JAMES G. INKROTT, FCAS, MAAA

CASUALTY LOSS RESERVE SEMINAR

SESSION 1F

SEPTEMBER 10, 1990

SLIDE 2

RESERVES FOR NEW COVERAGES

- EXISTING CONTRACTS ARE BEING CHANGED TO INCLUDE NEW COVERAGES SO THESE CONCEPTS ARE APPLICABLE TO EXISTING PRODUCTS, TOO
- COVERAGE CHANGES WITH NEW REPORTING PATTERNS CAUSE NEW TRENDS TO SHOW UP IN EXISTING PRODUCTS
  - UNDERINSURED MOTORISTS COVERAGE
  - PAYMENT PATTERNS EXTENDED FROM ADDITIONAL DEFENSE COSTS

SLIDE 3

RESERVES FOR NEW COVERAGES

SOURCES OF EXTERNAL DATA

- ANNUAL STATEMENT DATA FROM BEST'S AGGREGATES AND AVERAGES
  - LAE PAYMENT PATTERNS
  - LOSS PAYMENT PATTERNS
  - CAN BE HELPFUL FOR REPORTING PATTERNS, BUT WILL BE BETTER WITH NEW SCHEDULE P
  - TO SEPARATE CASE DEVELOPMENT FROM INCURRED DEVELOPMENT WILL NEED TO MAKE ASSUMPTIONS - LOOK AT COMPANY A.S.
- RAA - SOMETIMES HELPS ESTABLISH "OUT OF BOUNDS"
- MALPRACTICE DATA IN BICKERSTAFF'S ARTICLES
- ISO FILINGS
- PEER COMPANY RATE FILINGS AND ANNUAL STATEMENTS
- DATA FROM OTHER LINES OF BUSINESS AND OTHER COVERAGES AND OTHER STUDIES

SLIDE 4

RESERVES FOR NEW COVERAGES

APPLICATIONS

- REINSURED POOL FOR MUNICIPALITIES
- COMPANY MULTI-PERIL PACKAGE
- MOTORSPORTS AND SPECIAL EVENTS COVERAGES
- HOSPITAL PROFESSIONAL LIABILITY
- SELF INSURANCE TRUST - AUTO AND GL COVERAGES
- NEW COMPANY IS LIKE A NEW PRODUCT

SLIDE 5

RESERVES FOR NEW COVERAGES

- ASSUME WE HAVE ONE YEAR OF DEVELOPMENT AVAILABLE
- WE WILL ESTIMATE THREE COMPONENTS OF DEVELOPMENT:
  - "PURE IBNR" - USE EXTERNAL DATA AND SUPPLEMENT WITH AVAILABLE QUARTERLY COVERAGE DATA
  - ALAE - USE EXTERNAL PAYMENT PATTERN DATA
  - CASE RESERVE DEVELOPMENTS - USE QUARTERLY COVERAGE DATA

SLIDE 6

RESERVES FOR NEW COVERAGES

- ESTIMATING "PURE IBNR" REPORTING PATTERN
- FIRST YEAR OR SO, RESERVES BASED ON ASSUMPTIONS BY COVERAGE. USE "BORNHUETTER - FERGUSON" AND ASSUMED REPORTING PATTERN - DISCUSSIONS WITH COMPANY TO ESTABLISH ASSUMPTIONS
- ESTABLISH A QUARTERLY REPORTING PATTERN
- COMPARE TO ISO, OTHER COMPANIES, BICKERSTAFF:
  - REPORTING PATTERNS - NUMBER OF CLAIMS
  - PURE IBNR = NUMBER OF CLAIMS TIMES RELATIVE COST BY REPORT YEAR
  - MAY SEPARATELY ESTIMATE LARGE (XS) CLAIM REPORTING
  - MODEL OF AVERAGE COSTS BY DEVELOPMENT PERIOD FOR XS
  - "MINDSET FOR THIS COVERAGE = "

SLIDE 7

RESERVES FOR NEW COVERAGES

- ESTABLISH AN ANNUAL PAYMENT PATTERN - SEPARATELY FOR LOSS AND ALAE
  - USE BEST'S AGGREGATES AND AVERAGES, BICKERSTAFF, PEER COMPANY, SCHEDULE P:
    - "DECAY RATES"
    - ANNUITIES?
      STRUCTURED SETTLEMENTS?
    - ALAE - ARRANGEMENTS WITH LAW FIRMS?
    - EXPOSURE (PREMIUM) BASED ALAE
    - "MINDSET FOR THIS COVERAGE = "

SLIDE 8

RESERVES FOR NEW COVERAGES

- ESTABLISH A CASE RESERVE DEVELOPMENT PATTERN
  - PROBABLY COMPANY SPECIFIC, SO LOOK AT CASE DEVELOPMENT FROM SIMILAR CLAIMS
  - CAN PROBABLY DETERMINE FAIRLY EARLY - BY QUARTER
  - "MINDSET FOR THIS COVERAGE = "

SLIDE 9

RESERVES FOR NEW COVERAGES

- CONCLUSION - COMBINE ASSUMPTIONS FOR:
  - "PURE IBNR" - FUNCTION OF PREMIUMS OR EXPOSURES AND REPORTING PATTERNS FROM EXTERNAL DATA
  - UNPAID ALAE IS PROBABLY FROM BEST'S AGGREGATES AND AVERAGES
  - CASE DEVELOPMENT IS FROM QUARTERLY COVERAGE DATA

(Slide 1)

MS. TVERBERG: Good morning. The topic for today's talk is loss reserving when you don't have enough data. I'd like to talk about an approach we've developed which we call the industry model approach. It is kind of a common sense approach for blending what data you do have with the data you can get from outside.

(Slide 2)

The industry model approach is an approach that we've developed for medical malpractice. It is also applicable to other lines of business, though, and the examples given here are not exclusive to medical malpractice. You can think of it as any line of business which has a fairly long development pattern.

In the industry model approach, exposure data is used to develop an estimate of expected losses. If you look at the model, you will see that even if you don't have exposure data, there are ideas that you can get from this model which can be applied in other situations.

I think with medical malpractice, what we're dealing with in many or most cases, is a situation where our own data is too thin as opposed to not having any data at all. What we are trying to do with this model is to make as good a use as we can of the data which is available. We also, of course, have the problem with medical malpractice and other lines, too, of not having enough years of development.

(Slide 3)

In this approach, the basic idea is to build a model of how we expect the loss data to develop and how we expect the losses to look. We want to see what we would expect the losses to be on an ultimate basis.

We want to see what losses we would expect to be reported to date, and we're going to try to see what kind of losses are expected at various limits, at a low limit where there's not so much of the bouncing around, and also at a higher limit, which may be the company or the self-insurer's retention, and probably even at total limits, if the insurer files an annual statement.

Once we've developed this model, we will compare the hospitals or the group's annual experience to that which is expected by the model. Then we'll apply some credibility factors based on the size of the particular entity and we'll take a blending of the experience that is expected and the actual experience of the particular entity. We will use that to develop what our reserve for unreported claims is going to be.

is going to be. The rate filing can provide a lot of information that you might want to know.

Hopefully, you can get rate filings for the coverage you are looking for, but if you can't get them for exactly for the coverage you are looking for, even having some for a closely-related coverage may be helpful.

Another source is compilations of self-insured data. A consulting firm that does quite a bit of work in a field may have information as to how losses are expected to develop for a particular line -medical malpractice, municipal liability, long-haul trucking, whatever it is, the consultants who are working in it have probably had enough experience in it that they've got some ideas as to development factors, trends, and pure premiums. They may have actually put together some type of analysis for this purpose.

The Reinsurance Association of America compilations, published every two years, is a compilation of the excess loss development patterns experienced by members of the Association. The losses underlying these patterns include "additional case reserves" established by the reinsurers, in addition to the case estimates on ceded claims of primary companies. Thus, factors developed from this data should be used with caution.

Then, of course, there are various bureau compilations and filings. I've used the general term bureau, because the compilations and filings are not just those of ISO. If the line is workers' compensation, the bureau may be the NCCI, for example.

In terms of reporting patterns or development patterns, if it is a specific new coverage that you're dealing with, you may want to look at individual company annual statement data. Quite often, the annual statement data that you're dealing with is only on an overall basis so represents a blend of coverages. If you are analyzing a specific coverage, you may want to look at just those companies that are specifically writing it, if you feel that they have a big enough piece of the total that you can tell something reasonable from their data.

Of course, if you are looking for a more stable pattern, you would probably want to use something like A.M. Best data.

In terms of other factors (pure premiums, increased limits factors and trend factors), some of the same data sources discussed previously for development patterns can be used.

You have a shorter list of things you can use for those -- the pure premiums, the increased limits factors and trend factors -- though, because you're dealing with kinds of information that are more specific. For these, you are really going to have to use rate filings, individual self-insured data, or bureau compilations.

In this kind of approach, a number of different kinds of data are needed. Sometimes you can improvise so that you are not required to have exactly all of these things, but it's helpful to be able to get things that are basically along the lines that I'm talking about here.

(Slide 4)

The first thing needed is development factors of various types. You will need loss development factors at a low limit if you are trying to model low limit losses. You will also need loss development factors at a high limit, and you may be able to use some sort of an interpolating technique to get intermediate development factors. If you are going to look at the paid losses relative to what your expected paid losses are, then some payment patterns will be needed as well.

Another thing which is needed, since this method is a kind of a rating model, is an estimate of the expected pure premiums on this particular line, both for the current year and for prior years. We find that trend factors are often helpful for estimating pure premiums for prior years. That is particularly true if you do not have information as to what the pure premiums should be for every year back. You can sometimes substitute, if you know what pure premium is expected for the current year and you know what the trend factor is, then you can figure out what you would have expected as your cost-per-unit going back to prior periods.

So, the trend factors are used to try to figure out what those historical cost would be that you're putting into your model. This is the kind of a model you might build in Lotus.

Finally, the other thing you need in doing this, is some kind of increased limit factors. For example, even if the data is sufficient for estimation at a low limit, say, $25,000 per claim or $100,000 per claim, you really do not have enough information to properly estimate losses at a million dollars per claim. So, industry increased limit factors are helpful in order to try to estimate what kind of adjustments you're going to need to make.

(Slide 5)

There are several different sources of external data. We use a variety of different sources. The source that we use most frequently, which is often overlooked, is independent rate filings.

Quite often, as Jim also mentioned, there are going to be others writing a similar coverage, and if you can obtain their rate filing from a State Insurance Department, either in your state or in another state, if it's a program that is offered country-wide, that rate filing can give you substantial information as to how the losses are expected to develop and what the reporting pattern

(Slide 6)

Now, I'd like to start going through this model. I have tried to put together a simplified example of how the approach might work. Basically, what we do is start out with the years that this coverage has been self-insured or insured for this particular entity, and develop a model.

For each of these years, we have the number of exposure units of the coverage that was sold. Then we also have an estimate of the industry pure premium for that period.

Here, I've estimated the industry pure premium to be $500 for the most recent year. And, because I didn't know precisely what the pure premium was for each of the past years, the way I've estimated it is to use the trend factor to trend the $500 backward. I'd think, "Okay, if it is $500 this year, it would be lower by the trend factor for previous years." Here, of course, you have to have a reasonably good idea as to what the trend factor is for that particular coverage, so as to know what the pure premium would be for each of the prior years.

Extending out the pure premiums times the exposure units, I get an expected ultimate loss amount. Now, as you can see, the expected ultimate loss amount, at this point in the calculation, is based purely on external data. It is not yet modified for the particular entity's actual loss experience.

In the example we are discussing, we have used only one kind of exposure unit. Very often these are several types of exposure unit. If there are different types of exposure units, one approach is to express all of the exposure units in terms of a particular exposure unit. For example, conversion factors might be used to convert physician exposures and outpatient exposures to bed equivalents.

This approach only works if all of the types of exposures have the same underlying trend factor, especially when trying to estimate the prior years' pure premiums. So, if there are several different kinds of exposure units and one is inflation-sensitive and one is not, or something of that sort, you may want to prepare separate calculations of the expected losses on exposure base "A" and also on exposure base "B." You can then add the two together to get a better estimate of the expected ultimate losses for the historical time periods.

As I said before, the expected ultimate losses at this point in the calculation are simply a preconceived notion of what these losses are going to look like. Typically, this loss estimate is made at a fairly low limit, maybe $100,000 limits, maybe $25,000.

The limit used is not necessarily what you think of as basic limits. It might be a limit that you've selected particularly for this purpose because of the size of that particular account, and the data that you have available.

Now that we've calculated what these expected losses are, our next step is to add them together for the various different exposure bases. If we had done that first step a couple of different ways, maybe once for hospital beds, and once for physicians, we'd add together all of those expected losses.

(Slide 7)

Then, our next step is to calculate how much we expect to be reported at a particular point in time. Here, we use development factors to estimate how much is expected to be reported at each of the points in time.

So, I've shown some "expected percentage reporteds" here, which have been developed, at least in part, based on industry loss development factors. This is one place, though, I do like to try to look at the client's own data to see if the selected percentages are reasonable. If the data is available, I put together a triangle, and check to see whether the relationships are in line with those used in the model.

There may not be enough data to put together a very stable development triangle, but you don't want to go too far astray, so you want to check so see whether the selected reporting pattern is reasonable in relationship to the entity's own data. If industry data is used for the reporting pattern, you will want to use data from a similar coverage and from a similar state. You don't want to use something too different, or you are likely to run into problems.

Because of the uncertainties relating to a particular entity's data, we very often perform an analysis a couple of different ways. For example, we often look at paid as well as incurred data, because of the problems with different levels of case reserves, especially when the level of the case reserves is really unknown at a particular point in time.

Another thing we often do is analyze experience at a couple of different limits. There will be greater credibility at a low limit, but the insurer or self-insurer may really be reserving or retaining losses at a higher limit. You may, therefore, want to analyze experience at the higher limit, as well. If such an analysis is performed, you will need to make a calculation similar to that which is shown of the expected reported losses at the higher limit.

(Slide 8)

Once we have calculated the expected reported losses, we compare the actual reported losses to the expected reported losses. In the example, the actual losses are 85% of the expected. We then calculate a credibility factor, based on the size of the entity, and use the credibility factor to calculate a credibility weighted experience modification factor.

Now, the credibility factor used in this analysis is something that we prepare, based on the expected claim count for the entity. We often convert the credibility standard from a claim count basis to an exposure basis. For example, the standard for full credibility might be 20,000 occupied bed-years, rather than a fixed number of claims. Using an exposure base standard for credibility has the advantage of giving an account with unusually few claims credibility based on its expected rather than actual claim count.

When analyses are performed at different limits, we typically use a higher standard for full credibility at the higher limits. Thus, if you had data, say, at both $100,000 limits and $500,000 limits for the same hospital or the same self-insurer, you would typically use an approach which would give you a lower credibility factor at those higher limits, because you've got the greater fluctuation in the individual claim amounts.

On a typical account, we would analyze loss experience several different ways, perhaps at $100,000 limits incurred losses, $500,000 limits incurred losses, and maybe at $100,000 limits paid losses. This approach will give three different indications using the various credibility weightings. So, in this example, I've shown a .93, but maybe looking at the account different ways, I might get a .93 and maybe a 1.01 and a .85.

What we would do is select one experience modification factor, based on the various different indications, trying to get the best idea we can of what this account is doing relative to what our model would suggest.

One thing I've run into sometimes as I follow this procedure, is that instead of getting a reasonable ratio of actual to expected losses, I get a ratio of something like a 3 or 3.5. At that point, I say, "Whoops, I think there's something wrong here." I say to myself, "Okay, there is something that's not the way I expected it to be. Is the account's pure premium higher than what I thought? Do I have a proper accounting of the exposures? Has something gone wrong"?

At that point, you suddenly realize that there is something you don't understand about the process. Maybe the reporting patterns are a lot faster; maybe the trend factor is incorrect. It could be any number of different things, but if you suddenly discover the ratio of actual to expected losses is a 3.0, that's when you know you'd better be careful or you run the risk of setting too low a reserve. You wouldn't want to automatically multiply the indicated ratio of 3.0 by a low credibility factor and say, "Well, we will just credibility weight the actual with the expected at 1.0 and we'll put in the IBNR as if on the basis of the low credibilityweighted amount. You need to do more research if you're coming out with something way out of line with the model.

Of course, it also works the other way. If you come out with a .25 ratio of actual to expected losses, you're going to sit down and say, "Maybe we've got more exposures counted than what we really think we have. Maybe we should look at this a bit further."

(Slide 9)

In the particular example shown, I've assumed that the credibility weighted experience modification factor of .93 is the ratio we want to use. This ratio might have been developed by looking at, say, three different indicators rather than just the one analysis shown.

Looking at the slide, if the loss reserves are being computed at the same limit used in Slide 6, the Expected Ultimate Losses, shown on the slide are the amounts from Slide 6. The Experience Modification Factor is the selected credibility weighted amount. The Expected Unreported Loss Percentages are simply 100% minus the expected reported percentages shown on Slide 7.

We multiply these amounts together and that gives us our expected unreported losses, where we are taking into account this particular account's actual loss experience to the extent we can to modify those expected ultimate losses.

Sometimes we display the indications by combining Columns 2 and 3. We call the product of the Expected Ultimate Losses (Column 2) and the Experienced Modification Factor (Column 3) the industry losses modified for this particular client's or insured's own experience. In Column 5, we show the expected unreported loss amount, which is similar to the expected unreported losses calculated in the Bornhuetter-Ferguson approach.

(Slide 10)

What we would do then, in order to get the total unpaid losses, if we're doing this, say, at $100,000 limits, is to add the unreported losses to the case reserves to get the total reserves.

On occasion, if there are questions with regard to the case reserves, we may perform the calculation using paid losses. In that case, we calculate the expected unpaid losses, rather than expected unreported losses. In that case, we won't have the case reserve component, we'll just have the unpaid loss amount as the reserve.

(Slide 11)

In the example shown, all of the analysis was performed at the base limit of liability, which we have assumed is $100,000. If reserves are also needed at a higher limit, it is necessary to go back to Step 4 (Slide 9). On this slide, the expected ultimate losses are shown at that base limit.

LOSS RESERVING

USING EXTERNAL DATA

AN INDUSTRY MODEL APPROACH

GAIL E. TVERBERG, FCAS, MAAA
SEPTEMBER 10, 1990

CASUALTY LOSS RESERVE SEMINAR
SESSION 1F

Slide 1

INDUSTRY MODEL APPROACH

DEVELOPED FOR MEDICAL MALPRACTICE SELF-INSURANCE RESERVING

- -- OWN DATA TOO THIN
- -- NOT ENOUGH YEARS OF DEVELOPMENT

APPLICABLE TO OTHER LINES AS WELL

MAJOR REQUIREMENTS

- -- AVAILABILITY OF INDUSTRY DATA
- -- GOOD EXPOSURE DATA

Slide 2

INDUSTRY MODEL APPROACH
EXTERNAL DATA NEEDED

1. INDUSTRY DEVELOPMENT PATTERNS
   - -- INCURRED LDF'S AT BASE LIMIT
   - -- INCURRED LDF'S AT RETAINED LIMITS
   - -- PAID LDF'S AT VARIOUS LIMITS (OPTIONAL)
   - -- INCURRED LDF'S AT OTHER LIMITS (OPTIONAL)

2. INDUSTRY PURE PREMIUM INDICATIONS

3. INDUSTRY PURE PREMIUM TREND FACTORS
   - -- MAY VARY FOR DIFFERENT TIME PERIODS
   - -- MAY VARY FOR DIFFERENT LIMITS

4. INDUSTRY INCREASED LIMITS FACTORS

Slide 3

INDUSTRY MODEL APPROACH
SOURCES OF EXTERNAL DATA

<u>DEVELOPMENT PATTERNS</u>

1. INDEPENDENT RATE FILINGS
2. COMPILATIONS OF SELF-INSURED DATA
3. REINSURANCE ASSOCIATION OF AMERICA COMPILATIONS
4. BUREAU COMPILATIONS AND FILINGS
5. INDIVIDUAL COMPANY ANNUAL STATEMENTS
6. A.M. BEST'S ANNUAL STATEMENT DATA

<u>PURE PREMIUMS/INCREASED LIMIT FACTORS/TREND FACTORS</u>

1. INDEPENDENT RATE FILINGS
2. COMPILATIONS OF SELF-INSURED DATA
3. BUREAU COMPILATIONS AND FILINGS

Slide 4

INDUSTRY MODEL APPROACH
CONCEPTUAL OVERVIEW

BUILD MODEL, BASED ON INDUSTRY EXPERIENCE, OF HOW LOSSES ARE EXPECTED TO LOOK:

ULTIMATE BASIS

REPORTED TO DATE

VARIOUS LIMITS

COMPARE ACTUAL LOSS EXPERIENCE TO DATE TO MODEL.

SELECT EXPERIENCE MODIFICATION FACTOR, BASED ON COMPARISON OF ACTUAL TO EXPECTED LOSS EXPERIENCE AND CREDIBILITY CONSIDERATIONS.

USE MODEL, ADJUSTED BY EXPERIENCE MODIFICATION FACTOR, TO PREDICT UNREPORTED CLAIMS.

Slide 5

INDUSTRY MODEL APPROACH

1. CALCULATE EXPECTED ULTIMATE LOSSES AT BASE LIMIT (SAY $100,000) BASED ON INDUSTRY PURE PREMIUMS.

ACCIDENT YEAR (1)	EXPOSURE UNITS (2)	INDUSTRY PURE PREMIUM (3)	EXPECTED ULTIMATE LOSSES [(2) X (3)] (4)
1982	100	$338	$33,800
1983	110	355	39,050
1984	120	373	44,760
•			
•			
•			
1989	170	476	80,920
1990	180	500	90,000

- PURE PREMIUM FOR LATEST YEAR BASED ON EXTERNAL DATA.
- TREND FACTOR (OR FACTORS) BASED ON EXTERNAL DATA MAY BE USED TO ESTIMATE PRIOR YEAR PURE PREMIUMS.
- REPEAT PROCESS IF MULTIPLE EXPOSURE BASES.
- EXPECTED ULTIMATE LOSSES DO NOT AT THIS POINT REFLECT OWN EXPERIENCE.

Slide 6

INDUSTRY MODEL APPROACH

2. CALCULATE EXPECTED REPORTED LOSSES AT BASE LIMIT, BASED ON SELECTED REPORTING PATTERN.

ACCIDENT YEAR (1)	EXPECTED ULTIMATE LOSSES (2)	EXPECTED PERCENTAGE REPORTED (3)	EXPECTED REPORTED LOSSES [(2) X (3)] (4)
1982	$33,800	95.6%	$32,313
1983	39,050	94.6	36,941
1984	44,760	93.5	41,851
•			
•			
•			
1989	80,920	57.0	46,124
1990	90,000	33.6	30,240

- COL. (2) REFLECTS TOTAL EXPECTED LOSSES, ALL EXPOSURE BASES COMBINED.
- SELECTED REPORTING PATTERN REFLECTS COMBINATION OF INTERNAL AND EXTERNAL DATA.
- SIMILAR CALCULATION MAY BE MADE AT OTHER LIMITS.
- SIMILAR CALCULATION MAY BE MADE FOR EXPECTED PAID LOSSES.

Slide 7

INDUSTRY MODEL APPROACH

3. SELECT EXPERIENCE MODIFICATION FACTOR BASED ON COMPARISON OF ACTUAL REPORTED LOSSES TO EXPECTED REPORTED LOSSES, ADJUSTED FOR CREDIBILITY.

ACCIDENT YEAR (1)	ACTUAL REPORTED LOSSES (2)	EXPECTED REPORTED LOSSES (3)	ACTUAL/EXPECTED (2) / (3) (4)
1982	$ 1,076	$ 32,313	.03
1983	16,243	36,941	.44
1984	75,923	41,851	1.81
•			
•			
•			
1989	105,236	46,124	2.28
1990	3,000	30,240	.10
TOTAL	$305,265	$359,469	.85
CREDIBILITY			.45
CREDIBILITY WEIGHTED EXPERIENCE MODIFICATION FACTOR			.93

- CALCULATION MAY BE MADE AT ADDITIONAL LIMITS.
- CALCULATION MAY BE MADE FOR PAID AS WELL AS INCURRED LOSSES.
- CREDIBILITY DEPENDS ON LIMIT AND EXPECTED CLAIM COUNT.
- SELECTION BASED ON THE VARIOUS INDICATIONS.

Slide 8

INDUSTRY MODEL APPROACH

4. IF RESERVES ARE BEING SET FOR LOSSES AT BASE LIMIT, RESERVE FOR UNREPORTED LOSSES IS:

ACCIDENT YEAR (1)	EXPECTED ULTIMATE LOSSES (2)	EXPERIENCE MODIFICATION FACTOR (3)	EXPECTED UNREPORTED LOSS PERCENTAGE (4)	EXPECTED UNREPORTED LOSSES (2)X(3)X(4) (5)
1982	$33,800	.93	4.4%	$1,383
1983	39,050	.93	5.4	1,961
1984	44,760	.93	6.5	2,706
•				
•				
•				
1989	80,920	.93	43.0	32,360
1990	90,000	.93	66.4	55,577
				$136,923

WHERE

COL. (2) IS FROM STEP 2, COL. (2).
COL. (3) IS FROM STEP 3.
COL. (4) IS COMPLEMENT OF PERCENTAGE REPORTED IN STEP 2.

Slide 9

INDUSTRY MODEL APPROACH

5. THE TOTAL UNDISCOUNTED RESERVE AT BASE LIMIT (SAY $100,000) IS THEN:

ACCIDENT YEAR (1)	EXPECTED UNREPORTED LOSSES (2)	$100,000 LIMIT CASE RESERVES (3)	TOTAL RESERVE (2) + (3) (4)
1982	$ 1,383	$ 0	$ 1,383
1983	1,961	3,500	5,461
1984	2,706	48,237	50,943
•	•	•	•
•	•	•	•
•	•	•	•
1989	32,360	75,356	107,716
1990	55,570	3,000	55,570
TOTAL	$136,923	$151,095	$288,018

WHERE

COL. (2) IS FROM STEP 4.

Slide 10

INDUSTRY MODEL APPROACH
HIGHER LIMITS

6. IF RESERVES AT HIGHER LIMITS ARE NEEDED, STEPS 4 AND 5 MUST BE REPEATED, WITH THE FOLLOWING CHANGES:

   -- EXPECTED ULTIMATE LOSSES IN STEP 4, COL. (2) MUST BE ADJUSTED BY INCREASED LIMITS FACTORS TO SELECTED HIGHER LIMIT.

   -- EXPECTED UNPAID LOSS PERCENTAGES IN STEP 4, COL. (4) SHOULD BE REVISED TO REFLECT SLOWER REPORTING PATTERN EXPECTED AT HIGHER LIMITS.

   -- CASE RESERVES IN STEP 5, COL. (3) ARE AT HIGHER LIMIT.

EXPERIENCE MODIFICATION FACTOR WILL REMAIN UNCHANGED

   -- SELECTED AT LIMIT WHERE LOSSES ARE REASONABLY STABLE.

MR. JOSEPHSON: Good morning. Jim has pointed us to some general sources of information to be used in kind of a wide variety of reserving applications. Gail has shared with us a specific model that can be used, again, for a number of different types of exposures.

What I'm going to do is talk a little bit about what the process for finding and using data for a specific type of exposure. The type of exposure we are going to be looking at is municipalities and municipal liability.

Before discussing where we go to find data, I thought I'd talk a little bit about some of the reasons why municipalities are in the spotlight, why we are talking about municipal liability at a loss reserving seminar, and who needs and uses the data.

I think that the emergence of municipal liability really became pronounced in the mid-'80s, with the last turn in the commercial hard market. If you recall, it was the last market turn which was pretty abrupt and pretty vehement. Many, if not most, commercial insureds were affected, but affected the most or at least the most publicized among them were municipalities.

We all remember some of the news stories at the time about cities and towns and villages that were without insurance and all of a sudden, having to scramble to determine what they could do. One of the results of this was the move toward self-insurance by municipalities.

Some saw it as a more feasible and stable long-term alternative; others were pretty much forced into it. They didn't have insurance coverage and were forced to it, so they had no choice. Some chose to self-insure their own exposures. Others chose to form risk-sharing pools with other municipalities.

The problem didn't really begin in the mid-'80s. A study released in about 1980 by the All Industry Research Advisory Council presented the results of a survey of municipal risk managers and insurance company executives. The survey addressed some of the issues affecting municipalities at the time.

Foremost in municipalities' minds was the availability and cost of insurance. The insurance companies were worried about the cost of claims, and some of the trends that were emerging in the claims against municipalities.

But, the events of the mid-'80s, really served as a catalyst for much more widespread use of self-insurance among municipalities and, consequently, a need to reflect in their budget process and financial statements the cost of self insured claims. This required an evaluation of the cost of the liabilities that they are now retaining.

If reserves are needed at a higher limit, we would apply increased limit factors to these base limit expected ultimate losses, to get the losses in Column 2 to the desired per claim limit ($500,000 or a million, for example).

We would then apply the same experience modification factor, because that is something we've analyzed, at different limits, generally lower limits, to try to analyze how the account's experience compares to that that is expected.

Column 4 of Slide 9 shows the expected unreported loss percentage. If reserves are needed at a higher limit, these unreported loss percentages usually need to be modified, because the claims are going to be reported a little more slowly or the case estimates are going to develop a little more slowly. These unreported loss percentages include case reserve development as well as true IBNR.

So, looking at Slide 9, the unreported loss percentages shown in Column 4 will be higher at higher limits. The expected ultimate losses shown in Column 2 will be higher, because of the application on the appropriate increased limit factor. The experience modification factor in Column 3 will stay the same. When we multiply the revised factors out, we'll get the expected unreported losses at this higher limit, perhaps $500,000.

Then, what we are going to do is we will take and add these unreported losses at the higher limit, say, $500,000, to the case reserves at the higher limit, in order to get our total reserve at the higher limit, as shown in Slide 10 (Step 5).

As you can see, the approach I have described uses the data available for a particular account to the extent that it is credible. This approach can even be used where there is only a year or two of experience. With this approach, it is possible to analyze whether the reported losses are consistent with the pricing assumptions.

The industry model approach is a tool. It is a way of putting together the data available using a common sense approach. The approach can be modified depending on the information available. Even if you find that you don't have exactly what you need, the basic framework can be used with the information available. As such, the industry model approach is a flexible tool which permits the actuary to bring as much actual data to bear on the loss reserve estimate as possible.

Thank you.

The decision (or the necessity) to self-insure, in and of itself, doesn't necessarily give rise to a policy to establish and accrue liabilities for self-insured claims. Some municipalities self-insured and handled it on a cash or a pay as you go basis.

A second, and I think somewhat related, event which helps to really magnify the need for municipal liability is the development of the Governmental Accounting Standards Board Statement No. 10 (GASB 10). This statement describes its purpose as establishing accounting and financial reporting standards for risk financing and insurance-related activities of state and local governmental entities, including public entity risk pools.

Thus, both the individual self-insureds and the pools come under the scope of the statement. While the statement covers a lot of ground, one of its key provisions is that it does require self-insured public entities to recognize liabilities for unpaid claims as they occur rather than on a cash or a pay-as-you-go basis.

So, we have more municipalities self-insuring and a requirement that essentially says that they need to reflect the ultimate cost of the liabilities in their financial statements. Thus, loss reserving concepts do come into play. This leads to the questions of how do we find data and what do we do with it.

Finally, as we proceed, I'll be making occasional references to PRIMA. This is the Public Risk Management Association, a national organization whose purpose is to increase risk management professionalism among public risk managers. The growth of PRIMA, I think, has fostered an awareness of the need for data, both individually for municipalities and collectively.

Let's look at some specific areas in which municipal data might be needed. Who needs it and how is it used? One user would be a risk manager for a municipality who is evaluating his options for self-insurance. Part of that process is going to be determining what the cost of self-insured claims would be.

Actuaries and accountants certainly need the data to assist the self-insured entities in complying with GASB-10. GASB-10 is another one of those documents that some refer to as "full employment for actuaries" or "full employment for consulting actuaries" acts, because of the fact that it mandate a need to estimate ultimate claim liabilities, and I guess that's what we are here for.

Reinsurance companies. Most municipal pools will need to purchase excess insurance and reinsurance. As such, if I'm the underwriter or the actuary for a reinsurance company, I obviously need to be able to evaluate what I need to charge, for the coverage offered.

Insurance companies. Again, insurance company underwriters or actuaries may be looking at an individual municipality or perhaps a group of municipalities -- maybe a managing general agent has a book of municipality business that the company is considering. Again, we'll need to get a hold of some data and some things to look at to try to evaluate the risk.

I recognize that some of these aren't purely loss reserving applications. We are looking at pricing issues, as well, but I think the objective is to estimate the ultimate cost of claims, and loss reserving techniques and data sources come into play in that way.

Now that we have determined who needs the data, where do they go to get it? Let's look first at some of the sources of data for individual municipalities. The objective may be to estimate a self-insured municipality's unclaimed paid liabilities to allow it to conform to GASB-10.

The first and most obvious source of insurance data would be the municipality itself. If we are lucky, we'll meet with the municipal risk manager and sit down and talk about what we need, and he'll put out a nice little book that has his paid loss triangles and incurred loss development triangles, and his claim count histories for the last ten years, broken down into auto liability and general liability. We can go back and do our thing. How often would you guess we are that lucky? Not often.

The individual municipality data will come in a wide variety of sources. I think the emergence of PRIMA and the risk management that is coming with it is creating more and more insurance systems for municipalities to be able to provide a good running start for data analysis.

The variety and format of data that is going to come from a municipality will vary, so basically the starting point is to compile what history we have from the risk. After compiling the lost and exposure data, and we want to look at exposures, as well, we'll be likely to find that the data doesn't really allow a stand-alone estimate of the liabilities.

Actuaries will say it lacks credibility. That means we really need to have something else, as well, to supplement the information which we've received and compiled from the municipalities.

The problem may be one of maturity of data. For example, the municipality, maybe it's only been self-insured for a couple of years, so even if they've got a real good system set up, there isn't just enough of a history to really project the ultimate loss costs.

If this is the case, the first supplemental source of information that comes to mind would be the entity's prior insurance

carrier. With some luck or good fortune, the municipality will have received and saved copies of the loss runs that most of the commercial insurance companies provide, and will have a track record or a history of its loss history prior to self-insuring.

I will talk about some limitations of this in a little while, but, again, after compiling their own information, the next best source would be the municipality's own claims experience through the eyes of its insurance carrier.

To the extent that this is still not sufficient, we need to go to a broader source of industry data, and both Jim and Gail talked about some of these. We'd look at the same things, as well. We can look at rate filings for companies writing municipal liability insurance.

Most State Insurance Departments have some type of a vehicle where you can either sit down and look through their filings or request filings for specific coverages. Data from ISO or the National Council, as well, is generally available, either from their rate filings or from supplemental information, that, both of those bureaus (as well as some of the other rating bureaus) make available.

On a yet broader basis, Jim pointed awhile ago to the A.M. Best loss reserve development reports, the Schedule P summaries that compile general liability and auto liability claim development patterns. So, these are some of the broader sources of information for the individual municipality. We would kind of start with their own data, work through their own data from the insurance company and then onward and upward to the broader sources.

Next, I'd like to look at some of the possible data sources for municipal pools. As I mentioned, a lot of the municipalities have attacked their problems with the commercial market and created and formed municipal pools. They come in a wide variety of colors and sizes, from first dollar pools to excess liability pools.

Again, the issue is the same. Once we've got one of these things and now that GASB-10 is saying that they need to accrue and estimate their ultimate liabilities, how do we go about getting the information that will allow us to do that?

Again, we may be the consulting actuaries. We may be the reinsurer who is looking at it, but whomever we are, we need to get a hold of some data and some information. Like the individual municipalities, the starting point would be the pool's own history, its own loss history.

If the pool has been in existence for some time, there may be a sufficient track record to get a real good start and good handle on the ultimate liabilities. Absent this, we might go try to

track down the documents that were put together in the formation of the pool.

Most pools, many pools, have a feasibility study performed where the pricing is established. It may be an actuarial report. It may be a risk management report, but some evaluation of the cost of the claims is put together. This would provide a good starting point for measuring the emerging experience of the pool against the projections that were made when the pool originated.

Someone came up with a projection of loss costs in terms of coming up with the pricing. How is the pool doing relative to that, and can that assist us in evaluating the loss reserves or the ultimate claims?

A third possibility, one that can be very time consuming, would be to sort of follow the example of the individual municipality and try to put together a loss history from the pool members' prior insured experience.

If, for example, there are ten members of the pool and they were all commercially insured, we may be able to compile some loss histories from their prior insurance companies and get some background as to the loss levels and the loss development characteristics of this particular group of insureds.

This can be time consuming. It can also be kind of disjointed, with different insurance companies with different forms of loss runs and everything, but it is a potential source that can be evaluated.

A particularly helpful source of information would be State Municipal Associations, for example, the League of Cities or the School Boards Associations. The precursors to a number of pools were association-sponsored insurance program with a commercial company, where the association endorsed a particular company for its members.

A lot of the companies do provide loss summaries or loss histories to the association and, again, this may give a good sense of what the loss experience was prior to this pool actually becoming a self-insurance entity.

Finally, there may be information available from other pools and other sources. PRIMA has a Pooling Section which meets periodically to discuss issues specifically affecting pools and, through this, some sharing of information is probably common and available.

Then, the other commercial sources of information (e.g., A.M. Bests) are available as sort of the last resort to supplement the more specific pool information.

Now that we've got this information, presumably we need to use it to develop some estimates or some loss projections. I'm not going to go into methodology, as Gail gave us a good model for how we can throw some of this stuff into a hopper and use it and develop estimates.

What I would like to do, though, is talk about a few things to look out for in using these different sources and maybe some unique features of the municipality claim and the municipality liability climate. As in the use of any data, the first assessment that needs to be made is whether the claims environment which existed in the past is reflected with the current claims experience.

We mentioned using a municipality's prior insured experience as a basis for coming up with development patterns or loss emergence patterns and ultimate losses. One of the questions which needs to be addressed, particularly if we are using loss development patterns, is how does the municipality handle claims relative to the prior carrier?

What is the process? Is the loss development picture that we are seeing from the insured's experience going to be measured or represented in the same way as the municipality handles its own claims? One has to get a sense, and sometimes it's subjective and sometimes it's quantitative. It's important to get a sense of how the claims emergence and claims reserving will appear under the self-insured program relative to this base of experience that we have from its prior carrier.

Changes in exposure. Insured versus self-insured need to be compared and I think this is true in any situation. Is the experience that we are looking reflective of the exposure to loss? Have things changed? Has the environment changed? Has the municipality cut back on certain services or things that may either increase or decrease the potential for claims?

Budget pressures and the liability crisis (mentioned earlier) forced a lot of municipalities to stop having 4th of July fireworks displays, for example, and those types of things. Those types of changes in operation are going to affect the claim costs. We want to take a look at those things.

Some services that may have been added or cut could affect claims, as well. For example, the emergence of PRIMA and risk management is likely to foster an awareness of loss control. It may help reduce the cost of claims over the long run.

Again, the process of sort of blending the individual risk experience and the past experience comes down to judging whether the past is representative of what we're going to see from the current environment.

In some states, statutory considerations come into play, particularly for municipalities. Some states consider the purchase of insurance to be a waiver of some of the municipalities' otherwise sovereign immunities, meaning that if they purchase insurance they don't have the protection of the law that they may have had as a self-insured or (uninsured) municipality.

What this suggests -- and there are a lot of other statutory provisions affecting municipalities -- is that we'd sit down and actually take a look at claims. Let's take a look at the types of claims that were emerging in the pre-selfinsurance days and determine just what those claims would cost today under the current legal environment.

The liability of governmental units is limited. As I mentioned, in some states and under certain circumstances, limitations exist on both the type of claim, the amount of the claim, and also the timing -- with statutes of limitations, the time in which a claim can be brought against a municipality.

If insurance industry data, the broader data, is being used, again, we want to try to evaluate the impact of some of these municipal-specific limitations on, say, the broader industry development patterns we are using.

By the same token, some of the sovereign immunities are being eroded or abrogated by the courts as time goes on. They are being challenged and tested and, in some cases, not being upheld. So, the flip side is that claims which may have been protected in the past or amounts of claims limitations which existed in the past are eroding as the courts decide that the municipalities can be liable. An awareness of these changes, I think, is important, particularly in a municipal liability environment.

PRIMA puts out a publication -- I believe it is updated annually -- called "Tort Liability Today," that summarizes the laws affecting municipalities and how they have changed over time. I think anyone who is looking at municipal experience in a particular state is going to want to be aware, obviously, of the legal environment.

Finally, municipalities have been greatly affected by the deep pocket syndrome or the increasing tendency of the public to seek compensation for economic or personal mishaps. I think that if you talk to any municipal risk manager or commercial underwriter or claims manager, they will have many a story of the types of claims that they just never really expected would arise, that did.

Basically, the cost of municipal liability claims has increased as the -- either as the immunities have disappeared or the courts have gotten more liberal. Again, I don't intend to get into

specific examples of claims. I could probably spend an hour or a claims person could spend hours talking about them.

The report I mentioned earlier, the report in the early '80s by the All Industry Research Advisory Council kind of gave some types of claims and tendencies in claims that were occurring at the time, and which continued to emerge to the crisis of the mid-'80s.

The point is that, whether valid or not, whether the municipalities have seen the emergence of a lot more maybe spurious type claims, claims that really don't have any merit, but whether or not they do, it does take time and expense to evaluate and resolve the claims.

They can't ignore them, so the loss adjustment expense side of the picture can be significant in municipal liability to handle all these claims that emerge even if they ultimately are not successful. It obviously takes time and money to resolve them.

Finally, when we are comparing data for several different municipalities or several different groups of municipalities, it is important to keep in mind differences in exposure among them. As we talked about earlier, some services can give rise to exposure. Some cities may have fireworks displays and certain parks and recreation things. Each municipality is going to have a different type of exposure.

If we are looking at, say, a broader base of municipal experience, again, we want to try, to the extent we can, to measure the differences or how it reflects what we are going to be seeing with the entity that we are looking at.

A. M. Best produces and publishes a handbook. I think it's called "Municipal Underwriting Guide," which gives a broad range of types of municipal exposure, police and fire, school bus operations, libraries, kind of the entire gamut of typical municipal services, and talks about some of the liability exposures as well as the work comp exposures that can arise from those particular exposures. Again, I think it is really an underwriter's view of the claims for municipal liability.

If you've gathered that there isn't one real solid source of information to go to -- oh, we've got a municipality, we can go to Best and look in their municipal book and there is no such thing -- you're right. The information-gathering process is often difficult and sometimes sketchy in putting it together.

Fortunately, there are a couple of things that are on the horizon which will be helpful down the road for those of us who need to use municipal liability data. The first of these I mentioned earlier, GASB-10. The very fact of requiring municipalities to meet financial reporting standards is likely to result in more meaningful information systems for individual municipalities or pools.

In addition, GASB specifies that certain supplementary information be included with the financial statements. One in particular, there's an exhibit that's going to be required for pools. You may not be able to see the numbers real well. The main reason I've got it up here is that I've gone through seven slides without any numbers. As an actuary, that kind of distresses me, so I had to find one here.

(Slide)

Basically, this is a ten-year history for a pool of paid claims by exposure period, that is, a typical paid/loss triangle. This is going to be required of pools by GASB. Obviously, it is going to be some time before meaningful information is compiled, but it is a step in the right direction. We can look and see that at least a common source of information will be available and compiled.

An even more enlightening set of statistics will be available from pools which choose to follow some of the guidelines which were established, again, by PRIMA. It is a report called "Comprehensive Annual Finance Report Guidelines for Intergovernmental Pools."

This was developed by PRIMA's Accounting Task Force, and the guidelines set forth a number of supplemental schedules that it recommends pools provide with their periodic financial statements, their annual financial statements. It is not unlike what we are seeing from GASB.

What the exhibit shows is general liability; paid losses by accident year, by development period. The guidelines specify similar exhibits for paid losses, incurred losses, reported claims by auto liability, general liability -- an actuary's dream, I guess you'd call it, a set of documents that would come with the financial statements for pools that choose to follow the guidelines.

Another source of information will be PRIMA itself. PRIMA recently announced its Center for Public Risk Management, which has an objective to develop a standardized data collection format and a claim coding system for use in future national claims data collection systems.

I think the focus is moving forward compiling good municipal information for risk managers to share, for accountants to share, for actuaries to share. Municipal liability is a big enough piece of the liability pie to require a common source of information.

These are all going to be down the road. It is going to take awhile for them to materialize as real meaningful sources of information, but I think they provide some good "relief is on the way" type of things on the horizon, so that getting information for a municipal risk will be less difficult.

My focus has been on municipalities, I've tried to walk through the process for a specific type of risk or type of exposure. The process, however, is the same whether we're talking about trucking risks or hospital risks or any particular type of exposure.

Again, it is basically starting with gathering the information from the risk in question is going to be the starting point. We gather what we can from them, use actuarial techniques and credibility procedures to blend that information with other broader information along the lines of Gail's model and, from that, come up with a projection of the ultimate liabilities for that particular risk.

Thank you.

(Applause)

MR. HAFLING: Thank you very much, Gary. We have about ten minutes for questions. I would ask that if you have a question, if you'd use either that mike or I'll move this other mike back in the middle so that your questions can be recorded. Any questions?

(No response.)

MS. TVERBERG: This is going to be easy.

MR. HAFLING: Hearing no questions, I would like to -- oh, we do have a question.

QUESTION: I will address this to the panel in general. Exposure data is sketchy at best when you're talking about industry data. Any suggestions as to how anything useful in that area can be developed for application to a specific company or specific coverage?

MR. JOSEPHSON: Thinking through some of the types of information that I went through, for example, A. M. Best, the loss reserve development patterns, provide some very generic general liability, auto liability patterns.

As you step back in terms of prominence, for example, we talked about insurance company rate filings. To some extent, that information could contain a good deal of exposure information. I think the answer is a lot like what you've been hearing before.

It is gather what you can. Some of it will have more information and you should try to probe into the source of information that is likely to underlay the information that you're seeing, so it's going to be very much like the loss information. The relevance will vary with the source.

MS. TVERBERG: Yes, I think as long as you restrict yourself to something like annual statement data, you're right. You don't have the exposure data. But, as soon as you start reaching out to other, broader sources -- well, maybe not broader sources, but dealing with rate filings, or if a consulting firm has self-insured data, then the exposure data is available or at least you can start getting some feel for what is expected.

When you are doing your pricing, you have got to have some kind of idea as to what losses you are going to expect for what exposures and, somehow or another, you've got to bring that same kind of information to bear when you are setting your reserves.

MR. INKROTT: I guess the only thing I would add is premiums are a start at looking at exposures.

MS. TVERBERG: Yes, and if you have a rate history, you can sometimes essentially get a premium at a present rate kind of a calculation, which gives you a surrogate.

MR. HAFLING: Additional questions? Bruce?

QUESTION: I just had a comment that related to using industry data, loss development or loss adjustment expense. I think one of the important things to consider, particularly for a new coverage, is if you're writing exposures throughout the year and that coverage is growing significantly, that the average accident date for the experience you are looking at is going to be weighted toward the end of the year.

Even if you think that your loss development is otherwise going to behave exactly like the industry's, then you would need to increase that loss development factor to consider the fact that you've got a less mature book of business.

Another comment related to using Best data or industry loss development data is the definition of IBNR that the industry uses. I have found, in my experiences, that using Best loss development information is going to typically understate the development that you're actually going to experience, because some companies are putting that bulk reserve or that additional case reserve development into their reported case reserves.

I think the new Schedule P data is attempting to break that out between bulk and pure IBNR, but I think actuaries and others need to be cautious about using that specific information, and think that they are properly estimating the ultimate losses.

A final comment about using allocated loss adjustment expense histories, I think a lot of us have gotten into the habit of, when we don't have good information, going to another coverage and looking at the traditional relationship of allocated loss adjustment to ultimate losses, and applying that percentage, either for a brand new coverage or a specific area of expansion into another territory.

One of the cautions there is the development of allocated expenses over the last few years for the industry. That relationship of LAE to losses is eroding, and particularly for a new coverage, I think we need to be cautious about using historical relationships to set that reserve.

MR. HAFLING: Thank you very much for your comments, Bruce. Does the panel have anything they would like to add to that?

MR. JOSEPHSON: I think we've found someone for next year's panel.

MR. HAFLING: Do we have any more questions? I guess I have one question for the panel. Traditionally, new business is less profitable (runs a higher loss ratio), than existing business, so when you look at industry data and you try to incorporate that into a new operation that just discovered that particular market, how would you reflect, the fact that new business is traditionally not as good as existing business?

MS. TVERBERG: I think that the extent of the problem depends on the coverage. I think that the problem of higher loss ratios is greatest when you're talking about private passenger auto, or another coverage that it is underwritten, and the insured is switching from one company to another. They are shopping the market for the best price.

If you are dealing with a whole group in a state that is going self-insured for the first time or an insurer that's picking up a program from another insurer, there you have much less of that kind of a problem.

It is more of a situation-by-situation question as to whether or not there will be an expected difference. I would agree that the problem exists, especially on personal lines and for any coverage where the insured has a chance to shop for price. You are going to have a somewhat higher expected loss ratio, just because all the new insureds have already shopped the price on the coverage, and they haven't just said, "Oh, well, that renewal is reasonable."

So, you have to look at it based on what the particular situation is. I guess you'd increase you expected losses, if the line was one where you expected anti-selection.

MR. JOSEPHSON: I'd agree with that. I think a lot depends on if you're looking and comparing to an established book of business that's been seasoned. You're going to treat that differently than if you are comparing it to a similar start-up type of business, where the experience as a new program emerged somewhere else.

You really need to take a look at what you've got and, like anything else, evaluate how what you're looking at compares with

what you think, and judgments are made as you're looking at it, in terms of how it will compare once the business is written.

MR. HAFLING: Jim?

MR. INKROTT: The same. I'd say the assumptions for expected development wouldn't be changed that much, but the expected loss ratio or pure premium assumption might be changed, and you'd have to go back to the person who did the pricing, I think, to see what assumptions were made there.

MR. HAFLING: Do we have any additional questions?

(No response.)

MR. HAFLING: Before we close, I would like to remind you to fill out the session evaluation forms that are in your packet of information. Bruce Bassman will be at the door to collect them. If you want to receive continuing education credit, you can turn in your ticket that you have in your packet of information to me, and I'd like for you to join me in thanking the panel, very much.

1990 CASUALTY LOSS RESERVE SEMINAR

1G: REFLECTING UNCERTAINTY IN LOSS RESERVES

Moderator

Jerry A. Miccolis
Tillinghast/Towers Perrin

Panel

Robert W. Granow
Aetna Life & Casualty

Stephen P. Lowe
Tillinghast/Towers Perrin

Michael A. McMurray
Milliman & Robertson, Inc.

MR. MICCOLIS: Good morning and welcome to Session 1G, entitled Reflecting Uncertainty in Loss Reserves. My name is Jerry Miccolis. I am a principal and consulting actuary with Tillinghast, a Towers Perrin company.

Our distinguished panel this morning includes, from my far left, Mike McMurray. Mike is a principal and consulting actuary with Milliman & Robertson, Inc., a Woodrow Milliman company, one of those non-Towers Perrin companies. In his consulting practice, Mike has conducted a wide variety of loss reserving studies for most lines of business and for both traditional insurers and nontraditional insurance mechanisms. Mike currently serves as Chairman of the Casualty Actuarial Society's Committee on Reserves. Mike has been with M&R since 1979, and prior to that, was associated with Fireman's Fund.

Our second speaker this morning will be Steve Lowe. Steve has, by far, the worst handwriting on this panel. Steve is Vice President, Principal and Consulting Actuary in the Hartford office of Tillinghast. At Tillinghast, Steve has responsibility, for managing the firm's consulting practice to the insurance industry, including our reserving consulting practice. Steve is a past Chairman of the American Academy of Actuary's Committee on Property Liability Financial Reporting, and is a past member of the Academy Committee on Relations with Accountants, and is a current member of the Academy Board. Prior to joining Tillinghast in 1980, Steve spent seven years in the Corporate Actuarial Department with Aetna Life & Casualty.

Our third speaker is Bob Granow. Bob is the Assistant Vice President for Accounting Policy at Aetna Life & Casualty. In this role, Bob is responsible for monitoring the development of accounting standards, both statutory and GAPP and he is the liaison between Aetna and the standard setters, and coordinates the implementation of the new standards. Currently, Bob serves on the AICPA Insurance Companies Committee. Bob joined Aetna in this role about two years ago, after spending ten years in the Audit Practice of Arthur Andersen & Company in Hartford and spent most of his time, in that role, serving insurance industry clients.

I think you will agree we have quite a distinguished panel this morning.

Let me tell you briefly what this session is and what it is not. It <u>is</u> a frank discussion of the issues, both conceptual and practical, associated with the uncertainty inherent in the loss reserving process and how to deal with those issues. We will be discussing these issues from, obviously, several perspectives -- the accounting, the actuarial, and that broad area in between where those precepts and concepts and issues overlap.

This session is <u>not</u> a technical discussion of how to quantify and measure uncertainties. There are other sessions in this seminar

that deal with that, in particular, one tomorrow morning entitled Confidence Intervals and Profit Recognition.

The views you will hear expressed this morning by our panelists and by me, for that matter, are our own. They do not necessarily represent the views of the sponsoring organizations, the Casualty Actuarial Society or the American Academy of Actuaries, nor the views of our employers, our friends, or families.

The format of this session will be as follows. Each of our speakers will have approximately a twenty-minute session of prepared remarks and, based on our breakfast discussion, there will be some lively rebuttal among the panelists immediately thereafter. We will leave a significant amount of time at the end for your questions, and the panel does ask that you reserve those questions until the end.

This session is being recorded. When you do have a question, we ask that you please step to the microphone with your question. There is no need to identify yourself. We do ask that you evaluate this session and the entire meeting, using the evaluation forms that you were provided in your meeting booklet.

The last housekeeping item, the tickets will be collected at the end of this session if you want to receive CPE credit. There will be a monitor, some officious looking person, I presume, standing at the door at the end of this session whom you could hand your tickets to.

Let me start the proceedings proper by introducing or offering two premises. One, money has a time value. There is a time value of money, premise number one. Premise number two, loss reserving is an inherently uncertain process. I don't know that anyone would take issue with either of those premises. Does anyone? No. I think they are pretty indisputable.

As a matter of fact, you might not characterize them as premises at all. You might call them laws of nature or certainly laws of finance. Interestingly, though, in the financial reporting of an insurance enterprise, particularly statutory reporting, while each of these laws, if you will, are indisputable, both are ignored.

Maybe just as interestingly, while each of these laws has -- conceptually, anyway -- nothing to do with the other, in the history and the future of financial reporting for insurance companies, these two concepts are intimately tied together.

For statutory reporting purposes, insurance company loss reserves have long been stated on a full-value, undiscounted basis, and there has been no explicit treatment of the uncertainty in the reserving process. The common view is that the present value discount untaken, the discount untaken, represents an implicit margin for uncertainty.

It so happens that the types of business that are generally considered the riskiest -- that is, the long tail casualty lines present, by virtue of their longer tail, a greater opportunity for investment income, since the funds held against those reserves are available longer for investment.

Those lines present what we might call the greater investment income potential or greater present value potential. Well, that's kind of neat. The lines that are the riskiest and need the biggest margin tend to get it, because of the foregone investment income, foregone present value discount.

The problem is that that correlation is not one of those fundamental laws of nature. It is more like a happy coincidence. And it is this happy coincidence that has made us all lazy. We have not fully developed the means by which to explicitly recognize uncertainty in the loss reserving process.

Now, reserves, which have never really been stated accurately for the industry as a whole -- and the Tillinghast compilation of SEC loss reserve disclosures demonstrates that every year -these reserves are being discounted. They are being discounted for tax purposes, the result of TRA 86. They are being discounted even for statutory purposes in some lines, for limited purpose insurance companies. Bob will be speaking later about discounting in the GAPP arena.

I think it is fair to say that the discounting movement is afoot. When reserves are discounted, this implicit margin disappears and there is no explicit margin to take its place. So, that is our dilemma. Now, I'm going to turn it over to the panel to solve it. Thanks. Mike?

MR. McMURRAY: As Jerry introduced me, I am Mike McMurray with Milliman & Robertson. What I want to do today is give you an overview of some of the work that the CAS Committee on Reserves has done regarding the issue of uncertainty in the loss reserving process. I am going to use the terms margins, risk margins and reserve margins interchangeably. Whenever using these terms, I'm talking about the provision for uncertainty in the loss reserve process.

Given the continuing exploration of loss reserve discounting, the CAS Committee on Reserves undertook a study essentially of the other side of the coin, rarely the loss reserve fluctuation margins. The intent of the study was to provide a more balanced presentation and dissemination of information regarding the implications of moving to interest discounted reserving.

The primary focus was a review of the risks inherent in the reserving process and how the risks are going to be affected if we start pulling away the interest or if we start reporting reserves on an interest-discounted basis.

The Committee's efforts are summarized in a discussion paper which, with any luck at all, will be published in an upcoming edition of The CAS Actuarial Forum in the near future. At this time, though, I want to give you a preview of what I consider to be the key highlights of that paper.

Basically, there are three different area topics we are going to talk about. One is: Why haven't we had explicit reserve margins in the past and what have been the impediments to that? Two, what are the technical issues surrounding the calculation and the reporting of risk margins?

(Slide 1)

We have got a list of about seven different reasons for why we haven't had reserve margins in the past. I am going to be presenting to you kind of a personal priority list of why we haven't done it in the past.

The key reason why we haven't had risk margins reported in any explicit way in the past is there really have been no empirical/scientific estimation techniques for margins. They just haven't evolved yet. So, when we're talking, at this point, about risk margins, it's a very nebulous area.

What are margins and how do you calculate them? We don't even have an agreement as to what a risk margin is, so how do you calculate it? Why haven't we progressed, either as a profession or an industry, to having something quantified called risk margins?

Frankly, it really hasn't been a priority item. That's probably been an impediment to any real significant research into estimation techniques for loss reserve uncertainty.

I also want to point out that, in reality, there are no cookbook techniques for either loss reserving or interest discounting, as well. We may be further down the line on some agreement on approaches and techniques, but we are a real long way from having a consensus within the profession of what is the best way to do things in all cases.

Another impediment has been no common understanding as to how the financial statements would be impacted by risk margins and how the perceptions of the users would be affected. From my point of view, this is really not so much of a problem as a lack of an education effort on how to interpret risk margins if they were to be included in the financial statements.

We do have a couple of different perspectives we have got to worry about. We have the regulators. They are going to get a look at financial statements and the impact of margins in a certain way. Industry analysts will probably be looking at it in a different way. Company management is definitely going to have a different way of looking at it.

Politicians have a real fun time trying to interpret insurance company financial statements and have been very creative in some of their misinterpretations, as well. When we get into the area of risk margins, the opportunity for further misunderstanding is pretty substantial.

In the "other" category, we also have consumer activists who, particularly in California, have had a lot of fun looking at insurance company financial statements.

(Slide 2)

There has been concern that if we have an explicit provision for risk margins that we'll be distorting historical solvency benchmarks, historical tests such as the IRAs test and any of various A.M. Best tests, Schedule P tests.

If we were to go to a system that had risk margins, we are going to have to change the way we look at some of the solvency benchmarks, just as we'll have to change the way we look at them if we go to discounted reserves.

If we go to a financial report that includes risk margins, it will interfere with comparing different company statements over time.

Another perceived impediment is that there is no guarantee that margins will improve financial reporting. The key point here is "guaranteed." We are talking about an item that is relatively new. There is all sorts of opportunity for more subjectivity, for imprecision, for confusion.

Finally, the comparisons of financial results among companies would become more difficult, if not impossible. Again, for those of us who have worked at trying to compare company results, I don't think this is anything new to us.

(Slide 3)

In response to an exploration of the historical impediments and hang-ups to establishing risk margins, the committee essentially came to the conclusion that they exist, but they're going to exist under a discounting system, as well, and there is no real reason on the surface that we can't overcome some of these hang-ups.

I want to emphasize that all the comments that the committee has made and all the comments I'll be making are with the assumption that we are going to a discounted reserve reporting basis; and this is the context we're talking about risk margins in.

Next, I'd like to get into some of the technical issues that the committee has identified that we would have to consider if we are going to a system of reporting with reserve risk margins.

(Slides 4 & 5)

Essentially, the committee identified seven different general approaches to deriving explicit reserve margins. The seven we've identified I don't think is necessarily all-inclusive. This gives you a general idea of some things people are thinking about.

One method is an empirical study of historical loss development variation. Putting it at its simplest level, what this could evolve into is looking at historical variances in loss development to a given company's own average development patterns and then using that to derive some sort of risk margin, given the variance about the average development pattern.

Another method would be an empirical study of historical reserve deficiencies. Essentially, this would involve looking at historical errors in reserving and then building in a margin, based on how the reserve specialist has screwed up in the past.

It is an ominous way of going about it. You do a report card on your own and then you are carrying a provision for your own lack of accuracy. As a consultant, that one isn't real appealing to me.

Another approach that is frequently used, at least in self-insurance feasibility studies, et cetera, involves confidence interval techniques using size-of-loss distributions. Essentially, you would be trying to evaluate the probability of exceeding an indicated amount. Then regulator would decide that 80 percent is the acceptable amount, then the difference between an 80 percent reserve, confidence level reserve and an expected value reserve would then be your reserve margin.

Again, this would, in all likelihood, involve some sort of simulation techniques and would involve putting a lot more emphasis on size-of-loss distributions than is currently the case in most reserving assignments.

Another technique which is fairly popular in Europe is the ruin theory application where the reserve margin would essentially be the difference between your expected value reserve and that provision needed to meet a regulatory standard for a probability of insolvency.

(Audio interference.)

Thus, calculating the margin is the difference between the discounted reserve with a risk-related interest rate and that with a risk-free interest rate. In that context, what you'd be talking about in a risk margin is just taking into account the risk related to interest rates and expected value.

By commutation value, we mean what is the value that a third value would require to commute the reserves. From personal experience, this is possibly the most subjective of the methods we've looked at.

Now, we've got some other more technical issues to worry about. We have talked about different methods of estimating risk margins. Now, we're going to get into specific considerations in essentially defining risk margin.

(Slide 6)

The committee determined that if you are going to calculate an explicit risk margin, the first thing you should do is define what the sources of risk or identify what the sources of risk are. Under sources of risk, there are essentially two broad categories: Process risk and parameter risk. When I say process risk, I use the fluctuations with a full deck.

If you have a deck of 52 cards, you know what the probability of getting an ace of spades is and you often know what the probability of alternative values are. So, you know the variability inherent in the process.

Now, we go to parameter risk. That is the additional fluctuations in a stacked deck. Say, you're trying to estimate the probability of an ace of spades. You know the deck is stacked and you don't know how it's stacked. It is that additional uncertainty that I am going to refer to as parameter risk.

These other two categories here, non-optimal reserving and the unforeseeable, actually are also parameter risks, but the committee deemed they were so important, they should get their own discussion.

This essentially means what if the reserving technical you are using is not the best one to be using for the expected value. That gives you some additional parameter risks.

Finally, the unforeseeable, that's evolution of coverage extensions either by virtue of legislation or judicial interpretation that you never anticipated when you wrote the original policy.

Some of the extensions of liability we've seen regarding environmental liability, employers' liability, these are things that you didn't necessarily anticipate when the policy was written, didn't anticipate when you originally set up the loss cost provision, but it's something you have to worry about when you are setting reserves after the fact.

You must consider the best estimate of undiscounted versus discounted reserves. What we are getting at here is taking into

account the risk inherent in the discounting approach itself. You've got PL patterns that can vary from what you've anticipated and you've got interest rates that may not correspond with what you used to discount.

(Slide 7)

Other items to consider, building your risk margin approach or at least your provision by line of business; that's intuitively obvious, I think, long-tailed versus short-tailed business; and, by maturity. The 1979 accident year, you may feel a little more comfortable with at this point than the 1989 accident year. It's not clear that you need the same reserve margin, obviously.

Then, finally, in evaluating risk margins, should the calculation technique be mandated? Is that the right way to go? The committee doesn't have any answer on that, because the techniques haven't evolved to the point where we can agree on anything. Obviously, if there was a mandated reserve margin calculation technique, it would make life a lot easier for those who have to use the financial statements.

(Slide 8)

The first thing the committee has concluded is that the margins should enhance the reporting of the financial condition. By enhancing the reporting of the financial condition, we are talking about quantifying the uncertainty that is inherent in the insurance process. That should be the key criteria for whether or not we go with a margin or not.

Quantification and disclosure of risk margins should take into account the following: What is the best current value estimate? That is, what is the best estimate without discounting the reserve? What is the amount of the investment discount that you are subtracting off? What is the provision for process risk, and identifying that or taking that under consideration specifically. Then, what is the provision for the unforeseeable? Here, I'm lumping together the parameter risk items.

The committee agrees that if you are going to go with a reserve margin, don't hide it anyplace. We should make it explicit so we've got something to measure and we've got to know what the impacts of the reserve margins are in the financial statements.

(Slide 9)

The committee agrees that the uniformity of technique should be encouraged, but we are not anywhere near being able to reach a consensus on what that technique is. There may be some opportunity, at least, for where we do have uniform guidelines for techniques, we should at least be reporting what the significant variances from those methods are.

Probably, the most important aspect of all of this is that we should encourage CAS research in this area. Frankly, in the last couple of years, we have actually made some pretty good strides in exploring the issue of uncertainty in reserves, but we need to kick ourselves a little bit more to get more research out there so that we know a little bit more about what we are doing when we calculate something resembling reserve margins. The Committee on Reserves has explored some ideas of encouraging that research.

(Slide 10)

Let me jump down to the final statement in the committee's paper. The issues pertaining to explicit reserve risk margins cannot be isolated from those surrounding reserve discounting. From our point of view, it doesn't make sense to discount reserves if you don't take into account the other side of the coin.

Unfortunately, the techniques for quantifying risk margins are not as well advanced. Granted, we are not where we would like to be in terms of the technical tools; however, we do not believe that this is a valid reason for ignoring or deferring consideration of risk margins.

It is just too important to the financial reporting of insurance enterprises' results, and it is too related to interest discounting to ignore considering it explicitly. Again, what is presented here are the thoughts of the Committee on Reserves; that's the only organization whose thoughts are represented by this paper.

CAS hasn't come anywhere near endorsing this, and we haven't had the opportunity to get further feedback from the CAS membership at large, but anyway, this is what one sub-set of the CAS membership thinks about the issue of reserve margins, and that's basically where we're at.

At this point, I would like to turn it over to Steve.

MR. LOWE: I guess I'll just hold all this junk. I hope it doesn't rattle too much.

Mike, I think, has done a good job of introducing all of the issues and getting at some of the concepts. The committee, I think, has done a good job in trying to get something down on paper in an area where I don't think a lot is really down on paper. A lot of people have ideas, but I think we have a long way to go.

Jerry mentioned in his introductory remarks that we have a situation where the reserves aren't discounted; they don't reflect the time value of money; and, they don't reflect explicit reserve margins, either. The two of those are offsetting in their direction.

I am reminded of something a college math professor used to talk about, the law of compounding errors. If you make enough mistakes, you'll still get the right answer.

I guess I'd also object to his second premise on a technical point. I don't think reserves are uncertain. I think the liabilities are uncertain. I tend to be able to find the reserves in the financial statement, and they tend to be pretty certain, I guess.

I am a bit of a hawk on reserve discounting and I'll admit it. I'm in favor of discounting loss reserves. I have advocated that in the past on occasion, and that's because I believe that the time value of money is a necessary element in the valuation of liabilities.

However, that does not mean that I believe that the present value of expected liabilities, using market interest rates, the actual income you can use on the cash flow, that that is the right answer. I do not believe that is the right answer. Well, why not?

Well, here is a host of kind of interrelated reasons. The first, as has been mentioned, it fails to provide for uncertainty. It doesn't take into account the fact that the liabilities, in terms of timing and amount, are uncertain and you are making an estimate of them.

To me, the acid test is that they could not be exchanged for an equivalent amount of cash equal to that. The commutation market may be incomplete and partial, but one thing that I'm fairly sure about is that there aren't too many insurers out there who are willing to take all the risks for the present value of the liabilities. They usually want a little more than that and they usually want to take a little less than all the risk.

Thirdly, I would say that is not the way the liabilities were priced on their assumption when the insurance contract was issued, and I'll come back to that point.

The fourth point is that, in my mind, it is not representationally favorable. I'll come back to that point, also. I've got some additional comments on that and an explanation.

The last point is that I don't think it represents a good and sufficient provision, even though that term is not well defined in my own mind. It doesn't pass what I call the smell test. It just doesn't seem to make it, whatever "good and sufficient" means.

I mentioned representational faithfulness, and that may be a new term to you; it was to me until a couple of years ago. Several people, when I mention this, have asked me if it was something

that I coined and I certainly can't take any claim to it. It comes from the Fundamental Statement of Financial Accounting Concepts.

The Financial Accounting Standards Board has some excellent materials, which I would encourage you to read sometime. It is 20 or 25 pages of fundamental concepts relating to financial accounting. It is sort of the conceptual framework for GAP, if you will. It is really excellent, and I think it is really illuminating and I think it really helps.

It helped me tremendously in developing my own thoughts in this general subject area. What does representational faithfulness mean? It is defined loosely -- I guess I'm borrowing some of their words, but not all -- as the correspondence between a measure and the phenomenon it purports to represent.

For loss and loss adjustment liabilities, the idea is that they should be valued, using that measure which is most representationally faithful. In concept, the idea is -- I realize it's a little circular, but in concept, the idea is -- think about it this way.

If you had only one number that you could use, and you wanted to describe, as best you could, those liabilities, what number would you use? It seems to me you would want to take into account the amounts that you expected to pay, when you expected to pay them, and how uncertain you were as to when and how much they were going to be. You would want to take into account all three of those elements.

To me, the best valuation we could come up with is one that succeeded in taking into account all three of those in a systematic way, such that we maximized the communication of the value of those liabilities in the financial statements. It would be nice if there were a convenient and direct way to do that.

To me, what we are talking about here and what we want is a framework that would allow us to say this is perhaps what the cash exchange value is of the liabilities, what they are equivalent to if we would be willing -- what would be willing to exchange them for, for cash, if we had a complete secondary market for insurance liabilities. Then, presumably, the prices of those liabilities would be willing to make that exchange.

I think it is important, and I am coming back to my first point, that if we had a liability we expect to pay and we were certain we were going to pay in three years of $1,000, then we would probably say that a reasonable representation of that liability would be its present value discounted at our opportunity cost of money.

If that liability were uncertain, I think you could argue pretty strongly that there ought to be a different valuation for that

liability and that its present value doesn't convey what its real value is. So, I think this is an important concept to try and work in to the discussion.

I think there are probably some others in the accounting literature. This is not the only test for what is an appropriate method for valuing a liability, but this is the critical one, and I think it is the critical one in this particular context.

How, do we introduce that? How do we bring the uncertainty into the valuation of these uncertain liabilities? I think we need to recognize that the insurance business fundamentally is liability assumption. That is the business we are in.

We are trading certain amounts of cash for uncertain liabilities, uncertain in timing and amount. When we price those products, price those liabilities and determine the certainty equivalent that we are willing to exchange, we include expected costs plus a return commensurate with the uncertainty of the liability. At that point, prior to the occurrence, prior to the triggering event, we do have the proper valuation of a liability.

Assuming the prices are, quote/unquote, adequate, the valuation of the liability at that point is the price. It seems to me that the subsequent valuation and even precedent valuation, as I'll get to later, needs to continue to include that uncertainty element until the uncertainty is eliminated.

I don't think, the day we assume it, the price which we think probably is a good valuation, a relevant attribute, representationally faithful attribute, that the next day, all of a sudden, we ought to have a different way of valuing those liabilities. It seems to me that it ought to be a little more continuous.

I have a slide that attempts to make this point a little more strongly, and I think it fails miserably in that regard, but I'll show it to you anyway. Please don't consider this slide when you're grading this session.

It says "Valuation of Liability for Product Defect." The idea is, I've tried to list all the contingencies that I could think of for a products manufacturer. Turning your head sideways, you can see that we start out, the product is designed, and that's the first time he has an opportunity to screw up. Then he manufactures the product. Then he sells the product.

Then, an accident occurs and then an injury manifests itself, which does not necessarily happen when the accident occurs, like asbestos, and then he has to file a claim. He has to recognize that there is insurance and he has to file a claim. Sometimes they do; sometimes, they don't.

Then, the courts have to establish that there is a liability and the damages have to be determined. Once there is liability, there are damages, and their amount is uncertain even if there is liability. Then, finally, we pay a claim.

(End of Side 1.)

-- that relate to these liabilities, and I think they are sort of a series of contingent events. Apparently, we have market prices for the liability assumption just before the accident occurs if we're selling occurrence coverage, or maybe just before the claim is filed if we're selling claims made coverage.

It seems to me that, starting from left to right, we have a continuum of uncertainty that is gradually declining over time and we ought to be able to develop a model that says as the uncertainty declines, the margin that we need declines, and we get a continuous valuation that happens to go through the two data points that we have, which is the price of a product on a claims made or occurrence form.

It bothers me a little bit to have people say, "Well, on these reserve margins, we don't know how to calculate these margins. We are really in the dark ages. We don't know how to do that." To me, what we are sort of admitting is that we don't know how to price the product.

Because I consider a lot of this discussion about margins to be talking about profit margins and reserve margins, we are really talking about, I think, the same animal, at least in part, which some might not agree with. Some might not agree with that point.

I guess this is in response to some of the material in the paper that Mike was alluding to. I think there is a little bit of confusion and, in my mind, at least, there are two issues and two margins that we're talking about when we talk about margins. I think the two get commingled in a lot of people's minds.

I'd like to suggest that there really are two separate issues at play here, and try to get you to think about maybe seeing it my way. The first is the one that I've been talking about up to this point, which is the reserve margin, and that is compensation for risk.

To me, that is a necessary element in the valuation of the liabilities that should be included explicit in the reserve. We compute the reserve. We figure out what the expected liabilities are in timing amount; we discount them; and, we put back in an explicit margin for the remaining uncertainty. That is the same kind of exercise we would do if we were pricing the product. This reserve margin is synonymous with profit margin, which is the return for compensation relating to risk.

To me, there is a separate margin, which is the surplus margin, of which I think the margin for conservatism that many actuaries feel very comfortable with is part of, but it is really a piece of a larger problem, and that is, from a public policy standpoint, what level of confidence should we have that we can meet policy holder obligations?

To me, it is a different question and it is part of the reserve margin and margin for conservatism because of the uncertain in the reserves and the fact that they do fluctuate and are uncertain, that margin needs to -- we need to broaden that discussion to include uncertainty as to assets and their maturity and value, and mismatch between the two, and we really need to come up with, essentially, a minimum surplus standard.

Part of the point I'm trying to make is that I would put the reserve margin in the reserves. I would put it above the line. I would include it and have it affect income. I would put the surplus margin, which I view as a separate question, separate element, separate issue, as part of earmarked surplus. It's really minimum capital standards.

Finally, Mike talked about risk elements. He is disappointed in the slide. I think I ruined his day with this one.

To me, in this discussion, process risk is irrelevant. Mike talked about we have a deck of cards. What is the probability of an ace, one in 52 or four in 52? The ace of spades is one in 52. The point I would make on this is that at Atlantic City, they don't care about this risk, because they know the law of large numbers is operating. They do care a lot about the stacked deck. We should, too.

To me, process risk is not the relevant issue. The relevant issue is parameter risk. It is the inability to know what the mean of the aggregate distribution is. Those of you who have tried simulation models on large numbers of claims -- I assume -- I have found I have been disappointed in the size of margins I have gotten out of that process. You start assuming that the claim process is

(Inaudible)

or something like that, and you put 10,000 claims through and you've got a margin that's to the third decimal place before you get anything.

On the other hand, you start introducing parameter risk and the inability to know the future, inability to know what the parameters of the distributions are, and you've got significant margins. I think that is what we need to focus on in this measurement.

Another point I would make is that we've learned from capital asset pricing that diversifiable risk is not compensated, and that the market really only wants to compensate for undiversifiable risk. As I say, I think the process risk is largely diversifiable through the law of large numbers and/or reinsurance.

Now, I know that hurricanes we can't completely diversify, and I know there are still some elements there, particularly with reinsurers -- they might take exception with this -- but I don't think large automobile insurers -- State Farm doesn't need to worry about the remaining process risk in its auto liability business.

So, I hope you have found room for some stimulation in these remarks. I hope some of you disagree. I suspect some of you will. I appreciate your time. Bob.

MR. GRANOW: Thank you, Steve. It is a pleasure to be here this morning, although I am clearly up here as a token, but hopefully not a sacrificial, accountant. I am going to talk about some statutory and GAAP alternatives for reflecting uncertainty which is inherent in discounted loss reserves.

By way of background, though, I would like to talk about the use of discounting within GAAP accounting, in general, and then talk about discounting guidance specific to property casualty insurers. Next, I'll talk about the existing GAAP guidance applicable to explicit risk margins.

I'll touch on statutory guidance and some examples in this area, and I'll conclude with my thoughts on the most acceptable alternatives for reflecting explicit reserve margins within GAAP financial statements. As I said, I'll start with applications of discounting in general accounting practice today.

(Slide 1)

I have listed up here a couple of the more prevalent, more significant areas in which discounting does exist in practice. Certainly, in the area of recording of pension obligations or assets, and liabilities and possibly assets for other post-employment benefits, discounting is used in the recognition and measurement of the asset or liability as well as in the determination of the periodic cost.

Discounting is used in evaluating whether or not a lease is a capital or an operating lease and in the measurement and recognition of the capital lease. For long-term receivables and payable that pay other than a market rate of interest, we use discounting to value those for financial statement recognition purposes, as well as for deferred compensation arrangements.

In the insurance arena, we certainly use discounting in the setting of life insurance reserves and the amortization of deferred acquisition costs. Discounting certainly has a place in identifying premium deficiencies, although not necessarily in the measurement of premium deficiencies for property casualty companies.

There are certain other items in financial accounting that lend themselves to discounting, but may or may not be discounted. First, is the discounting of deferred tax assets and liabilities. This is a topic that received considerable discussion during the FASB's deliberations on Statement 96, and they ultimately concluded not to apply discounting to recognition and measurement of deferred tax assets and liabilities and to wait until they had completed the interest methods project, which I'll touch on shortly.

In the area of loss reserves for insurance companies, discounting is applied for property casualty companies, as you well know, only in certain situations. It generally is not very broadly applied.

(Slide 2)

Now, let us take a look at some of the guidance that is out there specifically for insurers. First of all, there is Statement No. 60, which was issued back in 1982. Statement 60 neither requires nor prohibits the discounting of loss reserves. All it does say that in the cases where loss reserves are discounted, you need to disclose the amount of the discount and the range of the interest rates used to discount the liabilities.

Staff Accounting Bulletin No. 62, which the SEC issued back in 1986, limits the applicability of discounting for SEC registrants. It limits it to those that are specifically allowed for statutory purposes or to those where the losses are fixed and determinable.

It also requires that an accountant's preferability letter be filed with the SEC for an accounting change and clarifies that the initial adoption of discounting, as well as a change in the method of selecting the discount rate, are both accounting changes.

Then, there is Staff Accounting Bulletin No. 87, which was issued late in 1989, to give us some concern in our filing of 1989 financial statements. While this is only a disclosure issue, it does clarify the SEC staff's view on the application of disclosure standards for contingencies to property casualty loss reserves. It specifically addresses those uncertainties that are considered to be other than normal and recurring.

The SEC also issued Financial Reporting Release No. 20, which expanded the 10(K) disclosure on loss reserves, in general, and certainly added some disclosure on loss reserves and discounting.

Lastly, there is the FASB's interest methods project, which really doesn't belong on this overhead, since it is certainly not applicable just to insurers, but for lack of another overhead, this was where I put it.

This project represents a sizeable undertaking by the FASB as they try and evaluate the place of discounting within the accounting framework in general. Right now, the schedule would be to issue a neutral issues document called a discussion memorandum in the fourth quarter of this year.

I'm not going to spend a lot of time talking about the FASB's interest method project. Wayne Upton, from the FASB staff, is here and will be talking about the FASB's project at Session 4F this afternoon and 7F tomorrow afternoon.

Steve alluded earlier to the FASB's conceptual framework. The FASB undertook a project going back to 1973 to develop some broad qualitative standards for financial reporting. The project expanded into the development of a conceptual framework of financial accounting and reporting.

(Slide 3)

The result of this effort are the five concept statements which set the objectives, qualitative characteristics or other concepts that guide the selection of economic events to be recognized and measured for financial reporting.

Relevance and reliability are the two primary qualities that make accounting information useful for decision making. Steve used the catch phrase "representational faithfulness" a couple of times, and he defined it, and I'll define it I think the same way, with some different words.

It is the correspondence between reported numbers and the resources or events that they purport to represent. It is just one of several attributes of reliability. The determination of what is relevant and what is reliable is very subjective and it may involve some contradiction.

One issue where relevance and reliability will conflict is in the treatment of conservatism. Conservatism may be one way of providing for explicit risk margins under GAAP. Within the FASB's concept statements, conservatism is not one of the basic characteristics of financial statements.

The application of conservatism is certainly prudent in financial accounting and reporting. If there are two amounts that are equally likely, conservatism would indicate a preference for under-estimating net income and net assets, rather than over-estimating.

As I have indicated, conservatism may conflict with other reporting objectives, such as representational faithfulness, neutrality and comparability. Once conservatism begins to consistently understate results, the reliability of the information will suffer.

The FASB also considered the effect of uncertainty on the recognition and measurement of assets and liabilities. Uncertainty impacts on what qualifies as an asset or a liability, and the recognition and measurement of that asset or liability.

The existence and/or the amounts of most assets and liabilities have at least some uncertainty inherent in them. We recognize that we all need to live with some uncertainty in our lives. We would have only cash basis financial statements if we insisted on only reporting amounts that had no uncertainty.

(Slide 4)

This is a quote from the International Accounting Standards Committee in their Standard No. 1. It says that "Uncertainties inevitably surround many transactions. This should be recognized by exercising prudence in preparing financial statements. Prudence does not, however, justify the creation of hidden or secret reserves."

(Slide 5)

Now, let's take a look at how explicit risk margins are provided for within U.S. GAAP. The first place we look to is to Statement No. 5, Accounting for Contingencies, which would say that we record the best estimates of probable losses. If we have a range of probable losses and no amount is more likely than any other, we would record the bottom of the range, and we would have some disclosure if that were appropriate.

We have Statements No. 60 and 97. Statement No. 60 may be the only place in the accounting literature where there is an explicit risk margin provided for. That is the provision for adverse deviation. When Statement No. 97 was issued back in 1987, the FASB, in defining the accounting for universal life type contracts, differed from FASB 60 and went back to Concept Statement No. 2.

The basis for conclusions to Statement 97 states that, "While conservatism may suggest that the more conservative of two equally likely alternatives should be used in an accounting measurement, conservatism does not suggest that a less likely outcome should be used simply because it is less favorable to the enterprise."

(Slide 6)

For other places in the GAAP accounting literature where explicit risk margins do or do not exist, we next look to Statement No. 87, Pension Accounting. Statement No. 87 says that in providing for the measurement of periodic pension expense and the assets or liability, "the use of explicit assumptions, each of which individually represents the best estimate of a particular future event is required."

It certainly does not provide for an explicit risk margin. It does, however, provide for a corridor. While I won't go into the mechanics of the corridor, what it does allow for is the smoothing of earnings, the nonrecognition in the income statement of actual results that deviate from assumptions within a fairly narrow band.

This corridor has had a fairly significant effect on many companies in keeping some volatility out of their income statements, particularly companies who are heavily invested in common stocks in their pension plans and may have assumed a fairly low -- seven, eight, nine percent -- rate of return, and over the last several years, when earnings were significantly higher than that.

We also look to the FASB's exposure draft on other postemployment benefits. The guidance in this area on selection of assumptions is very similar to that for pensions, in that each assumption is to be explicitly evaluated, and it also provides for a corridor to smooth some of the volatility.

What the exposure draft also provides for, though, is some disclosure of the sensitivity of the periodic costs and the accumulated post-retirement benefit obligation to a one percent change in the health care cost trend rate, which is certainly the most volatile assumption of all the explicit assumptions within the OPEB exposure draft. The FASB is scheduled to issue a final statement on OPEB in the fourth quarter of this year.

(Slide 7)

Let's look for a minute at the statutory accounting and the role of explicit risk margins in statutory reporting. Clearly, statutory financial statements have a different objective than GAAP financial statements.

Within the statutory world today, we have the mandatory securities valuation reserve for life insurers, which is a measure of explicit risk within the investment portfolio, and there have been some significant changes to that for 1990. Primarily, the changes affect life insurers.

There will be some impact on property casualty insurers and how they value certain non-investment grade securities this year, and

a larger group of non-investment grade securities next year. Certainly, Schedule F and Schedule P for property casualty companies represent an explicit risk margin, and there is also the financial guarantee minimum reserves in New York.

Elsewhere in the statutory world, the NAIC is working on a risk-based capital model, which, while in its infancy, could certainly provide for some explicit measure of risk, and that would become more appropriate in the event that statutory reserves were to be discounted.

The NAIC is also working on valuation reserves, which would expand MSVR type concepts to other asset classes, such as mortgages and real estate. If reserves were to be discounted for statutory purposes, one could reasonably expect to see changes in Schedule P, plus it would be likely that asset valuation reserves would be added to at least partially replace the implicit margin reserves that the discounting would take away.

I would like to conclude with a few thoughts of my own on ways to treat explicit risk margin in discounted loss reserves.
Given the relevance and reliability criteria of financial statements and that all information needed for potential investors or lenders to make informed decisions cannot be contained within the basic financial statements, I think that a conservatively determined reserve, without an explicit risk margin, but with a significantly expanded disclosure, either in the financial statements or elsewhere, can best meet the overall objectives of financial reporting. Thank you.

MR. MICCOLIS: I want to thank the panel for some thought-provoking comments. I don't mean to pick on Steve, but as is his custom, he has said something to agitate just about everybody up here. I know Mike wants to comment on Steve's comment with respect to process versus parameter risk. I know Bob, for his part, wants to gently rebutt Steve or at least provide a little more perspective. Steve singled out one of these FASB concepts on relevance and reliability, and that is representational faithfulness. There are at least a couple of others that Bob thinks ought to be considered to give this whole issue more perspective.

But before we get to that, let me respond to something Steve said, that reserves aren't uncertain; liabilities are. Well, I chose my words carefully. I said there is uncertainty in the reserving process and, by that, I meant to include both the uncertainty in the underlying liabilities and the uncertainty in measuring those liabilities. That was intentional, because that distinction is really the distinction between process and parameter risk.

The uncertainty in the underlying liabilities is process risk, which, according to some observers, is irrelevant. The additional uncertainty associated with the reserving process,

estimating those liabilities, is parameter risk. With that, I'll let Mike rebutt.

MR. McMURRAY: When I first saw Steve's slide where he said process risk was irrelevant, I assumed that that was a typographical error. There are two points. One, we've made pretty good strides in the last couple of years in coming up with ways of measuring process risk. Thanks for making it irrelevant.

Secondly, we as a profession, are far from getting a handle on the parameter risk aspect. It's somewhat depressing to know that somebody thinks this aspect is where we should be concentrating our efforts.

A couple of other things. I think Steve's client base may include a lot more in the way of large automobile insurers than maybe my client base. Process risk is very real in evaluating the financial condition of relatively small malpractice carriers and to relatively small excess and surplus lines carriers. I personally don't feel process risk is irrelevant for those types of carriers.

After saying that, Steve's comments on representational faithfulness consolidated a lot of my own thoughts about risk margins and why they have a place in any discussion of the discounting issue.

MR. MICCOLIS: Do we have a question? Yes, Pat?

MR. CROWE: My name is Pat Crowe with Kentucky Farm Bureau Insurance. I have two questions for Steve. Obviously, I couldn't miss talking about the parameter and process risk, either. I don't work in lines anywhere near as esoteric as Mike does, but I give one example, like increased limits, which I think Jerry wrote a paper on or else Bob did.

Yes, I have been looking at different processes for increased limit factors, and you have some now with the computers, and I never feel comfortable with any particular process. So, I guess the question to you on that is: Of all the esoteric policies you work on, do you always feel that you understand the process in every single one of them?

My second question is: I never heard this question of representational faithfulness before. I didn't understand it. Could you explain again, when you started off using the words "correspondence between"? I didn't understand this "correspondence between" the two elements you mentioned.

MR. LOWE: I think you asked a two-part question. The answer to the first part is yes, and the second part is no. Let me see if I can deal with them separately.

The slide that said that process risk was irrelevant was designed to provoke. Obviously, I don't believe that process risk is completely irrelevant. I think it is important, but when you start talking about increased limits factors and different ways of computing those increased limits factors, I think what you're talking about is parameter risk.

Your inability to decide what is the best model to use, that is parameter risk, at least in my mind. To me, process risk is (Inaudible)
and earns. All I was trying to point out is that part of the insurance process is taking individual risks and accumulating them, creating diversification through the law of large numbers and diversifying that risk away.

I recognize fully that for professional liability insurance and products liability, surplus lines, high limit excess, there are a variety of places where complete diversification is impossible, even if you use the whole reinsurance market, nuclear, for example.

All I was trying to suggest was that, to me, the most relevant risk and the one that -- I would agree with Mike -- we are furthest away from solving, but, to me, the most important one, problem to tackle, is coming up with decent models that recognize the parameter risk and the parameter side of the coin.

On the second point, I guess on this whole subject of financial accounting concepts, about a year and a half ago, I wrote a paper for the Valuation Special Interest Seminar in which I tried to summarize some of these GAAP accounting concepts.

When I was on the Academy's Financial Reporting Committee, I had occasion to review the FASB financial accounting concepts, which are fundamental concepts. FASB publishes a blue paperback that's about that thick (indicating) that includes every standard that they've issued, and they update it periodically.

In one small section of that, there are 25 pages called Statement of Fundamental Financial Accounting Concepts. In my paper, I tried to summarize those because I feel that, as actuaries, we are missing out on a significant body of literature that is very well thought out and very carefully drawn that we ought to know about.

The accounting profession has crafted this very carefully with a great deal of thought, bringing together a lot of different problems, and I would commend -- in answer to the second question, I would commend you either to the original accounting concepts or to a paper I wrote called GAAP and the Casualty Actuary, which is in the valuation -- the little blue paperback that gets published in the call paper program which I, in all modesty, think does a fair job of trying to summarize the concept of representational faithfulness as well as the other concepts

that have been alluded to, that all represent criteria by which the method of measuring an asset or a liability ought to be chosen.

MR. MICCOLIS: Pat, did you like that increased limits paper?

MR. CROWE: Yes, I did.

MR. MICCOLIS: Then I did write it. (Laughter) No, actually, Bob Miccolis wrote that paper. Ben, you had a question?

QUESTION: I'm not going to be technical. I guess my comments will best be served if I refer to the new landmark textbook, Foundations of Casualty Actuarial Science. In the first chapter of the introduction, the author tries to define or determine what is the basis of actuarial science.

He says it is probability theory with a classical evasion. Indeed, he says that had the actuary not had probability theory, he would have had to have invented it. Then, the author discusses some of the celebrated American casualty actuaries of this century. One of them now celebrated, actually, is Arthur Bailey.

In 1942, he wrote a paper on sampling theory. In that paper, he says that what we observe is a sample generated by some complicated probabilistic mechanisms. This means that, really, even with hindsight, we can't determine the exact risk. He also says that this fact has resulted in it actually coming into being.

I guess according to you, Steve, if process risk is unimportant, then I'm not too sure that the actuary is important. Now, in our determination of parameter risk, we can evaluate our parameter risk much more accurately and precisely if there was very little process risk.

The two are related in terms of the way we assess it. Process risk is important and so is parameter risk. I might, perhaps, agree with you when you say that, as you change your parameters, you are getting completely to finances. That's true and, therefore, what you really need to assess is the stability of the parameters. If you know process risk exactly, you'll know parameters and whether they are unstable or not. Thank you.

MR. MICCOLIS: Response?

MR. LOWE: Ben, I consider myself suitably chastised.

MR. MICCOLIS: But not unimportant. Yes, Steve?

MR. PHILBRICK: Steve Philbrick. If I could go in a slightly different direction and not beat up on Steve, a question --

MR. MICCOLIS: Any other questions? (Laughter)

MR. PHILBRICK: A question for Bob: I heard you say when you were discussing FASB-5, that if you have a range of equally likely outcomes, that you take the bottom of the range, and that followed by a couple minutes the statement earlier talking about prudence, where you said if there were two likely loss amounts, you would take the more conservative.

I think you then went on to tend to reconcile them, but I didn't follow the reconciliation. I hear two different principles or statements that sound like they're saying opposite things. Did you reconcile that?

MR. GRANOW: It certainly is an area of considerable judgment. The disclosure side of FASB-5 I think attempts to reconcile the two. If the range is wide, disclosure is required. Again, conservatism is not one of the basic tenets of financial reporting, but it is something that a prudent man might apply with some boundaries around it, such that there's not a material misstatement of financial results. Conservatisum may have its plan in evaluating likelihoods and establishing ranges, and contingency accounting can then be applied. They can be contradictory, it's clearly true.

Conservatism is not an end in and of itself, but it certainly is prevalent in financial reporting. At this time, FASB-5, when dealing with contingencies, clearly states that when you have a range and no amount is more likely than any other, you choose the bottom end of the range.

MR. GOULD: Don Gould, Crum and Forster. I'd like to come down to reality for a minute and perhaps address a question to Steve Lowe. I've been given the job of trying to come up with confidence limits for a worker's comp book of loss reserves. I'd like to know how I would go about assessing the parameter variation in a situation like that.

MR. LOWE: I'm sorry. We're all out of time. (Laughter) I appreciate the comment. I think there is -- I always have a temptation to get up in the clouds and keep the discussion at a conceptual level, but I would agree with Mike's comments earlier that we have a long ways to go on this area.

The committee, in its list of methods by which it might get at the uncertainty in the loss reserves, listed some approaches that include both process and parameter risk.

As I think Ben pointed out, if I understood him correctly, one of the problems we have is that some of the methods we might use, particularly retrospective methods that look back at what the risks might have been in the past, have a great deal of difficulty in separating out the two elements, such that you get the overall answer, but you don't really know how much was process and how much was parameter. I think that's okay.

What we're really interested in is what's the overall uncertainty or what's a reasonable measure of the overall uncertainty, such that we might be able to place some confidence boundaries around our estimates and develop appropriate margins or surplus out of that.

The final slide that Mike put up was really an exhortation to the CAS membership that -- and this is a development area where there is a crying need. We need some good thought and some good quality papers that help people through this.

I'm really seriously afraid that the accounting profession or the NAIC is going to proceed on a path to develop new accounting approaches, perhaps, maybe on a long-term timeframe, but nonetheless, proceed on that basis, without our complete input.

I think we should be leading that charge and helping each of those parties rather than letting them proceed ahead of us and scratching our heads, and saying, "Well, we haven't figured out the solution to the problem, so we really can't help."

MR. GOULD: Just one thing.

MR. LOWE: Rebuttal?

MR. GOULD: I think that it might be helpful to us who are doing loss reserves, if the CAS Loss Reserve Committee would share its thoughts with us from time to time instead of once a year at meetings like this.

MR. McMURRAY: Well, the committee does things once a year.

MR. MICCOLIS: There is a committee white paper in its final stages that needs approval by the CAS before release. Yes?

QUESTION: Did I understand you correctly at the end of your statement when you said that you would argue against an explicit margin or aggregate development and you would advocate the status quo of conservatism?

MR. GRANOW: Yes.

QUESTION: What would your argument be against an explicit risk margin? Wouldn't that further the goal of increased disclosure and ability for the intelligent reader to interpret the status?

MR. GRANOW: I think you can achieve the goal of increased disclosure without providing for explicit risk margin in the financial statements themselves. I think that the discounted loss reserves represent a best estimate at a point in time, albeit a conservative one, but a best estimate at a point in time.

There is a significant amount of disclosure that could be developed that would help the user of the financial statements to make an intelligent decision.

QUESTION: Can you give us an example?

MR. GRANOW: Right now, under FASB 60, we disclose the amount of the discounted reserves and the range of the rates used. We don't disclose what the amount of discount is. We don't disclose what the reversal of discount is.

We don't disclose on the basic financial statements in the current period loss provision, how much relates to the current accident year versus prior accident year, and how much of that is reversal of discount versus true adverse loss development.

I think there is a good deal that we could do to enhance the disclosure to make the financial statements, taken as a whole, more meaningful, without necessarily providing for an explicit reserve margin. I go back to the concept statements where, while representational faithfulness is one attribute, neutrality is another attribute; verifiability is another attribute.

I think it was Mike who alluded to the fact that if the explicit risk margins are totally noncomparable, have you really added anything to the credibility of the financial statement?

MR. MICCOLIS: We are out of time. I would like to thank our panel and I want to thank you, the audience, for keeping this discussion very lively. Thank you.

(Applause)

1G: REFLECTING UNCERTAINTY IN LOSS RESERVES

Slides

Robert W. Granow
Aetna Life & Casualty

Discounting

Applications in Current GAAP Accounting

- General
  - Pensions and Other Postemployment Benefits
  - Leases
  - Long-Term Receivables and Payables
- Insurance
  - Life Insurance
  - Premium Deficiencies

Items Not Discounted

- Taxes
- Loss Reserves

Discounting Guidance Applicable to Insurers

SFAS No. 60 -- Neither requires nor prohibits discounting; specifies disclosure

SAB No. 62 -- Limits applicability for SEC registrants

SAB No. 87 -- Clarifies contingency disclosure requirements

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FASB Interest Methods Project

Explicit Reserve Margins Under GAAP

FASB Concept Statements

Conservatism

- prudence in financial accounting and reporting
- preference for under-estimating net income and net assets rather than over-estimating
- conflicts with other reporting objectives-- representational faithfulness, neutrality and comparability

Uncertainty

- impacts on what qualifies as an asset or liability and recognition and measurement
- existence and/or amount of most assets and liabilities have at least some uncertainty

Conservatism

International Accounting Standard No. 1

"Uncertainties inevitably surround many transactions. This should be recognized by exercising prudence in preparing financial statements. Prudence does not, however, justify the creation of secret or hidden reserves."

Explicit Reserve Margins Under GAAP (continued)

SFAS No. 5 -- Accounting for Contingencies
Record best estimate of probable losses.

SFAS Nos. 60 and 97 -- Provisions for adverse deviations--possible adverse deviations from assumptions

Explicit Reserve Margins Under GAAP (continued)

SFAS No. 87 -- Pension Assumptions

- "requires the use of explicit assumptions, each of which individually represents the best estimate of a particular future event."
- Use of a corridor to smooth earnings impact of deviations from assumptions.

OPEB Exposure Draft

- Same as pensions.
- Disclosure of sensitivity of periodic cost and APBO to a one percent change in the health care cost trend rate.

Statutory Explicit Reserve Margins

Existing Practices

MSVR

Schedule F

Schedule P

Financial Guaranty Minimum Reserves (NY)

Developing Guidance

Risk Based Capital

Asset Valuation Reserves

1G: REFLECTING UNCERTAINTY IN LOSS RESERVES

Slides

Michael A. McMurray
Milliman & Robertson, Inc.

EXPLICIT RESERVE MARGINS

"SO WHAT'S THE HANG-UP?"

* COOKBOOK ESTIMATION TECHNIQUES FOR MARGINS DON'T EXIST YET
* NO COMMON UNDERSTANDING AS TO HOW TO INTERPRET FINANCIAL STATEMENTS THAT INCLUDE MARGINS
  - Key Perspectives
    * Regulators
    * Industry Analysts
    * Company Management
    * Others?

Slide 1

EXPLICIT RESERVE MARGINS

"SO WHAT'S THE HANG-UP?"

* DISTORT HISTORICAL SOLVENCY BENCHMARKS
* PROBABLE LACK OF UNIFORMITY IN CALCULATING MARGINS
* NO GUARANTEE THAT MARGINS WILL IMPROVE FINANCIAL REPORTING
  - MORE SUBJECTIVITY
  - MORE IMPRECISION
  - MORE CONFUSION
* COMPARISON OF FINANCIAL RESULTS AMONG COMPANIES WILL BECOME MORE DIFFICULT (IMPOSSIBLE?)

Slide 2

EXPLICIT RESERVE MARGINS

"SO WHAT'S THE HANG-UP?"

RETORT!!

SAME HANG-UPS GENERALLY APPLY TO LOSS RESERVE DISCOUNTING

Slide 3

DERIVATION OF EXPLICIT MARGINS

"HOW!?!"

* EMPIRICAL STUDY OF HISTORICAL LOSS DEVELOPMENT VARIATION
* EMPIRICAL STUDY OF HISTORICAL RESERVE DEFICIENCIES (!)
* CONFIDENCE INTERVAL TECHNIQUES USING SIZE OF LOSS DISTRIBUTIONS
  - Probability of Exceeding Indicated Amount
* RUIN THEORY APPLICATION
  - Probability of Insolvency

Slide 4

DERIVATION OF EXPLICIT MARGINS

"HOW!?!"

* UTILITY THEORY APPLICATION
  - Difference Between Certainty Equivalent & Expected Value
* USE RISK-RELATED VS. RISK-FREE INTEREST RATES FOR DISCOUNTING
* USE COMMUTATION VALUE VS. EXPECTED VALUES

DERIVATION OF EXPLICIT MARGINS

"Chronic Technical Annoyances!"

* MUST DISTINGUISH AMONG SOURCES OF RISK
  - Process Risk
    *Fluctuations With a Full Deck!
  - Parameter Risk
    *Additional Fluctuations In a Stacked Deck!
  - Non-Optimal Reserving Technique
  - The Unforeseeable
* MUST CONSIDER THE BEST ESTIMATE OF UNDISCOUNTED VS. DISCOUNTED RESERVES
  - Payout Patterns
  - Interest Rate Risk

DERIVATION OF EXPLICIT MARGINS

"Chronic Technical Annoyances!"

* MUST CONSIDER DIFFERENCES:
  - By Line
  - By Maturity
* SHOULD THE MARGIN CALCULATION TECHNIQUE BE MANDATED?

EXPLICIT MARGINS

CAS COMMITTEE ON RESERVES

PRELIMINARY THOUGHTS

* MARGIN SHOULD ENHANCE REPORTING OF FINANCIAL CONDITION
  - QUANTIFY UNCERTAINTY!
* QUANTIFICATION & DISCLOSURE SHOULD CONSIDER:
  - Best Full-Value Estimate
  - Amount of Investment Discount
  - Provision for Process Risk
  - The Unforeseeable!
* AMOUNT OF MARGIN SHOULD BE EXPLICIT

EXPLICIT MARGINS

CAS COMMITTEE ON RESERVES

PRELIMINARY THOUGHTS

* UNIFORMITY OF TECHNIQUE SHOULD BE ENCOURAGED
  - At Least Disclose Variances

* ENCOURAGE ADDITIONAL CAS RESEARCH!!

EXPLICIT MARGINS

CAS COMMITTEE ON RESERVES

PRELIMINARY THOUGHTS

The issues pertaining to explicit reserve risk margins cannot be isolated from those surrounding reserve discounting. Unfortunately, the techniques for quantifying risk margins are not as well advanced. However, we do not believe that this is a valid reason for ignoring or deferring consideration of risk margins.

1990 CASUALTY LOSS RESERVE SEMINAR

2A/2B: BASIC TECHNIQUES I

Faculty

Kevin J. Conley
Iowa Insurance Division

Beth E. Fitzgerald
Insurance Services Office, Inc.

MR. CONLEY: It is a Monday morning in early September and you are all sitting in rows and columns, I thought you'd get a little nostalgic for your school days. I went over to the SMU Library yesterday and asked them if they had any copies of any lectures that they thought would be interesting filed away.

I went over to see if they had a couple from the Zoology Department, so I did pick up one. Here it is. The title is, "The Long-Eared Central African Elephant: Mating Habits, Practices and Standards. Do They Really Practice Safe Sex?" So, if you do want to hear that, I'm a Democrat and, since we have a voice vote, we'll go through that instead of Basic Techniques I. No, I'm just kidding.

On the more serious side, I know the reason you are all here. It's all George Bush's fault. A couple of weeks ago, he did something without thinking through all the consequences of what he was going to do. You see, what he did was he called up the Reserves, but he didn't know how many he had, so they needed to put together this seminar to get a bunch of people who knew how to quantify the reserve levels. All right. Let's get serious.

My name is Kevin Conley. I work as a Property Casualty Actuality at the Iowa Insurance Division and I've been doing that for about a year, after spending half a dozen in private industry. I'm a member of the American Academy of Actuaries and a Fellow of the Casualty Actuarial Society.

My colleague here is Beth Fitzgerald, who is also a Fellow. She works for the Insurance Services Office out of New York City, usually referred to as the ISO, and she's been working there for about ten years.

So, you can be sure that in our presentation today, you'll have a balanced view, what with Beth working at a bureau and myself working in a regulatory capacity. To some extent, bureaus are not in very good public favor right now and it is true, to some extent, that it is public favor that we, as regulators, are asked to feed.

At any rate, the man who hired me, William Hager, who was Commissioner of Iowa, used to walk over to the legislature about once a month or so and raise the roof on the evils of what he called the cartels. He never called them bureaus. He called them cartels. Bill has resigned his post as Commissioner of Iowa and become president of the most dominant cartel of them all, the NCCI, so maybe we're not all that different. Maybe we are all on the same side of the fence.

I trust you all picked up a package at registration or had one handed to you, and you somehow managed to shuffle in those replacement pages we tried to get you. I guess I ought to take a little survey here. How many of you attended the previous session considerations?

(Show of hands.)

Most of you did that. Have any of you been to a Casualty Loss Reserve Seminar before?

(Show of hands.)

Just two, my goodness. Are a lot of you, let's say, in accounting departments where you work? A show of hands?

(Show of hands.)

Most of you, maybe. Claim Department?

(Show of hands.)

A scattering of those. Do we have any actuarial students here today?

(Show of hands.)

Quite a few of those, that's good. Do we have any people here who are thrilled that the Packers beat the Rams yesterday, as I am?

(Show of hands.)

All right, a lot of those. I like to see those Wisconsin natives. Let's get to business here.

You never know in a case like this just how fast or slow to go, so feel free, at any time, to ask questions. That's what we are here for and that's what you are here to learn as much as you can and, if by stopping us and asking a question, that helps you, that will help the whole process along.

(Slide)

This is an outline of what we're going to do in Basic Techniques I. That will be the morning session and then, I presume, unless we bore you to tears, you'll be back for Basic Techniques II after lunch, and then we'll cover those five items. Next slide, please.

(Slide)

The reservist's job is to estimate total reserves, which would be development on case reserves, otherwise known as supplemental development and IBNR reserves. Now, the basic data you need, and you might have gone over this in the consideration class, is premium and exposure, which is very important, because if you don't have some sort of benchmark on which to test the reasonableness of your results, you are liable to make some pretty grave errors.

Then, of course, you need all the loss data, which would be claim counts and paid and incurred losses by accident year, evaluated at yearly intervals. We'll talk about that a little bit more, I think, with the next slide unless it's a cartoon.

(Slide)

This is the basic building block. This is the cornerstone of what an actuary's job will be in setting a loss reserve. You see here along the column, you have the separate accident years of data and along the horizontal axis, you have developmental stages.

So, to interpret this exhibit, you see that this is cumulative paid losses and thousands of dollars. The first number in the upper left-hand corner, 3,361,000, represents the amount of losses that have been paid on claims that occurred during 1983, up to and including the end of December of 1983; that would be represented by 3361.

Then, on that same body of claims, you'll have additional payments in the next calendar year period and those payments would be represented by the difference between 3361 and 5991 as you go across. You'll also have additional claims that are reported to the company.

Sometimes, a claim could happen in December of the year and the company doesn't find out about it until June of the next year, so, obviously, no payment can be made until the company finds out about it. That's what we call delayed reporting, and then so on, as you go horizontally across the triangulation.

Eventually, if you go far enough out to the right, then, all the claims are paid and there is no more incremental difference as you go across horizontally. Now, on this particular example, auto liability, even after seven years or 84 months, there is still additional payment being made on accidents that occurred way back in 1983.

Now, the first step in performing an analysis on it is to check the patterns of how the numbers grow from age to age in their development process, so you calculate factors which are ratios of one column to the right divided by the previous column to the left.

Again, in the upper left-hand corner, the 1.783 would represent the 5991 number divided by the 3,361 number -- a sample calculation there. It's all out there for you.

One thing I should have mentioned on the other slide, the previous exhibit, is that loss development will go to the right and what we call trends will be the vertical component of the triangle. So, you have development and trends, which are the two basic components to figure out ultimate losses on past years or to project into the future in a typical rate-making situation.

One thing you'll notice here, and if you've had enough experience with these, you would know this. This is about the most stable set of numbers you would ever want to see. I think that's probably why they call it EZ Insurance Company. In real life, you're going to see a lot more variation, especially in that first column of development factors from 12 to 24 months.

It would not be uncommon in certain lines of business to see a factor of 6.12 and the next year, 1.37. Those are the real challenges for an actuary or any reserve analyst, is to handle those kinds of "gloopy" situations.

But, this is kind of like what it would be like, I suppose, in heaven if we were actually up there and working for Angel Guardian Mutual or something. This is good for basics, just to show you how it works out in a pretty stable environment, so there doesn't have to be too much judgment involved.

Our first cartoon.

(Slide)

The basic idea is that you set up those patterns and analyze the patterns so that you might make the logical judgment that if you paid "X" dollars after "Y" period of time in the past and then you have a new amount of dollars paid at the same developmental stage in the past, maybe it will develop by the same percentage to ultimate as it did in the past, which is a logical first step assumption to make.

So, that's what they're saying here, is the person on the left in 1982 was 3,000 inches or centimeters high or whatever as of the first year, which is the green hat, and the new guy, who is only one year, is already 6,000 centimeters tall, so if he grows in the same proportion as the 1982 losses there, he's going to be quite a guy, as it were.

(Slide)

I want to spend some time on this exhibit. This next step is very important in the process here. The top set of factors, we've already seen. Then it comes down to making a judgment about what factors you want to select to apply in order to come up with ultimate losses.

Now, here, the person who put together these exhibits calculated four different averaging methods. There is a just a straight average of all the numbers in the top column. There is a four point average which would obviously just be the four most recent years.

Then there is an average with the high and low excluded so, for example, in the first column, you would discard the 1.834 and the 1.765 and take the average of the remaining four. Then there is,

at the bottom, what is called a weighted average which is detailed at the bottom, whereby, each year, as it becomes more recent, gets slightly more weight. There are various ways you can do that.

Another way, actually a more common way in practice by which weighted averages are calculated and a way that I think is more preferred is to actually add up the numbers in the columns for however many years you want to include in the average -- three, four, five, six -- total up the actual raw data in the columns and then make that division. So, in other words, you are weighting by the amount of losses in the earlier period.

Is that clear? That would be another form of weighting which is actually a very good technique because a lot of times, what will happen is you will have an abnormally low amount paid in the prior year and so, your development factor will be artificially high because the earlier year was so low.

If you do just take a straight average, it can be statistically proven that that will give you a biased average that is actually too high, so if you do weight by the size of the numbers in the previous columns, that abnormally high factor which arose because of the low measurement in the first development year, will get a lot less weight, so it will kind of temper the size of the average.

There is also another technique, whereby you take inverses of the factors and then average those, and then re-inverse it to get it back up to the numbers. In other words, you take 1.783 and the inverse of that would be something around .55. You do that with all the numbers, then you calculate an average, and then you take a re-inverse of that. That's actually statistically a less biased technique but, for some reason, not very often done.

The weighted average where they have the squared weightings, I wouldn't pay too much attention to that. I don't know anybody who ever does something that complex. It doesn't really add any strength to the selection.

(Slide)

The next exhibit is a joke, except they're not laughing. We'll go to the next exhibit. There are a lot more of those jokes, so don't wear out your laugh.

(Slide)

This is a corrected exhibit, so this is where you should be replacing what you were handed out with what we gave you today. This is a technique which always gets taught, but I've never really seen it employed, but we'll teach it to you, anyway.

What you do here is if you see a pattern as you go down in the development factors -- now, there are a variety of reasons why development factors won't be stable over time, and we'll be talking about those through the rest of this session and in Basic Techniques II.

If you do spot a trend, either straight up or straight down, you might want to make selections incorporating that trend that you see. For example, if you took a fixed year average, you would be discarding that little knowledge about a special change in underlying factors, whatever they are, that you might want to reflect in your selection factors.

What they've done here is fit a line down the column, showing down to project factors that take into account, in this particular case, that as you do go down the column, there does seem to be some increase in the factors.

Sure enough, when you fit a line to those points, you do get a projected factor for 1989 in the first column there of 1.834 which is a fair bit higher than any of the factors developed using averaging techniques, the maximum of which was 1.812. Similarly, for the second column, a trend line fit and it shows a higher factor.

Now, they only show here the first two columns. It would be -the farther out you go, the more random variation there is and the fewer points there are, so it gets very risky to try fitting lines to what is essentially just random noise and, even though there is a pattern there, there is no reason to believe that pattern will continue in the future.

It's just like rolling the dice four times and you might happen to get two, three, four, five, or some increasing or decreasing set of numbers, but it isn't significance; it's still the same die. That is the kind of thing you have to worry about and watch out for in trending these things. All in all, my recommendation is that I would be very hesitant, ever, to use a trending technique on loss development factors.

(Slide)

Here, we just have a summary of everything we've learned to date on paid loss development techniques. We have the four averaging methods, the two trending methods. I kind of skipped over exponential trends. Later on, I'll get more into detail about how to trend and what to look out for in fitting trend lines and curves. At the bottom, the reserve analyst will make his or her selections as to what the development factor, the loss development factor, LDF, is for that particular interval of time.

You can see here that this particular analyst decided, for the first three periods, that the weighted average was the most reliable one to use in making projections about the future, the

1.812 and so on. Then, for the more distant development period, just the all-year average is used in the selection.

You will see there that even though our triangle stopped at 84 months, one of the most common pitfalls -- and I think there is a class here called Reserve Pitfalls -- is to assume that what you have in your triangle is the end of the universe and that's when everything stops.

As is frequently the case, you only get a snapshot, kind of a smaller triangle than what you really need, and so you have to make some provision for payments that will go beyond the latest evaluation point that you have. In this particular example, an additional column of 84 months to ultimate is included and a factor there was selected of 1.055.

So, were one to ignore that, you might think, "Well, five percent, that's not a very big number," but as Beth will show you later on, I guess maybe in the afternoon session, a very small change in the tail factor, which is what that is called, can change your reserve level by great numbers, so it's something you always have to watch out for and be careful of.

The most common sort of no-brain assumption that's used in making a tail factor selection is to assume that whatever incurred losses are there at the latest evaluation, that those are perfectly adequate, and that if you just take the case incurred losses divided by the paid losses at that time, that will give you a good estimate of the future payments that will be made.

Does the concept of case incurred sit well with everybody here? Then, there is a cumulative of LDFs, then, which would just be the product as you go from right to left of all the selected LDFs. Next slide.

(Slide)

You will see a summary exhibit once you've made all the selected factors. You have the paid to date numbers in the second column of this exhibit, and those would be the numbers from the latest diagonal on the paid loss triangle. You have your selected factors. You multiply those together and you get your ultimate losses using a paid loss development technique.

Then, if you add a column of earned premium there, which, again, we talked about is always important to have. The reason, again, is because you will want to calculate a loss ratio, which will be a very good benchmark to see if your technique produced reasonable results, because, obviously, the way the business works, loss ratios aren't going to vary from year to year all that much, because every company writing business is going to aim for a particular loss ratio.

There is a competitive process of regulatory restraints and you tend to end up in a particular line of business with a loss ratio with a fairly narrow band of reasonability. A company is not going to get away with writing a 15 percent loss ratio for very long, because somebody is going to move in and say, "We can write it for cheaper and still make money," so that will tend to drive the loss ratio back up to something around the range of 70 percent.

Similarly, a company -- if you come up with a projection in the loss ratio at 150 percent, that might be unreasonable because the company, you know, is obviously losing money and they're not going to do that for too many years and stay in business. So, you want to look to see that your loss ratios make sense in and of themselves.

You also want to make sure that the loss ratios make sense in a pattern from year to year. For example, here, you'll see that 1987 has the highest loss ratio. You have to ask yourself, "Well, does that make sense with what I know about what the market was in 1987? Was that a year in which getting premium increases was difficult?"

If it was, it would make sense that that's a year of higher loss ratios than other particular years; thus the loss ratio test affirms the projections. Then, Column 6 is the indicated reserve, which is the ultimate minus the paid to date. Using this method, we get an indicated reserve of about $35 million.

Now, one of the basic tenets of the whole operation is: Never rely on one method. Always do a few different methods if you have enough data and see how they corroborate one another; see how they contradict one another; see if you can explain the differences. If you can't explain the differences, maybe pick a number somewhere in between the two.

Now, here, you have, in the same kind of configuration, you just have incurred losses which would include the paid, as well as what the claim department of your particular enterprise has decided each and every claim might settle at. Those develop over time.

In this particular example, you see they increase again as you go from left to right on the exhibit. This is the typical procedure of a typical line of business, that the claim department will tend to maybe, in aggregate, understate reserves.

They may have a policy where they put up reserves at $10,000 as the claim is noted to the company. Some of those claims will settle for $500,000 eventually. So, there will be more cases where the claim department is under than they are over, in total.

There are cases, for example, in medical malpractice, where the biggest writer of medical malpractice will have case incurred

development that is actually downward, where their claims department has more or less told them a philosophy to reserve these claims heavy. In total, after one year, the incurred losses are actually close to double what they will eventually end up at, when everything is eventually paid out. We'll talk in the next exhibit about the relative advantages and disadvantages of paid versus incurred.

(Slide)

I want to spend most of my time on this particular exhibit. You might ask, at this point in the presentation, "Well, what is the difference? Can one be preferred over another? If I had a choice of using paid or incurred, should I favor one? Does it matter? Is it six of one, half a dozen of another? What gives here?"

Generally, you will see it presented that they are pretty much equal. They make assumptions of equal validity, and so on. The basic underlying assumption that you see here in paid is that the pattern of payment has not changed significantly over time. On the incurred side, the case reserve adequacy has not changed significantly over time.

So, both of these assumptions relate to how the claim department is handling claims. Are they paying them out faster? It is possible that that could happen in a favorable part of the insurance cycle. A company may say, as they might have said in 1988, "Look, this is a good year. Let's not fight claims as much, because when we do that, obviously, the claimants are little bit unhappy with their insurance companies and they call their Insurance Commissioner."

So, if they just pay full claims and settle quickly, everybody is happy and, if they have some money to spend and they don't have a cash flow problem, they might decide to do that, and speed up claim payments. The converse is true, that if there is a money squeeze and the market is hard, they may adopt a claim philosophy of stonewalling every claim until the last possible day.

On the incurred side, again, similar kinds of things can happen. A philosophy of how to set case reserves can change. It could be, in one year, any claim that comes in gets set up for $10,000 or $5,000. They could get a new Vice President of Claims and he could say, "Let's set them at $20,000 from now on." So, that is going to change all the patterns.

It's something that you have to take into account, because it will change the factors. It will weigh on the selections that you can make. Beth will talk about how to make adjustments for that in a little while here.

Here, they give one pro and one con for each one. A pro for paid is that it's hard data with no estimates involved at all, an

actual cash transaction and you're not trying to take into account somebody's judgment, like a claim analyst's judgment; whereas, on the incurred side, an advantage is that whatever reserves have been set up by the claims department theoretically have some meaning of what the ultimate would be.

The argument runs that you shouldn't ignore that information, to take into account everything you can possibly know. A disadvantage, perhaps, to using paid data here is that it is axiomatic that the loss development factors will be bigger on the paid loss development factor side just because the payment stream is slower than the case incurred stream.

Just because of the fact that the numbers are bigger, they are likely to be more volatile, and you're more likely to have an example, as I referred to earlier, where you have one factor of 6.1 and another of 1.2. What do you do? Whereas, case incurred will tend to be smaller numbers, maybe, with less variation and you can feel maybe a little more comfortable about your selection.

As a regulator, I much prefer paid data if I can get your hands on it. Usually, companies will file incurred data. The reasons, I would say, some additional pros that I would put on the paid data side is paid data is verifiable. What I mean by that is you can go to an annual statement which includes paid loss triangles for every company, every line of business.

So, if you look at a rate filing and it has a paid loss triangle, at least there is some way you can kind of check to see if these numbers are matching some external source; whereas, with case incurred, there is no way you can get your hands on any case incurred data. So, that is one reason paids are better.

The second reason is that there is more logical consistency on the factors on paid than there is on incurred. What I mean by that is for a particular line of business, let's say, worker's compensation, it won't matter much what the company is. The payment patterns in a particular state, such as Iowa, will be quite consistent, you know, 12 to 24, 24 to 36, so you always have some sense in your mind about what the right answer is. So, when you do have very volatile data, you have some way of knowing and zeroing in, the real answer should be really darn close to this, because payment patterns tend to be, in a way, more stable because payments -- there is a real sort of tug of war on payments.

You have a claimant that wants money now. You have an insurance company that wants money not yet. So, there is always a tug on paid that will tend to keep it on a pretty much centered amount; whereas, on an incurred basis, the numbers are almost irrelevant. They are just accounting conventions that a claim department will put certain amounts of money in, and in a way, it doesn't matter if those numbers are high or low. You have

actuaries backing up putting up IBNR reserves in the annual statement.

Claim departments really do have a different philosophy. In some small companies that I've interacted with, the claims people feel as though its their job and they have failed if they don't do this, to get the total dollar amount for reserves correct. In a big company, "We're just with a big actuarial department, the claims department might be less concerned with accuracy."

So, case incurred development factors vary from one company to another; thus there is no sort of "standard" development pattern, and that is a problem with case incurred data. Further, one always want to know what a pay-out pattern is, which we'll talk about again.

If you have a paid triangle, the pay-out pattern is implicit, buried in that triangle, and you can calculate it; whereas, if you have an incurred triangle, you're still left wondering, "What is the pay-out pattern here?" You always have to ask for more information, which you don't have to do with a paid triangle.

The final disadvantage to incurred is that incurred has a lot of different definitions, some of which you learned this morning. It may include IBNR, which are reserves that haven't even been reported yet; it may not. Companies can reserve on much more aggressive or liberal bases, so that's a problem with incurred.

(Slide)

Then my last exhibit here, my last two exhibits, are comparisons of the techniques. We see here a summary of the two techniques side by side and their indications. The indicated reserve based on an incurred technique is in Column 5. This is just incurred. This is fine.

You see here that by using the incurred development factors and the incurred data, we get an indicated reserve of about 28 million; whereas, if you'll remember, on the paid side, we got a $35 million estimate.

Here is the comparison now. This might seem, and it did seem to me when I was going through this, a very odd paradox, considering the stability of the triangles. We didn't look that long at the incurred triangle, but those numbers appeared to be even more stable than the paid triangle.

In fact, one thing I did was made selections based on the smallest -- and this is kind of a good exercise to do. Pick the smallest and the largest number in each column and just see what your result would be. I mean, that's a way of trying to say what is the absolute range of numbers I can get here.

Even on the incurred side, if you pick the smallest number in each column, your reserve estimate, instead of 27.7 million, is 27.3 million, and the maximum is 28.1, so if you can get that close a range on your reserve estimate, you're super. You're doing great, because usually, you want to be within about 50 percent and here you're within two percent.

Similarly, on the paid side, there was a slightly larger range. The indicated reserves on the exhibit selection were 35.2; the minimum was 33.3; and, the maximum was 35.9, so, again, a very small range, even using absolute minimums and absolute maximums.

Still, we're left with this quandary as to how such stable data could get two very different results, and Beth will talk about those, I think, about right now. Oh, not yet, not yet. There's another joke.

(Slide)

I'm the one on the top and, as you'll notice, the one on the bottom looks a little bit more like Beth. I look more like -I've got a little lumpier head, so I'm at the top. Next exhibit.

(Slide)

A lot of words here. I won't spend too long on this. You can kind of study this, maybe on your own time, but these are some of the basic assumptions that are being made in any particular analysis as we went through, and things you've got to check and see how they impact your results that you came up with.

For example, in claim settlement patterns, if the claims are closing at a different rate, that will affect the reliability of the paid loss methods. If the case reserving practices have changed, we talked about that one, or if the claim personnel in the claim department has changed, that, undoubtedly, will result in a change of philosophy.

Another thing to keep in mind is policy limits because, obviously, if there are limits, the claims won't develop quite as much, so if a company was writing million dollar limits in 1983 but starting in 1989, hundred thousand dollar limits, your development factors should be a fair bit smaller just because, once claims hit the limit, they can't develop any more. So, you have to check that.

Loss cost trends, are those factors affecting the work on the vertical dimension of that triangle. Other factors, such as mix of business need to be considered -- after all, automobile liability is a pretty broad concept. It could be much more commercial lines -- trucks than pintos -- so if you have that, you should have greater development factors with trucks than you would with cars.

Then, there could be a cycle that you don't really see in your loss development factors and I alluded to that a little bit earlier. You can have definite calendar year effects, effects that you can see on the diagonals, whereby, in a particular year, a company may feel rich or feel poor, and affect the way they set reserves or make payments. That would impact along the diagonal, and that's kind of a more sophisticated thing to take into account that we didn't do here today. Then, of course, you always have to check to make sure your data doesn't have anything strange in it, such as catastrophes.

(Slide)

MS. FITZGERALD: Hello. This slide is the cyclical joke based on the claim department. I think we can skip to the next one, though.

(Slide)

We've gone over two methods so far, paid loss development and incurred loss development. Each of these methods is only using dollars of loss, either what you paid out or what your claim department has reserved. What we're going to go through now is something called average value method.

We're going to go through using claim frequency and claim severity. Claim frequency is your number of claims per exposure. Since this is auto insurance, exposures are normally referred to as the number of car years. If you insure one car for one year, that's one exposure. We typically refer to claim frequency in either per 100 car years or per 1,000 car years, which I think is what we do here.

What we're going to try and do now is estimate our ultimate number of claims and then, on the other side of it, we're going to look at the claim severity, average cost per claim. We're going to try to estimate the ultimate value of the claim severity.

Then, putting the two together is going to give us an ultimate value of our total losses. The total losses are comprised of two parts, both the number of claims and the cost per claim.

(Slide)

What we're going to do here is going to look very similar to the triangles we developed in the paid loss development and incurred loss development methods, so, hopefully, by now, you've gotten a feel for the format of accident years down the side and the development months across the top.

What we have here is our number of reported claims for each accident year at each development stage and, as we expect, the number of reported claims tends to increase as time goes on. We

may not know of all the claims as of 12 months; they may not get reported until the next year.

Usually, by 24 months, you have most of your claims reported but there still are ones that get reported later on. Using this information, we can calculate our development factors the same way we did with paid losses -- the number of claims as of 24 months divided by the number of claims as of 12 months.

We can do all the same methods we used earlier. We can take the average and the four-point average. We calculated some trends here also. Looking at these trends, it doesn't show much of a trend. R squared is one way of seeing how good a fit you have to your trends. Usually, you want it close to 1.0. Given these are small here, I wouldn't pay much attention to these trends at all.

What we selected here is the four-point average. One difference between selecting the average versus the four-point average is you're not giving any more weight to the four years. Using the four-point average, you are not doing a weighted average, but you are believing the more recent experience as opposed to including six or seven years in the average.

By using six points in the average, you might be using a development pattern from too long ago. Thus, you may want to base it on the four-point average. You heed to get a feel for what you believe more.

If you don't have that much confidence in your recent patterns and it's not that stable, you may want to use the full average. But, here, we selected based on the four-point averages and then came up with cumulative loss development factors. For instance, the 2.03 says that the 12-month claims are going to almost double on an ultimate basis. Next slide.

(Slide)

We are going to calculate our severity by using our paid losses and our number of closed claims. Using this information, we can calculate the cumulative paid severity. The losses and claims were not shown here, but using that information, we calculated the cumulative paid severity for each accident year at each evaluation.

We've calculated our loss development factors, calculated all our averaging methods and, once again, we decided to use our four-point average in selecting our age-to-age factors and have come up with cumulative loss development factors at the bottom of the slide.

Once we have our loss development factors selected, we can calculate our estimated ultimate claim count and estimated ultimate severities. Using our claims reported to date which are the latest evaluation of how many claims have been reported, we

apply our selected factors to the reported claims to get our estimated ultimate claim counts; that's shown in Column 3.

Using our paid losses to date which are the cumulative paid losses for each accident year, and using the factors from our average severity exhibit which will to put them on an ultimate basis, we have calculated our ultimate average severity in column 6.

Some of the information here is just a repeat of the previous slide. Column 4 is our ultimate losses which we are trying to estimate. Given our ultimate counts we calculated, shown here in Column 2, and our average severity at an ultimate basis in Column 3, the product of these two will give us our ultimate losses. So, Column 4 is the equivalent of what we calculated on a paid or incurred loss development basis.

We can then calculate a loss ratio using the earned premium. This is an important thing to calculate so that we can monitor it for reasonableness. Then using our paid losses-to-date, we calculate the indicated reserve just the same as in the other methods.

In this case, we have $33.8 million and I think on the next slide, we'll get into comparing this method to the other two.

(Slide)

Now, what we show here, is a comparison two different ways. We compare the methods on a loss ratio basis, as well as comparing the actual reserves. If you look at the bottom of the overhead, you can see that the paid development as well as this average value method come out with pretty similar reserves.

The incurred development is pretty low. If you think back to what Kevin said about incurred development, you are assuming that the case reserves are adequate. Given the fact that this comes out much lower than the paid method and the average count method, you may want to find out what is going on with the case reserves. Maybe they are inadequate and the incurred method is actually going to give you inadequate reserves.

Looking at the loss ratios, we also notice that the latest year for 1989 is lower no matter which method you use. This afternoon, the first thing we'll get into in Techniques II is trying to see if we think that makes sense.

We are also going to look at different sorts of information to try and convince ourselves that either all the methods have some sort of data anomaly in it, or that the data makes sense because of what has gone on in the market.

A couple of things to point out. The paid loss development method will be similar to your counts and average method as long

as your reporting pattern of the claims is stable and how fast claims are closing is stable. If the claims are closing faster or slower than normal, your paid loss development is not going to give you adequate reserves.

Also, if you were to do counts and averages, we've used reporting claims, closed claims and paid losses. If you were to do that method based on reported losses and reported claims, you are basically just replicating your incurred loss development using the same information.

Another thing I'd like to point out here is using the counts and averages method, using the number of claims, there could be a distortion, if there is any problem or difference in how you count your claims. This data is auto liability. I've seen companies count the number of claimants in each accident and other companies just count the number of accidents.

Periodically, they may change the way they count the claims. If that is any kind of known change in how you count your claims, then you probably don't want to use a method that uses claim counts unless you are able to adjust data. You'd probably be a little better off with a method that uses total loss dollar. I think we have some graphs.

(Slide)

In addition to just looking at the loss ratios and looking at the reserves, sometimes it's easier to see the pattern and which methods are better or worse by graphing them. This graph shows the loss ratios graphed. You can see that in the '89 year, they are all going down. That's the kind of thing where you probably don't want to investigate the method; you want to investigate what is going on in the market or what is going on in your company.

For the most part, you can also see how the incurreds from this graph are always showing slightly lower results than the paid and the counts method. So, just pictorially, this is easier to see and, with PCs these days, creating graphs is usually pretty easy.

So, it might be a good idea to always create a graph in case, -- I don't know if you look at numbers all day long, but I think we all have a tendency to get bleary-eyed. Usually, having a graph makes things a little bit easier. In the next chart, we also do a bar chart of the different methods.

(Slide)

This is the actual reserve dollar for each of the three methods. One thing to point out here, your latest accident year is where you are making the most estimates and the fact that that was the one with the low loss ratio, we're really going to want to spend some time making sure that we believe that number.

For the '83 accident year, which had already developed for seven years, the total dollars there are not that high. Here again, you can sort of tell that the incurred method is usually the lower dollar estimate as well as the low loss ratio in just about every accident year. I think that's it.

I'd like to talk about a few things in general that aren't covered in the slides. Once you get the development triangle down and understand accident year and development stage, you can work that through and calculate the numbers.

For auto liability, bodily injury data may develop a lot differently than property damage. Property damage is going to develop a lot quicker. You're not going to have as many case reserves further out as you do with bodily injury, so you really have to decide what data you're going to use and how you are going to segregate it.

Even uninsured motorists is a growing coverage in auto liability. Uninsured motorists, from what I've seen, develops much higher than bodily injury because of the fact that those claims take longer to be reported and longer to be settled. They are usually the more severe cases. So, you really have to decide what data you're going to select and how you're going to split it out.

Homeowner's, for instance, you may want to split out the property losses from the liability. Obviously, the property losses are going to develop a lot quicker than the liability. Also, you have to think about the credibility of your data base. Are you going to just have auto state-wide data or are you going to look at state-wide and country-wide?

When I've looked at uninsured motorists data for certain states, you are lucky if you might have 100 claims; that's not that stable a data base. What we tend to do is look at country-wide data as well as state data and either base it on one or the other or maybe even credibility weight state and county-wide data together.

I think they covered in Considerations the idea of credibility a little bit. You can look at your volume of claims. If you really have data that goes from a 6.1 factor one year to a 1.2 factor another year you may ask yourself some questions. Is my data too sparse? Can I build up that data base or maybe weight those results with something else?

Even if you're only just selecting a factor, how much belief do you have in that pattern? If it's changing a lot, you may want to find out is there something going on with the mix of business that is changing? I think that's really important, to understand exactly what data you have.

Also, we have mentioned a little bit about closing patterns, claims, settlement of claims. Knowing what is going on in your

company and probably knowing your claim department is very important. If the data is very random, you may want to find out is that just randomness in the data or is there really, decision making going on that is changing the way things are happening. For example, is there pressure on you to pay out claims faster or slower? Knowing this information and how that impacts your different methods is important.

This afternoon, we will talk more about certain methods and how changes that could happen in a company will impact the different methods. Depending on if there are data anomalies or a company operation change is really going to have an effect on which method you use or on how much you believe a particular method and how you select your reserves.

I'll just mention a couple of changes and what you can do. If there is a policy limit change, one thing you can look at. We're looking at a policy year data. A policy year would be for all the policies written that year, you look at the losses from those policies.

It is similar to accident year. For accident year, you are looking at all the accidents that happened in that year. Typically, an accident year may have losses from policies written either that year or the prior year.

So, if you have a policy limit change, all of a sudden, you used to write million dollar policies in '88 and in 1989, you switch to $100,000. You may not want to look at it on an accident year basis but on a policy year basis, and that may alleviate the problem as opposed to trying to cap the losses at different limits or whatever.

Another change that could happen is a law change. If you have auto liability data, the introduction of a no-fault law might cause a much different pattern in your reporting of claims and how you settle claims. One way to look at it is on a report year basis, which I think they covered in the considerations.

All the claims reported that year will be reported under the law change, whereas, opposed to the prior year, it might be under a different scenario. So you may want to aggregate your data that way which would alleviate the problem.

At this point, I think we've covered most of the topics. Are there any questions or is anyone confused? Yes?

QUESTION: (Inaudible)

MR. CONLEY: I don't know of any restrictions they put on particular techniques.

QUESTION: I'm concerned about the (Inaudible) and that kind of thing. I'm not sure if you use different techniques. If you

look at this graph, you have significantly different techniques (Inaudible) than we had with all three methods.

MR. CONLEY: I would have to think if the IRS were going to make any judgments about your reserve redundancy, they would have to do it based on generally available data which would mean annual statement data, which would mean paid loss triangles, and they know how those operate in industry aggregates by line, so they might have guidelines if you're 40 percent higher than that or something, but that's all I could envision.

QUESTION: So, you'd use a paid loss triangle and then (Inaudible)

MR. CONLEY: Are there any other questions?

QUESTION: When you're using counts and averages, does the fact that you're using paid losses which might contain partial payments on claims in conjunction, with these claim counts, does that change anything?

MS. FITZGERALD: If you'll notice the actual development, the fact that it's a combination of paid on closed claims and paid on partial payments, the development from 12 to 24 months doesn't increase. It actually decreases and I think that's because the number of closed claims develops a lot from 12 to 24.

The actual meaning of that average severity is actually much too high, because you are relating total paids on a larger number of claims to just the number of closed claims.

As long as it is consistent and you are getting consistent factors, it's okay, but if there was any kind of inconsistency in how many claims closed as of a particular time, you would either have to adjust your data or use a different method. Otherwise, you would end up having inconsistent factors and your reserves would probably be inconsistent then.

MR. CONLEY: Also, there is a general comment I'd like to make before we get to your question. Just because, for example, we showed a paid technique to come up with average severities, that doesn't mean to imply that an incurred technique would be wrong. It's just that to simplify the presentation, just one of the two methods was done. So, if you knew there was a problem with partial payments changing all the time, you might want to use an incurred. Next question?

QUESTION: I was thinking about the same thing. You mentioned you could use reported claims and incurred losses. I was just wondering, you know, I'm sort of confused about your comment that you made during the presentation. Again, when you use incurred, it's like estimates instead of actually what happened. Would that be more --

MS. FITZGERALD: You're talking about using incurred claims and reported claims in the counts and averages? The way the reported claims are defined here, they really are incurred claims. It's paid plus whatever outstanding claims you have. If you were to use that in the counts and averages method, you are really just using the same information.

It would be very similar to what an incurred loss development triangle would be unless there were some distortion in the claim counts. It's kind of the underlying assumption that they are consistent. You'd end up using your paid losses plus your case reserves. Yes.

QUESTION: I'm confused on the paid and the incurred. Is there (Inaudible)

MR. CONLEY: Yes, there's a difference.

MR. FITZGERALD: I think the difference would vary by line a lot.

QUESTION: Would you repeat the question?

MR. CONLEY: The question was would there be a difference or a significant difference between triangles if one were on a direct basis and one were on a net basis, before and after reinsurance. Depending, of course, on the line and depending on the limit where the reinsurance applies, the net development can be a lot different. It would almost be the same question as the effect that changing policy limits could have, because it would impact in the same way.

QUESTION: (Inaudible)

MR. CONLEY: That is commonly done, yes.

MS. FITZGERALD: Were there other questions? Thank you. I'll see you this afternoon.

1990 CASUALTY LOSS RESERVE SEMINAR

2A/2B: BASIC TECHNIQUES I

HANDOUT

BASIC TECHNIQUES I

Estimating Loss Reserves - Three Methods

A. *Paid Loss Development*

1. *Building a loss triangle and calculating loss development factors (LDF's)*

2. *Estimating the development expected in the future*

   a) *averaging methods*

      average - average of most recent 4 points - average excluding high/low - weighted average

   b) *trending methods*

   c) *tail factors*

3. *Calculating expected ultimate losses and the indicated reserve*

B. *Incurred Loss Development*

C. *Paid vs. Incurred Methodology*

1. *Comparing the estimates*

2. *Assumptions and problems*

D. *Counts and Averages*

1. *Claim count development*

2. *Severity (average cumulative paid loss per closed claim)*

3. *Assumptions and problems*

E. *Comparing Results*

1. *Graphs*

2. *The historical data will support a range of estimates. Don't manipulate it to get the answer you want. Try to let the data speak to you.*

3. *Testing for reasonableness.*

EZ INSURANCE COMPANY

THE PROBLEM

What dollar amount should the EZ Insurance Company carry in reserve for losses that are not yet paid?

There are two types of unpaid loss:

1. If a claim has been reported to the company and is not yet paid, then it has been assigned a value, either by a claims adjuster or by formula. The sum of these values is called the "case reserve".

2. If a claim has occurred but the company hasn't been notified, then its value is part of the IBNR (Incurred But Not Reported) reserve.

The actuary's job is to evaluate the loss experience and to estimate the total reserve, which will include:

1. any development in the case reserve (positive or negative).

2. IBNR.

DATA AVAILABLE

- earned premiums by calendar year.

- paid losses, sorted by accident year, and evaluated at yearly intervals.

- incurred losses (paid + case reserves), organized the same way.

- the number of reported claims with the same data organization.

- the number of closed claims with the same data organization.

- earned exposures by calendar year (1 exposure = 1 car insured for 1 year).

EZ INSURANCE COMPANY
AUTOMOBILE LIABILITY

CUMULATIVE PAID LOSSES
(in thousands of dollars)

Accident Year	Development Stage in Months 12	24	36	48	60	72	84	Final Total Cost
1983	3,361	5,991	7,341	8,259	8,916	9,408	9,759	?
1984	3,780	6,671	8,156	9,205	9,990	10,508		?
1985	4,212	7,541	9,351	10,639	11,536			?
1986	4,901	8,864	10,987	12,458				?
1987	5,708	10,268	12,699					?
1988	6,093	11,172						?
1989	6,962							?

This is a common loss development triangle.
- The losses are sorted by the year in which the accident occurred.
- The losses are reevaluated at the end of each year.

The data is organized this way to highlight historical patterns.
- Development goes across. Trends go down.

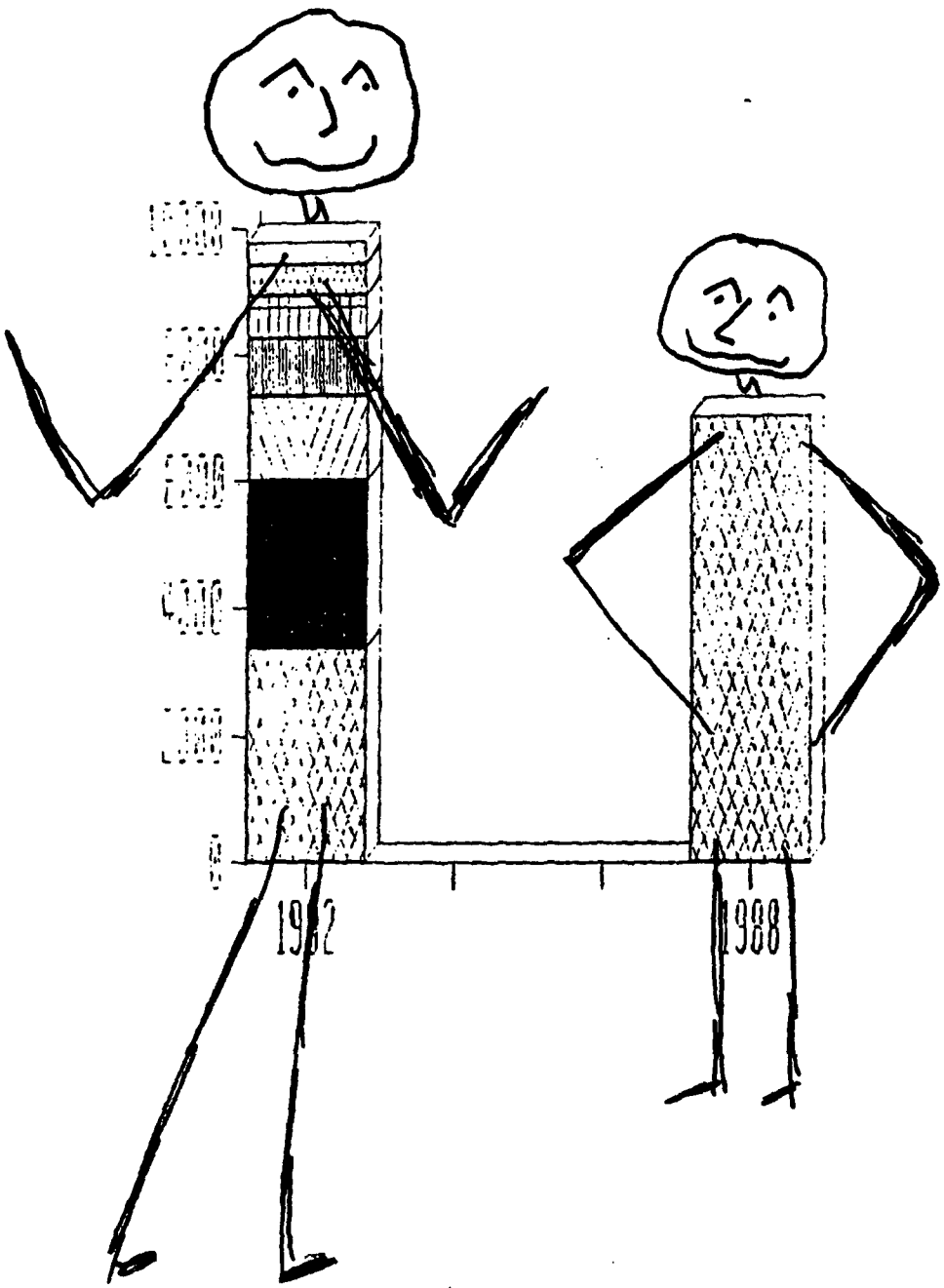
The goal is to estimate the total amount that will ultimately be paid.

The dollars shown above produce the factors shown below:

Accident Year	Loss Development Factors 12-24	24-36	36-48	48-60	60-72	72-84	Development To Ultimate
1983	1.783	1.225	1.125	1.080	1.055	1.037	?
1984	1.765	1.223	1.129	1.085	1.052		
1985	1.790	1.240	1.138	1.084			
1986	1.809	1.240	1.134				
1987	1.799	1.237					
1988	1.834						
1989							
All Year Average	1.796	1.233	1.131	1.083	1.054	1.037	

SAMPLE CALCULATION: 1.783 = 5991/3361

In the first to second year, paid losses grow about 80%. In the second to third year paid losses experience an additional 23% growth, and so forth.



YES INDEED! IF HE GROWS LIKE I DID, HE'LL BE QUITE A GUY.

EZ INSURANCE COMPANY
AUTOMOBILE LIABILITY

SELECTING PAID LOSS DEVELOPMENT FACTORS - AVERAGING METHODS

Accident Year	Paid Loss Development Factors					
	12-24	24-36	36-48	48-60	60-72	72-84
1983	1.783	1.225	1.125	1.080	1.055	1.037
1984	1.765	1.223	1.129	1.085	1.052	
1985	1.790	1.240	1.138	1.084		
1986	1.809	1.240	1.134			
1987	1.799	1.237				
1988	1.834					
1989						
AVERAGING METHODS:						
average	1.796	1.233	1.131	1.083	1.054	1.037
4 point average	1.808	1.235	1.131	-	-	-
avg w/o high/low	1.795	1.234	1.131	-	-	-
* weighted avg	1.812	1.237	1.134	-	-	-

For this sample, the loss development patterns are quite stable.

Issues to Consider:
Have there been any changes which might make the older years irrelvant?
Example: There are a lot of motorcycle losses in the oldest year.
EZ may no longer insure motorcycles.

Are the more current years a better predictor of the future?
Example: EZ may have begun writing a lot more business in State X in 1987.

Are there outlier points which need to be ignored?
Example: In one year there were bad ice storms at the end of December.
Late reporting caused unusually high development in the next year.

* Various weighting methods are possible.
In one method, the sum-of-the-digits, the earliest exposure period is assigned a weight of 1, the next exposure period has a weight of 2, etc. The method used here is a variation using the squared sum-of-the-digits.

Example	Year	Exposure Period	Squared	Weight
(12-24)	1983	1	1	1.10%
	1984	2	4	4.40%
	1985	3	9	9.89%
	1986	4	16	17.58%
	1987	5	25	27.47%
	1988	6	36	39.56%
	sum	21	91	100.00%

"No, on average I am **not** *comfortable, dammit!"*

Reprinted from the Actuarial Review.

SELECTING PAID LOSS DEVELOPMENT FACTORS - TRENDING METHODS

Any averaging method gives a projected value that falls within the range of historical values.

Trending methods fit a line through a set of data points and, in general, produce a projected value outside the historical range. Details on "least-squares" and other regression methods may be found in a basic statistics text.

Accident Year	Paid Loss Development Factors 12-24	24-36	36-48	48-60	60-72	72-84
1983	1.783	1.225	1.125	1.080	1.055	1.037
1984	1.765	1.223	1.129	1.085	1.052	
1985	1.790	1.240	1.138	1.084		
1986	1.809	1.240	1.134			
1987	1.799	1.237				
1988	1.834					
1989						
TRENDING METHODS:						
Linear Trend						
slope	0.011	0.004				
intercept	1.759	1.221				
r squared	0.730	0.580				
projected	1.834	1.245	-	-	-	-
Exponential Trend						
rate of change	0.6%	0.3%				
intercept	1.759	1.221				
r squared	0.729	0.580				
projected	1.834	1.245	-	-	-	-

These development factors don't show much trend as evidenced by the low R squared. If trend exists and is expected to continue, then this should be reflected in the choice of development factors. Check particularly for upward trend which indicates a progressively slower payout pattern.

EZ INSURANCE COMPANY
AUTOMOBILE LIABILITY

SELECTING PAID LOSS DEVELOPMENT FACTORS

Accident Year	....Paid Loss Development Factors..... 12-24	24-36	36-48	48-60	60-72	72-84	
1983	1.783	1.225	1.125	1.080	1.055	1.037	
1984	1.765	1.223	1.129	1.085	1.052		
1985	1.790	1.240	1.138	1.084			
1986	1.809	1.240	1.134				
1987	1.799	1.237					
1988	1.834						
1989							
AVERAGING METHODS:							
average	1.796	1.233	1.131	1.083	1.054	1.037	
4 point average	1.808	1.235	1.131	-	-	-	
avg w/o high/low	1.795	1.234	1.131	-	-	-	
weighted average	1.812	1.237	1.134	-	-	-	
TRENDING METHODS:							
Linear Trend							
slope	0.011	0.004					
intercept	1.759	1.221					
r squared	0.730	0.580					
projected	1.834	1.245	-	-	-	-	
Exponential Trend							
rate of change	0.006	0.003					
intercept	1.759	1.221					
r squared	0.729	0.580					
projected	1.834	1.245	-	-	-	-	
SELECTED LDF'S	1.812	1.237	1.134	1.083	1.054	1.037	1.055
AGE TO ULTIMATE	3.175	1.752	1.416	1.249	1.153	1.094	1.055

SELECTING THE "TAIL" FACTOR, i.e., the LDF from 84 months to ultimate

Tail factors are covered in Techniques III. Here we're going to assume that the current case incurred for the most developed year is the best estimate of ultimate paid loss developed:

incurred = ultimate = 10,292 ; paid = 9,759
tail factor = 10,292 / 9,759 = 1.055

Technique I
Exhibit 3

EZ INSURANCE COMPANY
AUTOMOBILE LIABILITY

ESTIMATING RESERVES USING PAID LOSS DEVELOPMENT

Accident Year	(1) Earned Premium (000)	(2) Paid to Date (000)	(3) Selected Factor	(4) Estimated Ultimate (2)*(3)	(5) Loss Ratio (4)/(1)	(6) Indicated Reserve (4)-(2)
1983	17,153	9,759	1.055	10,296	60%	537
1984	18,168	10,508	1.094	11,496	63%	988
1985	21,995	11,536	1.153	13,301	60%	1,765
1986	24,173	12,458	1.249	15,560	64%	3,102
1987	25,534	12,699	1.416	17,982	70%	5,283
1988	31,341	11,172	1.752	19,573	62%	8,401
1989	38,469	6,962	3.175	22,104	57%	15,142
	176,833	75,094		110,312		35,218

The mathematics here is straightforward.

The paid-to-date values come from the last diagonal in Exhibit 1. The selected LDF's come from Exhibit 2, page 3.

Your work should always be checked for reasonableness.

Looking at the loss ratios is part of this process.

You should particularly look at the current year - this is always a very important estimate. The loss development factor for this year is high, which means that there is a lot of uncertainty in this loss reserve estimate.

MAJOR ASSUMPTION of paid loss method: No Change in the Payout Pattern.

If there has been a significant change in the closure rate, the results for the paid loss method can be seriously distorted.

Technique I
Exhibit 4

EZ INSURANCE COMPANY
AUTOMOBILE LIABILITY

CUMULATIVE INCURRED LOSSES
(incurred losses=paid losses + reserves for reported claims)

Accident Year	Development Stage in Months 12	24	36	48	60	72	84	Final Total Cost
1983	8,382	9,781	10,110	10,219	10,268	10,280	10,292	?
1984	9,337	10,847	11,092	11,192	11,235	11,250		?
1985	10,540	12,205	12,551	12,690	12,725			?
1986	11,875	13,832	14,238	14,413				?
1987	13,343	15,542	16,066					?
1988	14,469	16,776						?
1989	16,561							?

PAID vs INCURRED DATA

Paid pro: Paid data is "hard" data - there are no estimates.

Paid con: For long tail lines, the paid ldf's for the most recent periods are large. Normal fluctuations in the paid dollars can produce unacceptable variations in the ultimate estimates. The longer the tail, the worse the problem.

Incurred pro: You're using all the information you have.

Incurred con: You're using estimates to derive estimates.

BASIC ASSUMPTION when using incurred data:

The methods & judgments used to establish individual case-basis reserves haven't changed during the experience period.

Note: There are techniques for testing for changes & for adjusting data. These are covered in the Intermediate sessions.

HOW SHOULD THE LOSS DATA BE STRUCTURED?

Gross or net of reinsurance recoveries?
If it's gross, you must estimate reinsurance recoverable on unpaid losses.
If it's net, you must adjust for changes in retentions.

Gross or net of salvage and subrogation?
If it's not significant, it probably doesn't matter.
If it's significant, separate analysis of the 2 components is preferable.

Technique I
Exhibit 5

EZ INSURANCE COMPANY
AUTOMOBILE LIABILITY

SELECTING INCURRED LOSS DEVELOPMENT FACTORS

Accident Year	.....Incurred Loss Development Factors..... 12-24	24-36	36-48	48-60	60-72	72-84	
1983	1.167	1.034	1.011	1.005	1.001	1.001	
1984	1.162	1.023	1.009	1.004	1.001		
1985	1.158	1.028	1.011	1.003			
1986	1.165	1.029	1.012				
1987	1.165	1.034					
1988	1.159						
1989							
AVERAGING METHODS:							
average	1.163	1.030	1.011	1.004	1.001	1.001	
4 point average	1.162	1.029	1.011	-	-	-	
avg w/o high/low	1.163	1.030	1.011	-	-	-	
* weighted avg	1.162	1.031	1.011	-	-	-	
TRENDING METHODS:							
Linear Trend							
slope	-0.001	0.001					
intercept	1.165	1.027					
r squared	0.107	0.057					
projected	1.160	1.032	-	-	-	-	
Exponential Trend							
rate of change	-0.1%	0.1%					
intercept	1.165	1.027					
r squared	0.106	0.057					
projected	1.160	1.032	-	-	-	-	
SELECTED LDF'S	1.162	1.029	1.011	1.004	1.001	1.001	1.000
CUMULATIVE LDF'S	1.215	1.046	1.017	1.006	1.002	1.001	1.000

Technique I
Exhibit 6

EZ INSURANCE COMPANY
AUTOMOBILE LIABILITY

RESERVE ESTIMATE BASED ON INCURRED LOSS DEVELOPMENT

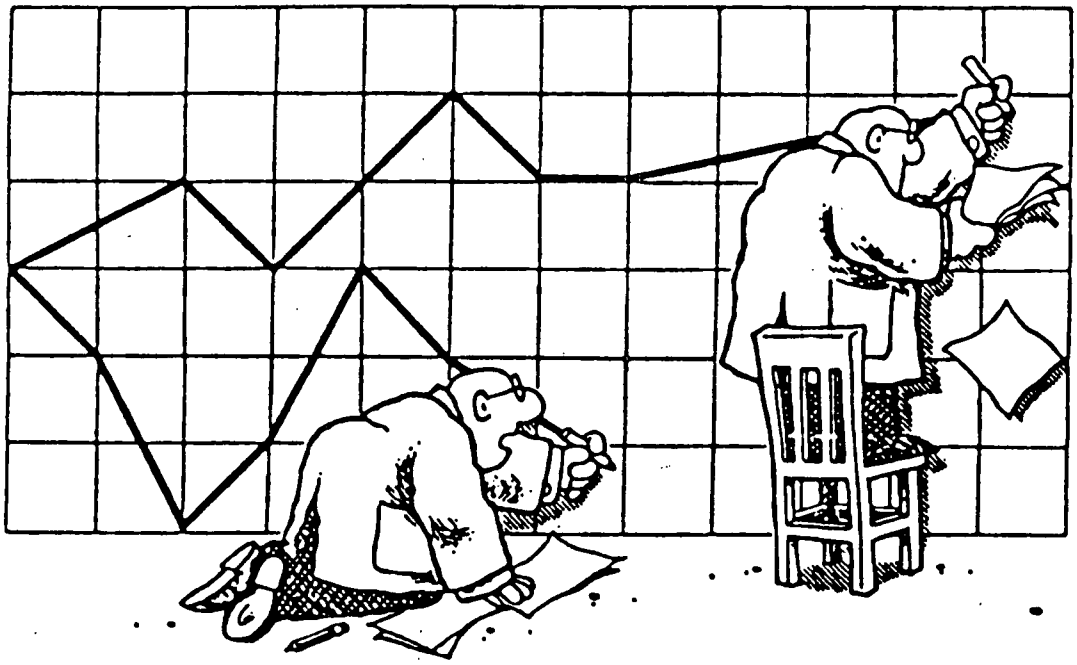
Accident Year	(1) Earned Premium	(2) Incurred to Date	(3) Selected Factor	(4) Estimated Ultimate (2)*(3)	(5) Loss Ratio (4)/(1)	(6) Indicated Reserve (4)-Paid
1983	17,153	10,292	1.000	10,292	60%	533
1984	18,168	11,250	1.001	11,261	62%	753
1985	21,995	12,725	1.002	12,750	58%	1,214
1986	24,173	14,413	1.006	14,499	60%	2,041
1987	25,534	16,066	1.017	16,339	64%	3,640
1988	31,341	16,776	1.046	17,548	56%	6,376
1989	38,469	16,561	1.215	20,122	52%	13,160
	176,833	98,083		102,812	58%	27,718

RESERVE ESTIMATE BASED ON PAID LOSS DEVELOPMENT

Accident Year	(1) Earned Premium	(2) Paid to Date	(3) Selected Factor	(4) Estimated Ultimate (2)*(3)	(5) Loss Ratio (4)/(1)	(6) Indicated Reserve (4)-(2)
1983	17,153	9,759	1.055	10,296	60%	537
1984	18,168	10,508	1.094	11,496	63%	988
1985	21,995	11,536	1.153	13,301	60%	1,765
1986	24,173	12,458	1.249	15,560	64%	3,102
1987	25,534	12,699	1.416	17,982	70%	5,283
1988	31,341	11,172	1.752	19,573	62%	8,401
1989	38,469	6,962	3.175	22,104	57%	15,142
	176,833	75,094		110,312	62%	35,218

A COMPARISON OF PAID VS INCURRED

Accident Year	....LOSS RATIOS.... Paid	Incurred	.....RESERVES..... Paid	Incurred
1983	60%	60%	537	533
1984	63%	62%	988	753
1985	60%	58%	1,765	1,214
1986	64%	60%	3,102	2,041
1987	70%	64%	5,283	3,640
1988	62%	56%	8,401	6,376
1989	57%	52%	15,142	13,160
			35,218	27,718



"HEY, I THOUGHT WE WERE WORKING WITH THE SAME DATA..."

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*

"Our research actuary's onto something this time — he's been plotting reserves against the claim manager's Biorhythm chart."

Reprinted from the Actuarial Review.

AVERAGE VALUE PROJECTIONS

VS.

DEVELOPMENT ESTIMATES

Development Projections -

Focus only on total dollars of losses, either paid or incurred

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
often referred to as Frequency/Severity Estimates

Techniques I
Exhibit 7

EZ INSURANCE COMPANY
AUTOMOBILE LIABILITY

CUMULATIVE REPORTED CLAIMS

Accident Year	Development Stage in Months 12	24	36	48	60	72	84	Final Claim Count
1983	1,432	2,724	2,800	2,832	2,844	2,858	2,858	?
1984	1,428	2,772	2,850	2,866	2,870	2,888		?
1985	1,710	3,032	3,086	3,094	3,110			?
1986	1,358	2,780	2,990	3,000				?
1987	1,210	2,518	2,656					?
1988	1,488	2,604						?
1989	1,604							?

Accident Year	Reported Claim Development Factors 12-24	24-36	36-48	48-60	60-72	72-84
1983	1.902	1.028	1.011	1.004	1.005	1.000
1984	1.941	1.028	1.006	1.001	1.006	
1985	1.773	1.018	1.003	1.005		
1986	2.047	1.076	1.003			
1987	2.081	1.055				
1988	1.750					
1989						

AVERAGING METHODS:

average	1.916	1.041	1.006	1.004	1.006	1.000
4 point average	1.913	1.044	1.006	-	-	-
avg w/o high/low	1.916	1.037	1.004	-	-	-
weighted average	1.906	1.052	1.004	-	-	-

TRENDING METHODS:

Linear Trend							
slope	-0.002	0.010					
intercept	1.923	1.010					
r squared	0.001	0.454					
projected	1.909	1.071	-	-	-	-	
Exponential Trend							
rate of change	-0.2%	1.0%					
intercept	1.924	1.011					
r squared	0.002	0.454					
projected	1.909	1.071	-	-	-	-	
SELECTED CDF'S	1.913	1.044	1.006	1.004	1.006	1.000	1.000
AGE TO ULTIMATE	2.030	1.061	1.016	1.010	1.006	1.000	1.000

EZ INSURANCE COMPANY
AUTOMOBILE LIABILITY

CUMULATIVE PAID SEVERITIES
(cumulative paid loss / number of closed claims)

Accident Year	Development Stage in Months 12	24	36	48	60	72	84	Ult Claim Cost
1983	5,108	2,663	2,840	3,074	3,248	3,358	3,456	?
1984	4,576	3,130	3,187	3,402	3,574	3,693		?
1985	5,386	3,267	3,415	3,598	3,784			?
1986	6,283	4,130	4,123	4,399				?
1987	6,225	5,186	5,363					?
1988	6,688	5,648						?
1989	6,295							?

Accident Year	Severity Development Factors 12-24	24-36	36-48	48-60	60-72	72-84
1983	0.521	1.067	1.082	1.057	1.034	1.029
1984	0.684	1.018	1.067	1.051	1.033	
1985	0.607	1.045	1.053	1.052		
1986	0.657	0.998	1.067			
1987	0.833	1.034				
1988	0.844					
1989						

AVERAGING METHODS:

average	0.691	1.032	1.068	1.053	1.034	1.029
4 point average	0.735	1.024	1.068	-	-	-
avg w/o high/low	0.695	1.033	1.067	-	-	-
weighted average	0.774	1.025	1.063	-	-	-

TRENDING METHODS:

Linear Trend						
slope	0.060	-0.008				
intercept	0.480	1.058				
r squared	0.790	0.265				
projected	0.903	1.007	-	-	-	-
Exponential Trend						
rate of change	9.2%	-0.8%				
intercept	0.501	1.058				
r squared	0.785	0.261				
projected	0.903	1.007	-	-	-	-

SELECTED SDF'S	0.735	1.024	1.068	1.053	1.034	1.029	1.055
AGE TO ULTIMATE	0.950	1.293	1.263	1.183	1.123	1.086	1.055

Techniques I
Exhibit 9

EZ INSURANCE COMPANY
AUTOMOBILE LIABILITY

ESTIMATING ULTIMATE COUNTS AND AVERAGES

Accident Year	(1) Claims Reported to Date	(2) Selected Factor	(3) Est Ult Count (1)*(2)	(4) Avg Paid Cost to Date	(5) Selected Factor	(6) Est Ult Avg Sev (4)*(5)
1983	2,858	1.000	2,858	3,456	1.055	3,646
1984	2,888	1.000	2,888	3,693	1.086	4,011
1985	3,110	1.006	3,129	3,784	1.123	4,249
1986	3,000	1.010	3,030	4,399	1.183	5,204
1987	2,656	1.016	2,698	5,363	1.263	6,773
1988	2,604	1.061	2,763	5,648	1.293	7,303
1989	1,604	2.030	3,256	6,295	0.950	5,980
	18,720		20,622	32,637		37,166

RESERVE ESTIMATE BASED ON COUNTS AND AVERAGES

Accident Year	(7) Earned Premium (000)	(8) Estimated Ult Loss (000) (3)*(6)	(9) Loss Ratio	(10) Paid to Date (000)	(11) Indicated Reserve (000) (8)-(10)
1983	17,153	10,420	61%	9,759	661
1984	18,168	11,584	64%	10,508	1,076
1985	21,995	13,293	60%	11,536	1,757
1986	24,173	15,768	65%	12,458	3,310
1987	25,534	18,277	72%	12,699	5,578
1988	31,341	20,177	64%	11,172	9,005
1989	38,469	19,472	51%	6,962	12,510
	176,833	108,992	62%	75,094	33,898

EZ INSURANCE COMPANY
AUTOMOBILE LIABILITY

A COMPARISON OF RESERVES ESTIMATES
USING THREE METHODS

Accident Year	....Estimated Ultimate Loss Ratios.... Paid Development	Incurred Development	Counts & Averages
1983	60%	60%	61%
1984	63%	62%	64%
1985	60%	58%	60%
1986	64%	60%	65%
1987	70%	64%	72%
1988	62%	56%	64%
1989	57%	52%	51%
	62%	58%	62%

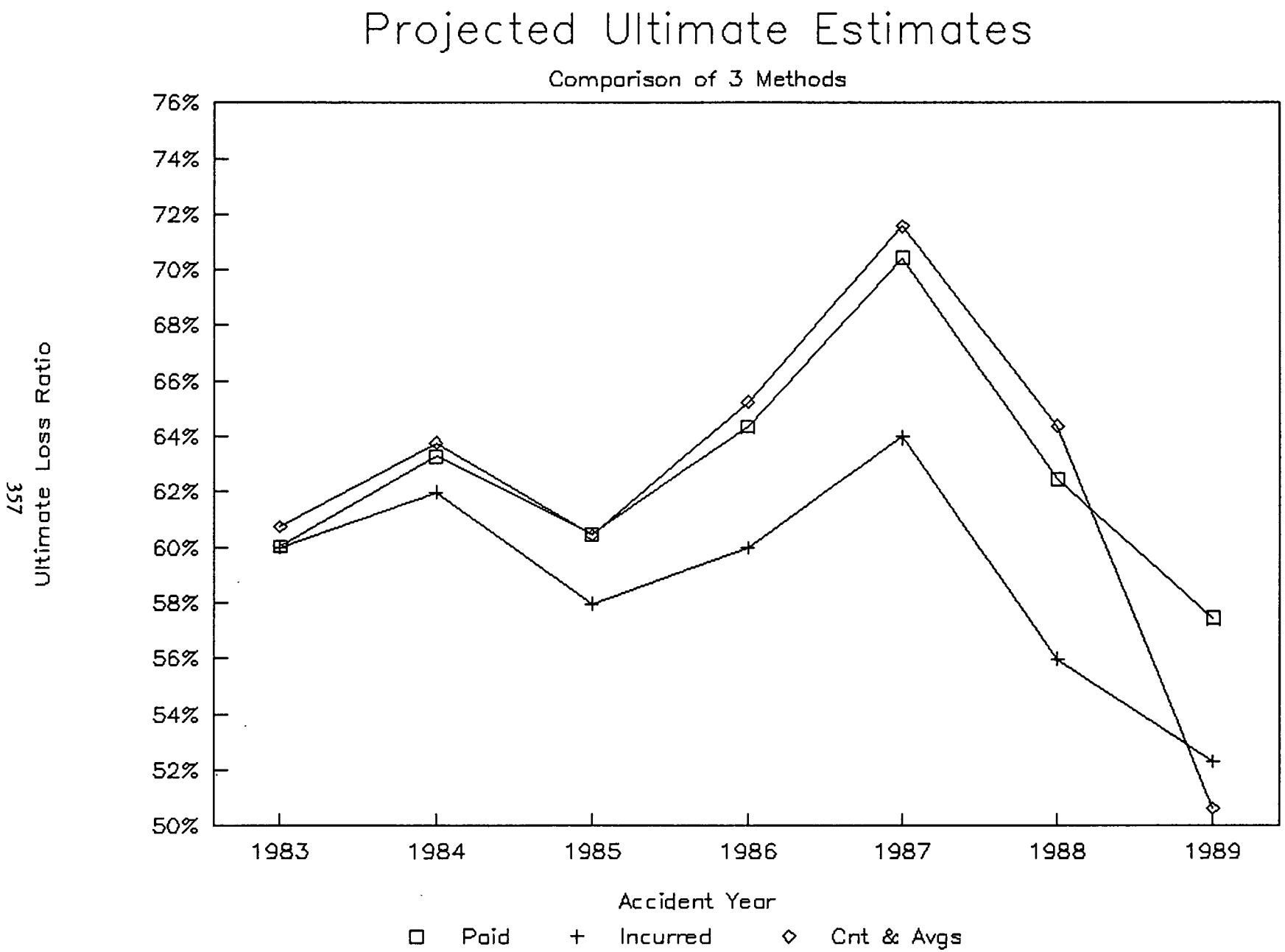
Accident Year	....Estimated Required Reserves.... Paid Development	Incurred Development	Counts & Averages
1983	537	533	661
1984	988	753	1,076
1985	1,765	1,214	1,757
1986	3,102	2,041	3,310
1987	5,283	3,640	5,578
1988	8,401	6,376	9,005
1989	15,142	13,160	12,510
	35,218	27,718	33,898

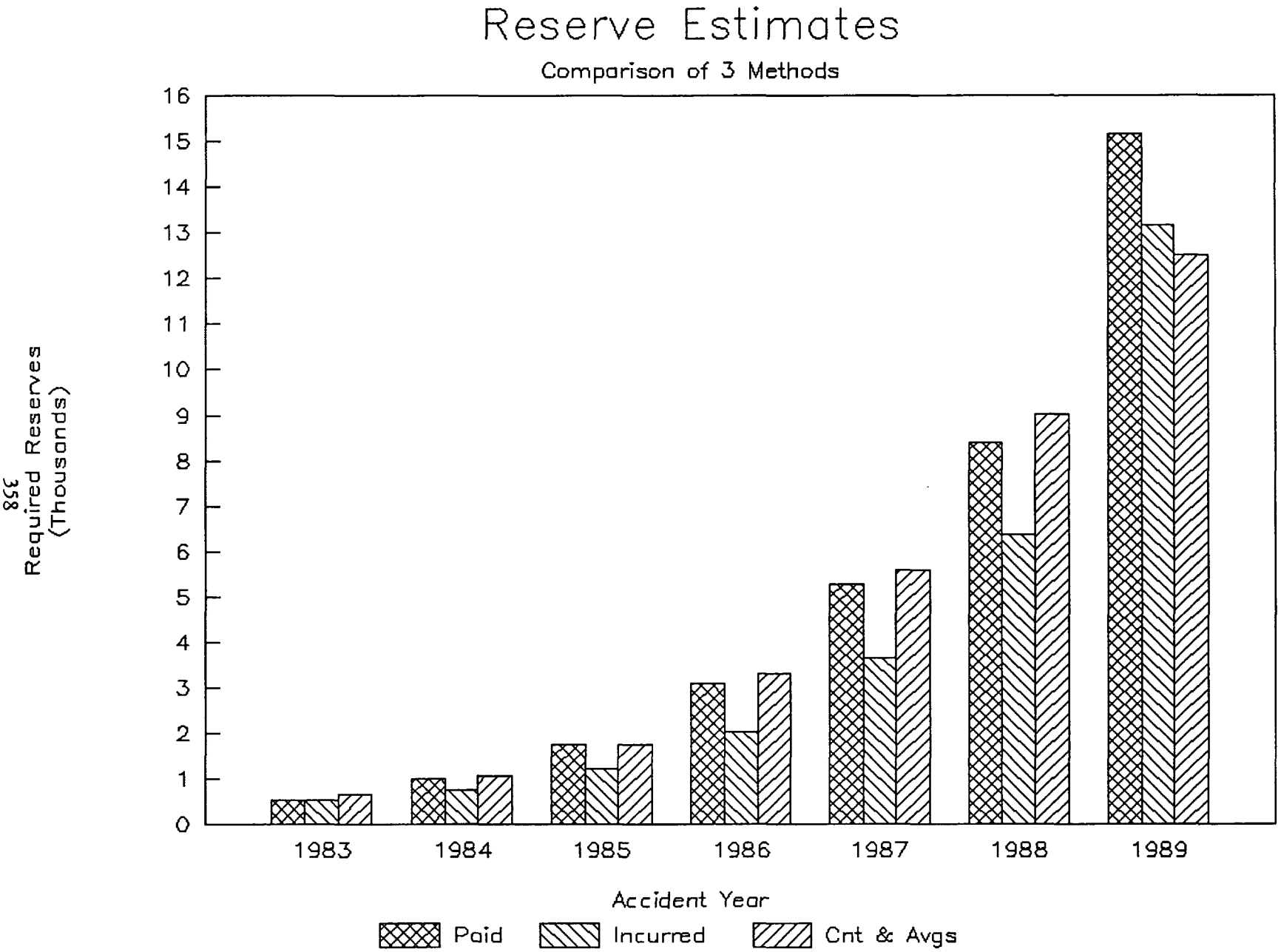
The Paid Loss Development method and the Counts and Averages method will produce similar results when

- the claim reporting pattern is relatively stable, and
- the claim closure pattern is relatively stable.

The Counts and Averages method will implicitly recognize the effect of a change in the closure rate. Paid Loss Development does not. With this Counts and Averages method you're using 3 pieces of information: reported claims, closed claims, & paid losses.

Using a Counts & Averages method based on REPORTED claims & REPORTED losses essentially replicates the incurred development method. Any change in reporting patterns is offset by changes in severity.


Projected Ultimate Estimates
Comparison of 3 Methods
Ultimate Loss Ratio
76%
74%
72%
70%
68%
66%
64%
62%
60%
58%
56%
54%
52%
50%
1983
1984
1985
1986
1987
1988
1989
Accident Year
Paid
Incurred
Cnt & Avgs


Reserve Estimates
Comparison of 3 Methods
Required Reserves
(Thousands)
0
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
1983
1984
1985
1986
1987
1988
1989
Accident Year
Paid
Incurred
Cnt & Avgs

1990 CASUALTY LOSS RESERVE SEMINAR

2C/4D: INTERMEDIATE TECHNIQUES II

Moderator

William R. Van Ark
The Wyatt Company

Panel

Anne Greenwalt
Nationwide Insurance Company

MR. VAN ARK: This session is Session 2C, Intermediate Techniques II. My name is Bill Van Ark. I'm a consulting actuary with The Wyatt Company. I've been in this business about fifteen years and most of it working in reserves one way or another.

My co-panelist is not Marvin Johnson, the name on the front of your handouts. Her name is Anne Greenwalt. She's been in the business about twelve years, most of it with Nationwide and about six years of it in reserving.

There was a stack of handouts in the back in the end chair. I hope most of you got one as you came in.

This session is being recorded so partly to make sure we get it all done --- both of us are new to this session and we are a little uncertain about the pacing of it --- We are going to ask you to hold any substantial questions you have until the end of the session and then we will see how much time we have for them. When the time for questions does come, we'll ask you to step to one of the microphones in the center aisle and speak distinctly and project so that your voice can be recorded on the tape for posterity.

The opinions you are about to hear are ours and not necessarily those of the CAS or the Academy. You, of course, have a session evaluation form in your folder. We'll ask you to fill them out during or immediately after the session and leave them in a pile on the chair at the back or hand them in at the registration desk later on.

Continuing education credit: one of those big long string of tickets you've got should say Session 2 on it. If continuing education credit is of concern to you, write C next to the 2, put your name on it, and hand that in also at the end of the session or during the session, whatever. At the back, please, not up front.

Intermediate Techniques II is basically a continuation of what was available in Intermediate Techniques I, for those of you who attended it. We've got a half a dozen techniques. There is no particular common thread in what you are about to hear. It is six techniques that may be of use to you in your work, if you do reserving, to tackle different problems.

The slides you are about to see are simplistic. They are constructed to make a point, so the data is clean and beautiful and shows nice progressions often. Very unlike what you will see when you actually try to set reserves, but we hope that still the underlying points will be helpful to you. Can we have the first slide?

(Slide 1-1)

The first topic that we have to talk about is on segmenting or dividing up your data. The basic principle that all reservers wish we always could fully reach with our data ... it should all have a long, stable history. The data should be homogenous, which to actuaries or statisticians, means you should not be able to divide it up in any way that gives meaningful results differ from what the total gives. And you want a sufficient number of claims that you'll get credible loss reserve patterns that you can use to project the future. One way or another, people doing reserving are always trying to reach from the past into the future. Homogeneity, in particular, means you don't want to do an analysis on data that has both apples and oranges in it. You want to look at your apples in one study and your oranges separately, if you have sufficient claims to have stable and credible patterns.

(Slide 1-2)

You rarely have everything that you wish, as stated in that basic principle. You'll find you have to compromise often. Conditions will change so you'll lose some stability and you are left with another basic problem of actuarial work. You can use lots of data, long term averages, which will give you nice stable results. Or use the absolute latest data you have, which will be responsive to changes and conditions if things really are changing. Of course, your data may not be very credible. You may not have enough data, enough claim data, and it may not be homogenous. Your problem is to keep your work responsive enough to keep up with the real world and stable enough to stay off a roller coaster. There is nothing that will ruin your credibility faster with your publics than to punch your numbers up high one year because you think you see a reason to, and then wind up dropping them a year or two later, let alone do that repeatedly. Next slide.

(Slide 1-3)

As I said, this data is very unreal, very unlike what you will see in the real world. I suppose this is as good a time as any to mention that our slides were prepared by two different people and so on this slide you see that for each accident year the data runs from left to right. On the slides that Anne is going to show you you're going to see the data running from top to bottom. So that will be your challenge for the morning, to keep that straight.

In this particular pattern, you think, wow, what nice, stable, credible data we have here. Nothing appearing to change. Each accident year in succession has claims of 2 million known at 12 months (or paid at 12 months) and 4 million at 24 months and 5 million at 36 months, which, by the way, we are assuming is final. All claims close at that point.

For 1987, all other things being equal, you'll assume that you are going to have 4 million paid through 24 months and 5 million at 36 months. You don't see things like this in the real world, but it's nice to dream. Next slide.

(Slide 1-4)

Now we've shown a possible segmenting of the data for the example company for those first three years. Suppose that they are really writing two very different lines of business. Subset A in the first line of business comes in relatively fast, 1.5 million at 12 months and 1.8 million at 24 months and 2 million at 36 months. Subset B is a much slower payout line, though still getting it all done by 36 months. Starting with only a half a million, then 2.2 million at 24 months and 3 million at 36. The totals are still what we saw on the first exhibit, 2, 4 and 5.

This is two homogenous subsets, we are assuming, and for the first three years in the data, the mix was stable. You've got the same amount of each line each year. The point of this example, of course, is that you have to look to subdivide your data to break out pieces that are going to develop differently. You can combine distinct data if the development is similar. You don't want to combine it if it is going to be radically different. Next slide, please.

(Slide 1-5)

Some subsets you might want to consider. The one obvious one is territories, if you are dealing in automobile insurance. We'll give you one example. Suppose you are a regional company and you've got about half your business in your home state and the rest scattered around. If your home state has development much different from the average, you are going to want to treat that separate. The volume of data you've got may force you to combine the rest, but you certainly want to break out that one large piece and see if it's different.

Sublines, bodily injury and property damage. If you've got the data you want to look at them separately. Certainly liability and physical damage...still talking about automobile. Urban and rural, fault versus no fault. Finally, if you write both, primary lines versus excess lines. Any of these, anywhere from might to will give you different development patterns. If you've got sufficient data you want to do your developing separately. Obviously, the bigger your company the more useful subsets you can hope to get and the more ways you can slice up your data.

Now we're supposing that there is a big change in 1987 for our example company. Instead of 75% of the business set in line A, we are going to 75% in B. That kind of move is drastic and rare, but you will see this kind of problem. For an example, a small specialty company that has been operating in one line, say substandard auto, decides it wants to write pollution liability

and writes a bunch of it because their rates are good and low. That company had better break out their data when it comes time to developing their losses. Next slide, please.

(Slide 1-6)

If you are not segmenting your data, for our example company you will assume that the past pattern repeats, even though the mix has changed and you will get the same projected ultimate losses for 1987 of 5 million dollars. If on the other hand you segment and develop using the same historical ratios, you are going to get projected ultimate losses of 9.7 million. That's quite a movement. Again, this is a drastic example to make the point, but this type of problem is normal in actuarial work.

Another example for you. Suppose you've got a claims manager in a moderate sized company that has been responsible for some claims, about 5% of your total losses. He is very conservative. He likes conservative reserving. Get those claims on the book quick. Open a claim file in every incident. Completely unlike everybody else that you've got, but then he's promoted. Now he's a regional claims vice president and he is responsible for half the country. As his philosophy permeates through his new areas of responsibility you are going to have to make some adjustments. Next slide, please.

(Slide 1-7)

So the next principle is to search for subdivisions related to possible causes of different loss development. You can't always guess which subdivisions will be meaningful --- which ones will have significantly different loss development. You can only form a conjecture. Try to split out your data. Test the conjecture. Sometimes you'll be more successful than others in getting your data split out. Next slide.

(Slide 1-8)

Again, some suggestions, some possible subdivisions you might want to consider. We mentioned geographic and territory, and the example of the company that had 50% of business in one state, perhaps New York or New Jersey, where the development is just not going to be like other states.

Production, particularly MGA, Managing General Agent. They have some control over claim adjusting, and the way claims develop for a part of your business in an MGA may be significantly different from the part of business where you are adjusting the claims directly.

We mentioned by subline.

Legal environment. Every now and then a state decides, not very many lately, that they want to go to no fault. If they do that,

their development isn't going to be like what it was when they were a fault state. You may want to look at development of other no fault states as a resource.

Deductibles, particularly high ones. The tiny deductibles aren't going to change your development factors much, but the high ones will. Some claims will come in much later, because there was an assumption that they were not going to break the deductible by the client, by someone. You'll find that they have different development factors.

For reinsurers the deductible point comes back in spades. They are going to have different development at different levels of attachment, because if you've got a working layer, $250,000 or $500,000 it will be broken once in awhile. That's a different problem than if you're talking about high liability excess, 25 million and up. Very slow development at those high levels.

Production. Again, if you are working through MGAs for part of your business, the development may be different.

Sublines. Reinsurers don't have the data that primary companies typically have, but still you want to at least break out property and liability. Ideally you'll try to break out auto versus general liability versus workers compensation versus medical malpractice. And you'll do whatever your data can support trying to improve your analysis. Next slide, please.

(Slide 1-9)

How do you decide? Well, one tip is to get out of the actuarial department and away from your numbers. Go talk to the underwriters. Mostly, they are making phone calls every day all around the country. They have ideas as to what is going on, changes they see, new forms they are being asked to write.

Agents. Agents are particularly good on local conditions. They may not know what's going on in the next state, but they generally know what's going on in theirs. They are closer than anybody else. If you can't talk to them directly, ask your marketing or underwriting people to.

Your claims staff. What are they doing differently? Did the new VP just tell them to adjust claims differently then what they have in the past. Or perhaps a different type of claim is coming in, and they never used to see cumulative trauma claims and now they're getting a zillion of them.

How about actuaries? You come to a place like this, where we've got those nice long refreshment breaks. Button-hole somebody. Ask if they've ever tried to break out urban versus rural data in their personal auto? Maybe you'll get a useful answer.

Read the trade press, for legal changes in particular.

The next few topics will be discussed by Anne.

MS. GREENWALT: I have three topics this morning that I'm going to cover. The first one is changes in loss patterns, how to detect some of them and how to adjust for some of them. The second topic is reinsurance and excess loss data. We're going to look at some development patterns with respect to those. And the third topic is tail factors.

I think the central theme this morning, as Bill has mentioned earlier, is that the issues are all database related. We really need to be very careful in looking for changes and in assessing causes of those changes and adjusting the data for those. Now, you may not always have control over those databases. They may be very sparse. It may be very expensive to refine those databases to look for some of the divisions that Bill mentioned, both in terms of time and cost to your company or client. But it is very important to look for those things. So we need to look at how we are going to detect some of these changes and some of the techniques we are going to use to overcome them.

(Slide 2-1)

Now the first slide here is the same basic slide Bill had and as he mentioned, it is rotated. So now we have the accident years running across the top of the column with months of development coming down. And months of development, as you know probably from your earlier sessions or the basic session, are counted from the beginning of the year. So we have 1984 as of 12 months with 2 million dollars of paid losses. As of 24 months it has 4 million dollars of loss. As of 36 months it has 5 million. Now this is, as we have discussed before, a very simplistic example, a no growth situation. Nothing is changing. We're going to use this as a basic pattern and see what happens when it doesn't hold, but obviously we never see this in our work or they wouldn't need actuaries and we'd all be out of a job. Next slide.

(Slide 2-2)

This is the first slide that demonstrates some changes. We're following the pattern of 2 million dollars in paid losses every year across to 1987. We used to have 2, now all of a sudden we have 1.5 million. There has been a drop in the loss level for some reason. You are losing business or from Bill's earlier example, there's been a change in mix. You've got more smaller claims. Maybe if you are working with an auto combined triangle, you've got property and liability together. And now you've got more property, more of the smaller claims. Again, we caution you about appraising those together, but you may not have any choice.

Similarly, the 24 month development on this triangle had always increased by a factor of 2. Four million dollars all the way across until 1986, but it only went up to 3.5 million. Clearly a

signal that something has changed. There is some kind of distortion in the development. And this occurs probably as opposed to a mix or a coverage type issue, because if we'd had a coverage type issue chances are 1986 would have started out different also. If you had a change in your mix between the liability and the property, it probably would have started out right away in the first 12 months. So what we need to do, we need to investigate what's happened. Why we are having this change in settlement or payment patterns? Remember we are dealing with paid losses here. And we need to confirm it and figure out how we're going to deal with it. And the next slide shows an approach we might take.

(Slide 2-4)

This slide shows a simple example of closed claims as a percentage of claims reported. Now we are talking about claim counts, as opposed to dollars. We're going to look at the counts and see what we can figure out about what's going on. This is something that actuaries do a lot. We're given this data as it is reported and we are asked to explain it. We're asked to adjust for it. And we have to identify what is going on and try to make these adjustments.

Now, the ratio we have here is of closed as a percent of reported. Your reported is going to be the number paid plus the number open. You probably covered that in an earlier session. And these could or could not include --- you need to know what's in your database --- CWPs, closed without payments. And that is important to know, because, say, for example, your home office decides to do a reserve reconciliation or an audit out in one of your regions. They go out and they review files and they close without payment a lot of files. They do a clean-up. That could distort these ratios. And you need to understand. Talk to your claims people and find out what's going on and why.

Now in this triangle you can see we've had 50% of the claims were closed, usually, as of 12 months. Now in 1987, this is the year we're beginning to see some problems, that has dropped to only 40% closed. At 24 months we traditionally have had 90% of the claims closed. In 1986, for the first time, we now only have 80% closed. So if you follow a business as usual type approach and just project your paid losses to ultimate, there is a good chance that you are going to run into some trouble, because something is changing and the future doesn't look like it is going to be the same as the past. Next slide.

(Slide 2-4)

Now this slide lines up for you the prior two slides. It is showing you the paid losses lined up with the percent closed, so you can see that the changes in the closing patterns are occurring at the same point as when you are picking up some changes in your paid loss patterns. Now we need to decide if

this percent of claims closed that is changing is either an inherent change in your data versus a one time change. Is it something that's going to continue, and this is the future and how you should project? Or is it a one time abnormal situation, that you can basically back out of the data and project as usual?

You probably know reading these triangles, you are reading a calendar year on the diagonal. For instance, 1986 at 12 months is activity during 1986. At 24 months it is activity during 1987. And for 1987 that 12 month number is activity during 1987. So you can see the changes that we're picking up in 1986 and 1987 are both occurring in the calendar year 1987. So it's something going on during 1987. Has there been a change in management? Possibility. There could be some sort of short term slow down in your claims department. Possibly a backlog. One thing we see more often than we would like, is maybe a new system is going in and there are data processing problems. There's a backlog. There's some training start-up. So there's been a slow down when they've implemented this new system and things and people are getting converted over.

So really there are a whole variety of causes and we really have a two part problem here. Our first assignment as the actuary is to give management a good estimate of the 1986 and 1987 ultimate losses. They want to know what are we going to have to pay out on these two accident years. So we have to project those to ultimate.

The second part of the problem is, in the future, this will become part of your history. So if you can document right now what has happened in these payment patterns, your job will be a lot easier in a couple of years when you look back at this and think, was this something typical? Do I need to adjust for it? Does the recent development do a better job? Is it more typical? Or does the prior development a better predictor? So, you have two things going on here. You need to project the current years to ultimate plus you need to document for yourself when this becomes the "history." Next slide.

(Slide 2-5)

This shows a technique to adjust if you have the data. This slide is fairly busy. What it shows is 12, 24 and 36 month rows are still the same, but we have the ability in this company to look at quarterly data. We have a 9 month row, and we have a 21 month row. So we have quarterly data available to look at and quarterly data can be very helpful. It can be more responsive to changes. You don't have to wait until the end of the year. You can see things are starting to happen this quarter and begin to do your research and find out why. On a personal lines book of auto business or a property book, this can be very useful. You may have some lines of insurance and if any of you are working for reinsurance companies, quarterly data may not be any help. In fact, you may not even get much development on an annual basis

much less a quarterly basis. But, of course, in this example it is constructed to work for us very nicely.

We can see at 9 months, in 1985 we had 40% of the claims closed, reading across that top line. At 9 months for 1986 we had 40% closed. But in 1987 it took us 12 months to get that 40% closed. Likewise, on the 21 month line, we had 80% closed for 1985, but it took us 24 months to get 80% closed in 1986. So what we can see is that there has been a slow down and there is exactly a three month lag in the most recent development for 1986 and 1987 over the prior years.

So the solution that occurs to us is to apply the 9 month to ultimate ratio to the 12 month data and the 21 month to ultimate ratio to the 24 month data. If we don't do this there really, truly is a slow down, you are going to understate your ultimates. The link factors are going to be larger for the 3 month earlier point. So you'll project your ultimates higher and compensate for the slowdown.

(Slide 2-6)

Now we know how to make adjustments. We just saw that. We have the lag and we can use the proper factors, but how do we detect changes in the payment patterns. One possible thing we could do is to look at the most recent two to three accident years. You would probably want to do this for, say, a property coverage. Because on property coverages most of the development will occur in the first 36 months. So you could focus here and look for the change and then go on to look at the other lines handled by the same claims staff. Because if there is actually a change in your claims procedures it is most likely going to affect all the lines, not just one. They are not going to slow things down in one line in particular. You've had an actual change in how they're processing and settling and investigating some of these claims.

The other thing, sort of keying off what Bill had mentioned earlier, is talk to some other people. Ask the claims staff about changes in opening and closing practices. They're the ones out there on the front line every day, adjusting and settling these claims and quite often they have a pretty good idea if things are changing in their regions. You may have that more aggressive claims manager. You might have changes in coverages. U.M., for example, they might be selling more U.M.P.D., so if you picked out a subset of U.M., you might be getting more property claims than liability. They may have a very good feel on what's going on. So talk to your claims staff in-house and talk to the region to those claims staff too.

(Slide 2-7)

Now the next slide moves on to the incurred losses. We've been talking about paid, and now we're going to talk about incurred.

Incurreds are both the paid plus the reserves. And you may have case reserves. You may have average reserves in your company. You may have some formula reserves. But in any case, it is the paid plus the reserves.

Now, if you look across the top line we've had a nice smooth 10% increase every year in our incurred losses. At the beginning of the 24 month line, we've had the same thing. Now, you see the last number in 1987 has actually declined from 3.6 million to 3.3 million and at 24 months, likewise, 1985 to 1986 we've actually seen a drop in our incurred losses. So this would suggest unless we know we're running off a lot of business, that some kind of change is occuring.

Now when you look at incurred losses it can be fairly complicated to detect a change, because, as I said, it's both the paid and the pending. And you could have changes in payment patterns underlying this change in the data. So the first thing you would want to do is look at your paid triangle and confirm that this was not the case. And once you can eliminate that, you can focus back on the incurred. You may ask, well, if incurred is more complicated because you've got both changes in payments going on and reserve changes going on, why do we even look at it? But in some lines you may not even have any paid loss information for quite a long time. Incurred gives us a lot more information sooner. If your claims department is doing a good job of getting the claims recorded very promptly and getting those case reserves set up, you are going to have a good bit of information.

So now we need to go to the next slide and look for causes of this change.

(Slide 2-8)

This slide shows the average reserve per open claim. Like Bill's example, claims are all paid at 36 months, so the reserve drops to zero. You can see the average reserve at 1984 was $1,000. It grew to $2,000. Claims are all paid at 36 months so there are no reserves.

We typically see this increase in average reserve over time, because the smaller claims are easier to settle, and they close early. The larger, longer tailed ones are often involved in litigation and take longer. So the average reserve does grow over time.

Now if we look at this pattern, something has happened dramatically. The average reserve is cut in half in 1987 versus where it stood at the end of 1986. The same thing happens at 24 months for 1986. The average reserve has actually declined to $1,200 from $1,210 as of 12 months.

Now something is definitely going on that is causing your adjusters to set a different level of reserves. If you really

saw data like this, this should be a major cause for alarm. It is unlikely that you would see this much change this quickly, but as I said, these examples are constructed to illustrate a point and not necessarily to reflect the experience that you would see every day.

(Slide 2-9)

So we need to adjust for this change in average reserve. What we've done, assuming we've done our homework with the claims department and we've become convinced that the level of claims in 1987 is properly reserved versus the past, which implies from the prior slide that we were grossly over reserved in the past, we need to adjust for that. So the footnote gives the details.

We take the paid losses of 2 million dollars. We're going to talk about how we get the 2.5. It was 3.0 in our original triangle. We take our paid losses for 1984 at 12 months, which were 2 million dollars and we want to restate the corresponding reserve. We want to reconstruct this triangle of incurred losses, and you would have to do it for every point...we're just going to illustrate one...so that all these pending reserves have the same level of adequacy. We know from the prior slide that $666 for 12 months at 1987...we've become convinced that is proper. We have the 10% inflation underlying this example, so we need to deflate that 666 back 3 years so it would drop 605, 550, 500 by the time you got back to 1984, deflating it back over those years. We now think that the proper reserve should have been $500 for accident year 1984 at 12 months.

In fact, it was $1,000 back on one of your prior slides. So the footnote shows the ratio of the $500 average to the $1,000 is one half. The original reserve was a million dollars, so we cut that in half to half a million, add it back to the paid losses and we've reconstructed the triangle to get 2.5 million of incurred losses. And that's the number we're going to use to construct our patterns and project the ultimate losses.

You could also do this by saying, I know the average reserve is $500. If you have claim counts you can multiply by claim counts. There are a couple of different ways to get at it, but the key is deciding what you think that average reserve should be and taking it back to the level that is appropriate for that year. You are restating the reserves. The payments don't change. You combine them and you have a new incurred loss triangle, which the next slide will show.

(Slide 2-10)

It gives us a nice, smooth pattern that we can use. Now remember the link ratios are coming down the columns. We can use the standard link ratio technique, that was probably covered in your basic sessions, to then fill in the bottom part of the triangle which projects out to our ultimate at 36 months. And you have a

nice, even factor now on the old history. The top of the triangle would be the restated part. Between 12 and 24 months the factor is about 1.7 and then the next line develops up by a factor of 1.2. We can apply those to our more recent years of 1986 and 1987 and project out and fill in the triangle. The numbers aren't as important as the point we're trying to get across that you've got changing patterns and you need to detect those, build some scenarios to explain them, and to adjust for them.

One way of looking for some changes might be to look at some indices. We see that frequently mentioned in the literature. Paid to incurred ratios, CWP ratios, any kind of index you can dream up is something to look at. It's not going to tell you what's changing, but it will at least signal that something's changing and you better do some more digging before you blindly apply link ratios and project an answer that looks great right now, but in about three years you'd wish you hadn't selected that.

(Slide 2-11)

The next slide, and I think this is the last of our complicated number slides. The next slide...or the last example anyway...shows that we want to adjust the incurred losses. Now before we'd been working with paid losses. And we want to adjust the incurred losses because we see this change in the claims cost. We have the same payment closing pattern as we had before, the 50% for 1985 and 1986 has dropped to 40%. At 24 months 1985 is 90% closed and has dropped to 80%. So this displays very similar data to what we just saw.

(Slide 2-12)

The next slide is very much like the paid losses. We're going to use the quarterly data and in the same straightforward manner, because these are all constructed with the same numbers, we're going to apply the 9 month to ultimate factor to the 12 month factor. And we're gong to apply the 21 month factor to the 24 month factor to develop to ultimate, because we have the same 3 month lag that we had before. So basically what you're doing on these is that you're calibrating your loss reserve triangle based on percent of claims closed. You're really calculating development factors, lining up everything at the same percentage of claims closed to get a more consistent pattern rather than using calendar month development.

Now, it is not intuitive why this makes sense for incurred losses. It makes sense for paid losses, because you can think of paid losses being related to claims closed, because when you pay them you close them and vice versa, usually, in most cases. But if you think about that a little more, using percent of claims closed for incurred does make sense, because a slowdown in payment patterns and changes in reserve levels, either inadequate

or over adequate, can occur for the same reason. And it is because the same claims department is controlling both of those. They are both paying the losses and they are setting the reserve. So if you see changes in one of these, they can be definitely related to changes in the other because of something that's happened in the claims department, be it change in management or a new system or what have you.

So this wraps up this middle section here on some of the techniques. These are also covered in the Berquist and Sherman paper in the 1977 Proceedings. The paper is on Part 7 of the CAS exams, if anybody has run into it there, but that would give you some more information and a reference if you want to do some further reading on this topic.

(Slide 3-1)

The next topic we have to cover this morning is reinsurance. Most of the prior examples were probably direct insurance. You were dealing with a primary company. It probably was the case, if you had that much information and that type of detail available, chances are you were dealing with a primary level company. The question we have before us now is, should the loss reserve analysis be gross or net to ceded reinsurance? For those of you that haven't heard the term before, ceded reinsurance is the reinsurance that the insurance companies buy. For instance, if we'd sell an umbrella policy with a 3 million dollar limit, we might decide to buy some reinsurance for that and we might keep the first 1 million and cede off to someone else the excess 2 million. So that's what ceded reinsurance is, very simplistically.

But anyway, should we be analyzing gross or net to reinsurance? The advantages of gross...the biggest advantage is that you can ignore change in retention. Retentions, as Bill mentioned earlier, are like a deductible that the insurance company keeps. That million dollars in my umbrella example earlier is the retention. Now those change over time, without question they change. Especially over a long period of time that you would need to look at when you are doing a loss reserve analysis. The million dollars might grow to 1.5 million or 2 million, so you're going to get changes in your development just because of changes in that retention, not anything to do with the true development. So if you look at it gross, you're looking at the grand total losses, regardless of the reinsurance. That will eliminate that problem altogether, and you'll be on your way to looking at the analysis.

Now another advantage of looking at gross is, it gives the grand total liability if your reinsurance proves to be uncollectible. You would be well advised to let your management or your clients know what their true total liability is regardless of their reinsurance collections, because they need to address that as a separate issue.

Advantages of looking at net. If you look at net and you cap those limits so you're just looking at things below your retention, you're going to have a lot more stable development on the lower layer when you get rid of that high excess layer. That is an advantage of the net. The net is also required in the financial statement, so at some point someone is going to have to come up with the net reserves. You could also have internal reinsurance uses. What that might be is a pooling type arrangement. If you're dealing with a company or a client who owns numerous companies, and they pool things to one another, and losses go back and forth between them before they get booked. That's an internal reinsurance type transaction. You might have to do things net there.

Another use of the net type of approach would be if you had a profit center or a region, where when their results are tabulated at the end of the year, they are only charged with every loss, up to a certain amount, say, a million dollars, and the balance gets charged back to the home office. They are going to need to know some net reserve numbers in order to process their results at the end of the year.

Chances are at some point in your careers you will look at both.

(Slide 3-2)

The next topic we have to discuss are techniques to reserve for the excess layer. That's the high layer of coverage that I mentioned has sparse data. It can be very difficult to analyze because there are so few claims that get up into the excess layer. Now, the first, most direct, way of doing it is just to look at the actual development of the excess losses. Again, you're going to have to be careful of the changes in your underlying retentions, because you're not going to want changes in retention to appear as changes in development. One thing you might do is restate all your history at the current retention and then any changes you see in those patterns will actually be development changes and they won't be retention changes.

Another method is the second one listed up there. You could look at your primary layer. That's going to be the most stable. Develop that to ultimate. Then you would look at your total layer. That's probably your next most stable. Develop it to ultimate. And if you subtract the two, you're going to get an implied estimate of your reserves for the excess loss layer. That's another technique to consider.

The last item up there is to estimate the excess losses with Increased Limits Factors. We're going to see an example of this next, and this might be something that you might want to use if your excess development is so sparse that you have absolutely no hope of coming up with any kind of development pattern to project those losses.

(Slide 3-3)

This slide shows an example of the Increased Limits approach. Let's assume we've had a million dollar retention, say, for many years in this company and for the current accident year we've increased the retention to 2 million dollars. The current loss development factors aren't going to give us much help. What are we going to do for the current year for that layer between 1 and 2 million. An approach we might want to take is to take the current accident year, limit the losses to a million and analyze them with the history that you have for that million dollar layer. Say you do this and it gives you the result of $1,000 or $1,000,000, how ever many zeros this exhibit might imply. So you have your $1,000. Now, how am I going to get that to the 2 million layer? I want to apply my average Increased Limit Factor of 1.33 and that will give me an estimate of my ultimate losses up to 2 million dollars.

Now this Increased Limits Factor should be averaged over your actual policy limits distribution in your book of business so you get a proper reflection of the exposure you have. You might, because you don't have anything else, have to use an industry Increased Limits Factor, but I should caution you that that could have a different distribution of limits underlying it.

And the final thing that you should be very careful with in using this method, is to know if those Increased Limits Factors include loss adjustment expense loads. You have risk loads in there, profits, contingencies. There can be other things besides increased losses implied and built in to those Increased Limits Factors. So you need to talk to your pricing people. The factor you want is only the factor for the loss portion. If you can get one, that will give you an estimate of the losses in the next layer.

(Slide 4-1)

The last topic I have this morning is tail factors. First of all, what are they? A tail factor is a factor, if you are familiar with from the basic session or the earlier intermediate session, your nice long triangle of development factors. Our examples of triangles were short. The very end of the triangle is your last development point. What's going to happen between there and ultimate? That is what a tail factor is. It indicates the development between your very last point and ultimate.

Chances are you don't have enough history. Most companies don't. It has either been too expensive to maintain or they haven't been in business that long, or certainly our computer databases don't go back that far unless you built them back. So it can be very difficult to get any old information. However, tail development, say, 20 or 30 years, can be very significant for some lines of business and you don't want to ignore it. For example, if you have workers compensation and you've looked at

ten years worth of data. You think you've seen it all. You could be very fooled, because not only are not all the claims closed, they may not even all be reported. So the point we want to make is tail development may be significant. And actually there is a session I believe tomorrow afternoon on some methods for calculating tail factors that are in the more advanced levels. So if you are interested in that, I could refer you to those sessions.

Some of the more simple things we could do is, we could look at external data. We have ISO. We have NCCI. We have RAA, that's the Reinsurance Association of America, so that would only be giving you reinsurance development. And we have Best's. Best's will provide aggregates of Schedule P type data that you could use to see how long your line of business might be developing.

There's a method around known as the Bondy Method. And what that does is, it takes your loss development factor from your most recent year, which is N minus 1 to N. This is the most recent loss development factor and it says that is your factor from now until infinity. It's rough, but it is a method. It might be okay. You might want to test how good a job it will do by applying it to some of your older data and see how it would have worked in the past. And if it did a good job, then by all means you could try it.

Something that has a little more analytic appeal, maybe, to an actuary, would be actually to fit a curve. You have the pattern that you have available. You don't have it out to ultimate, but you have some sort of pattern. So fit your curves. Try several. Get a good fit. Test the parameters and extrapolate it out. Now how far out to extrapolate, of course, is another question, because the factors will start getting very small, 1.001, 1.0005, etc., etc., but that may go on for a long time when you fit a curve and it can get very significant for some lines of business. So you have to gauge where to cut it off. But fitting a curve can frequently do a pretty good job on a tail factor.

(Slide 4-2)

This next slide is constructed to give you some examples to show that tail factor development can be significant. The age up here is in years. The numbers are not months, as we were looking at earlier. And this data is from the 1987 RAA study, which as I mentioned was reinsurance. The 1989 study is now out and the development is even worse. So the problem does continue and even continues to get worse.

We have up here workers compensation, GL, and AL means All Other Liability. It's a little different abbreviation than some of us might have seen before. So we can see in the top line for workers compensation at 15 years we still have 24% of the losses left to develop. Moving over we can see at 20 years, we still

have 10%. And at 25 years, we still have 3%. So the point of this slide is to show you that it is significant, and you can't ignore it.

Down below the first section is medical malpractice. And you can see the development factors between 10 and 19 years. The development factors between 15 and 19 years are enormous. Medical malpractice, as you know, has traditionally had a very long development pattern. Reasons for this, some claims are reported promptly, but they take a very long time to develop. Some claims are reported very late. Yes.

QUESTION: Are these paid or incurred?

MS. GREENWALT: From RAA? I don't know. I did not construct the triangle. I don't think the RAA publishes paid data.

The question was, for those of you who couldn't hear it, are these paid or incurred development factors. I don't know for sure.

For medical malpractice, under the old occurrence policy, you could have a claim reported very, very late, just before the age of majority and that would account for some of this very long lag we see on this type of line of business. The point is, it is significant and we don't want you to ignore it. And as I said, there is another session tomorrow that would give you more ways of calculating these tail factors.

(Slide 4-3)

And the final slide that I have this morning shows some other claims with report lags greater than 10 years. You run into this in your products liability cases. They can be very complicated. You could have many coverage issues involved. Things are being fought out in the courts that take a long time to get settled.

You have very uncertain dates of loss on some lines of business. Pollution and asbestos come to mind. Say for pollution you've got a municipality, a small town, that's piled up salt next to a bridge for years and they use that in the winter on the bridge to get rid of the snow. And the water has come through that salt and dissolved some of it and it's trickled into the water supply. And it has ruined the water supply for this town. And this is a very real problem that some places are seeing these days. So you have a pollution claim that took many years to develop. For those of us that are used to dealing in auto lines of business where the date of loss can be pinned down to the actual date and the minute the accident occurred this can be a very different type situation where the date of loss is very difficult to pinpoint. It occurred over many years.

You have multiple claimant type issues, where it takes a lot of time to identify the claimants. You can have aggregate deductible

situations where there is a long delay in reporting and settling the claims. You can have the delayed manifestation type claims. Examples of these might be your Dalcon Shield or your DES type claims. DES was the drug that women took in the 50's when they were pregnant and now their daughters are infertile as a result of it. It took many, many years for that to become known. In fact, just a couple of months ago I read about they actually have had some cases now of granddaughters of women that took DES are now filing suit and they too are having the same type of problems. So we have very long situations in some of these lines.

Marine insurance is an example. As I said, I did not construct these slides, and Reopens is up there under marine insurance, and I just want to make a point that Reopens is a problem in all lines of insurance. It's not unique to marine insurance at all. The workers compensation back injury is a situation where you could have Reopens occur very much later, after you thought the claim was closed and settled. Reopens occur all the time. And Reopens can be a problem to the actuary and people working in loss reserves. I caution you to make sure you know how reopens work in your company, in your database or in your client's company. Because if you do not retain that original date that the client has reported and a claim becomes reopened, your system may set it up as a new claim and that is going to look like IBNR. So reopens are a whole issue all together and I just want to make the point, they're not unique to marine insurance. They occur throughout the lines of business and it's a different issue that you need to watch for in your IBNR.

MR. VAN ARK: I've got two more topics to talk about. The first is a general method sometimes used in reserving called the expected loss ratio method.

And the method is extremely simple. You have an expected loss ratio, you multiply it by your premium, that's your expected losses. Your expected losses less your reported losses is your IBNR. If you have an expected loss ratio of 65% and a reported loss ratio of 20%, your IBNR ratio is 45% of your premium.

The most common use of this method that we've all seen is in the annual statement where it is used for minimum reserves. There are some obvious dangers in the method. It is, in effect, circular logic. What you want in the end is, what is total losses for a particular year? And if you start by assuming your loss ratio is known, you've got your answer already. I think there are many of us who right now could not tell you what your loss ratios will be by line of business for 1990. And here we are in September. It is pretty aggressive to try to pick expected loss ratios and use it for reserving.

The other thing is that if you simply set reserves by picking an expected loss ratio, you'll miss things. You won't look into really what's going on with your data, if you have data. Claim

frequency, claim size, what's happening with claims handling? What's happening in your pricing side? You can get better and more believable answers if you dig into the data and use other methods. Next triangle, please?

(Slide 5-2)

We're back to left to right on your accident year run out. The same basic triangle that you've seen before, except that when you get up to 1987 we've assumed that, for some reason, the losses that have come in are 4 million instead of 2, double what you've seen before.

Now let's talk about how you'll estimate your ultimate losses for that year with three common methods. Expected loss ratio method, we've added by the way, a column on the right hand side for the premiums for the year. Keeping it all simply, we've taken a 100% loss ratio so that the premiums are equal to 5 million per year. So your expected loss ratio estimate of your ultimate for 1987 is good old 5 million dollars. And the fact that your loss is up, what would have come through at 12 months has doubled, doesn't affect your estimate to this point.

(Slide 5-1)

The Bornhuetter-Ferguson method, which I hope you've heard about in earlier sessions, would estimate your ultimate losses at 4.5 ... excuse me, have we jumped a slide? Can we go back to slide 5.1. I'm sorry. The Bornhuetter-Ferguson calculation would estimate your ultimate losses at 4.5, which is the 5 million dollars that you start with, your expected losses ratio, times the fact that 60% of your losses are believed unreported at 12 months, plus the known reported losses. And your loss development method, multiplying by a factor of 2.5. This time, of course, our 12 month losses is 1.5. Excuse me for jumping slides on you. Your loss development method will get 3.8 million as your ultimate.

Your expected loss ratio is not at all responsive to the change that has come in so far. The Bornhuetter-Ferguson method does not recognize that change, in terms of your IBNR, but fully reflects it in terms of what has already come in. Your loss development method carries it all the way through.

The expected loss ratio method could be right. If your claim emergence has slowed down, there's been one of those famous backlogs in the claim department, or some such pattern. Maybe 5 million dollars is the right number. Next slide, please.

(Slide 5-2)

Now we go to the other example. What's come in at 12 months has doubled. By the way, there is an error in one of those three numbers at the bottom. There's extra credit for the first person

who knows what the right number is. The Bornhuetter-Ferguson number should be 7 million. The expected loss ratio method, once again, will be 5 million dollars. The Bornhuetter-Ferguson method, as I said, will be 7 million. Your development factor method will be 10. Once again, the expected loss ratio method completely ignores what has happened to date. The Bornhuetter-Ferguson believes what's known, but doesn't extend it into the IBNR estimate. Your development factor method extends it all the way through. It's better, I think, as the conclusion, to not use an expected loss ratio method if you have data to use something else. Next slide, please.

(Slide)

Fast rules of thumb. What kind of methods do you want to use? If you've got fast closing lines, like auto physical damage or property, paid loss development is a fine method. Your development factors will be small enough, that you won't have a lot of leverage if you've got complete accident years. And you don't have to worry at all about reserve adequacy. You do still have to worry about things like slowdowns in your claims department. If your paid losses have been understated, at one point or another you need to know about it and make an adjustment.

For short to medium tail lines, again, your primary auto, your general liability. You can use both, paid loss development or incurred loss development. You probably will look at both before you make your final selections.

In your long tail lines you would want to bring in the Bornhuetter-Ferguson. You'd look at frequency and severity techniques. You also could use your triangles. You can include almost anything in long tail lines. You get a lot of scope for creativity. Next.

(Slide 5-4)

So if I'm so down on the expected loss ratio method, when should you use it? Basically, two cases. When it really doesn't matter so much. It's for a small immaterial line. And when you can't think of anything else, which basically the most common example would be, it's a new line and you don't have any data. You are doing something you've never done before. You can start with a loss ratio the people who priced it used. They must have had some notion what they were going to bring it in at. But compare, if you can get any data at all on other writers who are writing the same subline, and you find they are writing at 100% trying to do the same kind of thing you're doing, and your pricers tell you you've got to come in at 50%. It might be time to be skeptical. For reserving maybe you want to stick in a 100%. Next.

(Slide 6-1)

One more miscellaneous topic, EBNR premium. It's a topic I actually ran into when I was setting pool reserves for the National Council. I never expected to run into it too many other places, but it turns out to be a relatively common problem. The EBNR stands for Earned But Not Reported. It's premium that actually, if you had known about it, and had it on your books, it would all be earned premium or most of it would be earned premium. You would not set it up as unearned premium. The most common example is in workers compensation and premium audits. I've heard rumors of a company that routinely added 10% of its premium in premium audits, perhaps as a marketing tool in getting a lower deposit premium.

Extended billing plans. If you've got some type of billing plan that extends over several years for a 12 month policy, your premium will trickle in slowly, and depending upon how you book it, you may have an EBNR problem.

Retro adjustments, more typically will be down than up, but it still is a future adjustment to the premium that you think you've got earned. Disputed classes will almost always be down. Very few policyholders have come in demanding higher rates after their policy has expired. Processing lags, that's the obvious one, if you just physically didn't get the premium onto the books, but you've collected it. It still can be earned.

In attacking the problem you can use any reasonable triangulation to estimate what your earned but not reported premium is, with, of course, any other reasonable technique as well. Next.

(Slide 6-2)

It's a bigger problem for reinsurers. Reinsurers will, at least some reinsurers, will do some of their accounting in underwriting year. And underwriting year, if you are familiar with the concept of policy years, it's like a policy year only it doesn't necessarily start on January 1. So if you've got this example, the treaty that starts in July of one year, the treaty expires a year later, but that's when the last policy it covers may be written and the last claim can be incurred a year later yet. You can be covering three accident years with that one treaty. So since your claims are going to be spread out over three years, ideally in earning your premium, you'll spread that over the three years as well. Next slide, please.

(Slide 6-3)

This is an example. It happens to be taken from prorata reinsurance of emerging premium over time. You can see that the premiums have more than doubled for this particular example between 12 and 24 months and the development isn't over then. It trickles in for many years afterwards though most of it is done in three or four years. Next slide.

(Slide 6-4)

The focus of this last slide is how you might vary your IBNR estimates, depending on what you've done with EBNR. The first line ... this is a busy slide. I'll try to walk you through it. The first line focuses on the EBNR estimate itself. Suppose for this particular insurer you have reported earned premium for a year of $800,000. Your estimated ultimate --- however you've estimated it --- is a million. So you've got $200,000 premium yet to book, not yet called EBNR. But suppose that however, whatever internal process we've gone through, we've said that 60% of that should already be earned. In that case, the EBNR reserve becomes $120,000, 60% of $200,000. Your adjusted earned premium becomes $920,000.

Similarly on the loss side, you've got $500,000 in losses that have come in. However you've done it, you've estimated your ultimate losses for that underwriting year at $750,000, so you've got $250,000 in losses yet to book, and an ultimate loss ratio of 75%. If then the earned premium you are going to book, at this point, is $920,000, your losses incurred that you should book using that same loss ratio is the $690,000, and your IBNR then is that minus $500,000, is $190,000.

Noted at the bottom there's really three ... there's a range of solutions to this problem. All the way from setting up a zero EBNR reserve, all the way up to the full $200,000, but if you are going to be consistent between the two to match your losses and your premiums, the IBNR slide is the same way from $100,000 with zero EBNR up to $250,000 with the full $200,000 EBNR.

Let's the end of our formal presentation. We have about 15 minutes yet before lunch. We invite questions. If you have a question, please step up to the center microphone and let the world hear you. Yes, in back, would you come to the mike please?

QUESTION: No. I have a quick question, sir. The comment earlier on the RAA, (inaudible) incurred (inaudible).

MR. VAN ARK: If anyone didn't hear that the comment was that the RAA development factor numbers are probably incurred rather than paid.

QUESTION: (inaudible)

MR. VAN ARK: Well, keep in mind that the IBNR that we are talking about, that last piece of IBNR, is meant for claims that haven't occurred yet, so there is no statutory obligation to put up a reserve for them.

QUESTION: (inaudible)

MR. VAN ARK: I'm pointing out ... right ... for 1988 claims. I'm pointing out that there is a consistency problem here. You want to be careful to match the premiums and losses that you put on your books. However, you consider the EBNR problem.

We've run out of formal exhibits and formal topics at this point. If you have any more questions, feel free to step up to the microphone and let posterity hear your words.

Any other questions or comments? Have a nice lunch.

BASIC PRINCIPLE

LOSS RESERVE DATA SHOULD CONTAIN A LONG,
STABLE HISTORY OF HOMOGENOUS CLAIM EXPERIENCE,
WITH A SUFFICIENT NUMBER OF CLAIMS TO
PRODUCE CREDIBLE LOSS RESERVE PATTERNS.

SLIDE 1-1

CLASSIC ACTUARIAL DILEMMA

THE TYPICAL ACTUARIAL PROBLEM INVOLVES BALANCING
BETWEEN STABILITY AND RESPONSIVENESS. THE DIFFERENCES
BETWEEN THE BASIC PRINCIPLE (IDEAL) AND THE REAL
WORLD WILL BE VERY EVIDENT TO ANYONE WHO DOES LOSS
RESERVING.

SLIDE 1-2

CUMULATIVE PAID LOSSES BY ACCIDENT YEAR
(IN MILLIONS)

	EVALUATION MONTH		
ACCIDENT YEAR	12	24	36
1984	2.0	4.0	5.0
1985	2.0	4.0	5.0
1986	2.0	4.0	
1987	2.0		

SLIDE 1-3

CUMULATIVE PAID LOSSES BY TYPE OF CLAIM
BY ACCIDENT YEAR (IN MILLIONS)

	EVALUATION MONTH		
1984-86 MIX	12	24	36
SUBSET A	1.5	1.8	2.0
SUBSET B	0.5	2.2	3.0
TOTAL	2.0	4.0	5.0

SLIDE 1-4

CUMULATIVE PAID LOSSES BY TYPE OF CLAIM
BY ACCIDENT YEAR (IN MILLIONS)

	EVALUATION MONTH		
1984-86 MIX	12	24	36
SUBSET A	1.5	1.8	2.0
SUBSET B	0.5	2.2	3.0
TOTAL	2.0	4.0	5.0
1987 MIX			
SUBSET A	0.5		
SUBSET B	1.5		
TOTAL	2.0		

SLIDE 1-5

CUMULATIVE PAID LOSSES BY TYPE OF CLAIM
BY ACCIDENT YEAR (IN MILLIONS)

	EVALUATION MONTH		
1984-86 MIX	12	24	36
SUBSET A	1.5	1.8	2.0
SUBSET B	0.5	2.2	3.0
TOTAL	2.0	4.0	5.0
1987 MIX			
SUBSET A	0.5	0.6	0.7
SUBSET B	1.5	6.6	9.0
TOTAL	2.0	7.2	9.7

SLIDE 1-6

FURTHER PRINCIPLE

ALWAYS SEARCH FOR SUBDIVISIONS
RELATED TO POSSIBLE CAUSES OF
VARIABLE LOSS DEVELOPMENT.

SLIDE 1-7

SUGGESTED SUBDIVISIONS OF DATA

PRIMARY

1. GEOGRAPHIC
2. PRODUCTION SOURCE
3. SUBLINE
4. LEGAL CHANGES
5. DEDUCTIBLES

REINSURANCE

1. ATTACHMENT POINT
2. PRODUCTION SOURCE
3. SUBLINE

SLIDE 1-8

HOW DO YOU DECIDE?

ASKI

1. UNDERWRITERS
2. AGENTS
3. CLAIMS STAFF
4. ACTUARIES

SLIDE 1-9

CUMULATIVE PAID LOSSES

EVALUATION MONTH	ACCIDENT YEAR 1984	1985	1986	1987
12	2.0	2.0	2.0	2.0
24	4.0	4.0	4.0	
36	5.0	5.0		

2-1

CUMULATIVE PAID LOSSES

EVALUATION MONTH	ACCIDENT YEAR 1984	1985	1986	1987
12	2.0	2.0	2.0	1.5
24	4.0	4.0	3.5	
36	5.0	5.0		

2-2

CUMULATIVE CLOSED AS A PERCENT OF CLAIMS REPORTED

EVALUATION MONTH	ACCIDENT YEAR 1984	1985	1986	1987
12	50%	50%	50%	40%
24	90%	90%	80%	
36	100%	100%		

2-3

CUMULATIVE PAID LOSSES AND CLAIMS CLOSED AS PERCENT OF CLAIMS REPORTED

	ACCIDENT YEAR					
EVAL. MONTH	1985 PAID LOSS	1985 % CLOSED	1986 PAID LOSS	1986 % CLOSED	1987 PAID LOSS	1987 % CLOSED
12	2.0	50%	2.0	50%	1.5	40%
24	4.0	90%	3.5	80%		
36	5.0	100%				

2-4

CUMULATIVE PAID LOSSES AND CLAIMS CLOSED AS A PERCENT OF CLAIMS REPORTED

	ACCIDENT YEAR					
EVAL. MONTH	1985 PAID LOSS	1985 % CLOSED	1986 PAID LOSS	1986 % CLOSED	1987 PAID LOSS	1987 % CLOSED
9	1.5	40%	1.5	40%	1.1	30%
12	2.0	50%	2.0	50%	1.5	40%
21	3.5	80%	3.0	70%		
24	4.0	90%	3.5	80%		
36	5.0	100%				

2-5

HOW CAN CHANGES IN PAYMENT PATTERN BE RECOGNIZED?

- LOOK AT MOST RECENT 2 TO 3 ACCIDENT YEARS
- LOOK AT OTHER LINES HANDLED BY SAME CLAIMS STAFF
- ASK CLAIMS STAFF ABOUT CHANGES IN OPENING AND CLOSING PRACTICES

2-6

CUMULATIVE INCURRED LOSSES

EVALUATION MONTH	ACCIDENT YEAR 1984	1985	1986	1987
12	3.0	3.3	3.6	3.3
24	4.7	5.2	5.1	
36	5.0	5.5		

2-7

AVERAGE RESERVE PER OPEN CLAIM

EVALUATION MONTH	ACCIDENT YEAR 1984	1985	1986	1987
12	1,000	1,100	1,210	666
24	2,000	2,200	1,200	
36	0	0		

2-8

RESTATED CUMULATIVE INCURRED LOSSES USING AVERAGE RESERVES ADJUSTED FOR INFLATION

EVALUATION MONTH	ACCIDENT YEAR 1984	1985	1986	1987
12	2.5	2.8	3.0	3.3
24	4.2	4.7	5.1	
36	5.0	5.5		

E.G., ACCIDENT YEAR 1984 AT 12 MONTHS
IS EQUAL TO 2.0 PAID LOSSES
+0.5 RESTATED RESERVE
(1.0 ORIGINAL RESERVE
X 500 AVG/1000 AVG)

2-9

PROJECTED CUMULATIVE INCURRED USING AVERAGE RESERVES ADJUSTED FOR INFLATION

EVALUATION MONTH	ACCIDENT YEAR 1984	1985	1986	1987
12	2.5	2.8	3.0	3.3
24	4.2	4.7	5.1	5.6
36	5.0	5.5	6.1	6.7

CUMULATIVE INCURRED LOSSES AND CLAIMS CLOSED AS A PERCENT OF CLAIMS REPORTED

	ACCIDENT YEAR					
EVAL. MONTH	1985 INC'D LOSS	1985 % CLOSED	1986 INC'D LOSS	1986 % CLOSED	1987 INC'D LOSS	1987 % CLOSED
12	3.0	50%	3.0	50%	2.5	40%
24	4.7	90%	4.4	80%		
36	5.0	100%				

CUMULATIVE INCURRED LOSSES AND CLAIMS CLOSED AS A PERCENT OF CLAIMS REPORTED

	ACCIDENT YEAR					
EVAL. MONTH	1985 INC'D LOSS	1985 % CLOSED	1986 INC'D LOSS	1986 % CLOSED	1987 INC'D LOSS	1987 % CLOSED
9	2.5	40%	2.5	40%	2.0	30%
12	3.0	50%	3.0	50%	2.5	40%
21	4.4	80%	4.0	70%		
24	4.7	90%	4.0	80%		
36	5.0	100%				

2-12

SHOULD THE LOSS RESERVE ANALYSIS BE GROSS OR NET OF CEDED REINSURANCE?

ADVANTAGES OF GROSS:

- DATA UNAFFECTED BY CHANGE IN REINSURANCE RETENTION
- GIVES TOTAL LIABILITY IF REINSURANCE PROVES UNCOLLECTABLE

ADVANTAGES OF NET:

- IMPROVES STABILITY OF LOWER LAYER BY LIMITING LARGE LOSSES
- REQUIRED FOR FINANCIAL STATEMENTS
- INTERNAL REINSURANCE USES

3-1

TECHNIQUES TO RESERVE FOR EXCESS LAYER LOSSES

- DEVELOP ACTUAL EXCESS LOSSES
- SUBTRACT DEVELOPED PRIMARY LIMIT LOSSES FROM DEVELOPED TOTAL LIMIT LOSSES
- ESTIMATED EXCESS LOSSES WITH INCREASED LIMIT FACTORS

3-2

ESTIMATING HIGHER LAYER LOSSES WITH INCREASED LIMIT FACTORS

ULTIMATE LOSS LIMITED TO $1 MIL	*AVERAGE $2M/$1M INCREASED LIMIT FACTOR	ULTIMATE LOSS LIMITED TO $2 MIL
$1000	1.333	$1333

(*) INCREASED LIMITS FACTORS AVERAGED OVER ACTUAL POLICY LIMITS DISTRIBUTION

3-3

TECHNIQUES TO DERIVE TAIL FACTORS

- EXAMINE BROADER DATA SOURCES
  ISO, NCCI, RAA, BEST'S
- "BONDY METHOD": LDF From N To Infinity = LDF From (N-1) To N
- CURVE FITTING

4-1

HOW MUCH TAIL CAN THERE BE?
(AGE IN YEARS)

1987 RAA STUDY
CUMULATIVE AGE TO ULTIMATE FACTORS

	15 TO ULT.	20 TO ULT.	25 TO ULT.
W.C	1.241	1.102	1.030
G.L.	1.178	1.057	1.016
A.L	1.003	1.000	1.000

	10 TO 19	15 TO 19
MED. MAL.	2.122	1.463

Assumes Ultimate is 31 years for W.C., G.L. and All Other Liability

4-2

SOME CLAIMS WITH REPORT LAGS GREATER THAN 10 YEARS

LINE	CAUSES
PRODUCTS	Complicated. Uncertain DOL.
PRODUCTS	Multiple claimants. Aggregate deductibles.
PRODUCTS	Delayed manifestation.
MARINE	Ship Collision and Explosions: Reopens.
WORKERS COMP.	Back injury.

4-3

CUMULATIVE PAID LOSSES BY ACCIDENT YEAR
(IN MILLIONS)

	EVALUATION MONTH			
ACCIDENT YEAR	12	24	36	PREMIUMS
1984	2.0	4.0	5.0	5.0
1985	2.0	4.0	5.0	5.0
1986	2.0	3.5		5.0
1987	1.5			5.0

1987 ULTIMATE LOSS USING:	
ELR	5.0
BORNHUETTER-FERGUSON	4.5
LOSS DEVELOPMENT	3.8

SLIDE 5-1

CUMULATIVE PAID LOSSES BY ACCIDENT YEAR
(IN MILLIONS)

	EVALUATION MONTH			
ACCIDENT YEAR	12	24	36	PREMIUMS
1984	2.0	4.0	5.0	5.0
1985	2.0	4.0	5.0	5.0
1986	2.0	3.5		5.0
1987	4.0			5.0

1987 ULTIMATE LOSS USING:	ELR	5.0
	BORNHUETTER-FERGUSON	8.0
	LOSS DEVELOPMENT	10.0

SLIDE 6-2

WHAT SHOULD YOU USE, AND WHEN?

1. FAST CLOSING LINES
   (MEDICAL, DENTAL, AUTO PHYSICAL DAMAGE)
   PAID LOSS DEVELOPMENT
2. SHORT - MEDIUM TAIL LINES
   (PROPERTY, PRIMARY AUTO & G.L.)
   INCURRED LOSS WITH PAID LOSS DEVELOPMENT
3. LONG TAIL LINES
   (EXCESS AUTO & G.L., UMBRELLA, MEDICAL MAL)
   BORNHUETTER-FERGUSON
   FREQUENCY/SEVERITY METHODS

SLIDE 6-3

WHEN TO USE LOSS RATIO TECHNIQUES

1. FOR SMALL, IMMATERIAL LINES
2. WHEN YOU CAN'T THINK OF ANYTHING ELSE

SLIDE 6-4

WHY IS THERE EBNR PREMIUM?

1. PREMIUM AUDITS
2. EXTENDED PREMIUM BILLING PLANS
3. RETROSPECTIVE RATED BUSINESS
4. DISPUTED CLASSIFICATION
5. PROCESSING LAGS

SLIDE 6-1

REINSURER'S UNDERWRITING YEAR

- COVERS UNDERLYING POLICIES WITH INCEPTION DATES IN 12-MONTH TREATY PERIOD.
- SPANS 3 ACCIDENT YEARS
- EXAMPLE

  TREATY WRITTEN JULY, 1985

  COVERS POLICIES INCEPTING 7/85 TO 6/86

  LAST ACCIDENT JUNE, 1987

SLIDE 6-2

EARNED PREMIUM DEVELOPMENT FACTORS

PRO-RATA REINSURANCE

UNDERWRITING YEAR

24/12	2.254
36/24	1.044
48/36	1.012
60/48	1.008
72/60	1,008
84/72	1.004
96/84	1.002
108/96	1.001

SLIDE 6-3

INTERPLAY OF EBNR AND IBNR
UNDERWRITING YEAR 1986 AT 12/87

(1)	(2)	(3)	(4)	(5)	(6)
REPORTED EP	ULTIMATE EP	DIFF (2-1)	% EBNR TO EARN @ 12/87	EBNR (3X4)	ADJ EP (1+5)
800	1,000	200	60%	120	920

(7)	(8)	(9)	(10)	(11)	(12)
REPORTED IL	ULTIMATE LI	DIFF (2-1)	ULTIMATE LR (8/2)	ADJ LI (10X6)	IBNR (11-7)
500	750	250	75%	690	190

POSSIBLE EBNR	POSSIBLE IBNR
0	100*
120	190
200	250

*100 = (75% X 800) - 500

SLIDE 6-4

1990 CASUALTY LOSS RESERVE SEMINAR

2D/5D: RESERVING FOR OPERATING LOSSES OF THE INVOLUNTARY MARKETS

Moderator

Kevin M. Ryan
Milliman & Robertson, Inc.

Panel

Robert P. Aldorisio
Milliman & Robertson, Inc.

James M. Foote
The Travelers Insurance Companies

Richard M. Jaeger
National Council on Compensation Insurance

Albert J. Quirin
Hartford Insurance Group

Bryan G. Young
Tillinghast/Towers Perrin

MR. RYAN: I have the pleasure of being the moderator of this panel which is going to be addressing the question of reserving for the involuntary market. What we would like to do first is to have our five speakers give you a sense of how big the problem is with the reserves in the involuntary market. Then to review losses are emerging and then give you some sense as to how those losses are being estimated and what impact they're having on or should have on the insurance company's bottom line.

We'll be looking at the general problem as it impacts on an insurance company. We'll be looking at the national pools for workers compensation and then a specific example of a workers compensation pool in Texas, which has its own peculiarities. We'll look at automobile, the JUA in New Jersey specifically, and then some of the more general considerations, such as medical malpractice.

The approach to this will be for us to listen to the five presentations and then have a discussion at the conclusion. Rather than have questions after each speaker, we'll hold them until the end. Having five speakers, we want to make sure that we cover all of the ground before we get into the discussions. So, write down your questions and make sure that during the course of the presentations you are prepared to have some discussion afterwards because we will have time for that at the conclusion.

Our first speaker is Al Quirin, who is Senior Vice-President of the Hartford Insurance Company. He has been with the Hartford since 1972 where he started as an actuarial trainee. In 1981, he had the position of staff assistant to the Chairman and CEO, Pete Thomas.

From '83 to '86, he was Vice-President and Director of Actuarial Research Operations. And since '87 has been the Senior Vice-President and Director of Actuarial and Research Operations. He is a Fellow of the Casualty Actuarial Society and a member of the American Academy, and has served on various insurance committees, and has been very active at ISO.

Al will be the stage setter for today's panel. He will take a broad view and discuss the overall business impacts of the involuntary markets on the insurance industry in general. He will discuss these issues from the insurance company management perspective. The topics covered will include the insurance industry and insurer business impacts, financial dimensions, causal factors, operating ramifications and possible courses for corrective action.

MR. QUIRIN: Thank you, Kevin. I'm very happy to be here and glad that we're not recording this session.

Kevin outlined what I'm going to try to do today. I'm going to try to set the stage for some of the folks behind me who will be

getting into more specific state and line of business issues in the involuntary market.

I want to just start by asking a question of all of you just to get a sense from the audience. The thing I'm interested in is how many people here are actually employed by insurance companies and, therefore, directly impacted by the bottom line with the involuntary market.

Okay. Well, that's good. You can look at this issue in a couple of different ways. If you work for an insurance company it's a phenomenal financial burden and if you work as a consultant, it's a potential source of additional revenue.

Most of you are in my boat, which at least makes my presentation easier to make. I wanted to start just by summarizing very briefly what we're talking about in my own simplistic way and terms.

What are involuntary markets? They're basically nothing more than mechanisms established in those states, in those lines of business where insurance companies do not voluntary want to write those risks. Plain and simple.

They occur primarily today in automobile and workers compensation primarily because those are two lines of businesses that are either legally required or vital to the public interest in terms of the coverages they provide. Mechanisms have been set up when insurers voluntarily do not want to write these lines in these states for obvious profitability reasons.

Now, how are they set up? Generally speaking this is a phenomenally complex subject. You can get a PhD in involuntary markets if you want because it's very complicated. Even if you talk about comp, you know there are so many different kinds of mechanisms, JUA, servicing carriers, -- state funds, etc. They are all run a little bit differently.

But basically every state -- when they see or perceive to have some kind of an availability crisis, they establish mechanisms usually through legislation. Where legislation actually establishes the mechanisms insurance departments might address some of the financial issues at the time and then after the legislation is passed.

The insurance departments are basically given the responsibility of administering law, administering additional rules and procedures regarding the mechanism and approving rates for, modifications to pricing within those mechanisms. So, that's basically how it happens.

What's the overall situation today? I personally believe as an executive in an insurance company that if there is a bigger operational problem that exists in insurance companies today, I don't know of one.

Just to give you a sense for the dimension of the volume of involuntary markets, the volume has grown about four and a half times as a multiple from where it was in 1984 to 1989. In other words, the overall written premium in involuntary markets has increased by a factor of four and a half from 1984 to 1989. Whereas, the all lines combined voluntary written premium has gone up like 83 percent in that same time period from '84 to '89. So, you can see the phenomenal growth of involuntary premiums going up four and a half times. In some lines like comp it has gone up seven or eight times since that particular time period. So, the volume increase has been significant.

Now, the volume is not too bad by itself unless it is also unprofitable. Just to give you a sense of just how unprofitable this business is, across these lines, on average the combined ratio is about 150 percent for all the involuntary business written in the United States. This gives you a sense for exactly how unprofitable it is.

I've tried for the purposes of this presentation to provide my own estimates of how big this number is in terms of an operating loss for the industry today. The best number that I could come up with is a staggering number. I believe that in 1989 the industry had an operating loss after investment income of about $6.75 billion in 1989 from the involuntary markets.

Now, how big is that number? You know, the industry surplus is only $130 billion or something like that. So, we're talking about a five percent negative return on equity just because of involuntary markets.

You know, if you're trying to return 15 percent to your stockholder to offset just this involuntary cost, you've got to make 20 percent on the voluntary business that you write just to return 15 percent to your stockholder. So, that's how big this problem has become in the last five years to produce a $6.75 billion operating loss.

Now, if you had to split that, most of it would be worker's comp today. Worker's comp would probably be about four and a half billion and then you have places other than the places administered by the National Council, like Texas, which alone has created a half a billion dollar operating loss. So, that's about $5 billion of that $6.75 and the rest is split relatively equally between the personal auto and commercial auto loss.

So, that's basically the overall perspective of why the issue is so important today.

(Slide 1-1)

I've got some questions that I'm trying to address in today's presentation. What are the major overall impacts to the industry? What are the primary causal factors for the growth in unprofitability of this market?

What are some of the recent, past and current financial dimensions to the involuntary market? What are the major 1989 financial impacts in certain lines and in certain states? What are the operational ramifications to insurance company managements? Finally, what is needed to reduce the costs of the involuntary markets?

(Slide 1-2)

I talked about, you know, the dollars involved. These are basically word descriptions of the impacts on the insurance industry. Obviously, it's a phenomenal and significant financial burden.

The industry has basically gotten to the point it's at as a result of the increasing socialization of insurance that we're all very familiar with. I would say the socialization of business in general these days. But insurance has been the lead industry to be in the business of, you know, producing social programs on behalf of the government. So, it has been a result of socialization of insurance, also increasing regulatory and consumer pressures have been a result of this.

The most important impacts to me are the major cross subsidies that exist among industry participants. This burden, this $6.7 billion of operating loss is basically proportionate to all of the insurance companies only who write voluntary business. So, you've got self-insurers who basically do not participate in the funding or the assessment of these involuntary markets. You have a lot of different kinds of companies or other entities that might sell insurance.

But it's only licensed insurance companies who write business voluntarily. By and large, that's the situation today where this total burden is basically being paid by the insurance companies in proportion to the amount of voluntary business that they write.

There's also a major unfair financial burden on privately insured voluntary risks. Why is that? That's because insurance companies have to pay for it and the only way they can charge for it is to pass it on to their voluntary risks. So, it's extremely unfair from the standpoint that voluntary risks have to pay to the extent to which insurance companies can pass on those costs. They have to pay for the cost of the involuntary risk, which, as a citizen just does not make sense to me. And as a purchaser of private insurance, I don't like it.

Also, it's a tremendous threat because of the magnitude of the operating losses that are being incurred today. It's a major threat, in my opinion, to the future of the private insurance mechanism, both in automobile and in worker's compensation.

(Slide 1-3)

I believe the primary causal factors are similar to some of the overall impacts. I would say the primary one that I didn't even include on the list is the impact of politicians and legislators to get elected. We all know that to a large degree providing insurance for people who cannot get it because either insurance companies don't want to voluntarily write it or the coverage has been restricted, that's basically a social decision that the country has made to provide an ability for these people to buy coverage.

Now, that's fine and good and the insurance industry wouldn't mind being an administrator of a government program if that's all we were is an administrator of a government program. But the major causal factor here is that these social programs are very good for candidates to campaign on in terms of a platform, in terms of satisfying the broad constituency, and getting elected by passing legislation like this, and being able to do it without the most important bottom line to a legislator and that is the fiscal accountability and responsibility for it.

This is basically a hidden tax. We have a tradition of taxation with representation in the United States. What has happened here is we have taxation without responsibility because basically the legislatures where these social programs would need a big direct tax to finance have been able to pass legislation and pass on the cost to the insurance companies.

And not even really worrying, frankly, about the financial soundness of some of the mechanisms. They have been able to pass social agendas without having to come up with the taxes to fund it, which is a very appealing political situation as you all know. That's the major causal factor in my opinion and results really from the socialization of insurance and social engineering.

Also, it is caused by the insurance industry itself in terms of the affordability, availability crisis that, you know, we basically went through in '84 and '85 in terms of, you know, the bottom of the underwriting cycle and the wholesale unavailability of insurance coverage. So, the insurance industry certainly shares the blame in terms of not managing its own business as effectively as it could and providing the kind of availability and affordability crisis that existed at that time that caused a lot of this legislation to occur.

I also believe that lack of industry leadership to design and redesign efficient and effective involuntary mechanisms is another source of the problems of the involuntary market. And certainly lack of legislative and regulatory leadership in statutorily defining and approving financially sound, fair and visible costing mechanisms.

There is where the real leadership has failed in terms of providing the visibility and fairness of those funding mechanisms by the state legislatures and the administrative insurance department management of some of these mechanisms.

Rate inadequacy obviously is a major causal factor, whether it's inadequate voluntary rates or it's the inability to separately charge the kind of premiums that are necessary for the involuntary risks.

Finally, a significant erosion of cost based pricing just exacerbates the whole thing in terms of overall inefficiencies and cross subsidies throughout class and territories within a state.

(Slide 1-4)

I wanted to give you a feel for the financial dimension of the involuntary markets in certain lines. And I chose to do this by talking about size, which I have defined as the ratio of the involuntary volume to the voluntary volume.

I believe all kinds of financial statistics regarding involuntary are best described by relating everything to the voluntary market because that today is the place where you've got to get the money to pay for (not that that's the place where it should be paid for). I think the best kind of statistics are usually ratioing things about the involuntary business to the voluntary business.

So, in terms of size, I just take involuntary premium and divide it by voluntary premium. And just talking about the all lines combined for a minute, I want to remind you before you look at that, that the all lines row includes all the lines that don't have involuntary as well.

So, you've got property, CMP, all the other lines that don't really have involuntary lines and it still ends up to be those kinds of impacts in terms of size where if you take all the lines combined you'd have approximately a ratio of eight percent of involuntary volume to voluntary volume in the industry on an all lines combined basis.

In terms of combined ratio of cost, what I do is take involuntary adjusted underwriting income by, you know, all the losses and expenses incurred from an underwriting standpoint, take that involuntary loss and relate it to the voluntary earned premium. That's, in effect, the cost of the combined ratio that you have to make up when you write voluntary business. That cost on an all lines basis is three points.

The last one that I did is a statistic more geared to the stockholders whereby I take the involuntary after tax operating loss. Obviously, there's not much investment income from 150 combined ratio. So, there's not a tremendous amount of

difference between the after tax operating loss and the after tax adjusted underwriting loss. But I've taken that and tried to make estimates of what that is and relate that to the voluntary surplus.

As you can see, as I talked before, it's about a five percent of voluntary surplus for all lines combined.

And so, the industry to make 15 percent has really got to make 20 percent on voluntary. You may want to write in some subtotals for the involuntary lines only, you know, the sum of those three that I showed. The size would be 14 percent. The combined ratio cost would be 7 percent and the return on equity cost is 13 percent instead of five percent.

So, that last statistic, 13 percent for the involuntary line, the automobile and comp together, we're basically talking about a return on equity cost of 13 percent. Which means you've got to make almost 30 percent return on voluntary business to produce a net 15 percent return, which as you know is not exactly too realistic in the competitive business of insurance.

I wanted to give you one more chart that's not in the handout that gives you a rough feel. What I did is took that last growth, all lines combined, and just broke it down by state. And you can see that in certain states -- let's just concentrate on the last column because I think you can get a feel for the magnitude of size and combined ratio costs.

But just talking about the return on equity costs, country-wide, all lines combined, it costs 5 percent return on equity. You can see in many states, namely Louisiana, Massachusetts, Rhode Island, South Carolina and Texas, the return on equity costs is in excess of 10 percent. And you can see just how big the involuntary markets are in certain states and we will be talking about some of these states and some of these lines in today's panel.

So, it gives you a feel for the magnitude. Not only is it a phenomenal country-wide, all lines combined problem, but in many states and in many lines there is no possible way to really make money because you can't charge enough. So, the situation is phenomenally significant in many states throughout the country.

(Slide 1-5)

These are what I consider the major operational ramifications to an insurance company. Obviously a significant operating loss. Obviously an increasing need to have the voluntary risk subsidize the involuntary risks and the inability to do that because of the competitive nature of insurance.

It certainly accelerates the movement of traditional insurance going to self-insurance because self-insurers don't pay for these

costs. They escape the funding of these costs. So, obviously there's going to be a tremendous incentive to selfinsure so that you don't buy insurance and then have insurance companies pass on these costs of the assigned risk plans to you as a purchaser of insurance.

Tremendous growth of servicing and carrier business. This has become a tremendously important line of business by itself in terms of, you know, the volume of revenues and potential profit in just becoming a service provider by itself.

The last area -- sort of -- the next couple anyway are obvious. The increasing need to retrench geographically and by class in automobile and workers compensation where the costs of the involuntary market are so extreme. If you don't withdraw completely, like the next bullet because you're convinced you can make some money somewhere in that state, you have to be very, very precise in that business you do write because of profitability requirements of the business that you do write.

Finally, it puts phenomenal pressure on insurance companies and other constituencies to develop meaningful insurance reform and meaningful cost containment efforts, especially with respect to the involuntary market.

(Slide 1-6)

My last chart is just really an attempt at a high level to summarize some of the major things that we need to do as an industry.

If we're going to keep the system the way it is now, which I wouldn't prefer to do because I think the system is ill-designed and ill-constructed to begin with. But in the absence of major reform, the first two things would be nice to start with, and that is voluntary rates which are adequate and equitable by themselves. And involuntary rates which stand on their own.

Obviously, depopulating assigned risk plans would be a good thing. There's an awful lot of administrative kinds of abuses. There's a lot of false incentives that exist for people to be in the involuntary plan to begin with and a lot of these are addressable. But depopulating the assigned risk plan and producing an equitable voluntary rate is obviously the ultimate solution.

Efficient and effective management of the involuntary mechanisms, in terms of underwriting standards, emphasis on loss control, all the mechanisms that oversee these pools.

The last two, I believe, are the most important and that is to make the net cost visible to all constituents. And for equitable funding by all the constituencies of the net cost of the system. This is to me the ultimate irony of, you know, how we've

RESERVING FOR OPERATING LOSSES OF THE INVOLUNTARY MARKET

Overview presentation (as part of a panel) by **Al Quirin**, Senior Vice President and Chief Actuary, **Hartford Insurance Group**, at the September, 1990 Casualty Actuarial Society Loss Reserve Seminar in Dallas, Texas.

INSURANCE COMPANY PERSPECTIVE

- What are the major overall impacts of involuntary markets on the insurance industry?
- What are the primary casual factors for the tremendous growth and unprofitability of the involuntary market?
- What are the recent past and current financial dimensions to the involuntary market?
- Where are the major 1989 financial impacts of involuntary markets by line of business and state?
- What are the major operational ramifications of the involuntary markets on insurance company management?
- What is needed to reduce the cost of the involuntary markets?

Slide 1-1

WHAT ARE THE MAJOR OVERALL IMPACTS OF INVOLUNTARY MARKETS ON THE INSURANCE INDUSTRY?

- Significant financial burden
- Result of increasing socialization of insurance
- Result of increasing regulatory and consumer pressures
- Major cross subsidies exist among industry participants
- Major unfair financial burden on privately insured voluntary risks
- A tremendous threat to the future of private insurance mechanism in automobile and workers compensation

Slide 1-2

WHAT ARE THE PRIMARY CASUAL FACTORS FOR THE TREMENDOUS GROWTH AND UNPROFITABILITY OF THE INVOLUNTARY MARKET?

- Socialization of insurance
- Social engineering (voluntary risks subsidize involuntary risks)
- Insurance affordability/availability crisis
  - external causes (social inflation)
  - internal causes (cycle)
- Lack of industry leadership to design/re-design efficient and effective involuntary mechanisms
- Lack of legislative and regulatory leadership in statutorily defining and approving financially sound, fair and visible costing mechanisms
- Rate inadequacy
- Significant erosion of cost-based pricing

Slide 1-3

WHAT ARE THE MAJOR 1989 FINANCIAL IMPACTS OF INVOLUNTARY MARKETS BY LINE OF BUSINESS AND STATE?

	TYPICAL COMPANY ILLUSTRATION		
	% INVOL WP / VOL WP	% INVOL AUI / VOL EP	% INVOL A.T. LOSS / VOL SURPLUS
	SIZE	COMBINED RATIO COST	RETURN ON EQUITY COST
PERSONAL AUTO	14	(5)	(10)
COMMERCIAL AUTO	12	(7)	(10)
WORKERS' COMPENSATION	15	(8)	(14)
ALL LINES	8	(3)	(5)

Slide 1-4

WHAT ARE THE MAJOR OPERATIONAL RAMIFICATIONS OF THE INVOLUNTARY MARKETS ON INSURANCE COMPANY MANAGEMENT?

- Significant operating losses
- Increasing need to have voluntary risks subsidize involuntary risks
- Accelerates movement of traditional insurance going to self-insurance, captives, etc.
- Tremendous growth of servicing carrier business
- Increasing need to retrench geographically and by class in automobile and workers compensation
- Increasing need to completely withdraw from insurance in certain states
- Increasing pressure on insurance reform and cost containment efforts

Slide 1-5

WHAT IS NEEDED TO REDUCE THE COST OF THE INVOLUNTARY MARKETS?

- Voluntary rates which are adequate and equitable
- Involuntary rates which stand their own
- Depopulate assigned risk plans
- Efficient and effective management of involuntary mechanisms
- Make net costs visible to all constituencies
- Equitable funding by all constituencies of net cost of system

Slide 1-6

gotten to this point because this is a huge hidden tax. And it's very obvious to figure out why it has been a hidden tax if you're a legislator or a politician.

Insurance companies, in my opinion, made a major failure by not effectively communicating to the people who buy the insurance and to the public-at-large as to how big these costs really are. And I think until we make all those net costs visible and we get a broader base of constituency supporting really wanting to do something about this problem, we're going to continue to be in the quagmire that we're in.

That's all I have as a stage setting for the other panelists.

MR. RYAN: Thanks, Al. I remember now why I confused you with somebody that works at Travelers. You had said that you didn't mind Travelers paying this hidden cost, but it was the Hartford's paying that you objected to.

(Laughter)

Our next speaker is Richard Jaeger, who joined the National Council on Compensation last year. Before joining NCCI, he was vice-president and actuary with the Crum and Forster Company where he had corporate actuarial responsibility for the development, implementation and monitoring of pricing programs.

Prior to that, Mr. Jaeger served 15 years with the Insurance Services Office where he held a number of management positions, including Regional Actuary and most recently Actuarial Director. He was responsible for analysis of investment income and rate making, the impact of federal income tax changes on pricing and the loss reserve adequacy of the insurance industry.

Richard is in a unique position of assisting in developing price indications for worker's compensation insurance. The reflection of whether that's a good job or a bad job is witnessed in the size of the residual market in workers compensation. He also sets reserves for the workers compensation assigned risk plans.

So, Richard?

MR. JAEGER: After that fine introduction, I feel very bad about bringing generally bad news. Although it would not possibly seen so, it may in some ways be worse than what Al has already said. I'm going to talk a little bit about the national pool and a couple of the other pools that the NCCI manages, talk about the management problems that arise from the operating loss impacts, talk about how the reserves are set, give a little bit of the history of the result of that reserve setting process and then talk a little bit about what's the prospect for good news in the future.

I want to ask just a couple of questions here to set the stage. How many of you are on the receiving end and then have to do something in your companies with the information that the National Council sends out saying here's the result of the accounting for the pools? Okay. We've got several hands.

How many of you are familiar with, in general, the way the national pool operates? Okay. That's pretty good. How many of you have set national pool reserves? I saw a hand. Okay.

Very quickly, the way the pool operates is that if a workers comp risk cannot get coverage in the voluntary market, the National Council will assign it to a servicing carrier. There are several servicing carriers in each state. That carrier will handle the business of that risk, but will fully cede it to the pool.

Through the mechanism of the pool, the results are, in effect, assumed reinsurance that goes back out to all of the carriers who participate in workers compensation in that state.

(Slide 2-1)

Let's take a quick look at the written premium, how it has grown from almost nothing and how rapidly it has grown in the most recent years. You can see that the national pool, which is the result of combining 30 states, is shown in dark on this particular slide, and the other pools that the NCCI manages are shown in the white portion. Either way that's a huge amount of premium and quite a bit of growth most recently.

(Slide 2-2)

Has the growth slackened? I can bring you up to the first quarter and as you can see from these quarterly premium writings, they keep on going up. At last count when we take out a number of factors, we're left with an estimate of 7 percent real growth in the national pool and the other pools that the National Council administers.

Take out all of the rate changes, take out the wage inflation and you're still left with about a 7 percent growth at the most recent point. So, the problem is big and it doesn't seem to be turning around yet.

(Slide 2-3)

To try and bring it into proportion, we can say, as Al was doing for the various lines, what if we relate that involuntary pool premium to the voluntary, what does it look like? And as you can see, it's a little bit larger in the earlier years than we saw in that first graph. But it's still much higher in the recent years than it has been in a long, long time. In short, what we're seeing is conditions that are really unprecedented since at least the early '70s as far as the size of that pool.

(Slide 2-4)

Here is an interesting effect you can see from this graph, with the loss ratio for the residual market in the heavy line, and in the lighter line the market share that we were looking at in the other exhibit. You'll see that they just turn perfectly in unison, but in opposite directions.

Now, what's happening in the most recent years to a large extent is that as that market share grows, more and more of the risks that are not so terrible are being put into the residual market. And as a result the loss ratio in the residual market comes down a bit more than the total market does, an effect of the redistribution and an indicator that in the residual market, when you come to the reserving, there are some special considerations because of the composition and the changing composition of the pools.

(Slide 2-5)

Very quickly because Al has done an excellent job, here is the picture of the operating loss. This is where much of your pain is going to start coming from. And as you can see, it has been growing significantly for the pools. And oddly enough, even a relatively small state like Maine can be a significant part of the problem as you see in the upper portion of those bar graphs.

(Slide 2-6)

To really bring it home, we can look at what we call the residual market burden. This is operating loss related to the voluntary premium. In other words, 12.3 percent is the burden in 1989 for the national pool, and that means 12.3 percent of the voluntary premium that you bring in is going to wind up going right out the door to fund that operating loss for the pool.

(Slide 2-7)

The impact on you is going to depend on where you write. That was a national pool average for the burden. Suffice it to say that this slide shows in the darker areas where that burden is the highest and in the lighter shaded areas where that burden was smallest, at least for the policy year 1988. The white areas are not necessarily good news. Those may simply not be states that participate in the pool to any significant extent.

(Slide 2-8)

One final point is that with the growth in the pool that we've seen in recent years and with what passes for a slight leveling off of the rate of increase, there are real cash flow problems in the pool. The way the pool operates, unlike perhaps some other involuntary market mechanisms, is that the money that comes in is sent back out to the companies who are participating. And when

cash is needed, a call goes out to the companies to provide the cash. And those huge operating losses year after year are starting to come home to roost. In 1989, there was about a half a billion dollar negative cash flow. That means money that has to be gotten from the companies, and that's a real pain also.

(Slide 2-9)

I'd like to talk a little bit about the reserving. Very quickly, here is the data we collect including premiums and losses. Part of the reserving that's done in the pool is for the EBNR, but I want to concentrate as the name of the seminar indicates, on the loss side. What we've been collecting has been both paid losses and case reserves. We are starting to collect for the assigned risk the full loss reserve including IBNR, from the carriers and that's something that we'll be able to look at in the future.

(Slide 2-10)

The methodology for the pool loss reserving is split into two areas. We do something a little different on the older policy years. What do I mean by older policy years? Right now that would be policy years 1986 and prior. What we do there is we take the case incurred, which was reported to us, and we develop it.

The development is done in two different ways. One way is to look at the latest three year average for whatever link ratio you're trying to obtain. The other is to look at matching years. These are matching years in that cycle of growth and depopulation because there are impacts having to do with, one, just the growth itself and, two, the composition of the residual market that you're looking at.

What we're doing right now is a very recent change. Whichever of the two methods of development yields the higher estimate, we're using that in the reserving process on the older years.

For the recent policy years we do two different things. One approach is we go through the same process of taking the case incurred and developing it out two different ways.

The second approach because of the variability that would be associated with those estimates is to establish a base year which is currently 1986, the most recent policy year that's done under the method for older policy years. We trend it for the relationship between losses and premiums. We bring it on level -- for the benefit changes, for example. And we look at both of those -- the case incurreds that are developed, and the trended on-level base year -- to come up with the estimate for the incurred for those most recent policy years.

(Slide 2-11)

What has been the history? This slide shows four different policy years, the incurred loss ratio as estimated by the National Council and how that has developed over time. Now, remember these are policy years. That first evaluation is really an incomplete policy year. You don't have a full look at what's going on in the policy year until that second evaluation.

You can see 1980 at the bottom has been fairly stable. 1982 was fairly stable after the initial development when the full policy year came in. You can jump all the way up to 1984, which was unstable in the sense that the estimate of the incurred loss ratio had to be increased time after time. Two years later, policy year 1986 is just below 1984. And that seems to be developing a little bit better.

What happened to 1984? Well, part of the answer is that the entire industry was off the mark in 1984. If you look at Schedule P results for the entire industry, you'll see that for the loss ratio from the first evaluation to the fifth evaluation, accident year '83 went up 5 points, and accident year '84 went up 12 points, which is quite a significant amount of additional development on that year.

(Slide 2-12)

And if you put that policy year '84 pool result on the same graph with the all industry total market accident year '84, you'll see a pattern like this. And most of it is just the industry missing the result. Part of it is that we changed methods after that because we were not picking up some of that growth because of the methods we were using at that time. We weren't picking up some of the changes in composition. So, we're now using a somewhat different method using the matching years. They weren't used at that time.

(Slide 2-13)

When is it going to change? We're doing a number of things in the residual market itself to try and make the problem less. The biggest thing that can be done is to fix the voluntary market rate level.

(Slide 2-14)

As you can see here, the operating ratio for the total market is shown in the white line, the market share for the residual market is shown in the black line. They track very well except that the market share in the residual market lags by about two years.

And you can see that as long as that total market operating ratio is up that high, and we're turning in combined ratios of about 118, there isn't going to be much hope for that residual market

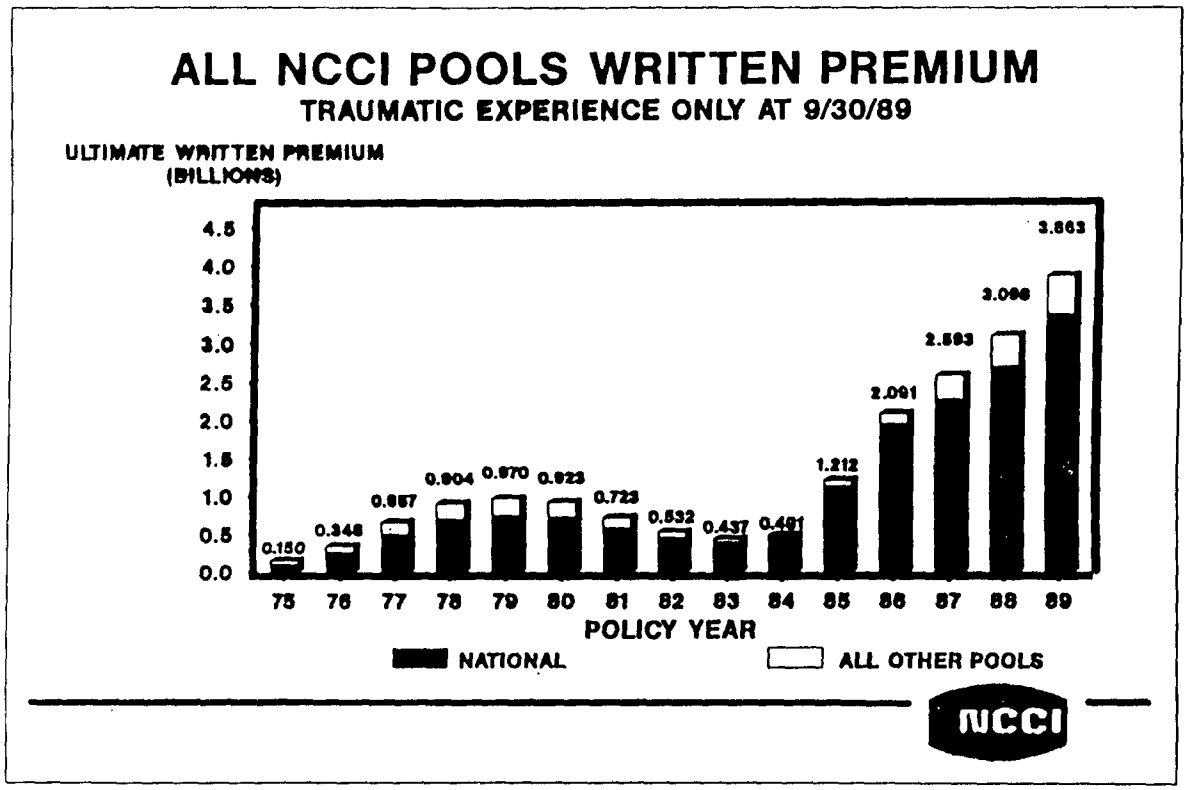
share coming down, absent the specific measures that we're taking in the residual market. And we could even expect a lag of two years. So, that is the bad news about when this will go away.

That concludes my presentation. Thank you.

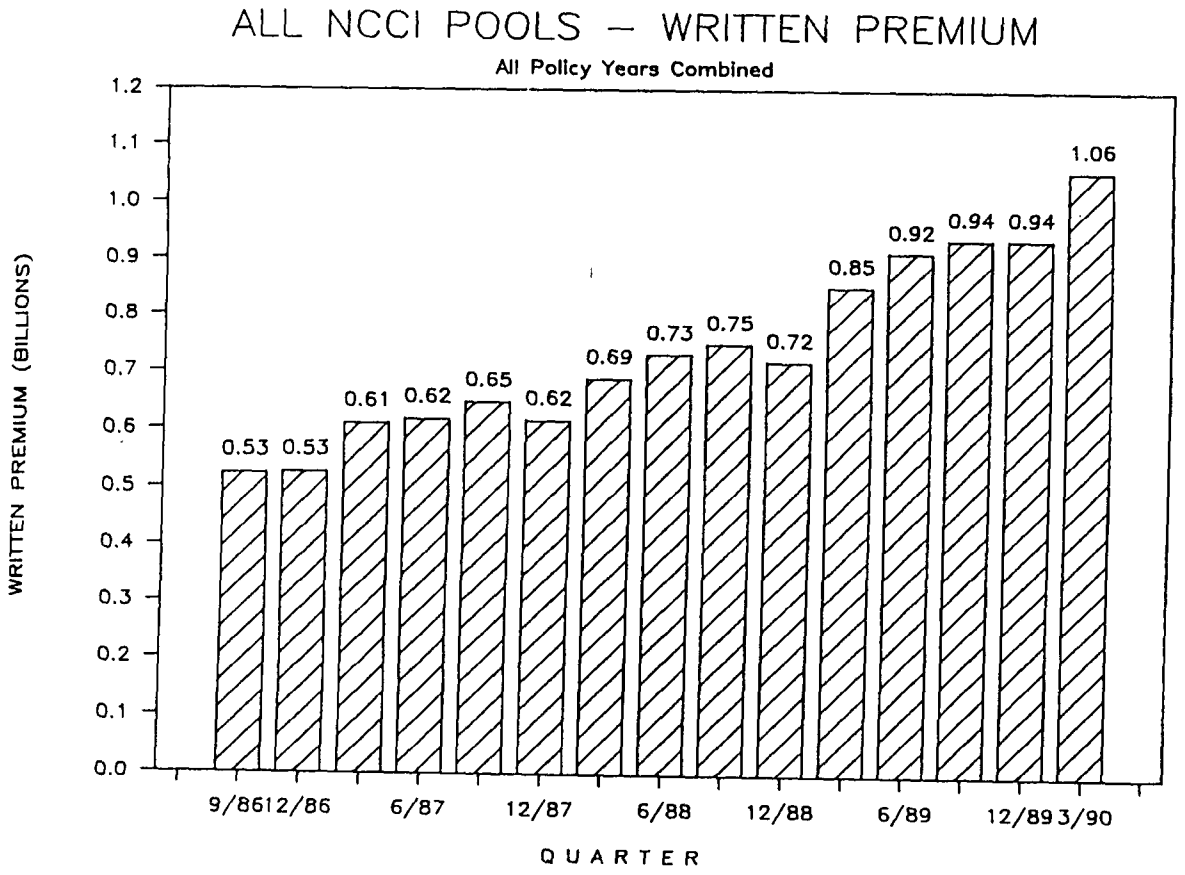
MR. RYAN: Thank you, Rich. Our next speaker is from Travelers. His past actuarial experience includes some consulting experience with Milliman and Robertson and for ten and a half years in insurance company positions. Jim Foote is formerly Chief Actuary at the New Hampshire Insurance Group and currently Chief Actuary in the worker's compensation strategic business unit of the Travelers.

His prior experience includes assistant professor of mathematics at Monmouth College. He is a Fellow of the Casualty Actuarial Society, and a Member of the American Academy of Actuaries. The overall national pool experience is bad. Jim is here to tell you that there are some states that are different than that. Texas not only is bad, but complicated.

Jim?



Slide 2-1



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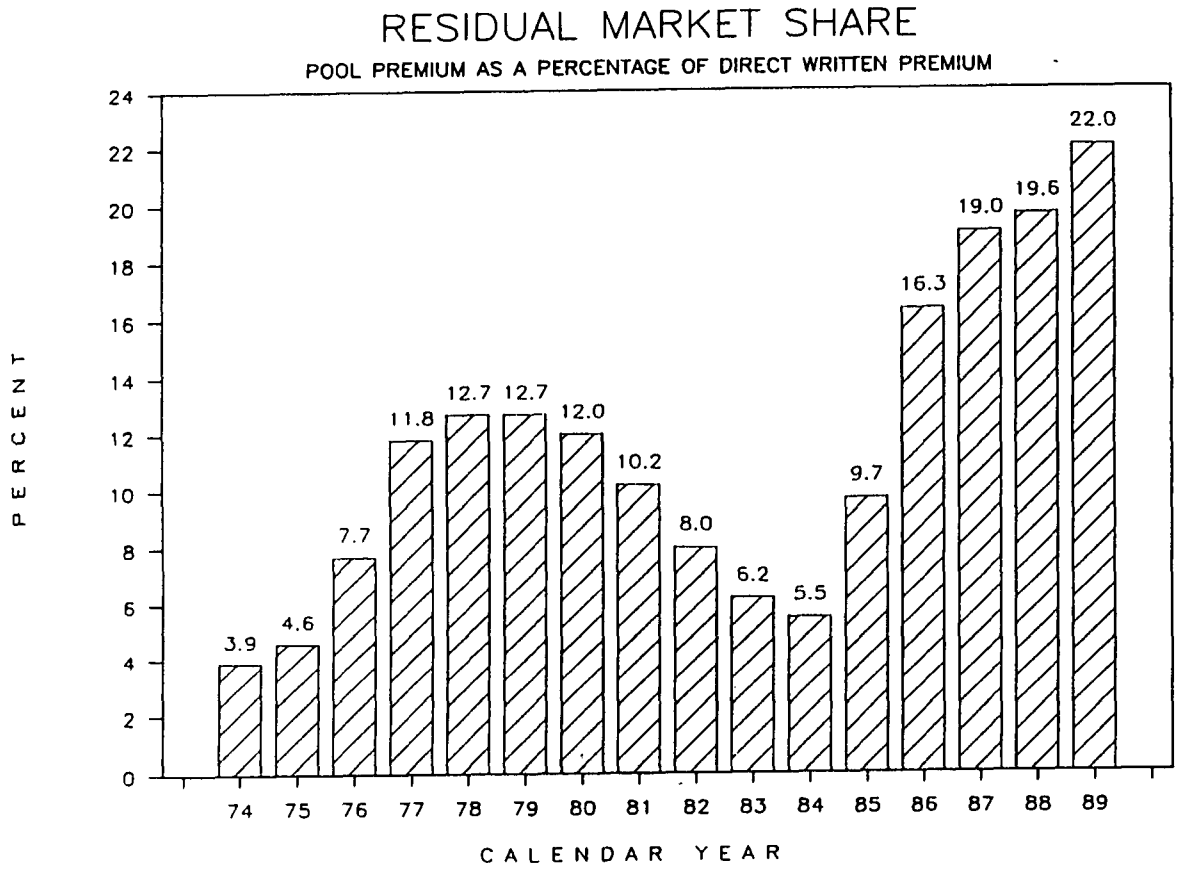

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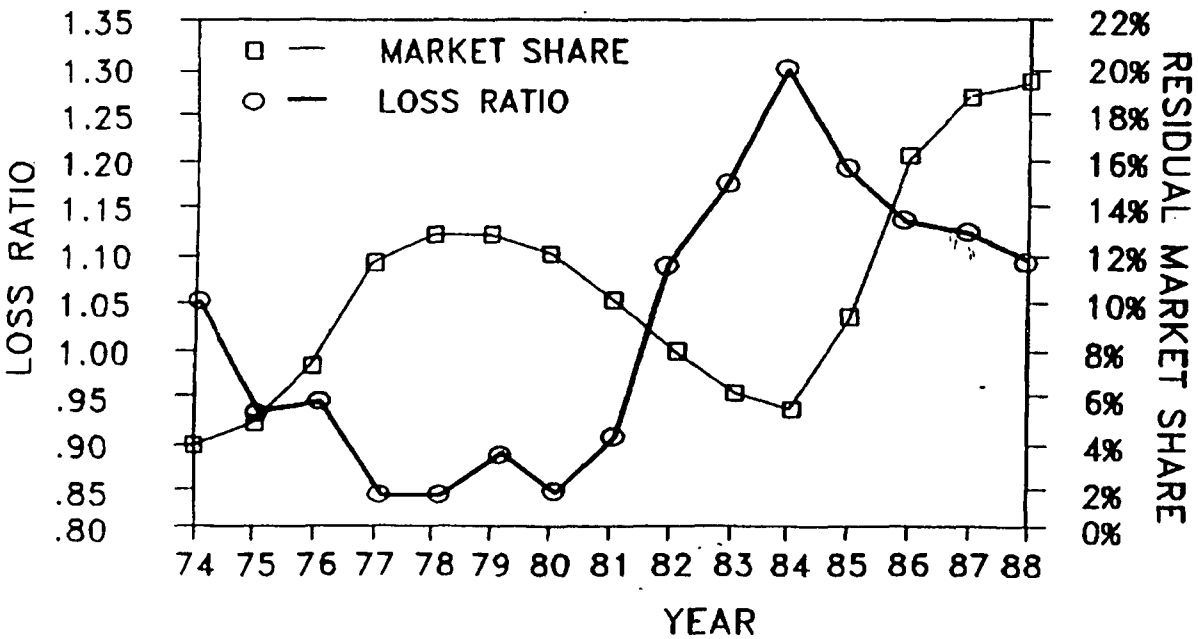
COMPARISON OF RESIDUAL MARKET LOSS RATIO AND RESIDUAL MARKET SHARE



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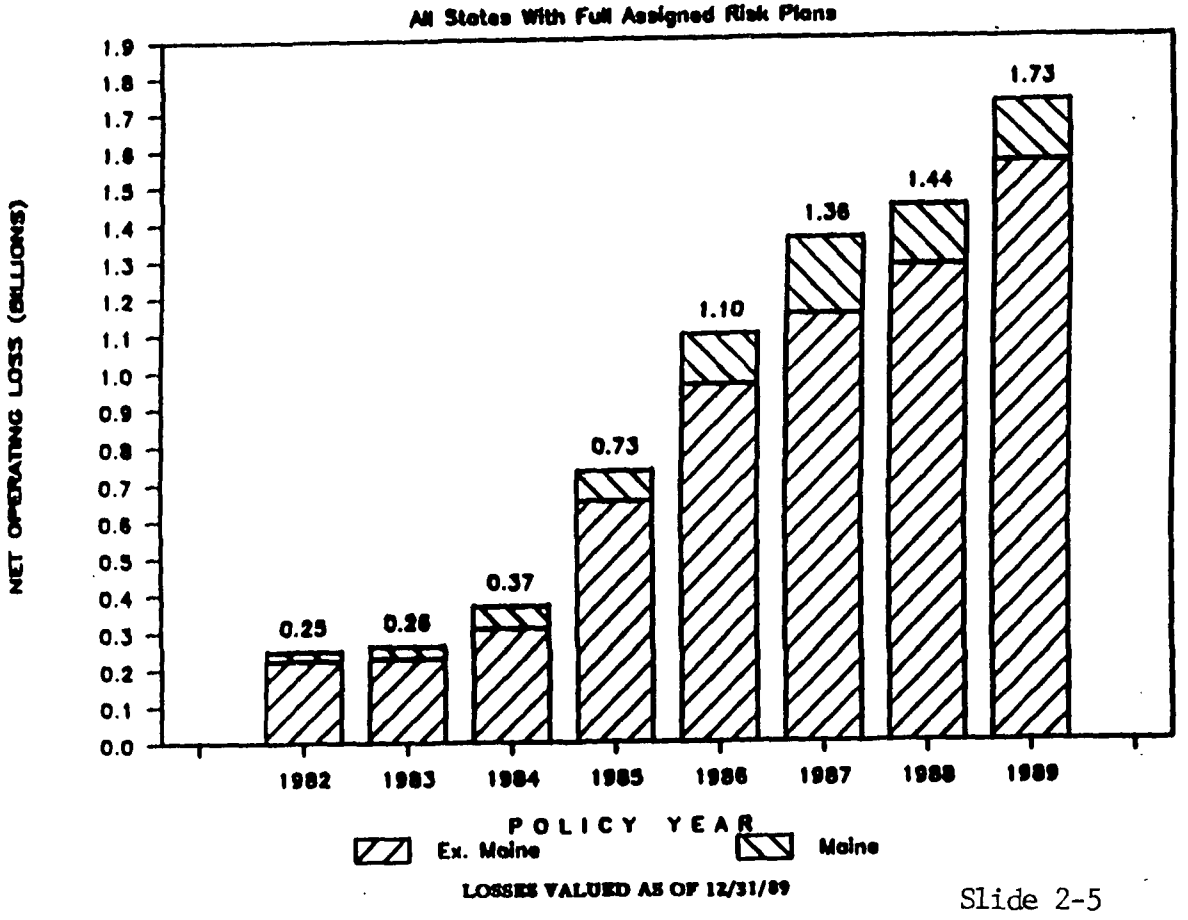
RESIDUAL MARKET OPERATING LOSS



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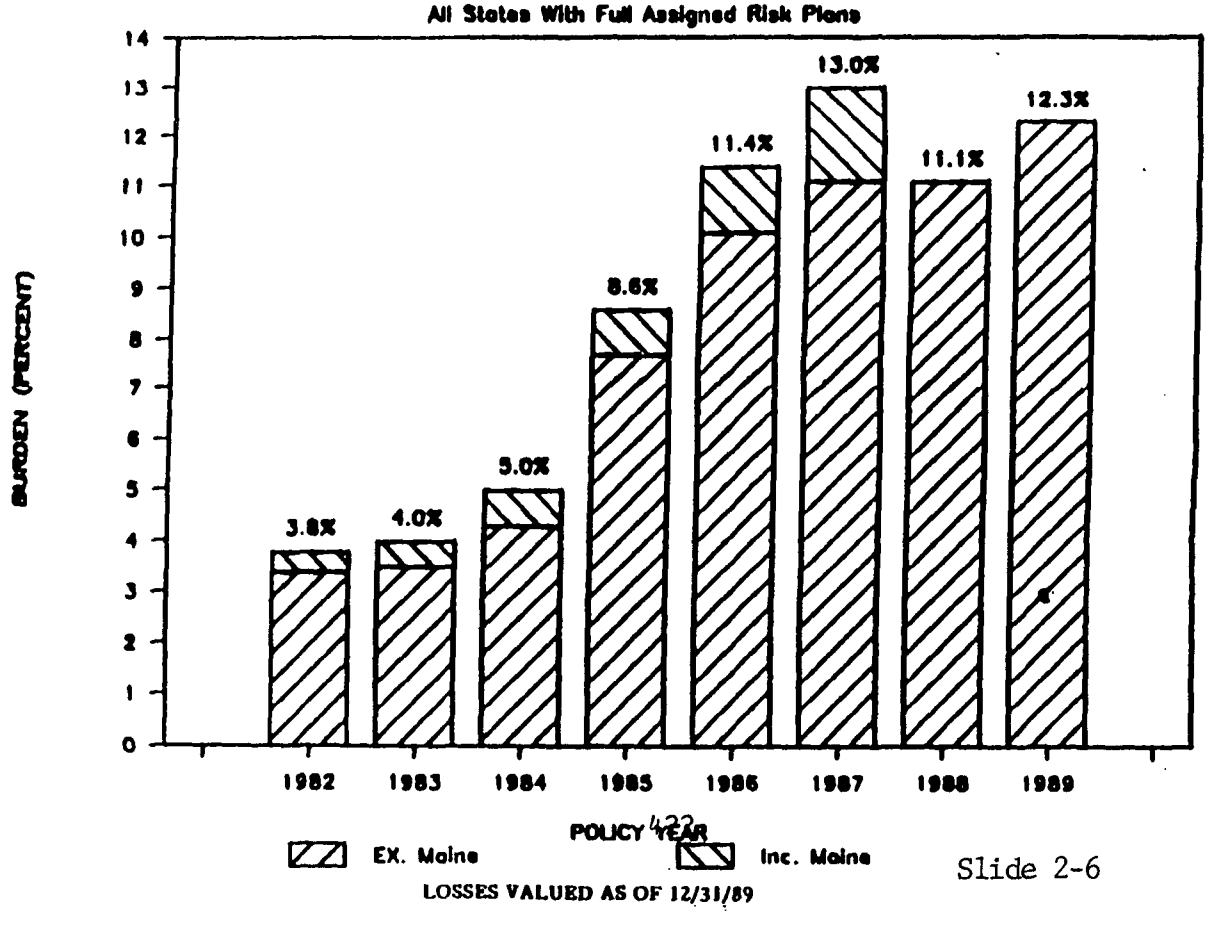
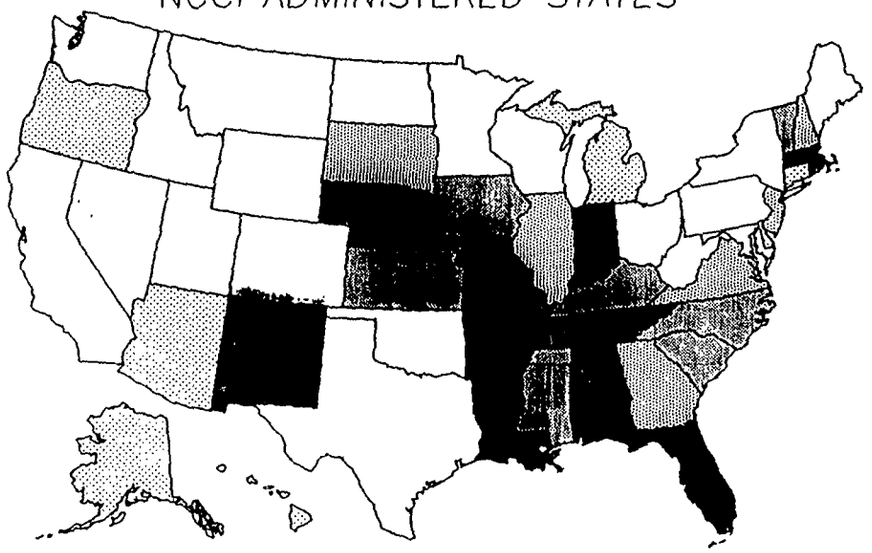
RESIDUAL MARKET BURDEN



Slide 2-6

RESIDUAL MARKET BURDEN
POLICY YEAR 1988
NCCI ADMINISTERED STATES

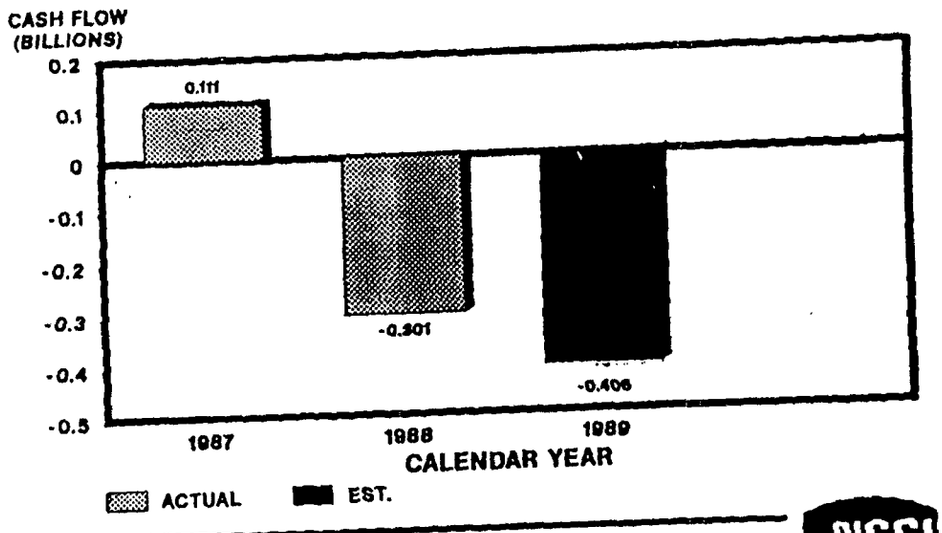


OVER 20% | 13%–20% | 7%–13% | 4%–7% | BELOW 4%

BASED ON LOSS RESERVE VALUATION AT 12/31/89

Slide 2-7

CASH FLOW
ALL POOLS EXCEPT THE MAINE WCRMP



NCCI

Slide 2-8

DATA

Premiums

Losses: Paid and Case Reserves

Slide 2-9

POOL LOSS RESERVING

Older Policy Years

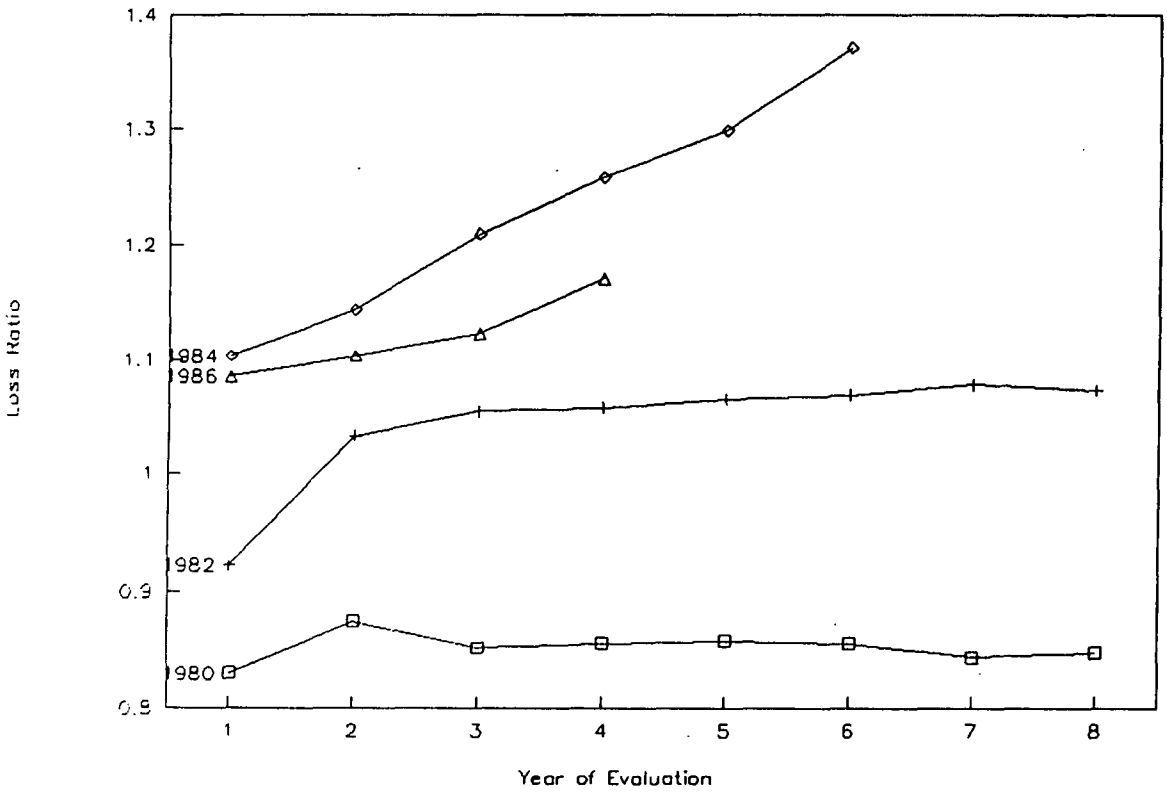
- Case Incurred Developed
  Development - 3 Year Average
  - Matching Years

Recent Policy Years

- Case Incurred Developed
- Base Year - Trended
  - On-Level

Slide 2-10

Policy Year Loss Ratios



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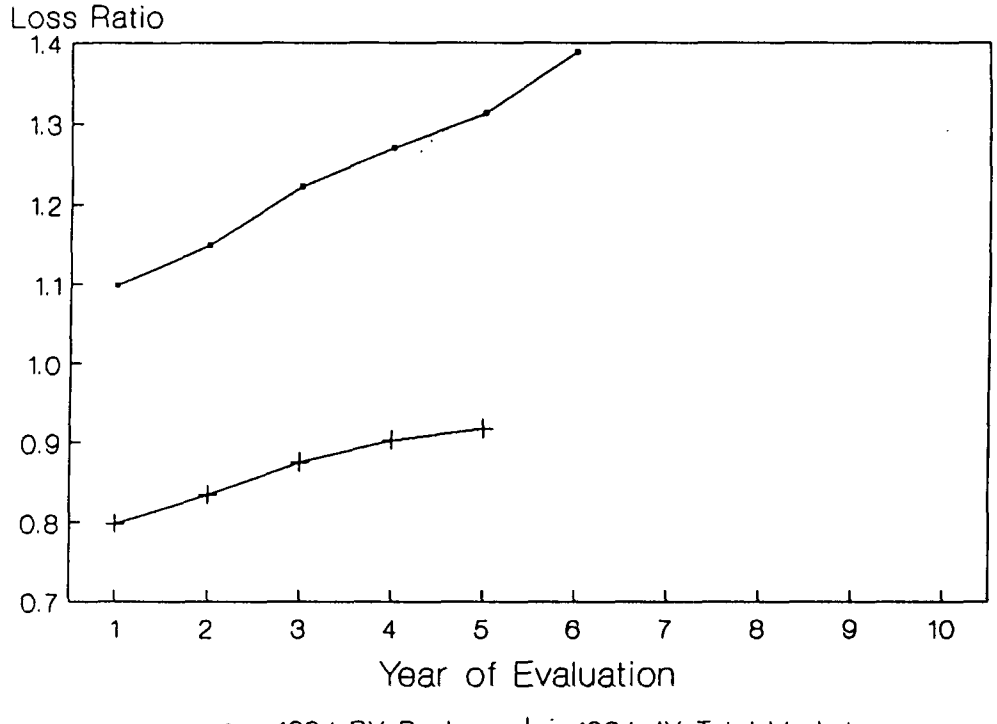
1984 LOSS RATIO DEVELOPMENT



Slide 2-12

STEPS TO REDUCE THE POOL OPERATING LOSS

Total Market

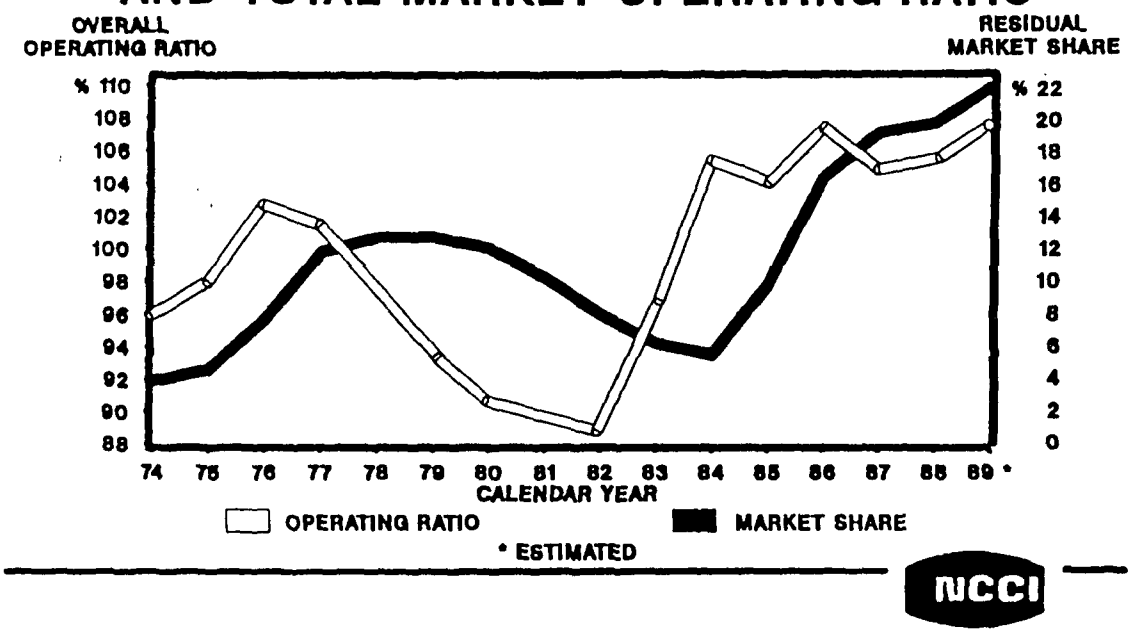
- Rate Increases
- Workers Compensation Reform

Residual Market

- Pricing Differentials
- Assigned Risk Adjustment Plan
- Assigned Risk Rating Program
- Underwriting Rules

Slide 2-13

COMPARISON OF RESIDUAL MARKET SHARE AND TOTAL MARKET OPERATING RATIO



Slide 2-14

Most of the material in my presentation is factual. Any opinions expressed, however, are my own. I do not speak for the management of the pool or for the governing committee.

The Texas Workers' Compensation Assigned Risk Pool (Pool) was formed in 1953 to provide a market for those risks in the state of Texas who could not find workers' compensation coverage in the voluntary market. This is an independent pool and is not affiliated with the National Pool. All insurers authorized to write workers' compensation insurance in Texas are members of the pool. Although the pool may adopt bylaws, rules and regulations, all such bylaws, rules and regulations are subject to the continuing regulation of the State Board of Insurance.

The administrative office of the Pool is in Austin under the direction of general manager Charles MacKay. The Pool is governed by a governing committee of twelve member companies. I currently represent The Travelers as a member of the 1990 Governing Committee and as Chairman of the Actuarial Committee. There are currently nine servicing carriers which issue policies and handle claims for the Pool. Up until last year, there were ten servicing carriers.

There are several differences in the way the Texas pool operates as compared to the National Pool. One of the key differences is

that this pool operates on a calendar year basis rather than a policy year basis. This means that each year an operating result is calculated on an incurred basis for the pool's prior calendar year. In all but one year of the pool's history, this result has been a loss. After a deficit is determined, the member companies are assessed for the full amount of the deficit based on their voluntary market share for that calendar year. This means that the Pool accumulates reserve funds on which it earns investment income, another key difference. The operating expenses of the Pool are deducted from the investment income for the year and the surplus is returned to the members based on their market share for the calendar year. It does not take much effort to perceive that there is an equity problem in matching calendar year operating results with calendar year market share.

The pool grew slowly in the early years as you can see in Exhibit 1. In 1954 there were a little over 1000 risks and a little over $1 million in premium. Twenty years later, there were a little over seven and a half thousand risks and about thirteen and a half million dollars in premium. In terms of market share however, there was not much growth in the first twenty years. From 1974 to 1978, there was dramatic growth in the Pool followed by a steady decline up through 1983. This is very similar to the growth in the National Pool during that period. The most dramatic growth, however, began in 1985 and

has continued through the present. Market share for the pool reached an unprecedented level of over twenty-three percent in 1989. The 1989 written premium was $810 million and the 1990 premium looks like it will hit $1.2 billion. Although a great deal of this premium growth is due to rate increases and pool surcharges, there continues to be growth in risk counts. Graph 1 gives a better illustration of the growth in market share.

Exhibit 2 shows what has happened with the operating result of the pool over the years. You can see that as the deficit was building over the seventies and early eighties, the investment income was also increasing. The net result as a percentage of the voluntary market premium, what I have referred to as "Voluntary Market Burden", did not appear to be a problem for the industry prior to 1985. The 1985 year, however, was the beginning of a very rapid rise in both the size of the deficit and the voluntary market burden. For 1989 the operating deficit was $551 million. After deducting $22 million in investment income, the net deficit was $529 million, a voluntary market burden of almost twenty percent. Graph 2 clearly illustrates this sudden change.

At the end of 1985, the Pool's reserve for loss and loss adjustment expense was only $207 million. As of December 31, 1989, the total loss and loss adjustment expense reserve for the

pool was $1.3 billion, an increase of over 500%. The reason that investment income has not grown more during this period is that beginning with the 1986 operating result part of the assessment was deferred to future years. Of the 1989 total reserve, $537 million is in deferred assessments from years 1986 through 1988. This will be collected in equal installments during 1990, 1991 and 1992. The 1989 deficit of $551 million will be collected in equal installments over 1990 to 1993. Thus the Pool held funds of approximately $300 million during 1989. (See Appendix)

Why did the deficit grow so rapidly over such a short period of time? For several years up through 1985, the Pool had two additions to case reserves in the form of bulk reserves; 10% of the net case reserves for IBNR and a Rule X reserve of 25% of net case reserves. In effect, the reserve for the broad definition of IBNR was 35% of the adjusters' case reserves. The 10% IBNR reserve was increased to 15% in 1986 for a total bulk reserve of 40%.

In 1987 the governing committee became concerned with the rapid growth in the Pool and hired a consulting actuary to review the reserves of the Pool. The Pool itself did not have the required data for an actuarial analysis, so the consultant had to secure the data from the individual service carriers and compile it for

analysis. The consultant has done an annual review each year since then and there has been considerable development in his estimates over this period. The governing committee, surprised by the size of the indicated shortfall, did not increase reserves by the full actuarial indication in 1987 or 1988. They took no action in 1987 and added a contingency reserve of $12 million in 1988 to the formula bulk reserve.

In 1989 the governing committee agreed to have an actuarial subcommittee made up of actuaries from several member companies of the committee review the report of the actuarial consultant on the 1988 results and the governing committee's initial decision in setting the December 31, 1988 reserve level. The governing committee had initially increased the contingency reserve from $12 million to $52 million. As a result of the actuarial committee review, an additional $62 million was added to the 1988 reserves which in effect increased the contingency reserve to $114 million. This resulted in a supplemental assessment to the membership on the 1988 year.

The old formula reserves have now been discarded. This year the actuarial committee met with the consultant to review his analysis of the reserves as of December 31, 1989 and subsequently recommended that the governing committee accept the recommendation of the consultant. Although we had some

differences of opinion with the consultant on the analysis, the difference was not considered material in view of the overall loss reserve of $1.3 billion. The governing committee accepted the consultant's recommendation and the result is the $551 million deficit. Exhibit 3 shows the status of the year end 1989 reserves. You can form your own judgement on the reasonableness of these numbers.

I referred earlier to the inequity of the current system. The 1989 deficit of $551 million is due in part to $111 million of adverse development on accident years 1986 through 1988. Thus, members of the Pool are being assessed on 1989 market share for deficits which are being generated by prior years experience. On the other hand, if the current estimate of ultimate losses proves to be inadequate, part of the deficit generated by 1989 injuries may be assessed based on future market share.

I have tried to reconstruct what would have happened with the Pool deficit on an accident year basis back to 1980. In order to do so, I took the ratio of commissions and service fees to written premium and applied that ratio to earned premium to produce earned commission and service fee amounts. Then I defined the operating loss to be: Earned Premium less Earned Commission less Earned Service Fees less Operating Expense less incurred Loss and Loss Adjustment Expense. In order to simplify

the process, I have left out investment income. The result is compared to the gross calendar year deficit for the corresponding years in Exhibit 4 (details in Appendix).

As you can see, there is a significant difference in results. There even appears to be a profit in 1980. Had we been projecting accident year losses accurately in the early 80's, we would have recognized the problem earlier.

It is also important to recognize what is happening now. Even though we have just declared the largest deficit in the pool's history, if we look at accident year results, we see some small improvement.

I have three graphs to illustrate the comparison of accident year and calendar year. Graph 3 shows the comparison on a dollars of deficit basis. Graph 4 shows the ratio of deficit to voluntary market written premium. Graph 5 shows the deficit as a ratio to pool earned premium. The accident year numbers show a clear indication that things are beginning to turn around, but we still have a long way to go. Calendar year data would only indicate a steadily deteriorating situation.

I have done some projections on what I expect the 1990 results to be. Although the pool's combined ratio is definately

improving, the deficit for the 1990 accident year will most likely exceed the 1989 accident year. I expect a deficit between $400 million and $530 million for the 1990 calendar year. This would represent a voluntary market burden of 13% to 17%. Company actuaries should be doing their own analysis of the situation to be sure their company is anticipating their share of the 1990 deficit.

Another factor to be considered is the situation with Texas Employers Insurance Association, once the largest workers' compensation insurer in Texas. This company is now in conservatorship. Their current liability for pool assessments, including the 1989 deficit, is about $83 million. The amount due in 1990 is $25 million. If they can not pay their assessments, the shortfall will go back to the other pool members.

What else does the future hold? There will be significant changes in the way the pool operates due to the recent reform legislation of Senate Bill 1, but we do not have time to discuss that here. The pool governing committee will be considering a possible change to a policy year accounting system for future deficits. And of course, one of the most important items affecting future deficits is what happens at the rate hearings this fall.

EXHIBIT 1

TEXAS WORKERS' COMPENSATION ASSIGNED RISK POOL SHARE OF TEXAS WORKERS' COMPENSATION MARKET

CALENDAR YEAR	RISKS ASSIGNED	POOL WRITTEN PREMIUM (000s)	POOL MARKET SHARE
1954	1,079	$1,049	N.A.
1964	3,146	3,357	2.3%
1974	7,643	13,537	2.6%
1978	30,597	114,769	10.4%
1983	19,953	45,652	2.8%
1984	26,136	50,213	3.1%
1985	55,134	147,997	8.7%
1986	70,133	351,050	16.1%
1987	69,330	450,262	18.5%
1988	73,927	549,185	19.1%
1989	85,758	809,836	23.4%

TEXAS WORKERS' COMP. ASSIGNED RISK POOL

WRITTEN PREM. SHARE OF VOLUNTARY MARKET

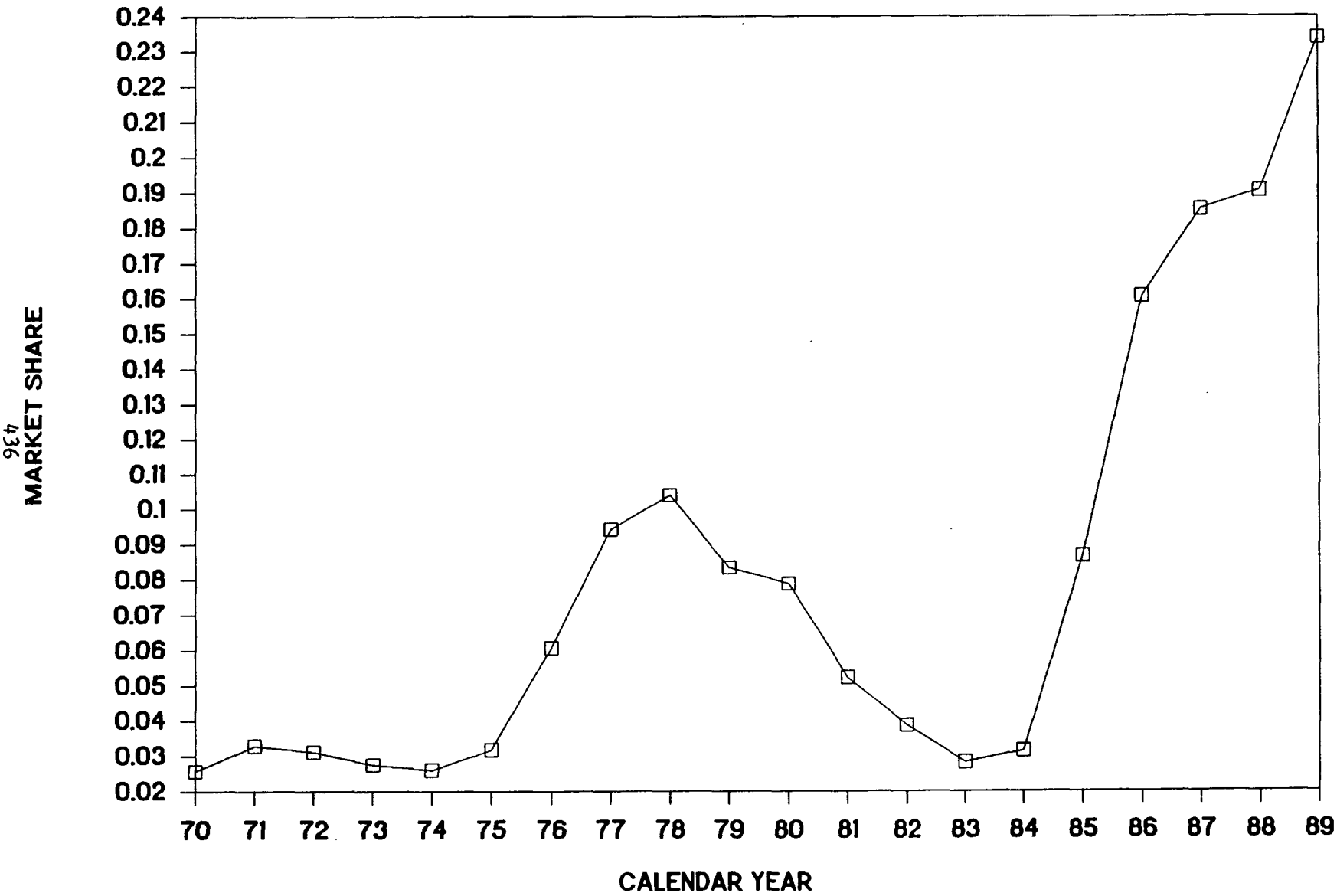


EXHIBIT 2

TEXAS WORKERS' COMPENSATION ASSIGNED RISK POOL DEFICIT AND OVERBURDEN

CALENDAR YEAR	UNDER-WRITING DEFICIT (000s)	INVEST INCOME (000s)	NET DEFICIT (000s)	VOLUNTARY MARKET BURDEN
1964	$738	$106	$632	0.4%
1974	2,397	645	1,752	0.3%
1978	14,358	4,719	9,639	1.0%
1983	19,883	16,201	3,682	0.2%
1984	14,459	13,721	738	0.0%
1985	73,504	16,130	57,374	3.7%
1986	182,280	16,839	165,441	9.0%
1987	334,178	17,842	316,336	16.0%
1988	461,792	18,935	442,857	19.0%
1989	551,183	22,116	529,067	19.9%

TEXAS WORKERS' COMP. ASSIGNED RISK POOL

VOLUNTARY MARKET OVERBURDEN

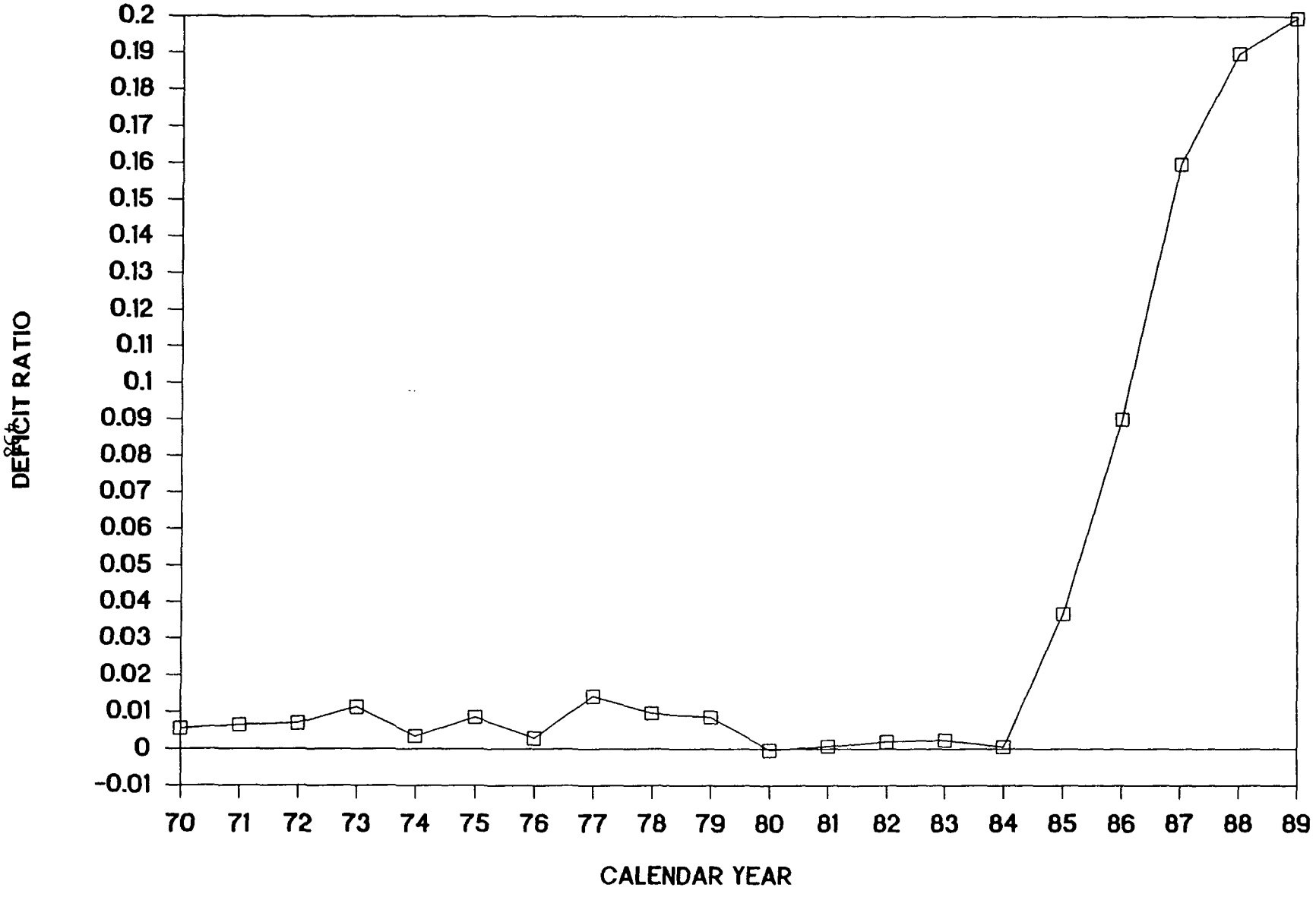


EXHIBIT 3

TEXAS WORKERS' COMPENSATION ASSIGNED RISK POOL
CALENDAR/ACCIDENT YEAR RESERVE STATUS
AS OF 12/31/89

ACCIDENT YEAR	PAID LOSS	CASE RESERVES	IBNR RESERVES	ESTIMATED ULTIMATE LOSS
PRIOR	-	26,015	0	-
1980	54,017	4,254	0	58,271
1981	48,952	4,906	0	53,858
1982	49,032	3,965	0	52,997
1983	46,805	5,990	334	53,129
1984	57,498	8,103	421	66,022
1985	190,916	20,613	8,808	220,337
1986	397,864	50,028	24,385	472,277
1987	526,011	96,340	49,091	671,442
1988	518,073	198,254	114,867	831,194
1989	228,481	368,522	340,222	937,225
TOTAL		786,990	538,128	

AMOUNTS IN $000s

DATA SOURCE: INDEPENDENT ACTUARIAL SERVICES, INC.

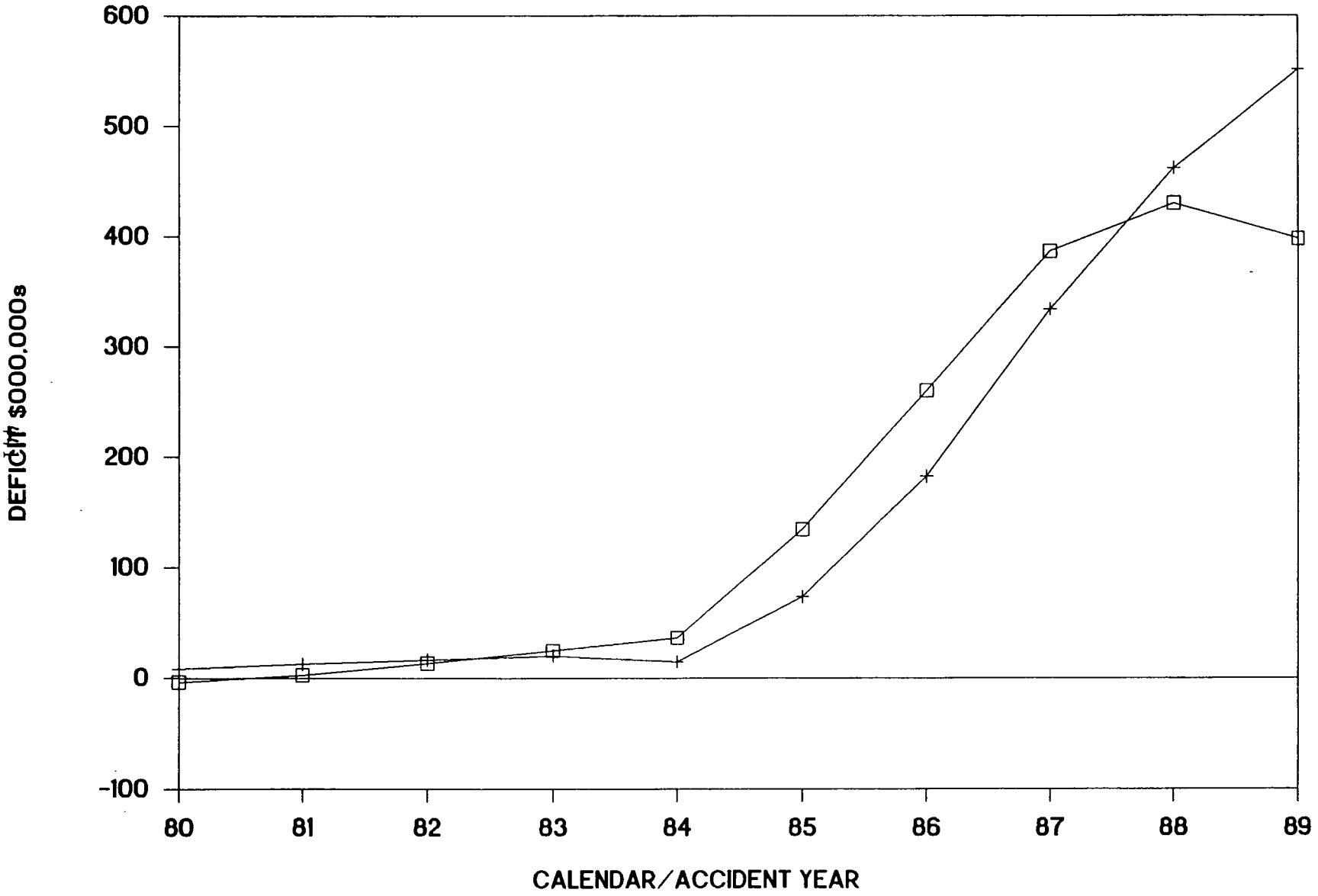
EXHIBIT 4

TEXAS WORKERS' COMPENSATION ASSIGNED RISK POOL UNDERWRITING RESULTS

YEAR	EARNED PREMIUM	CALENDAR YEAR UNDERWRITING RESULT	ACCIDENT YEAR UNDERWRITING RESULT
1980	$96,415	($8,163)	$3,838
1981	80,251	(12,521)	(2,740)
1982	62,888	(16,537)	(13,364)
1983	47,140	(19,883)	(24,648)
1984	49,109	(14,459)	(36,020)
1985	134,033	(73,504)	(134,288)
1986	322,475	(182,280)	(260,183)
1987	434,005	(334,178)	(386,710)
1988	518,403	(461,792)	(430,161)
1989	739,787	(551,183)	(397,751)

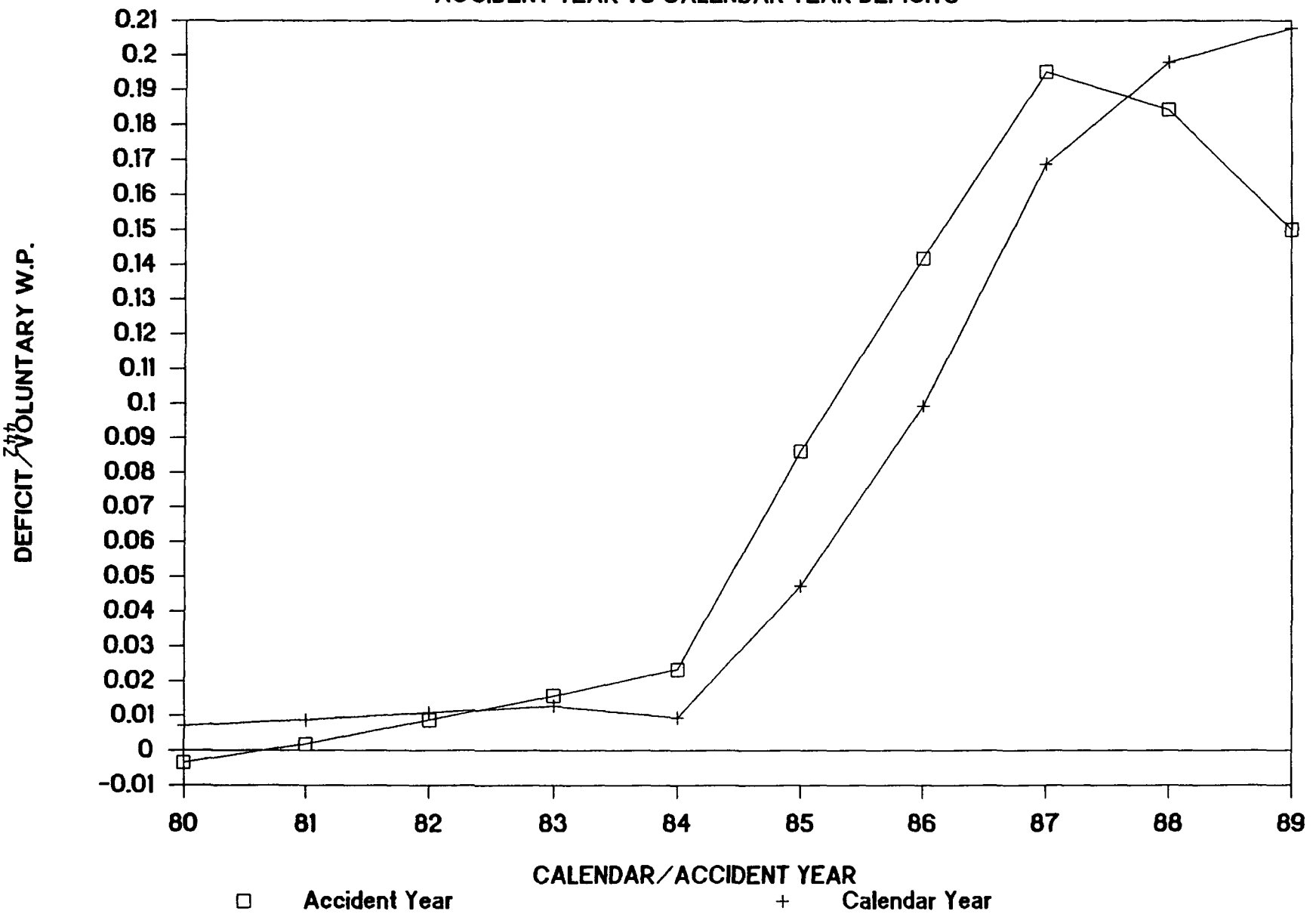
TEXAS WORKERS' COMP. ASSIGNED RISK POOL

ACCIDENT YEAR VS CALENDAR YEAR DEFICITS



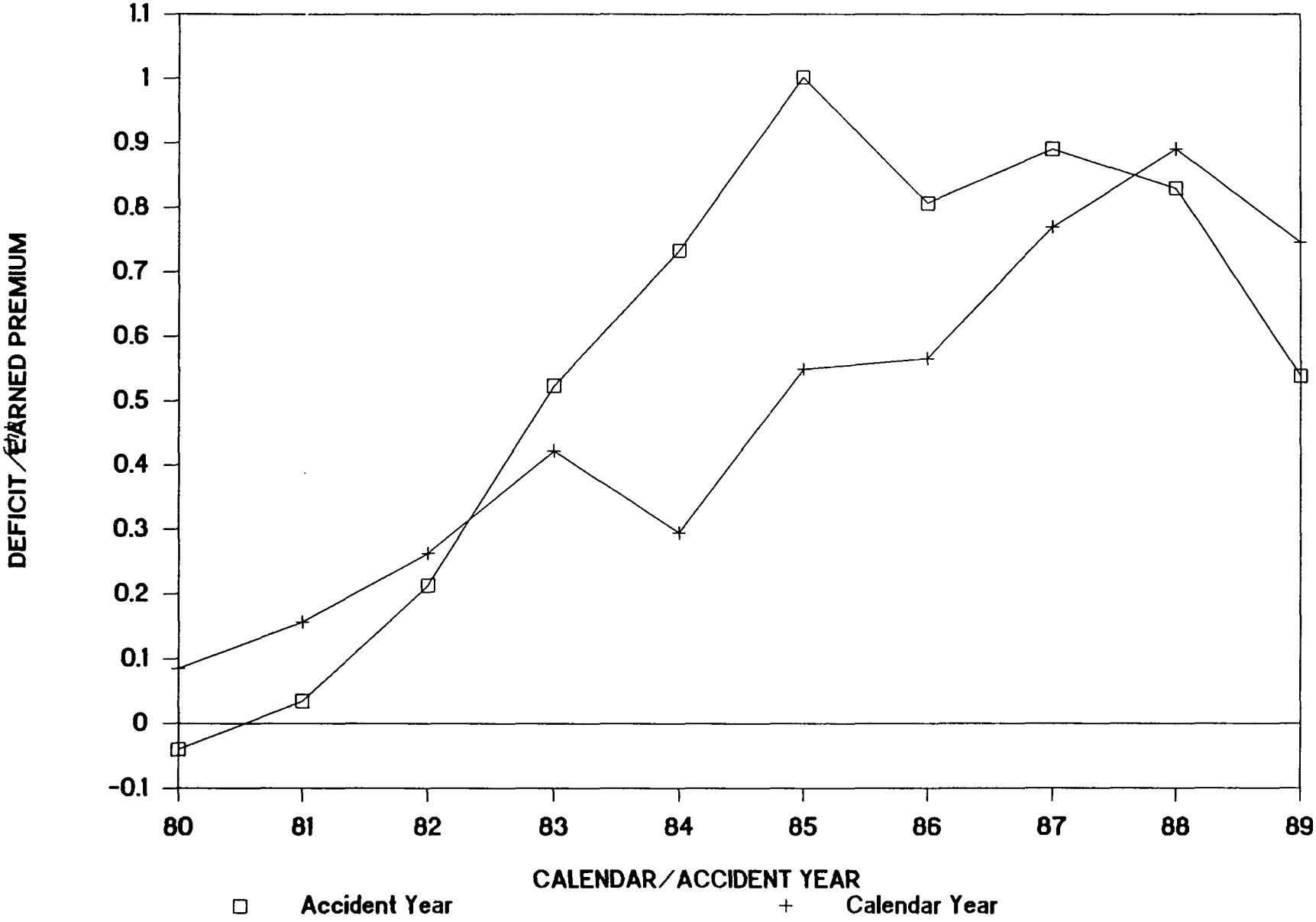
TEXAS WORKERS' COMP. ASSIGNED RISK POOL

ACCIDENT YEAR VS CALENDAR YEAR DEFICITS



TEXAS WORKERS' COMP. ASSIGNED RISK POOL

ACCIDENT YEAR VS CALENDAR YEAR DEFICITS



APPENDIX

EXHIBIT A1

TEXAS WORKERS' COMPENSATION ASSIGNED RISK POOL
FINANCIAL STATUS AS OF 12/31/89

Net Reserve for Loss and LAE		$1,317,353
Defered Assessments	1986	47,959
	1987	126,592
	1988	362,019
Assessment for CY 1989		551,183
Total Due to Pool		$1,087,753

Assessments to be levied on uncollected deficit as of 12/31/89

1990	316,652
1991	316,652
1992	316,652
1993	137,796
	$1,087,753

Data source: TWCARP Financial Statement 12/31/89

Exhibit A2

TEXAS WORKERS' COMPENSATION ASSIGNED RISK POOL
UNDERWRITING RESULTS
($000s)

Year	Written Premium	Earned Premium	Service Fees	Comm.	Operating Expense	Earned Service Fee + Comm	Ultimate AY Loss &ALAE	AY Underwriting Result	CY Underwriting Result
1980	$95,684	$96,415	$28,957	$3,165	$1,939	$32,367	$58,271	$3,838	($8,163)
1981	78,034	80,251	23,609	2,601	2,178	26,955	53,858	(2,740)	(12,521)
1982	60,702	62,888	18,380	2,053	2,086	21,169	52,997	(13,364)	(16,537)
1983	45,188	47,140	13,696	1,814	2,479	16,180	53,129	(24,648)	(19,883)
1984	49,679	49,109	15,064	1,915	2,323	16,784	66,022	(36,020)	(14,459)
1985	146,255	134,033	44,398	3,961	3,666	44,318	220,337	(134,288)	(73,504)
1986	347,857	322,475	105,366	7,835	5,440	104,941	472,277	(260,183)	(182,280)
1987	446,407	434,005	134,647	13,751	4,998	144,275	671,442	(386,710)	(334,178)
1988	586,241	518,403	112,657	14,659	4,787	112,583	831,194	(430,161)	(461,792)
1989	809,836	739,787	190,835	22,358	5,561	194,752	937,225	(397,751)	(551,183)

Exhibit 3A

TEXAS WORKERS' COMPENSATION ASSIGNED RISK POOL

PROJECTION OF 1990 UNDERWRITING RESULTS

($ millions)

		OPTIMISTIC	PESSIMISTIC
1.	1989 Earned Premium	$740	$740
2.	A.Y. 1989 Incurred Loss & ALAE	937	980
3.	A.Y. 1989 Loss & ALAE Ratio	126.6%	132.4%
4.	Premium on level factor	1.323	1.323
5.	Benefit Change	0.950	0.950
6.	Loss Trend	1.230	1.230
7.	Projected A.Y. 1990 Loss & ALAE Ratio [(3)/(4)]*(5)*(6)	111.8%	117.0%
8.	Projected 1990 Commission + Service	25.0%	25.0%
9.	Projected A.Y. 1990 Underwriting Ratio (7)+(8)	136.8%	142.0%
10.	Projected 1990 Written Premium	$1,200	$1,200
11.	Projected 1990 Earned Premium	1,100	1,100
12.	Projected A.Y. 1990 Underwriting Loss	405	462
13.	Prior Years Loss Development*	0	65
14.	Projected C.Y. 1990 Underwriting Loss	$405	$527

* Pessimistic estimate = 5% of $1.3 billion reserve at 12/31/89.

Exhibit A3

TEXAS WORKERS' COMPENSATION ASSIGNED RISK POOL

PROJECTION OF 1990 UNDERWRITING RESULTS

($ millions)

		OPTIMISTIC	PESSIMISTIC
1.	1989 Earned Premium	$740	$740
2.	A.Y. 1989 Incurred Loss & ALAE	937	980
3.	A.Y. 1989 Loss & ALAE Ratio	126.6%	132.4%
4.	Premium on level factor	1.323	1.323
5.	Benefit Change	0.950	0.950
6.	Loss Trend	1.230	1.230
7.	Projected A.Y. 1990 Loss & ALAE Ratio [(3)/(4)]*(5)*(6)	111.8%	117.0%
8.	Projected 1990 Commission + Service	25.0%	25.0%
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10.	Projected 1990 Written Premium	$1,200	$1,200
11.	Projected 1990 Earned Premium	1,100	1,100
12.	Projected A.Y. 1990 Underwriting Loss	405	462
13.	Prior Years Loss Development	0	65
14.	Projected C.Y. 1990 Underwriting Loss	$405	$527

Note: Pessimistic estimate in #13 = 5% of $1.3 billion reserve at12/31/89.

MR. RYAN: Thank you, Jim. Our next panelist is Bob Aldorisio, who is a Consulting Actuary with Milliman and Robertson. His insurance company service includes Vice-President and Actuary at Selective Insurance Company, Assistant Vice-President at Crum and Forster, and a (Inaudible) at the Royal Insurance Company. Bob is both a Fellow of the Casualty Actuarial Society and a Member of the American Academy of Actuaries. We're going to move from the workers compensation area and get into some of the Assigned Risk automobile problems, especially focusing on New Jersey.

MR. ALDORISIO: I don't have any overheads so I'll just speak from here. I think there's probably not a better example over the long term of how politics, politicians and legislators create problems for the insurance industry than New Jersey automobile.

I started in this business at Royal Insurance in 1973. One of the first things I worked on was New Jersey automobile and I was amazed then how political the subject was. And in the 17 years that have passed it hasn't changed. The faces change, the entities change, but the problem doesn't change. The politicians continue to try to create a better system and every time they try to fix it they just make things worse.

I'm going to talk mainly about the New Jersey JUA, a little bit of history before that and a little bit about where things are going since there has been a major statutory change this year.

Prior to 1984 New Jersey had an assigned risk plan. As I said, it was always a very political environment. Rates were always considered by insurance companies to be grossly inadequate. So, there was always a very large involuntary market, usually in the neighborhood of 30 to 35 percent of the business was written in the assigned risk plan.

The companies lost a lot of money on the assigned risk business because the rates were almost identical to the voluntary rates, perhaps with some slightly larger surcharges for accidents and convictions.

The State tried to ease that burden around 1980 when they allowed companies to charge something known as a policy constant that was to be charged to all insureds, voluntary and involuntary. The policy constant was intended to offset

the losses on the assigned risk business, so the voluntary carriers got to keep that money.

But charging the same policy constant to all drivers meant that the voluntary and involuntary drivers were still paying the same amount of money. That policy constant amounts to $70 per car and we still have that today.

The FIUA was established and started writing business January 1984. By the way, I will use the terms "FIUA and JUA" interchangeably although FIUA is the correct name for it. It stands for "Full Insurance Underwriting Association." I tend to call it FIUA, but most others call it JUA. So, I'll lapse back and forth probably.

The difference between the FIUA and the assigned risk plan had nothing to do with rates. There was no difference in rates between the FIUA, the Assigned Risk Plan and the voluntary market. The major difference was that the insurance companies no longer had financial responsibility for the results of the FIUA.

The FIUA was intended by statute to operate on a break even basis. That was not clearly defined, however, and I'll come back to that in a second.

The policy constants were continued, but starting with the advent of the JUA, the voluntary insurers were forced to remit those monies to the JUA so the policy constants continued to fulfill their purpose which was to offset the losses in the involuntary program.

But since the premiums and policy constants were still considerably inadequate to cover the ultimate costs, the JUA immediately started to run a statutory deficit. And for the first six years, the statutory deficit averaged $500 million

a year and at the end of six years there was a deficit of $3 billion.

Now, as I said, the statute required the FIUA to operate on a break even basis. The Department of Insurance interpreted that to mean cash flow. They believed that as long as the JUA had money in the bank and had a certain amount of money available to pay claims that it was operating in accordance with the statute and the statutory deficit was not important.

The Board of Directors of the JUA and most of the insurance industry didn't agree with that interpretation and believed that it ought to be funded on a statutory basis and that issue was in the courts for a long time. Ultimately the Supreme Court of New Jersey upheld the department's position as being reasonable, not necessarily agreeing that that was what the statute intended, but that it was a reasonable interpretation of the statute. So, that's where it stands. It continues to run on a cash flow basis.

Now, the statute also provided that should the JUA not function on a break even basis, if it should lose money on whatever definition we use, that there is a remedy for that and that was referred to as a residual market equalization charge commonly known as a RMEC. I guess there are several dirty words in New Jersey automobile, RMEC is one of them. JUA happens to be another one.

Because of the way cash flow works in insurance, the JUA actually did have a lot of money in the beginning. It started writing in January 1984 and at the end of January of 1986 it actually had abut $620 million of cash and invested assets that it had accumulated. That was the peak and then every single month for several years that money dwindled until it got dangerously low. I think the lowest point it

ever reached was about $100 million.

Now, that may not sound like a dangerously low number to a lot of you, but this is a very large entity with $2 billion a year going in and $2 billion a year going out, and $100 million is hardly a couple of weeks worth of claims.

So, that was a pretty dangerously low level and the state was forced very reluctantly to approve a RMEC charge in 1988 and then a second RMEC charge later in 1988 to get it up to a high enough level. That has served to stabilize the cash flow and the cash balance. The JUA has maintained a decent sized cash balance and the statutory deficit has stayed fairly level now for the last two years and remains at $3 billion.

The result is that between the policy constants and the RMECs that people pay, we can pay as much as $222 per car per year for the involuntary burden.

The next subject that I would like to address is estimating reserves. The JUA does, in fact, publish a statutory annual statement. The yellow book that you're all familiar with is published every year. So, the reserves at December of 1984 had to be based primarily on data from elsewhere, one year of data is not enough to establish development patterns and the like.

So, the actuaries involved at the time worked from the premise that the JUA would operate and would show development patterns very similar to the assigned risk plan that preceded it. They made a couple of adjustments to recognize that 1984 was a partial accident year and the average accident date wasn't July 1st.

They also made some attempts to obtain actual development data from the companies that were serving as servicing carriers and to restrict the data to those companies to try to get a better picture of what the developments would be. It certainly seemed at that time to be the most reasonable and probably the best thing that could have been done.

However, as time went on and data emerged it turned out that the data didn't develop according to the patterns that were expected in 1984 and the development factors have turned out to be substantially higher than what was expected. Accident year 1984 turned out to develop higher than expected. Accident year 1985 turned out to develop higher than accident year 1984, which was surprising. Accident year 1986 turned out to develop even higher than accident year 1985.

So, we went through a period where we had some prior information and some new information which differed from the prior information. Under these circumstances you gradually allow the new information to take the place of the prior information in your decision making process. It took a while, but eventually all of the old data from the assigned risk plan and the servicing carrier data was discarded and by about the fourth year all of the reserves were established based purely on JUA data.

As a result, the reserves established as of December of 1987 and the reserves established as of December 1988 appear to be holding up very well. The most recent evaluation of those accident years are very similar to what they were when they were originally set up.

In establishing reserves for the 1989 annual statement for the JUA, we think that the reserves for all accident years, except perhaps 1989, are stated pretty accurately. Now,

accident year 1989 presented some new problems. Two major things occurred that affect 1989. There was a law change that affected the coverage. The bodily injury coverage in New Jersey had two optional thresholds, a monetary threshold of $200 or $1,900 that the insured could choose. For policies effective January 1, 1989, the options changed to no threshold or verbal threshold. That change will have an effect on the overall magnitude of the BI losses, as well as the payment and reporting patterns of those losses and will be somewhat dependent on what options people choose.

We don't have much data yet and it's not clear just how those things will develop.

The other major change is that we have a complete change over in the companies handling the claims. Prior to March of 1989, all the servicing carriers were insurance companies. Starting March of 1989 all the insurance companies with the exception of one were no longer hired to be servicing carriers and four noninsurance companies, referred to generally as computer companies, were brought in to take their place.

Those companies had no claims staff so they very rapidly had to gear up to develop claims staff to handle two million vehicles. So, as you would expect, those companies had significant problems in staffing and in handling claims. There is some evidence in the data that the payments have slowed up quite a bit in 1989. Maybe they are beginning to catch up now in 1990.

I would have to say that the actuaries dealing with the JUA are fairly confident of the total 1989 reserves. There are a lot of unknowns, however, relating to accident year 1989 and time will tell about this accident year. I think its fair to say, however, that the deficit of $2.95 billion is

not too far off.

So, what will the State do about it? They have a solution. Our new Governor made auto insurance his number one campaign issue. He promised two things when he took office. One was that the JUA would be DOA. And the other was that the cost of auto insurance would be decreased by 20 percent. He delivered on both of those promises.

On March 12, 1990 he signed into law something known as the Fair Automobile Insurance Reform Act of 1990, which basically was his bill. Some would say he railroaded this bill through the legislature on a very fast track and signed it in March. The law does many things.

First of all, the JUA is DOA. It can no longer write business after October 1, 1990. There will be a new JUA to take its place temporarily, called the Market Transition Facility or the MTF. This JUA should not develop a deficit because unlike the previous JUA it will be supported by the insurance industry and assessments will be levied in the event that it loses money.

The RMEC and policy constants are eliminated effective April 1, 1991 and therein lies the Governor's second promise, the 20 percent decrease in auto insurance.

Now, the JUA will leave behind $3 billion of unfunded liabilities. Where will the money come from? One could argue that deficits of this kind don't really matter until you close the operation down. So now they've closed it down and the money has to be raised.

So, here's what they're going to do. There's a two year surtax on private passenger automobile premiums that's intended to raise $300 million in total from the insurance

industry. And then there is a seven year assessment on most lines of insurance that will raise $1.12 billion from the insurance industry.

There are increased automobile registration fees which will raise $150 million a year from drivers for six years. That will be about $900 million. $100 per year licensing fees for doctors, lawyers, body shops, et cetera, intended to raise about $50 million over seven years. The revenues that the JUA currently gets from the DMV will continue.

The law makes it very clear that the insurance industry will be assessed about $1.5 billion for the JUA deficit over the next several years. The companies, I think, should now be accruing liabilities for this based on their premium because that's the way these assessments are going to be levied.

The other thing that's interesting here is that the MTF may well generate losses of its own that the insurers will be assessed for. MTF will write its first policy October 1 of this year, but companies may want to think about reserving for future losses of the MTF. I think the rates that it's going to go into effect with will be quite inadequate. That's a matter of opinion I guess.

The question of whether the companies will be able to recoup any of these monies, I think, will ultimately be settled in the courts. The law specifically states that these monies are not to be collected from policyholders and that they've got to come out of the coffers of the insurance companies. The courts will ultimately decide that issue.

MR. RYAN: Our concluding panelist is Brian Young, a consultant with Tillinghast. He's a fellow of the Casualty Actuarial Society and member of the American Academy of Actuaries. He has worked for both large and small casualty insurance companies and has six years of actuarial experience prior to joining Tillinghast.

His past experience includes rate making for both commercial automobile and homeowners, as well as, expense allocation and product development for commercial lines. Brian is going to focus on one of the residual lines that we haven't really spent much time on medical malpractice.

Presented by: Bryan G. Young, Tillinghast/Towers Perrin

RECENT CHANGES IN

MEDICAL MALPRACTICE RESULTS

A. PURE PREMIUMS HAVE STABILIZED

B. STABILIZATION PRIMARILY DUE TO DECLINE IN FREQUENCY

EFFECT OF RECENT CHANGES

A. FAVORABLE DEVELOPMENT ON PRIOR ESTIMATES

B. IMPROVED RATE ADEQUACY

C. INCREASED COMPETITION

INVOLUNTARY MARKETS IN MEDICAL MALPRACTICE

A. JUA's -- 12 STATES

B. SURPLUS LINES

C. PCF (EXCESS ONLY) -- 7 STATES

D. VOLUNTARY MARKET
(ONE OR TWO PROVIDERS)

CURRENT SURPLUS STATUS OF

INVOLUNTARY MARKET

($MILLIONS)

	ESTIMATED DEFICIENCY
A. JUA's -- 12/88	$400
B. PCF's -- 12/89	900
C. VOLUNTARY MARKET	?

KEY - TRY TO AVOID INSOLVENCIES BY MONITORING AND LOBBYING

A. RESERVE LEVELS

B. RATE LEVELS

C. EXPANSION OF COVERAGE

D. OTHER PROFESSIONAL LIABILITY COVERAGES

CONSIDERATIONS IN DETERMINING

WHETHER YOU SHOULD CARRY A RESERVE

1. AMOUNT OF INADEQUACY

2. CURRENT ASSESSMENT PROVISION

3. FUTURE ASSESSMENT PROVISIONS

4. LIKELIHOOD OF FUTURE ASSESSMENTS

5. IRS

6. COMPETITORS

1990 CASUALTY LOSS RESERVE SEMINAR

2E: REINSURANCE RESERVING II

Moderator

Betty H. Barrow
The Reliance Insurance Company

Panel

Regina M. Berens
Prudential Reinsurance Company

Ross A. Currie
Tillinghast/Towers Perrin

MS. BARROW: Good morning and welcome to session 2E -- Reinsurance Reserving 2. I am Betty Barrow, with Reliance Insurance Company. Before I introduce our panelists, there are a few things I'm supposed to announce.

First, this session will be recorded. We will have some time for questions at the end, and if you are asking a question, please speak into the microphone so that your question will be recorded.

The opinions of the panelists are their own, and not those of their employers, the Casualty Actuarial Society, or the American Academy of Actuaries.

There are handouts in the back of the room, so please make sure you get a copy. You have been given session evaluation forms, and we would appreciate your filling one out for this session. They will be collected at the end of the session, as will tickets from all attendees who want to receive credit.

We have two speakers today. The first is Ross Currie, Consulting Actuary with Tillinghast, a Towers Perrin company. He is a Fellow of the Casualty Actuarial Society and a Member of the American Academy of Actuaries. Ross has been a consultant for seven years, and his practice has concentrated on reinsurance issues for the last four. His experience includes:

- evaluating loss reserves for reinsurance companies
- pricing reinsurance coverages
- evaluating potential for uncollectible reinsurance
- and valuing commutations.

Today Ross will be speaking to you about IRIS ratios, RAA statistics, reviewing reinsurance contracts and underwriting data, claims and accounting information, and setting reserves for reinsurance contracts.

Our second speaker is Regina Berens, Actuarial Director with the Prudential Reinsurance Company. Regina graduated from the University of Cincinnati in 1975, is a Fellow of the Casualty Actuarial Society and a Member of the American Academy of Actuaries. She became a fellow of the Canadian Institute of Actuaries this year.

Regina tells me she has been with Prudential Re long enough to be vested (five years), and prior to that worked at Great American and AFIA. Regina has been setting reserves on international and reinsurance business for twelve years.

Today she will be talking to you about reserving for International reinsurance and the effects of foreign exchange fluctuations, retrocessions, and how financial reinsurance affects reserves.

Ross...

ROSS CURRIE: We're going to begin by talking about some general characteristics of reinsurance. This session is for more experienced reinsurance actuaries, but we're just going to spend a couple of minutes going over this because it will have a direct bearing on some of the things that we're going to talk about later.

Reinsurance is much more market driven than primary insurance. Its pricing is much more competitive; it reacts to forces in the marketplace more quickly than primary insurance, and so we see things happen in reinsurance with a speed that is not possible in the primary insurance market.

Reinsurance also has a great deal of diversity in both its coverages and its contracts. It is not like primary insurance where all insurance companies are writing very similar contracts with similar terms and coverages.

As a result of these two characteristics, we find a very high variation in operating results for reinsurers. Loss ratios for reinsurers have varied significantly over the years; we'll discuss historical rate changes for reinsurers and see that they have been much more dramatic than the types of rate changes possible on primary business.

Results are influenced by company orientation. Some reinsurers write mostly pro-rata coverage; other reinsurers concentrate on excess coverage. There are companies that only write property business; and there are some that write both property and casualty business. Reinsurance results are also affected by market orientation - there are distinctions between brokered and direct writers (and some companies write in both markets), and treaty vs. facultative business.

These characteristics are reflected in the IRIS ratios that are produced by reinsurance companies. If you compare IRIS results of reinsurers to those of primary companies, you can see some significant differences. For example, in 1988 all property/casualty

groups (940 as surveyed by A.M. Best) had a premium to surplus ratio of 170%, whereas reinsurers had a premium to surplus ratio of only 81%.

Reinsurers can successfully operate with such a low degree of premium/surplus leverage because there is a much greater reserve/premium leverage for reinsurers. Because reinsurance losses are paid out later than primary claims, reinsurers earn significantly more investment income off of each dollar of premium. This means that a reinsurer can afford to write at relatively low premium to surplus ratios and still make a decent rate of return on surplus.

In addition, keeping a low premium to surplus ratio protects a company against the variability that is inherent in reinsurance results. If a reinsurer were to write at a high premium to surplus ratio, the wide swings in results which are typical for this business could be damaging to its solvency.

Finally, even though reinsurers are leveraged more with regard to reserves vs. premiums than primary companies, reinsurance groups continue to maintain lower reserve to surplus ratios than primary companies. Primary companies' reserve to surplus ratios are 204%; reinsurers' ratios are 173%.

Other IRIS ratios are also affected by the fact that reinsurance companies differ from primary operations. The one and two year reserve development to surplus tests have historically displayed greater variability for reinsurers than they have for primary insurance companies. The estimated reserve deficiency to surplus test is also affected because it is heavily influenced by historical results. This test, for those of you who are not completely familiar with it, takes developed reserve levels from prior years, compares them to premiums, and then multiplies the result by the current premium base. Therefore, rate adequacy changes can greatly affect the reserve redundancy or deficiency calculation for a reinsurer. Since rate activity for reinsurers is much greater than that of primary companies, distortions in this test's results can occur when looking at a reinsurance company.

An example of the kind of rate changes that have occurred in the reinsurance market is shown in Exhibit 1. This exhibit shows rate changes as estimated by Tillinghast for the total overall market's treaty business. As you can see, there have been rate decreases in 1984 and 1988 and significant rate increases of approximately 170% in 1985 and 55% in 1986. This is not the kind of rate change activity that is present in the primary insurance market.

The contracts that a reinsurer writes can also influence the results of the reserve deficiency test. If a reinsurer's retentions and attachments are changing over time, then the necessary proportion of reserves to premium dollars will also be changing. As a company's attachment points increase, a larger proportion of its losses will be held in reserves because of reporting delays. The appropriate reserve to premium ratio for a high attachment point is not the same as the appropriate reserve to premium ratio for a low attachment point. If a company's attachments are changing over time, it will affect the

validity of this IRIS test.

So, if you are looking at a reinsurer's financial position, whether for a merger, acquisition, or if you're trying to decide whether to buy stock in that company yourself, it is important to remember that the IRIS ratios for a well managed reinsurance company will be significantly different from those of a well managed primary company. If you use primary company standards to judge a reinsurance company, you may find a poorly managed reinsurance company looking attractive and vice versa.

Let's move on to the subject of loss reserve analysis. A primary source for doing loss development work for reinsurance companies is RAA experience. We use RAA experience because a company's own data might not be credible for a valuation; however, before relying on RAA data it is important to understand the characteristics of RAA business.

RAA experience represents excess reinsurance coverage. The latest study includes statistics for 34 companies, but in previous years the number of companies has been significantly smaller. The study is compiled on an accident year basis for occurrence coverage. Since 1961 it has included both bodily injury and property damage experience, and it includes allocated loss adjustment expense.

I said that RAA statistics are made up of the experiences of 34 companies. Well, what are the characteristics of the 34 companies which we are going to use when estimating loss development? General Reinsurance is 20% of the 1989 RAA data base; Employers Reinsurance is 15%; other direct writers make up 35% of the RAA data; and brokered business is only 30% of RAA experience. If your company does not look like Gen Re or Employers Re, and if it is not a direct writer, its experience may not be very well represented by the RAA portfolio.

What are the characteristics of the direct writers that make up the RAA study? Direct writers have direct access to primary insurers. Their contracts have low attachment points, and they generally write excess coverage over primary coverage, not excess coverage over excess coverage.

What is the current average ground up attachment point for RAA data? Based on an informal survey of RAA companies, as well as some of the other work that Tillinghast has done for the RAA, our conclusion is that the average RAA attachment is somewhere around $300,000.

In addition to the attachment points of the underlying data, you should also be aware of the net retentions of the RAA companies. RAA data is net of retrocessions, and we believe that the net line for RAA busines is approximately $500,000. Some people mistakenly believe that the RAA net retention is very high, because other reinsurers assume the retroceded exposure, thus keeping losses in the data base. The problem with this belief is that it rests on the assumption that RAA companies cede the upper end of their exposure to other RAA companies; in fact, this is not the usual case. That is why the average RAA retention is lower than you might think. If an

RAA company spins the excess business off to a non-RAA company, it is not in the underlying RAA data.

Even given this low level of exposure, the variance in loss development among RAA companies is significant. Therefore, we find it useful to break down RAA exposure into slow, average, and fast development patterns. Now remember, the RAA publishes loss development information - it does not publish loss development factors or curves. The factors shown in Exhibit 2 have been developed by Tillinghast consultants from RAA information. They are not published or endorsed by the RAA.

Exhibit 2 displays General Liability loss development factors to ultimate at 5, 10, 15, and 20 years of maturity. At 5 years, the slowest RAA companies have an age to ultimate factor of 4.050 while the fastest RAA companies' ultimate factor is 1.738. Although the spread between fast and slow companies decreases as experience matures, even after 20 years have passed the differences are substantial. Fast RAA companies have only 2.3% of additional development after the 20th year, but slow RAA companies have a tail factor of 21.5%. So there is a wide variability of results within the RAA data.

But RAA statistics are the only reliable source of tail data on an industry-wide basis. Most reinsurers, even those with a reasonably credible data base of their own, are going to rely largely on reinsurance industry statistics when projecting tail development on casualty lines; but, given the wide swings which occur in RAA data, how can we come up with an appropriate tail factor for a particular book of business? One approach which I have used successfully is to calculate loss development based on historical experience for a treaty and model it against various RAA statistics. An integral part of this process is to review the coverage provided under the treaty as a basis for making assumptions regarding the development that would be expected for that type of coverage.

It is important to note that I've used the word "treaty" here, because, in studying reinsurance development, the actuary has to review underwriting information and individual contract experience to a greater extent than is ever the case in a primary insurance reserve evaluation.

This brings me to a fundamental question that is just beginning to be debated by reinsurance actuaries: What is the best approach towards analyzing data in a reinsurance reserve evaluation? Here are quotations from two FCAS's who appeared at the 1989 CLRS:

"One day anything less than a contract by contract reinsurance - reserve analysis will not be considered reasonable or appropriate."

"It makes sense to set reserves on an individual contract only when it's so large and so unique it can't be lumped with the rest of the business."

This is a debate which is just beginning, and I urge you all to think about it.

I'm going to discuss the practical issues behind a contract-by-contract reserve analysis because over the last year or two I have converted from being what you might call a "triangle actuary" to being an advocate of contract-by-contract analyses using industry factors adapted for each individual contract.

It has been argued that if you are looking at a small book of business individual contract analyses are fine, but it is difficult to look at individual contracts when reviewing a large portfolio. However, it has been my experience that even large books of business have most of their IBNR exposure concentrated in a small proportion of the underlying treaties. For example, Exhibit 3 shows actual results for one of my reinsurance clients. In this particular case, 52% of the loss reserve results from 6% of the company's treaties. An additional 5% of its treaties account for another 23% of the reserve; and another 9% of its treaties account for 15%. So 20% of this company's treaties are responsible for 90% of its loss reserves. This is not atypical for a portfolio of reinsurance.

In this situation, we can look at the treaties that account for most of a company's reserves in great individual detail and set reserves for the remaining treaties using industry factors selected after a simple evaluation of the coverage provided by the treaty in question. Our detailed evaluations will consider both underwriting and claim information.

There are three sources that will provide you with most of the necessary underwritng information for your analysis. First, there are the actual reinsurance contracts. A second source is the contracts' placement slips, which are documentation in outline form that generally precede the issuance of the contracts. Finally, there are underwriting submissions, which are basically promotional information that an underwriter or MGA sends to reinsurers in order to persuade them to take a piece of business.

The reinsurance contract is generally the least useful piece of information of the three items noted above. It states in very bland legal jargon all of the contract's terms; but although it lists retentions, aggregates, and other contract provisions, it does not provide any information about the underlying book of business.

Placement slips are a little more informative and usually give a thumbnail sketch of the underlying book, but the true meat of a reinsurance program is most likely to be found in its underwriting submissions. For example, one of the key items in evaluating a contract is knowing whether it is pro-rata or excess coverage. You have to be very careful because excess contracts are often described as providing pro-rata coverage in contract wording and placement slips when they represent pro-rata shares of excess business. Underwriting submissions will clarify this often ambiguous point.

A quality underwriting submission will provide you with valuable information that is non-numerical in addition to quantitative data. It will describe production goals and target markets for the business that is being underwritten. It will list the lines and classes of

business that are being written and, just as importantly, those being excluded under the proposed contract. It describes underwriting controls - what maximum limits are permitted, and what proportion of the maximum limits are generally being provided on individual risks. It should discuss the primary rating of the program and any deductibles associated with it. It should mention who is providing the claims handling services on the program.

On the quantitative side, a good submission should include premiums, losses, and limit profiles by line of business. This means that in addition to noting the average limit, it should actually show the distribution of limits. For example, the submission might list the percent of policies that have limits of $100,000 or less, $100,001-$250,000, $250,001-$500,000, $500,001-$1 million, etc. Similarly, it should provide an attachment point profile, which will show the underlying distribution of attacment points.

Layer profiles are also valuble when performing an evaluation. There is a big difference between writing a $500K excess of $500K contract providing coverage over primary (a first layer excess treaty), and a $500K excess of $500K contract attaching above underlying $100K XS $100K, $200K XS $200K, and $100K XS $400K contracts (a fourth layer excess treaty). Development is significantly slower for a fourth layer reinsurer than it is for a first excess reinsurer on an identical layer.

Finally, submissions will often contain large loss information, so you can decide whether or not to adjust your estimate due to the presence of a small number of unusually large claims.

The information which I have described is quality underwriting submission information that will not be available in many cases. I have seen contracts and underwriting submissions which indicate that the contract covers all business, property and casualty, both international and domestic, which the MGA chooses to accept on behalf of the reinsurer. In these cases I would urge you to use very conservative loss development factors and initial expected loss ratios in your evaluations, because programs that do not have quality underwriting submissions usually have inadequate rating and underwriting controls. The absence of information can be as important as the presence of information in assessing the quality of the underlying business.

The retrocessional protection that your own company has is important as well. Obviously, if it has an aggregate limit or stop loss, this will limit the company's exposure. Losses should not be developed above the maximum net retention of your company.

Of course, claim data is as important as underwriting information. There are many issues to address here as well. Is the ceding carrier including IBNR resrves in reported losses? Are ACRs (Additional Case Reserves) included in the underlying experience? How are structured settlements being treated? Has you company conducted claim audits?

In reinsurance we see reporting issues that are not present for primary companies. Sometimes losses are not carried in your claim

system because your company is in a contractual dispute with the ceding carrier. Many times when a company has stopped paying any losses it files claim notifications without entering them into its data base. Then, when the dispute is resolved, these claims are processed en masse. So from a development standpoint, a company can develop huge backlogs of claims when this type of situation exists.

If you are looking at excess business, precautionary notices (notification of claims that have not yet reached your attachment point) are generally received when claims exceed 50% of the attachment point. Obviously, you can use that information in your loss development studies as well.

Once you have digested all this information for a treaty, it is time to set reserves.

Although individual contract analyses preclude the use of actual historical factors to estimate future development, the actuary can review the actual loss emergence of a contract and determine how well it tracks with industry benchmarks. The underwriting review will suggest an appropriate mix of coverages and development characteristics for the treaty under evaluation. The contract's historical performance should indicate whether or not modifications to the original development selection are necessary. For example, actual emergence could imply a larger casualty component than is indicated by the underwriting review.

It is also important to consider report lags when selecting a development pattern. Report lags are caused by the delay which occurs in loss reporting due to the existence of intermediate parties, such as MGAs or low layer reinsurers. One very rough rule of thumb is that the normal development pattern for a treaty will be set back 6 months for every party that exists between the primary writer and your company. This rule implies that the appropriate loss development factor for a third layer excess writer at 48 months of development will equal the 36 month factor for a first layer excess reinsurer writing the same layer of coverage. Estimating the appropriate lag can be difficult, since it is sometimes impossible for a retrocessionaire to know just how many players exist between the primary cover and its own attachment.

Credibility is often lacking in reinsurance loss experience due to low volume, high attacment points, and slow emergence. For this reason loss development projections are generally supplemented with other estimates - the most prominent being the results derived using a Bornhuetter-Ferguson analysis. In order for this method to be effective, the initial expected loss ratio must be an accurate reflection of the price as charged in the marketplace for the treaty that is under review. Exhibit 4 displays initial expected loss ratios for an actual casualty reinsurance treaty over time. We believe that an initial expected loss ratio of 250% is appropriate for this treaty's 1983 and 1984 business.

It is quite common for inexperienced reinsurance actuaries to set initial expected loss ratios to the break even point. For reinsurance, this is a poor assumption given the strong influence of

competitive forces which I noted earlier. During the early and middle 1980's reinsurance loss ratios went through the roof on casualty business. A loss ratio selection of 100%, 110%, or even 125% for casualty business written during this period could result in a gross underestimation of reserves.

As I mentioned earlier, this type of detailed analysis can be applied to the few treaties that make up a major portion of a company's IBNR requirement, but the actuary must set reserves on a large number of smaller treaties as well. How can we do an effective reserve analysis on this remaining business?

One approach which I have used successfully is to take each of the treaties and assign them to a category based on a very basic underwriting review. For example, we distilled approximately 200 treaties into 23 categories of business for one recent client - and one of those categories represented commuted business.

Another advantage of doing a contract by contract analysis is the ability to easily calculate the effect of commuting a contract on a company's IBNR need. If your evaluation is based on an analysis of development triangles, it can be very difficult to remove a commuted treaty from the underlying data; and, just as important, once you have removed the treaty the indicated IBNR for the remaining business may change because selected loss development factors may be revised as a result of removing the commuted treaty. If you do a treaty by treaty analysis, you avoid this problem. It becomes very easy to pull commutations out, and your remaining factors do not have to be adjusted once the treaty is removed.

Once you have selected loss development factors and initial loss ratios for each category, they can be entered into a general reserve model which, in this example (Exhibit 5), uses a Lotus spreadsheet driven off of look-up tables. This exhibit uses category tables showing percent of ultimate curves and initial expected loss ratios for underwriting years and stages of development.

Note that the appropriate age of development of a treaty is not just determined by the underwriting year and evaluation date. Consideration should also be given to whether the treaty was written on a loss occurring or risk attaching basis, and whether it is a direct reinsurance treaty or a retrocessional treaty. So another advantage of this method is that it can respond to cases where two different treaties fall into the same coverage category but one is an accident year treaty and one is an underwriting year treaty; or cases where one is a direct reinsurance cover and one is a retrocessional cover.

A payout pattern can also be entered into the same type of table, automatically generating discount factors at any given discount rate. We can change the interest rate instantly and end up with a discounted reserve and a discount effect.

In conclusion, then I would like to emphasize two points:

First, reinsurance is significantly different from primary insurance, -

and should be evaluated from a different perspective.

Second, reinsurance treaties can be so distinctive that serious consideration should be given to evaluating their experience on an individual basis.

And with that, I'll turn it over to Regina.

EXHIBITS PRESENTED BY ROSS CURRIE

ESTIMATED UW YEAR RATE CHANGES TREATY BUSINESS

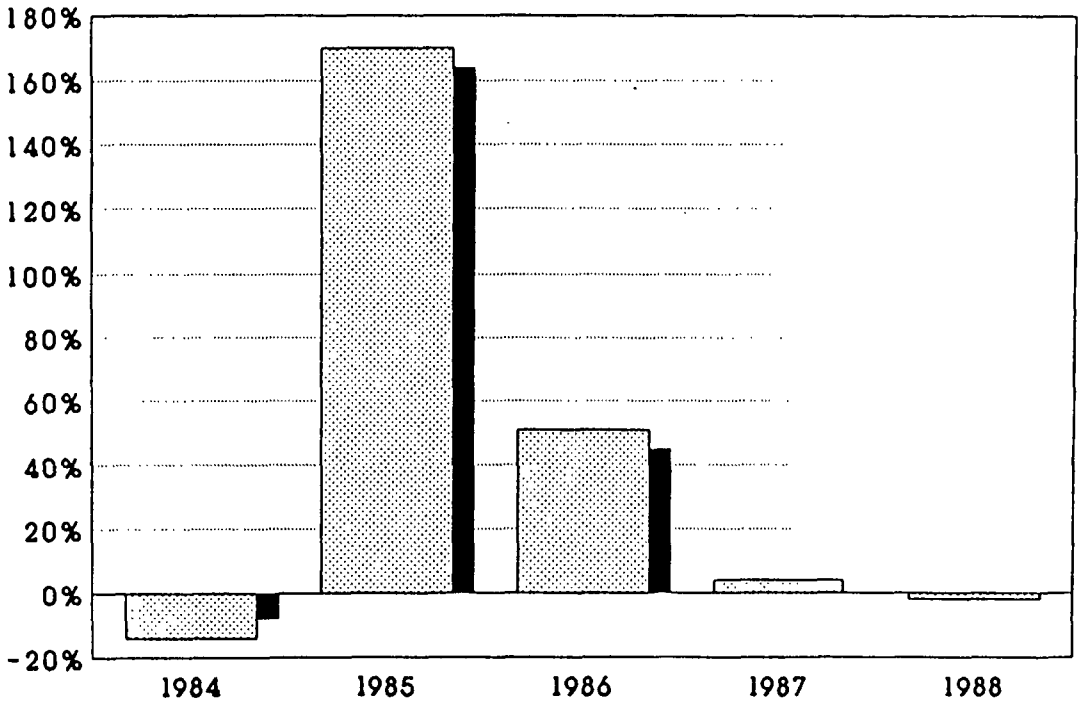


Exhibit 1

COMPARATIVE LDFS
RAA GENERAL LIABILITY

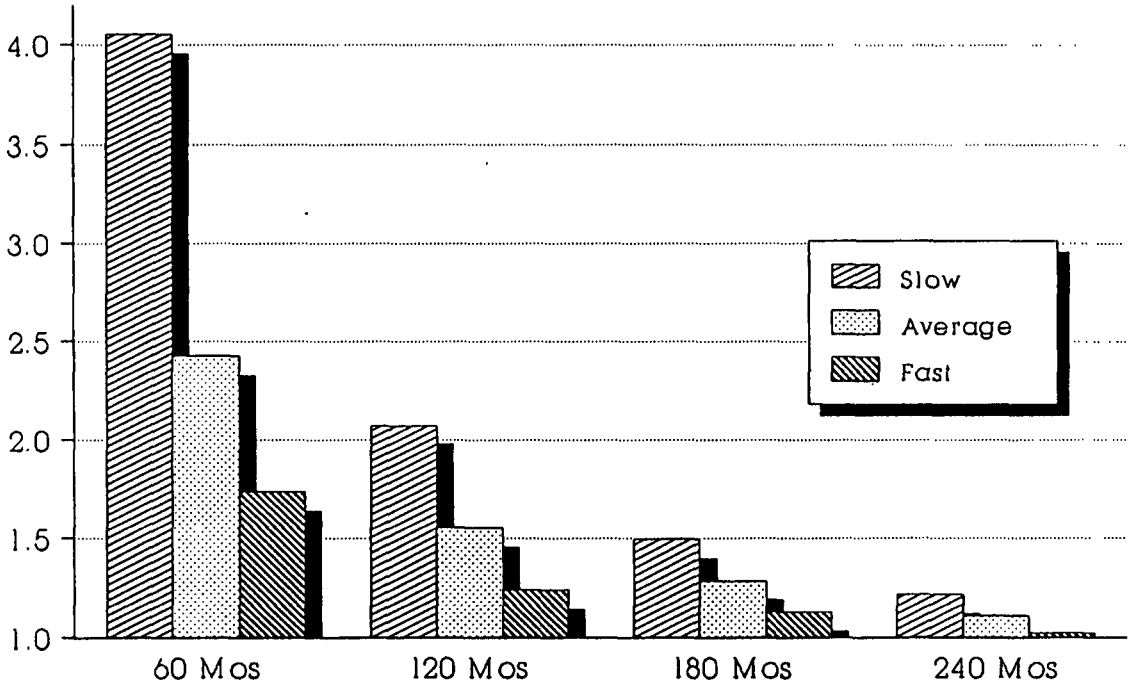


Exhibit 2

RESERVE DISTRIBUTION

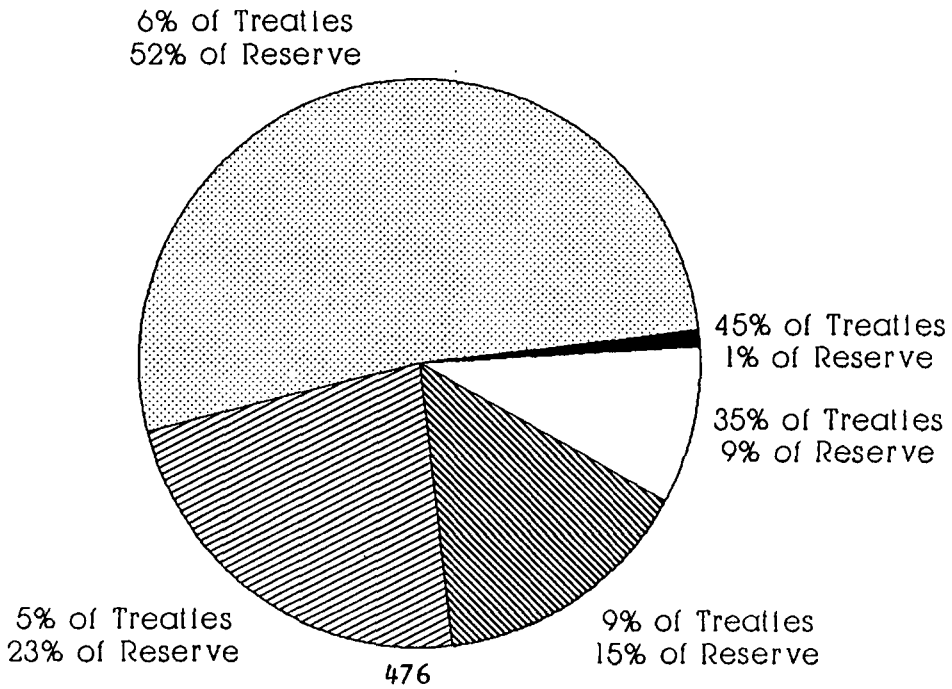


Exhibit3

INITIAL EXPECTED LRs
EXCESS CASUALTY TREATY XXXX

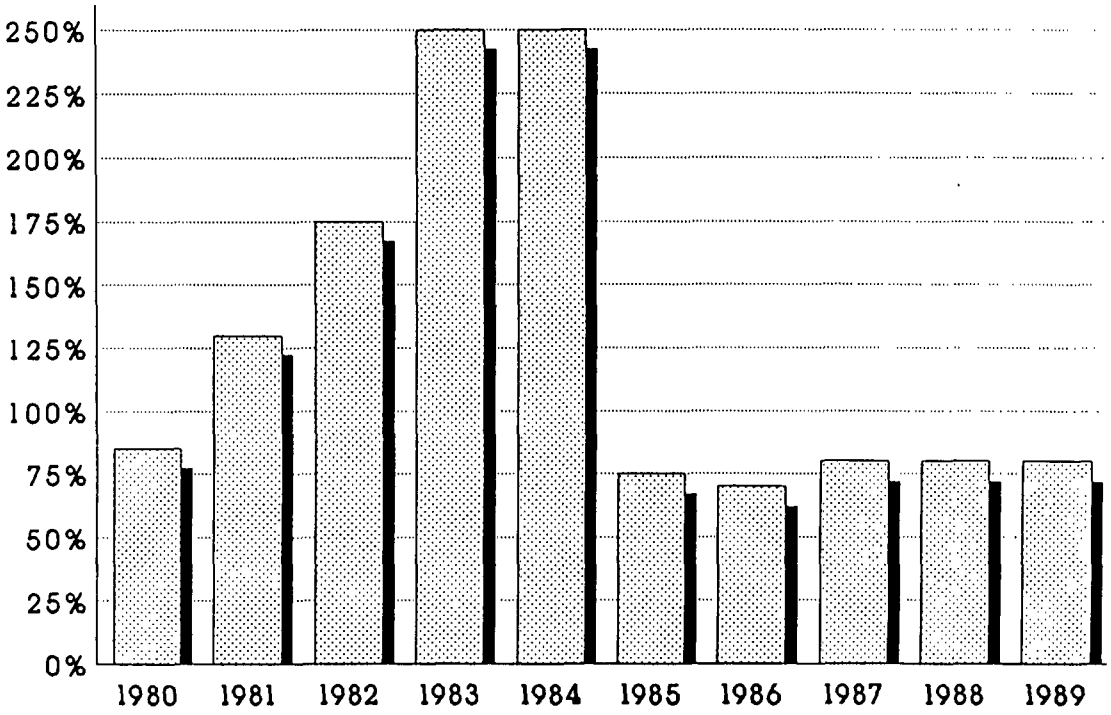


Exhibit 4

Exhibit 4

Loss Reserve Model Worksheet

Treaty	Yr	Acc UW	Reins=1 Retro=2	Age	LOB Mix	Earned Premium	Paid Loss	Case Reserve	Case Incurred Loss	Initial LR	% of Ult	LDF Indicated IBNR	B-F Indicated IBNR	Final Indicated IBNR
1002	81	A	1	108	7	105,585	171,520	94,854	266,374	130.0%	44.7%	329,781	75,930	202,855
	82	A	1	96	7	148,902	195,310	32,861	228,171	175.0%	40.7%	332,280	154,492	243,386
	83	A	1	84	7	124,764	307,594	89,140	396,734	250.0%	37.0%	676,158	196,572	436,365
	84	A	1	72	7	153,213	489,629	148,911	638,540	250.0%	32.1%	1,351,549	260,133	805,841
	85	A	1	60	7	369,606	61,962	26,112	88,074	75.0%	26.1%	248,806	204,732	226,769
	T					902,070	1,226,015	391,878	1,617,893			2,938,575	891,858	1,915,217

Treaty	Yr	Acc UW	Reins=1 Retro=2	Age	LOB Mix	Total Reserve	Discount Factor 7.9%	Discounted Reserve	Discount Effect
1002	81	A	1	108	7	297,709	0.520	154,750	142,959
	82	A	1	96	7	276,247	0.505	139,387	136,860
	83	A	1	84	7	525,505	0.488	256,436	269,069
	84	A	1	72	7	954,752	0.479	457,639	497,113
	85	A	1	60	7	252,881	0.471	119,028	133,853
	T					2,307,095		1,127,241	1,179,854

Exhibit 5

Regina M. Berens
CLRS- Dallas/Fort Worth
September 10,1990

Good morning. At the seminar in Chicago last year I spoke on this topic. I made a few mistakes. I was rights on after this lunch where every single course was heavy on cholesterol. Jack Byrne, who is a fantastic speaker and a tough act to follow, gave the post-lunch address and then I turned out the lights so the audience could see the overheads. They were polite. Nobody snored.

First of all, I want to talk about international reinsurance. What makes it different?

I blundered into this area twelve years ago and it was a very interesting move. Reinsurance became international before primary insurance, because even countries which tightly restrict primary business realize that after a point, pieces of the bigger and more volatile risks have to be spread beyond their own boundaries. At a time when many U.S. companies want to establish a presence in foreign markets, there are frequently fewer trade barriers for companies writing assumed reinsurance than for primary companies.

International reinsurance is fun. It is interesting. It makes for great business trips. I'd rather go to Brussels or London than all of the state capitals. It can balance out your results when the cycle in the U.S. hits it bad point. It can also kill your company if it is not done right.

One of the wonderful ironies of the international business is that if you are not careful about what you are getting, you could end up with a fifth-hand retrocession of U.S. casualty business.

One thing to expect is that there are longer report lags for international business. It just happens that way. And I have seen it with two different employers. I am not talking about the time lag it takes for the data to get from the overseas office to the U.S. office. This is the delay from the ceding company or the broker to the overseas office, even if they are booking it there. And that is just the way the business works.

International Reinsurance: What makes it Different?

- **Longer report lags**
- **EBNR even more important**
- **Coverages/Laws vary**
- **Reporting varies (e.g. IBNR)**
- **Data by country? What country?**
- **Currency Fluctuations**

It is especially noticeable and surprising with earned premium reporting. My company has a book of international business for which its Earned But Not Recorded premium, or EBNR, consistently exceeds its IBNR. And I've

been doing reserve studies on this book since 1986 and it just keeps happening that way.

So the first point is that EBNR is even more important for international business than for domestic business. It is more important to get the amount right and it is more important to set up an adequate amount of IBNR on it.

Depending on the characteristics of the book, whether it is long or short tail, whether it is profitable or unprofitable, improperly estimating your EBNR can have a significant effect on the bottom line.

In addition to the extra report lags you may encounter, for both premium and losses, there are some other things to remember. First, the nature of a given line of business is going to vary by country. I guess that's obvious.

There is a temptation to think that you can solve that problem by separating your data by country and, of course, then you end up with the proverbial useless collection of crumbs.

Another problem with separating data by country is that the mix of business can vary by year. Political and economical climates change, in given countries ... I guess we've noticed that ... so it may be an attractive place to write reinsurance one year and questionable the next year. Good regional management will keep its ear to the ground, and they will take advantage of the flexibility that reinsurers have to move in and out of markets in particular countries.

I'll give you an interesting example. Auto theft insurance used to be a fairly profitable cover to write in Taiwan. It didn't happen very often. Now it isn't. They are stealing autos all over the place. Do you know why? They changed the law. They don't cut off the hands of thieves anymore.

Most of the time the best approach to take is to assume that the underwriting standards are consistent and to combine the data on similar types of business for all countries.

Now that you've concluded that in most cases you cannot separate the results by country, you run into the next complication, which is foreign currency. Now, we all know that in 1992 all of the EEC nations are going to have the currency and they are going to speak the same language. And if you believe that I have a retrocession of some stop loss cover protecting Lloyd's members that I'd like to see you. But, anyway, we will still deal with the problem of currency, since it certainly exists in the past and it is going to exist in non-EEC countries, regardless.

First, let me talk about how currency is generally converted. I think this is typical, but you should check it out in your own company and see how they do it. Premiums and paid losses are converted at the rate of exchange in effect when the transaction is booked. Outstanding losses and any other assets and liabilities are converted at the current rate of exchange, which follows the liquidation theory principle that you would want to convert your reserves at the rate of exchange you would need if you had to liquidate them tomorrow.

Perfection, of course, is original currency data, and we will go into what that might mean in a minute, but what I just described is what you usually end up with if the data has already been converted for you.

So what does this do to your development triangle? It doesn't do anything if your business was all transacted in Hong Kong dollars, which has a pretty stable relationship with the U.S. dollar. It can be a big problem if you are writing a book of business in a country where the currency loses 90% of its value against the U.S. dollar every year. And such countries exist. The truth for your own book is probably somewhere in between.

I threw together a model. I was actually surprised at the results myself. But I constructed an example of a typical book of business in three currencies. One is U.S. dollar where we don't have an exchange problem. The second is Pound Sterling where there has been fluctuation over time. there have been steady trends for a few years that occasionally turned around and reversed themselves. Finally, I added the Mexican Peso where it has been pretty much downhill against the U.S. dollar.

Currency Fluctuation Model Assumptions

- **Business in 3 currencies: U.S. Dollar, Pound Sterling, Mexican Peso**
- **Age-to-age Factors identical for given period across entire book, for all accident years**
- **Actual historic exchange rates used**

I took triangles of reported loss data from the three currencies, started them out at approximately identical volumes of ultimate losses, converted the reported losses using the process I just described and came up with age-to-age factors for all of them. I constructed the example so that within each currency the age-to-age factors were identical. In other words, if you looked at the Mexican Peso book, in Mexican Pesos, the age-to-age factors were identical to what you saw if you looked at the Pound Sterling book in Pounds Sterling. So, I tried to construct three identical

books of business and then converted them and added them up. Now, if that is not enough to convince you that this data is only simulated, I'll also point out that I pulled the development factors out of thin air on a Sunday morning when I was thirty miles away from the office. The exchange rates are real. We have a database of exchange rates going back forever. So, this is what really happened.

Okay. I'll start out with the Mexican Peso example on Exhibit I. This is where you expect weird effects. There is a high inflation rate in Mexico and the Peso has devalued consistently against the U.S. dollar. And this exhibit is in original currency and it shows my nice, neat development factors down at the bottom. You can tell they are phony. I've never seen any like that in real life.

IBNR is 13.5 million Pesos, which sounds like an awful lot, but it is $4,900 at the current rate of exchange. It is up in that little section that says total IBNR.

In Exhibit II, Mexican Pesos are converted into U.S. dollars and this, again, is using the process that I described. First of all, you can see that the numbers are decreasing and that is because of the exchange rates. You can also see the sharp decrease in the age-to-age and age-to-ultimate factors. Again, this has absolutely nothing to do with what is going on in the underlying exposures. This is the effects of the exchange fluctuations. IBNR from this triangle is $1,100 or about one-fourth of the original currency estimate.

Now some people argue at this point that the Peso has decreased against the U.S. Dollar since the days of Pancho Villa and so it is safe to use the lower estimate, since the Peso is probably going to keep devaluing against the U.S. Dollar. Remember, though, that we are not in the business of forecasting exchange rates and implicitly that is what you would be doing if you used the lower estimate. And, besides that, people who can forecast exchange rates get paid better than actuaries do. Our job is to calculate what it would cost to liquidate claims now. And that means, at the present rates of exchange.

Okay. Let's go on to Pound Sterling. That example surprised me. I figured that since it didn't fluctuate as drastically against the U.S. Dollar and sometimes it went in one direction and sometimes it went in another, it wouldn't make a big difference. It didn't work out that way. When I took the triangle of the original currency ... and, again, these are with the nice, neat made-up age-to-age factors ... I came up with $672,000 U.S. dollars in reserves. This is on Exhibit III. When I took the converted triangle in Exhibit IV, and went through the same process, I came up with the loss development factors shown, and I ended up with $549,000 U.S. So there we have a shortfall of almost 20%. And when you start looking at examples like this, you start to realize that even if

you have a book of business written in Canada, there are fluctuations and you should try and pay attention to them and see what they are doing to your data and find out how the transactions are converted when they are booked.

Okay. So you need one more complication.

Exhibit V shows all three currencies converted to U.S. Dollars. This is probably what you would do if you walked in and didn't have any original currency data and took what they had out of the computer. From what I've seen of a lot of international operations, you are lucky if you can get this out of the computer. I went through the same process, came up with age-to-ultimate factors and calculated IBNR on the total. And the development factors, in this example, were dragged down so much by the Mexican Peso, that the total IBNR was greatly understated. We came up with $853,000 compared to the sum of the original currency estimates, which was $1.3 million.

Here is a summary of the effects for each method.

Results in US $

	Method 1	Method 2	Method 3
Pounds	$672,058	$549,103	
Pesos	4,914	1,173	
U.S. $	578,210	578,210	
Total	$1,255,182	1,128,486	$853,177

Method 1: Reserves calculated in original currency, then converted
Method 2: Reserves based on individual converted triangles
Method 3: Reserves based on combined converted triangle

PARTICIPANT: Do you have a favorite method?

BERENS: Yes. My preferred method is to do it in the original currency if you have it.

Okay. I suppose you expect a solution to this problem. Our objective, of course, would be to eliminate the effects of exchange rate fluctuation on the development triangle. Perfection, if you can get it, is to reconvert all of the transactions at the latest exchange rates. Now, fortunately, I've actually been able to do that with our book of business written out of Brussels. Sometimes it's very mysterious what they have in the computer versus what you can get out of it, but somewhere they have original currency data. I can't get it, but I can tell them to convert everything at the rate of exchange in effect right now. It doesn't matter what accident year it was or when it was booked. That is one thing you can do.

Another technique, which is what I use when the first type of data

is not available, is to come up with index factors. We go back to the underwriters and say, okay, for certain various pieces of the book of business what is the underlying distribution of the premium ... for example, the premium you wrote on property pro rata business in 1988. What do you think the currency distribution is? What do you think the loss distribution is? Two separate things, unfortunately. But you can build this up for the whole history of a particular type of business.

You can then combine that with historical exchange rates, which are published in a lot of places and come up with index factors, and you can use the index factors to attempt to back out the effect of exchange fluctuations. It is not perfect, but it is better than blindly accepting what you've got and assuming that the effects of exchange do not make much difference.

Okay. Another point that I wanted to mention about currency. The currency in which the transaction is booked may be different from the currency of the underlying exposure. If you are reinsuring a Dutch ceding company, and a ship belonging to one of their insureds has a loss off the coast of Brazil, the case reserves reported to you may be in Dutch guilders, even though the loss is in Cruzados. If the data you are working with has been converted to U.S. Dollars, you now have three sets of interactions between exchange rates to worry about.

And, by the way, if you thought this whole exercise was interesting, the Call Paper topic for the CAS meeting in May, just in case you needed another incentive to go out to California, is international business.

To recap what I have said about international business, before I go on to the next topic: expect longer report lags. Pay attention to EBNR, earned but not recorded premium, and try to eliminate the effects of exchange fluctuations from the development patters or at least be aware that they are there and they may be messing things up.

Okay. The next topic I want to discuss is retrocessions, assumed and ceded. There was a CAS Continuing Education seminar on reinsurance ten years ago and one of the speakers stood up and said, don't write retrocessions. If you haven't followed that advice, you need to know how to set reserves on assumed retrocession business.

Retrocessions - What to look for

- **Funded Covers**
- **Contracts with large Aggregate Deductible**
- **Differing Contract Year/ Accident Year Definitions**
- **Differing Line of Business Definitions**

As with international business, expect longer report lags. If you are confident about the characteristics of the business, you can use development factors which are appropriate for that line of assumed reinsurance business and add a time lag on to it. And how long it is would, of course, be a matter of judgment.

The part about knowing the characteristics of the business is a major if. The ceding company, in this case a reinsurer itself, should be able to give you a preliminary idea of the mix of business that the contract is meant to cover. But that would be a premium mix, which, again, does not tell you how the losses are going to be distributed.

Keep in mind, also, that if you are on a contract for many years, the company might have the sense or at least will tell you that they weeded out the more disastrous portions of its business every few years, and so, the current business might not run off as badly or the same way as the prior years.

Some forms of retrocessions should be analyzed separately or at least combined with contracts that you know are similar, if at all possible. One example is Funded covers, which I'll discuss in a minute. Another is contracts where the ceding company pays all losses falling under a large aggregate deductible. The aggregate deductible is generally defined as a percentage of the subject premium or a loss ratio point or a flat dollar amount. After that amount has been reached than the retrocessionaire starts paying. So you can have zero losses for a very long period of time and then the losses start rolling in.

In reserving for retrocession business you also want to pin down how contract year and line of business are defined by the ceding company. You can't always expect a mirror image. In fact, it almost never is. If, for example, the 1989 contract year is a

retrocession of all contracts with inception dates falling in the 1989 calendar year, you don't want to combine results on this contract with another retrocession where the ceding company defines its contract year differently.

You should also find our about the line of business details, if you plan to use it. I noted in prior seminars that as a reinsurer you should check out the accuracy of the line of business detail provided by the ceding companies before you use it. It is even more important with retrocessions, since the reinsurer, which is your ceding company, is already getting data second hand and then booking it into its own system.

Funded covers are frequent in reinsurance. The idea is that you smooth out fluctuations in the ceding company's results from year to year, but that over time, the ceding company will eventually reimburse the reinsurer for most of the losses. So your IBNR provision may not have to be as large. And you should actually look at the contract and see what you can find out about the funding provisions.

The next area I want to discuss is financial reinsurance.

We all know that many of us will be past retirement when the profitability of the business being written today can be established as an exact dollar mount. What I did on Exhibit VI here was to list as many items as I could think of, which enter into that final calculation. Now some of the elements, or at least estimates of those pieces, are brought into statutory profit immediately. These include the first five items.

Items six through nine are timing items. They certainly affect your profitability, but it doesn't get into the statutory figure explicitly. An intelligent company will try to estimate these things and will watch them, but the results are used to improve cash flow and make investment decisions, not to calculate items which enter into the statutory profit or loss.

Item ten, which is equity in the unearned premium reserve, is taken into income for statutory purposes only as the premium is earned.

Items eleven and twelve relate to the investments underlying the book of business. And, of course, they are taken into statutory profit only after they are realized.

And items thirteen through fifteen also fall into the same category. They are taken into statutory profit when they are realized.

Items sixteen and seventeen, catastrophes and unrecoverable reinsurance, are items that you might be able to fund right now,

but the IRS does not let you deduct them. For example, you may certainly deduct losses on Hurricane Hugo, now that it has happened, but you cannot pre-fund the once-every-ten-year hurricane that has not happened yet. Or at least you can't for tax purposes.

You may also have a problem if you think that, say, five percent of your reinsurance may be unrecoverable, because that is what has happened consistently, and you want to deduct that from your taxes without attaching that to a specific company or contract that you know about.

So where am I leading with these exercises? And what does financial reinsurance have to do with it? It changes the timing of some of the items. You can get back the equity in the unearned premium reserve, up front, for example, by a straight quota share cession of a percentage of your portfolio. You can recognize investment income in advance, if you cede part of your existing business for premium which reflects the time value of money.

Another interesting thing is that this also has the effect of freezing reinvestment and investment default assumptions. Let's say you cede over 50 million dollars worth of premium for a particular type of contract. You no longer have to figure out what is going to happen to the investments into which you put this 50 million dollars worth of premiums. The reinsurer, of course, is going to have to do that and that will be built into their assumptions, but you have, in effect, taken that risk off your book and give it to the reinsurer.

Now keep in mind that the type of contract that I just talked about has to meet certain requirements before you can reflect it in your statutory results, and this has been stated in New York's Reg. 108, which I cannot recite from memory. And most of New York's Reg. 108 is now included in the NAIC requirements, so it is countrywide essentially.

Another item that a financial reinsurance contract can take into account in pricing would be anticipated salvage and subrogation. So you can get that benefit earlier.

I've also heard rumblings about products to cover reinsurance recoverables. And this is another case where the premium for the contract could reflect some of the patterns that you have seen in collectibility or uncollectibility in your reinsurance. So, in effect, it can give you a tax deduction up-front for unrecoverables. And with last year's weather catastrophe still in mind, you can buy a Funded cover, which would allow you to pay premiums yearly into a fund in which the reinsurer holds. You can be credited with investment income on the fund, and losses and the reinsurers expenses are deducted from it yearly. This type of contract works very well for catastrophe exposures.

Another interesting point is that you can effectively freeze the tax provisions applying to a segment of the business through appropriate financial reinsurance, since the reinsurer bears most or all of the impact of future tax law changes on the book once it has assumed it. So that takes care of item 14.

I put in item 13, which is foreign exchange gains and losses, for fun, because we talked about it earlier. To my knowledge, no company has been creative to come up with a product for this one, although there are immunization strategies available through other means to control it. You should recognize, however, that if your company is assuming reinsurance on business written out of the U.S., it may also be assuming an element of foreign exchange risk even if the contract was not written for that purpose.

All financial reinsurance contracts require special consideration, including the legal and regulatory questions involved whether you are analyzing them from the assumed side or the ceded side.

Financial Reinsurance Reserving Considerations

- What does the contract say?
- What risks are being transferred? How can we evaluate them?
- What's the accounting treatment?
- Is the contract likely to be commuted? What are the implications?
- Be careful of what you group together.

First, you have to consider traditional underwriting risk, because most financial reinsurance contracts do have some. Maybe less than a traditional reinsurance contract, but you should evaluate it. You almost have to read the individual contract, directly contradicting the quote which Ross showed you earlier. I'm starting to find the dangers of being quoted in print. But, anyway, read the individual contract to find out the extent of the underwriting risk and use appropriate methods to measure. The other risks that we talked about are really what make it financial reinsurance. For the most part, financial reinsurance is allowing the ceding company to reflect up-front the effects of some items which are usually considered too uncertain to be reflected in statutory results. The important thing is to find out what risks the reinsurer assumed and then find ways to evaluate them.

Another point, if you have not figured it out already, is to be careful about what you group together. Setting a reserve on a bunch of contracts which all qualify as financial reinsurance does not make any sense unless they cover similar risks. If you are lucky, your company will stick to a few kinds and try to do them well so you can combine data on similar types.

Okay. That is about it. Thank you to everybody who is still awake.

EXHIBITS PRESENTED BY REGINA BERENS

EXHIBIT I

MEXICAN PESOS- IN ORIGINAL CURRENCY

PAID LOSSES

80	92,000	184,000	312,800	406,640	487,968	536,765	563,603	580,511	592,121	598,043	598,043
81	95,000	190,000	323,000	419,900	503,880	554,268	581,981	599,441	611,430	617,544	
82	99,111	198,222	336,977	438,071	525,685	578,253	607,166	625,381	637,888		
83	110,000	220,000	374,000	486,200	583,440	641,784	673,873	694,089			
84	90,000	180,000	306,000	397,800	477,360	525,096	551,351				
85	98,000	196,000	333,200	433,160	519,792	571,771					
86	97,000	194,000	329,800	428,740	514,488						
87	100,000	200,000	340,000	442,000							
88	102,000	204,000	346,800								
89	105,000	210,000									
90	104,000										

TOTAL IBNR	
PESOS (000)	US$
13,574	4,914

Age-to-age	2.0000	1.7000	1.3000	1.2000	1.1000	1.0500	1.0300	1.0200	1.0100	1.0000	
Age-to-Ult.	17.2714	8.6357	5.0798	3.9075	3.2563	2.9603	2.8193	2.7372	2.6835	2.6569	2.6569
IBNR	1,692	1,603	1,415	1,285	1,161	1,121	1,003	1,206	1,074	1,023	991

INCURRED

80	184,000	331,200	529,920	794,880	1,112,832	1,335,398	1,468,938	1,542,385	1,573,233	1,588,965	1,588,965
81	190,000	342,000	547,200	820,800	1,149,120	1,378,944	1,516,838	1,592,680	1,624,534	1,640,779	
82	198,222	356,800	570,879	856,319	1,198,847	1,438,616	1,582,478	1,661,601	1,694,833		
83	220,000	396,000	633,600	950,400	1,330,560	1,596,672	1,756,339	1,844,156			
84	180,000	324,000	518,400	777,600	1,088,640	1,306,368	1,437,005				
85	196,000	352,800	564,480	846,720	1,185,408	1,422,490					
86	194,000	349,200	558,720	838,080	1,173,312						
87	200,000	360,000	576,000	864,000							
88	204,000	367,200	587,520								
89	210,000	378,000									
90	208,000										

Age-to-age	1.8000	1.6000	1.5000	1.4000	1.2000	1.1000	1.0500	1.0200	1.0100	1.0000
Age-to-Ult.	8.6357	4.7976	2.9985	1.9990	1.4279	1.1899	1.0817	1.0302	1.0100	1.0000

MEXICAN PESOS- CONVERTED TO U.S. DOLLARS
PAID LOSSES

80	3,993	7,719	13,122	17,059	20,470	22,517	23,643	24,352	24,839	25,088	25,088
81	3,848	5,824	6,661	7,181	7,513	7,600	7,622	7,629	7,634	7,637	
82	2,062	2,686	3,430	3,830	3,981	4,022	4,034	4,042	4,047		
83	693	1,283	1,893	2,086	2,161	2,187	2,200	2,208			
84	482	839	1,056	1,127	1,162	1,182	1,192				
85	388	557	663	708	744	763					
86	167	242	302	344	375						
87	78	122	181	218							
88	45	88	140								
89	44	82									
90	38										
											TOTAL IBNR
Age-to-age	1.6476	1.4178	1.1920	1.1260	1.0621	1.0315	1.0195	1.0138	1.0077	1.0000	IN US $
Age-to-Ult.	3.6293	2.2027	1.5536	1.3033	1.1575	1.0898	1.0564	1.0362	1.0221	1.0143	1.0143 ----------
IBNR	99	99	77	66	59	68	67	80	90	109	359 1,173

MEXICAN PESOS
INCURRED-CONVERTED

80	7,986	13,680	17,638	19,504	23,820	25,681	25,201	25,100	25,272	25,505	25,447
81	7,695	8,985	8,074	9,330	10,069	9,019	8,348	8,067	8,061	8,007	
82	4,123	3,685	4,683	5,487	5,139	4,690	4,465	4,478	4,429		
83	1,386	2,226	2,921	2,885	2,742	2,608	2,656	2,624			
84	965	1,409	1,421	1,422	1,432	1,511	1,512				
85	776	827	843	890	1,024	1,071					
86	334	363	403	516	613						
87	155	192	280	370							
88	90	157	227								
89	88	143									
90	75										
Age-to-age	1.3419	1.1575	1.1142	1.1200	1.0080	0.9695	0.9902	1.0031	1.0054	0.9977	
Age-to-Ult.	1.8873	1.4064	1.2150	1.0905	0.9736	0.9659	0.9963	1.0062	1.0031	0.9977	1.0000

POUNDS STERLING- ORIGINAL CURRENCY

PAID LOSSES

80	2,300	4,600	7,820	10,166	12,199	13,419	14,090	14,513	14,803	14,951	14,951
81	2,500	5,000	8,500	11,050	13,260	14,586	15,315	15,775	16,090	16,251	
82	2,700	5,400	9,180	11,934	14,321	15,753	16,541	17,037	17,377		
83	2,500	5,000	8,500	11,050	13,260	14,586	15,315	15,775			
84	3,000	6,000	10,200	13,260	15,912	17,503	18,378				
85	3,200	6,400	10,880	14,144	16,973	18,670					
86	3,100	6,200	10,540	13,702	16,442					TOTAL IBNR	
87	3,300	6,600	11,220	14,586						----------	
88	3,500	7,000	11,900							POUNDS	US$
89	3,700	7,400									
90	3,500									419,905	672,058
Age-to-age	2.0000	1.7000	1.3000	1.2000	1.1000	1.0500	1.0300	1.0200	1.0100	1.0000	
Age-to-Ult.	17.2714	8.6357	5.0798	3.9075	3.2563	2.9603	2.8193	2.7372	2.6835	2.6569	2.6569
IBNR	56,950	56,504	48,550	42,409	37,099	36,598	33,436	27,404	29,255	26,927	24,773

INCURRED

80	4,600	8,280	13,248	19,872	27,821	33,385	36,723	38,560	39,331	39,724	39,724
81	5,000	9,000	14,400	21,600	30,240	36,288	39,917	41,913	42,751	43,178	
82	5,400	9,720	15,552	23,328	32,659	39,191	43,110	45,266	46,171		
83	5,000	9,000	14,400	21,600	30,240	36,288	39,917	41,913			
84	6,000	10,800	17,280	25,920	36,288	43,546	47,900				
85	6,400	11,520	18,432	27,648	38,707	46,449					
86	6,200	11,160	17,856	26,784	37,498						
87	6,600	11,880	19,008	28,512							
88	7,000	12,600	20,160								
89	7,400	13,320									
90	7,000										
Age-to-age	1.8000	1.6000	1.5000	1.4000	1.2000	1.1000	1.0500	1.0200	1.0100	1.0000	
Age-to-Ult.	8.6357	4.7976	2.9985	1.9990	1.4279	1.1899	1.0817	1.0302	1.0100	1.0000	

POUNDS STERLING CONVERTED TO U.S. DOLLARS
PAID LOSSES

80	5,343	9,935	16,890	21,957	26,348	28,983	30,432	31,345	31,972	32,291	32,291	
81	4,992	9,298	14,516	17,666	20,520	22,467	23,686	24,538	25,083	25,341		
82	4,651	8,676	13,346	16,902	20,406	22,800	24,261	25,118	25,664			
83	3,728	6,816	11,336	15,079	18,774	21,234	22,493	23,228				
84	3,706	7,580	13,745	18,862	23,781	26,529	27,930					
85	4,132	8,830	16,320	22,375	27,260	29,977						
86	4,551	9,734	17,784	23,245	27,631							
87	5,518	11,639	19,618	25,005								
88	6,493	12,537	20,379									
89	6,390	12,312										
90	5,602											
Age-to-age	1.9667	1.6925	1.3038	1.2104	1.1087	1.0556	1.0333	1.0212	1.0101	1.0000		TOTAL IBNR
Age-to-Ult.	14.5992	7.4231	4.3860	3.3640	2.7792	2.5067	2.3746	2.2981	2.2504	2.2279	2.2279	----------
IBNR	76,179	79,079	69,004	59,112	49,161	45,168	38,392	30,153	32,090	31,115	39,649	549,103

POUNDS STERLING
INCURRED-CONVERTED TO U.S. DOLLARS

80	10,686	17,283	26,239	36,428	45,645	54,766	63,656	71,551	77,471	75,074	71,941
81	9,983	16,188	23,313	30,698	42,448	54,324	64,820	73,024	71,126	68,438	
82	9,302	15,118	21,217	31,616	47,325	61,989	73,548	73,870	71,748		
83	7,455	11,757	18,955	30,565	47,164	61,491	64,980	65,062			
84	7,412	13,779	24,138	40,029	61,579	71,504	75,179				
85	8,265	16,346	28,947	47,425	64,796	74,437					
86	9,101	18,027	31,356	45,838	61,330						
87	11,035	21,434	33,068	47,294							
88	12,985	22,208	33,600								
89	12,780	21,787									
90	11,204										
Age-to-age	1.7568	1.5830	1.4954	1.4101	1.2251	1.1253	1.0618	1.0087	0.9658	0.9583	
Age-to-Ult.	8.0134	4.5615	2.8815	1.9270	1.3666	1.1154	0.9912	0.9335	0.9255	0.9583	1.0000

ALL 3 CURRENCIES COMBINED AND CONVERTED TO U.S. $
PAID LOSSES

80	13,016	25,014	42,524	55,281	66,337	72,970	76,619	78,918	80,496	81,301	81,301
81	12,839	23,121	34,778	42,527	49,250	53,404	55,812	57,407	58,462	58,979	
82	10,912	19,762	31,055	39,296	46,664	51,327	54,026	55,662	56,742		
83	8,421	16,098	26,828	34,844	42,151	46,758	49,198	50,676			
84	7,988	16,019	27,721	36,785	45,098	49,882	52,401				
85	8,221	16,787	29,564	39,437	47,629	52,327					
86	8,618	17,776	31,347	40,827	48,692						
87	9,595	19,761	33,399	42,903							
88	11,037	21,625	35,819								
89	11,434	22,394									
90	10,839										
Age-to-age	1.9431	1.6653	1.2904	1.1966	1.0994	1.0500	1.0297	1.0193	1.0095	1.0000	TOTAL IBNR
Age-to-Ult.	12.0993	6.2267	3.7390	2.8977	2.4215	2.2026	2.0977	2.0371	1.9985	1.9796	1.9796 ----------
IBNR	120,309	117,045	98,109	81,415	69,217	62,926	57,520	52,557	56,655	57,778	79,645 853,177

ALL 3 CURRENCIES COMBINED AND CONVERTED TO U.S. $
INCURRED LOSSES

80	26,031	44,211	65,074	87,728	113,978	133,863	147,615	158,346	165,672	164,138	160,946
81	25,678	39,573	54,427	74,588	100,901	121,404	137,035	148,152	147,588	145,530	
82	21,825	33,923	50,092	73,391	103,268	127,643	145,073	148,761	147,998		
83	16,841	28,383	44,916	68,010	98,290	122,160	131,503	134,747			
84	15,976	28,868	47,447	74,283	108,975	128,173	137,365				
85	16,441	30,492	51,102	80,283	110,575	129,214					
86	17,235	32,430	54,223	80,050	109,118						
87	19,191	36,026	56,388	82,224							
88	22,075	38,565	59,746								
89	22,868	39,930									
90	21,679										
Age-to-age	1.7261	1.5471	1.4647	1.3841	1.1989	1.1032	1.0513	1.0132	0.9885	0.9806	1.0000
Age-to-Ult.	7.3923	4.2827	2.7683	1.8900	1.3655	1.1390	1.0324	0.9821	0.9693	0.9806	1.0000

EXHIBIT VI

WHAT DETERMINES THE TOTAL PROFIT AFTER THE LAST DOLLARS OF LOSS AND EXPENSE HAVE BEEN PAID

1. Amount of losses
2. Amount of reinsurance recovered on losses
3. Amount of commissions and expenses
4. Amount of premium
5. Amount of taxes
6. Timing of loss payments
7. Timing of recoveries on reinsurance
8. Timing of tax and expense payments
9. Timing of premium receipts (net of ceded reinsurance premiums)
10. "Earning" of Equity in Unearned Premium Reserve
11. Investments - Dividends and Interest
12. Capital Gains/Losses
13. Foreign Exchange Gains/Losses
14. Tax Law changes
15. Salvage and Subrogation Recoveries
16. Funding for Future Catastrophes
17. Provisions for Unrecoverable Reinsurance

QUESTION: I have a question on the RAA factors. Correct me if I'm wrong, but I think starting in the 1989 book, general liability triangles excluded asbestos. I'm wondering if there are other sources we could use to estimate the impacts of environmental hazards like asbestos.

CURRIE: To my knowledge, there are no other outside sources that give asbestos liability figures. In fact, we have done a lot of work within the firm trying to study environmental hazards in general and our uncertainty is such that we now put a caveat in our reserve reports saying that development factors do not include any provisions for environmental claims, asbestosis, and similar factors.

QUESTION: How would you estimate it, if, for example, in my company we used to write asbestos?

CURRIE: We have put up aggregate limits on those contracts that have known exposure.

PARTICIPANT: One possible approach that we use is to analyze RAA studies including and excluding asbestos. So, if you take the differences you can get some real nice asbestos data that we are now using for some of our actual loss reserving.

CURRIE: One other problem is that the toxic waste issue is going to be at least as big as asbestos in the future and we have no way of getting our hands around that at the moment.

PARTICIPANT: To report on the RAA actuarial committee of last week, it is an objective to have that in the 1991 study.

BARROW: I have a question for Ross. Have you ever considered using industry development factors based on A.M. Best data?

CURRIE: We have used the A.M. Best loss reserve development reports to get development factors. The first thing you have to remember is that while RAA experience is strictly excess, A.M. Best is just company data as reported in the annual statements and includes pro-rata and excess coverage. We have generally restricted its use to true pro-rata coverage. I've used multi-peril as a surrogate for property coverage in the past because the liability component on multi-peril has not been that large; however, Tillinghast assembles pure property patterns from client information that we use internally.

One problem with A.M. Best data is that individual companies can significantly distort the development factors you get when taking total industry data straight from the A.M. Best Loss Reserve

Development Reports. We have found in the past, for example, that annual statement data reported by Best for Prudential Re does not make sense. Historically, this data has to be taken out in order to get reasonable development factors using A.M. Best data.

Another company, which appeared in the past but which does not appear at the current time, was New England Reinsurance. New England Reinsurance data for early years has negative paid losses in a lot of places - very strange information. So, when you are using Best data, you have to look through all of the individual companies before you come up with development factors. Even then you should only use Best for pro-rata coverage, even though there is some excess exposure there. This is very short tailed experience.

PARTICIPANT: How do you calculate patterns from this data?

CURRIE: What we have done is assemble the reinsurance development reports for many years and take loss ratios and create development triangles; and of course, you have to worry about companies that go in and out of the data. As I said, New England Re is not in the data anymore, but it was in there for many years and causes distortions; so you must pull it out of all of the underlying data.

That also happens with the RAA study, by the way. The companies in RAA study have changed over the years and the database today is not the same as it was several years ago. RAA tail factors have gotten longer over the years. That is because losses now develop more slowly, but it is also because the block of companies in the study has changed. If you cut current RAA data off at, say, 1983 or 1985, calculate development factors, and compare them to the reported RAA development at the same calendar year, the current triangles are longer tailed than the old triangles - and the only difference is the companies that are going into the study.

QUESTION: Is Gen Re carrying ACR's in its loss experience?

CURRIE: I don't know the answer, but someone up here has just said yes.

QUESTION: Do you credibility weight the results of your IBNR calculations?

CURRIE: I don't use any formal creditability procedure, but you should look at the results using both methods before making a selection. In a previous reinsurance session, they discussed the mix and match idea and I believe that even on a particular treaty you can mix and match methods to arrive at the best answer. I've had a situation with a client recently where we used the loss development method on all property treaties; on casualty treaties we used the loss development method for very mature years; we used a mixture of loss development and Bornhuetter-Ferguson for what we considered to be semi-mature years; and we used pure Bornhuetter-Ferguson for immature years. So there is obviously still a lot of subjective judgment involved in doing this type of analysis.

QUESTION: How are the confidence intervals which are shown in the

RAA study calculated?

CURRIE: The confidence intervals are established by eliminating companies that are outside the confidence ranges. There are no special mathematical techniques used on the data that you see in the RAA study. There are no smoothing assumptions or any curve fitting techniques used.

QUESTION: For example, the 25th percentile...that's a particular company then? That is an observation of the fourth out of sixteen and the twelfth out of sixteen.

CURRIE: Exactly.

QUESTION: It's those companies.

QUESTION: Has it ever been published as to which companies are outside of the confidence ranges?

CURRIE: No.

QUESTION: Then its correct to say that the curves shown in the RAA study aren't really "curves" at all.

CURRIE: Yes. As I said, the RAA study is really a rote presentation of mathematical results. It is not an actuarial study of excess reinsurance - and it is important to remember that.

PARTICIPANT: Just two other comments on that study. One...excess and aggregate losses in the past have been taken out of the data. In other words, if you have an aggregate treaty where there is a large deductible in the treaty, on a loss that is supposedly reported to the RAA, it does not get reported in the triangle until you have exceeded the aggregate deductible, which really slows down the development of the company's losses on its aggregate treaties. In the upcoming study, which will go out at the end of 1990, we are asking that data be reported as if there were no aggregates at all. So what you may end up seeing is a slow down in the development curve, just due to the fact that we are attempting to strip the aggregates out of that curve. We are also going to ask companies to attempt to identify any other environmental liability type claims and attempt to strip them out in addition to asbestosis. We are trying to clean up the data once again.

PARTICIPANT: One more thing out of the RAA committee that might be of interest. I think it is pretty well set for the 1991 study that there will segregation of true facultative business, facultative automatics and treaty business. I know that has been an item of discussion over the years. I think that is significant.

ANOTHER PARTICIPANT: The last study was the first time that they separated treaty and facultative coverages, and what the analysis showed was that the treatment among various ceding companies of where they should put all automatic facultative varied. It was felt that we should try to clear up that gray area.

PARTICIPANT: If you read the study I think it will surprise you. I would say that the facultative and treaty loss development patterns were so close together that there was some speculation that treaty experience was heavily influenced by automatics.

QUESTION: I wonder if you would mind commenting on any additional considerations you would have if one of your ceding companies was in rehabilitation.

CURRIE: The major added consideration is the timeliness of reporting. In some cases, you may end up using a pure loss ratio approach if you have real timing problems and data quality problems with that sort of situation.

BARROW: Regina...

BERENS: I just wanted to add a brief p.s. to that answer. Fortunately, I have heard this second-hand from consultants who have been trying to analyze results of insolvent reinsurers. I think the same thing could happen with a primary company that is insolvent. With the insolvent reinsurers they found that brokers knew, of course, that the company was shaky and, therefore, sort of carefully doled out large losses over long periods of time because they were afraid that if they dumped too many on them at once, the company would go insolvent and they would never pay another nickel of claims. I could see also, that with a primary company in the same situation, the agents may be careful about reporting large losses. So you may have a lot more pipeline losses than you would expect.

PARTICIPANT: I would add one more observation on insolvent companies after the insolvency. Someone you might get in contact with is the liquidator or rehabilitator. They have taken the place of your claims personnel and and we at Scor found that, in the few cases where we have reinsured companies that are insolvent, loss development patterns were quite slow for the first two years; the state could not figure out what was going on and suddenly wanted to clean up everything all at once. Then they tried to digest what they had tried to clean up and we found loss development to be heavily influenced by those type of special circumstances.

BARROW: Any more questions? Okay.

Please join me in showing the panel a sign of appreciation for all the hard work they have put into it.

1990 CASUALTY LOSS RESERVE SEMINAR

2F: TAX ISSUES RELATING TO LOSS RESERVING

Moderator

Jonathan Roberts
Clarendon National Insurance Co.

Panel

Richard N. Glaser
Coopers & Lybrand

Owen M. Gleeson
Financial Analysis & Control Systems Corp.

MR. ROBERTS: I'm vice-president of Clarendon Insurance Group. I'm your moderator for this session, Session 2F. We'll be talking about tax issues related to loss reserving, both of them. Actually there are more than two. There are so many, in fact, that it is critical that each of you fully comprehend the tax consequences associated with your function and with your work product.

I'd like to first ask a question for the audience, is there anyone here who works for the IRS or the Treasury? Okay. Very good. I won't have to tell you why I asked the question. I would also like to ask that each of you refrain from asking questions during the presentation. If your memory is not the greatest, you can always write down the questions. We hope to have a minimum of five or ten minutes at the end of the presentations to field these questions.

Now, we'll begin with a presentation by Richard Glaser. Rich is a senior manager in the insurance tax practice at the New York office of Coopers and Lybrand. He has 12 years experience in the insurance industry. His clients include major life and property and casualty companies, as well as reinsurers and captives. He's an attorney and a CPA. We're glad to have him on the panel.

Rich?

MR. GLASER: Good morning.

Today I'll be talking about tax issues dealing with unpaid losses and unpaid loss adjustment expenses. I'm going to loosely follow my outline covering the major issues. There are a number of issues which I've briefly talked about or mentioned in my outline, which I won't cover in my prepared speech today. However, at question time at the end if one of these areas is something of particular interest to you, feel free to ask your question.

The first major issue I'd like to discuss is loss reserve discounting as mandated by the Tax Reform Act of 1986. Prior to the '86 Act, deductible losses incurred for tax purposes were essentially statutory losses incurred. Some of you may recall that in 1984, Congress attacked the life insurance industry resulting in an entirely new taxation scheme for life insurers. It was during this process that Congress learned something about the insurance industry and what loss reserves are all about.

In 1986, as part of a revenue raising measure, Congress decided to go after the casualty industry. The thought was that there's something inherently unfair with the ability to deduct an item today that's not going to be paid until some time in the future. Nowhere else in the code is the taxpayer allowed such a deduction.

Mechanically, loss reserve discounting is not difficult. It's simply a present value analysis. And in any present value analysis you need a principal, some type of timing and a discount rate. And that's what I'd like to talk about, loss reserve discounting.

The principal, or what's going to be discounted, is straightforward. It's unpaid losses and unpaid loss adjustment expenses. Generally, unpaid losses are the statutory unpaid losses on the NAIC blank. There are some exceptions. The notable exception is a situation where statutory losses are already discounted on a statutory basis, like workers comp and med mal, for instance.

There's a rule that creates a complication in such a case. The rule simply says that the tax reserve after loss reserve discounting cannot exceed the reserve on the annual statement and that's by line by accident year. And if you have taken a deeper discount for annual statement purposes than for tax purposes you're likely to result in a problem.

Let me give you a simple example. Suppose we're talking about a workers comp block and the nominal reserve is $1,000. You've taking a discount on your blank and the statutory reserve is $700. If you disclose on an annual statement, and I believe the interrogatories of the statement require you to disclose discounting, for tax purposes you can gross up your reserve to the nominal reserve. In my case, $1,000. You'll then discount it for tax purposes under the tax rules.

Suppose in my situation the tax reserve is calculated at $720. The nominal reserve is $1,000. The stat reserve is $700. I gross that stat reserve back up to $1,000 and discount it to $720. If that happened to be one accident year on that line of business, you can only carry a $700 reserve for tax purposes.

The time element in our present value analysis relates to the loss payment pattern. When do we pay these losses? When do we expect to pay them? In this context, the code allows two options which are elective. The taxpayer can either elect to use the company's own loss payment pattern experience or alteratively elect to use a payment pattern that's developed as the industry pattern from BEST data gathered by the IRS.

For 1992 companies will reelect for five years to use the company payment pattern or the industry payment pattern. What does that mean? If you're using the industry payment pattern, IRS will collect the BEST data once every five years and will develop a payment pattern. If you use the industry payment pattern, you'll use that payment pattern for five years.

There are rules which provide which companies may use their own payment pattern. Basically, its any company that has sufficient experience. That's not defined except it excludes insurers if a particular line writing represents the bottom 10% of the industry in terms of premium volume. I don't know how many years experience you need, for instance in workers comp business, to

have experience which is sufficient. Assuming you've made the determination that the company has sufficient experience, you can then develop a loss payment pattern.

Once one elects to use the company payment pattern, this election is for all lines. But since a company can't use its own payment pattern for lines which there is not sufficient experience, the election to use the company payment pattern really becomes effectively a line by line election. Since you elected to use the company payment pattern, if you are deemed to have sufficient experience in any line, you must use the company payment pattern for that line.

But if you are deemed not to have sufficient experience, you cannot use the company's experience. You'll fall into the industry payment pattern. Many companies which elected to use their own payment pattern are in fact using a hybrid method depending on its experience in that line.

In 1987, the decision to use the company payment pattern or the industry payment pattern was essentially a trade off. If you pay claims faster than the industry average, you're going to have a smaller discount under the present value analysis and, therefore, you'll be able to deduct a higher reserve included in incurred losses.

On the other hand, one wished to maximize the fresh start. Very simply stated, the fresh start represented the difference between 12/31/86 undiscounted reserves, and discounted opening reserves at 1/1/87.

As an example, suppose 12/31/86 year-end reserves, both on the annual statement and on the tax return were $1,000. And suppose the 1/1/87 discounted reserve is $800 for tax. The $200 opening discount represents the fresh start.

The term "fresh start" is a carryover from the '84 Act. Life companies had a similar type of reevaluation of life reserves which resulted in a lowering of reserves. As an accommodation to the industry, that lowering of reserves was forgiven. Since, typically when you take down reserves you have income to the extent of this opening discount on the 1/1/87 reserve, the income was forgiven forever (i.e., there was a "fresh start").

You may hear tax people talk about the double deduction. Here is a simple illustration. Suppose the 12/31/86 reserve is $1,000 resulting in an incurred deduction of $1,000.

Assume in 1987 you pay off all your claims. Since your opening tax reserve is $800, you will release $800 in reserves creating $800 of income at this point. But when you release the reserve, and assuming that no adverse or favorable development occurred, paid losses will be $1,000.

To recap; prior to 1987, you deducted the $1,000 reserve increase. In 1987 you released $800 in reserves and deducted $1,000 for losses paid, resulting in a $200 net deduction in 1987. Over time there was a $1,000 deduction prior to '87 and

$200 of deduction in 1987 resulting a total deduction of $1,200. That $200 is simply the opening discount, and the "fresh start" amount that we referred to is the double deduction.

The major fresh start issue was reserve strengthening, which is a term of art.

In the life insurance industry if one changes mortality assumptions or interest rates in determining reserves, that's reserve strengthening and the I.R.C. has dealt with that for years on the life side.

Many of the property/casualty provisions enacted by Congress in 1986 were the result of what Congress learned in 1984 when dealing with life companies. The issue of strengthening was addressed in the 1984 provisions impacting life insurers. What was the concern of Congress? Let me illustrate.

An astute actuary might say, "my reserve level is $1,000 and my reserve discount will be $800. I'm going to get a $200 fresh start. If I increase reserves to $2,000, I will take a one year surplus decrease.

However, if my tax reserve on $1,000 is $800, my tax reserve on $2,000 should be $1,600. I now have a $400 fresh start. I have created a $200 permanent benefit by increasing reserves for one year that I can theoretically take down in 1988."

Congress saw this as an evil in 1984, and in the Committee Reports to the 1986 Act, Congress said that if companies are engaged in this behavior, no fresh start will be allowed. The Committee Reports didn't define strengthening, they described strengthening. They said it's an artificial tax oriented increase. Don Rocap, who was at the Treasury, believed that the IRS could not audit intent. Therefore, the IRS would deem that "strengthening" occurred as follows: Start with pre-1986 accident year reserves at 12/31/85 and subtract paid losses during 1986 on those reserves.

If there was no development one way or the other, you would expect the 12/31/86 reserve to be the 12/31/85 reserve less the paids. If the 12/31/86 reserve on pre '86 accident years is anything higher than that, strengthening is deemed to have occurred.

One of my clients had an actuarial consulting firm evaluate reserves and conclude that they were severely deficient. Coopers & Lybrand agreed. These reports were late in 1985. Early in 1986 the company, with real reluctance, and having no idea how the tax laws would change, increased reserves dramatically. That client had a totally non-tax motivated strengthening. That client also has a tax exposure relating to the reserve increase.

The issue of strengthening was also addressed in Notice 88-100, which was a notice put out by the IRS in the summer of 1988. It described three types of strengthenings, which really address the issue of whether one can offset strengthenings and weakening.

The Notice came up with three categories of strengthenings: changes in estimates was category one, changes in assumptions other than interest rate was category two, and unspecified additions, which was category three.

The Notice simply provided that in category one, estimate changes, you can net strengthenings and weakening within category one strengthenings. For changes in assumptions, category two, there's no netting. And in category three, which are bulk IBNR reserves, again there are strengthenings, but weakening offsets.

Notice 88-100 also said that if a reinsurer picks up business, and there are losses for pre '86 accident years during 1986, that'll be treated as new business. That's not strengthening.

The third element of loss reserve discounting is a discount factor. The IRS and the Treasury publishes rates monthly for various purposes. One such rate is called "the applicable federal rate", or the AFR. It's a rolling 60 month average. In 1987 this rate was 7.2 percent and for 1990 the rate is 8.39 percent. Therefore, the AFR moves generally with interest rates but lags behind as it's a 60 month average.

The second major issue that I want to talk about is accruing salvage and subrogation for tax purposes. The best way to describe this issue is to give a historical perspective. In 1983, Continental Insurance had a Court of Claims case where IRS asserted that Continental should accrue salvage and subrogation.

The court held that if in any state that you do business, (meaning any state to which you submit a statutory blank) that state does not permit the accrual of salvage and subrogation, then you don't have to accrue for tax purposes. So, if you happen to be one of those little companies that writes in just one state and your state happens to be the state that permits accruing of salvage and subrogation you had to accrue for tax purposes, but everybody else did not.

The 1986 tax law provided a mandate that, "treasury, consider the issue of salvage and subrogation". Congress really didn't know what to do with this issue, but Congress gave the IRS another opportunity to consider it.

In December of 1987 the IRS came out with proposed and temporary regulations, which basically are regulations that one has to follow just like any other regulations except that temporary and proposed regulations give the IRS the ability to retract them very easily. These regs were issued under Section 832, which is the general section telling how property/casualty companies pick up income and deduct expenses. Not Section 846, under which the authority they had for dealing with these regs was granted.

The regs under Section 832 didn't provide for fresh start. If you make companies start accruing salvage and subrogation, there's an amount sitting on the books that's ready to be accrued. Should you get a fresh start and from here on in just start accruing? Well, IRS just didn't deal with the issue, but they also didn't issue the regs under Section 846 which provides for fresh start.

In addition, they didn't provide for discounting. Should one pick up 100 percent of an accrual or should one discount it just like discounting on the reserve side? They didn't deal with that issue either. But, again, by issuing the regs under Section 832, there's no basis in Section 832 for either discounting or fresh start. It's an Section 846 issue. What's the difference? There's a big difference dealing with statutory authority to issue regulations.

The industry, through the trade associations, asserted that these are not valid regulations. Apparently the point got through to the Treasury. They retracted these regulations which were to be effective for 1988 tax year.

Well, 1989 came along and in March 1990, IRS went through the process again and moved the effective date to 1990. And in the President's budget proposal last January there was a provision providing for the accrual of salvage and subrogation.

Congress, I believe has the sense that accrual of salvage and subrogation is warranted. As I talked to our people in Washington, and in the meetings I've been involved with in Washington, various IRS and Hill people have been talking about this issue, and it seems to me that Congress isn't dealing with this on its technical merits. They're not saying you should or shouldn't. They're saying the revenue need exists, and I think you can expect that if there's a tax bill in 1990 it will include a provision requiring the accrual of salvage and subrogation.

The industry is really pushing hard for a fresh start and that's up in the air, and I'm being told that it's going to be dealt with as a budget item. It's likely if there's no fresh start, there'll be some type of phase-in, like a four-year phase-in. And it's also likely that discounting of the accrued salvage and subrogation will be included as well.

MR. ROBERTS: Thank you.

MR. GLASER: Your welcome.

MR. ROBERTS: Again, there are going to be questions, time for questions at the very end. However, my next speaker is Owen Gleeson. Owen began his actuarial career with USF&G in Baltimore in 1972. His responsibilities in the 12 years that he worked there included loss reserving, annual statement preparation and financial planning.

From 1984 to 1987, he worked at General Reinsurance. During that period, in addition to work in the areas of loss reserving and nontraditional reinsurance, he devoted much of his time to the analysis of the Tax Reform Act of 1986 and its impact on the property/casualty industry.

In 1987, he founded the company, Financial Analysis and Control Systems. FACS designs and distributions financial planning models to property casualty companies. Owen is a fellow of the Casualty Actuarial Society and a member of the Financial Analysis Committee.

Owen?

MR. GLEESON: There's two particular aspects of the Tax Reform Act of 1986 I want to focus on today. First is discounting of loss reserves. Now, in discussing this feature of the tax law I want to focus on the cost in two situations. One of these is that in which the company has adequate loss reserves and the second is the case in which the companies posts inadequate loss reserves.

The second topic I want to discuss is the alternative minimum tax and its interaction with the regular tax. I think that many of the people in the Casualty Actuarial Society understand the regular tax adjustments, but the interaction with the alternative minimum tax is something that might still be a little bit of a mystery and I think that it's an area in which this tax law and its effects are still not well understood.

(Exhibit A)

Let's start by looking at the discounting of loss reserves and the effects of adequacy. The property casualty industry has had a long history of inadequate loss reserves. Under the prior tax law, the penalties for inadequate loss reserves were rather small as long as the inadequacies didn't get out of hand.

One of the reasons for this was that the industry paid little or nothing in the way of taxes prior to 1987. And as a result, small deficiencies in the reserves would only have the effect of deferring some deductions and a marginal impact on the investment strategy. The permanent loss associated with inadequate reserves is rarely the problem for most companies, although it could and did happen on occasion.

Due to the Tax Reform Act of 1986, the situation was changed dramatically. Most companies are now paying a substantial amount of taxes and this adds a significant cost to doing business. Inadequacies in loss reserves only compounds this problem and adds an additional cost that's unnecessary in my opinion and which companies simply can't afford.

There's one school of thought that holds that loss reserve deficiencies simply defer the tax benefits and don't cause much in the way of difficulties. However, in the example that we're going to be taking a look at in a few minutes, the indications are that the costs can be significant. In addition, loss reserve inadequacy can result in a permanent loss of tax benefits. We'll be taking a look at this when we get to the discussion of the alternative minimum tax.

(Exhibit B)

Now, we're going to be looking at loss reserve discounting here to start with. Pay out rates on the incurred losses are shown at the top portion of the exhibit here and these more or less approximate the industry pay out rates for auto liability. The

other assumptions are listed on the exhibit. The discount rate is 4 percent compounded semi-annually and works out to about 8.16 percent.

We're also assuming that the pay out rates for tax purposes are the same as the actual pay out rates. That's just one of the assumptions that I could make and it was a simplifying assumption in this case.

Finally, we'll assume that the incurred loss in the accident year in question is $100,000. Under these assumptions the discount at the end of the accident year is $7,980 as we see posted here under Section 3. Now, this is a deferred deduction and it reverses over the next seven years. The schedule of the reversal appears at the bottom of the exhibit and in this case we've assumed that the loss reserves are adequate. The next step in the example is to assume that the reserves at the end of each year are deficient.

(Exhibit C)

The assumptions that we've made in this situation are exactly the same as in the previous exhibit with one exception. In this case we assume that the reserves posted by the company are 10 percent deficient at the end of each year. The required reserves and the reported reserves are detailed in the middle section of the exhibit.

For example, the incurred losses are $100,000 and the assumed pay out rate in the first year is 31 percent. Therefore, the paid losses are 31,000 and loss reserves should be 69,000. However, the posted loss reserves are 10 percent deficient with the reported reserves being $62,100. We see that the same situation holds at the end of each of the following years.

Now, when the reserves of 62,100 are discounted by the first year discount factor and subtracted from 69,000, we find that the difference is 14,082. This is the amount of deferred tax benefit at the end of that accident year. The deferred tax benefits are reversed over the next seven years according to the schedule at the bottom of the exhibit.

Now, there's two things to note here. One is not that important, but it might seem like a mistake if you're examining the results of these exhibits carefully. You might notice that the deferred tax benefits from inadequate reserving at the end of the accident year works out to $6,900. That's the deficiency. Also, the deferred tax benefits due to discounting that we saw in the previous exhibit was $7,980. We add those together. We get $14,880. That's about 800 more than the $14,082 figure that we have here.

What's the explanation for this? Well, the explanation is in this example that discount factors are being applied to

inadequate loss reserves. The 800 difference is the product of the first year discount factor times the amount of reserve deficiency at the end of the first year. So, that reconciles the two differences. And in other words, discounting doesn't defer tax benefits if you haven't posted the loss reserves in the first place.

Now, the other and more important thing to focus on is that the deferred tax benefits almost double.

This is when the posted reserves are 10 percent deficient. And this leads me to a point that I wanted to make. When discounting was under discussion, companies complained very much and very bitterly about how much the cost would add to the way they did business. There was a real hue and cry raised in the property/casualty business. So, no company would voluntarily accept discounting of loss reserves for tax purposes. But a company with reserve deficiency for this magnitude imposes approximately the same amount of cost on itself. That's something to think about.

Let's go on to the next exhibit and figure out what the exact amount of the cost is.

(Exhibit D)

Discounting loss reserves has been characterized as making a temporary loan to the government. And I think that's a pretty good way of looking at it. The cost to a company of having to make this loan as the tax rate multiplied by the difference between the current benefit and the discounted value of the benefit. The current or nominal amount is $7,980 in the case of adequate reserves as we've already seen. The discounted benefit at four percent semi-annually is $6,828.

As a result the cost is $392 as we have posted here. In the case of the deficient reserves the costs as measured in this matter is $679. Now, initially this doesn't look like a lot of money when compared to $100,000 of incurred losses. But the property/ casualty industry is characterized by thin margins and relatively low rates of return. The extra costs that the company imposes on itself like this lowers its return on equity. It effectively takes away from its premium income or its overall income. And there's a variety of ways that you could measure the cost.

I looked at three different methods that we've posted here, but I think the most effective method was to suppose a company wrote $50 million a year in premium -- and they have a 70 percent loss ratio and a 30 percent expense ratio. In a case like that, the annual cost for a company like that works out to $100,000. That's a lot of money for a company writing $50 million in premiums each year.

Now, some of the assumptions that I've made here are very simplistic. I assumed that the pay out rate for tax purposes and the actual pay out rate was the same. You might want to redo this and change those assumptions and vary the present value rate, and the other variables.

(Exhibit E)

Now, the next thing I want to look at is the question of the AMT. I'm going to go through Exhibits E and F pretty briefly here. We have the basic assumptions listed at the top of the exhibit here, the underwriting income, the tax adjustments and the investment income split between taxable investment income and tax exemption investment income.

Now, let's -- instead of talking about all these numbers, let's focus on the regular tax and the AMT. As you see down at the bottom, the regular tax is $4,080 and the AMT works out to be $2,900. That would be under the tax calculations, and the preference calculations for the years 1987 to 1989.

John, let's go to the next exhibit.

(Exhibit F)

Now, it's my contention that for most companies, those would be companies writing at a reasonably low combined ratio and which have a mix of taxables and tax exempts. The Tax Reform Act of 1986 has a tax increase built into it. It's not talked about a lot, but it is there.

In this exhibit I redid the calculations using the same facts. If we redo the regular tax, we get the same result because there's no change with regard to the regular tax with the exception of adjustments like accrual for salvage and segregation. But if you assume the same facts for a moment, the regular tax remains at approximately $4,000.

But look at the AMT, the AMT is now $4,650. So, a company with the same set of facts and circumstances, the same underwriting income, the same investment income, sees its taxes increase by about 15 percent going from 1989 to 1990. That's something to think about in terms of the change in a preference calculation.

(Exhibit G)

The most complicated parts of the Tax Reform Act of 1986 are not things like revenue offset, discounting and proration. Those are relatively mechanical. But one problem created by the parallel tax structure is that this structure can severely limit the value of tax losses and it adds a whole new dimension to tax planning.

One of the limitation areas is that of carry backs of regular tax losses. An example that we have here in Exhibit G. Let's assume

that the company has regular taxable income in 1989 of $12,500 and alternative minimum taxable income of $20,000. In the next year the company experiences a tax loss of $3,000 on a regular tax basis. However, it still has income of $8,000 on an AMT basis.

Let's for a moment ignore the AMT income and assume there's no alternative minimum tax, that is we're back in the years prior to TRA '86. Then as was the case under the old tax law, we could simply carry the 3,000 back to 1989 and recapture some of the previously paid taxes. In this case, the company would recapture $1,020 in previously paid taxes. This illustrates some of the benefits to property/casualty companies of the old tax law.

Under the current tax law, the benefit of the tax loss carry back can be very limited as seen in this example. The tax liability calculations prior to carry back are shown in the lower part of the exhibit. We would have the AMT. The regular tax is $4,250 and the AMT is $4,000 in 1989, and zero and $1,600 in 1990.

As you can see, the company is a regular taxpayer in 1989 and an AMT payer in 1990. Prior to the payment of taxes in 1990 the loss of $3,000 is carried back to the year 1989 and the taxes are then recomputed. In this case, the regular taxable income is reduced from 12,500 to 9,500 and the regular tax liability is reduced to 3,230. Under the old tax law, the refund would have been 1,020 as we've seen already.

However, in 1989, the AMT liability comes into play at this point. The AMT liability is now greater than the recomputed regular tax liability and effectively serves as a minimum. As a result the carry back refund is limited to $250. One-fourth of what we would have gotten back under the old tax law.

Let's go to the next example which is even more restrictive in terms of the effect of the limitation.

(Exhibit H)

In this example we have a situation in which a company receives no benefit at all from a regular tax loss. Before 1987, if a company suffered a regular tax loss, there was always talk about, well, we have some benefit from it. Let's look at this situation here.

The facts for 1990 are the same, but I've revised the 1989 assumptions. In this situation the company is an AMT taxpayer in 1989. Consequently, when the regular tax loss from 1990 is carried back to 1989 there's no refund at all. So, the company has no cash benefit that it receives here. It does get some benefit in terms of reducing the regular tax liability in 1989 and that increasing the AMT credit. That's not much solace to companies that are reporting on a statutory basis.

Now, in this exhibit and the previous one, we've looked at some very basic examples of the interaction of the regular tax and the AMT tax in a carry over situation, and the AMT credit. The next situation I want to look at is a little bit more complicated and let's go right to J and skip I.

(Exhibit J)

This is a very -- I warn you in advance, this is a very complicated example. This is an example of what can happen to a company that experiences fairly highly variable combined ratios, say varying over a range of 7 to 10 points. And it has a reasonable amount of its assets invested in tax exempt bonds.

In the first year, 1988, the company is an AMT taxpayer, since the AMT liability is 1,620. Look at the sixth line down. The AMT liability is 1,620 and the regular tax liability is 1,020. Now, since the minimum tax is greater than the regular tax, an AMT tax credit in the amount of $600 is created in this year. This can be carried forward to the future years and used to offset an excess of regular tax over a minimum tax in those years.

In the next year, 1989, the regular tax liability is 4,216 and the minimum tax liability is 3,900. So, the company is a regular taxpayer. The AMT credit generated in 1988 is applied to the regular tax and reduces the regular tax liability to 3,900. If we had simply subtracted the 600 credit from the 4,216, we would have obtained 3,616. However, the amount that an AMT credit can reduce the regular tax liability is limited by the rule that the AMT credit cannot reduce the regular tax liability below the minimum tax liability.

As a result, the regular tax liability is only reduced to $3,900 in 1989. 316 of the 600 AMT credit is used and at the end of 1989, we've now worked our way through two years, a credit of 284 remains. In the next year the company suffers a loss of 2,400 and I assume just that we didn't have any history prior to 1988. This is carried back to 1988. The 3,000 in regular taxable income in 1988 is reduced to 600.

When the regular tax is recomputed, it's now 204 as opposed to the 1,020 that we have previously. The AMT credit then is 1,416. This is an increase of 816 over the original AMT credit. We had 600 originally. So, now we can see in the exhibit that the accumulated credit at the end of 1990 is 1,100. Now we've worked our way through 1989. In 1991 the company's results improved dramatically. As a result, both the regular tax and the minimum tax go up sharply.

Before credits and carry overs, the regular tax liability is 18,700 and the AMT liability is 15,940. The available AMT credit of 1,100, that was what we saw at the end of 1990, is applied to the regular tax liability of 18,700 and it reduces it to 17,600. Note that the remaining regular tax liability, that's

down at the bottom of the screen there, is still substantially in excess of the AMT liability of 15,940.

Now, let's go on to 1992. In 1992, the company again suffers a loss on a regular tax basis. This is carried back to the third prior year and that would be 1989. The regular taxable income in that year is reduced to 10,800 from the original 12,400. And the recomputed regular tax liability is now 3,672. This does two things. Originally the company was a regular taxpayer in that year but because of the carry back the company is now a minimum taxpayer in that year. So, the AMT credit that was used in that year is now freed up.

You will recall we originally used the 316 credit that's posted on the exhibit under 1989 and that was generated in '88, carried forward to '89. That's now freed up. This is no longer needed and can be used in the years following 1989. At the same time an additional credit in the amount of 3,900, which is the AMT liability in that year, minus 3,672, the new regular tax liability, is created. This is equal to 228 and when added to the credit free up of 316 gives us a total amount of 544. Now, we're back in 1988 and we have a 544 credit. That's brought forward to 1990 and applied to the excess of regular tax over minimum tax.

Then, this credit is used to reduce the amount of taxes payable as shown in the exhibit. The 544 that we have down here is displayed as a carry back refund instead of an application of an AMT credit because the first thing that happens in the sequence of events is a carry back of a tax loss. A situation like this makes tax planning and evaluation of tax strategies very difficult.

The first couple of years weren't too difficult for most companies. But when you get about four or five years into the tax law, for most companies, you're looking at situations like this one. Particularly if you are a relatively smaller company or a regional company subject to weather catastrophes.

This makes tax planning very difficult, but it does present some opportunities. Suppose these are the basic facts and further suppose that we're in a situation in which we have the option of increasing the losses in 1991 by some amount between 1,000 and 5,0000. Let's assume also that the company expects that the years 1992 and 1993 will be generally profitable years. Is there an optimal amount of loss increase that we could recommend? Let's start by increasing the losses by 1,000 as on the next exhibit.

(Exhibit K)

The first four years in this example are exactly the same as in the previous example. But for the year 1992 the regular tax loss is increased by 1,000, from 1,600 to 2,600. Since the

alternative minimum taxable income for these years, 1990 and following, is the sum of the regular taxable income and the AMT preference, the additional loss flows directly through to AMT. Therefore, the alternative minimum taxable income is reduced from 24,500 to 23,500. So, we get a benefit there as well.

But before computing the final tax liability, we have to go through the carry back calculations all over again and I will spare you the details this time. In this case, we find that the combination of the AMT credit freed up and the additional credit created in 1989 totals 884. This is carried forward again and used in 1991. The AMT liability in 1992 is now 4,700 and when reduced by the 884, the carried forward effect, works out to 3,816. This is the total payable taxes in 1992.

Now, let's compare that amount with the amount we saw in the previous exhibit. The net tax paid in the previous exhibit was 4,356. Therefore the difference in payable taxes works out to 540. Now, this is an interesting result when we realize we've only increased the loss reserve or the losses by 1,000. One thing that we could conclude from this is that the cost of the company of increasing the losses is tempered by the high effective tax rate. That would be 54 percent in this case.

Now, let's go on to the next exhibit and see if we can find an optimal amount.

(Exhibit L)

If we look at what's going on here for a moment, we realize that the maximum regular tax loss that will produce the 54 percent tax benefit is 4,882. This is obtained by taking the difference between the net tax paid in 1991 and the 1991 AMT liability and dividing by 34 percent. So, we have a carry back tax refund now totaling 1,660 and the net tax paid is now 2,584.

I thought it would be worthwhile to push this example a little bit further to see what happened. Let's go to the next exhibit.

(Exhibit M)

The carry back tax refund in the previous example was 1,660. That's the same thing that we have here. The net tax paid is reduced somewhat. But the only effect that we're seeing now is the effect on the AMT liability. So, we're no longer getting the 54 percent tax benefit. The marginal rate is only 20 percent.

Let's go to the next exhibit.

(Exhibit N)

Summarizing this, for the first 1,000 that we looked at, we got an effective tax rate, and that's in quotes, of 54 percent. The maximum increase would be 3,282. We're still getting 54

percent. And if you go beyond that, for example, up to 4,000, the effective tax rate on the increase is 47.9 percent. The effective tax rate is in quotes here. There's only one effective tax rate under the Federal Tax law and that's 34 percent. This is due to the fact that the regular tax and the alternative minimum tax are linked through the mechanism of the AMT credit.

One thing to notice on this example is that as the losses go down, we have a zero regular tax payment that year for when the losses go up. We have a zero regular tax paid and the AMT is going down 20 percent of the increase in the loss. So, what's happening is that we're losing the AMT credit. Well, then you have to ask yourself whether or not the AMT credit is all that important to you or if you want to make sure that you have your losses in the best possible situation.

Let's go back to the previous one for a moment, John.

Now, before leaving this example, I wanted to discuss this situation. One of our assumptions was that we're going to have fairly profitable years in 1993 and 1994. Suppose that you have deficient reserves in 1992 and you fail to increase the losses beyond what we saw on the first example. What happens? The taxes paid in 1991, which you could have recaptured if you had increased the losses, will never be recaptured because those losses that will turn around in '91, '92 and '93 can only be carried back for three years.

You won't be able to reach the 1991 year and you needlessly pay taxes when you shouldn't. That's really something that has to be considered when a company is establishing its loss reserves in these years under this parallel tax system. It's very complicated and it's something I think should inhibit the high levels of deficiencies that we've seen in the industry over the years.

I've got one more short example here. Let's go to the next one.

(Exhibit O)

When the Tax Reform Act of 1986 was put together, I'm sure that not everybody understood all of the possible ramifications for it. And this one is a surprise. Somebody referred to it as the final jeopardy question in the tax category or the ultimate insult. This is a company that is a minimum taxpayer in 1990 and it has no preferences. Let's look at the effect of this.

Now, the company has a tax loss carryforward in 1986 of 40,000. Regular taxable income in 1987 of 10,000 and AMT of 25,000. The regular taxable income of 10,000 in 1987 is shielded by the tax loss carry over and the remaining NOL on a regular tax basis is 30,000. Now, carry overs can only reduce the alternative minimum taxable income by 90 percent. And as a result, AMTI after NOL in 1987 is 2,500 and the tax burden is 500 as you see under Section B.

Similar things happen in 1988. The remaining tax loss is again carried forward, and the regular taxable income after NOL is zero. The AMT after NOL is 1,800. So, the company is again an AMT taxpayer, what is called the two percent taxpayer, in 1988. However, at the end of 1988, if you look at the bottom of the exhibit, there is no more NOL for the company to use on an AMT basis.

Now, we've assumed that the company is getting rid of its tax exempts and its common stocks. As a result there are no preferences in 1989. And the regular tax on the AMTI are about 14,000. What happens here is that again we have a shielding effect from the carry over so that we have no regular taxable income, zero in 1989, and no regular tax, again zero. But the company is an AMT taxpayer because the AMTI has been larger than the regular taxable income in the previous years. This looks like a very unusual example, but as a matter of fact this is a real life example.

Situations like this with a parallel tax structure of the Tax Reform Act of 1986 call for a lot of planning, not just for this year, but you have to look forward to see what would happen in the next couple of years. The Tax Reform Act of 1986 calls for a lot of planning and its spawned several types of products, particularly in a reinsurance area, that companies can use when their planning fails and I think Jon Roberts is going to talk a little bit about some of those now.

Thank you.

MR. ROBERTS: Can you cut the lights and turn on the slide machine? I've got about five minutes to do this. Now I can't see. Thank you.

(Slide 1)

All right. Owen just pointed out some of the tax consequences associated with having deficient loss reserves. What I'm going to talk about is what can you do about it, a little bit, very quickly. You've got handouts, too, on this, so please look through them in the dark. If you go blind, don't blame me.

But anyway, here we have an example, this is Owen's example by the way. He was kind enough to give me his presentation beforehand, so I just did this based on his numbers so that you're not bombarded with two sets of examples. I'm going to talk about reinsurance and what you can do about deficient loss reserves using reinsurance, and what the tax implications may or may not be.

(Slide 2)

Here is Owen's example of adequate loss reserves. Here's your payout pattern. You book exactly what you need. This is the

adequate case. So, what is the impact of loss reserve discounting? Well, Owen likened it to an interest free loan to Uncle Sam. That's exactly what it is. It's an interest free loan to Uncle Sam.

(Slide 3)

Here I get a 2,713 interest free loan to Uncle Sam. So, I discounted that tax flow because it comes back as you pay out the losses. I discounted that at a 6.6 percent interest rate which is assumed to be a tax free interest rate. That's what you could do with the money had you not made this interest free loan to Uncle Sam. And I came up with 326, it's exactly Owen's format here, as the cost of the discounting alone. That's the adequate case.

(Slide 4)

Deficient case, it's exactly the same as Owen's numbers again. You should have had 69,000 up there, but you've only put up 62,100. So, you get a deficiency of 6,900, which reverses itself in years one through seven subsequently. So, you have to strengthen those loss reserves if you do nothing. So, in other words, that strengthening of 6,900 over time as the losses are paid offsets the initial deficiency of 6,900 and there's no impact. However, there is an impact tax-wise as well. So, what is the effect of this acceleration of income? What does that mean? That means you're paying taxes faster than schedule.

(Slide 5)

Well, you get this 14,082 that Owen was talking about in his slides. This 14,082 is a combination. It says ending discount on this slide and it says "discount reversal," that's really a combination of deficiency and discount that's initially being booked and will reverse itself out over time in the next seven years as those losses are paid.

So, here we have instead of a 2,713 interest free loan to Uncle Sam, we have here a 4,788 larger loan to Uncle Sam. You don't make interest on it. So, what do you have? You have a tax cost in this case of 585. It's in that illegible red. I'll blame the slide company. The 585 then includes both the tax cost associated with having discounted reserves (but even the adequate reserved companies have discounting) but also the tax cost due to the deficiency as well.

If you subtract the 326 (due to just the discounting), you get a tax cost of 259 due just to the deficiency. Wow. Why do people have deficient loss reserves if there's this tax cost? Let me tell you something, before tax reform, before we had any loss reserve discounting, there was an even bigger tax cost associated with deficiencies.

So, why do people have deficient loss reserves? Well, there's something else, there's this book benefit. People get -- what would be the reason why you have deficient loss reserves? I'll give you -- one example might be you want to keep regulators happy. Or, you know, you can show more income so you keep the reserves down. You make regulators happy.

What else might it be? Let's say you want to book more income this year because let's say management's bonuses are based on the organization's total profitability. It happens. Management bonuses could be a reason why you want deficient loss reserves.

What else could be a reason? You want to attract quality business. If you show a larger surplus you're a stronger company, agents, the quality agents would go to you, the quality business would go to you, and that benefit could be quantified. Another reason could be management bonuses. You could accelerate the income and pay out larger bonuses this year.

Another reason could be shareholders. You want to keep the shareholders happy. Show more earnings this year and the price of the stock can be kept afloat. Another reason could be management bonuses, and then a fifth reason could be management bonuses too.

(Laughter.)

Anyway it's hard to quantify it, but for some reason there is a benefit that exceeds the tax cost associated with loss reserve deficiencies. I propose one method here. I chose a book benefit here that you get of 874, which is based on the stockholder theory. I didn't want to get into the bonuses. That would be real complicated.

But say you have this stockholder theory, so what is the value of accelerating earnings due to loss reserve deficiencies? That value, let's say, is based on an 11 percent return on equity. In other words, a dollar of earnings today could be worth a $1.11 of earnings at the end of the year. I don't know. I'm just making it up. I'm just throwing out a way to quantify the value of having deficient reserves, but there's some value there.

874 in this case using that method, an 11 percent return on equity based on keeping the shareholders happy as your reason. So, the 874 more than offsets the 259 tax cost of having deficiencies. That's why you have loss reserve deficiencies.

(Slide 6)

In fact, the benefits of reserve deficiencies increase at a greater pace with increasing deficiency than the tax cost does. So, what can you do about it? Well, if you're deficient and you know it, instead of putting it up because that would just -you'd get the tax benefit back, but then you couldn't pay out your

management bonuses, right. So, what could you do? You want your cake and eat it too. If you're deficient and you know it, but you can't afford to show it, you could buy reinsurance.

Here's an example, simple reinsurance, 29,000 is the limit. It attaches at 40,000. Remember you had 69,000 of total reserves. So, this reinsurance would cover your deficiency. You spend 22,100 in reinsurance premium as this example shows, this balances out to zero at the end. So, if you're paying 22,100 to the reinsurer, plus you're keeping 40,000 of reserves as retention, that's a total of 62,100, but you've already booked that up in the front anyway. So, this has no book impact to you, yet you're now covering your loss reserve deficiency of 6,900.

(Slide 7)

This shows the financial impact of buying reinsurance. The first three columns, if it's positive it's good for you, if it's negative it's bad for you, credits and debits. I'm not an accountant. So, pre-tax income is the sum of the first three. This shows just the marginal impact of buying reinsurance. Because now you're reversing some of the discounting, the tax out flow is a benefit (negative). You're now borrowing interest free from Uncle Sam: 859 in the last column. So, there's a tax benefit associated with buying reinsurance and this is given to you by the Tax Reform Act of 1986. This is due to reversing the effect of reserve discounting.

Finally, there is a book benefit as well because now you're accelerating earnings by buying reinsurance. That's what you wanted to do. You wanted to pay out higher bonuses, keep the stockholders happy, keep the regulators happy, higher quality business, keep the management bonuses high. So you have a benefit associated with buying the reinsurance. You can go through the numbers any way you'd like, but we can discuss this in the questions.

(Slide 8)

But anyway, then I've got a bunch of graphs at the end of this which basically show the more you reinsure (and on this graph going right to left, you're buying more reinsurance because your retention is going down). The benefits generally increase.

(Slide 9)

The same here. I love three-dimensional graphs. You have retention increasing up to 65,000. Remember you've got 69,000 of total loss reserve here, but as the retention goes down, in which case you're buying more reinsurance, generally the tax benefits go up. Similarly, the more deficient you are (going from 10 percent annual deficiency to a 12 or a 14 percent deficiency), the more benefits potentially are available from reinsurance.

(Slide 10)

Book benefits are similar. Again, the more reinsurance you buy the more book benefits are realized. However, with respect to deficiencies, the more deficient you are, the less reinsurance can help you in generating book benefits. In other words, the more deficient you are, (this should make sense), the less reinsurance can help because you're already accelerating as much earnings you can.

Anyway, I'm done here. And now we're going to take questions from the field. You can now brighten the lights.

MR. GLEESON: I just want to say one thing. I did not have time to get my exhibits here ahead of time. If you want a copy of my exhibits, just give me your business card and I'll send it to you.

MR. ROBERTS: So, any questions for any one of us?

MR. GLEESON: Perfectly clear.

MR. ROBERTS: If you have written questions, you can ship them to the front.

QUESTION: Actually this is two questions, but I don't want to get up twice, so I'll ask them at the same time. I know that the service is attacking deferred acquisition costs in life companies. First, it was going to be an AMT issue and now it might be a regular tax issue. And I guess my question is it appears to be the only thing left on the property/casualty balance sheet that they can go after and I'd like your views on whether they'll go after that or not.

The second question has to do with retrospective rate premium debits that companies put up. The NAIC a year or two ago revised the annual statement and required that companies show the debit separately and not net off on the unearned premium reserve, hopefully to get a bigger revenue acceleration through the haircut. I know that this is an issue right now. Companies don't know whether the annual statement revision changed the service's view of that rule or not. I was wondering if you can comment on those two issues?

MR. ROBERTS: Actually I can comment on both issues. First, the DAC issue, you're right, the life industry has lost the issue on the AMT basis back in 1984. There was a carve out of the '84 law that said that when we go to adjusted current earnings, which is the basis for the AMT starting in 1990, an adjustment will be a DAC. And it basically said that life companies will have to capitalize and amortize DAC in accordance with GAAP, whatever that means.

A current proposal by Representative Downey -- by the way, this is a mutual life company bill, believe it or not. Representative Downey came up with a bill requiring capitalization of one-half of commissions on what I'll call traditional whole life business over a straight line over seven years with a type of phase in. And that's going to cost life insurance industry a fortune.

As far as applicability to the casualty side, my impression is it already happened when we had the 20 percent haircut on the unearned premium reserve. As you recall, the 20 percent was arrived at, was deemed to be an average commission level and so I think the casualty industry already took it on the chin for the same issue and in some of the committee meetings at Ways and Means, that has been acknowledged.

So, my guess at this point is it has already been done to the industry and nothing further will be done. I think that's the - (Inaudible)
-- at this time. Do you want to comment on that issue?

MR. GLASER: I agree. Particularly on the last point, the revenue offset probably already does the same thing.

MR. ROBERTS: Good night.

(Applause.)

(Break in tape.)

SPEAKER: -- but the industry, in particular RAA, the Reinsurance Association of America, came out with a paper that was supported by the entire industry going -- saying -supporting the position that the Colonial Life case should not apply to property/casualty companies.

EXHIBIT A

LOSS RESERVE ADEQUACY AND TRA '86

- PRIOR TAX LAW
  - — INDUSTRY PAID LITTLE IN WAY OF TAXES
  - — MARGINAL DEFICIENCIES NOT TOO DAMAGING
- CURRENT TAX LAW
  - — SUBSTANTIAL TAX PAYMENTS
  - — DEFECIENCIES CAN RESULT IN LOSS OF TAX BENEFITS
- SOURCE OF PROBLEMS
  - — TAX PAYMENTS
  - — AMT
  - — CARRYBACK, CARRYFORWARD PERIODS

EXHIBIT B

DISCOUNTING

(ADEQUATE LOSS RESERVES)

1. PAYOUT RATES (ON LOSSES)

PERIOD	PERCENT	PERIOD	PERCENT
AY+0	31%	AY+4	5%
AY+1	32%	AY+5	3%
AY+2	16%	AY+6	2%
AY+3	10%	AY+7	1%

2. OTHER ASSUMPTIONS
   - A. DISCOUNT RATE = 4% SEMI-ANNUAL
   - B. PAYOUT RATE FOR TAX PURPOSES = ACTUAL
   - C. INCURRED LOSSES = 100,000

3. RESULTS
   - A. DISCOUNT END OF AY = 7,980
   - B. DISCOUNT REVERSAL

PERIOD	AMOUNT	PERIOD	AMOUNT
AY+1	3,710	AY+5	327
AY+2	2,018	AY+6	153
AY+3	1,131	AY+7	35
AY+4	606	TOTAL	7,980

EXHIBIT C

DISCOUNTING

(DEFICIENT LOSS RESERVES; 10% EACH YEAR)

1. PAYOUT RATES (ON LOSSES)
   - SAME AS BEFORE

2. OTHER ASSUMPTIONS
   - A, B, C SAME AS BEFORE
   - RESERVES DEFICIENT BY 10%

PERIOD	REQUIRED RESERVES	REPORTED RESERVES	PERIOD	REQUIRED RESERVES	REPORTED RESERVES
AY+0	69,000	62,100	AY+4	6,000	5,400
AY+1	37,000	33,300	AY+5	3,000	2,700
AY+2	21,000	18,900	AY+6	1,000	900
AY+3	11,000	9,900	AY+7	-0-	-0-

3. RESULTS
   A. DEFERRED TAX BENEFITS END OF AY = 14,082
   B. BENEFIT SCHEDULE

PERIOD	AMOUNT	PERIOD	AMOUNT
AY+1	6,539	AY+5	594
AY+2	3,416	AY+6	338
AY+3	2,018	AY+7	131
AY+4	1,046	TOTAL	14,082

EXHIBIT D

DISCOUNTING

— COST TO COMPANY —

1. ADEQUATE RESERVES
   A. COST = (TAX RATE) x (NORMINAL BENEFIT - DISCOUNTED BENEFIT)
   B. NOMINAL AMOUNT = 7,980
   C. DISCOUNTED BENEFIT = $3{,}710/(1.04)^2 + 2{,}018/(1.04)^4 + \ldots + 3/(1.04)^{14}$
      $= 6{,}828$
   D. COST = (.34)(7,980 - 6,828) = 392

2. DEFICIENT RESERVES
   COST = (.34)(14,082 - 12,084) = 679

3. FINANCIAL MEASUREMENT
   A. PERCENT OF PREMIUM
      (1) DISCOUNTING ALONE: 3/10%
      (2) DISCOUNTING AND INADEQUACY: 5/10%

   B. ROE (PREMIUMS/SURPLUS = 3:1)
      (1) DISCOUNTING ALONE: 9/10%
      (2) DISCOUNTING AND INADEQUACY: 1.5%

EXHIBIT E

COMPARISON OF AMT CALCULATION

— THE YEARS 1987-1988 VERSUS 1990 AND FOLLOWING —

A. ASSUMPTIONS

UNDERWRITING

EARNED PREMIUM	330,000	LOSS RES. DISCOUNT	4,500
LOSSES	250,000	REVENUE OFFSET	5,500
EXPENSES	100,000	U/W TAX ADJUSTMENTS	10,000
STATUTORY		TAXABLE	
U/W LOSS	(20,000)	U/W LOSS	(10,000)

INVESTMENT INCOME

TAXABLE = 22,000 TAX EXEMPT = 15,000

BOOK INCOME

BI = (20,000) + 22,000 + 15,000 = 17,000

B. 1987-1989 CALCULATIONS

RTI = (10,000) + 22,000 = 12,000; RT = 4,080

AMT PREFERENCE = (1/2)(17,000-12,000) = 2,500

AMT = 12,000 + 2,500 = 14,500; AMT = 2,900

EXHIBIT F

COMPARISON OF AMT CALCULATION

— THE YEARS 1987-1989 VERSUS 1990 AND FOLLOWING —

(CONTINUED)

C. 1990 AND FOLLOWING CALCULATIONS

RTI = (10,000) + 22,000 = 12,000; RT = 4,080

AMT PREFERENCE = (.75)(15,000) = 11,250

AMTI = 12,000 + 11,250 = 23,350; AMT = 4,650

D. COMMENTS

1. SAME FACTS BUT TAXES INCREASE BY 570
2. IMPLICATIONS FOR
   A. INVESTMENT STRATEGY
   B. PROFITABILITY

EXHIBIT G

CARRYBACK LIMITATION

EXAMPLE #1

A. ASSUMPTIONS

	1989	1990
RTI	12,500	-3,000
AMTI	20,000	8,000

B. PRIOR TAX LAW

REFUND IN 1990 = .34 x 3000 = 1,020

C. CURRENT TAX LAW

	1989	1990
RT	4,250	-0-
AMT	4,000	1,600

CARRYBACK -3,000 TO 1989

RTI = 12,500 - 3,000 = 9,500

RT = (.34) x 9,500 = 3,230

CARRYBACK REFUND = 4,250 - 4,000 = 250

EXHIBIT H

CARRYBACK LIMITATION

EXAMPLE #2

A. ASSUMPTIONS

	1989	1990
RTI	7,500	-3,000
AMTI	13,000	8,000

B. TAX CALCULATIONS

	1989	1990
RT	2,550	-0-
AMT	2,600	1,600

CARRYBACK -3,000 TO 1989

RTI = 4,500

RT = 1,530

NO REFUND

EXHIBIT I

VARIABILITY OF COMBINED RATIOS

	'83	'84	'85	'86	'87	AVG.	RANGE
COMPANY A	97.0	98.4	107.4	106.3	99.3	101.7	10.4
COMPANY B	91.2	93.4	98.5	115.0	95.9	98.8	23.8
COMPANY C	106.0	127.0	116.2	106.6	98.1	110.8	23.9
COMPANY D	101.0	128.2	112.5	96.2	89.3	105.4	38.9
COMPANY E	105.0	107.9	105.6	109.9	107.4	107.2	4.9
COMPANY F	98.5	110.2	103.3	97.9	94.6	100.9	15.6
COMPANY G	107.5	111.0	110.4	105.3	104.4	107.7	6.6
COMPANY H	98.1	98.6	93.3	96.3	92.8	95.8	5.8
COMPANY I	127.1	117.3	106.3	106.4	98.6	111.1	28.5
COMPANY J	129.8	111.8	121.6	96.9	88.2	109.7	41.6

EXHIBIT J

CARYOVER EXAMPLE
— BASIC EXAMPLE —

	1988	1989	1990	1991	1992
RTI	3,000	12,400	-2,400	55,000	-1,600
AMTI	8,100	19,500	-0-	79,700	24,500
RTI (AFT.NOL)	3,000	12,400	-0-	55,000	-0-
AMTI (AFT.NOL)	8,100	19,500	-0-	79,700	24,500
RT LIABILITY	1,020	4,216	-0-	18,700	-0-
AMT LIABILITY	1,620	3,900	-0-	15,940	4,900
REG. TAX PAID	1,020	4,216	-0-	18,700	-0-
AMT TAX PAID	600	-0-	-0-	-0-	4,900
AMT CREDIT CREATED	600	-0-	816	-0-	4,900
AMT CREDIT USED	-0-	316	-0-	1,100	-0-
ACC. AMT CREDIT	600	284	1,100	-0-	4,900
CB TAX REFUND	-0-	-0-	-0-	-0-	544
NET TAX PAID	1,620	3,900	-0-	17,600	4,356

EXHIBIT K

CARRYOVER EXAMPLE
— EFFECT OF 1,000 LOSS INCREASE IN 1991 —

	1988	1989	1990	1991	1992
RTI	3,000	12,400	-2,400	55,000	-2,600
AMTI	8,100	19,500	-0-	79,700	23,500
RTI (AFT.NOL)	3,000	12,400	-0-	55,000	-0-
AMTI (AFT.NOL	8,100	19,500	-0-	79,700	23,500
RT LIABILITY	1,020	4,216	-0-	18,700	-0-
AMT LIABILITY	1,620	3,900	-0-	15,940	4,700
REG. TAX PAID	1,020	4,216	-0-	18,700	-0-
AMT TAX PAID	600	-0-	-0-	-0-	4,700
AMT CREDIT CREATED	600	-0-	816	-0-	4,700
AMT CREDIT USED	-0-	316	-0-	1,100	-0-
ACC. AMT CREDIT	600	284	1,100	-0-	4,700
CB TAX REFUND	-0-	-0-	-0-	-0-	884
NET TAX PAID	1,620	3,900	-0-	17,600	3,816

EXHIBIT L

CARRYOVER EXAMPLE
— EFFECT OF 3,282 LOSS INCREASE IN 1991 —

	1988	1989	1990	1991	1992
RTI	3,000	12,400	-2,400	55,000	-4,882
AMTI	8,100	19,500	-0-	79,700	21,218
RTI (AFT.NOL)	3,000	12,400	-0-	55,000	-0-
AMTI (AFT.NOL)	8,100	19,500	-0-	79,700	21,218
RT LIABILITY	1,020	4,216	-0-	18,700	-0-
AMT LIABILITY	1,620	3,900	-0-	15,940	4,244
REG. TAX PAID	1,020	4,216	-0-	18,700	-0-
AMT TAX PAID	600	-0-	-0-	-0-	4,244
AMT CREDIT CREATED	600	-0-	816	-0-	4,244
AMT CREDIT USED	-0-	316	-0-	1,100	-0-
ACC. AMT CREDIT	600	284	1,100	-0-	4,244
CB TAX REFUND	-0-	-0-	-0-	-0-	1,660
NET TAX PAID	1,620	3,900	-0-	17,600	2,584

EXHIBIT M

CARRYOVER EXAMPLE
— EFFECT OF 4,000 LOSS INCREASE IN 1991 —

	1988	1989	1990	1991	1992
RTI	3,000	12,400	-2,400	55,000	-5,600
AMTI	8,100	19,500	-0-	79,700	20,500
RTI (AFT.NOL)	3,000	12,400	-0-	55,000	-0-
AMTI (AFT.NOL)	8,100	19,500	-0-	79,700	20,500
RT LIABILITY	1,020	4,216	-0-	18,700	-0-
AMT LIABILTY	1,620	3,900	-0-	15,940	4,100
REG. TAX PAID	1,020	4,216	-0-	18,700	-0-
AMT TAX PAID	600	-0-	-0-	-0-	4,100
AMT CREDIT CREATED	600	-0-	816	-0-	4,100
AMT CREDIT USED	-0-	316	-0-	1,100	-0-
ACC.AMT CREDIT	600	284	1,100	-0-	4,344
CB TAX REFUND	-0-	-0-	-0-	-0-	1,660
NET TAX PAID	1,620	3,900	-0-	17,600	2,440

EXHIBIT N

CARRYOVER EXAMPLE
—SUMMARY OF TAX EFFECTS —

LOSS INCREASE	TAX PAID DECREASE	"EFFECTIVE TAX RATE"
1,000	540	54%
3,282	1,772	54%
4,000	1,916	47.9%*

*MARGINAL TAX RETURN ON 718 LOSS INCREASE IS 20%

EXHIBIT O

PARALLEL TAX SYSTEM
— CARRYFORWARD EFFECTS EXAMPLE —

A. ASSUMPTIONS

TAX LOSS CARRYFORWARD @ 12/86 = -40,000

	1987	1988	1989
RTI	10,000	12,000	14,000
AMTI	25,000	18,000	14,000

B. TAX CALCULATIONS

RTI (AFT.NOL)	-0-	-0-	-0-
AMTI (AFT.NOL)	2,500	1,800	12,700
RT	-0-	-0-	-0-
AMT	500	360	2,540

REMAINING NOL

RTI	30,000	18,000	4,000
AMTI	17,500	1,300	-0-

ADEQUATE LOSS RESERVES

Period	Payout Rate	Actual Payout	Needed Reserves	Booked Reserves
AY+0	31%	31,000	69,000	69,000
AY+1	32%	32,000	37,000	37,000
AY+2	16%	16,000	21,000	21,000
AY+3	10%	10,000	11,000	11,000
AY+4	5%	5,000	6,000	6,000
AY+5	3%	3,000	3,000	3,000
AY+6	2%	2,000	1,000	1,000
AY+7	1%	1,000	0	0
TOTAL	100%	100,000		

Slide 1

ADEQUATE LOSS RESERVES

Period	Tax Basis Reserves	Ending Discount	Discount Reversal	Tax Outflow
AY+0	61,020	7,980		2,713
AY+1	32,719	4,281	3,699	(1,258)
AY+2	18,749	2,251	2,030	(690)
AY+3	9,878	1,122	1,130	(384)
AY+4	5,485	515	606	(206)
AY+5	2,812	188	328	(111)
AY+6	962	38	149	(51)
AY+7	0	0	38	(13)
TOTAL			7,980	0

TAX COST = 326 DUE TO DISCOUNTING ALONE

(Present Value of Tax Outflow AT 6.6% I.R.R.)

Slide 2

DEFICIENT LOSS RESERVES

Period	Payout Rate	Actual Payout	Needed Reserves	Booked Reserves	Development
AY+0	31%	31,000	69,000	62,100	(6,900)
AY+1	32%	32,000	37,000	33,300	3,200
AY+2	16%	16,000	21,000	18,900	1,600
AY+3	10%	10,000	11,000	9,900	1,000
AY+4	5%	5,000	6,000	5,400	500
AY+5	3%	3,000	3,000	2,700	300
AY+6	2%	2,000	1,000	900	200
AY+7	1%	1,000	0	0	100
TOTAL	100%	100,000			0

Slide 3

DEFICIENT LOSS RESERVES

Period	Development	Tax Basis Reserves	Ending Discount	Discount Reversal	Tax Outflow
AY+0	(6,900)	54,918	14,082		4,788
AY+1	3,200	29,447	7,553	6,529	(2,220)
AY+2	1,600	16,874	4,126	3,427	(1,165)
AY+3	1,000	8,891	2,109	2,017	(686)
AY+4	500	4,936	1,064	1,045	(355)
AY+5	300	2,531	469	595	(202)
AY+6	200	865	135	335	(114)
AY+7	100	0	0	135	(46)
TOTAL	0			14,082	0

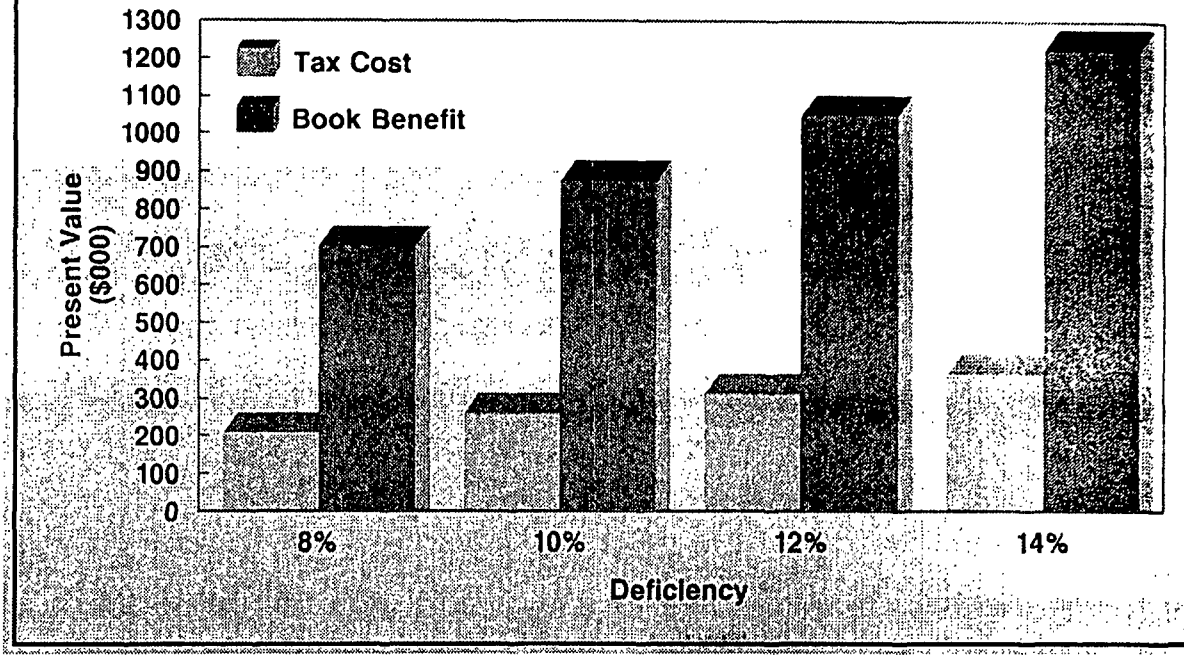
TAX COST = 585 DUE TO DISCOUNTING AND DEFICIENCY
- 326 DUE TO DISCOUNTING ALONE

259 DUE TO DEFICIENCY ALONE

BOOK BENEFIT = 874 DUE TO DEFICIENCY
(66% of Present Value of Development at 11% R.O.E.)

Slide 4

RESERVE DEFICIENCY
Financial Impact



Slide 5

ADVERSE DEVELOPMENT REINSURANCE

LIMIT = 29,000
RETENTION = 40,000
PREMIUM = 22,072

	Beginning Balance	Interest at 10%	Payout in Layer	Ending Balance
AY+1	22,072	2,207	0	24,279
AY+2	24,279	2,037	8,000	18,316
AY+3	18,316	1,344	10,000	9,660
AY+4	9,660	722	5,000	5,382
AY+5	5,382	392	3,000	2,774
AY+6	2,774	180	2,000	953
AY+7	953	47	1,000	0
TOTAL		6,928	29,000	

Slide 6

ADVERSE DEVELOPMENT REINSURANCE

Marginal Impact To Company

CHANGE IN:

	Paid Losses	Booked Reserves	Investment Income	Pre-Tax Income	Tax Basis Reserves	Net Tax Outflow
AY+0	(22,072)	22,100	0	28	19,544	(859)
AY+1	0	3,200	(2,207)	993	2,829	211
AY+2	8,000	(6,400)	(2,037)	(437)	(5,499)	158
AY+3	10,000	(9,000)	(1,344)	(344)	(7,983)	229
AY+4	5,000	(4,500)	(722)	(222)	(3,955)	110
AY+5	3,000	(2,700)	(392)	(92)	(2,405)	69
AY+6	2,000	(1,800)	(180)	20	(1,665)	53
AY+7	1,000	(900)	(47)	53	(865)	30
TOTAL	6,928	0	(6,928)	0	0	0

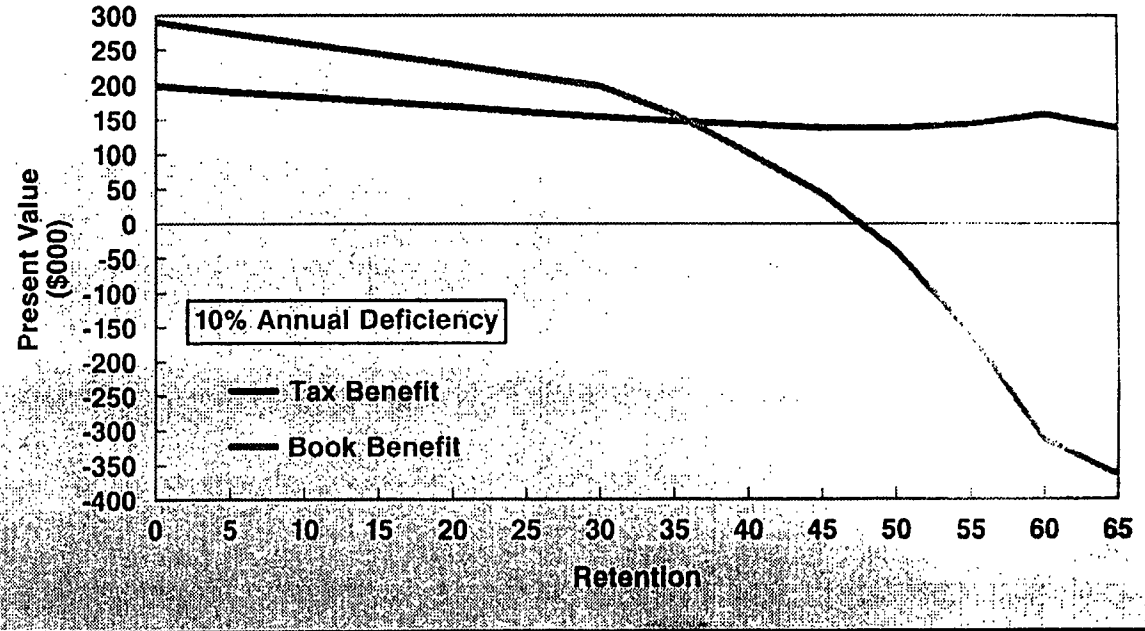
TAX BENEFIT = 143 FROM BUYING REINSURANCE
(Present Value of Tax Outflow at 6.6% I.R.R.)

BOOK BENEFIT = 101 FROM BUYING REINSURANCE
(66% of Present Value of Pre-Tax Income at 11% R.O.E.)

Slide 7

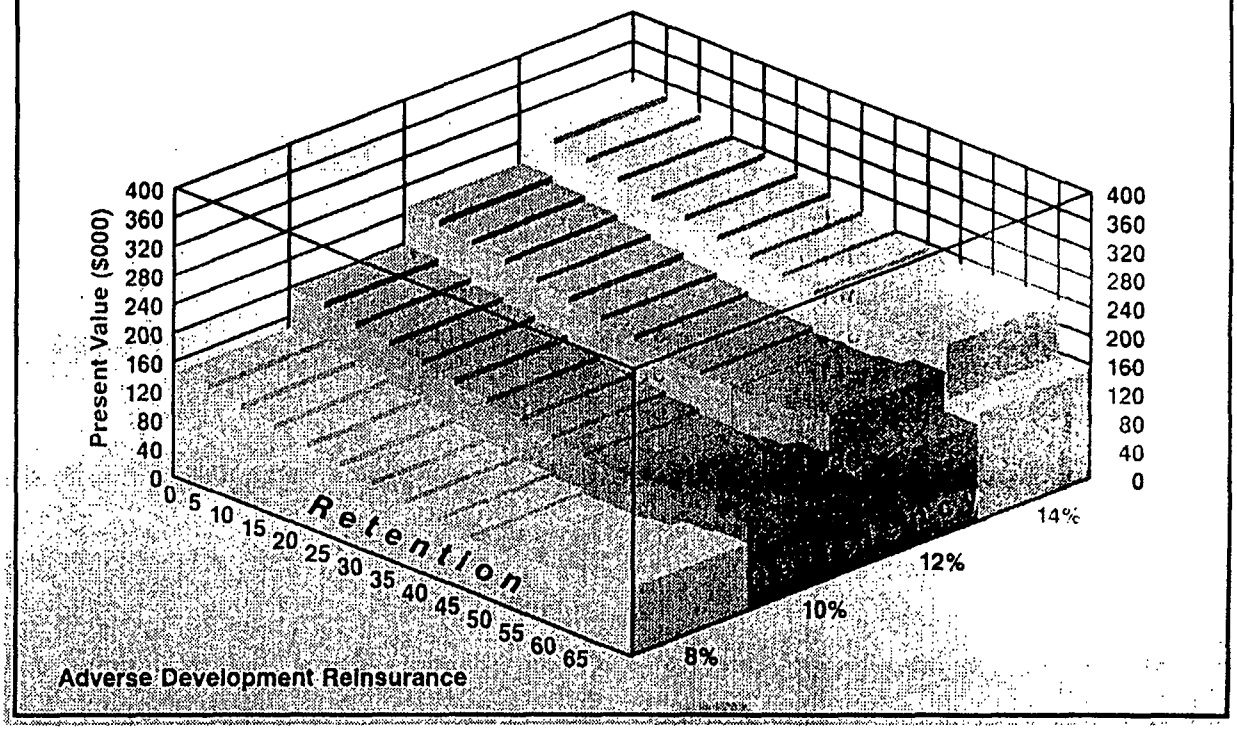
ADVERSE DEVELOPMENT REINSURANCE

Financial Impact



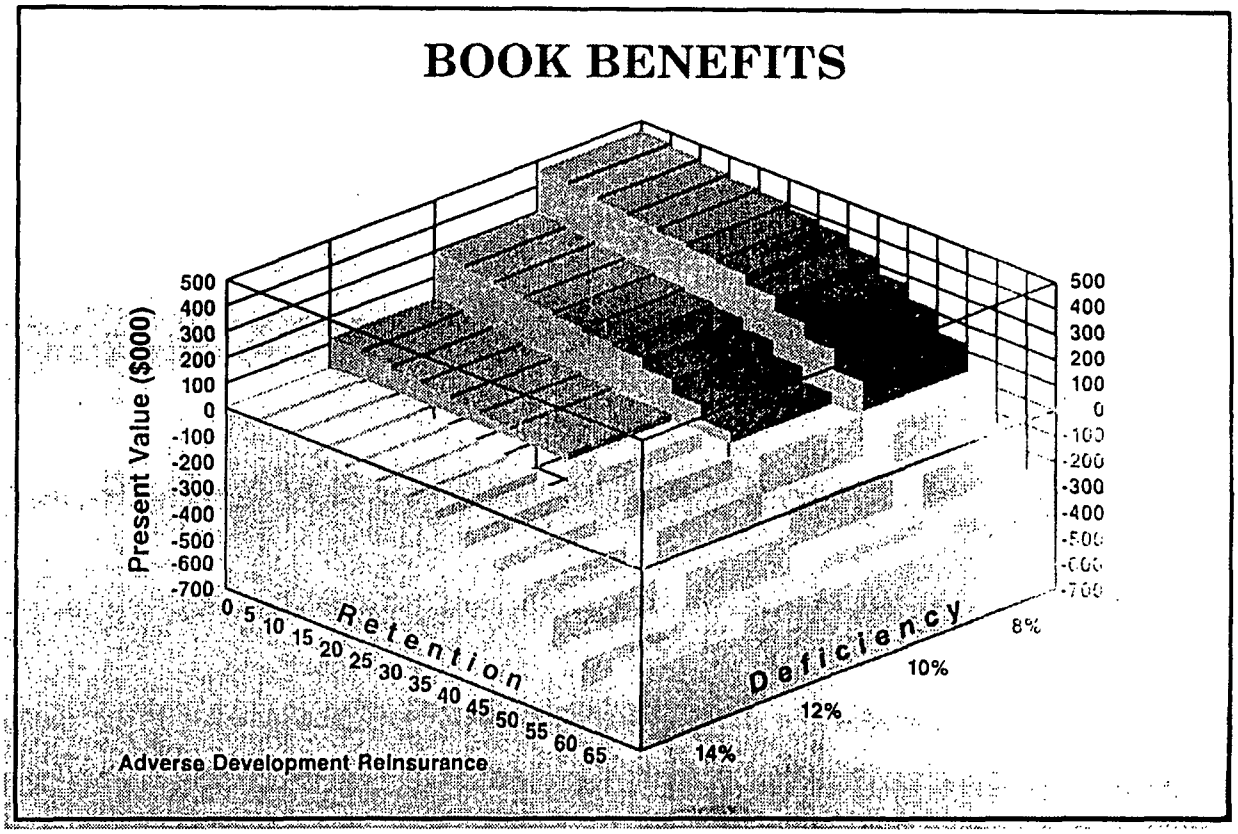
Slide 8

TAX BENEFITS



Slide 9

BOOK BENEFITS



Slide 10

1990 CASUALTY LOSS RESERVE SEMINAR

2G/7G: MODELS OF CLAIM DEVELOPMENT PATTERNS

Moderator

Stuart B. Suchoff
William M. Mercer, Inc.

Panel

Spencer M. Gluck
Milliman & Robertson, Inc.

Alfred O. Weller
Ernst & Young

MR. SUCHOFF: Good morning. This is Session 2G, Models of Claim Development Patterns. I am Stuart Suchoff. I am Principal with William M. Mercer and I'll be your moderator for this session. Our panelist are Al Weller on my far left and Spencer Gluck. I will introduce them in a few moments before they speak.

Our subject today is development factors to ultimate or tail factors. We'll be discussing both claim counts and claim amounts in the course of this session. As you know, in many actuarial applications there may be some prospective development on even the oldest data available. Even when that oldest data is fully developed, the development patterns themselves may be changing.

In both of these situations and, of course, in many others, the tail factors representing anticipated development beyond a given maturity is a very significant actuarial assumption. It affects all of the other link ratios, of course, when they're accumulated.

The panelists today will discuss alternative methods for estimating tail factors. In addition, I have asked them to apply these methods to uniform data set and to share their results with us so that we can gain a comparison and feel for the applicability of the methods.

The data that we'll be using is the actual claim experience of a hospital professional liability insurance program over the years from 1973 through 1985. The data reflects the primary layer of an occurrence coverage program and its arranged by calendar accident year and by development year.

There are a couple of interesting wrinkles in this data set which I will describe to you so you can understand what our panelists had to cope with. This primary layer that we're talking about consisted of the first $100,000 per claim through September 30, 1977. Subsequently, the initial retention was increased and an annual index was added. The initial retention was increased and an annual index was added. The initial retention increased five times over the period reaching $200,000 per claim in 1984 and then catapulting up to $500,000 at the start of 1985, the last year of our experience period.

The index amount was based on the number of years between claim occurrence and claim settlement. It was generally ten percent of the initial retention for each year of settlement lag. So, for example, in a year where the initial retention was $110,000, the index would increase that retention by $11,000 for each year of delay in the settlement of a claim.

The retention and index changes were effective for policy years beginning on October 1st and added complications, since the data that was available to us was only categorized on a calendar accident year basis, from January to December.

In addition, tort reform measures were enacted during this experience period, in the mid 1970s. The significant portions of the reform were, in fact, held to be constitutional, but none of the cases reached the State Supreme Count until nearly ten years after the legislation was enacted. So, what we have in this experience, in addition to the indexing and retention changes, is most likely the gradual introduction and gradual impact of tort reform over the experience period.

For your information, this same data set will be used in the advance case study which is Session 6G. My understanding is that they will apply methods that don't involve development factors and tail factors, but take alternative approaches to analyze the phenomenon.

The form that we have adopted for this session is for each panelist to speak for about 30 minutes and then to respond to your questions and comments. Let me advise you that our session is being recorded and if you want to ask a question or express a comment, to please come up and use the microphone. It's not necessary to identify yourself, however.

Our first panelist is Alfred Weller. Al is the Senior Manager with Ernst and Young in New York. He is a Fellow of the Casualty Actuarial Society, a Fellow of the Conference of Actuarial and a Member of the American Academy of Actuaries. Al is a graduate of Swathmore College and has a masters degree in mathematical statistics from Indiana University.

Al.

MR. WELLER: Good morning. It is a pleasure to be here and I am happy to see you all.

(Overhead 1)

I am going to start with an apology. I do not have handout material with me. If you would like a copy of the article on "Generalized Bondy Development" or a copy of the slides I will be using, there is a phone number on the first slide. You can give me a call or you can give me your business card at the end of the session and we will get some material to you.

(Overhead 1a)

"Generalized Bondy Development" is a particular formula that will fit to a very broad variety of development patterns. I am going to give you some background on how it operates. Then we are going to look at the data and then I am going to go over some of the caveats in dealing with generalized Bondy development.

The basic outline of our talk is going to be as follows. We will spend a little bit of time talking about the theoretical importance of Bondy Development. I will give you some historical background. Bondy Development is not a term that a lot of people grew up with. My seven-year-old doesn't use it at all. On occasion, I'll say "GBD" instead of Generalized Bondy Development because I get lazy. If you have any questions along the way when you see the equations and what not, raise your hand, I will slow down and go over it again or whatever.

Let me give you an idea of how I think Bondy Development fits into actuarial science. I've got a marker in my hand. If I drop it, it falls. Now, there are different reasons for it falling. One of us would say I dropped it, somebody might get teleological and go back to what happened in 1910 and trace the thing through the opening of Tutankhamen's tomb. And what not.

But when you get to describing the actual fall, you are going to use the law of gravity. You don't know necessarily know why the gravitational constant exists. It is something you believe in and it describes the way things fall. Similarly, I cannot prove generalized Bondy development to you any more than I can justify the law of gravity. But, I can show you how it fits. I can show you how it relates pointwise development to aggregate development. I can make predictions using it. And, I can test those predictions.

Generalized Bondy development fits into that sort of theoretical framework. It gives me pretty good descriptive power.

(Overhead 2)

Here are some illustrations of descriptive power. Every year A. M. Best publishes paid loss development patterns. The patterns I used are just three year averages for the 200 largest carriers (I think 99 carriers are medical malpractice). The overhead shows that if we fit a generalized Bondy development pattern to the paid loss development patterns, we explain over 99 percent of the variation in the logarithms of the development ratios with the one parameter (or two parameter, depending on how you count) development pattern called generalized Bondy development.

There is a paper in the CAS Proceedings by Rich Sherman. If we go through the reviews, the author's comments, and the original paper, eleven different sets of data are presented. We fit generalized Bondy development to each set of data and compared the fit. We can see excellent fits using both approaches. And, interestingly enough, with generalized Bondy development we win five times, with Sherman's approach we win five times and one comparison is a tie. It could not come out any nicer. The fit is pretty good.

When we get down to the medical malpractice example, on the paid loss patterns generalized bondy gives you a 99 percent explanation of the variation in the development factors. There are 16 data points. Ninety-nine percent over 16 points is not too bad. Generalized Bondy development does worse on the other two because the generalized bondy curve (with a positive Bondy parameter) cannot go below unity. When there is negative development such as a .9 factor, the value will go into the algorithm that determines the Bondy parameter, but the actual prediction will be bounded below by unity.

The examples give us an idea of the descriptive power of generalized Bondy development. The other thing that comes out of this analysis is a natural way to classify development patterns. If we go through the overhead, we see the parameters in the middle column are higher for longer tailed lines. We have to be careful that you have comparable start points, but generalized Bondy development gives us a way of comparing two fits. We can take two carriers with automobile liability data, run their data through the generalized Bondy algorithm and decide whether one has a longer payout pattern than the other.

We have a built-in classification system because we have a single parameter to determine long tail or short tail.

{Overhead 3}

Now, a little bit of history. The concept of Bondy development comes from Martin Bondy. He was an actuary working for an insurance company that belonged to the Mutual Insurance Rating Bureau in the early 1960s. Back then Bureaus did not collect a whole lot of tail data. They had the problem of what do you do for

a tail factor if you only have data to 48 months, 36 months, whatever?

Marty came up with the idea, well, why don't we just use the last age-to-age factor. And, lo and behold, to the extent they were able to do tests, his idea worked pretty well.

The equations on the overhead illustrate what's going on behind the original theory of Bondy development from, say, 1962. The variable d(t) is an age-to-age factor, and u(t) is an age-to-ultimate factor at maturity t. The original Bondy hypothesis is that the age-to-ultimate factor at time t is the age-to-age factor for the preceding period.

How do we generate that? Well, the age-to-ultimate factor is the product of all the age-to-age factors. Recognizing that each age-to-age factor is the square root of the preceding age-to-age factor, we get equation (4) at the bottom. When we multiply the terms, the exponents add. And the sum of the exponents is one because it's a geometric series.

That is the basic mathematics behind the original Bondy theory. You probably have seen it in some ISO filings and some ISO committee minutes.

QUESTION: Is there a paper that discusses that?

Probably if you go back to the minutes of the committees of the Mutual Insurance Rating Bureau you could find it. (Laughter) I think it's only about 28 years ago and the minutes are in a flooded basement some place on Third Avenue in Manhattan.

QUESTION: There's an IASA paper from the middle, like '76, '77.

Yes. But you've got to jump decades to get there. There is nothing that's contemporaneous.

(Overhead 4)

Let me tell you some of the theoretical considerations that got me into looking at Bondy development or the things I like about it.

If I can describe development in terms of a point process then I can aggregate it and I can get what happens in an accident year. In other words, if I look at all the claims that come in on January 1, 1990, my theory of development on how those claims are going to develop should in some way explain the development of those individual claims for that accident date and then enable me to aggregate them and create an accident year pattern of development. One of the neat features about the Bondy formula you're going to see is that, if you have point processes that have a given Bondy

parameter and you have a uniform distribution of exposures, the accident year data will have the same Bondy parameter and follow a Bondy curve.

And, you can probably prove the same thing for a policy year and whatnot. We're going to talk a little later about an earnings phenomenon which means you've got to go out to a certain point in the tail before generalized Bondy development applies. But you can go from an accident quarter to an accident year to five year intervals, and there's a systematic way to get back and forth using the equations that are in the paper.

When I'm saying "paper," I originally presented this paper at the ASTIN Colloquium last year. I'll probably send you a copy of the paper along with the overheads.

The next thing - a lot of the information we look at really is not what you would call homogeneous. We're going to look at medical malpractice data. Depending on the medical malpractice carrier you look at, you'll have some slips and falls possibly embedded in the policy coverage. You might have D&O claims embedded with the med mal. You'd like to be able to analyze them in homogeneous clusters. You can't always do that because of the way carriers keep data. But you'd like to have a theory of development that lets you anticipate how the mixing problem should affect your development factors as you project out.

When we get to the end of this talk, I'll show you some mixing and masking phenomena and that will address what happens when you mix homogeneous classes. You don't come back with a Bondy fit, but because you start out with a Bondy hypothesis, you can derive what should be happening to the mixed data.

Aggregation - I mentioned that you should be able to get from what happens at a point in time to what happens in the aggregate data and Bondy development will let you do that.

Now, how does it do that? Well, the concept I presented in the paper is called the Force of Development. Most of you will have seen the Force of Interest or the Force of Mortality at some point in the actuarial exams. Force of Development is just an instantaneous rate of change in a variable subject to development. Well, what generalized Bondy is going to do, is it's going to say the development pattern is generalized Bondy if the Force of Development fits a certain equation.

So, the first step you've got to take is an instantaneous rate of development, which is not something you're going to find throughout our syllabus. It's a relatively new concept or, at least, I don't know of it any place else.

I'll read the examples just for completeness. For annual data on recorded losses, the Force of Development would be the instantaneous rate of change in reported losses expressed as an annual rate. And, if you were doing quarterly development, you would have a different force because you would be expressing it as a quarterly rate.

Those are some of the guiding principals that go into this. Now, let's define Generalized Bondy Development.

(Overhead 5)

Let me go through the equations on the overhead. The variable h is going to be the interval. So, if we are dealing in years, h would be equal to 1. The age-to-age factor for year t+1 would be a function of the age-to-age factor for the prior year. In the original Bondy development the parameter B would be .5. So, what equations (5) and (6) are saying is that we are going to have a parameter that links the logarithms of observed age-to-age factors. In a second I will show you how to get a tail factor using equation six as the basis for finding a generalized Bondy parameter.

Now, the linkage is the phenomenon that we're trying to hook into. How do we do it? Well, equation (7) gives us the definition of the Force of Development. It is a derivative of the logarithm with respect to time (maturity). And, equation (8) is the relationship that defines generalized Bondy development. If we look at the Force of Development at any two points in time, its values are related by a constant raised to a power, The power is simply the number of intervals between the two points.

So, y minus z is the absolute difference in time. If the difference was five years, we would get a five there. If I'm dealing with annual data, h is one. So, I'd have B^5 relating the two forces of development.

From the force of development we're going to develop some equations which will now generate tail factors. They'll help you interpolate. Given any two observed development ratios you'll get the whole development curve.

There's a couple of constraints you've got to watch here though. The way we're defining it, there's always got to be some loss that starts out. If you have a decay rate, but you don't have any claims at the start, you've got a left-hand discontinuity. You're going to get a force applied to zero, you'll always get zero claims. So, it only picks up after a point in time. We'll talk a little bit more about that later.

(Overhead 6)

Now, how would you use this for tail factors? It is going to look remarkably similar to the original concept. What we are going to do is create a geometric series. As long as my Bondy parameter is between zero and one, that geometric series converges and the tail factor is given by equation (11). So, the factor u(t) is equal to $d(t)^{1/(1-B)}$.

What usually happens is you want u(t) for one period beyond the latest age-to-age factor that you have. So you usually have u(t) is equal to $d(t-1)^{B/(1-B)}$.

(Overhead 7)

Let me give you an example.

A lot of you are writing like crazy. It's probably easier if you just follow along and then ask for a copy later.

Here's a common everyday problem. We have two development ratios that we've picked for a given book of business. One is 1.45 for 24 to 36 months, the other is 1.225 for 36 to 48 months. The question is: What's the tail factor after 48 months?

Well, what do we do? We take the logarithm of each factor, divide the logarithms and determine the Bondy parameter. We find that the Bondy parameter is 0.54618.

Now that we have the Bondy parameter, the next step is to find the exponent in the relationship. The appropriate exponent is going to be 1.225 because the question asks for development from 48 to ultimate. We compute 1.20352 by plugging into the preceding equations.

Now, we can compute the tail factor. We take our factor of 1.225 for 36 to 48 months, raise it to the 1.20352 power, and determine a tail factor of 1.277.

That's pretty straightforward. You can probably do that in under five minutes with a handheld calculator. And, you know that the answer directly corresponds to the limited data you're given.

(Overhead 8)

Another advantage in Bondy Development is that you can handle fractional periods.

These equations are a little more complicated. So, let me go over the notation. The parameter B is the basic annual Bondy development parameter. $B_{h/n}$ is the Bondy parameter for subintervals of length h/n. If we take the interval h that defines B, divide it into n subintervals, how should that Bondy parameter be related to the original one? They are related by a power relationship as you

would expect. So, we can now get, let's say, a quarterly Bondy parameter by taking the annual factor to the 1/4 power.

Having done that, we can get a relationship for the quarterly factors $d_{h/n}()$, solve that, and find out what the lead quarterly factor is. So, we have 1 plus $B_{h/n}$ from up here. and we continue to $B_{h/n}^3$. If we raise both sides to exponents, we have the first quarterly development factor. And we have a decay pattern so we can get the succeeding development factors for each quarter.

(Overhead 9)

Let's do an example.

We use the same two development ratios. They're getting to be my favorites. The first thing we do is find the Bondy parameter. So, we take the logarithms and we divide. Now we have the annual Bondy parameter.

Next, we plug into equation (13) and get the semiannual parameter 0.73904 - semiannual because we are looking for a six month development factor.

Next we need to get the development factor from 24 to 30 months. We plug into equation (15) on the prior slide and compute 1.2382.

Finally we go back six months using equation (5). The development factors are linked by the .73904 Bondy parameter. So, we just take the exponent going the other way and discover that the 18 to 24 month development factor is 1.335.

We can go anywhere with this. We could get the 108th to the 112th month development factor, if we wanted it, just by plugging into the formulas.

(Overhead 10)

Here is the medical malpractice example. I am going to concentrate on showing you how generalized Bondy development works. I am not going to make adjustments for the use of indices and things of that nature.

This overhead presents the paid loss pattern. The erratic one is the actual one. I took straight averages of the development ratios. I did not try to analyze the development. I just went for a very simple approach and took averages to generate a well-defined pattern for loss payments. When I fit the generalized Bondy pattern, I got the smoother curve. The Bondy parameter is .6532. It may be good or bad. I do not know a whole lot about this malpractice insurer, but the generalized Bondy curve is explaining

99.31 percent of the variation in the logarithms of the development ratios.

Variation in logarithms may not be the best metric, but it lets things compute very easily. So, it's a handy thing to keep track of.

(Overhead 11)

Now let's take a look at what happens if you do this for reported losses.

What if the losses come in faster than paid losses? The Bondy parameter gets lower. It is 0.1841.

The other thing you can see is that the smooth curve never dips below the zero. Whereas, on the actual curve there are points below zero. But even without the ability to go below zero in the emergence pattern, we're explaining 74.63 percent of the variation.

(Overhead 12)

Let's do something a little different with the development patterns. Let's take a look at development for the ratio of allocated claim expense to paid losses.

The Bondy parameter is 0.2329. There's nothing unique here. All we did is pick development ratios and fit a Bondy parameter. We explain 88 percent of the variation in the underlying development pattern. And, if you look at how the patterns overlay, it looks pretty decent as you match the smooth curve up to the jagged curve.

(Overhead 13)

Here are the reserves that come out of those projections and you can compare them to the estimates that you see later. The paid loss projection is $53 million as a reserve on an indexed basis. You have to unindex it to get it to an actual dollar basis. The reported loss projection is $58.6 million. Since the paid loss projection had a better fit, I'd probably say there is some redundancy in reported losses and the actual case reserves are going to come down. And the claim expense projection is $39 million on the paid loss base.

This was all done very algorithmically and later on I am going to caution you that you need to understand the underlying data before you apply generalized Bondy development as an algorithm. But in terms of just seeing how the equations work, the algorithms demonstrate what happens and the fact that things compute very easily.

(Overhead 14)

Now, why is it important to understand the underlying data? Here's a mixing and masking example.

What I've done is I've taken a short tail and a long tail. My short tail has a Bondy parameter of 0.5 and my long tail has a Bondy parameter of 0.9. I need a start point, I gave them the same 12 to 24 development factor start point. I put 80 percent of the weight on the short tail and 20 percent on the long tail. The example may not be that dissimilar from some of our liability lines. That 80 percent then converts to a weight so that I have a uniform million dollar base for the calculations.

If I look at the overhead, I have the long tail at the bottom. I have my short tail in the middle. And then the top line is the sum of the two. That is mixing the two.

(Overhead 15)

I can look at this as an emergence pattern - how many dollars of loss come out in each period. You can see the long tail is going to peak after ten years, the short tail is coming down rapidly after year one and the average is some place in between.

(Overhead 16)

If you look at the age-to-age ratios, the short tail clearly dominates the average age-to-age factors. I have a tough time distinguishing the two lines even with my glasses on.

(Overhead 17)

But if you look at the sort of projections you're going to get out of this on a Bondy example, the short tail is the Bondy parameter for the lower line, the long tail is the Bondy parameter for the upper horizontal line. If you take a two point average, which is sort of what you'd observe, you'll see that the Bondy parameter actually goes above unity (which it really should not) because of the mixing of the two data sets of data. If you take a five point least squares fit moving average, again you are going to get some absurd patterns in the parameter. Chances are, if you plug in the algorithm at early maturities, you are going to underestimate your loss reserves. If you plug in at advanced maturities, you might overestimate. The examples indicates the need to be familiar with the data as you select the development process you're using.

(Overhead 18)

Now, here's a little different example. The purpose behind this example is to show you that not all curves look the same.

This again is short tail, long tail, add the two together.

(Overhead 19)

The emergence patterns look a little different.

(Overhead 20)

Age-to-age is here for completeness. But, I don't think you pick up a lot on that graph.

(Overhead 21)

But the point I want to make is when you do the fits, you've got a different pattern of fitting because of the different relationship between the high and low parameters.

How am I doing on time?

(Overhead 22)

Now, what are some of the caveats?

If our data isn't homogeneous, if we have masking, then we have to make some adjustments in how we fit parameters or how we interpret the fit. If we just fit to the short tail and we do not have any indication there is a long tail, obviously we are going to underreserve.

Because of the problem of masked data we have the problem of data selection. We will get different results depending on how we pick our data.

Earnings effects. I mentioned you need to be able to get from a point process to an aggregate process. Typically when you look at 12 to 24 month development, there is some part of the 12 month development denominator that is underreported. The book maybe closed December 20th, so we're missing the last ten days of the year and we're missing ten over 365 percent of the claims. That earning effect screws up the integrals that prove that the aggregate pattern has the same Bondy parameter as the pointwise pattern. So, it's sometimes better to start with the 24 month to ultimate factor if earnings effects are likely to cause problems.

Another problem we have is the left-hand discontinuity. We need some claims to get the system going. Generalized Bondy development will not start of its own accord and describe what's going on. We need a starting claim level.

Generalized Bondy development is fitting to the development factors we pick. In principal, a more complete theory would tie the development factor to the end of the line loss dollars. But, that would be a lot more intricate and the idea is to have a simple theory.

Also, there's a real difference between goodness of fit and extrapolation. The fact, that I've got 99 percent explanation of the data we're fitting, does not mean that I haves 99 percent confidence that my tail factor is within plus or minus one percent. Usually it's a good idea to separate what you're fitting based on historical data and break estimates into two sets of reserves just so you can see the comparative effects. What you're going to find is anything that fits a tail has great sensitivity to the data points.

And then the last thing that I didn't cover, but you need to do in any kind of development model is you've got to basically test and verify your model. So, if I fit Bondy to data missing the last year's points, I should hope to get the same Bondy effect for all data that I have. If the Bondy parameter is not staying constant, then I've got something going on in my data that indicates I should be doing something different in modeling it.

(Overhead 23)

With all that as background, here's my parting comment:

Generalized Bondy development facilitates estimation of development factors. It is easy to compute. Just take a logarithm and you are there. The fits that you get are really powerful. But, I don't think that you should view it as a straightforward algorithm even though it is easy to compute. And, if you don't understand the underlying data or the insurance situation you're involved in, chances are generalized Bondy development is not going to do the job for you.

Thank you.

(Applause)

MR. SUCHOFF: Thank you, Al. I think we have time for a few questions if people have them. Please come up to the mike and we'll get Al to respond. Does anyone want to be first? Please.

QUESTION (Gail Tverberg): I think this is just a comment. In terms of doing it, I think it's kind of a neat technique. I think there are some things you want to be aware of in talking about reasonableness. There are two different things that come to mind.

One of them is that during a particular time period your development factors may be affected by some external kind of situation. For instance, maybe there's a court situation that says a certain kind of claim that has not been permitted in the courts before is now permitted. So, you may have a three-year period in which you get a fair number more claims coming in. That may affect all your development factors all the way out. And it may be a temporary phenomenon. Your curve may fit real nicely, but when it

comes to projecting out, going forward, it's kind of a lump that's coming through your data on a calendar period basis, maybe a three-year calendar year period basis. So, that when you're looking at it while you've got it fitting nicely, it doesn't necessarily tell you what's going to happen out a ways.

I think the other thing that I've noticed just looking at long tail data is that we have kind of an endpoint out there. We sometimes need to keep in mind whether there is one. For instance, on medical malpractice, you have the infant statute of limitations extending to when they're an adult. So, if you've got 20 years plus a couple, if you're already out at 18, it may not be appropriate to project out to year 30 using your 18 year factor. You may want to stop it at year 22 or 24, or something like that - just taking into account some external information you have on the statute of limitations. It's not really a smooth curve going down indefinitely. It's going to be a smooth curve, but then sort of a drop off, hopefully.

MR. WELLER: First on data selection. In terms of algorithm it doesn't matter what data you pick, generalized Bondy development is going to fit, which is exactly the point you're making. But it's up to the practitioner to find some other way of diagnosing that that bump is there and he or she is putting in an appropriate factor.

Second in terms of endpoint. If you have one claim you're better off hiring a claims examiner than an actuary. If you have 1,000 claims, you're better off hiring the actuary. I don't know where the crossover is. But as you start getting out to, you know, 20, 22 year tail factors, you're pretty close to the point where your case reserve is probably a better indicator than the average projection.

An example would be something like you've got a $200,000 limit, in two years you've got $50,000 claims open, the other year you've got a $200,000 claim open. In each case it's a single claim. If you rely on case reserves, you've got to be knowledgeable about problems like claims departments that fail to close open reserves so reserves linger longer than they should and some of these other things that go on. Well, what generalized Bondy development will let you do in that situation is take the case reserves and figure out the anticipated payment pattern for them. And it lets you do it quicker than you can make a phone call and find out when the claim is going to settle.

QUESTION (Ben Zehnwirth): Al, you might know what I'm going to say. I think the proof is questionable at a very important point. Any analysis of loss development factors, which is the analysis in a development year direction is fundamentally flawed if you don't take account of the trends in the calendar year direction. Because any trends in the calendar year direction are always projected on to the development year, any tail factors or any analysis of any

development factors, whether it be on the logarithmic scale or any other scale, cannot work unless you take into consideration the most important direction, which is the calendar year direction.

MR. WELLER: I don't disagree with that, Ben. But, you know, if you are putting factors on a year by year basis, which is something you can do in that set up, this still gives you a way of enforcing consistency.

What you are saying is you should be measuring pretty much across the array and recognize that you've got trends that go across all three directions - rows, diagonals and columns. What I'm saying is, if you feel comfortable using one set of development factors for all years, then you have a way of getting consistency for that one set. If you have a set of data where it's more appropriate to measure development factors on an annual basis so as to capture that inflation, you still have a way of enforcing mathematical consistencies for each of those years that you fit.

I think what this tells you is, once you've decided you're going to use a development factor approach, you've got a way to interpolate, you've got a way to get a tail factor, and you've got a way to get a consistency across periods and discuss whether it's long tail, short tail, whether you've got masking, problems of that sort. I don't think it's a be all and end all tool for all problems.

MR. SUCHOFF: Other questions? Yes.

QUESTION (Mr. Gould): What is your goodness of fit in measuring the coefficient determination?

MR. WELLER: What we're doing is we're taking logarithms of age-to-age factors and we're measuring the deviations in the logarithm of the fitted factor to the actual. The algorithm that's in the paper basically minimizes the sum of those squared deviations.

MR. SUCHOFF: Any other questions? Yes.

QUESTION (Ben Zehnwirth): I just have one quick comment. I think it's very dangerous to use the R^2 as a measure of fit even if it's 99.5 percent. I can show you plenty of cases with R^2 of 99.5 percent and even higher, and it's very easy to see that the models aren't going to work.

MR. WELLER: You can tilt a line and change the R^2 whenever you do a fit.

I mentioned earlier in the talk that I wasn't content with the method I was using in terms of logarithms. We can shift the metric by changing weights. There's a bunch of things you can do.

But what I haven't come up with yet is a handy way to measure the fit in terms of the effect on the projected reserves. What we should be talking about in terms of goodness of fit is what's the impact on the variable we're really concerned with. And generally what we're saying is we can compute in terms of all other types of loss cost functions and they compute neatly and, hopefully, they're close to what minimizes errors in loss reserves. But generally, if it computes easily, it doesn't really measure the inaccuracy in the reserve directly.

MR. ZEHNWIRTH: A lot of things work very well once you adjust for calendar year trends.

MR. SUCHOFF: For those of you who don't know, I think Ben will be presenting some of these methods tomorrow afternoon in "An Alternative Approach to Development Factors."

MR. ZEHNWIRTH: Today, in the afternoon.

MR. SUCHOFF: Today. What session is that?

MR. ZEHNWIRTH: 3G.

MR. SUCHOFF: 3G. Come see an alternative approach then. Any other questions for Al?

MR. WELLER: I recommend you go to Ben's by the way. It's quite informative.

QUESTION (Don Gould): If you're calculating a tail factor here, it's not clear to me what you're fitting. Are you calculating a ratio backwards towards the origin and comparing them to the actual age-to-age factors?

MR. WELLER: Basically, you give me two age factors with identified intervals and I can plug into the equation and get an exponential relationship and that's what I'm fitting. What's getting fit is the actuary's selection of age-to-age factors.

QUESTION (Don Gould): Over all of the known ratios?

MR. WELLER: Well, whatever you want to do. On the medical malpractice example there are, I think, 16 different ratios that came through. So, I fit to all 16. But, if for some reason I had faith in five of them and didn't like the other 11, I could have fit to 5. I would have gotten a different result.

MR. SUCHOFF: Thank you again, Al, for your comments and those from the audience as well. Our next panelist is Spencer Gluck. Spencer is a consulting actuary from the New York office of Milliman and Robertson. He is a Fellow of the Casualty Actuarial Society and a Member of the American Academy of Actuaries. Spencer holds a bachelors and masters degree both from Cornwell University.

Spencer.

MR. GLUCK: How's that? Does everybody hear me all right? Okay.

I'm going to keep my talk on a pretty practical level and starting off with pretty much the same basis as Al, that I'm fitting to development factors and I think all the previous comments and discussion you hears about calendar year distortions and the like and development factors would apply here.

So, where already you have to be comfortable with the situation if you're in a situation where you think the development pattern is reasonably consistent over time and that you're projecting a development factor pattern observed in the past into the future without presuming that that pattern is changing over time or that there are calendar year distortions affecting your data.

What I'm going to talk about here is just fitting curves to development factors. I think it's a little less formal than talking about modeling. It's going to be kind of a practicalness in that we haven't gotten into all the same analysis of the error terms and everything that you would in a modeling situation. Although I'm going to have to get a little into some of those issues because if it makes sense theoretically then it has its practical considerations as well.

I'm also going to talk about at the end some of the drawback limitations of curve fitting. I don't think that it can be -- it should be done slovenly or that it's any panacea. Okay. So, to start we're going to just work on a couple of curves that we're not the only ones who use it, they're around.

(End Side A)

-- is fit to the development factors themselves and you had seen where -- I don't even know exactly where it came from. I know Larry Steiner who did a lot of the programming here and that in his bag of commonly used development factor curves and that works reasonably well. I've got the inverse power curve, the true parameter version, which is the one from Rick Sherman's paper. He also includes a three parameter version where he allows a shift in the X value as a C parameter, but I didn't deal with that one here today.

And an exponential model which is also like the inverse power exactly fit to the development factor minus 1. The exponential

model is actually reasonably closely related to the generalized Bondy that Al presented. If you took the approximation that one plus A times one plus B equals 1 plus A plus B, which is an approximation that gets reasonably accurate when A and B are very small, then here were you have the excess of the development factor over the one following the geometric progression rather than the development factor itself following the geometric progression, those become relatively similar.

Okay. Let's talk a little bit about these curves. The first one if any of you have played with curves and the like that you'll remember is the two parameter -- the inverse power curve is much thicker tailed than the others here. A lot of times it seems to be too thick in the tail, but if you've got a data set that we're going to work with here, you're going to find that the inverse power curve is too thick in the tail and the other tow curves are not thick enough in the tail.

So, we don't have an exact match in any of these curves. The other thing is, of course, whether they actually produce finite tail projections. Here again the developed, both the power model and the exponential, do if extrapolated to infinity produce a finite tail, whereas the inverse power curve does not. It would produce an infinite tail extrapolated to infinity.

So, when you use the inverse power curve obviously it becomes pretty important to decide where you're going to cut it off, which is an arbitrary decision. In any case, so what I'm going to talk about is the methods used to fit these curves and the most common approach is to make these things linear by taking some logs.

(Slide)

Okay. That's just a process. The power model, you have to take the log and develop a factor twice before you get a linear expression. The other two, the input on the left and your Y value is a log of the development factor minus one an you only have to do it once to get a linear expression.

So, then if you use this approach to it, then all you have to do is do linear regression on the remaining -- on the curves. In the first case, I guess it's the twice log of the development factor and the output that you get in the first parameter is the twice log of the A parameter and then you regress that against the time, X here is time or maturity. And the second parameter you'll get is the log of B.

In the second curve you take the log -- you regress the log of the development factor minus one against the log of time and you can see the output you'll get is the log of A and B itself. And in the third one you regress the log of the development factor minus one against time and the parameters you get at a long of A and B itself again. So, those are relatively simple to do in

terms of linear regression, but it doesn't necessarily mean it's the best thing to do.

A couple of issues, again none of these curves will allow development of zero or negative development. So, you cannot in the log transform version of solving -- in none of these cases can you put in an actual development factor of one or less. It won't work. So, practically speaking, that's a problem with linearizing. But when you see that kind of problem that is really saying something about the error distribution which this transformation is -- which is assumed when you use this transformation.

Now, basically we're here talking about development factors and basically when you do the log transform, what the errors you are minimizing are percentage errors and you, in effect, are presuming that the error distributions are themselves log normal. Looking something like that and those error distributions are -- of course, do not hit the axis being log normal and that's -- in other words, there is no probability of a development factor of zero or negative according to those curves.

Now, even in development which is normally strictly positive, we sometimes see some negatives. Even in paid development, many triangles there will be a lot of development zero out by the tail. And so what can happen with this log transform is that the curve can get overly sensitive to the -- (Inaudible) -- tail. So, for example, if you have an observed development factor of 1.0001, which will not make it blow up, you'll be able to do -- you'll be able to solve the equations with that development factor in there. What's going to happen is that development factor will strongly attract the curve downward because when dealing with a percentage error of the excess of the factor over one, the difference of say a fitted factor of 1.01 and an observed factor of 1.0001 is a factor of 100 error. That would be treated by the algorithm as an enormous error and, therefore, that will attract the curve very strongly.

So, you have to wonder about whether the error structure itself -- sometimes you have to wonder about whether this error structure itself is an adequate description and if it's not, then you may get excessive weight again to fitting small development factors in the tail.

Now, if you just do a straight nonlinear fit, then you're assuming an error distribution something more like that. Since you're not modifying the data, we're basically dealing with minimizing the sum of the square, which is optimal with normally distributed errors and they're not proportional errors either.

I tried to make those little minimal curves all the same size. Well, that helps us down there in the tail because it says even if the expected value out in the tail is greater than -- is a development factor greater than unity, it still allows that a development factor of zero or negative to the possibility.

On the other hand, in practice that's not so good either because now all errors are being treated at their absolute values as equal. So, the fitting techniques when you use this technique will say the difference between a development factor of -- in the 12 to 24 column, the difference between a development factor of 2.5 and 2.6 is treated as an error equal to the difference between a 1.01 and a 1.11 in the tail. We know practically speaking that the second difference is a far more important difference.

So, we've turned the problem around and now we just have the problem the other way. So, these are -- now, the way we can address that problem is with weighted fits and that, of course, can be done on the linear of nonlinear version with just an example here.

If we felt that we needed that -- we needed to weight the fits by the application of weights, we still have the nonlinear version, so we still have the possibility of zero or negatives in the tail that we would like to have because we know that they do sometimes happen. And then making the curve proportionately bigger. Proportionately bigger is, in effect, what is assumed by giving reduced weight to those early points in the fit.

Now, to say what the actual correct weights is, weighing a fit is a measure of --
(Inaudible)
-- in the model itself. But as I said, we're trying to keep away from too much of the formal modeling approach here, but it's basically saying if there's greater variation in the data around that point and again -- then that point should receive lesser weight in the fit.

For a practical easy approach, we said we know that the equal weights on the nonlinear fit doesn't work so well, it doesn't give enough weight, it gives too much weight to those early factors. So, we came up with a little practical idea. Now, I thank Larry again for working these equations out.

We said, okay, we will -- this is errors not based exactly on variations of the data, but based on we're going to measure an error by how much we care about it. So, we're going to consider two errors equal. If they produce equal dollar amount errors in the final reserve estimate and if we further presume that all years in the triangle have equal volume, then the result comes out that we should use a weight equal to the maturity or time over the development factor.

That's actually pretty intuitive because if you consider the first maturity measure one, you realize that that development factor you fit in that column applies to one year and the second development factor you fit will apply to two years, the third development factor you fit applies to three years. So, that pretty much explains the numerator, the part of the weight in the

numerator. And the size of the development factor itself in the denominator converts it to its percentage effect so that an error of .1 in a development factor of 3 is obviously much smaller than a development factor of 1.1.

Okay. So, some of this dealing with nonlinear fitting was brought up because of the issue of negative development. Now, of course, there are other -- if a negative development is sporadic, occurs occasionally, but is not really part of the pattern, one approach is to use nonlinear fitting. Another approach within a linear example is simple to monkey with the data a little to smooth the occasional downward point out. And as long as it's a spurious thing that happens occasionally, but the average is still positive, that's probably not an unreasonable approach either.

On the other hand, if the pattern itself is negative, if there really is a pattern of downward development, then simply states I don't think any of these curves, none of these curves -- if there's a pattern of downward development.

(Slide)

Well, I wanted to make another thing about the log transform which is important to realize when you do the log transform is that in those little log normal distributions, that the fitted value, the value of the curve is not the mean. So, when you do a log transform, fit the data and then use the curve, the values you are using are not the means. They are the mean of the underlying normal distribution.

So, in terms of a log normal distribution, you're getting the value, E to the mew. But if you remember your log normal distribution, the mean of the log normal is E to the mew plus one-half sigma square. So, when you fit the curve after doing the log transform, the fitted values you get are below the mean.

I guess as a final point on development factors in general, even if you had the mean development factor in every case, it's been -- I've seen it established pretty clearly that that doesn't necessarily give you the mean loss reserve answer anyway. The processes with all their multiplication and everything don't preserve means anyway. So, the whole process of loss development factors is in that way kind of statistically imperfect. I don't propose a solution to that right here.

(Slide)

Okay. Another issue which now I'll mention briefly is this issue of fitting the 12 to 24 development factor. Often in all the curves, frequently you have a lot of trouble fitting the 12 to 24 development factor, particularly with incurred development curves. I think that my theory is that this is mostly because within the year itself, up to 12 months, there's two things going on.

There's not only a development pattern, but there's also the accumulation of exposure happening across the year. And especially in 12 to 24 factor you're definitely still seeing some recognition of lag information from near the end of the year that is related to the accumulation of the exposure.
Ira Robins wrote a paper in the Blue Book about four rears ago where he talked about using infinitely decomposable percent of ultimate curves. Not quite as foreboding as it sounds. Basically is you treat a curve as applying to development on an exposure point in time and then integrate that over the course -- intergrate the oncoming of exposure over the course of a year, that's basically the concept that Ira was using in that paper. And that will help a lot in fitting the 12 to 24 development factor. As you get further out in the curve to the right that is probably less significant an issue.

I think you're going to find as we get into looking at some of these curve -- (Inaudible) -- that a lot of these curves did not fit the whole development pattern that well. And so, if we're particularly focusing on tails here, it might make a lot of sense not to fit the whole curve, but to fit a number of points if you have enough of them and we did have a big triangle here near the tail.

(Slide)

Okay. I'm going to put up just some of the answers and unfortunately I chose for my sample, whereas Al chose for his sample curve of a curve which included the index data, I chose for my sample curve the paid loss development limited to 100,000. So, we don't exactly have the same data to compare notes on.

But in any case, so here's what I get, I get 27 answers here, except for the one that's crossed out and said error there. We picked the wrong factors, so I don't have that one. In any case, basically I tried fitting the curves using all the points. Then I took off the first point to see if I could get a much improved or changed fit from taking off the first point. Then there were, I think, 17 development factors available all together and focus in on the tail. The last point, I fit only the last ten points. I tried each of my three curves and I tried fitting them three ways, either linear, nonlinear un-weighted, or nonlinear weighted according to the systems of weights that I showed you.

On the first one we used all the points. You're going to see dramatically different answers depending on which curve you use. First off, both the power and the exponential curves, which for most of it produced pretty similar results, produce almost no tail. But the actual data did show some development in the tail. But these curves when fit over the whole life of the curve dropped down, had a tendency to drop down at a faster rate than the actual data.

So, especially in the un-weighted model, which as we say gives excessive weight to fitting the first two development factors, which you don't care that much about. There was noting left in the tail. And even when we pot the weights on, these curves still just dropped down too fast to fit the whole development pattern well.

In the linearized version of the power and exponential, you see a somewhat bigger tail because the linearized version is very, very sensitive to fitting the tail, much more than anything else. But if you actually saw the data fit on the linearized version, you'd see that it fit the tail, the first couple of development factors, very poorly.

The inverse power had the opposite, the inverse power curve had the opposite problem. It was too thick tailed. Now, again, if you look at the -- especially look at the non -- or un-weighted where it says "error," the real development factor there, I think, is about 1.16, if that had been the error, about 16 percent compared to non in the other curves. And that's because again using that method, fitting the first two points very accurately, that's a very thick tailed curve and the projections out in the tail were way over what the real data was showing. Again, the linearized version on that one again is a little better because the linearized version tends to fit almost all the weight on fitting the tail.

I should also mention that the problems that you sometimes see with negative downward development or factors very close to one attracting the tail -- attracting the curve very strongly, which I discussed theoretically, were not generally a problem in this data set. There was one development factor of one, though, which we simply excluded from the fit on the linearized fit. So, you can call that a compromise and perhaps a problem.

Okay. Next I dropped out the first point to see if a lot of it was coming from 12 to 24. It made some differences, but not that dramatic. It was really -- really to get a dramatic difference, you had to come down to where I dropped out the first seven points. I just fit the last ten. There you see all of a sudden now once we're just fitting to the tail itself the curves are starting to get very close to each other. The power and exponential curve having basically identical results. The inverse power is still a thicker tailed curve. But now the results are at least getting in a reasonable neighborhood with each other.

So, I think that what this really shows is a difference between the curves, especially in the all, or the all except first, is that none of these curves really fit that well over the entire life of the -- over the entire 17, or even 16 if we drop the first point off, development points.

Some of the R squares were pretty high. I'm not showing them here because I don't have a problem with time and what they mean. First off, recognize that the R square you get on the linearized curve is the R squared after you've taken log transform data and it's absolutely not comparable to the R square you get in the nonlinear year versions where you haven't long transformed the data.

I should also point out the in a nonlinear case, just the standard definition of R squared doesn't work that well either. Sometimes you can get R squares. If you just use the standard R square formula in the nonlinear case you can R squares in excess of one; that's because R squared is the percentage of variation you've explained and since when you -- the thing you fit is a curve and not a line, sometimes you can explain more than 100 percent. There can be more variation in the fitted curve than in the data itself. So, watch out for nonlinear R squared.

What we use for a nonlinear R squared is we take the correlation between the actual and the fitted data and square the compilation coefficient. Of course, in the linear case that gets you back to R squared anyway. So, that gives us a better non-linearized square. But even with that done, so we get rid of the R squares in excess of one, the R square on the data that hasn't been transformed just is not reasonably comparable to the R square on the data that has.

Furthermore, when we do the weighted fits, we therefore calculated the correlation coefficient and weighted, and we found that again that R squared was not reasonably comparable to the un-weighted R squared. So, even in comparing one curve to the other, the R squares are only comparable. They are comparable, for example, if I'm using all three models, but fitting it the same way. Then at least I have three weighing of R squared on each of the three models which are comparable.

But sometimes they'll be different a little bit and I would much more advise you to actually look at the fit because the R squared just doesn't tell the story. We've got some R squares here which are 99 percent on fits that just didn't look that good, especially that were not fitting well in the tail, which is the region we're most interested in.

So, I guess I'm not giving you any good diagnostics right here to decide what curve to fit except to say to look hard at the fit and the data and make sure you're satisfied that it at least look reasonable. Once we got into the tail, though, we did get reasonably consistent results form the different curves.

I wanted to go a little into downward development. I don't have any curves. I guess the first place I saw this again in Robins' paper and he suggests and tested a little bit using a difference of two curves to produce a curve that will allow downward development. And over at Bacon and Woodward, Howard Clark and some other have used that a number of times also.

So, this isn't exactly the way Robins did, but Robins did a difference of two related exponential. We was using exponential in a slightly different form as a cumulative curve. I'm using them here in period development factors. This is just a three parameters all together instead of the two parameters exponential, and this gives you a curve that will go downward. Just to draw a little picture. This depending on the parameters can give you something that looks like that. It goes below zero and again you would fit that -- you could fit that curve to a development factor minus one.

I didn't do that, but I just throw that out as a possibility of something that might be worth experimenting with if you have patterns which clearly have downward development in them. Obviously, it's different, so you can't take the log of that thing in any reasonable way. So, linearizing it by taking a log doesn't work and the only approach that you could use on a curve like this would be nonlinear fitting and you'd have to find some good starting point values to get your techniques to converge. But, again, it's not a terribly complicated curve and it should work.

But on this particular data base nobody had talked that much about the incurred data. The incurred data had lost of downward development in the tail. It was clearly not appropriate in any of these curves. I guess Al showed you a picture of it and you could see that it went well below the axis.

So, just because we're talking tail methods, although this is not curve fitting, I've thrown out another tail method that I sometimes use and I'd like to talk about it. It's using -- many of you have probably seen the backward or cursive method from the appendix of the Marker Mold paper.

I never liked the term backward or cursive because it didn't seem any more backward or cursive than any other loss development method. So, we call it the case reserve run off method and it's most appropriate from claims made or report year data, but I'll get into why you sometimes can use it on accident year data in a minute.

Just for those not familiar with the method, basically in each column according to the method in each column, you select two factors, a paid factor, which is the ratio of paid in that column compared to outstanding at the beginning of the period and an outstanding factor which is the ratio of the outstanding at the end of the outstanding at the beginning.

Then you are looking for a factor which I'm calling outstanding to ultimate, which is a factor you would multiply times the case outstanding to get the total reserves. And the outstanding to ultimate factor would be I, PI plus outstanding factor at I times the next outstanding to ultimate factor. So, all you've got to do is pick the last outstanding to ultimate factor and you've got it made.

Okay. First off, using the mark -- the Marker Mold method is somewhat unstable because it's using outstanding as a base and that gets to be a pretty unstable base. On the other hand, if the kind of IBNR reserve you're measuring is entirely a case development reserve, there is certainly a lot of logic to using the outstanding losses as the base. If you have no open claims in a particular year and there's no more claims to be reported, you don't need IBNR in that year.

So, that's the logic and in many accident year data bases, if you look at the claim count development, you'll find that after the third or fourth column there's really nothing much happening and yet there still may be plenty of action in the incurred triangle whether up or down, and that's because -- so, really when you get out to the tail of these triangles, it does get to a point where everything you're seeing or practically everything you're seeing is development on known cases. In which case, at least to the right in the triangle, this method might make some sense.

Now, we went through and made an additional assumption. In looking at these factors in real data, despite the fact that, number one, the factors are prettier data. But, number two, after a certain point, they don't seem to change that much. They don't necessarily -- (Inaudible)

And I think there's some logic to that. The logic being that an old open case doesn't really know whether it's a four-year open case or a six-year open case. It's just an old open case. And there is some probability that it will settle in that year and there's some probability it won't.

So, we can go through an assumption that says after a point these factors will stabilize. Not -- (Inaudible) -- one. But the paid and outstanding factors you see after a point on old open cases don't change. And even though you pick a paid and outstanding factors that don't change and you repeat them to infinity, that does work within this method. That does produce a covergent tail factor. So, that's the assumption I went forward on.

(Slide)

Okay. So, now I assume that the paid factor and the outstanding factor after a particular point become stable and then repeat to infinity. So, calling those factors P and OS, it follows pretty simply that the outstanding to ultimate factor from that point on in any year is just P divided by 1 minus OS. So, it says IBNR, which is this case is really a case development reserve as a percentage of case reserve become a stable factor after a certain point, if you buy this that is.

In this particular data base we had 17 year triangle and it appeared that starting from about the 11th maturity out to the 17th that the factors were not really changing anymore.

Now, one of the advantages of that is that even through the factors are unstable, just by assuming that everything from 11 to 17 were all observations out of the same group, I had a lot of observations of factors. So, I could throw out factors that were based on very small volumes of data, cross out a few high factors and a few low factors and still wind up with 10 or 12 factors in the middle as average.

The other thing I should just comment about my application of this method is that I don't usually select a paid and an outstanding factor, I select a paid factor and a total factor which is the sum of the paid and the outstanding. That's because the total factor represents total development on case reserves and tends to be substantially more stable and either the paid factor or the outstanding factor also. When you get a big payment, generally you'll see a big pay factor, that will generally be accompanied by a very small outstanding factor because some big case was settled. Vice versa if you see a very, very small payment, you may find it be outstanding which didn't go down because nothing was settled in that cell.

So, I considered the sum of the tow is the most important thing anyway. First, I averaged the total factor, then the paid factor and back into the outstanding.

In terms of the specific way it came out -- by the way, this data had very dramatic downward development in the tail and the -- so, just some quick numbers. The total factor came out to about 73 percent. That is to say every year we had an observation, we took the outstanding losses at the beginning of the year, total development on that outstanding losses in one year was down 27 percent whether through settlement or remaining outstanding. Then we had a paid factor of about 14 percent, we put that together and the conclusion is that the ultimate losses are about 34 percent of the case reserve. So, we had some pretty dramatic downward development in this triangle.

(Slide)

Okay. Just as a little final exhibit if you want to look at it so we can compare a few results. What I did is I have two comparisons basically on this page. I wanted to compare results that could be gotten from two different triangles. So, I took the ultimate losses via paid development and with a fitted curve and here I took the power model fitted to the last ten points with weighted nonlinear fitting, which was one of the better fits for that model, and then I took the ultimate losses via the case reserve run off method and those are compared in columns A-1 and A-2.

In this case, the paid answer, and I just applied it to the oldest at seven years. I don't want to get into all the details of what might be going on. This is not a full blown reserve analysis, just a comparison of some techniques. But here you

have about a two percent discrepancy with the case reserve development answer coming in lower.

Then also I did a similar thing with claim counts. I fitted a fitted curve to close count development, actually the same model was selected there and that's in B-1 and I compared it in B-2 to ultimate claim counts from reported development. That actually was not a fitted curve. That was just a straight out reported counts development.

And here the discrepancy, I think -- (Inaudible) -- my calculator, but it's a much smaller discrepancy than about 0.3 percent I think. And that's probably almost no discrepancy because we didn't put a tail factor on the reported counts and 0.3 percent of the tail factor on the reported counts will probably be pretty reasonable. So, there you have some comparison of fitted curve methods with just methods based on data that was already -- pretty much already in.

Okay. I'd just like to make a few closing comments if I can find that page in my notes. Here it is. Okay. We don't have any theory that predicts any one of these curves. These are just practical curves that have been picked by people because they seem to fit reasonably well. I think Al made a very similar comment at the beginning of his -- this is just something that seems to describe what we see. There's no theory that says this is what's going to happen.

And when you've got that situation, extrapolation is kind of dangerous. You're fitting, you can tell if it fits well in the region, but it's hard to tell if it fits well beyond the region. I think we compared the fits. You saw some of the early ones were the thick tailed curve and the low tailed curve had completely different answers for you. It leaves you -- you have to worry about extrapolation. Extrapolation is pretty dangerous.

In fact, we've had some situations -- I remember a situation where some -- we had picked a tail factor based on a fitted curve and it was pretty -- I mean, we were careful that it at least looked like a reasonable tail factor. And then we got some revised information that one of the -- a data error came. We were informed of a data error and one of the early development factors come in a little higher now than it was before.

All the others were the same. So, we said, let's keep the -- it's a small change, let's keep the method the same and we put it through the same curve. And because the early development factor was higher, the tail factor on the curve was lower. You can see that would have worked similar with Al's method.

And, logically, did that make any sense? We got no new information except that there was a little more development in the early stage. Everything else was the same and the total effect would have been to make the answer lower. So, I just

include that within the caution. Look at the fix. The R squares don't mean much. Look at the fit to make sure you're satisfied with them.

And, Finally, to go again with something Al said, even though we did a lot of extrapolation off paid here and extrapolation of paid triangles to infinity, I do also believe that when you get deep in the tail there's only a few cases open and the claims department may know a lot more than you do, and so I look at that incurred data when I get deep in the tail and I make sure that what I pick for a paid tail is reasonably consistent with what the incurred data shows deep in the tail, all curve fitting aside.

Okay. That's the end of my presentation. I guess we have time for some questions.

MR. SUCHOFF: We do have about 10 minutes before lunch and I'm sure Spencer would be happy to answer any questions or respond to comments that you may have.

QUESTION: You talk about comparing the I squares between the linearized curve and the nonlinear curve. What's wrong with once you get the parameters of the linearized curve translating them back to a nonlinear format and calculating your R squared on that basis?

MR. GLUCK: Yeah. We've done that. The problem is in that case because of the nonlinear curve was specifically designed to minimize the sum of the squares untransformed and a linear curve was designed to minimize the sum of the squares transformed, the linear curve in that case -- if you measure your R squared onthe nonlinear basis, on the non-transformed basis, the linearized curve will always perform substantially worse because it wasn't -- it's not minimizing those errors. You can do it the other way, too. You can take the logs and compare that way even on the -- but then, of course, the linearized one will always perform much better. So, if you -- the curve is going -- the ones that are going to perform better, which is -- you know, if the measurement technique is comparable to the fitting technique, then that curve is going to be the one that's going to perform better and I don't know exactly what it tells you.

QUESTION: I just have a quick question. In a curve where --which does not go below one and you have data like, let's say, 1.01, .99, 1.01, what do you think about the method where you take like a geometric mean of those three points and use that in place of the --

MR. GLUCK: Yeah. That was what I -- something like that was what I meant when I said you might -- if you have an occasional downward, but with a general pattern of upwards that to smooth it out or average it out, I think that's okay. The problem, again, is that if you're close to the axis, you have to worry about the reaction of that linearizing method when you're close to the axis. The fact that it doesn't work at all at zero or under the axis should be a caution to watch out what happens if you're too close to the axis also.

QUESTION: Just going back to that R squared that I think we need to forget about, but maybe in your case I think it's important that we do think about the R squared that you've calculated. You mentioned that once you change one of the observations in the early development years, you got different answers. Well, I guess the same thing happens if you estimate the 6 degree polynumeral to seven data points, it'll fit all the points exactly. The R squared will be 100 percent, you just change one of those points and you'll get completely different answers. If you generate numbers that are all constant, the same value, each one of those values is 100. Okay. A sequenceof ten numbers, sales figures. The R squared is zero. But my prediction error is also zero.

MR. GLUCK: Did you mean your prediction error was zero or your prediction error was very large?

QUESTION: (Inaudible)

MR. GLUCK: Okay.

QUESTION: It's an excellent model. (Inaudible).

MR. GLUCK: Okay. The general point being that watch out for Rsquared, it doesn't tell you that much of a story about how goodyour model is and I concur.

QUESTION (Gail Tverberg): Alfred, you had mentioned there can be a bias. You know, one thing we run into when we're looking at these very long tail things is, say, a million dollar claim that comes in every couple of years. You get them erratically out at the tail.

So, what you end up with is factors very close to one and then you've got a big blip up and then a big blip down. Is there a bias in the fitting in your method or should be smoothing that kind of information before you ever put it. What happens is you sometimes get truly late reported claims, but there are relatively few of them and relatively large dollar amounts. And so, it's not where you're dealing with, say. 100,000 limit data, but it's where you're dealing with, say, million dollar limit data., that you'll get development factors that look fairly flat and then they go blip, flat, blip. If you just sort of ignore the blips, that's really where the development is - in those blips. Maybe the answer is that you really have to smooth it first to get it down to a better, more smooth kind of data to use.

MR. WELLER: Gail is talking about this basic pattern (drawing on overhead). If I was going to use a Bondy technique -- just because I gave the speech doesn't mean I use it exclusively. (Laughter)

But, if I was going to use the Bondy technique, I would leave the blips in because it would give me a tail that went like that through the blip. Generally, when I use the Bondy technique, I try to use it in a format of what do the actual development factors you see fit to. So, I would prefer not to smooth the data in most cases because, if I want to get into more elaborate models, I'll use a more elaborate model and not do the smoothing.

Generalized Bondy development will give you a fair estimate. It gives you a way of interpreting the data. If I try to level the data out, then the Bondy approach will fit ever so much better. The R^2 will go up, you know, exactly like Ben said. I'm not going to do anything in my prediction; I'm not going to characterize the data better.

Generally I will use Bondy if I'm tied to a development factor model and I'm trying to say what's in the actual data, as opposed to what might be hidden in the actual data.

QUESTION (Don Gould): Last question. Assuming that I have a model that's parsimonious in the parameters and it's not a 100 degree

polynomial and I have to make an extrapolation on a long tail line, I'd rather have an R^2 of 99 than 44.

MR. SUCHOFF: Very well. Please join me in thanking our panelists for their excellent presentations.

(Applause)

Generalized Bondy Development

Alfred O. Weller
Ernst & Young
212-773-3123

Casualty Loss Reserve Seminar
Dallas, Texas
September 9-11, 1990

Sessions 2G & 7G
Models of
Claim Development Patterns

Generalized Bondy Development

1. *Theoretical Importance*
2. *Historical Background*
3. *Fundamental Concepts*
4. *Defining Equations*
5. *GBD Tail Factors*
6. *Fractional Periods*
7. *CLRS Medical Malpractice Example*
8. *Masking - example 1*
9. *Masking - example 2*
10. *Caveats*
11. *Conclusion*

GBD Descriptive Power

A. M. Best Data (12/31/87)

Automobile Liability	.370	99.48%
General Liability	.629	99.53%
Medical Malpractice	.627	99.62%
Multi_Peril	.321	96.97%
Workers' Compensation	.398	99.28%

"Extrapolating, Smoothing, and Interpolating Development Factors" by Richard Sherman

Type of Business	Inv Power	Bondy	Bondy
Workers' Comp. Paid Loss	99.73%	.354	99.52%
Auto BI - 5 carriers	99.29%	.190	99.97%
Gen Liab - 5 carriers	99.14%	.488	98.83%
Work Comp - 5 carriers	99.87%	.457	98.81%
RAA Auto Liab	96.25%	.403	99.67%
RAA Gen Liab	99.94%	.582	99.21%
RAA Med Mal	92.20%	.474	98.91%
RAA Work Comp	99.24%	.633	95.93%
Auto BI - claims	99.96%	.091	99.96%
Other BI - claims	99.26%	.279	99.58%
Med Mal - claims	99.41%	.262	99.57%

Medical Malpractice Example

Paid Loss	.653	99.31%
Reported Loss	.184	74.63%
Claim Expense	.233	88.41%

Original Bondy Development

d(t) = development factor from time t to time t + 1

u(t) = development factor from time t to ultimate, i.e., the tail factor at time t

$$u(t) = d(t-1) \quad (1)$$

Equation (1) follows from

$$u(t) = d(t) \times d(t+1) \times d(t+2) \times \ldots \quad (2)$$

and

$$d(t+1) = d(t)^{1/2} \quad (3)$$

because

$$d(t-1) = d(t-1)^{1/2} \times d(t-1)^{1/4} \times d(t-1)^{1/8} \times \ldots \quad (4)$$

Theoretical Considerations

Point Process

A theory of development should describe development for arbitrarily small units of time in which losses can be incurred.

Mixing

A theory of development should account for the mixing of distinct homogeneous classes.

Aggregation

A theory of development should account for the aggregation of development phenomena into experience periods.

Force of Development

The force of development is the instantaneous rate of change in the variable subject to development.

For example, for annual data on reported losses the force of development is the instantaneous rate of change in reported losses expressed as an annual rate.

GBD Equations
Definitions

Development Ratios

$$d(t+h) = d(t)^{B} \tag{5}$$

or,

$$B = \frac{\ln(d(t+h))}{\ln(d(t))} \tag{6}$$

Force of Development

$$f(t) = d/dt \ln(r(t)) \tag{7}$$

$$f(y) = B^{(y-z)/h} f(z) \tag{8}$$

GBD Equations
Tail Factors

$$u(t) = d(t) \times d(t+h) \times d(t+2h) \times \ldots$$
$$= d(t) \times d(t)^{B} \times d(t)^{B^2} \times \ldots \quad (9)$$

$$\frac{1}{1-B} = 1 + B + B^2 + B^3 + \ldots \quad (10)$$

$$u(t) = d(t)^{1/(1-B)} \quad (11)$$

GBD Examples
Tail Factors

Two development ratios have been estimated for a given book of business. They are:

24 months to 36 months = 1.450
36 months to 48 months = 1.225

Using generalized Bondy development, what is the tail factor describing development from 48 months to ultimate?

Solution:

Step 1: Find the Bondy parameter using equation (6).
The natural logarithm of 1.225 is 0.20294.
The natural logarithm of 1.450 is 0.37156.
The Bondy parameter is .20294/.37156 = .54618.

Step 2: Find the appropriate exponent of the development factor 1.225. Because the questions asks for development from 48 months to ultimate the sum in equation (10) starts with the second term.

.54618 / (1-.54618) = .54628/.45381
= 1.20352

Step 3: Compute the GBD tail factor using equation (11).

$1.225^{1.20352} = 1.277$

GBD Equations

Fractional Periods

$$B = \frac{\ln(d_{h/n}(t+h))}{\ln(d_{h/n}(t))} = B_{h/n}^{n} \tag{12}$$

$$B_{h/n} = B_h^{1/n} \tag{13}$$

$$d_h(t) = d_{h/n}(t)^{1 + B_{h/n} + B_{h/n}^2 + \ldots + B_{h/n}^{n-1}} \tag{14}$$

$$\ln(d_{h/n}(t)) = \frac{\ln(d_h(t))}{1 + B_{h/n} + \ldots + B_{h/n}^{n-1}} \tag{15}$$

GBD Examples
Fractional Periods

Two development ratios have been estimated. They are:

24 months to 36 months = 1.450

36 months to 48 months = 1.225

What is the factor spanning the fractional period from 18 to 24 months using generalized Bondy development?

Solution:

Step 1: Find the GBD parameter for 12 month periods using equation (6).

The natural logarithm of 1.225 is 0.20294.

The natural logarithm of 1.450 is 0.37156.

The GBD parameter is .20294/.37156 = .54618.

Step 2: Using equation (13) compute the GBD parameter for semiannual periods.

$$B_{h/n} = .54618^{(1/2)} = .73904$$

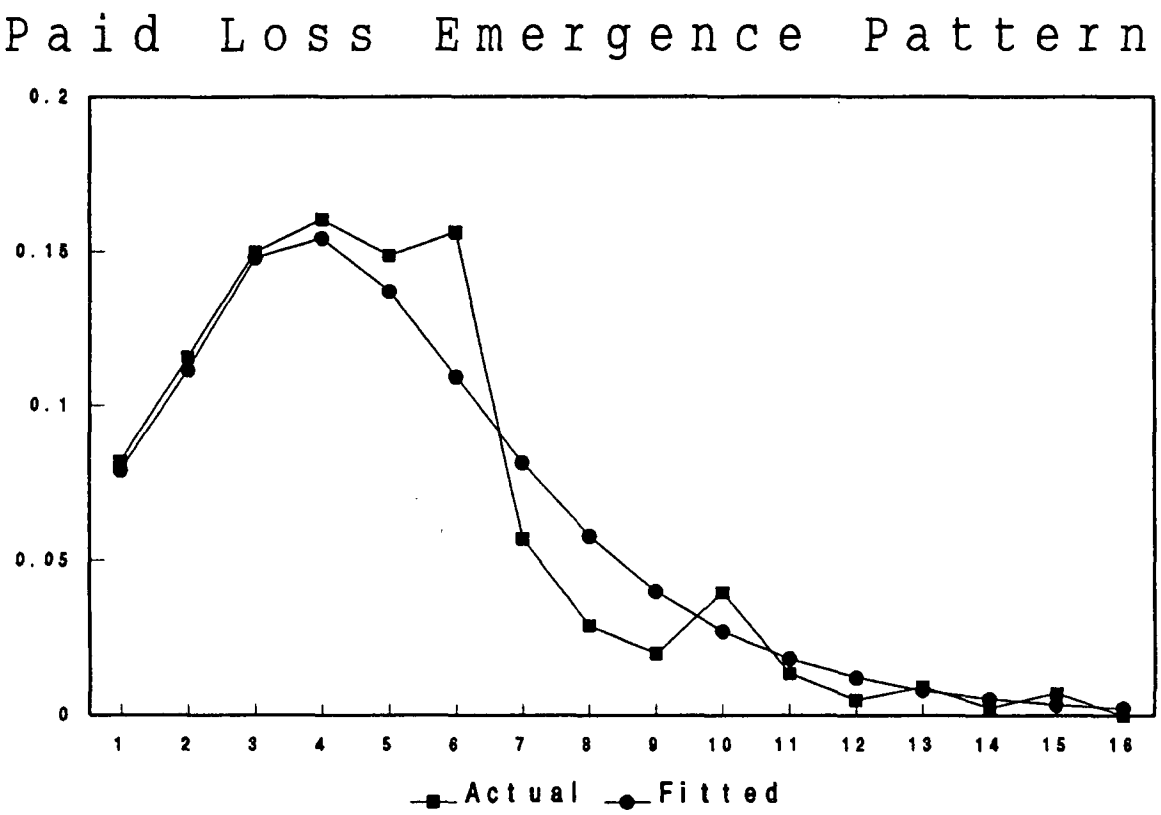
Step 3: Using equation (15) compute the GBD development factor from 24 to 30 months.

$$\ln(d_{1/2}(2)) = \ln(d(2))/(1+B_{1/2})$$
$$= \ln(1.450)/1.73904$$
$$= .21336$$
$$d_{1/2}(2) = e^{.21336} = 1.2382$$

Step 4: Compute the GBD development factor from 18 to 24 months using equation (5).

$$d_{1/2}(1.5) = d_{1/2}(2)^{1/B} = 1.2381^{1/.73904} = 1.335$$

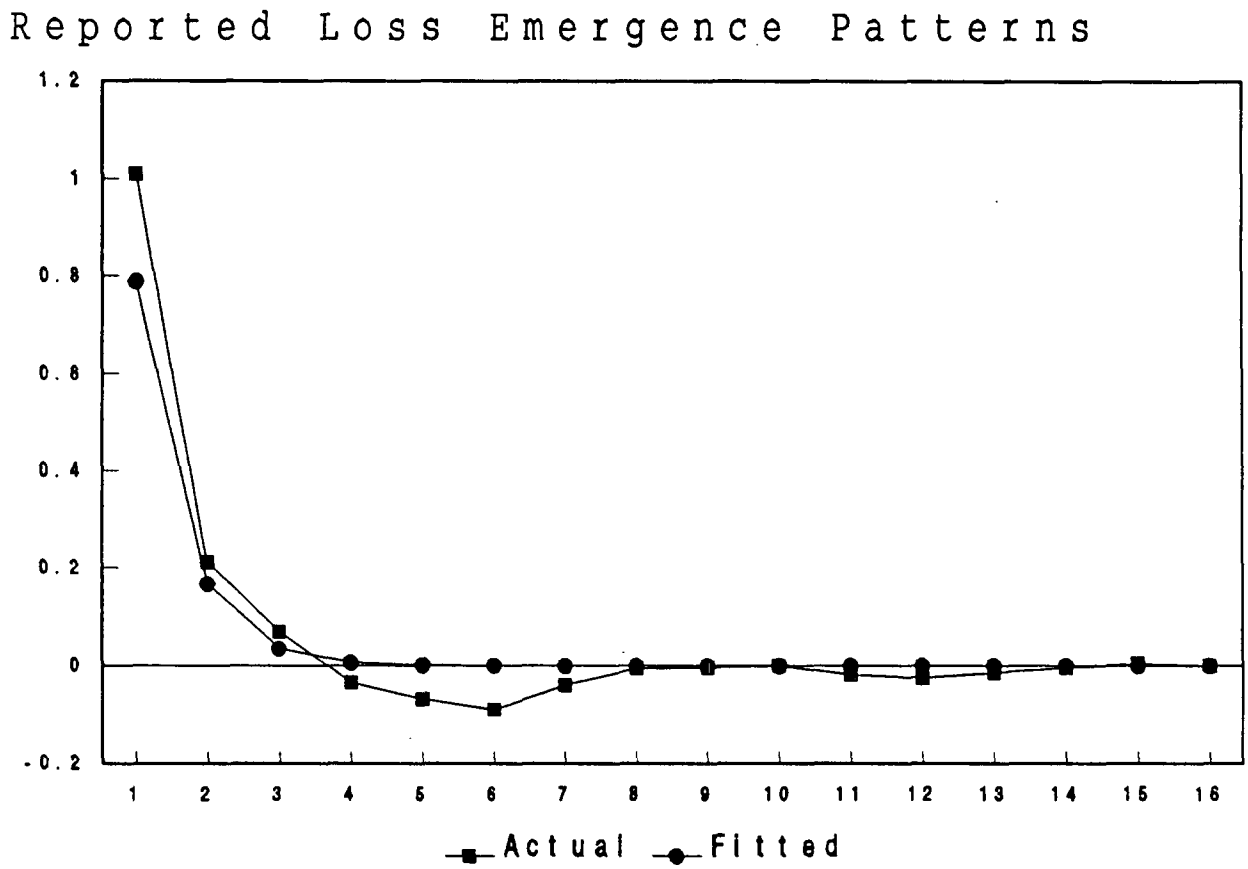
Medical Malpractice Example



Bondy parameter = 0.6532

Explained variation (in logarithms) = 99.31%

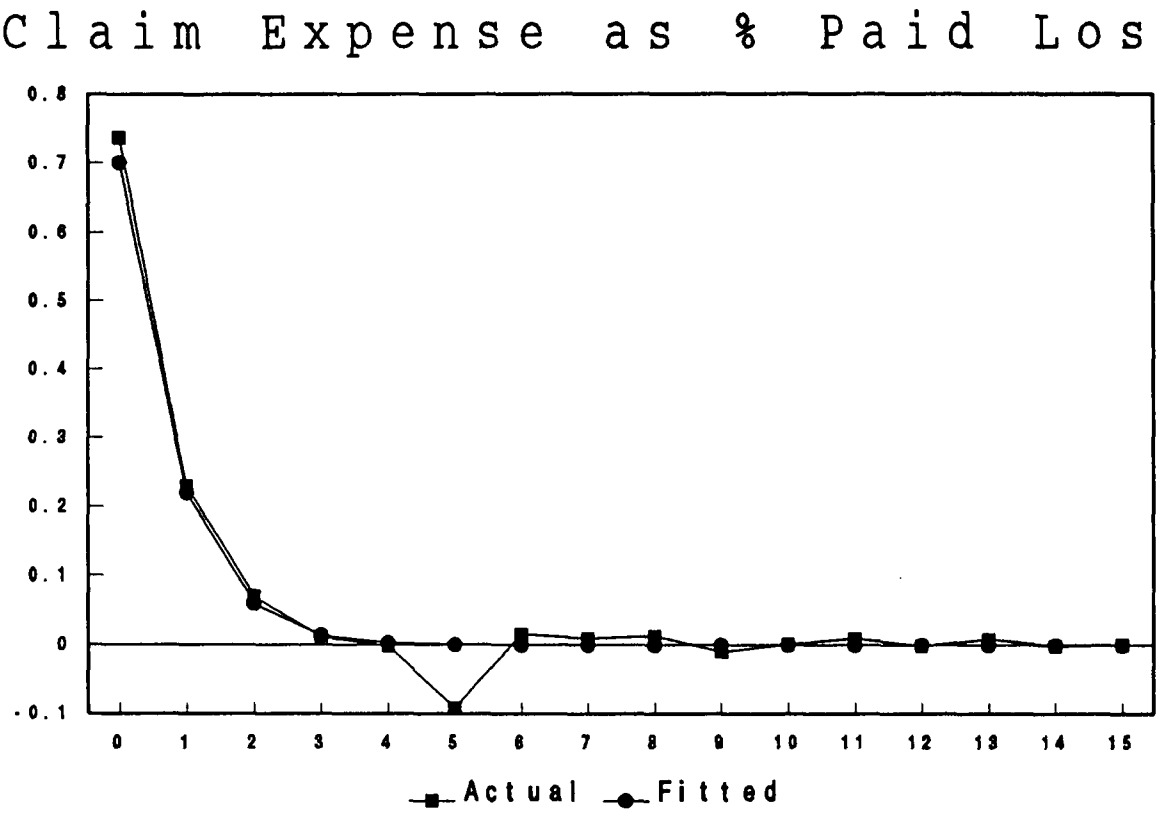
Medical Malpractice Example



Bondy parameter = 0.1841

Explained variation (in logarithms) = 74.63%

Medical Malpractice Example



Bondy parameter = 0.2329

Explained variation (in logarithms) = 88.41%

Medical Malpractice Example

ESTIMATED INDEXED RESERVES

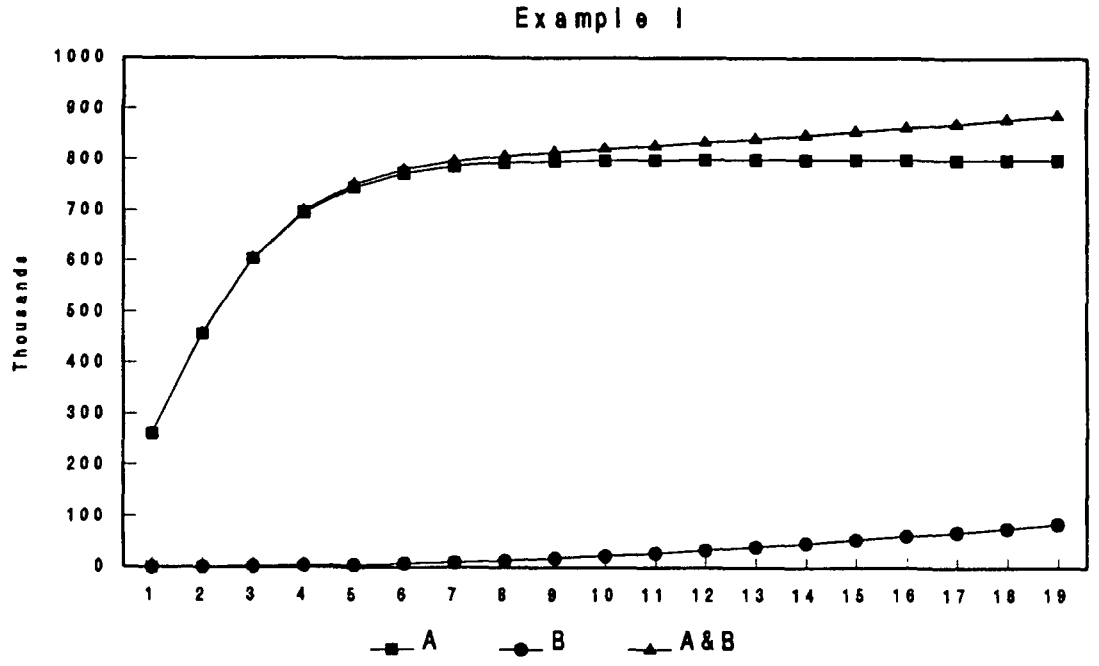
Paid Loss Projection = $53,173,000

Reported Loss Projection = $ 58,674,000

Claim Expense (paid loss base) = $39,461,000

Mixing & Masking Example I

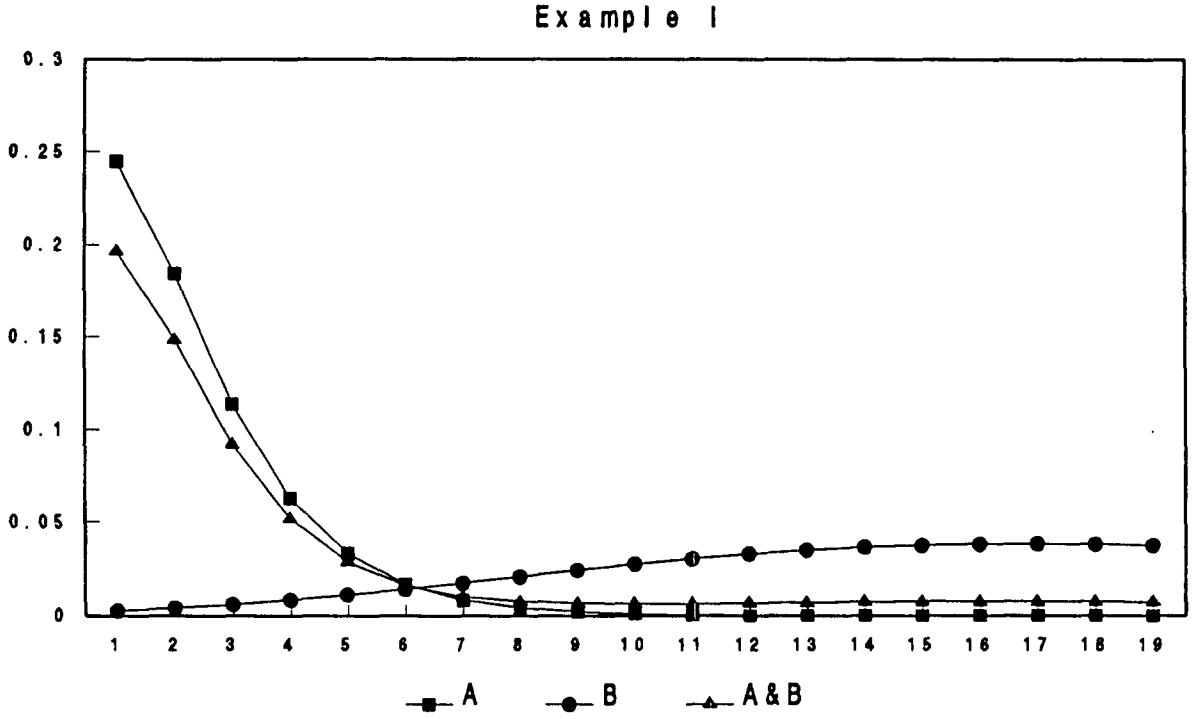
Cumulative Amounts



Example I	A	B	A&B
Parameter	0.5000	0.9000	NA
D(1)	1.750	1.750	1.750
Share	80.00%	20.00%	100.00%
Ultimate	800000	200000	1000000

Mixing & Masking Example I

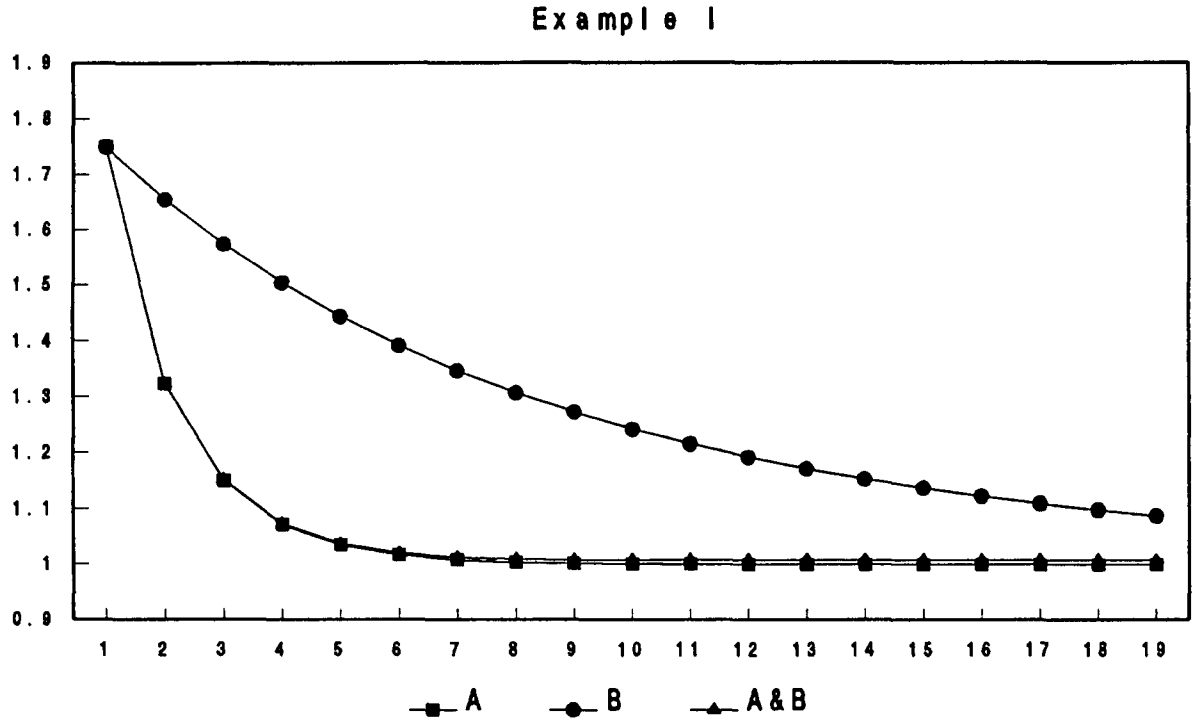
Emergence Pattern



Example I	A	B	A&B
Parameter	0.5000	0.9000	NA
D(1)	1.750	1.750	1.750
Share	80.00%	20.00%	100.00%
Ultimate	800000	200000	1000000

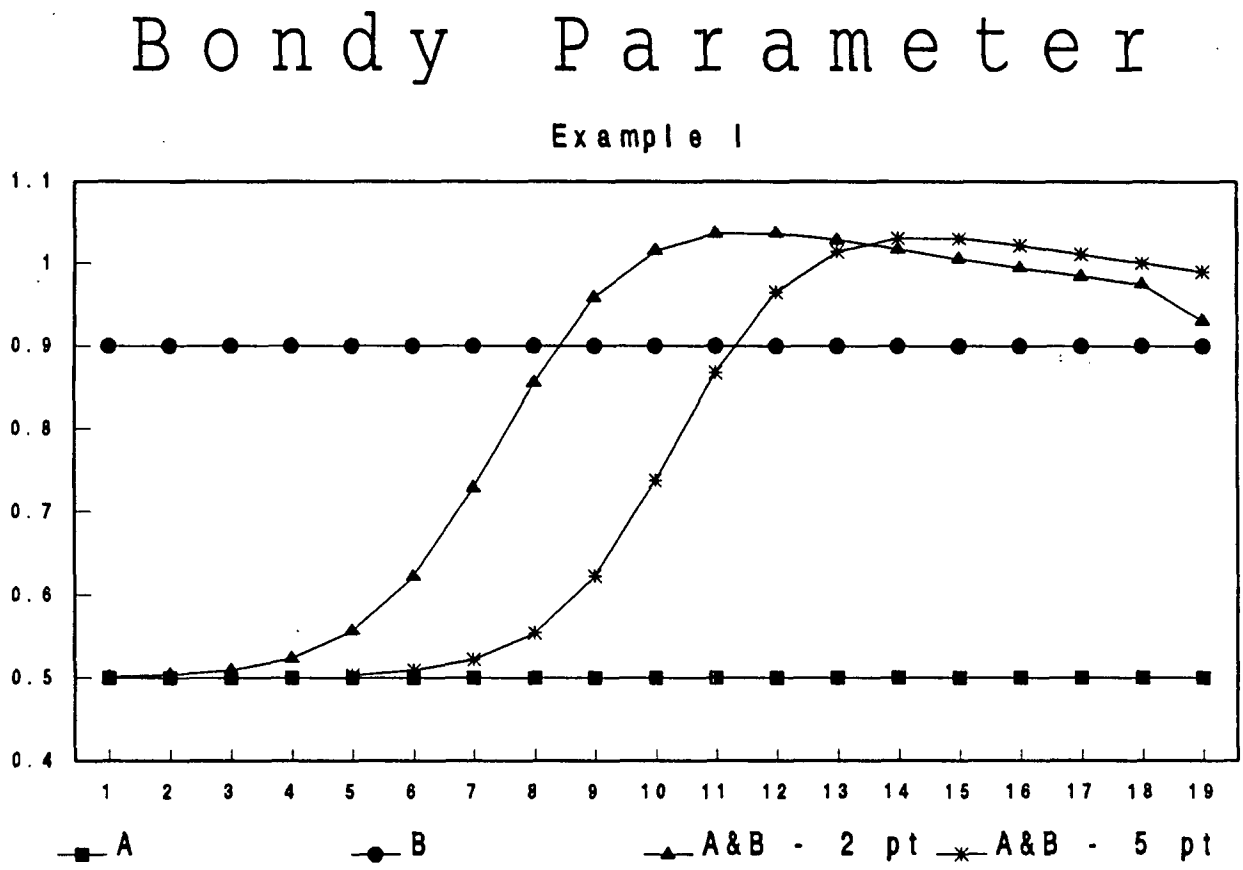
Mixing & Masking Example I

Age-to-age Ratios



Example I	A	B	A&B
Parameter	0.5000	0.9000	NA
D(1)	1.750	1.750	1.750
Share	80.00%	20.00%	100.00%
Ultimate	800000	200000	1000000

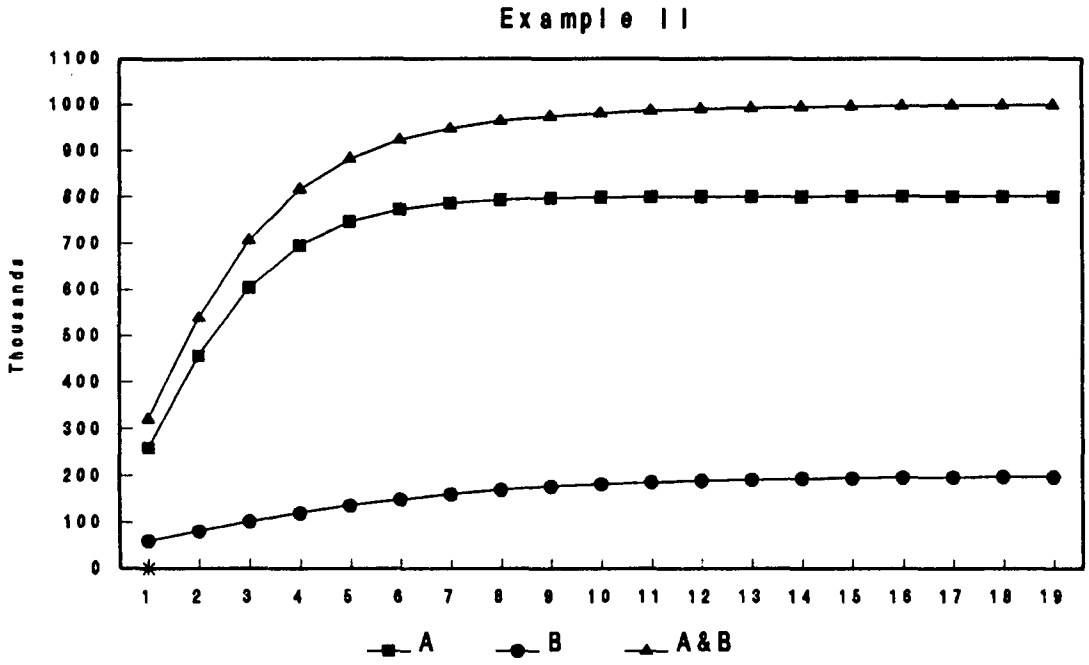
Mixing & Masking Example I



Example I	A	B	A&B
Parameter	0.5000	0.9000	NA
D(1)	1.750	1.750	1.750
Share	80.00%	20.00%	100.00%
Ultimate	800000	200000	1000000

Mixing & Masking Example II

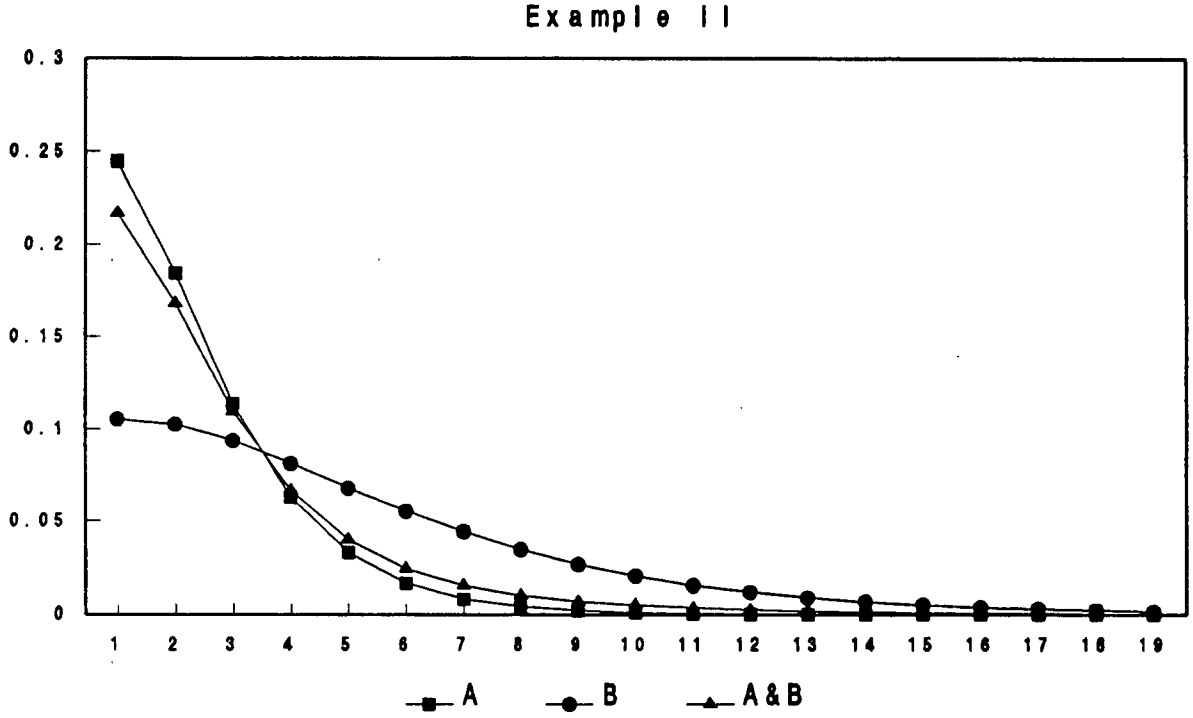
Cumulative Amounts



Example II	A	B	A&B
Parameter	0.5000	0.7500	NA
D(1)	1.750	1.350	1.675
Share	80.00%	20.00%	100.00%
Ultimate	800000	200000	1000000

Mixing & Masking Example II

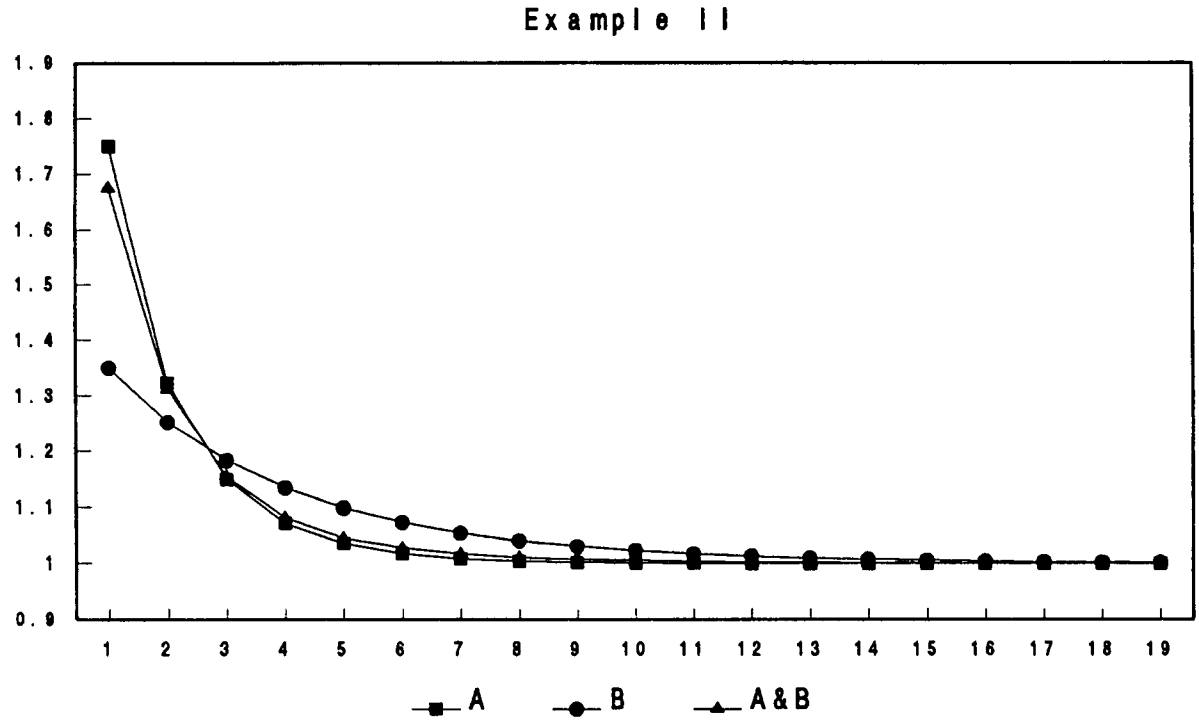
Emergence Pattern



Example II	A	B	A&B
Parameter	0.5000	0.7500	NA
D(1)	1.750	1.350	1.675
Share	80.00%	20.00%	100.00%
Ultimate	800000	200000	1000000

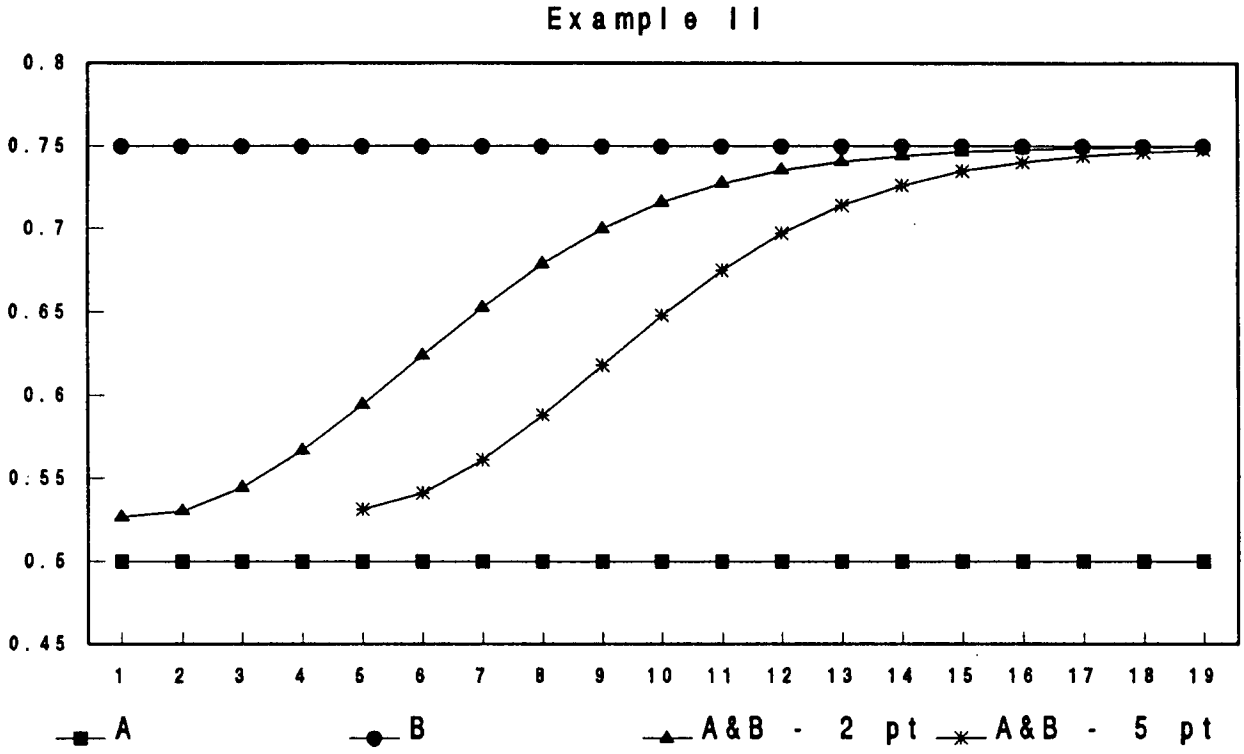
Mixing & Masking Example II

Age-to-age Ratios



Example II	A	B	A&B
Parameter	0.5000	0.7500	NA
D(1)	1.750	1.350	1.675
Share	80.00%	20.00%	100.00%
Ultimate	800000	200000	1000000

Mixing & Masking Example II



Example II	A	B	A&B
Parameter	0.5000	0.7500	NA
D(1)	1.750	1.350	1.675
Share	80.00%	20.00%	100.00%
Ultimate	800000	200000	1000000

Generalized Bondy Development - CLRS - Overhead 21

GBD Caveats

1. Masked Data
2. Data Selection
3. Earnings Effect
4. Left-hand Discontinuity
5. Base for Fitted Factors
6. Goodness of Fit versus Sensitivity of Extrapolation
7. Testing and Verification

Generalized Bondy Development

Generalized Bondy development facilitates estimation of development factors, is easily computed, and affords excellent fits to observed data. However, it should not be viewed as a straightforward algorithm. Its successful use depends crucially upon the skill of the actuary and his or her understanding of the data and insurance situation being analyzed.

1990 CASUALTY LOSS RESERVE SEMINAR

LUNCHEON

Speaker

Herbert E. Goodfriend
Prudential Bache Securities

Outline For Speech
by Herbert E. Goodfriend
1990 Casualty Loss Reserve Seminar
September 10, 1990 -- Dallas

THE TURN HAS WORMED: REDUX

I Where We Are In Commercial P-C Pricing.

A. Primary < Brokered Market > National
Agent Market Regional

B. Reinsurance

1. Domestic

2. Foreign

II Where We Are In Personal Lines.

III Where We Were Supposed To Be.

IV Where Are We Going? Why? When?

A. Combined Ratio Profits

B. Return On Equity

C. Balance Sheet

1. Weak Spots

2. Strengths

3. Investment Portfolio Variables

D. P-BS Reserve Study--Preliminary Findings

V "M & A" Considerations

VI Investment Conclusions

MR. GOODFRIEND: In my assessment of the outlook for the Property Casualty Insurance industry, I have undertaken to analyze not only its operating status but the balance sheet of the industry. In so doing, I have inquired of primary domestic and foreign companies, reinsurers, intermediaries, regulators as well as customers. These are my tentative conclusions, and these were dated September 6, based on about six weeks of polling. I polled companies which historically would deny they were price cutting -- it's always the other guy. I polled companies that indeed readily admit that they are seeking market share -- that's a euphemism for "Boy, am I going to get that business."

I polled companies that sit on the sidelines and are abstaining from business and are living up to that discipline, much to their chagrin, because the good news is they are not writing bad business; the bad news is that because of it they are losing people inside their organizations as well as parts of their distribution organization who believe the message. When you take the bread out of somebody's mouth, you get business from an intermediary you don't want.

Here are the tentative conclusions and trends that I have discerned. One, managements see little or no change in the U.S. reinsurance and facultative markets; retentions by primary customers remain uncomfortably high. World markets, for all of the problems of the recent past, are still awash in overcapacity.

Two, large national account brokered contracts are still quite competitive in standard commercial lines. Actually, renewal prices may have risen by five percent, but after inflation, the effect is discounting when you allow for what the true costs are.

Third, at best, these and medium-sized risks are quite competitive. Actually, several major agency carriers have been "deviating." You have heard that word before. This is not a scatological remark drawn in a men's room, but rather it relates to price-cutting.

Fourth, small Main Street business of the type written by some of the Midwestern companies and perhaps some companies down here in the Southwest, which will remain and are nameless, are firm but not improving, per se.

Lastly, the areas of greatest price increase and solidity remain upscale special coverages of the type that Hank Greenberg, A.I.G., would tell you he writes, and Dean O'Hare of Chubb would tell you they write, as well as certain parts of the Workers' Comp business, written by many companies but remaining a very troubled line.

It is my view that the industry, whose combined ratio is hovering now at around 108 percent, will do well to linger at that number, and, more likely, will be at between 110 and 112 for the better part of the next year. This equates to approximately a 6 percent

return on equity. One has to recognize that, unlike Mr. Ralph Nader or the gentleman from California, Harvey Rosenfeld, I do not include, and I do not think most analysts include, realized capital gains or indeed losses in the equation, treating solely from the standpoint of operating gain, including investment income. We will probably have to be retutored in due course if the federal government has its way or certain forces within the accounting profession do.

Suffice to state that we see no steady forward price movement "on the beach", and in several cases we do see slippage. The situation is not yet a Dunkirk, but it is certainly not a successful landing either.

If this is the case, what can we do constructively to overcome the current state of the art or, prospectively, inure ourselves against the onslaughts of the cycle as it continues? There are several things that could, as they say, shake the tree.

One is a series of catastrophes. I am not going to be Dr. Gloom and Doom, because, A, that connotes a competence in meteorology, and I am not equipped for that, but suffice to state that those things do happen. They happened with a vengeance last year, and as we meet, as we enter the new hurricane and related storm season, we could get a series of shock waves later on in the fall and winter.

Two, securities markets can be hardly described as stable. As somebody who is in that business, I can tell you that things "ain't so good". The bond and stock markets are quite volatile, they were volatile before Kuwait and the Middle East crises, and they are likely to remain so. But if they became more volatile and you had a shakeout of the dimensions of three years ago in October 1987, parenthetically, that could overnight, ab initio, cut away some of the stress capacity. I am not hoping for that, but that would certainly shake the tree.

Thirdly, you could have reserve strengthening. What is the oxymoron?: "adequate or redundant reserves." Reserve strengthening is certainly over due. We have just concluded our study, which is an amateur's assessment of reserves, and we find, of the 22 companies we follow closely, about 75 percent are adequate or modestly redundant as to reserves. That is a lower proportion than it was a year ago, which, in turn, was lower than two years ago and is the lowest since we have been doing this study, about 10 years. Indeed, if you listen to the ISO and other related industry organs, they will tell you that reserves are massively overstated and that the industry must come up with major bucks in due course.

The fact is that most of the companies have been postponing the moment of truth, hoping to eke out through the fray and get through this terrible time without "upchucking" and having to come up with major capital infusions. That is a rather deft

game, which has proved conclusively in the past to be very elusive for most companies to do well.

Or you could have, as another stimulus to turning around the market, either regulatory change on how to price portfolios or massive hits to book value from the other high-risk assets, not just high-yield bonds but real estate and mortgages, affecting the property casualty business via sister companies and parent companies of property casualty companies who have to come up with funds or take hits to their book value. That would reallocate capital away from the PC business into the life insurance business, or at least it would not be found in the P-C underwriting marketplace.

Suffice to state that, of course, the federal government takes a different view of the health of your business. They see you as robust. Of course, certain of the individual states, and the people's advocates, the demagogues, also see you as deserving of another tax round of increases. Fortunately, I do not think that is going to happen this year, but, sure as little apples, they will be back in 1991 and 1992 to try to extract another pound of flesh.

It is possible, of course, that European developments and the change in the dollar vis-a-vis currencies, interest rates and developments abroad could wither away capacity that has helped in whatever degree here at home for the industry to remain relatively soft.

Lastly, of course, you could have significant major purchases of public companies' own securities as they continue to languish here in low markets rather than employ that money in the marketplace per se. This, together with mergers and acquisitions, which have showed a kind of renaissance in the last several months, could serve to turn the market around by reducing utile capacity.

Absent these stimuli, any one or a combination of which would be helpful, it is hard to see a change in the Chinese Water Torture, drip-by-drip pricing scenario over this year and I think through mid-1991. That does not mean it cannot happen, but I would be, I think, loathe to say that it would, and I do not see it just around the corner.

Indeed, the interesting phenomenon is, not the worst of all possible worlds, but one of the worlds that does not do well for the property casualty business is this euphemism called "stagflation" where you have rising inflation and interest rates and increased interest rates to a level that are not excessive. They certainly do not help out at a time when the economy sags or stagnates or is tepid. In such event also, of course, the securities of your industry do not come into favor very much.

The thesis used to be held that if you had declining interest

rates, or the perception, more particularly, of declining interest rates, your group, whether they be property casualty, reinsurers, brokers, multi-line companies, and yes, of course, life insurance companies, would be quite popular. That tenet is still held today, but most portfolio managers to whom I speak are chary of stepping up to the plate, and they are sitting with a lot of cash rather then employing funds in a business that is still faced with a soft cycle and where interest rates are not giving ground.

Hopefully, that will change. Our own strategists and economists believe that we are not going to go into a classic National Conference Board of Economists defined recession, which is two consecutive quarters of down GNP in real statistics.

But a rose is a rose, isn't it? Remember the old definition: A recession is when my neighbor is out of work; a depression is when I'm out of work. Nor does it make very good sense to tell your neighbor up the street that we are not in a recession when his house carries a lesser value than it was three years ago and his profits are down as well.
Suffice to state that these are tough economic times that we do not see improving, cum or ex Kuwait. Kuwait and Iraq make things a lot more difficult, in terms of the inflationary pressure.

I think it is also true that the property casualty business investment income cannot be depended upon in equal measure to bear the brunt of misadventures on the underwriting side, not only because taxes are higher but because the whole orientation and mix of what you can employ funds in reasonably well, with high liquidity, is changing as well.

The role of tax-exempt securities declined pronouncedly in the last 10 years, more particularly in the last 5. Even though the infrastructure of the United States has to be financed, importantly, through municipal bonds, most property casualty companies are shunning them, in good measure, like the proverbial plague. They would rather buy highly-liquid, yielding lower corporate securities than the tax-exempt market. That has profound influences upon the investment income scenario.

I said I would not portray sober issues with humor unless I needed it, and I think this is the time to do so. Lord Balfour is reported to have said, "There are things that would definitely be clear had they not been explained." I think that used to be the actuaries credo, or certainly that of a security analyst.

But I was reminded of another equally historic comment. Somebody said to me, "Is a sense of humor necessary in your own business?" And I said, "Certainly." An actuary once told me a story about a dying Irish actuary named McGinty. His comment to his grieving family was, "Bury me in Jerusalem." And his wife, widow-to-be, astonished as she was, says, "Jerusalem?" He says, "Yes." McGinty says, "My studies show it has the highest

resurrection rate in the world."

There are a couple of things that I wanted to add. I have not discussed personal lines here, and I know that that is important for some people here, as both drivers and owners of personal wealth as well as students of the business. I have taken the view that unfortunately, protestations notwithstanding, this country's personal lines business is headed toward a quasi-socialist system, and the give-back phase is very much with us.

Even though some rhetoric and court decisions are going the private way for the time being, the adversaries are not throwing in the towel. One need only look at states other than California states that are joining the fray. That is going to provide an opportunity as much as it is a problem for companies that are both efficient and disciplined, and there are a few of them. There is going to be a large market unserviced by what used to be called the voluntary private sector. It may indeed pay to -- what was the expression years ago? -- "go naked"; i.e. drive without coverage. But there are going to be companies that will reenter the fray and write sub-standard business, unlike those that are pulling away today, at some point in time. It is not here yet because the crunch is not here yet, but, in due course, I believe it will happen. That is going to provide a significant opportunity.

Unfortunately, the flip side of that is that they may not seek to enter it using the agency system. They may come in in a direct billing or direct way, running a flanker around the agent, in my view, because, that perennial rhetoric query: is it sane and rational for an agent to derive -- (and I know the answer, so please don't respond), 15, 20, or 22 cents on every dollar of premium for performing the service of getting you automobile insurance?

I have my own response to that, which I am sure you know is a fully objective one, but I think it is certainly a target of opportunity for companies to cut costs going forward, looking at that as a way to do so.

Off center stage, maybe 5 years away, maybe 10, but probably sooner rather than later, don't forget a few of the banks. The banks have their own problems that take priority for the intermediate turn. Certainly, capital is one of them and mismanagement is another, and the two are related, and God knows why they should go from one troubled arena to another, but they will and probably with the blessing of the federal and state governments.

Suffice to state that there is a handful of banks that will go after personal lines business, and they will do so not because they are articulate or wonderful or very profitable; they will do so because they can process the paper, in their perception, cheaper and easier than some of the companies represented in your

business. It is a big market.

The worse that crunch gets, the greater the political pressure for massive surgical repair, that is when you will get the man-on-a-white-horse effect to come in. We are not there yet, but I think it will happen. Accordingly, you will find very few recommendations from me and my firm that are ecstatic about personal lines auto companies, with rare exception.

I do want to make one other observation. I pointed out that I expect this combined ratio to be at 110 to 112 shortly. I would also state that there is an adversary view. There is a view that we are right at the bottom and that things are going to improve dramatically. This is not a documented view; it is much more hyperbole and hope than it is anything else, but it is out there. This very complacency feeds the elongation of the cycle, at least in part. It is the Scarlett O'Hara syndrome: "I'll worry about it tomorrow"; "not to worry". That is a distinct negative, so I think you will need the shock effects of these other events to turn things around.

(Applause)

1990 CASUALTY LOSS RESERVE SEMINAR

3A/3B: BASIC TECHNIQUES II

Faculty

Andrew J. Rapoport
Worker's Compensation Reinsurance Association

Ralph L. Rathjen
Tillinghast/Towers Perrin

MR. RAPOPORT: This is Basic Techniques II. We are going to be covering these topics in this afternoon's session: Evaluating the current year, analysis of loss development factors, other methods besides the loss development that we looked at this morning, accounts and averages, and --
(Inaudible)
-- long term results.

MR. RAPOPORT: Before I begin --
(Inaudible)
-- any questions that you thought of over the lunch or other things at this morning's sessions? Good. Make it easier now.

When we last left off we had loss ratios coming out of three different methods, pay development method, incurred development accounts and averages, and as I mentioned, if there are not significant changes in closure rates, accounts and averages tends to be very close to the pay development method.

Now, all three methods here, as the note says, indicates an improved ratio for the most recent year. The question is, is that a legitimate improvement? Can we go in and be heroes and tell people that we are doing much better in 1989 or do we have to be concerned and do we have to actually adjust what comes out of our methods?

There are several things that may cause an improved loss ratio. Five of them are listed here. Higher rates; essentially if a loss ratio is your losses divided by your premiums, then if you have a higher premium rate you are collecting more money on the denominator, so you're going to end up with a smaller ratio.

Lower frequency; when we looked at that exhibit we saw that in some years we may actually have a much lower claim count than other years, and that's a possible indication, or lower severity.

In other words, although we're getting the same number of claims, either there is better safety factors, change in benefits or some other reason that the average size claim is lower.

A couple of other reasons, slower claim payment. 1989, the most recent year, only has one evaluation point.
(Inaudible)
And if there is a slower pay out during that year when you apply in old factors, factors that are based on a regular size payment, you're only applying it to a smaller portion. You'll see what happens when we look at it a little closer. You'll get a lower result.

Less adequate case reserves. Ralph mentioned this morning that when we use the incurred method, we are using the estimates for case reserves. So, we're making an estimate based on estimates. It's assuming that the people making those estimates are using the same set of rules and objectives as they have in the past. If

suddenly then they change their rules and we don't know about it, it's like comparing apples and oranges. Something is different out there --
(Inaudible)
-- than was there before. And as a result --
(Inaudible)
-- applying the same old method, we're going to get a different result.

Now, of these five, which do you think would actually be the cause of a lower ratio and which do you think might actually just cause a distortion?

SPEAKER: (Inaudible)

MR. RAPOPORT: That's exactly right. (Inaudible)
It's exactly correct. If you've got higher rates, that really does affect your ratio. That should give you a different method if you have a lower frequency and lower severity. All three of those are really affecting the individual point of the data.
The slower claims --
(Inaudible)
-- affects the ratios.

The ratio may be slightly different because of that. You'll see those claims later because they're slower and as a result your ratios are different. Similarly, less adequate space reserves now, they'll show up later.

So, the first three -- actually if you had evidence on your reports that you had a lower indication and you could find one of these three to be true, that would be a good indication to go with the lower number.

How do you check if there's a change in rate level? Probably the easiest way is to go and find out if the company has actually changed the rates on you. But if you didn't have anybody to ask and you had certain data available, you could get it --
(Inaudible)
-- by certainly look at the --
(Inaudible)
-- results.

So, in this case, we pulled out the earn premium from the past seven years. We looked at the insured --
(Inaudible)
-- remember Ralph talked to you about --
(Inaudible)
-- year is essentially a year's worth of coverage --
(Inaudible)
We take the division of that and we get the cost per car year.

So, in other words, if we have a
(Inaudible)

-- we should see these costs going up right here. And as a result, we've done that calculation and what we can see is in 1984 there was a slight increase, in 1986 and 1987, substantial increases in 1985, pretty big increases in '88 and '89. There's only one catch here. Well, there may be more, but there's one that I --
(Inaudible)

In looking at this, besides the fact that your rates may have gone up, there's one other thing that could cause it.
(Inaudible)

(Slide)

Another source of a big change could be the change in mix of business. In other words, if somebody -- you decided that you want to write a lot more high risk auto drivers, you may end up reflecting more premium per driver. That's a change in mix of business.

So, then, if you see a pattern like this where you definitely know that your average size premium is different, you've got to go find out is it due to rate changes or is it due to some change in mix of business. To find mix of business changes, you may have to ask your underwriting department or if you're computer system is good, look a little closer at your type of business. Some of it may be easier to stop, such as what state it's in. Some of it may be somewhat harder.

(Slide)

Another thing that we're going to be looking at today --
(Inaudible)
-- what's causing that most recent --
(Inaudible)
-- changes, frequency analysis. Well, we talked in the last method about claim counts and severity, frequency is very close to claim counts. It is essentially looking at your claim counts and dividing by the number of cars. So, in one case if you were looking at pure claim counts, it could go up because there's more cars out there.

Frequency may stay the same, you just may have more business. But if you're looking at frequency, you will see claim counts per car and you can tell if your business is improving or not.

In this case, we've listed the insured car years, they should match the prior exhibit, and the number of reported claims. I think earlier there was a question in the first session about whether there were --
(Inaudible)
-- claims, paid claims. I have talked to one of the sources on the data, they should probably be --
(Inaudible)

When we do the division of each one of these periods by what's the car years, for example, we would -- we'll do '83, which has 100 which makes it easy. 1,432 claims divided by 100 is 14.3. Similarly, you look here in 48 months, 2,832 divided by 100 is 28.3.

So, we do those types of divisions and then we can see comparing the different years how is the frequency. The ultimate frequency here, I believe, used the projections of the claim counts to an ultimate number because if we just took these numbers, there are different ages. But we projected them to an alternate and developed this listing here.

So, what do we see? We see a slight decrease, almost the same in 1984. We see a 13 percent increase in claim counts in '85, decreases in '86 and '87, almost level in '88. A big increase in 1989. That's somewhat interesting because we've got a loss ratio increase that year, too, but it sure looks like we're getting a lot more claims.

We also look at the first year comps here. We can see in 1985 there was a substantial increase in the number of claims. It's possible there may have been, as we talked about, a catastrophe that may have caused a higher number of accidents.

(Slide)

Yes?

QUESTION: (Inaudible)

MR. RAPOPORT: On the second part? Yeah. I believe if you did not get a copy of the part II numbers there are some here that we could pass along. Are there other questions on frequency? Very well.

Besides looking at frequency, we look at the next piece which is the severity. Are there changes in the average size claim? Now, to calculate the average size claim, we list -- we take our list of alternate claim counts and we take the amount of -- we list our pay losses and we have our incurred development. These are -- I'm sorry. These are the developed ultimate losses from each of the three methods. And in this case, I believe we only have one method that gives us alternate claim counts so we're using that in all three.

We divide our ultimate loss dollars by our ultimate claim counts and that gives us a series of averages. Now, in all three of them we have somewhat -- we have a fairly similar pattern. Eight to ten percent increases the first year, small increase in '84, a substantial increase in '85 and '86, a small increase in '88, a decrease in '89.

So, one, we know there's more claims out there and we know that the average size is a lot smaller. So, it would seem to indicate perhaps that our improvement in loss ratio may be due to the fact that we're making smaller settlements or maybe that there has been some improvement in outside factors. For example, seat belt laws and whatever that may be bringing down the size of losses.

On the other hand, the fact that the claim counts are going up perhaps means we're paying a lot of new types of claims that are smaller that we didn't have to pay before. And perhaps because we're settling those claims better, the few that might develop ultimately bringing down the ratio.

Has there been a change in the rate at which claims close? Now, this happens to deal with the speed with which claims have been reported to the company are settled and closed out. So, in this case we take a graph of the number of claims and we put them closed by age of development.

It's somewhat hard for me to compare here, but I believe we just simply take the number of claims closed divided by the number that have been reported and --
(Inaudible)
But case by case we do that and we get a series of factors showing how many claims reported have been closed by a certain period of time.

A couple of things, you see by 36 months, three years, we've got about 90 percent of the claims closed out. So, in the remaining few years there's a few, but not all that many. Now, what's going on with our data? At 12 months we've got numbers here, you see the first four are in their 20s, but in the second to most recent three years, there was a significantly higher closure.

Again, you need to go to the claims department, you need to find out why are the claims higher. Is it a different type of claim or is it a new policy going on that you're closing them out sooner? Basically, we look at these type of things and raise questions and then we go and ask. In the following years, the numbers seem to be fairly stable in the '70s, year '90, et cetera.

QUESTION: (Inaudible)

MR. RAPOPORT: I think you notice -- as I was putting it down I noticed that too, I believe you're correct. In this case you'd use a calculated ultimate number here and you divide each column by the ultimate and that would give you the percents. So, to some extent these percents are partially also developed based on that ultimate estimate of claim counts. That's a different version of a closed ratio --
(Inaudible)

(Slide)

Has the adequacy --
(Inaudible)
-- changed. We talked about the alternative reserve method which actually uses the estimate of the case reserves, projects an incurred number --
(Inaudible)
-- and then measures how that changes over time.

Now, in this case, what we do is we take the outstanding case reserves and we make a triangle of those over time and the open claims in terms of just those that have reserves on them. We do the division and we can take a look at the reserve adequacy. Now, what we're actually look at is the average size of open case reserve. When we have -- that's funny here -- a number 12 months. '87 looks very big. And perhaps '85 looks sort of smaller.

But, again, something strange happened in 1987 that sent the claims and the claim average way up. Perhaps we had this very low claim count here and it may be do to some reporting problem, maybe some internal data problem. This almost looks like a data problem to me. Maybe someone typed the number wrong. Maybe we really should have 593 instead of 293.

But, again, when you see things that jump off the page, ask the question. When you're applying the methods, the method is blind and you --
(Inaudible)
-- just like everything else. So, it's important to do these additional analysis, additional investigations, to look into the data.

(Slide)

This is a graph of those averages that we just looked at. And it's pretty easy to see in the picture that, you know, 1987 looks a little high at 12 months. This was --
(Inaudible)
-- and it would look like except for '87, it looks like a fairly smooth change.

(Slide)

I'm not sure exactly --
(Inaudible)
-- again pay close attention to the activities of the claims department. If a claims department may have a policy change and sometimes if it's in response, it may be partially offset by what the actuary does. They may actually keep their loss ratios similar to what they have been in the past and that may offset changes.

(Slide)

Again, if there's any questions along the way, please feel free to ask.

The estimated -- this exhibit shows you -- is going to show you the effect of a tail factor. Now, we talked in the first half about a tail factor being the estimate of what happens after all the data. In our case we have data going out 84 months, that's 7 years. But oftentimes all the claims are still not settled. And something -- there may be some effect and that should be filled in to all the more recent years.

So, how, number one, we list the incurred dollars to date? We show the factors that we used to develop them and we show the age to ultimate factors. The estimated ultimate then is applying 1 times 3. These are a little sideways, but if you remember, you multiply age times age to get age to ultimate factors. So, 1 times 1.01 yields 1.01 here, 1.01 times this 1.01 yields 1.002. 1.002 times 1.004 yields this 1.006, et cetera and we get an age to ultimate.

We then apply that times our original incurred to give us our ultimate losses. The premium is not listed here, but we've calculated the loss ratios. We also indicate the reserves, which is the ultimate minus the paid.

QUESTION: (Inaudible)

MR. RAPOPORT: Well, you probably -- let's see if I can get one that's slightly off here. I think when you multiply numbers very close to one, you --
(Inaudible)
-- almost the same result. When you got down to about this column here, 1.006 times 1.062, I think you would see that one would not quite --
(Inaudible)
-- multiplication.

QUESTION: (Inaudible)

MR. RAPOPORT: Yeah. Don't add them if you're doing them yourself. Be sure to multiply them. You'll see they'll be pretty close.

Now, what happens when we change this factor? In this version we are assuming that there's no -- I can't reach that high. In this version we're assuming that there's no development after 1983; that's actually an assumption we are making. In the second version we are adding a 2 percent factor. We are saying even after 7 years there's going to be 2 percent more losses --
(Inaudible)
So, all of the factors are basically about 2 percent higher --
(Inaudible)

And, again, for small numbers, it looks like we're just adding. I think when you finally get down near the bottom -(Inaudible) -- seem like it's a little bit bigger than just that multiplier. But all of these factors then are increased --
(Inaudible)
-- compared to 1.017, 1.067 compared to --
(Inaudible)
That 2 percent tail factor affects all years

We then did an estimate ultimate number that is about --
(Inaudible)
-- 873 compared to 1.02 and 812. And the loss ratio, it turns our that's about one percentile, 59 compared to 58. We're dividing these new losses by the same premium and the net effect is about one percent increase in loss ratio.

The reserves are 27, 2718 -(Inaudible)
They go up to --
(Inaudible)
If you have your calculators handy, I believe the change between this number and number should be the same as between this number and that number. So, we basically just added about $2 million. The note at the bottom, the net increase is a 7 percent increase in the reserve --
(Inaudible)
-- because the reserves are not as large as --
(Inaudible)
-- curve, a 2 percent --
(Inaudible)
-- incurred produced a 7 percent change --
(Inaudible)

So, it's very important when using these type of procedures to look at close at what you are estimating for that previous year. Questions?

(Slide)

The last thing I'm going to show you before I turn it over to Ralph is another --
(Inaudible)
-- thing to look at. What we have taken here are the loss development factors for the paid --
(Inaudible)
-- there's this much paid in '89, you multiply it by 3.175 and you get an ultimate --
(Inaudible)

Now, the mathematical technique of this is that you take the one divided by that factor and you get a series -- this is actually converted from factors to percents. Essentially, you get a series of percents, 95, 91, 87, 57, down to 31 percent that represent percent that has been paid to date. So, if we say that we're going to need three times more ultimate reserves than we

have paid to date, that essentially means we're saying about one-third reserves have been paid to date, about 31 percent.

In this case we talk about report period. This essentially means how many years since the beginning of the policy. At the end of '89, 1989, it's one year old. At the end of '89, 1989, '88, it's two years old. So, we have basically report year -
(Inaudible)
-- and to calculate the percent here there's --
(Inaudible)
slightly rounded, that's pretty close. We look at -- this breaks down how much is left, how much has been paid to date and this shows how much has been paid during each period.

So, let's take a look for a second here. If we have 57 percent paid at the end of two years and 31 percent paid at the end of one and 57 minus 31 gives us 26, and that's how much is paid during the second year. In this case these are actual subtractions. This is --
(Inaudible)

And so what we have then is the pay out pattern. Indications from our reserve estimates are that this companies pays about 31 percent of its losses in the first year on a given year's policies, 26 percent in the second year, 14 percent in the third year, 9 in the fourth, et cetera.

Now, again, you go and talk to other people in the company who may have some knowledge about the business. Does this pay out pattern make sense? There's another way to check if the loss development if our loss reserve estimate makes sense, because if we're getting a pay out pattern that doesn't work --
(Inaudible)
-- then we need to revise the loss reserves. So, it's another way to help verify which of your estimates looks most reasonable.

(Slide)

The loss ratio --
(Inaudible)
-- has to do with the fact that you may have smaller years and you want to be careful about multiplying. We talked about how a two percent tail change affects all years combined. So, in this case, again we start with -- we list the year premium by year.

However, in this case, we listed the incurred losses on an incremental axis. These are the incurred losses that we saw at 12 months. These are the incurred losses that we saw a change during the next 12 months. If we took our primary exhibits and showed incurred to date --
(Inaudible)
-- subtractions, and we're showing the incurred during each period.

We take those incurred and we make the division by the premium and we get a series of factors. So, in effect, we are sort of saying this part of the loss ratio we see in 12 months, this part of the loss ratio in the next 12 months, this part of the loss ratio we see during the third 12 months.

And, again, we have our own techniques, averages. Just take the average of all of these number or point average where we're looking at the most recent four years and experience, and in this case we --
(Inaudible)
We made some selections. It appears the selections we made was to take essentially the straight average in all cases. There was not a significant difference except in the first year.

And in order to produce our different --
(Inaudible)
I haven't used this method very much. So, we start with the annual factor of .1 and we add that up here, .001 plus .001 is .002, .002 and .002 is .004, 4 and 6 is 10, 10 and 17 is 27, 27 and 80 is 107, 107 and 484 is 591. In this method because we're talking about additive method, we add these different factors together.

So, what we have then is a series of ratios that indicate how much loss as a percent of premium should still be coming in. That particular year --
(Inaudible)

QUESTION: You're assuming some -(Inaudible)
-- rate adequacy through time -(Inaudible)
that you're writing to, say, a fixed loss ratio of say 60 percent or 70 percent in this method. If you had significant changes in rate adequacy in this incremental method, your premium should perhaps be adjusted to a common rate level basis.

(Slide)

MR. RAPOPORT: Again, we start with our earned premium paid to date, our incurred to date, we convert --
(Inaudible)
-- loss ratio, which is column three divided by column one. And we take our loss ratio developments from the last page. We list those by the appropriate years. And we add those together, so this is just a straight additAnd hene. can see --
(Inaudible)
-- at the top, 69.9 plus .1 is 62.9. I'll skip down a little, 53.7 and 2.7, 56.2. So, we simply say this is how much we currently --
(Inaudible)
-- incurred to date. This is how much we think will come in between now and eternity and these are our ultimate losses.

We then have an alternate loss ratio. It's not quite shown, but essentially you would take --
(Inaudible)
-- times your premium to get ultimate loss and subtract out what has been paid to date and you get your indicated --
(Inaudible)

(Slide)

We're now going to attempt to use a frequency and severity to predict the ultimate losses. On this exhibit we list the frequency per car year where we've seen it. We have an ultimate frequency, except we haven't quite listed the 1989 ultimate.

We have an average from the prior years of 28.4 of all our prior ultimate frequencies and a four point average of 28.3. Our trend on the linear trend and --
(Inaudible)
-- indicate about 26.2 frequency. So, the actuary that reviewed this took a look at these, took a look at the trend -
(Inaudible)
-- slightly in between 27.3 as a selected frequency number.

We then compare -- in the course of running the trends you do a projection look at all years. We take a comparison of those actual numbers from up here, the ultimate frequencies. We look at the originals. And these are -- the trends actually product a formula. You can plug in the numbers --
(Inaudible)
The details of that are done by models and I'm not touching on that in this exhibit. Indicating a series of what the model indicates would be the factors or what would be the ultimate frequencies.

(Slide)

And when we do the comparison of that with the actual exhibit, I believe this is the linear exhibit, linear because it comes out to be a straight line. You can see that the trend in there indicate the dollars decrease. It's difficult to say definitely. There's sort of one big number, 1985, and I'd be a little suspicious of that one. There does seem --
(Inaudible)
But that's the indication there.

(Slide)

Using the frequency and severity to predict the ultimate losses. We've listed here the alternate averages here, again except for 1989, of all the prior years. We use a trend, both linear and exponentially to fit and try to come up with a number for the ultimate average severity. And again we get a formula that we can plug in to generate those. It's the same basic technique that we use on the frequency side.

(Slide)

Looking at the graph there on the --
(Inaudible)
-- severity actually looks pretty well behaved on this and you can see where the projections have come out. Now, remember on both of these, this is sort of going one step beyond your prior estimates. It's assuming you've done a reasonable job by subjecting all your prior years and you know you need some extra help looking at the most recent years. You're relying -- you're essentially, I think, ignoring this 12 month data which you have for '89, so you say if the trends from the prior years --
(Inaudible)
-- for 1989. And it sort of says in the 12 months there --
(Inaudible)

Reserve estimates using frequency and severity. Again, we list the --
(Inaudible)
-- prior years. We list our ultimate frequencies and our ultimate severities. If you have an ultimate frequency, which is the claim count per car year, and you have an ultimate severity, which is the average cost per claim, and you have the number of car years, then you multiply them all together and you get losses. Maybe it sounds a little complicated, but it's --
(Inaudible)

Cars times claims per car year indicate number of claims times loss cost per claim, claims drops off, you get loss dollars and that's what was done here. And you get another projection of ultimate losses. You subtract out the payments as we're doing each time and we end up with the reserves.

(Slide)

QUESTION: (Inaudible)

MR. RAPOPORT: Pure premium as opposed to premium. Premium is what you charge for insurance, it's all the money that you take in. Pure premium is the loss cost, in this case one car per year. It's essentially the portion of the premium that goes only for losses. So, you measure this part and it excludes all the expenses here. The insured car years is what we start with. Again, we take a look at the incurred losses during the first 12 months and we make a calculation of the pure premium -(Inaudible)

In this case it's the losses divided by the number of cars. So, we're getting a figure of how much loss, how much we're paying out in loss, are we incurring loss --
(Inaudible)

We also take a look, we can do the same thing with the ultimate losses. For the number of cars that were out there that were covered, we're saying this is how much money we will ultimately

pay during those years. That implied that you're getting these numbers per car year.

So, in our case we're looking at pure premium. If our reserve estimates are right, we have a pretty steady increase -- (Inaudible)
And, again, we look at the exhibits, is that consistent with what we know about the business?

I'm going to touch upon tail factors once again. As we mentioned this morning, we're not going to go into any great depth on tail factors, but we're going to at least revisit them for a time.

(Slide)

We have data here that's quite extensive. We have development through 84 months and the data is relatively stable. We're reviewing a total of 7 accident years for our analysis. But for the moment, let's assume we had to roll back the clock to 1987, December 31, 1987. You would no longer have the benefit of these two last diagonals that we have as of year end 1989. And if you were looking solely at incurred development you would not know just from looking at the development triangle that we had development of 60 months to 84 months went from 10,268,000 to 10,292,000.

Often when you are looking at information you will not have an extensive enough history to definitively decide that you've reached a tail factor position of one. The extreme example, of course, would be going back to earlier years, say as of year end '85. You have only these six values. And if at 36 months you decide 10 million on an incurred basis was adequate, you could be missing your ultimate value by a significant amount.

The concern for tail factors is more pronounced in pay development where we have payments say for 36 months of 7,300,000. That increases significantly through 84 months at 9.7 million and we still at least based on incurred information expect --
(Inaudible)
-- basis.

So, that -- we're trying to give you an idea of the importance of tail factors and to recognize that the data you're reviewing may be limited. You may not have an entire picture as to what is going to happen out beyond where the data stops. And to address that, we need to determine tail factors. And we're going to talk a little bit about paid tail factors. And if you recall this morning, the pay development analysis used the paid to incurred ratio at 84 months or 10,292,000 ratio to be paid at 9.7 million resulted in a tail factor of 1.025.

We could look at earlier valuations and determine a tail factor, for instance, at 60 months for payments at 60 months to an open

basis or ratio pay at 60 months -- I'm sorry, pay incurred at 60 months, paid at 60 months. It provides --
(Inaudible)
-- indication, which would imply a tail factor of 1.128 at 60 month paid data.

Use of those two different scenarios will give you different estimates as far as your projections are concerned. The first half of this exhibit, we are reproducing the estimates we had this morning using the 1.055 tail factor. And these factors are tied to what was shown this morning. We have an indicated reserve of 35.2 million.

If we go back to the other scenario of selecting the paid to incurred values of --
(Inaudible)
-- 72 and 60 months and then continue with the incremental age to age or --
(Inaudible)
-- factor that we derived this morning, take a cumulative product and derive the estimated ultimate, our indicated reserve will drop 35.2 million to 33 million. This again iterates how important the tail factors are in deriving reserve estimates. Your answer is very sensitive to your use of tail factors.

If we have limited data, what are our other options for determining tail factors? I believe I'm missing a slide, but I want to bring out a few of the possible alternatives you can use for development tail factors.

In this instance we know we have data that represents automobile liability. We may know more about this automobile liability. We may know that it represents information from a particular state. There may be outside sources that we can use, industry data, ISO or other sources that will give us some idea on what additional pay development we might expect on 84 months or for that matter on the incurred --
(Inaudible)
We can use outside industry data to try to, so to speak, fill in that missing piece.

The other -- I guess you can either use rate making data which might go back beyond, say, 84 months if you're looking at ISO or you may want to look at industry data and you --
(Inaudible)
-- annual statement data which will give you a longer history. But the tail factor decision is very critical in --
(Inaudible)
--- your end result.

(Slide)

The other area that we'd like to cover today is what's known as completing the square and monitoring the results. And

what we've done in this instance is taken the -- we start with the --
(Inaudible)
-- this morning. And we use the selected age to age factors that were derived by --
(Inaudible)
-- individual averages and based on judgments --
(Inaudible)
-- selections as far as the age to age component factor --
(Inaudible)

Using these factors we can, so to speak, compute the square. For instance, if we believe that we'll have 5 and half points redundant on the 1983 accident year beyond 84 months, we believe then that this 9.7 million will ultimate be 10.3 million.

For 1984 accident year we expect that 10.5 million to increase by 3 percent to a value of 10.9 million and then to 84 months we ultimately expect that to increase another 5 and a half percent for an ultimate of 11.5 million. We can complete this process, at 60 months, 11.5 million, we expect that to grow to 12.2 million and 12.6 and ultimately 13.3 million.

What this is going to provide us is the -- our scenario of the future if you will. This is the way we believe this paid loss development triangle will complete itself. In terms of monitoring of results, it's going to be very helpful if we review what experience we have indicated for a particular year. For instance, these are cumulative values and these are incremental values shown in the lower portion of this exhibit. If we sum this -- the --
(Inaudible)
-- for all periods, this will provide us what we expect as payments during the 1990 calendar year. You may say as of certain points of time, for instance June 30th, you may want to compare your actual payments to what you have expected to be paid by way of the paid development method. This, of course, being a full year of payments, but you can decide whether or not you're ahead or behind schedule.

It's sort of what I might refer to as an early warning system, that if you've paid, say, 80 percent of what you expect to be paid for the full year through six months, you're probably going to have a --
(Inaudible)
-- using this method --
(Inaudible)
-- ultimate won't increase.

You could continue this and also calculate what we expect to be paid in 1991, but with another year of data, you'll probably want to go back to the review of averages, review of loss development factors and come up with a pattern. But this is one way of monitoring results. You need to acknowledge that losses

should be paid, but there's a decay to payment pattern of losses. So, for most years you expect a greater proportion of your losses to be paid in the first six months than in your last six months in the year because you have a natural progression of payments and decay of payments.

I think that concludes my remarks on --
(Inaudible)
-- square. We could -- on one other exhibit we show a similar calculation on an incurred basis.

(Slide)

Again, here we've assumed no development beyond 84 months. But we again go through a similar procedure where we're completing this triangle data into the future with the assumptions we've made based on our earlier incurred analysis. And, again, the last item here represents the expected incurred amounts during calendar year 1990. Again, we can gleam some information as to where we are headed on an interim basis and monitor those results.

Any questions?

QUESTION: (Inaudible)

MR. RAPOPORT: At what time -(Inaudible)
-- 1990?

QUESTION: (Inaudible)

MR. RATHJEN: Are you asking if we could go back and compare the methods from prior years to say how good is the method compared to what has actually happened?

QUESTION: (Inaudible)

MR. RAPOPORT: Yes. That would be reasonable to do as well as you've --
(Inaudible)

MR. RATHJEN: That's called hindsight analysis and actually, again, I believe it's covered in one of the intermediate or one of the other sessions. But it's a common technique and it's used precisely for what you've described. It's a method of checking prior years methods. Has this method worked in the past? If you know that you've got the incurred method and every time you've ever run it, it has always come out high, then you run it on hindsight data from other years and it indicates much higher than what actually came in, you may adjust accordingly. It's a good check on using --
(Inaudible)
-- method.

QUESTION: (Inaudible)

QUESTION: I have a question --
(Inaudible)
-- ultimate? We're just stopping at each point along the way, right? This would be the same --
(Inaudible)
-- factor?

MR. RAPOPORT: Right. If you go back to this morning's handout you'll see where this is incurred -- we selected this factor for incurred development between --
(Inaudible)
We selected this factor between 60 and 72 months.

QUESTION: (Inaudible)
We just ended up multiplying that data times 1.004 times 1.001 all the way out.

MR. RAPOPORT: Right.

QUESTION: (Inaudible)

MR. RAPOPORT: Right. This morning we were interested in the ultimate amount. What we are trying to do here is say, okay, we determined ultimate amount. This is where we stand as --
(Inaudible)
-- '89. How do we expect that to develop in the future as of each year end?

MR. RATHJEN: If you did go back to the exhibits, you should see -- they should be the same numbers?

QUESTION: The ultimates should be?

MR. RATHJEN: Yes. I know on exhibit 2.5 where we recopied them, the ultimates were the same.

QUESTION: (Inaudible)

MR. RATHJEN: Right. It's like, I guess, having a road map and here's where you're going and here's where you should be at each stop along the way. That's a good way, also, again for monitoring. Experiences tells you in the next couple of years if you're going to have problems later on. Are we already below or above where we thought we would be in 12 months?

MR. RAPOPORT: Are there any other questions either on the materials I've just presented now or --
(Inaudible)

MR. RATHJEN: I think, in summary, basically in this morning we presented the basic technique which is looking at a triangle of

data, looking at different groups of numbers and seeing how they develop over time. We showed you how actuaries measure that development, how they deal with aggregating or averaging different numbers together to summarize it.

This afternoon we've tried to focus on different ways to check that. We talked about the fact that when you look at the data, one, you get results that are different depending upon what method, but there's also the basic assumption that nothing is changing. In the real world something is always changing and these additional methods that we talked about looking at frequency, looking at severity, looking at pure premium, looking at loss ratios, looking at pay out patterns, all of these help verify whether or not the methods are working correctly.

SPEAKER: (Inaudible)
We'll adjourn.

MR. RAPOPORT: Thank you.

1990 CASUALTY LOSS RESERVE SEMINAR

3A/3B: BASIC TECHNIQUES II

EXHIBITS

BASIC TECHNIQUES II

A. *What's going on in 1989?*

   1. *Has the frequency or severity changed?*

   2. *Has the rate at which claims close changed?*

   3. *Has the adequacy of case reserves changed?*

B. *Analysis of Loss Development Factors*

   1. *Sensitivity: How do the reserves change when the LDF's change?*

   2. *Payout patterns: LDF's in a different form.*

C. *What can you do when you don't have enough data in the first period or two to be comfortable with a multiplicative method?*

   1. *Loss ratio projections*
      - *ultimate = incurred to date + average historical point dev'l*

   2. *Using earned exposure data*
      - *frequency and severity*
      - *pure premium*

D. *Tail Factors*

E. *Monitoring Results - squaring the triangle*

EZ INSURANCE COMPANY

AUTOMOBILE LIABILITY

CURRENT YEAR ANALYSIS

The current year has about 40% of the total reserve dollars. All three of the methods are implying much better loss ratios for this period. Improvements can come from various sources:

1. *Rates are higher.*
2. *Frequency is lower.*
3. *Severity is lower.*

Better results would also appear to be true if:

1. *Claims were being processed or paid more slowly.*
2. *Case reserves were less adequate.*

However, in these last 2 instances, the experience is not really improving and the reserves would be understated. The next exhibits look at some ways of analyzing the data to check for these possibilities.

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AUTOMOBILE LIABILITY

HAS THERE BEEN A CHANGE IN RATE LEVEL ADEQUACY?

Accident Year	(1) Earned Premium (000)	(2) Insured Car Years (000)	(3) Average Premium (1)/(2)	(4) Change from Prior Year
1983	17,153	100	172	
1984	18,168	102	178	4%
1985	21,995	98	224	26%
1986	24,173	103	235	5%
1987	25,534	105	243	4%
1988	31,341	105	298	23%
1989	38,469	105	366	23%
	176,833			

Increases in average premium are primarily due to
- a change in the mix of business, or
- rate increases.

If the 23% increases in 1988 and 1989 are due to rate increases, then that would explain much of the improvement in the loss ratios.

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AUTOMOBILE LIABILITY

FREQUENCY ANALYSIS

Accident Year	Insured Car Years (000)	Cumulative Reported Claims ..... Development Stage in Months 12	24	36	48	60	72	84
1983	100	1,432	2,724	2,800	2,832	2,844	2,858	2,858
1984	102	1,428	2,772	2,850	2,866	2,870	2,888	
1985	98	1,710	3,032	3,086	3,094	3,110		
1986	103	1,358	2,780	2,990	3,000			
1987	105	1,210	2,518	2,656				
1988	105	1,488	2,604					
1989	105	1,604						

Accident Year	Frequency per 1000 Insured Car Years Development Stage in Months 12	24	36	48	60	Ultimate Frequency	Change in Freq
1983	14.3	27.2	28.0	28.3	28.4	28.6	
1984	14.0	27.2	27.9	28.1	28.1	28.3	-1%
1985	17.4	30.9	31.5	31.6	31.7	31.9	13%
1986	13.2	27.0	29.0	29.1		29.4	-8%
1987	11.5	24.0	25.3			25.7	-13%
1988	14.2	24.8				26.3	2%
1989	15.3					31.0	18%

Frequency has not been very stable. Have there been weather conditions or changes in laws or changes in the speed limit which would effect the number of claims?

The frequency for the first 12 months of 1987 is particularly low. Checking back, we see that the number of reported claims was down. Unusual items like this need to be investigated.

EZ INSURANCE COMPANY
AUTOMOBILE LIABILITY

SEVERITY ANALYSIS

Accident Year	Estimated Ultimate Claim Count	Estimated Ultimate Losses: Paid Loss	Incurred Development	Counts & Averages
1983	2,858	10,296	10,292	10,420
1984	2,888	11,496	11,261	11,584
1985	3,129	13,301	12,750	13,295
1986	3,030	15,560	14,499	15,768
1987	2,698	17,982	16,339	18,274
1988	2,763	19,573	17,548	20,178
1989	3,256	22,104	20,122	19,471

Accident Year	Estimated Ultimate Severity: Paid Loss Dev'l	Incurred Dev'l	Counts & Averages	Change in Severity: Paid Loss Dev'l	Incurred Dev'l	Counts & Averages
1983	3,602	3,601	3,646			
1984	3,981	3,899	4,011	10%	8%	10%
1985	4,251	4,075	4,249	7%	5%	6%
1986	5,135	4,785	5,204	21%	17%	22%
1987	6,665	6,056	6,773	30%	27%	30%
1988	7,084	6,351	7,303	6%	5%	8%
1989	6,789	6,180	5,980	-4%	-3%	-18%

There's no consistent pattern in severity.

We expect severity to increase because of inflation. Consequently, the decrease in 1989 is surprising. Frequency in 1989 was somewhat higher. Perhaps we're seeing more smaller claims. This would be a good question for the claims department.

EZ INSURANCE COMPANY
AUTOMOBILE LIABILITY

HAS THERE BEEN A CHANGE IN THE RATE AT WHICH CLAIMS CLOSE?

Accident Year	.....The Number of Claims Closed by Age of Development..... 12	24	36	48	60	72	84	ultimate
1983	658	2,250	2,585	2,687	2,745	2,802	2,824	2,858
1984	826	2,131	2,559	2,706	2,795	2,845		2,888
1985	782	2,308	2,738	2,957	3,049			3,129
1986	780	2,146	2,665	2,832				3,030
1987	917	1,980	2,368					2,698
1988	911	1,978						2,763
1989	1,106							3,256

The ultimate number of claims is based on the projection of reported claims.

Accident Year	.....Percentage of Claims Closed by Age of Development..... 12	24	36	48	60	72	84
1983	23%	79%	90%	94%	96%	98%	99%
1984	29%	74%	89%	94%	97%	99%	
1985	25%	74%	88%	95%	97%		
1986	26%	71%	88%	93%			
1987	34%	73%	88%				
1988	33%	72%					
1989	34%						

In the past few years, claims have been closing faster. This would imply that claims are being paid more rapidly, and that the paid loss development factors may be too high.

There are techniques that can be used to restructure the data to adjust for this change in the rate of closure. These are discussed in the Intermediate Sessions. Our interest here is simply to be aware of some of the factors which produce differences in the reserve estimates.

EZ INSURANCE COMPANY
AUTOMOBILE LIABILITY

HAS THE ADEQUACY OF THE CASE RESERVES CHANGED?

Accident Year	Outstanding Case Reserves - (000) omitted						
	12	24	36	48	60	72	84
1983	5,021	3,790	2,769	1,960	1,352	872	533
1984	5,557	4,176	2,936	1,987	1,245	742	
1985	6,328	4,664	3,200	2,051	1,189		
1986	6,974	4,968	3,251	1,955			
1987	7,635	5,274	3,367				
1988	8,376	5,604					
1989	9,599						

Accident Year	Open Claims						
	12	24	36	48	60	72	84
1983	774	474	215	145	99	56	34
1984	602	641	291	160	75	43	
1985	928	724	348	137	61		
1986	578	634	325	168			
1987	293	538	288				
1988	577	626					
1989	498						

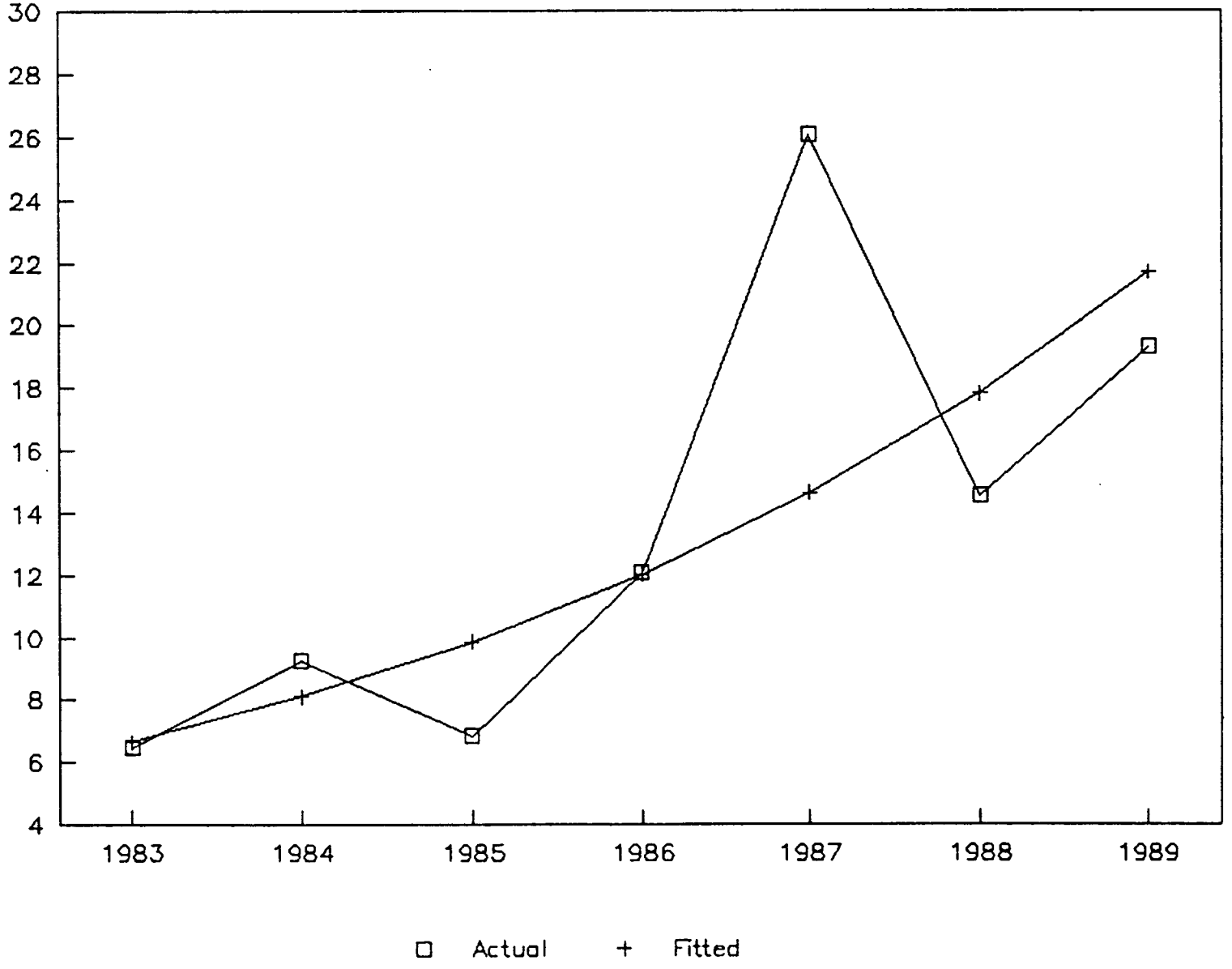
Accident Year	Average Case Reserve						
	12	24	36	48	60	72	84
1983	6,487	7,996	12,879	13,517	13,657	15,571	15,676
1984	9,231	6,515	10,089	12,419	16,600	17,256	
1985	6,819	6,442	9,195	14,971	19,492		
1986	12,066	7,836	10,003	11,637			
1987	26,058	9,803	11,691				
1988	14,516	8,952					
1989	19,275						

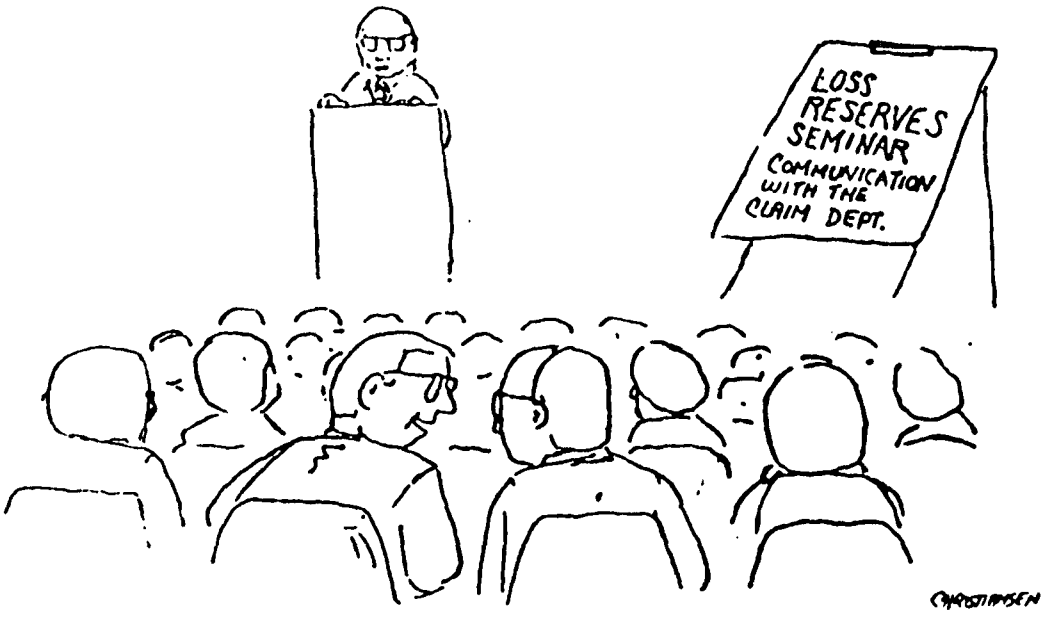
The first report of 1987 is so unusual that we immediately have problems in trying to use this information to draw any conclusions about 1989. There are further problems with 1985. In general, we expect the average reserve to increase because of inflation; a decrease is always unusual.

If the case reserves were less adequate in 1989, then greater development would be expected for that year. Use of historical Incurred LDF's would underestimate that development and lead to inadequate reserves. There are techniques for restating the data, but those are beyond the scope of this course.

AVERAGE CASE RESERVE

at age 12 months





"We always engage in a give-and-take with our claims department. They take down the reserves and we give them back in bulk."

Reprinted from the Actuarial Review.

EZ INSURANCE COMPANY
AUTOMOBILE LIABILITY

SENSITIVITY - HOW DO THE RESERVES CHANGE WHEN THE LDF'S CHANGE?

A small change in the LDFs can lead to a large change in the reserves. For example, EZ's incurred loss experience is available through 84 months. Suppose there is an additional 2% development after that.

ESTIMATING RESERVES USING INCURRED LOSS DEVELOPMENT

Accident Year	(1) Incurred to Date (000)	(2) ..Selected age-to-age	(3) LDF'S.. age-to-ultimate	(4) Estimated Ultimate (1)*(3)	(5) Loss Ratio	(6) Indicated Reserve (4)-Paid
1983	10,292	1.000	1.000	10,292	60%	533
1984	11,250	1.001	1.001	11,261	62%	753
1985	12,725	1.001	1.002	12,750	58%	1,214
1986	14,413	1.004	1.006	14,499	60%	2,041
1987	16,066	1.011	1.017	16,339	64%	3,640
1988	16,776	1.029	1.046	17,548	56%	6,376
1989	16,561	1.162	1.215	20,122	52%	13,160
	98,083			102,812	58%	27,718

THE EFFECT ON THE RESERVES OF A 2% CHANGE IN THE TAIL

Accident Year	(1) Incurred to Date (000)	(2) ..Selected age-to-age	(3) LDF'S.. age-to-ultimate	(4) Estimated Ultimate (1)*(3)	(5) Loss Ratio	(6) Indicated Reserve (4)-Paid
1983	10,292	1.020	1.020	10,498	61%	739
1984	11,250	1.001	1.021	11,486	63%	978
1985	12,725	1.001	1.022	13,005	59%	1,469
1986	14,413	1.004	1.026	14,788	61%	2,330
1987	16,066	1.011	1.037	16,660	65%	3,961
1988	16,776	1.029	1.067	17,900	57%	6,728
1989	16,561	1.162	1.240	20,536	53%	13,574
	98,083			104,873	59%	29,779

Reserves increased $2 million, which is 7% of the initial reserve estimate.

EZ INSURANCE COMPANY
AUTOMOBILE LIABILITY

PAYOUT PATTERNS

Accident Year	PAID LDF's	% paid (1/LDF)	Report Period	Payout Pattern
			8 & later	5%
1983	1.055	95%	7	3%
1984	1.094	91%	6	5%
1985	1.153	87%	5	7%
1986	1.249	80%	4	9%
1987	1.416	71%	3	14%
1988	1.752	57%	2	26%
1989	3.175	31%	1	31%
			total	100%

EZ INSURANCE COMPANY
AUTOMOBILE LIABILITY

For some lines of business, losses paid or incurred develop very slowly. For these lines, there is little data in the first one or two accident periods. Consequently, the LDF's for age 1 to age 2 are volatile, and the multiplicative methods give unstable answers. The EZ data will be used to illustrate an alternative additive methodology.

LOSS RATIO ADDITIVE PROJECTIONS

INCURRED LOSSES on an INCREMENTAL BASIS

Accident Year	Earned Premium (000)	Development Stage in Months 12	24	36	48	60	72	84
1983	17,153	8,382	1,399	329	109	49	12	12
1984	18,168	9,337	1,510	245	100	43	15	
1985	21,995	10,540	1,665	346	139	35		
1986	24,173	11,875	1,957	406	175			
1987	25,534	13,343	2,199	524				
1988	31,341	14,469	2,307					
1989	38,469	16,561						

INCURRED LOSS RATIOS - INCREMENTAL BASIS

Accident Year	Development Stage in Months 12	24	36	48	60	72	84
1983	0.489	0.082	0.019	0.006	0.003	0.001	0.001
1984	0.514	0.083	0.013	0.006	0.002	0.001	
1985	0.479	0.076	0.016	0.006	0.002		
1986	0.491	0.081	0.017	0.007			
1987	0.523	0.086	0.021				
1988	0.462	0.074					
1989	0.431						
Average	0.484	0.080	0.017	0.006	0.002	0.001	0.001
4 pt avg	0.476	0.080	0.017				
Selected	0.484	0.080	0.017	0.006	0.002	0.001	0.001
To Ult	0.591	0.107	0.027	0.010	0.004	0.002	0.001

EZ INSURANCE COMPANY
AUTOMOBILE LIABILITY

LOSS RATIO ADDITIVE PROJECTIONS

ESTIMATING RESERVES USING INCURRED ADDITIVE LOSS DEVELOPMENT

Accident Year	(1) Earned Premium (000)	(2) Paid to Date (000)	(3) Incurred to Date (000)
1983	17,153	9,759	10,292
1984	18,168	10,508	11,250
1985	21,995	11,536	12,725
1986	24,173	12,458	14,413
1987	25,534	12,699	16,066
1988	31,341	11,172	16,776
1989	38,469	6,962	16,561
	176,833	75,094	98,083

Accident Year	(4) Current Loss Ratio (3)/(1)	(5) Loss Ratio Development (Ex4;Pg1)	(6) Ultimate Loss Ratio (4)+(5)	(7) Indicated Reserve (000) (1)*(6)-(2)
1983	60.0%		60.0%	533
1984	61.9%	0.1%	62.0%	760
1985	57.9%	0.2%	58.1%	1,233
1986	59.6%	0.4%	60.0%	2,052
1987	62.9%	1.0%	63.9%	3,622
1988	53.5%	2.7%	56.2%	6,450
1989	43.1%	10.7%	53.8%	13,715
			71.5%	28,366

EZ INSURANCE COMPANY
AUTOMOBILE LIABILITY

USING FREQUENCY AND SEVERITY TO PREDICT ULTIMATE LOSSES

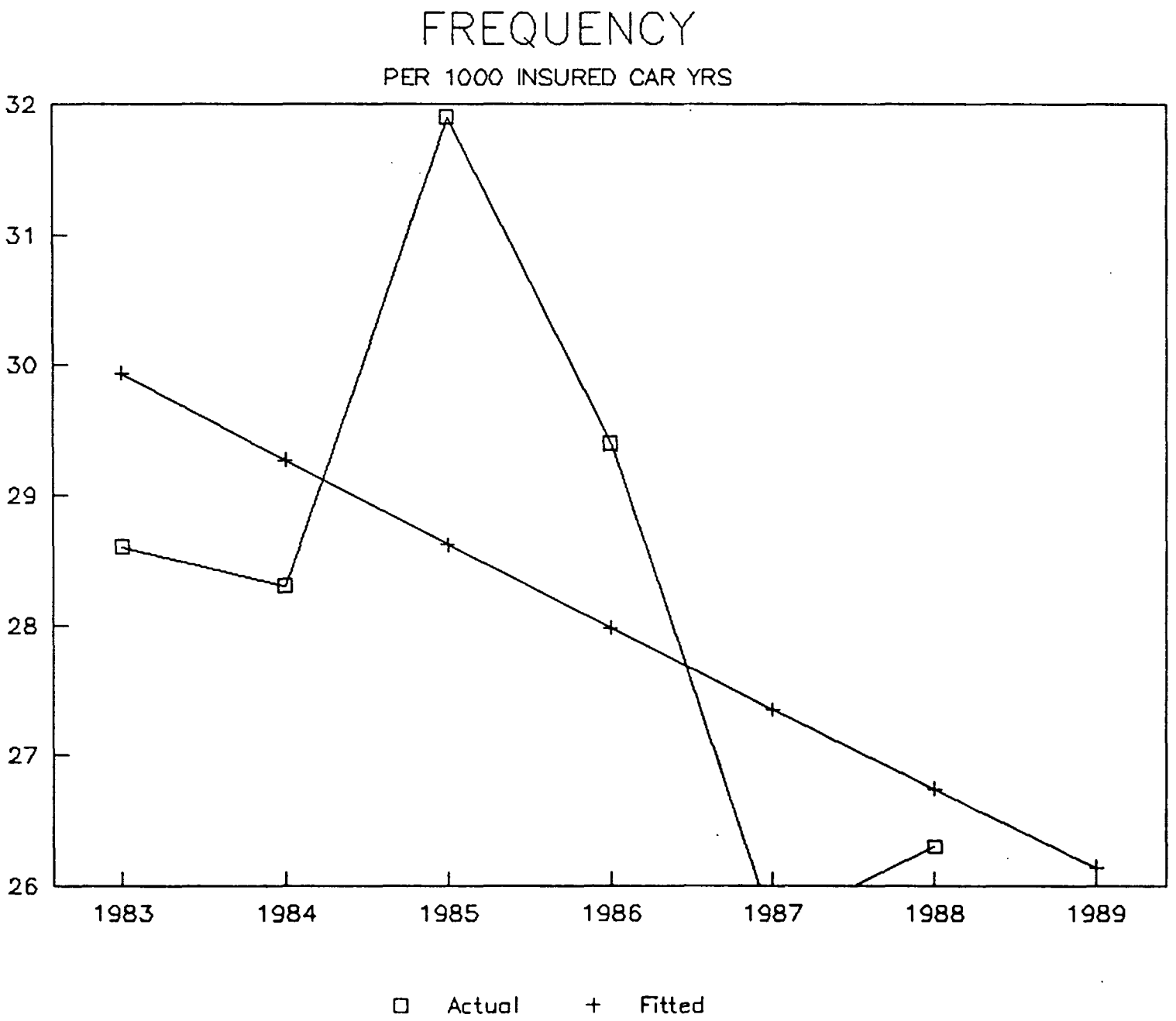
If the current year had very few reported losses, the actuary could project reported claims for earlier years, calculate ultimate frequencies for these years, and then estimate the current year frequency based on the historical results.

Accident Year	Frequency per 1000 Insured Car Years Development Stage in Months 12	24	36	48	60	Ultimate Frequency
1983	14.3	27.2	28.0	28.3	28.4	28.6
1984	14.0	27.2	27.9	28.1	28.1	28.3
1985	17.4	30.9	31.5	31.6	31.7	31.9
1986	13.2	27.0	29.0	29.1		29.4
1987	11.5	24.0	25.3			25.7
1988	14.2	24.8				26.3
1989	15.3					?
Average						28.4
4 Pt Avg						28.3
Linear Trend projection 1989						26.2
Exponential Trend projection 1989						26.2
Selected Frequency for 1989						27.3

Linear Trend	
slope	
intercept	
r squared	0.000
projected	26.2
Exponential Trend	
% chng	0.0%
intercept	1
r squared	0.000
projected	26.2

Comparison of Actual & Fitted Values

	original	linear	exponential
1983	28.6	29.9	29.9
1984	28.3	29.3	29.3
1985	31.9	28.7	28.6
1986	29.4	28.1	28.0
1987	25.7	27.4	27.4
1988	26.3	26.8	26.8
1989	?	26.2	26.2


FREQUENCY
PER 1000 INSURED CAR YRS
32
31
30
29
28
27
26
1983
1984
1985
1986
1987
1988
1989
Actual
Fitted

EZ INSURANCE COMPANY
AUTOMOBILE LIABILITY

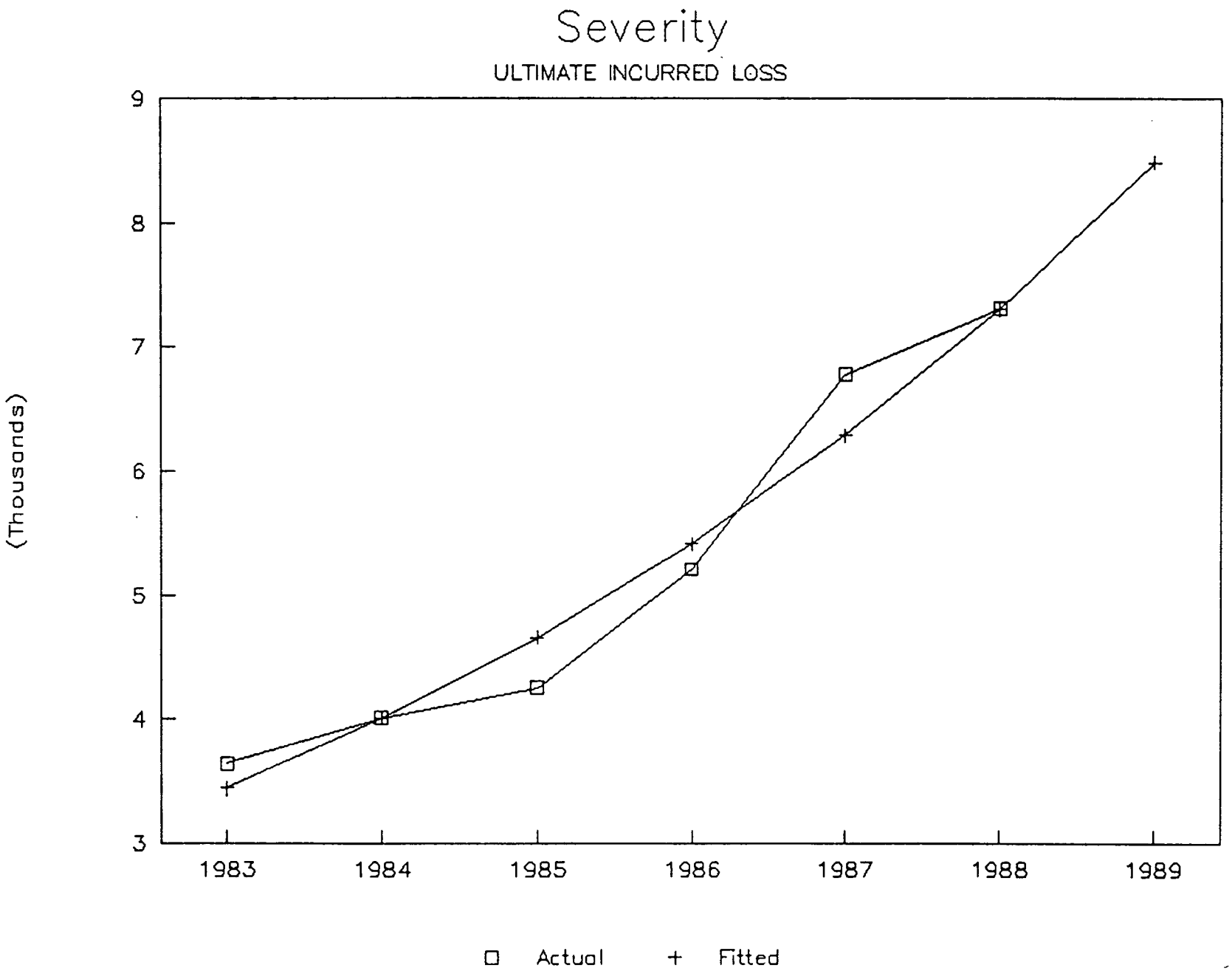
USING FREQUENCY AND SEVERITY TO PREDICT ULTIMATE LOSSES

Severity for the current year can also be estimated via a projection of the estimated ultimate values.

Accident Year	Ultimate Severity Inc Loss	Comparison with Fitted Values Linear Trend	Exponential Trend
1983	3,646	3,231	3,450
1984	4,011	4,018	4,009
1985	4,249	4,804	4,657
1986	5,204	5,591	5,410
1987	6,773	6,377	6,286
1988	7,303	7,164	7,302
1989	?	7,950	8,484
average	5,198	Linear Trend	Exponential Trend
4 pt avg	5,882	slope 786	% chng 16.2%
		intercept 2,445	intercept 2,970
		r squared 0.931	r squared 0.955
		projected 7,950	projected 8,484
selected severity 1989		8,484	

The projections of ultimate frequency and severity can be used to estimate ultimate losses for the current year.

Accident Year	(1) Insured Car Years (000)	(2) Ultimate Frequency (Ex5;pg1)	(3) Ultimate Severity (Ex5;pg2)	(4) Ultimate Losses (000) (2)*(3)	(5) Loss Reserves (4)-PAID
1983	100	28.6	3,646	10,420	661
1984	102	28.3	4,011	11,584	1,076
1985	98	31.9	4,249	13,295	1,759
1986	103	29.4	5,204	15,768	3,310
1987	105	25.7	6,773	18,274	5,575
1988	105	26.3	7,303	20,178	9,006
1989	105	27.3	8,484	24,309	17,347
				113,829	38,735


Severity
ULTIMATE INCURRED LOSS
(Thousands)
9
8
7
6
5
4
3
1983
1984
1985
1986
1987
1988
1989
Actual
Fitted

EZ INSURANCE COMPANY
AUTOMOBILE LIABILITY

PURE PREMIUM

PURE PREMIUM is the loss cost for 1 car for 1 year.

Accident Year	Insured Car Year (000)	Incurred Loss 12 month	Pure Premium 12 month	Ultimate Incurred Loss	Ultimate Pure Premium
1983	100	8,382	84	10,292	103
1984	102	9,337	92	11,261	110
1985	98	10,540	108	12,750	130
1986	103	11,875	115	14,499	141
1987	105	13,343	127	16,339	156
1988	105	14,469	138	17,548	167
1989	105	16,561	158	20,122	192

EZ INSURANCE COMPANY
AUTOMOBILE LIABILITY

TAIL FACTORS

1. Is the best estimate the current case reserve?

2. Is there more data available, say, for example, from last year's report?

3. Are there external data sources such as industry data?

4. For paid LDF's, would the results be more reliable if paid data was converted to incurred at, say, 60 months instead of 84? This alternative is illustrated in Exhibit 7.

Tail factors are discussed in more detail in Techniques III.

EZ INSURANCE COMPANY
AUTOMOBILE LIABILITY

TAIL FACTORS for PAID LDF's

CUMULATIVE PAID LOSSES (000 omitted)

accident year	Development Stage in Months						
	12	24	36	48	60	72	84
1983	3,361	5,991	7,341	8,259	8,916	9,408	9,759
1984	3,780	6,671	8,156	9,205	9,990	10,508	
1985	4,212	7,541	9,351	10,639	11,536		
1986	4,901	8,864	10,987	12,458			
1987	5,708	10,268	12,699				
1988	6,093	11,172					
1989	6,962						

CUMULATIVE INCURRED LOSSES (000 omitted)
(paid losses + reserves for reported claims)

accident year	Development Stage in Months						
	12	24	36	48	60	72	84
1983	8,382	9,781	10,110	10,219	10,268	10,280	10,292
1984	9,337	10,847	11,092	11,192	11,235	11,250	
1985	10,540	12,205	12,551	12,690	12,725		
1986	11,875	13,832	14,238	14,413			
1987	13,343	15,542	16,066				
1988	14,469	16,776					
1989	16,561						

RATIO OF INCURRED TO PAID LOSSES

accident year	Development Stage in Months						
	12	24	36	48	60	72	84
1983	2.494	1.633	1.377	1.237	1.152	1.093	1.055
1984	2.470	1.626	1.360	1.216	1.125	1.071	
1985	2.502	1.618	1.342	1.193	1.103		
1986	2.423	1.560	1.296	1.157			
1987	2.338	1.514	1.265				
1988	2.375	1.502					
1989	2.379						
average	2.426	1.575	1.328	1.201	1.126	1.082	1.055

EZ INSURANCE COMPANY
AUTOMOBILE LIABILITY

TAIL FACTORS for PAID LDF's

Accident Year	(1) Earned Premium (000)	(2) Paid to Date (000)	(3) Selected Factors age-age	(4) Factors age-ult	(5) Estimated Ultimate (2)*(4)	(6) Loss Ratio (5)/(1)	(7) Indicated Reserve (5)-(2)
1983	17,153	9,759		1.055	10,296	60%	537
1984	18,168	10,508	1.037	1.094	11,496	63%	988
1985	21,995	11,536	1.054	1.153	13,301	60%	1,765
1986	24,173	12,458	1.083	1.249	15,560	64%	3,102
1987	25,534	12,699	1.134	1.416	17,982	70%	5,283
1988	31,341	11,172	1.237	1.752	19,573	62%	8,401
1989	38,469	6,962	1.812	3.175	22,104	57%	15,142
	176,833	75,094			110,312	62%	35,218

Accident Year	(1) Earned Premium (000)	(2) Paid to Date (000)	(3) Selected Factors age-age	(4) Factors age-ult	(5) Estimated Ultimate (2)*(4)	(6) Loss Ratio (5)/(1)	(7) Indicated Reserve (5)-(2)
1983	17,153	9,759		1.055	10,296	60%	537
1984	18,168	10,508		1.082	11,366	63%	858
1985	21,995	11,536		1.126	12,995	59%	1,459
1986	24,173	12,458	1.083	1.220	15,202	63%	2,744
1987	25,534	12,699	1.134	1.383	17,568	69%	4,869
1988	31,341	11,172	1.237	1.712	19,123	61%	7,951
1989	38,469	6,962	1.812	3.102	21,595	56%	14,633
	176,833	75,094			108,143	61%	33,049

EZ INSURANCE COMPANY
AUTOMOBILE LIABILITY

MONITORING RESULTS - COMPLETING THE SQUARE

CUMULATIVE PAID LOSSES (000 omitted)

Accident Year	Development Stage in Months 12	24	36	48	60	72	84
1983	3,361	5,991	7,341	8,259	8,916	9,408	9,759
1984	3,780	6,671	8,156	9,205	9,990	10,508	
1985	4,212	7,541	9,351	10,639	11,536		
1986	4,901	8,864	10,987	12,458			
1987	5,708	10,268	12,699				
1988	6,093	11,172					
1989	6,962						

Accident Year	Selected Age to Age Development Factors 12-24	24-36	36-48	48-60	60-72	72-84	84-ult
1983							1.055
1984						1.037	1.055
1985					1.054	1.037	1.055
1986				1.083	1.054	1.037	1.055
1987			1.134	1.083	1.054	1.037	1.055
1988		1.237	1.134	1.083	1.054	1.037	1.055
1989	1.812	1.237	1.134	1.083	1.054	1.037	1.055

Accident Year	Expected Cumulative Paid Losses 12	24	36	48	60	72	84	Ultimate Losses
1983								10,296
1984							10,896	11,496
1985						12,158	12,608	13,301
1986					13,495	14,223	14,749	15,560
1987				14,397	15,596	16,437	17,044	17,982
1988			13,823	15,671	16,976	17,892	18,553	19,573
1989		12,617	15,610	17,698	19,171	20,205	20,952	22,104
								110,312

Accident Year	Expected Incremental Paid Losses 12-24	24-36	36-48	48-60	60-72	72-84	84-ult
1983							537
1984						388	599
1985					622	449	693
1986				1,037	728	526	811
1987			1,698	1,199	841	608	937
1988		2,651	1,848	1,305	916	661	1,020
1989	5,655	2,994	2,087	1,474	1,034	747	1,152
	5,655	5,645	5,633	5,014	4,140	3,380	5,751

EZ INSURANCE COMPANY
AUTOMOBILE LIABILITY

MONITORING RESULTS - COMPLETING THE SQUARE

CUMULATIVE INCURRED LOSSES (000 omitted)

Accident Year	Development Stage in Months 12	24	36	48	60	72	84
1983	8,382	9,781	10,110	10,219	10,268	10,280	10,292
1984	9,337	10,847	11,092	11,192	11,235	11,250	
1985	10,540	12,205	12,551	12,690	12,725		
1986	11,875	13,832	14,238	14,413			
1987	13,343	15,542	16,066				
1988	14,469	16,776					
1989	16,561						

Accident Year	Selected Age to Age Development Factors 12-24	24-36	36-48	48-60	60-72	72-84	84-ult
1983							1.000
1984						1.001	1.000
1985					1.001	1.001	1.000
1986				1.004	1.001	1.001	1.000
1987			1.011	1.004	1.001	1.001	1.000
1988		1.029	1.011	1.004	1.001	1.001	1.000
1989	1.162	1.029	1.011	1.004	1.001	1.001	1.000

Accident Year	Expected Cumulative Incurred Losses 12	24	36	48	60	72	84	Ultimate Losses
1983								10,292
1984							11,261	11,261
1985						12,738	12,750	12,750
1986					14,471	14,485	14,499	14,499
1987				16,242	16,307	16,323	16,339	16,339
1988			17,254	17,443	17,513	17,530	17,548	17,548
1989		19,237	19,785	20,002	20,081	20,102	20,122	20,122
								======
								102,812

Accident Year	Expected Incremental Incurred Losses 12-24	24-36	36-48	48-60	60-72	72-84	84-ult
1983							0
1984						11	0
1985					13	13	0
1986				58	14	14	0
1987			176	65	16	16	0
1988		478	189	70	17	18	0
1989	2,676	549	216	80	20	20	0
	======	======	======	======	======	======	======
	2,676	1,027	581	272	81	92	0

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1990 CASUALTY LOSS RESERVE SEMINAR

3C/7B: LOSS ADJUSTMENT EXPENSES

Moderator

Glenn A. Evans
Coopers & Lybrand

Panel

James F. Cerone
Milliman & Robertson, Inc.

Wendy A. Johnson
Coopers & Lybrand

John D. Zicarelli
Argonaut Insurance Company

MR. EVANS: -- can be taken to minimize future cost increases. First up is Jim Cerone. Jim is a senior consultant with Milliman and Robertson. He directs their claims consultant practice out of Chicago. Jim has more than 30 years of management and technical claims experience. He has worked as a consultant since 1981. Before that he worked in various insurance company claims department positions. He has a BS in business administration from Vallenova University and an MBA from the University of Chicago.

Jim?

MR. CERONE: Thank you. Good afternoon. The perspective that I'll give to start the session is a claim based perspective. It's not actuarial. Controlling defense costs is something that insurance companies, when I worked for them, and insurance companies and self-insurers that I now consult to, have been grappling with ever since I was in the business.

What I hope to do today, is to set the foundation for what will follow by describing some of the ways that claim departments of insurance companies, and self-insurers attempt to attack the issue of controlling allocated defense costs.

Many insurance companies, if they want to give you a quick opinion as to why allocated legal defense costs are so high, will simply bash lawyers and tell you that their rates are too high. Insurance companies believing that lawyers are the problem or a substantial part of the problem then attack the issue of higher rates and the fact that lawyers charge too much money, by attacking ways to control the hourly rates.

Companies will use a flat rate per case. They'll agree with outside defense firms that for a stipulated amount, say, $500 or $1,000 per case they will send all of their legal defense work in a particular area to the law firm and the law firms will handle it at a flat rate per case. This is a very attractive, appealing approach when you first put pencil to paper and figure out the number of lawsuits and multiply it times the flat rate per case. You can demonstrate that you're going to save a lot of money.

Some companies also approach it on an annual retainer basis where they'll agree up front that the law firm will get a certain amount of money each month and in return for that the attorneys will provide all of the services they normally were providing at an hourly rate. And, again, when you sit down with pencil and paper, it'll make a very attractive appeal to the CEO or the CFO of the company and it will often buy for chief claim officers at least 12 to 18 months of freedom from being hit over the head because they said they were going to lower the cost of legal defense.

Other companies will simply go out believing that they can lower their allocated legal defense costs by shopping around for a

lower hourly rate. They'll look for cut rate lawyers. They don't want to get locked into any flat rate per case. They don't want to get locked into an annual retainer. They may find that those are difficult to negotiate, so they'll simply shop for lower rates.

Another approach that I think is clearly bizarre, is when some insurance companies will ask the defense lawyers how they can lower the amount of money they pay to them. I know of some companies that regularly bring in their defense lawyers from around the country, sit down, confess to the defense attorneys that they're paying too much to defend their cases and ask the lawyers what the company can do to pay them less money.

I think that's a great topic for a dinner party, but I can't imagine me asking the client or having the client ask me what I could do to charge him less money to do work.

Part of the problem with these approaches is that when you're trying to squeeze the lawyer economically you're going to worry about the quality of defense that he's giving to you. If he's committed to a flat rate per case, it seems to me that the way he's going to try and maximize his profit margin is to do as little work on the case as possible and that may cause you some problems with the quality of defense. You have to worry about it.

Another problem with some of the approaches is monitoring to determine if you're really winning or losing and also trying to define just exactly what winning or losing means as you approach the various techniques that I talked about. Does winning mean that you drop your legal defense costs, but your loss side is going up because the case isn't being handled as vigorously?

There's a question on how to measure that. Clearly there is an effect on losses if you try to squeeze out any profit incentive for a lawyer to develop defenses. You'll find that your cases in many instances are not developing defenses, they're just sitting in your file cabinets until the eve of trial and then there's a rush call to settle the case.

The other issue is, are the savings that you're seeing in the first 12 to 18 months real or are you simply deferring, until a later date, the amount of money you're going to pay to defend those cases?

(Break in tape)

-- insured tort claims. The rates are not a problem.

Some other approaches that operate: Firms will use staff counsel.

(Slide)

In studies that we've done in terms of staff counsel, it proves to be an effective way to lower your costs. The best estimate that we've come up with in studies is that when you figure in the cost of the attorney's salary, the support staff salary, the rent, overhead, furniture, fixture and equipment, the cost works out to about $40 an hour, which is a pretty good savings per hour as opposed to outside counsel.

It's an effective approach to lowering allocated defense costs, but the considerations have to be whether or not the company or the self-insured has a geographic concentration of lawsuits so that you can keep the staff attorney busy defending cases. You run into issues as to the level of competency. Typically the staff counsel, for a salary that's going to produce a $40 an hour full cost for operation, is likely to be less experienced and less effective than the attorneys that you'll find in the major tort defense firms.

I'm not saying that there's a problem with using staff counsel, I'm just saying that it's not simply plugging in somebody that works at a much lower base salary and shutting off your need for outside attorneys. Normally that means that you've got to have, in that geographic concentration of claims, enough routine cases to make it pay off.

Those are the problems and those are the approaches. We're repeating this session tomorrow so it won't have as great an impact as it does today, but the key to controlling allocated legal expenses, some people have called this the magic bullet, quick fix, the end of the litigious society, a panacea of tort reform, it's none of those. The real key to controlling allocated legal expense is next.

(Slide)

It's a blank slide.

(Laughter)

It's a blank slide. It didn't malfunction. I don't believe that there's any quick fix to controlling legal expenses. The guiding principles that I believe works; that we recommend to clients are very simple. The first one is that you hire lawyers to do only the work which requires a lawyer's services, that you do not use lawyers to do work which may be done by claim people. Now, that seems very simple.

But I guarantee you in the majority of litigated files in the offices from where you come, if you work for a self-insured operation or you work for an insurance company, I guarantee you that you'll see lawyers doing things in those claim files that could be done by nonlawyers. Probably by staff claim people or independent adjusters. Secondly, the other guiding principle is to control the number of lawsuits.

(Slide)

The control of litigated cases and allocated expenses, I believe, is a step by step, tedious process. It begins prelitigation, before that lawsuit is filed. It next occurs when you make the initial assignment of the case for defense, then that there's an ongoing process during the pendency of the lawsuit that would be described as the case management. And, finally, there's a verification of bills.

There are four things that can be done to control legal defense costs. The prelitigation strategy that companies ought to employ is as follows. We're excluding cases where the summons of complaint is your first notice of suit. We know that there are jurisdictions, I think New York City is an example, where when the client comes in and asks the attorney to represent them, that the lawyer there instead of sending a letter to the insurance company or to the defendant announcing that he represents a client, the first thing he'll do is to file a summons of complaint.

So, we're not talking about where the summons of complaint is the first notice. But the number of lawsuits can be controlled or ought to be controlled so that we are only taking a lawsuit on a case that has been reported to you, where you've had time to make a decision as to whether or not you want to pay any money on the case. And if you do want to pay something on a case, about how much do you want to pay.

And you should make that position of either denial or negotiation, up to an amount, known to the attorney. If at that point you get a lawsuit, those are good lawsuits. Those are the ones you ought to take. Those are lawsuits that are part of doing business and represent honest disputes with the plaintiff's attorney as to how much is owed, if anything.

But if you find that when the suit comes in after you've had the case in your office for six weeks, eight weeks or twelve weeks, and you read that file and you find that no decision has been made as to whether or not you owe it or if it has been made, no communication has been made of your position to the claimant's attorney. I think those are potentially avoidable lawsuits and some percent of those cases that of drift into litigation, can be avoided.

The second step, after you have worked on controlling the number of lawsuits that come in the front door, is to take a look at the initial assignment strategy that the claim people operate. For many companies, when the summons of complaint come in, you'll look in the file and you'll see a short handwritten memorandum where the claim person writes to the defense lawyer, "Attached is a copy of our file, the summons and complaint, kindly do the necessary."

Again, as a consultant, I would wish clients would tell me, "Kindly do the necessary. Just send me your bills as they come in." But they don't do that. They hold us to prices.

One of the things that we stress that ought to be done, and companies do do this, is to view the assignment letter to the attorney as the first point where claim people can take control of the strategy of that case. The letter should precise. It should cover all of the issues. It should tell the attorney, in a captioned paragraph way, what the coverages are. If there are no coverage questions, tell the attorney there are no coverage questions.

Explain to the attorney who the various parties in the litigation are, who the plaintiffs are, who the defendants are. If you've got multiple defendants, if you're dealing with commercial lines of business, you should tell the attorney who you insure and if it's someone other than the named insured, perhaps an additional insured, or someone coming in under the vendor's coverage, tell the attorneys that so you reduce his fret time in trying to figure out who is insured and who isn't insured.

You should give your understanding of the facts of the accident as you've developed it, your understanding of the damages as they've been alleged, the evaluation of what it is you want to do with that case. Do you want to pay it or do you want to deny it, or you're not sure and what do you (the Attorney) think it's worth? State precisely what additional work claim people will do in developing facts, negotiations and so forth.

The last thing should be what it is that you want the attorney to do; very specifically. It's not, "Kindly do the necessary." It's file an answer, file interrogatories, perhaps take depositions, file a cross complaint, join a third party defendant. All of these things you can tell a lawyer to do and you're not practicing law when you do it. You're managing the case and you're managing the responsibilities of your selfinsured fund or the policy of insurance.

The final thing you should do is, ask the attorney to read your letter, review the file and write back to you and tell you only those things in your letter with which he disagrees. If you don't do that, if you send a straight speed memo to the lawyer, what you'll get back, I guarantee you, will be at least four to eight pages of a letter that's going to feed back to you what you've just sent to him. You take control of the case by doing this as opposed to just sending it out there with a "Kindly do the necessary" note.

Now, during the pendency of a case and after you've set the strategy and the course of it, there are certain things that attorneys should do. Clearly attorneys should prepare and file pleadings and interrogatories. They should appear at trials and motions. They should take affirmative depositions, ones that

they order if you authorize it. The attorneys shouldn't necessarily have a free hand in scheduling depositions of anybody they want to.

I can remember when I was on the company side, an attorney was defending a taxi cab company in Los Angeles. A taxi cab collided with a train at a railroad crossing in Los Angeles because the taxi driver went through the red light. The one passenger was a seaman from England and he was killed in the car. The lawyer wanted to fly to London to take the deposition of the wife. I couldn't understand what the wife, who was in London at the time of the accident, was going to say about the accident. We already admitted liability and it was just a matter of settling up. We could have obtained information by interrogatories. He didn't go to London.

You should authorize the spending of the money to take depositions. Now, defending depositions if the other side is going to take the deposition of your insured, well, then clearly your lawyer has got to be there to defend it. There are things that attorneys need not do. You don't need a defense lawyer to investigate a case for you. You don't really need a defense lawyer to design strategies and tell you how to handle a case. You don't need the defense lawyer to, every 90 days, sit back in the office and provide you a periodic update and summary of the file. You don't need lawyers to tell you what the case is worth and you don't need lawyers to negotiate. Those are things that attorneys need not do.

The final piece of a strategy to control litigation will not necessarily save you money, but it's a good control function. This is to verify the bills as they come in. You ought to insist that the lawyer sending you bills set forth on that bill, in detail, the date and the nature of the services that were provided and how much time was charged. They should provide you with the individual identification, be it only the initials, of the particular person in that firm who provided those services.

That's important because unless you're working with a sole practitioner, there are people in law firms that have different hourly rates and you want to be sure that the bill sets forth who is doing the work. Is it the senior partner, a junior partner, a paralegal and so forth? And then make sure that you've got the right hourly rate charge. Then you should see a summary that provides a breakdown of the individual's hours and rates.

You can verify bills by looking in the file to see if there's evidence of the work performed. I know one company that probably goes to the greatest extreme that I've seen. On the claim person's running notes of how the file is going, they'll record, as many claim people do, the date and the gist of the conversation with a particular defense attorney.

In looking at these files, in addition to all of that, they also had 11:15-11:25 a.m. When asked "What does this mean?" They said, "Oh, that was the time that we spent on the phone talking to a lawyer. Now, when their bills come in, we'll check for that date to see how much time they charge us for the telephone conversation." Now, that's a checking that almost gets extreme, but it can be done to verify that the work was performed.

The lawyers ought to give to you, at any time that they change them, their published rates for everybody in the firm so that you can make sure that (a) you know what their rates are per hour, and (b) that they're adhering to those in the bills that they're sending to you. Finally, you should run an adding machine tape to check the hours and check the math that multiplies the hourly rates times the number of hours because there are errors to be found. It's very tedious, this saving of money.

But what is it worth? So, let's estimate the savings. For prelitigation, that's the notion of limiting those lawsuits only to those that you ought to get because you can't get the case settled for the amount of money that you want to pay, you take the number of avoidable lawsuits. In the studies we've done, the best estimate is that usually 10 to 20 percent of all the lawsuits are what we would characterize as avoidable lawsuits. Assume you're doing better than anybody. So, take 5 percent of the outstanding lawsuits that you have, multiply it times the average defense cost that you pay to close a lawsuit and that's the potential savings from doing a prompter job in taking a position on the handling of cases.

(Slide)

I talked about estimating the savings for the assignment letter, a very detailed letter. I talked about the fact that if you don't do it, typically the first communication you get from a defense lawyer is the four to eight page letter that will tell you what you just sent him. Looking at bills, they'll charge you at least one hour to send you that letter. I suggest that the potential savings from using a detailed assignment letter would be one hour times the number of new lawsuits you get times the average hourly rate.

(Slide)

Now, the things that we talked about during the pendency of a claim that you don't want the lawyer to do, these are best estimates and these are very conservative. If you find you're allowing the lawyer to investigate cases, maybe not necessarily going out and taking pictures of an intersection, but deciding that you ought to have pictures of the intersection, hiring an independent adjuster to take pictures of the intersection, reviewing the independent adjuster's report when it comes back and then putting a cover letter on it to send it to you at $85 an hour; that at the minimum, if the attorneys are directing and

deciding on investigation over the course of the two to three years that that case is in lawsuit, you ought to at least be able to save two hours per case.

If you're letting them design the strategies for you as opposed to reacting to the strategies that you suggest; if you let them take the lead, that's another two hours a case. If every 90 days or every six months you ask them to sit down and give you a summary of what the file is all about to satisfy your own internal reporting requirements, my best guess is that you're going to pay for four hours a case.

If you allow them to price cases, to write you a letter and tell you what they think the case is worth, that's probably two hours. And conservatively, if you let the attorney pick up his telephone and negotiate at $85 an hour instead of picking up your telephone and negotiating on your own, that's another two hours a case. So, on average, if you're not controlling the case and letting lawyers do things that you ought to do, it's 12 hours times the hourly rate times the number of lawsuits you have.

I think the bottom line is that you don't even have to do these estimates. I'd be shocked if anybody has a company where savings were not possible if you went in and you looked at these issues of prelitigation, assignment letters, and letting lawyers do things that you can do yourself. I say now to handle the cases promptly, send the explicit assignment letters, and take back the work from the lawyers. Do this and you will save legal exercise costs.

In a very practical way that's what we see as driving, from a claim perspective, the allocated expense problems. Now, I'll leave it to the other members of the panel to take it from here.

Thank you.

(Applause)

MR. EVANS: Next up is John Zicarelli. John is the senior vice president and chief actuary for the Argonaut Insurance Group. He has been working as an actuary now for more than 15 years. Before joining the Argonaut, he was with the St. Paul Companies. John has a PhD in math from the University of Minnesota. He's going to discuss the increase in the litigation and attorney involvement in workers compensation.

In his talk he's going to present data which demonstrates the problem, discuss the reserving approach used in his company and he'll describe the interaction between the claims department and the actuarial responses to the situation.

John?

MR. ZICARELLI: Amidst the many problems facing a workers compensation insurer (or self-insurer) these days, the problem of allocated loss expense has been somewhat submerged. It is closely related to the increasing involvement of litigation in this theoretically "no-fault" system. The size of this expense has been increasing rapidly both absolutely and as a percentage of total costs.

(Slide 1)

Let's begin our discussion of reserving for this cost by defining what we are talking about. Allocated Loss Adjustment Expense (ALAE) is the expense associated with a particular claim for defense, investigation, or arbitration. General industry practice is not to consider outside adjustor expense to be in this category, even if it can be directly associated with a particular claim file. There is some difference of opinion on the latter point, however.

(Slide 2)

ALAE on workers comp claims almost always occurs when either the compensability or benefit award is disputed by the claimant. Unfortunately, this seems to occur more often these days in part fanned by the proliferation of law firms who specialize in creating workers comp disputes. In some jurisdictions, labor unions encourage attorney involvement in all lost time claims.

There does not seem to be any definite relationship between benefit levels and ALAE. In high benefit states, there is more incentive for claimants to attempt to maximize generous permanent injury awards. So it is common to hire an attorney to explore all the administrative and judicial appeal processes towards this end. In low benefit states, a claimant often needs to make an exaggerated claim in order to get adequate compensation. This process is encouraged by the results obtained in the courts of many states.

In other words, the ALAE problem is very widespread!

The situation is exacerbated by a general lack of good data in the industry. Part of the problem is the rating bureaus do not capture ALAE data as part of the rating data base. So we do not know as much about industry experience in this area as we do about industry experience in this area as we do about the indemnity and medical benefits. The National Council on Compensation Insurance (NCCI), who acts as the rating bureau for about 35 states, is now looking at adding ALAE to their data base. The issues being raised are symptomatic of the general data problem. Companies do not agree on a definition of ALAE. Many companies have never set individual case reserves for ALAE, which would tend to constrain the NCCI to analyzing paid data alone. Discussions in my home state of California are fare more tentative than those going on at the Council. "We" are not sure whether there is any value in the data!

I have also observed political opposition towards collecting ALAE data for ratemaking purposes. Ironically, it seems that the trial lawyers don't want this information made public! After all, workers comp is a no fault system and there should be no need for litigation except when someone makes a mistake such as wrongfully denying benefits.

Finally, I have observed that workers comp ALAE shows more delayed development than the underlying benefits! I can think of a few reasons for this phenomenon. While there may be a lawyer involved on behalf of the claimant from day 1, it may take awhile for the situation to develop to the point that a defense attorney is required. Often, these cases are not immediately recognized. Also, for the less tangible types of losses, such as stress claims and latent occupational diseases, we observe both later initial reporting and a much higher involvement by attorneys. I suspect that these observations account for much of the "tail", but I have seen no published studies on this point (probably because there is little published data!)

This, then, is the setting in which we must attempt to quantify the liability for ALAE. So let's look at some data. Since this is the loss reserve seminar, we might as well look at a development triangle to begin with.

One popular way to look at ALAE experience is to compare it to the associated loss experience. The usual way to do this is to analyze the ratio of incurred (or paid) ALAE to loss. The data that I will use for illustration today is for one company in one state. The years identified are accident years.

(Slide 3)

Looking at this chart, one notices a few things. First, the ratios tend to get larger as you look down the columns. This is evidence of the point that ALAE is becoming a larger part of the total. Also notice that the numbers tend to get bigger as you move to the right. that the stuff has a long tail. The fact that the ratio is increasing means that ALAE is developing later than the underlying loss.

(Slide 3a)

Here is a graph of some of the data in the triangle. Here, the older accident years are represented by the longer lines. So it is fairly clear that both trends are consistently present in this data. One wonders where the most recent points are headed for!

However, a reasonable reserving method would be to apply some development factors to the current set of observations - and/or trend the more mature observations - to get "ultimate ALAE" to Loss ratios. Then you can base the ultimate liability for ALAE on your estimate of the loss liability. This method has some practical advantages. It is easy to explain, it is easy to

administer (say by an accountant or a computer), it corresponds to many pricing systems, and it gives management a gauge of what is happening to this cost.

On the other hand, one drawback of this method is that it uses case reserves. This particular set of data suffers from two changes in case reserving methods and a "clarification" of what expenses belong to ALAE during the past 4 years. I don't think these kind of problems are isolated to this company! My experience is that making case estimates for ALAE is quite difficult. Many companies use formula reserves for some or all of their case ALAE reserves rather than attempt to make individual estimates. The data you are looking at has a combination of formula and case methods.

(Slide 4 and 4a)

To deal with this problem, we could try looking at the ratio of paid ALAE to paid Loss. Here is the triangle, ... and the graph.

Here, the development component is much more pronounced than with the incurred. This is even more evidence of the tail - workers comp is known as a long tail line (for loss!). It appears that the older years level out and converge to some ratio. But one wonders (again) where the more recent years are headed. The convergence is not happening very rapidly. But one can imagine that there is a relatively consistent development pattern that could be applied to early observations of the ratio to get an estimate of ultimate.

Finally, we could forget about the relationship to loss and attempt to develop the ALAE experience in isolation. One could then recover the informational advantages of the ratios by computing them once you have the estimates. Or better yet, you could do it se4veral ways to look for consistency.

(Slide 5)

Here is what the paid ALAE link ratio triangle looks like. There are a few scattered ugly points, but things appear to be reasonably well behaved. At the bottom of the triangle, I have computed the arithmetic average of the ratios - and the extreme points.

(Slide 6 and 7)

Now look at this graph which shows results for the last seven years compared to the average. This graph has normalized each accident year so the amount paid in the first year of development equals 1. Although there is some scattering, the recent points seem to be following the pattern reasonably well which is encouraging. To keep things in perspective, I also graphed the ALAE pattern with the loss payout pattern using the same method. This certainly demonstrates the long-tail property I have been talking about!

In summary, I have illustrated an approach to reserving for ALAE which has the following steps:

1. Find out what is happening in the environment which is generating the numbers.

2. Develop a statistic that provides useful information about the trends.

3. Use several projection methods, concentrating on those which minimize the impact of known data distortions.

Good luck!

(Applause)

MR. EVANS: Finally this morning Wendy Johnson is going to talk to us about unallocated loss adjustment expense. She's going to present the conceptual approach to estimating unallocated adjustment expenses using highly flexible procedure. Technique is based directly on claims reporting and closure patterns, and it permits the actuary to take into direct consideration changes in claims operations.

Wendy is a senior consultant in Coopers Casualty Actuarial Consulting Group in San Francisco. She has got a varied background. She has worked for a number of years now as a property casualty actuary. She has worked as a pension actuary. She has worked as an insurance broker. She has a bachelors degree in math from Oxidental College.

Wendy?

MS. JOHNSON: Can you hear me? Good. I have a tendency to be sort of soft spoken, so if I start dwindling away, speak up. You can start the first slide.

(Slide)

Unlike Jim and John, I'm going to talk about a specific technique for estimating unallocated loss adjustment expenses, the expenses that can't be attached to specific claims. And as John defined them, you're talking about claims personnel, travel and salary expenses, company overhead, space allocations, that kind of thing. It's pretty hard to say those expenses should be attributable to specific claims. Most of you are probably familiar with the standard technique for estimating unallocated loss adjustment expenses, which is to compare the annual payments on a calendar year basis to the annual calendar year payment for losses.

Ratios are always a good approach for looking at any kind of expense -- comparing the one to another presumably more stable base of expense or to some base that you have better sense of how

it develops over time. But it's also good to have an estimation method that's based directly on the costs themselves. Then you can probably identify more clearly where the expenses are actually coming from. That's what this particular method does.

I want to go to the first real slide.

(Slide)

Unfortunately these are probably not too much more readable than John's, I'm afraid, but this is the basic data that the method uses and I'll try to explain what it is for those of you who can't see it in the back.

The first column is the calendar year paid unallocated loss adjustment expenses by year and it goes from $9,459,000 in the year 1977 to $281,593,000 in 1986. So, the costs per year for this particular company have been going up considerably.

Also, the numbers of open claims at the end of each year, which is in the second column of the exhibit, have been going up considerably. There are 50 at the end of the first year and 436 at the end of 1986. This particular example comes from a medical malpractice insurer that was started in the late 1970s in response to the medical malpractice liability insurance crisis. That explains the rapidly increasing numbers of both open claims and amounts of expense dollars.

The third column of the exhibit is the number of claims that were open during a particular calendar year. I was working in this particular example with an assumption that a claim cost twice as much to work with in the year that it was opened as it did later on in its life span as an existing file. This seemed to make sense from the data I was working with, but other assumptions might work better for other bodies of data.

For example, you might want to say that a claim cost twice as much to work with in the year it was opened as it did in subsequent years until the year it was closed, when again it might cost twice as much to work with as it did in the middle years.

When I say it costs twice as much to work with, you have to consider that being inflation-adjusted dollars. If a claim is going to be open say for ten years it's obviously going to cost more to work with in the tenth year than it did in the first year, just because of normal salary increases. So, maybe units of labor is a better term than dollar units.

The fourth column of the exhibit is what I call a weighted number of open claims and there I'm just applying my assumption that a claim costs twice as much to work with in the year that it is opened as it does in subsequent years. That is, I work with double the number of claims that were in their first year of having been open.

Then the fifth column of the exhibit is just the expense per weighted open claim. So, it's just the first column divided by the fourth column. You can see that for this particular company the expenses are going up at a pretty rapid rate, $135 per open claim the first year and $503 per open claim in 1986, the last year in the exhibit. That works out to be an average rate of increase of 17.4 percent, which is pretty steep.

But that's what this data looked like. Right off you get some benefit, I think, from having looked the data this way. You might say per year, gee, our claims costs are going up at 17.4 percent, why is that? Is our overhead that much? Are we paying our claims people that much more? What else is going on that's causing it to be that much?

The last column of the exhibit is just an exponential fit to the previous column and then I'm estimating a projected value for 1987 of $595 per weighted open claim using that exponential curve.

Go on to the next one.

(Slide)

If you're going to figure that it's going to cost $595 to work with a weighted open claim in 1987, the first thing you're going to want to know is how many weighted open claims there are going to be in 1987 and subsequent years. This exhibit shows a calculation of that. What I did was I took the claim reporting pattern and the claim closure pattern that was typical of this company and extrapolated out the number of claims that we could expect them to have open at the end of each of the next ten years or so, or actually considerably more years than that.

To do that I needed to say how many claims do we think are going to be opened each year and how many claims do we think are going to be closed each year, and then the difference, of course, is the change in the number that are open at the end of each year. So, that's this exhibit.

(Slide)

And the following slide is just a continuation of the exhibit to show the rest of the years until we would expect that all of the claims from the years 1986 and prior have been closed. It goes out to 1998.

(Slide)

This exhibit shows the calculation of the associated outstanding liability if you assume that each weighted open claim is going to cost $595 in 1987 to work with and run that 17.4 percent expense trend out into the future, so that it's going to cost an amazing $3,474 to work with a weighted open claim in 1998. If this is,

in fact, the case you have an outstanding liability of $1,490,000 as of the end of 1986 in order to adjust all of the claims from 1986 and prior. Those adjustment activities will run until 1998.

The next one.

(Slide)

This is an example of how you might use the method to adjust some of your assumptions about claims costs and see what the impact on your actual outstanding liability might be. Here I've assumed that the company is going to manage to control the rapid acceleration in its cost of working with its open claims. I'm assuming that the company is going to bring the rate of increase down from 17.4 percent per year to only 5 percent. So, that by 1998 it's only going to cost about $1,000 to work with a claim instead of about $3,500. So, it makes a big difference.

It also makes a big difference in the outstanding liability associated with the claims. Instead of about $1.5 million it's something less than $1.2 million. It doesn't make as much difference, of course, in the outstanding liability as it does in the cost to work with the claim in 1998 because you will have many fewer open claims associated with 1986 and prior years by 1998.

This might be, of course, unduly optimistic if you've been running a 17.4 percent annual increase in claims. It's probably going to entail making some considerable changes to work the increase down to only 5 percent per year.

Go on to the next one.

(Slide)

Here I'm calculating the outstanding liability if we assume there are some changes in the environment that are going to cause fewer claims to be reported after the year of the accident instead of the number that were indicated by this company's claims reporting pattern. I assume that only half as many claims are going to be reported after the close of the accident year and ran out similar kinds of statistics.

This is again with the high 17.4 percent annual increase in the cost of working with the file. And this causes the outstanding liability to come down to about $1,050,000. Of course, you might have a combination of the two things where you have fewer late reported claims and also a lower rate of increase per year. That would bring, the outstanding liability down even further.

(Slide)

This is a calculation of the classical method of estimating unallocated loss adjustment expenses where you look at the ratio

of unallocated loss adjustment expenses paid in a year to the loss payments made in the same year. In this case, the ratios range from almost 55 percent to, oh, about 15 percent for this particular company. Something on the order of about 20 percent seems to be a reasonably stable ratio for this particular company.

The company had a loss reserve of about $12.5 million, and an IBNR reserve of about $7.5 million. What you do in a standard method is that you say that the full amount of the ratio is going to be applied to the IBNR reserve and half of the ratio is going to be applied to the reserve for outstanding claims that have already been reported. In this particular case the indicated reserve is about $2 million. So, it's actually a little bit higher than the result from the method that I'm describing here.

(Slide)

This is a variation on the method that I'm describing where you assume for a relatively small company that you might have relatively fixed overhead costs. You may have a claims department, say, of 20 people that are all adjusting the claims and if your book of business expands rapidly or decreases rapidly you're not going to necessarily let a significant number of those 20 people go or build up staff significantly.

You may take a longer time span to do that and, therefore, the overhead cost may be relatively fixed. You may have a single office building and you're not going to necessarily get a lot more rental space or decrease the amount of rental space just because you have a larger or smaller book of business and so forth.

Here I'm saying that the calendar year unallocated loss adjustment expense payments of $281,000 in 1986 are going to increase at a relatively steady rate that has to do with inflation of, say, rental values and salary costs. And I'm taking the number of open claims that are going to be there each of the subsequent years and dividing them between the claims that are associated with 1986 and prior and the newly reported claims.

We can observe that a decreasing proportion of the claims in any one year, the claims that are open at the end of any one year, are associated with 1986 and prior. And an increasing proportion of them are associated with the newly incurred claims. Just divide the costs according to the number of claims that are associated with the 1986 and prior injuries.

This results in a very low unallocated loss adjustment expense reserve of only about $700,000. That's because the rate of inflation in the overall unallocated loss adjustment expense costs is so low.

(Slide)

A question that may come up in the use of this method is how are you going to allocate the outstanding liability to various accident years. This shows an example of that kind of calculation. Basically what I'm saying here is of the 654 weighted open claims that are going to be existing at the end of 1987, 170 of those are going to be from accident year 1986. If you just allocate the loss reserve on the basis of the number of claims that are outstanding for each particular accident year and sum up the total, then you have the allocation to that accident year.

I think that's pretty much the end.

(Applause)

MR. EVANS: Okay. We've got a few minutes for questions if we have any.

QUESTION: (Inaudible)

MS. JOHNSON: The question was about the fact that the assumption that I'm making about the claims costs being extended out over a long period of time, over an annual period of time, is very different than the standard assumption that there's a cost associated with a claim at the time it's opened and a cost associated with a claim at the time it's closed. I'm assuming that there is a cost associated with the claim throughout its life of handling as a file and that that cost is actually double in the year the claim is open and then maybe runs even throughout the claims life.

My experience in working with claims departments is that, particularly for most kinds of liability and workers' comp claims, there really is an ongoing cost associated with handling a file. You may have correspondence back and forth between the claims department, the attorneys and things like that that are going to cause you to continually take out and put back that file. You know, you may have to give some response to the attorneys over some question. There's going to be work associated with the claim throughout its life and, therefore, there are going to be salary costs and associated other overhead costs associated with working with that claim.

My assumption that the cost is double the year the claim is opened is reasonably arbitrary. You might take a look at your own claims department and say, well, that doesn't seem to make sense for us in our particular line at all. Maybe it's three times the ongoing cost. Maybe it's only half the year it's opened. I would tend to think there are probably more costs the year something is opened just because you have to set everything up.

And then, also, there may be more costs associated with it the year it's closed. But you could work with this basic method and

choose any assumption that seems right for your particular situation. I think that's my main point. Costs do seem to be ongoing over the life of the file. As far as how they're allocated amongst the years, you can assume whatever seems best for your particular situation.

MR. EVANS: Other questions?

MS. JOHNSON: There's one over here.

MR. EVANS: Yes.

QUESTION: (Inaudible)

MR. CERONE: Well, you know, I'm not an actuary and at M&R we have to -- I have to abide by the rule that I don't talk about ratios and so forth. That's a particular ratio that as a claim person has never made a lot of sense to me. If you choose to measure me by the ratio of allocated expenses to losses and I can get you to agree to measure me only by that, I can be a hero because I'll just pay a lot of money in losses. But if someone here wants to explain the dynamics of ratios and so forth, they can do it.

The practical piece that I could suggest to you, I think you gave the illustration of whether or not a company handling liable and slander claims is likely to have more allocated defense costs than maybe personal lines automobile carrier. I think the answer is clearly yes. I think the majority of those cases are going to be in litigation and drive up costs where in the personal lines auto, that's not the case. That's my opinion.

MR. ZICARELLI: I'll basically endorse that, too. It's very much a line of business issue, you know. Products liability obviously has more defense costs associated with it than your normal premises liability or the slip and fall type cases. Within workers comp, I also find that it's a jurisdiction issue and that some places have higher ratios than others.

One of the reasons I picked one state from my illustrations was to try to at least simplify that part of it. But we look at it and have looked at in each state and find that there is some variation, although the trends seem to be going on quite broadly, although at different relative levels.

MS. RIVER: I'm Gail River from Tillinghast. I'm just coming at this from an actuarial perspective. I really don't have the claims background. I was wondering, Jim, now is this a method that really has been tested in insurance companies, you know, whether there's really savings if you're controlling the attorney the way you are?

I guess my first reaction when I heard you talk about this was it's going to be kind of discontinuous or, you know, you're going

to have the company doing something and the attorney doing something. And I'm wondering if everybody is going to understand what's going on and whether you're going to have a negotiation going on with a claims person who really isn't adequately up to speed on the depositions and, you know, kind of not necessarily having a better result in the end. I just don't know. Has it been tested or how does it work in practice?

MR. CERONE: In practice it does work. The various techniques and strategies that I was discussing do work in practice. They were employed, I think, with success in the companies where I worked. And now on the consulting side of it, it's a test, a standard that we use in trying to help clients develop ways to lower the amount of money they pay lawyers.

As consultants, we've had a chance to go in, test, demonstrate that these things are happening, issue a report with recommendations and projected savings and then monitor them over time against the historical values and demonstrate that the savings are possible. Clearly if they don't occur, it's because they're not doing what we tell them do. But, seriously it does work and it is practical.

The thing about the claim person in the company not being up to date in what is in the lawyer's file and, therefore, having maybe a bifurcated handling of the case where one person is negotiating and one person is defending; as a practical matter I don't see that happening because in the majority of cases the attorney is reporting on an on going basis back to the company and the company person is in the position to know what is going on and has the reports from the attorneys. Yes, I think it's workable and practical.

(Applause)

MR. CERONE: Thank you.

(Laughter)

MR. EVANS: Time for one more question.

MR. ZICARELLI: Maybe if nobody wants to use that opportunity, I wanted to comment on Wendy's talk a little bit. We've been trying to solve three problems in our company and it turns out something very similar to her technique provided a solution. The three problems are setting reserves for unallocated loss expense, measuring the efficiency of claims offices, and equitably charging one division for the services of another.

And what we have done is used a variation on her technique to, in effect, set up a standard cost which is a cost per unit of processing activity, be it opening a claim or having an open claim on your inventory for a year or closing a claim. We've actually separated it to that point rather than creating a

weighted open count. And then use that together with an inflation factor to set a reserve and also to allocate expenses internally between our offices.

So, I guess the point here is that the technique that Wendy talked about has a number of very useful and interesting other applications besides the reserving application she discussed.

MR. EVANS: I thank you all for your attention.

(Applause)

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James F. Cerone
Senior Consultant
Milliman & Robertson, Inc.

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Defusing Defense Costs

BY JAMES F. CERONE

Insurers are justifiably concerned with the costs of defending lawsuits against policyholders. Payments to defense attorneys are a measurable percentage of earned premiums, and next to the costs of staff claim personnel, legal fees are the largest segment of loss adjustment expense. The size of defense costs is particularly significant since these expenses are related to a relatively small portion of total claims. Typically, 20 to 25% of an insurer's claims are in litigation requiring the use of defense attorneys.

Some insurers have decided that defense attorneys' hourly rates are too high and have designed strategies to lower them. These strategies include the use of fixed-fee schedules in which attorneys agree to handle certain types of lawsuits, usually the less complex ones, for agreed-upon prices. A broader variation is the use of an annual retainer wherein a law firm agrees to handle a loosely defined number of lawsuits of all types in return for fixed monthly payments. Another approach is to simply shop around for the lowest hourly rate and to assign the work to the cheapest attorney.

JAMES F. CERONE, a previous contributor to Best's Review, *is director of claim management practices in the Chicago office of Milliman & Robertson.*

It is difficult for an insurer to monitor the contractual arrangements to determine whether they actually reduce defense costs. Also, for all of the strategies there is a potential loss of quality in terms of the level of defense services provided. This is an acute problem, given the duty of an insurer to defend and the duty the defense attorney has to his client, the policyholder. Cut-rate defenses can backfire into bad faith actions against the insurer and professional liability actions against the defense attorney.

SOME MYTHS ABOUT RATES

The underlying reason why these strategies typically fail is the fallacy that the hourly rates charged by defense attorneys are too high. Nationwide, insurance defense attorneys charge about $80 per hour, with higher hourly rates often found in big cities and most of the Northeast. Actually, however, these rates are not high, compared with the hourly rates of most other legal practice areas such as work relating to the Securities and Exchange Commission, mergers and acquisitions, labor law, corporate litigation, real estate syndications and domestic litigation. Quite often, the hourly rates attorneys charge insurance companies for defense work are upwards of 35% lower than what they charge insurers for corporate work.

The use of staff employee defense attorneys is a fine extension of the do-it-yourself approach. The hourly cost of staff attorneys, including support staff and overhead, is approximately $40. Therefore, companies enjoy a $40 an hour savings for every hour of defense work shifted from an independent attorney to a staff attorney. This is an excellent method to lower defense costs, but its use is limited to those insurers who have sufficient geographic concentration of lawsuits to keep a staff attorney busy.

Additionally, the lower hourly cost is often obtained by hiring less experienced attorneys who cannot otherwise obtain employment in the market which charges $80 an hour for services. Because of the difference in competencies and potential conflict-of-interest considerations, staff attorneys normally handle only the routine, less explosive cases.

A naive approach, perhaps taken out of frustration, finds insurance companies forming councils with defense attorneys or defense organizations to discuss and design plans to lower defense costs. This approach is doomed. Defense costs are expense to the insurers and revenue to the attorneys. Does anyone really believe that attorneys are interested in determining how they can earn less?

There is no magic bullet or quick

fix to contain legal defense costs, and the so-called litigious society is not going away. Insurers will continue to be buyers of expert services and, in the case of litigation, those services are provided by independent tort defense lawyers. Therefore, the guiding principle for insurers should be to hire lawyers to do only the work that requires a lawyer's services and not to ask them to do work that could be done by claim people. This also means minimizing the need for lawyers in the first place by working to control the numbers of lawsuits filed against policyholders.

The control of defense costs begins before the suit is filed. The handling of claims should be directed, to the extent practical, toward limiting the numbers of lawsuits to claims where the amount claimed is greater than the insurer is willing to pay. Lawsuits filed because the insurer has been slow in investigating or negotiating often result in unnecessary defense costs and should be avoided.

As a quick test, claim management personnel should review the claim file upon the receipt of a lawsuit to determine whether the claim adjuster has been responsive to the claimant or his attorney. If it is a case in which the insurer would pay some amount to settle, has this been communicated or has an offer been made? In studies we have performed, a conservative finding is that 5 to 10% of all lawsuits—and their resulting expenses—were probably unnecessary.

A second critical point in managing legal expenses occurs when a lawsuit is initially assigned to defense counsel. The initial assignment is the first opportunity the insurer has to direct the work of attorneys, and it often sets the stage for the insurer-attorney relationship over the course of the litigation.

Insurers typically assign work to attorneys through the use of a letter of transmittal. The extent and quality of assignment letters vary greatly from insurer to insurer. At one extreme, the letter consists of a few brief sentences typically telling the attorney to make an appearance and do whatever is necessary.

This type of letter does not restrict, define or limit the attorney's activities, nor does it provide the insurer's assessment of the claim and plan for future activity. As a result, it invariably produces a multiple-page letter of first impression from the attorney in which the attorney reviews the file which he has just received from the insurer. These "feedback" letters conservatively cost between one and two hours of attorney time charges, or from $80 to $160 for every suit assigned.

THE RIGHT DETAIL

Insurers who effectively manage and control litigation use a very detailed letter of assignment which tells the attorney how to proceed instead of leaving the assignment open-ended and undirected. Following are some guidelines regarding the specific points that should be included in the letter:

Coverage. Identify the coverages and limits of liability of the policy involved in the case. Discuss any coverage questions or state affirmatively that there are no coverage issues.

Identification of plaintiffs and defendants. Review the relationships of all parties to the litigation and identify any additional parties to be joined.

Identify the insured defendant. Specify the defendant(s) for whom a defense is owed. If the defendant is other than a named insured, explain the basis for coverage and defense.

Facts. Review the facts of the claim, including physical evidence, official records, witnesses' versions of what happened and the positions of the plaintiffs and defendants.

Damages. Outline the claimed damages and provide an assessment as to the accepted damages.

Current evaluation. Give your evaluation of liability and damages, including potential claims for indemnity or contribution.

What you will do. List any additional activities planned by your company, including additional investigation to be obtained and a timetable plan for disposition.

What defense counsel will do. In addition to filing an Appearance and Answer, list the items of requested Discovery. Request that the attorney simply acknowledge receipt of the assignment and limit any further comments to only those parts of the assignment letter which he disagrees with or finds deficient.

This type of letter supports the goal to manage legal expenses. It also ensures that the file supervisor has performed an up-to-date assessment of the claim and has a clear plan for future handling of the case. Both purposes served by the letter should ultimately produce financial benefits.

After the initial transmittal of the suit, the level of legal expenses is related directly to the amount of work performed by the defense attorney, which should be limited to only those activities which require the services of an attorney. These typically include the preparation and filing of pleadings and interrogatories, appearance at trials and motions and the taking or defense of depositions. The insurer should recommend or approve all affirmative depositions. As noted earlier, defense attorneys should not perform work which can be done by adjusters, such as ordering and obtaining items of investigation and conducting negotiations.

Insurers can review their closed suit files to determine the extent of work performed by attorneys that could have been performed by staff claim personnel. To estimate your own potential savings on attorneys' fees, first estimate the number of avoidable lawsuits each year and multiply that by your average defense cost per closed claim.

Second, figure what you can save by writing comprehensive assignment letters and thus avoiding long attorney "feedback" letters by multiplying the number of lawsuits per year times your average hourly cost of attorneys. (This assumes that the attorney spends only one hour on the response letter.) Finally, take the average estimated number of hours of work per lawsuit that was unnecessarily completed by a lawyer and multiply that by the average hourly attorney fee. If no improvement is needed in an area, enter zero.

AN EXTRA $960

Then add these three figures together to estimate the money you could be saving on unnecessary litigation and attorneys' fees. In our studies we have found that unnecessary attorney activities average five to 12 hours of charges per case. At $80 an hour, this adds $400 to $960 to the cost of defense for the insurer for each case.

If they prefer, insurers can probably skip the process of reviewing files and estimating potential savings on defense costs. Based on our experiences, the savings are possible for every company. Carriers which adopt the policy of providing prompt evaluation and responsive communications to third parties, sending explicit letters of assignment and not paying lawyers to do work which can be done by other parties will find that the dollar savings are there. □

1990
CASUALTY LOSS RESERVE SEMINAR
CONTROLLING DEFENSE COSTS

X78JC01

CONVENTIONAL WISDOM

Hourly Rates Are Too High!

X73JC02

CONVENTIONAL STRATEGIES

Lower/Control Hourly Rates By:

- Flat Rate Per Case
- Annual Retainers
- Shop for Lower Rates
- Ask the Lawyer

X73JC03

CONVENTIONAL PROBLEMS

- Quality of Defense
- Monitoring – Winning or Losing?
- Affect on Losses
- Are Savings Real or Deferred?

X78JC04

ABOUT THOSE RATES

	Rate per Hour
Tort Defense	85
Corporate Litigation	120
Mergers & Acquisitions	200
S.E.C.	250

X73JC05

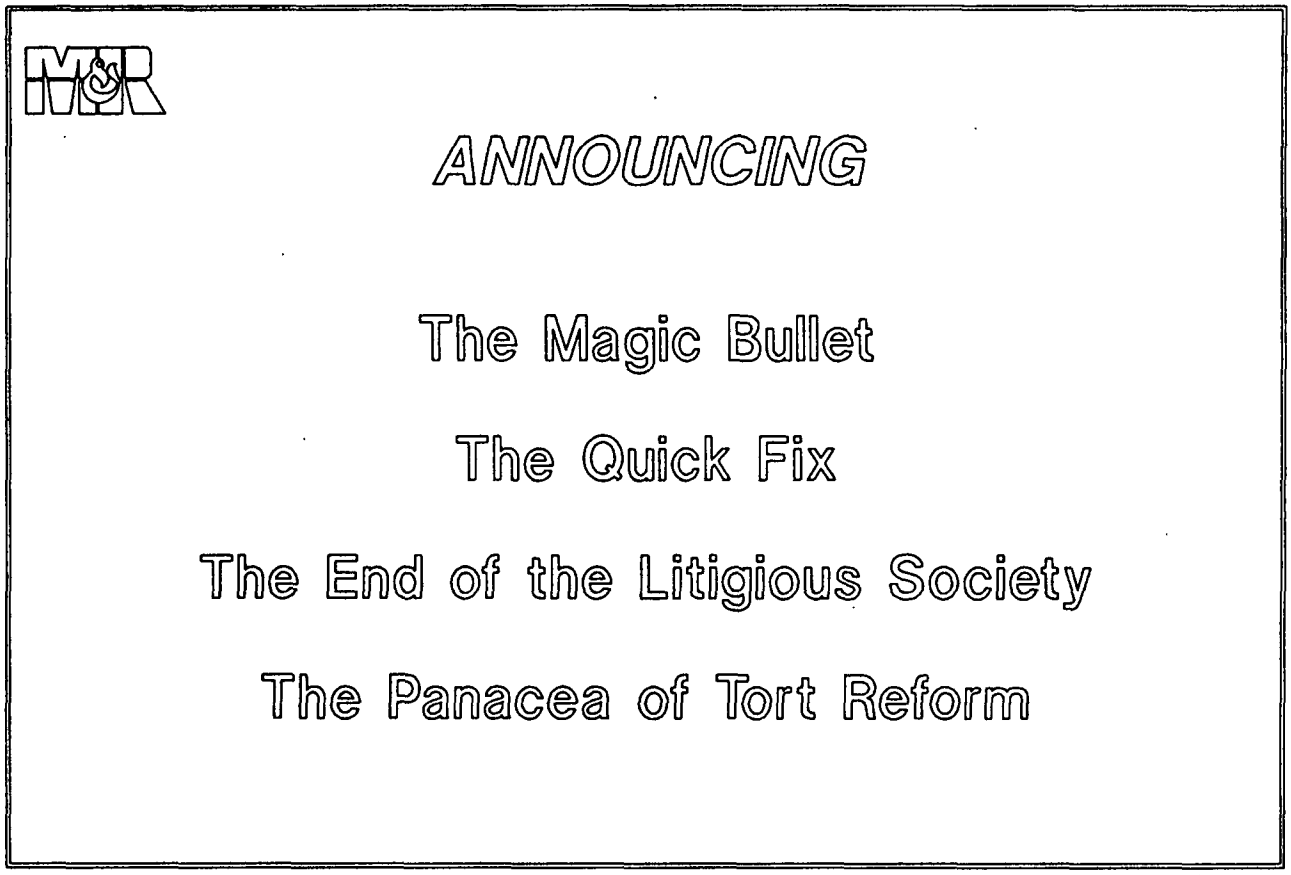
More Approaches:

- Staff Counsel – $40 per hour

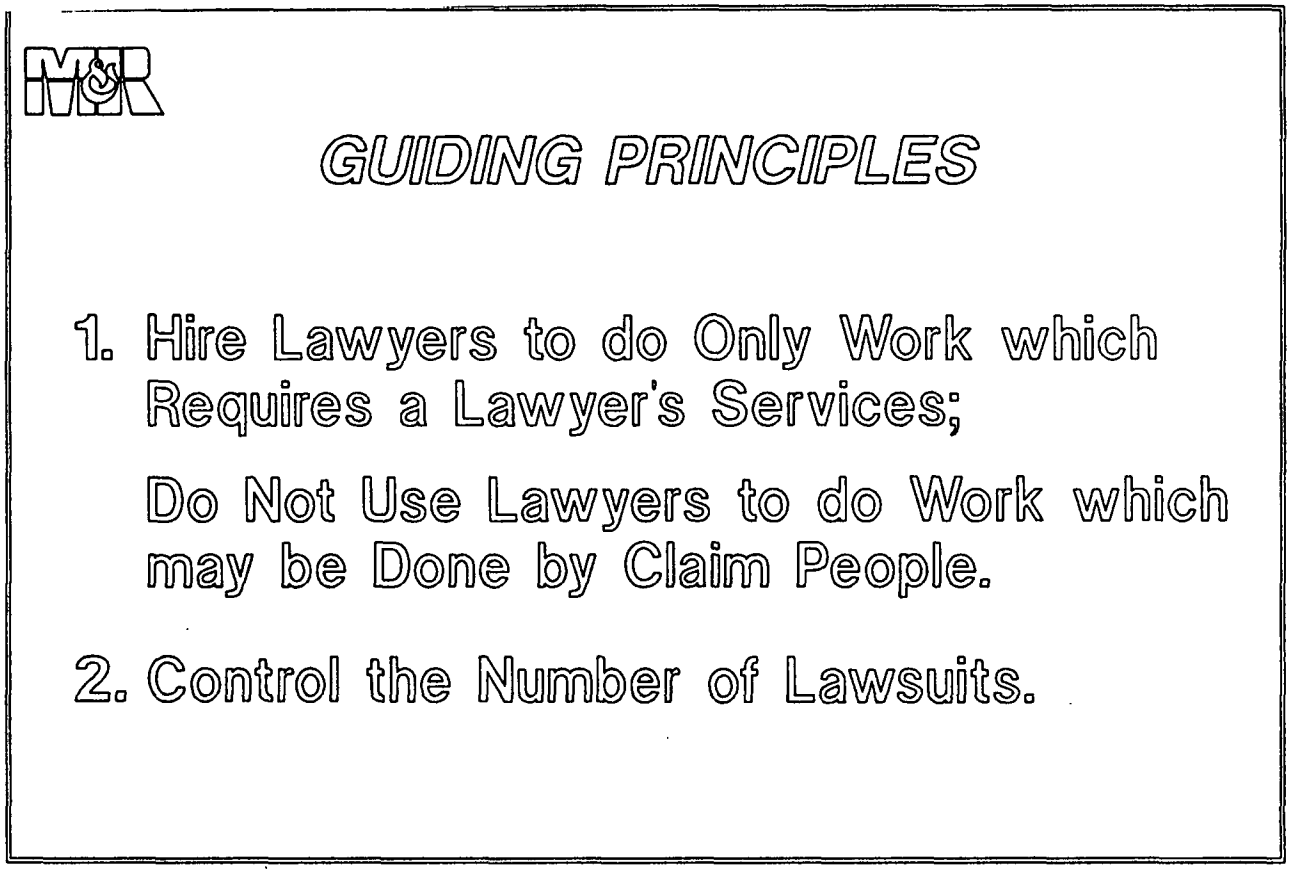
Considerations:

- Geographic Concentrations
- Level of Competence
- Routine Cases

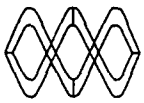
X73JC06



X73JC07



X73JC09



LITIGATION MANAGEMENT A SEQUENTIAL APPROACH

1. Pre-litigation
2. Initial Assignment for Defense
3. Case Management
4. Verification of Bills

X78JC09A

PRE-LITIGATION STRATEGY

Limit the Number of Lawsuits to Claims where the Amount is Greater than You Are Willing to Pay.

X73JC10

INITIAL ASSIGNMENT STRATEGY

- Your Letter
  - *Coverage*
  - *The parties*
  - *Covered defendants*
  - *Facts*
  - *Damages*
  - *Evaluation*
  - *What you will do*
  - *What the attorney should do*
- The Attorney's Letter

X73JC11

CASE MANAGEMENT STRATEGY

Attorneys Should:

- Prepare and File Pleadings and Interrogatories
- Appear at Trials and Motions
- Take Authorized Depositions
- Defend Depositions

Attorneys Need Not:

- Investigate
- Design Strategies
- Prepare Periodic Summaries
- Price
- Negotiate

X73JC12

VERIFICATION OF BILLS

Format

- Date and Nature of Work; Time Charges
- Individual Provider Identification
- Summary Breakdown of Individual's Hours and Rates

Verify

- Evidence of Work Performed
- Use of Published Rates
- Addition and Multiplication

X78JC12A

ESTIMATING THE SAVINGS

Pre-Litigation

Number of Avoidable Lawsuits

X

Average Defense Cost Per Closed Suit

X73JC13

ESTIMATING THE SAVINGS

Assignment Strategy

Minimum 1 Hour Charge for
"Feedback" Letter

x

Number of New Lawsuits

x

Average Hourly Rate

X73JC14

ESTIMATING THE SAVINGS

Case Management Strategy

	Hours per Case
Investigate	2
Design Strategies	2
Prepare Summaries	4
Price	2
Negotiate	2
	12

12 x Hourly Rate x No. of Lawsuits

X73JC15

SAVE ESTIMATING TIME

- Handle Claims Promptly
- Send Explicit Assignment Letters
- Don't Pay Lawyers to do Work Others can do

X73JC16

1990 CASUALTY LOSS RESERVE SEMINAR

3C/7B: LOSS ADJUSTMENT EXPENSES

John D. Zicarelli
Argonaut Insurance Company

Allocated Loss Adjusting Expense

Includes:

- Attorney Fees
- Court Costs
- Expert witnesses
- Consultants
- Etc.

Does not include:

- Salaries & traveling expense of Company employees
- Company overhead
- Fees paid to independent adjustors for adjusting claims

ALAE:

Environment Issues:

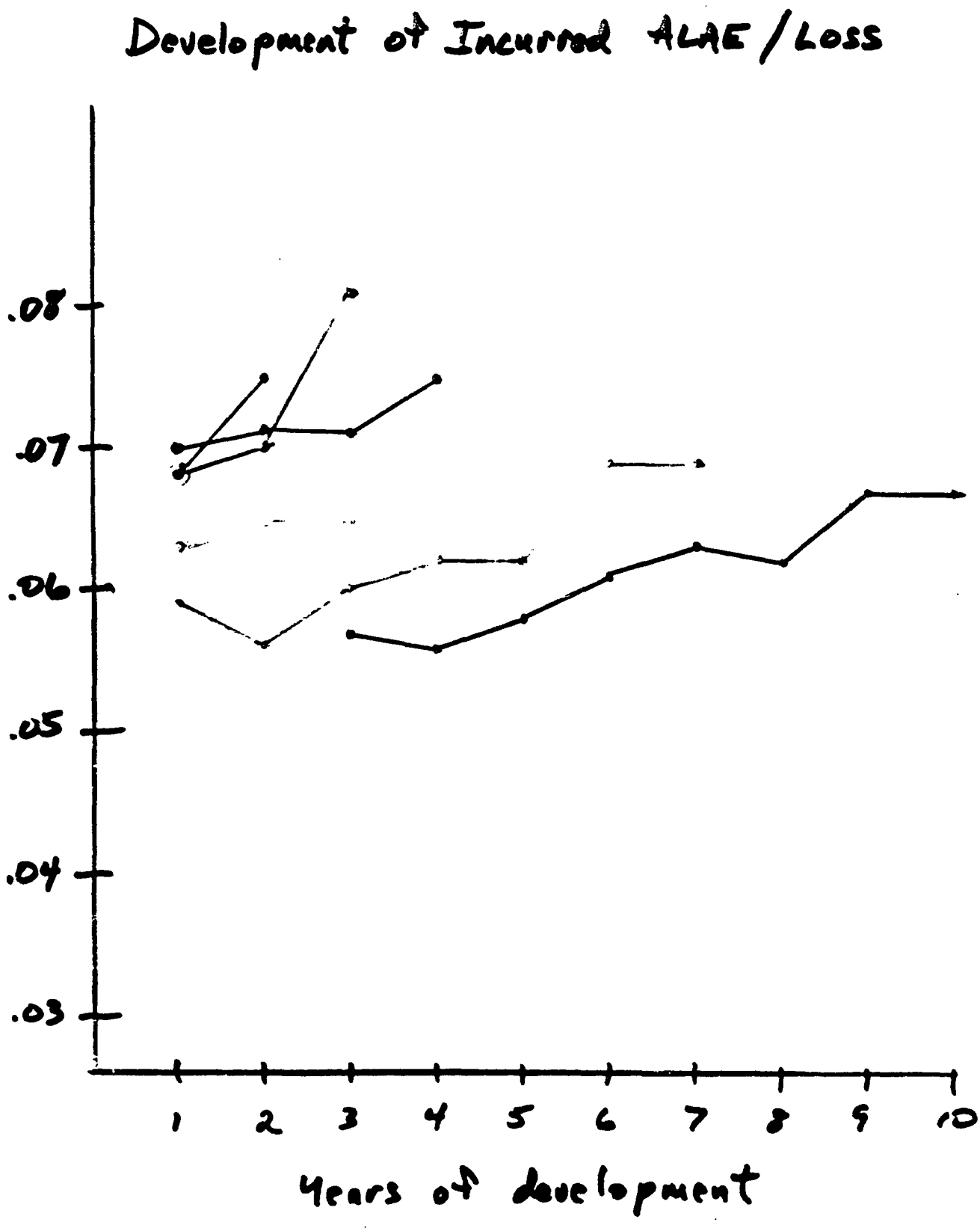
- Increasing costs

- Lack of industry data (Workers Comp)

- Long tail

Ratio of Incurred ALAE to Incurred Loss
State 04

Year	12	24	36	48	60	72	84	96	108	120
1977						0.060	0.061	0.064	0.062	0.062
1978					0.063	0.062	0.063	0.064	0.065	0.066
1979				0.054	0.054	0.055	0.056	0.056	0.056	0.056
1980			0.057	0.056	0.058	0.061	0.063	0.062	0.067	0.067
1981		0.055	0.054	0.057	0.060	0.060	0.060	0.062	0.062	
1982	0.059	0.054	0.059	0.060	0.059	0.059	0.061	0.063		
1983	0.059	0.056	0.060	0.062	0.062	0.069	0.069			
1984	0.057	0.061	0.062	0.061	0.061	0.065				
1985	0.063	0.065	0.065	0.071	0.075					
1986	0.070	0.071	0.071	0.075						
1987	0.068	0.070	0.081							
1988	0.068	0.075								
1989	0.063									


Development of Incurred ALAE / Loss
.08
.07
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.05
.04
.03
1
2
3
4
5
6
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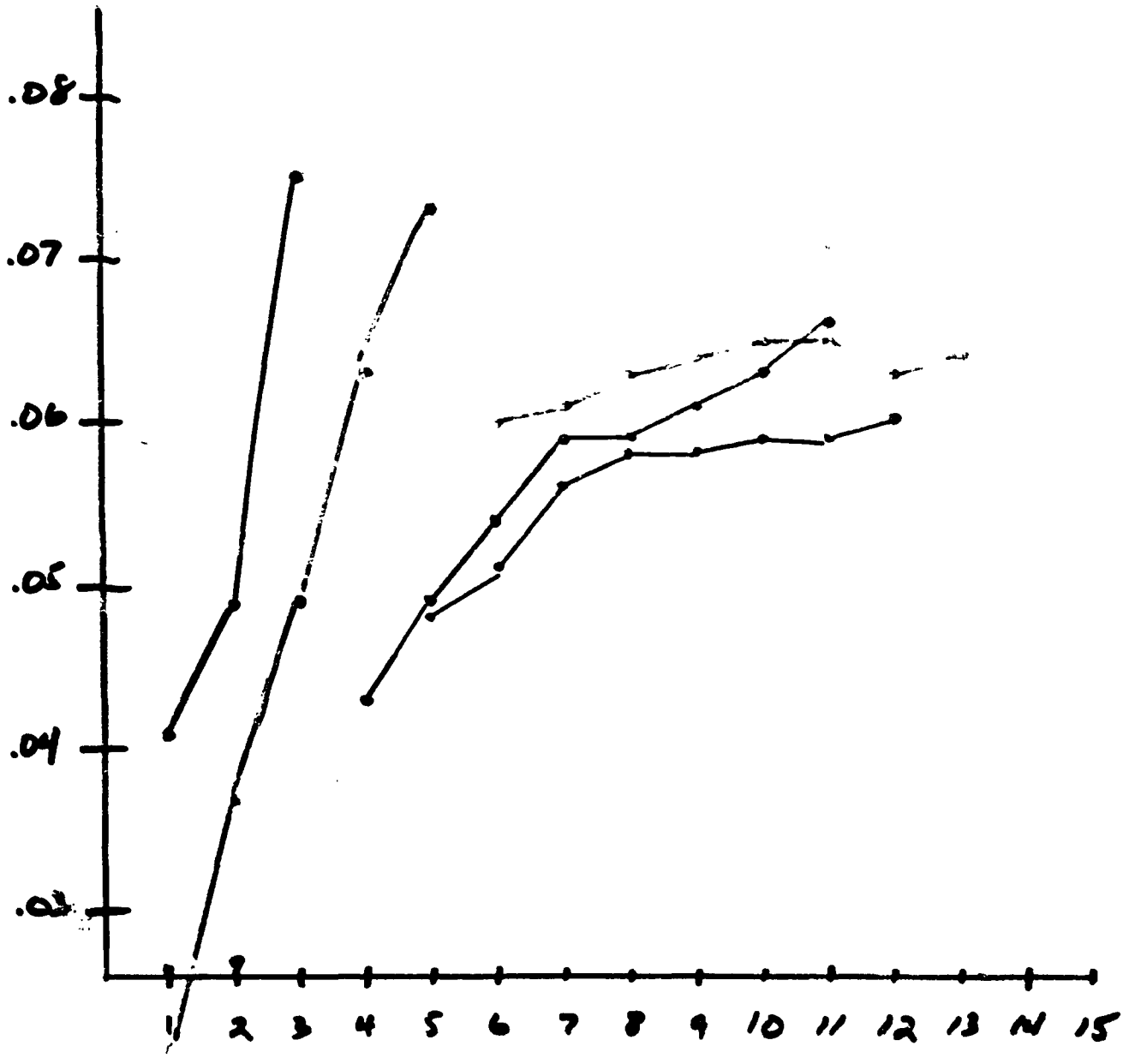
8
9
10
Years of development

Ratio of Paid ALAE to Paid Loss
State 04

Year	12	24	36	48	60	72	84	96	108	120
1977						0.060	0.061	0.063	0.064	0.065
1978					0.058	0.060	0.062	0.063	0.064	0.065
1979				0.048	0.051	0.056	0.058	0.058	0.059	0.059
1980			0.043	0.049	0.054	0.059	0.059	0.061	0.063	0.066
1981		0.028	0.038	0.048	0.054	0.055	0.058	0.060	0.062	
1982	0.019	0.031	0.041	0.049	0.053	0.057	0.059	0.061		
1983	0.026	0.033	0.041	0.050	0.054	0.058	0.065			
1984	0.023	0.032	0.042	0.052	0.056	0.061				
1985	0.022	0.037	0.049	0.063	0.073					
1986	0.035	0.055	0.061	0.071						
1987	0.041	0.049	0.075							
1988	0.026	0.052								
1989	0.020									

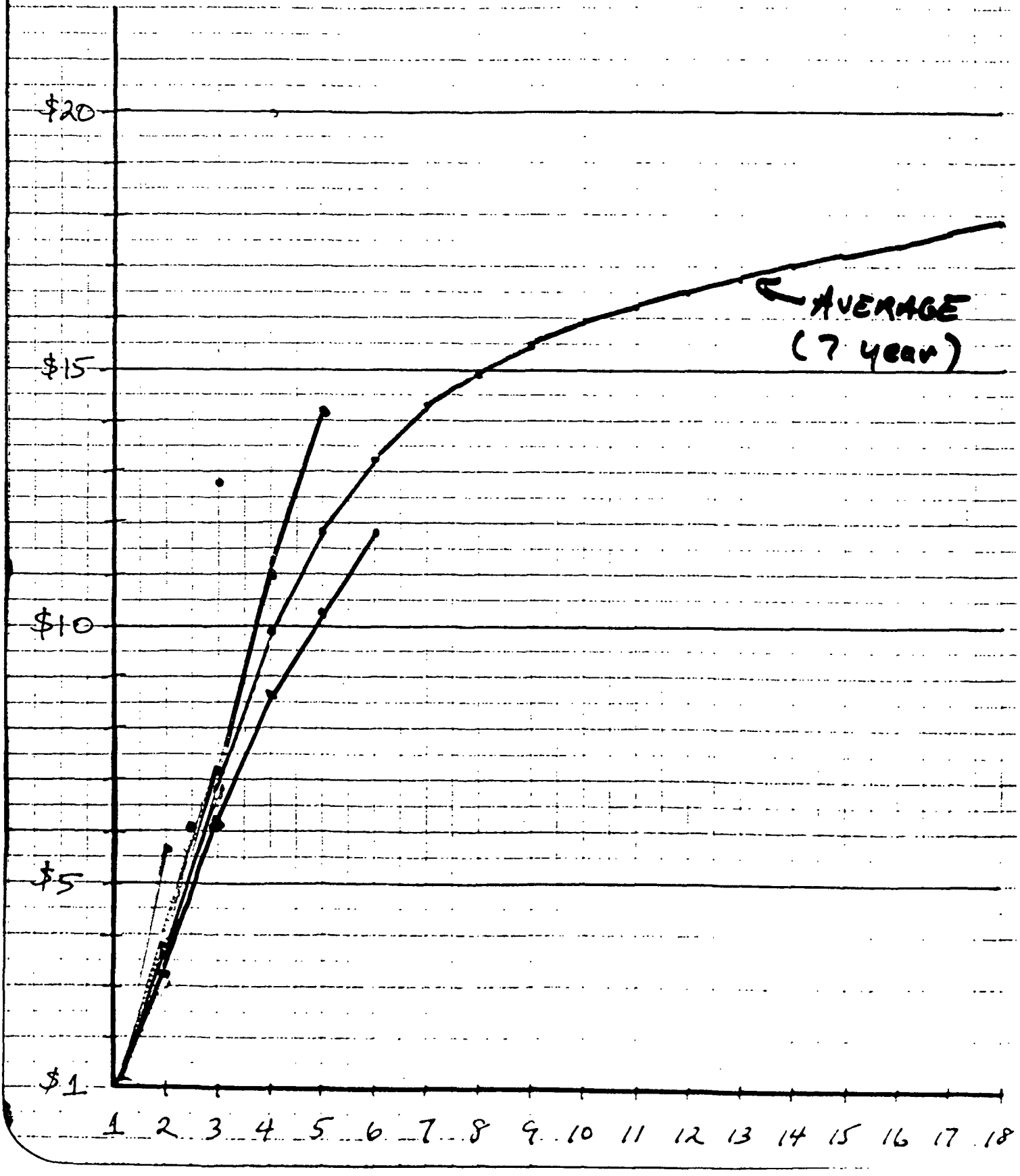
Development of PAID ALAE/Loss



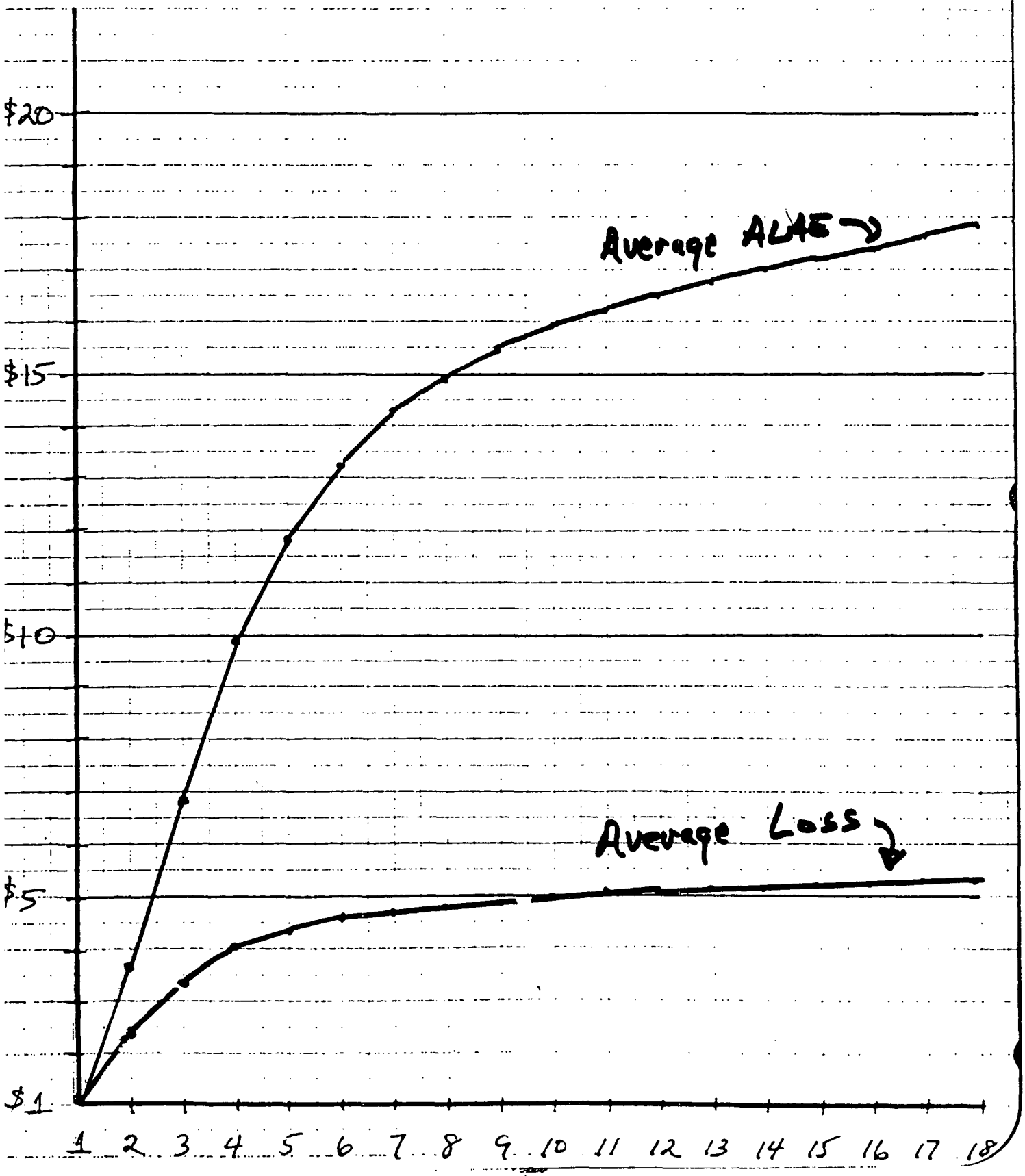
Accident Year Paid ALAE - Link Ratios
State 04

Year	12	24	36	48	60	72	84	96	108	120
1977						1.058	1.044	1.035	1.028	1.015
1978					1.070	1.058	1.035	1.034	1.021	1.014
1979				1.129	1.127	1.073	1.025	1.037	1.015	1.021
1980			1.328	1.201	1.137	1.066	1.045	1.047	1.061	
1981		1.871	1.452	1.196	1.091	1.069	1.067	1.041		
1982	3.594	1.759	1.407	1.166	1.122	1.088	1.057			
1983	2.721	1.781	1.436	1.148	1.124	1.161				
1984	3.133	1.914	1.435	1.193	1.147					
1985	3.718	1.904	1.559	1.284						
1986	3.914	1.687	1.453							
1987	3.024	2.269								
1988	5.668									
Average	3.682	1.884	1.439	1.188	1.117	1.082	1.046	1.036	1.028	1.020
High	5.668	2.269	1.559	1.284	1.147	1.161	1.067	1.047	1.061	1.025
Low	2.721	1.687	1.328	1.129	1.070	1.058	1.025	1.028	1.015	1.014

PAID ALAE DEVELOPMENT



Comparison of Payout - Loss vs ALAE



Accident Year Incurred ALAE - Link Ratios
State 04

Year	12	24	36	48	60	72	84	96	108	120
1977						0.995	1.036	1.030	1.016	1.002
1978					0.970	1.010	1.015	1.022	1.002	1.028
1979				0.976	1.062	1.015	1.009	1.005	0.999	1.019
1980			0.988	1.061	1.042	1.026	0.991	1.059	0.998	
1981		1.032	1.041	1.080	0.999	0.983	1.039	1.000		
1982	1.096	1.090	1.056	0.999	1.012	1.031	1.010			
1983	1.120	1.158	0.987	1.008	1.110	0.975				
1984	1.391	1.039	0.981	0.991	1.061					
1985	1.267	1.039	1.076	1.059						
1986	1.127	1.093	1.048							
1987	1.395	1.243								
1988	1.612									
Average	1.287	1.099	1.025	1.025	1.037	1.005	1.013	1.022	1.006	1.013
High	1.612	1.243	1.076	1.080	1.110	1.031	1.039	1.059	1.016	1.028
Low	1.096	1.032	0.981	0.976	0.970	0.975	0.991	1.000	0.998	0.999

Session 3C / 7B

Loss Adjustment Expenses

"Determination of Outstanding Liabilities for Unallocated Loss Adjustment Expenses"

by Wendy Johnson

Casualty Loss Reserve Seminar
September 1990

Calendar Year Expense Per Open Claim

Exhibit 1

Year	Calendar Year Paid ULAE	Number of Open Claims at Year End	Number of Claims Opened During Year	Weighted Number of Open Claims	Expense Per Open Claim	Fitted Values
	(a)	(b)	(c)	(d)	(e)	(f)
1977	$ 9,459	50	20	70	135	119
1978	13,715	56	33	89	155	140
1979	19,886	75	49	124	161	165
1980	29,023	106	70	176	165	193
1981	42,355	156	80	236	179	227
1982	64,071	174	60	234	274	266
1983	78,898	199	63	261	302	313
1984	138,600	246	79	325	426	367
1985	214,991	343	127	470	457	431
1986	281,593	436	124	560	503	507

(g) 1987 Value Based on Fit of Data to Exponential Curve: 595

(h) Indicated Trend in Expenses per Open Claim: 17.4%

Notes:

(a) Calendar year ULAE payments from the Annual Statement. The most likely source of this information would be successive Schedule O's and Schedule P's.
(b) From Schedule P of the Annual Statement.
(c) From company records.
(d) (b)+(c). The assumption here is that a claim costs twice as much in absolute dollars to handle in the year it is opened than it does in subsequent years, and is closed at the beginning of the year of closure. Other assumptions may be more relevant for other bodies of data.
(e) (a)/(d)
(f) Curve is y=a(exp(bx)), y=column (e), a=-312.867, b=.16067, and coefficient of determination is .941.
(g), (h) From exponential curve fit.

Numbers of Open Claims by Accident Year

Year	Number Open at 12/31/87	Number Opened in Year	Number Open at 12/31/88	Number Opened in Year	Number Open at 12/31/89	Number Opened in Year	Number Open at 12/31/90	Number Opened in Year	Number Open at 12/31/91	Number Opened in Year
1977	3	0	1	0	0	0	0	0	0	0
1978	7	0	3	0	1	0	0	0	0	0
1979	9	0	3	0	3	0	1	0	0	0
1980	15	4	8	0	6	0	4	0	3	0
1981	23	0	10	0	8	0	6	0	4	0
1982	39	8	15	1	11	0	8	0	6	0
1983	61	5	26	3	17	1	12	0	9	0
1984	112	15	51	8	30	2	20	1	14	0
1985	139	44	82	19	59	9	35	2	23	1
1986	122	48	158	60	98	23	71	10	42	2
Totals	530	124	357	91	233	35	157	13	101	3
Weighted Totals		654		448		268		170		104

Notes:

Based on the following claim reporting and closure patterns:

Year	Percent Reported	Percent Closed
1	46.5	0.8
2	64.4	2.3
3	86.8	27.9
4	95.3	58.9
5	99.2	72.9
6	100.0	84.5
7		89.9
8		93.0
9		94.6
10		96.1
11		97.7
12		98.4

Number of Open Claims by Accident Year

Exhibit 2
Page 2

Year	Number Open at 12/31/92	Number Open at 12/31/93	Number Open at 12/31/94	Number Open at 12/31/95	Number Open at 12/31/96	Number Open at 12/31/97	Number Open at 12/31/98
1977	0	0	0	0	0	0	0
1978	0	0	0	0	0	0	0
1979	0	0	0	0	0	0	0
1980	0	0	0	0	0	0	0
1981	1	0	0	0	0	0	0
1982	3	1	0	0	0	0	0
1983	7	4	3	0	0	0	0
1984	11	8	5	3	0	0	0
1985	16	12	9	5	3	0	0
1986	27	19	15	10	6	3	1
Totals	65	44	32	18	9	3	1

Exhibit 3

Estimated Outstanding Liability for ULAE

Year	Weighted Number of Open Claims (a)	Expense Per Open Claim (b)	Indicated ULAE Paid (c)
1987	654	$ 595	$ 389,130
1988	448	699	312,941
1989	268	820	219,780
1990	170	963	163,670
1991	104	1,130	117,550
1992	65	1,327	86,252
1993	44	1,558	68,545
1994	32	1,829	58,525
1995	18	2,147	38,649
1996	9	2,521	22,687
1997	3	2,959	8,878
1998	1	3,474	3,474
Total Estimated Outstanding Liability for ULAE as of 12/31/86			$1,490,083

Notes:

(a) From Exhibit 2.
(b) Based on 17.4% expense level trend indicated by the data in Exhibit 1.
(c) (a)x(b)

Exhibit 4

Estimated Outstanding Liability for ULAE Assuming Level Expense Trend of 5%

Year	Weighted Number of Open Claims	Expense Per Open Claim	Indicated ULAE Paid
	(a)	(b)	(c)
1987	654	$ 595	$ 389,130
1988	448	625	279,888
1989	268	656	175,805
1990	170	689	117,094
1991	104	723	75,216
1992	65	759	49,360
1993	44	797	35,084
1994	32	837	26,791
1995	18	879	15,824
1996	9	923	8,307
1997	3	969	2,908
1998	1	1,018	1,018
Total Estimated Outstanding Liability for ULAE as of 12/31/86			$1,176,423

Notes:

(a) From Exhibit 2.
(b) Based on an arbitrary expense level trend of 5%, under the assumption that the company can bring its expenses under control.
(c) (a)x(b)

Exhibit 5

Estimated Outstanding Liability for ULAE Assuming Fewer Late-Reported Claims

Year	Weighted Number of Open Claims (a)	Expense Per Open Claim (b)	Indicated ULAE Paid (c)
1987	530	$ 595	$ 315,350
1988	363	699	253,566
1989	209	820	171,396
1990	119	963	114,569
1991	77	1,130	87,032
1992	49	1,327	64,689
1993	33	1,558	51,409
1994	24	1,829	43,894
1995	14	2,147	28,986
1996	7	2,521	17,015
1997	2	2,959	6,659
1998	1	3,474	2,606
Total Estimated Outstanding Liability for ULAE as of 12/31/86			$1,157,171

Notes:

(a) Based on the assumption that only half as many claims will be reported after the close of the accident year, for each accident year and report period.
(b) From Exhibit 2.
(c) (a)x(b)

Exhibit 6

Indicated Classical ULAE Reserve

Year	Calendar Year Paid Losses	Calendar Year Paid ULAE	Paid to Paid Ratio
	(a)	(b)	(c)
1977	$ 17,341	$ 9,459	0.545
1978	51,969	13,715	0.264
1979	111,898	19,886	0.178
1980	215,746	29,023	0.135
1981	292,559	42,355	0.145
1982	396,168	64,071	0.162
1983	522,313	78,898	0.151
1984	694,288	138,600	0.200
1985	934,070	214,991	0.230
1986	1,265,029	281,593	0.223
Total/ Average	$4,501,379	$ 892,590	0.198

(d) Estimated Loss Reserve: $12,458,095

(e) Estimated IBNR Reserve: $ 7,575,485

(f) Indicated Classical ULAE Reserve: $ 1,986,255

Notes:

(a) From Annual Statement.
(b) From Exhibit 1.
(c) (b)/(a). Obviously, averages other than the dollar-weighted could be selected if desired.
(d) From annual statement.
(e) From annual statement.
(f) (.5 x .198 x (d))+(.5 x .198 x (e))

Exhibit 7

Estimated Outstanding Liability for ULAE Assuming Overhead Levels are Fixed

Year	Calendar Year Paid ULAE	Weighted Number of Open Claims from Past Years	Weighted Number of Subsequent Open Claims	Total Weighted Claims	ULAE for Claims from Past Years
	(a)	(b)	(c)	(d)	(e)
1986	$ 281,593	560	0	560	$ 281,593
1987	$ 296,000	654	202	856	$ 226,000
1988	311,000	448	377	825	169,000
1989	327,000	268	557	825	106,000
1990	343,000	170	656	826	71,000
1991	360,000	104	722	826	45,000
1992	378,000	65	758	823	30,000
1993	397,000	44	780	824	21,000
1994	417,000	32	795	827	16,000
1995	438,000	18	807	825	10,000
1996	460,000	9	812	821	5,000
1997	483,000	3	816	819	2,000
1998	507,000	1	818	819	1,000
1999	532,000	0	818	818	0
Total Estimated Outstanding Liability for ULAE as of 12/31/86					$ 702,000

Notes:

(a) Assuming that total ULAE payments increase at 5% per year
(b) From Exhibit 3.
(c) Assuming 220 claims per future year and applying the reporting and payment patterns from Exhibit 2.
(d) (b)+(c)
(e) (a)x(b)/(d)

Allocation of Outstanding Liability
to Accident Year 1986

Exhibit 8

Year	Total Number of Weighted Open Claims	Number of Weighted Open Claims from 1986	Indicated ULAE Paid on Past Claims	Outstanding Liability Attributable to 1986
	(a)	(b)	(c)	(d)
1987	654	170	$ 389,000	$ 101,000
1988	448	218	313,000	152,000
1989	268	121	220,000	99,000
1990	170	81	164,000	78,000
1991	104	44	118,000	50,000
1992	65	27	86,000	36,000
1993	44	19	69,000	30,000
1994	32	15	59,000	28,000
1995	18	10	39,000	22,000
1996	9	6	23,000	15,000
1997	3	3	9,000	9,000
1998	1	1	3,000	3,000
Total Liability Attributable to 1986				$ 623,000

Notes:

(a) From Exhibit 3.
(b) From Exhibit 2.
(c) From Exhibit 3.
(d) (c)x(b)/(a)

1990 CASUALTY LOSS RESERVE SEMINAR

3E: REINSURANCE COMMUTATIONS

Moderator

Heidi E. Hutter
Atrium Corporation

Panel

Jeffrey H. Mayer
Milliman & Robertson, Inc.

Scott Moore
Coopers & Lybrand

Dale F. Ogden
Dale F. Ogden & Associates

MS. HUTTER: My name is Heidi Hutter and I am moderator for this panel. In defining a reinsurance commutation, the College of Insurance textbook on reinsurance, describes it as the estimation payment and complete discharge of all obligations including the future obligations between the parties for reinsurance losses incurred. In other words, it is a buy out of a reinsurance contract that had already been in place.

Much of the reinsurance commutation activity in the marketplace involves an insolvent ceding company, an insolvent reinsurer or two insolvent parties. But commutations are not restricted to insolvencies. In fact, in my experience I have seen quite a number of commutations taking place where both parties are solvent, but have run into coverage disputes or other issues in conjunction with their reinsurance.

This morning our first speaker is Dale Ogden. He will survey the types of situations that give rise to a commutation. Dale is president of Dale F. Ogden & Associates. Prior to forming his own firm, Dale was Executive Vice President & Chief Operating Officer of Kramer Capital Consultants and a manager at Peat, Marwick & Mitchell. He is currently a Member of the Property and Liabilities Issues Committee of the American Academy of Actuaries. Dale, please.

MR. OGDEN: Thank you. First I'd like to apologize. I don't have a handout, a copy of the paper yet. There will be one that will be published in the book that comes from the Loss Reserve Seminar. If anyone would like a copy of it in advance, please just drop a business card up here and I will make sure you get it. As an aside, it is virtually identical to a paper that I presented last year, so if you have last years' proceedings you can read that and get the same benefit from it.

In discussing reinsurance commutations, I think it is important that we recognize why companies buy reinsurance to begin with. An insurance transaction can be viewed, particularly in the reinsurance area, as one designed to smooth financial results over a long period of time. Catastrophe reinsurance, you pay in money year after year and when you get hit with a catastrophe, you recover some of that money back. In essence, you are borrowing money and you are typically paying some sort of profit margin to the reinsurer for borrowing their money or borrowing their surplus.

The liberalization of the tort system and the judicial fiat in finding coverage where none existed before and other social and economic situations have made predicting losses much more difficult and there have been a large number of insolvencies for those reasons as well as reasons related to competition and low pricing.

There has been a lot of insolvencies recognized in the last few years and each year there have been more and more companies out

there trying to use reinsurance treaties. I heard...and I do not know this for sure, but I heard that there were something like 1,700 reinsurers of mission insurance group. So spread all through the world and if there is probably a lot of those that are going to try to commute those liabilities in some form or another...either through courts, through arbitrations or negotiations. So this issue is becoming much, much more important. It is also becoming more difficult, as more people are trying to commute, it is more difficult for an insolvent carrier to commute on favorable terms. Frequently, both parties are insolvent and both parties are trying to preserve some sort of fiduciary responsibility to their policyholders or claimants or whatever.

So, I think that it is getting much more difficult and it is becoming more and more important to be able to come to some sort of agreement.

As with any corporation, once an insurance company or reinsurer is recognized as being insolvent, it is necessary to either recapitalize or liquidate that company. In the past years, recapitalization often worked because the reason for the insolvencies were abusive rate regulation...they were generally small companies and once the companies could get relief from aside risk plans or rate relief, they could earn profits and earn back and make it worthwhile for someone putting money in.

The insolvencies that have occurred in the 1980s have primarily been commercial lines companies where it is impossible to get the same kind of rate relief because of the market competition.

The largest asset in most insolvent carriers is the reinsurance recoverable. So, before these companies can be liquidated, it is necessary to, in some way, figure out how much that asset is worth and, if possible, convert it to cash so that (inaudible) claims can be paid or that guarantee funds can be reimbursed for the claims their paying.

The way I look at commuting reinsurance treaties is based on which company is solvent and which company is insolvent. That gives us four situations. Both solvent, both insolvent and one insolvent and the other not.

In the first situation, let's consider insolvent ceding companies. As I said, assumed reinsurance recoverable is there largest asset and it is important to realize that. It is often larger than the total of cash in invested assets.

In the second case, where we have an insolvent reinsurer, its payable reinsurance is going to be its largest liability. There is good balance there. So in negotiating these treaties it is very important to recognize the realities of the solvency of the companies. In the case of an insolvent reinsurer, if you are a solvent ceding company, you have to make a decision as to whether

you can do better if you commute today or if you commute in the future or if you try to wait and see if there is anything left over at the end. In a number of situations of reinsurers that are more or less voluntarily running off under the supervision of insurance department, there are a number of ceding companies who are saying we are going to sit back and wait. And after everybody else commutes the company may have enough left over that they can pay our claims. In the meantime, we will fight them claim by claim and see what we can collect.

There are others who say, well, if we can get fifty cents on the dollar or sixty cents on the dollar today, we are going to take it because we don't figure there is going to be anything left and if you wait you may not get anything.

There has been a recent change in the laws and regulations governing this. It occurred in New York, where they now have specific rules governing reinsurance commutations. And if they are approved by the department and if they satisfy certain criteria, they are no longer considered to be preferential payments and they won't be reversed if the company ultimately goes into liquidation.

In addition to commuting for insolvency purposes, there is also...people will commute treaties because the reason for which they bought the treaty may not exist. Suppose a company were buying reinsurance in order to provide them with capacity in a growing market and as the market softens and they pull back somewhat, they don't need that anymore, they now can afford to retain more risk, they may commute to treaty to help minimize the cost to them of maintaining those treaties.

In addition, there are some situations where older reinsurance contracts from fifteen, twenty, or thirty years ago, still have a small number of claims and in many situations those treaties were spread so thinly, that you are making a thousand dollar recovery spread among twenty or thirty reinsurers and the administrative cost may make it prohibitive to continue the treaty. So rather than trying to administer that treaty, you may commute and just take your chances. Those treaties...the remaining losses because of much lower limits in the 60s or 50s or whatever, may no longer be material and they may no longer be worth the trouble.

Another situation. You may have a retrospectively rated contract, in which you are paying the reinsurer a mark-up on the losses. In essence, a 100/88ths of the losses or something becomes the reinsurers expenses and profits and so forth. In commuting the treaty, you may save more money than the losses will cost you. You also may feel more certain about those losses today than you did when you wrote the policies and are now willing to assume those risks.

Another situation relates to workers compensation annuity reserves. Again, you may be talking about weekly or monthly

payments on very old policies and very old claims that are expensive to administer and keep collecting reinsurance. So, you may decide that you are very comfortable with the indemnity payments that are going on and that there will be limited if any medical payments in the future, so you may decide to commute an annuity claim and just continue to pay that and not have to concern yourself with collecting the reinsurance.

Finally, as Heidi alluded to, even between solvent carriers, there is a lot of dispute. Hardly a week goes by that you don't read in the trade press about some arbitration, awards more and more litigations and reinsurance and everything else. On the east coast I'm reading about opinions in New York that are very favorable to reinsurers. On the west coast I'm hearing about opinions that are very favorable to ceding companies. Somewhere, maybe, the two coasts will get together. Probably in Chicago, but ...you know, there is still a lot of uncertainty over the outcome of anyone of these situations. Even if someone feels very strongly that they have a good case, it is almost a crap shoot about what is going to happen in court or what is going to happen in an arbitration. So there used to be a rule of thumb, that if you thought you were right you went to arbitration, and if you thought you were wrong you would try to get it into court somehow. But, I don't think that is the case anymore. I think arbitration is becoming more and more arbitrary.

In negotiating commutation, it is important to look at the advantages and disadvantages of each of the parties. Whenever you have an insolvent cedent and a solvent reinsurer, there is a couple of considerations that need to be made. The first one is that in most reinsurance treaties, if not all...I haven't seen any for a long time that don't have this provision in them...there is provision that reads something as follows: Not withstanding any other provisions to the contrary, in the event of the insolvency of the company, the reinsurance provided hereunder shall be payable by the reinsurer directly to the company or its liquidator, receiver, or statutory successor on the basis of the liability for the business reinsured hereunder without diminution either because of such insolvency or because the liquidator, receiver, or statutory successor has failed to pay all or a portion of any claim except as provided by (some section of the New York insurance law and so forth)...or where there is a specific agreement or a cut through agreement that provides for another payee in the case of insolvency.

To boil down what all those words say, basically is that just because the company becomes insolvent, the reinsurer isn't off the hook. Unfortunately, it is not always clear what not off the hook means. There are a lot of situations where once a company goes under, certain things may come to light that the reinsurer was unaware of and they say, well, now we're not going...we're going to resend the treaty because you never told us that you were using managing general agents. You never told us you were writing nuclear power plants and on and on. A thousand reasons why they should resend the treaty.

Now even though they may feel very comfortable about that and the other side may feel very comfortable that they can not resend the treaty, you've created an uncertainty. And now commuting the treaty may avoid a lot of expense of litigation or arbitration.

This clause means the reinsurer has to pay and can not reduce its liability just because claims are not paid. In one situation, there is a liquidating company that is currently paying only twenty cents on the dollar or reimbursing its policyholders where they have paid the claims themselves, only twenty cents on the dollar. If there are a $100,000 retention as there were in some years for that company, and a $300,000 claim made that was approved by the liquidator, then the company would pay out twenty percent of that or $60,000. They would then recover $200,000 from the reinsurer under that treaty. So that the remaining assets of the liquidating company are now greater than they were before they paid the claim. Now at the end of the day, which could be after all of our lifetimes, there is still money left over, they may pay thirty cents or forty cents on the dollars. I mean, if they accumulate enough assets they may increase the amount they are paying. But for now, you could argue that there is a benefit to the ceding company to overpay claims or prove claims that are too high. In every situation I'm familiar with, the liquidators are doing whatever they can to make sure that doesn't happen. But in many cases those claims are now being handled by the policyholders themselves. In some situations, the policyholders may negotiate an assignment of the proceeds from any policy they have to the claimant. And in that situation the policyholder and the claimant no longer have a disagreement, there becomes an incentive for the policyholder, perhaps, to agree to a higher settlement in order for the claimant to accept that assignment. So, the actual liability of the reinsurer may be increased in an insolvency situation to spite any efforts made to the contrary by liquidators, by policyholders or whatever.

So if you are the reinsurer looking at this insolvent company, you may think if I can commute this on the basis of what would have been losses, what may be a determined amount of losses, then I'm cutting off that risk that those claims will be settled for higher amounts than they otherwise would have been settled for in an ongoing company.

Though I think the incentive, on the one hand, is to get out, to cut off the risk, the incentive on the part of the ceding company is that they may need cash to make any kind of distribution and they need to eliminate the uncertainty in how much cash they are going to get so they can determine some percentage that they can pay out in liquidation. They have either the guarantee funds or in situations where they are not covered by guarantee funds to pay the money directly to the policyholders or claimants.

Even when there is a guarantee fund involved, and there are those that believe that guarantee funds are even more likely to overpay claims, there is frequently a proclaim limit, which is lower than

many of the policies written by the ceding company. In those situations, you are still going to have the incentive for the policyholder to, perhaps, agree to a larger settlement in order to encourage the claimant to take the assignment.

In these situations, the reinsurer may be willing to pay a little bit extra in order to get rid of that increased risk. The reinsurer, because of the uncertainties, may also wish to commute in order to eliminate a qualified audit opinion or a qualified reserve opinion. They may want to get rid of these liabilities so they can have a stop off ring or some other type of corporate reorganization, merger, acquisition or whatever and possibly avoid the cost of running off the tree where they may have to fight each and every claim. There are situations where it appears that the companies may spend most of their assets fighting over which claims are covered, which claims aren't covered, late notice issues and a myriad of other issues. Both parties can benefit from the commutation.

In the case of a solvent cedent and an insolvent reinsurer, I think there is a definite advantage to being the person negotiating on behalf of the insolvent reinsurer. On the one hand, there is an old legal theory that an old and maybe wise lawyer once told me, that if you have the money they have the problem. So if you are the reinsurer and you are sitting here with a certain amount of assets and you figure that you have fifty cents or sixty cents on the dollar to pay each one of your ceding companies, the ceding company is sitting there saying, you know, if I can get cash I'll be happy. But, you are no longer paying claims. You are negotiating. You have very strong advantage in negotiating.

In many situations, probably most situations, I don't feel sorry for the ceding company because they are the ones that wrote the business and they are the ones that bought the bargain basement reinsurance. And, I guess, to a large extent, they are getting just what they paid for. Anybody in here could name a dozen or more companies, reinsurers, that have gone under or primary insurers that seem to write a lot of reinsurance that has gone under. And there probably isn't a company left in the country that hasn't been affected, at least, to a small extent by one of those.

Some reinsurers that are actively commuting are not actually insolvent or at least they haven't admitted that they are insolvent. But they are no longer writing business. Their solvency margin, if any, is very small. And they are trying to reach, what we might call, a soft landing. But most of those, if they really had to pay out the claims, would be insolvent.

In the situations where there is a insolvent reinsurer, you might argue that there is very little incentive for them to commute. Again, they have the money. They have the liabilities. They are under a liquidation order. They really don't have to pay

anything for quite some time. They might decide, we are going to sit here and wait ten years or fifteen years, and everybody can submit their claims and then we will divvy up the money. However, fortunately, most liquidators are more responsible than that and they feel a fiduciary obligation to those ceding companies to get as much money as is reasonably prudent to those company as soon as possible. And a commutation, a negotiated commutation, is one in which may enhance the position of the insolvent re insurer making them maybe less insolvent and allow them to make distributions to others sooner, particularly if they can commute the longer more uncertain treaties.

The ceding company that refuses to commute is facing the risk that they may not collect anything down the road. And they may also be risking qualified audit opinions. They may be risking statutory penalties for the uncertainty in their reinsurance. You typically will have to take a 100% surplus penalty for reinsurance from an insolvent reinsurance company. However, if you commute for thirty cents on the dollar, forty cents on the dollar, whatever, you may lose money and you may have to recognize a net loss on your income statement, but you still enhanced your remaining statutory surplus. It may be the difference between being allowed to continue to write business and not continue to write business.

If the amounts are significant enough, failure to commute may result in the actual insolvency of the ceding company, even after a commutation. There are situations where they have commuted, even though after the commutation they have become insolvent, be cause once they were able to commute and quantify their insolvency, they were then able to raise additional capital to participate and then turn around in the market. That was 1985, 1986. I'm not sure anybody is expecting that imminent turn around today . The stock market does not expect it.

Finally, in the case where the ceding company and the reinsurer are both insolvent, you reach almost an impasse. Hopefully, this scenario remains rare, but I doubt that it will be. I had a few copies of the first issue in January and the first issue in July from the last three years of Business Insurance. And the headlines on the front page, in each case, say things like, Rate Cutting Abounds...you know, No Turn in Sight...things like that. So, there has been a lot of competition in the last three years. And it doesn't look like it is going to end soon. It is going to end. The question is when. Nobody really knows. As Heidi had said, there was a survey once taken for five different years and the turn was always eighteen months away. And if you read the trade press that is what everybody says today. The turn of the market is eighteen months away. It could be eighteen years away. I doubt that, but...and it maybe only eighteen months away. It could be six months away. Something will happen. But, I think, particularly with the new reserve certification requirements that you might see a group of newly insolvent companies at the end of 1990 and at 1991 because that

requirement is phased in more. Unfortunately, you may also see more law suits against accounting firms and actuaries. But, of course, I've never seen a valid law suit against an actuary.

(Laughter)

The situation where both parties are insolvent, more resembles the insolvent reinsurer case than the insolvent ceding company case. Because, once again, the reinsurer has the money. The ceding company is trying to liquidate itself and it needs the money in order to settle those claims.

In this case, one of the methods that I have seen used in order to commute these so that everyone can feel comfortable that they have satisfied their fiduciary responsibilities is to, in essence, hire three sets of actuaries or three actuaries. The ceding company and the reinsurer will both hire...let's call them an independent advocate to come up with an estimate of the expected value of the losses, the pay out of the losses and the present value of those losses. Even though both actuaries are independent, for some reason the ceding company's numbers tend to turn out higher than the reinsurer's numbers. So they hire a third actuary to review both work products and pick one or the other. That helps to keep the advocate...the independent advocate actuary is more honest and more reasonable in their assumptions. And it provides a mechanism...a fair mechanism for resolving those differences.

In conclusion, I think anytime you are going to get involved in negotiating a commutation...if you are going to get involved in calculating the liabilities under the treaties or anything else, I think you have to recognize that, in essence, you are pricing a loss portfolio treaty. If you are the reinsurer when you are selling off that loss portfolio treaty, you don't have to worry about the credit risk that you may otherwise have to worry about, because you are giving, in fact, the original company. But , it is important that you understand all the contracts involved very thoroughly. You have to make sure that the information you are using to commute that treaty is reliable. It is very often, particularly for the reinsurer, quite useful to conduct an audit of the outstanding claims and, in many cases, even the settled claims under the reinsurance treaty. You often can find a lot that, perhaps, should not have been covered under the treaty, particularly when you have situations of a ceding company with a very complicated reinsurance structure, a lot of reinsurers. You will invariably find cessions to your treaties that should not have been there...that should have been someone else's.

The results of those audits can often encourage a ceding company, even a solvent ceding company, to commute to treaty because they figure they are better off doing that than letting you knit-pick at their claims for the rest of your life.

You have to understand the situations, the motivations of all the parties to the transaction. In many situations the reinsurer must get an agreement from their retrocessionaires before they (inaudible). They may recognize that they are getting a good deal in commutation, but if their retrocessionaires are saying, well, you are commuting this on a gross basis and we only have an excess of $500,000 per claim liability to you, we don't owe you anything. And yet, you know, you may feel, well, some of those claims would have gone over $500,000. Maybe they would not have, but, you know, there seems to be reasonable that the retrocessionaire would make some contribution. You have to get that out of the way before you can commute to treaty.

If possible, and again this is the reason why you are commuting, you should resolve underwriting and coverage disputes before calculating ultimate losses or the present value under those treaties. As I said, in many instances that is what you are trying to resolve is those issues. And you may be able to come up with an agreement in advance that says, alright, we are going to calculate a fair commutation value and we will set up the mechanism to do this with the groups of actuaries or whatever and then we will make a $5,000,000 reduction to resolve these disputes. That sort of situation. That helps because now all you have to do is get some people to agree on what the losses are if these things were covered and you have a fixed amount that is not covered.

You then have to get into the calculation of the ultimate losses, present value, commutation value based on agreed coverages, and the magnitude of any remaining disputed items. And once you get to a certain point, if you get the two sides close enough, they may be willing to negotiate it because the differences are no longer material.

One situation we were dealing with...one side had a number of 75 million dollars and the other side had a number of a 100 million dollars. That is a big difference to both parties involved. And yet, once they had those it was relatively easy and it only took about two negotiating sessions to, for some reason, to split the difference. The old negotiating technique.

And, finally, if necessary, you should set up a...and I call it a modified arbitration. It is sort of like the baseball arbitration technique that I described earlier, where both sides picked a number and then you hire a third party, who is independent of everybody, to pick one or the other. That way, if one side is being unreasonable, they do not just getting stuck with a split the difference sort of situation. They can get a fair result from the commutation.

In closing, I'd like to say the best way you can do this is to avoid these problems to begin with. There a lot of companies that I see that buy more reinsurance than they need, merely because it is cheap. When reinsurance is cheap they lower their

retentions and buy a lot of it. When reinsurance is expensive they don't buy much of it. And generally I think the trend towards retaining more risk by many companies out there has been a very positive trend because it makes them care more about the business they write. Unfortunately, there are still companies out there...I'm trying to think...I don't remember the exact numbers, but in 1989 one insurer wrote something in the order of magnitude of 12 and a half billion dollars in premium and ceded four and a half billion of that. It seems to me an insurance company that size, probably ought to be retaining a lot more risk than it does, but it is still exploiting or it, at least, it believes it is exploiting the reinsurance market to its benefit. Thank you.

(Applause)

MS. HUTTER: Thank you, Dale. Our next speaker this afternoon is Jeffrey Mayer. Jeffrey is a consulting actuary with the New York office of Milliman & Robertson. Prior to joining M&R, Jeffrey was vice president with Kramer Capital and prior to that spent five years with Peat Marwick. Jeffrey is a Fellow of the Casualty Actuarial Society and a Member of the American Academy of Actuaries. He is a frequent speaker at the CAS and other actuarial forums. Jeffrey authored a paper for the CAS 1988 Call Paper Program. He has served on the CAS Examination Committee and currently serves on both the American Academy Committee on Property and Liability Issues and the CAS Nickelbocker Committee. Jeffrey will now discuss the considerations to establish a commutation price.

MR. MAYER: Thanks. Whoever really wants Dale's candid opinion on how reinsurance works is welcome to join us at dinner tonight. Dale is paying.

After that discussion on why commutations actually take place, and prior to Scott's discussion on the financial consequences of such commutations, I will discuss some of the issues that go into the pricing, not so much the negotiations, but rather the pricing of the commutations.

There are five major categories that I like to think of when working on a commutation. Those are the amount of future payments, commonly referred to as the IBNR valuation, which is nothing more really than a reserve study. What is the population of losses that we are talking about that will be commuted? This is number one. We will talk more in detail about how you might go about doing that. Number two is the timing of payouts. Unlike most reserve studies where the timing of payment is not necessarily an explicit consideration...the purposes of commutation where you have one shot at getting this pricing right; when you are dealing with the present value the timing is very important. Third, the interest rate or the discount rate, in this case, for purposes of present values. The economic value of risk. Again, you perform an analysis; you arrive at an

expected value of future payments and expected pay out patterns, an expected interest rate. You only have one shot at getting the commutation right. There are no reserves...set up where you can later shift from reserve to surplus. It is a reserve when you break it down, a premium will be paid or a reserve will be put up and a premium will be received.

And lastly, the financial and reporting aspects of the transaction. Scott will get more into those details later.

The IBNR valuation, for say, casualty excess of loss...sources of IBNR. Three major categories...case development, that is case reserves put up for a dollar and eventually settle for two dollars or a million dollars and settle for two million dollars. Pure unreported claims. Claims that have not been reported as of yet to the ceding company in the primary layer, or have been reported in the primary layer but not yet in the excess layer, what we refer to as pure IBNR.

The individual ceding company's perspective, from the ceding company looking at this book of business now, for purposes of reassuming from my reinsurer...I think about the abberations in the data. I'm dealing with a layer that I'm not accustomed to dealing with. Instability or that's why you purchased the reinsurance in the first place. We are dealing in a layer that the ceding company may very well not feel comfortable playing in it.

Treaty by treaty analysis. At times that is what needs to be done.

Entry data. One of the arguments that is commonly heard, is the argument that we are better than the average reinsurer. You can't use the industry data. We have lower limits, lower retentions, more basic business, no GL, no products, no malpractice, good malpractice. Not everyone can do better than the average.

On the other hand, the RAA in the industry date does not necessary dominate high layers hazardous risks. It is a useful tool. On the other hand, there is also a great deal of variations. You have to be very careful. That is the bottom line in using the industry data.

I'm now a ceding company looking to reassume my own book of business. What I want to look at for purposes of doing that analysis will be similar to reserving as a reinsurer. The information in that book there is really the kind of information one would want in doing an in depth reserve study. The kind of independent (inaudible) that is used for a commutation on the other person. Paid losses, outstanding losses, allocated expenses, claim counts, all from first dollar, if possible, gross, net, ceded, policy limits profiles, knowledge of the book quantitatively and qualitatively, premiums and other exposure information.

What are some of the advantages that the ceding company has? Well, for one thing, the ceding company presumably, has better knowledge of the underlying business. After all, they wrote the underlying policy.

What are some of the pitfalls that the ceding company has when paying to reassume this excess layer? One is data may be too unstable, not only for that specific ceding company, but just in general for analyzing higher layers. Data history for the particular ceding company's experience may be too short for doing any kind of meaningful analysis. The company may have inadequate appreciation of the extent of the excess development.

So there are three types of development. There is the net development, the gross, which is over and above any net retention but up to policy limits. And then there is difference, over and above the net retention and up to policy limits. In fact, the development pattern, both in magnitude and in length, then ranks as follows. The shortest and perhaps easiest development to look at is the net development followed by the gross and last followed by the excess.

A common rule of thumb in doing reserving is to look at the IBNR to case reserve ratio. And, in fact, one needs to be careful because "a reasonable value" may be inappropriate if you don't have a good feel for reasonable, that layer. What is reasonable for the net layer and/or for the gross layer may very well not be right for the excess layer.

Some possible approaches is to look at the net development and the gross development. Look and see the losses separately. Look at net losses and apply some industry type increasement factors.

At the assuming company side, the advantages that they would have in this type of calculations are, again, greater familiarity with the excess business, having worked in that, having...that is what they do...they assume the excess layer...a larger database, longer tails, and more data and history may be available. That puts them at an advantage over the ceding company.

Some of the pitfalls, again, not to be facetious, is that if they really understand the business so well why were they the ones that were having problems. If they understood it well they wouldn't have the problems they do. And maybe that acts as an advantage to the ceding company.

Over payment pattern...you know, we talk about having to project undiscounted ultimate losses, IBNR, case reserves, case development. We know get into having to calculate how those losses will pay out over time. Again, this is very important because a dollar today is different than a dollar tomorrow, so they say. Unfortunately, the RAA...well, the payment data is published on an industry basis is probably not quite as forthcoming as for loss information. The last and report to

payment, so you can think of the process as being...the accident occurs and gets reports. The accident gets reported and is then paid. That last lag may not be quite as long as (inaudible) to be careful. A lag reporting pattern may be a reasonable approximation...six months, twelve months, eighteen months, twenty-four months, or whatever.

Certainly if a payment pattern is (inaudible) reporting pattern is in all likelihood not right. The interest rate...no risk rates, (inaudible) rate, treasury note, something of that nature, the length you crossed on the payment pattern and using a higher rate (inaudible) for writing an amount less than a full value. Obviously, the higher rate is smaller dollars today that need to be transferred and change hands.

Discounted value of projected payments is less than a fear value for commutation from the ceding company. I'm getting one shot at taking back this risk. If I have done a expected value calculation...if I had my druthers I, obviously, would want to collect more premium than just what that expected value calculation would allow. Financial discretion in reinsurance, obviously, changes the risk characteristics and transactions that Dale mentioned earlier. (inaudible) reinsurance against a healthy ceding company. That place has a certain advantage to the reinsurer.

And, lastly, the financial affects and, again, something which Scott will discuss in greater detail. The actual long term affect, the true economic affect, of the transfer, of the commutation, on the deal, is the difference between a settlement, the ultimate settlement, and the ultimate discount today that is used to do the contract. On the other hand, the short term affect, for financial statement purposes, is the difference between the settlement value, ultimately...I'm sorry it is (inaudible) contract on (inaudible) reserve. It is the settlement value that is used in the contract that will be used to determine cash changing hands. The carry reserve is the liability (inaudible) surpluses, benefited or perked, by that difference. That is the short term impact of these deals.

Those are the words. There is a relatively simple example that follows in the next three or four exhibits. Nothing all that fancy here. Ceded incurred losses by accident year. Loss development factors. They are steady. Looking at those factors, the real key selection, I guess they would have to be what the tail factor is. The twelve to twenty-four, twenty-four to thirty-six and so on. Those factors would (inaudible) steady. The tail factors really is a guess. Again, we talked about how the assuming company presumably has a whole database to look at for purposes of supplementing this information, which only goes out by years. The ceding company may not have that experience.

(inaudible) basis, the same type of calculation, same type of analysis. Of course, note that the development factors are much

larger, the tail factor...they go out longer and they are, in magnitude, larger than perk factors were. From this calculation falls that not only an independent estimate, perhaps, of what the ultimate losses are, but in addition, a payment pattern that we mentioned on slide number 2, which needs to consider (inaudible) those losses, whatever you may agree on, on a discounted basis...how will they pay out. And they will pay out as follows.

The ultimate loss we decided on was 21.7 million dollars. The reserve that is being transferred is 8.4 million dollars. Column number four, future as of 12/89. 8.4 million dollars is the amount of dollars that is being commuted for which cash needs to change hands today. I suppose if I was the ceding company, now, reassuming those losses, I would like to receive 8.4 million dollars in cash. In fact, however, that is not going to be the case. We are going to look at the pay out of how the 8.4 pays out. Fairly quick pay out actually in this example. The present values and 7% as a discount rate, which today might be a little low. The 8.4 with present value down to 7.4. In an ideal world the troubled assuming company would transfer 7.4 million dollars of cash to the ceding company, for purposes of taking back 8.4 million dollars in liabilities.

Another scenario would be where the same undiscounted losses, 8.4 million dollars in column four, with a somewhat faster pay out, shifting losses more in calendar year 1990 and 1991, and less in the 1992 and subsequent. Using the same 7% interest would come to a consideration of 7.6 million dollars. Again, the pay outs are relatively short and therefore, the amount that the discount is not all that great. But, again, the fastest pay out, more dollars would transfer from the troubled assuming company to the now reassuming ceding company. And for 7.6 million dollars, the ceding company would reassume 8.4 million dollars of liabilities. In the real world the reinsurer would have their own estimate of those losses and in all likelihood, it would be a lot less than 8.4 million dollars. They would see a need to pay a consideration of significantly less, perhaps, than the 7.6 million dollars and the negotiations would get started, as Dale touched upon.

The financial impacts...financials on...impacts on financial statements can vary upon how one wants to book the transfer. I think Scott certainly would like to talk about that. Thank you.

(Applause)

MS. HUTTER: Thank you, Jeffrey. Our last speaker this afternoon is Scott Moore, who will discuss the accounting treatment, as we have promised, of these commutations. Although Scott is speaking last in the line-up this morning, the financial impact of a commutation usually is an integral part of the negotiation process for each party. Scott is a partner in the firm of Coopers & Lybrand in New York. He has been with Coopers & Lybrand for twelve years, where he specializes in the insurance and reinsurance industry. Thank you, Scott.

MR. MOORE: Good morning. Heidi, thank you.

As evidenced from Jeffrey and Dale's discussion on pricing and negotiating commutation agreements, there is a considerable amount of data that has to be gathered and evaluated to structure the agreement on terms that are agreeable to both parties.

A significant level of professional judgment is involved, because there is considerable business risk and uncertainty. As you can imagine, this presents some interesting challenges in determining the accounting treatment.

Before we engage in a discussion of the accounting treatment for commutations, I'd like to spend a couple of minutes reflecting on the significance of reinsurance recoverable to the insurance industry.

This first graph (Slide 2) presents reinsurance recoverable as a percentage of policyholders' surplus, the bar to the right represents the industry in total and the bar to the left, represents the reinsurance industry. As you can see from the graph, the industry has reported reinsurance recoverables equal to approximately two hundred percent of reported policyholder surplus.

Similarly, the reinsurance industry has reported about one hundred percent. Clearly, the significance of reinsurance recoverables is evident. This graph is based on reported information as contained in Best's Aggregates and Averages. The accuracy of these graphs is contingent on the accuracy of the ceded IBNR number that is reported in the annual statements.

The next graph (Slide 3) focuses on reinsurance companies. The first bar on the graph represents reinsurers who operate through the broker market and the second bar on the graph represents reinsurers who operate directly with ceding companies. The source for this is a study prepared by Nac Re for the 25 largest reinsurance companies who are members of the Reinsurance Association of America.

The graph indicates that for the broker market, the reinsurance recoverable amount is considerably more significant. While the percentages are very large, I don't view them in and of themselves as being alarming, providing that the ceding companies and the reinsurers have the proper mechanisms in place to track those recoverables and monitor the ability of the reinsurers to fulfill on the obligations assumed under the reinsurance agreements.

However, to the extent that these balances become questionable in terms of their collectibility or if they are going to have to be settled at some amount less than the full credit that's been taken in the financial statements, such as in the case of commutation agreements, the impact could clearly be significant.

This (Slide 4) will probably be your third or fourth definition of a reinsurance commutation. Just to review, a commutation is the reversal of an existing reinsurance agreement whereby the original ceding company reassumes the losses ceded to the reinsurer in exchange for consideration.

Jeff commented that the consideration is generally a discounted value, with the view that if properly invested, the original ceding company would be able to build a fund to cover the full extent of the liability being reassumed.

In (Slide 5) determining the accounting treatment for reinsurance commutations, there were several factors which had to be addressed. Some of the questions which had to be answered were: Could there be different treatment for the ceding company and the reinsurer or is symmetry in the accounting model necessary?

What is the effect, if any, of the gain or loss on the commutation? Should the gain or loss be reflected in the results of operations or reflected directly as an adjustment to surplus? If the gain or loss is reflected in the income statement, should it be reflected in underwriting income or in some other income or expense category?

There are questions about which balance sheet accounts would be impacted; questions about the impact on supporting exhibits and schedules in the annual statement; and the type of disclosure that will be needed in the annual statement.

If (Slide 6) the gain or loss on the commutation is reflected in underwriting results, it is potentially distortive with respect to the underwriting results that are being reported in the annual statement. That's not unique to the industry. Reserve strengthening and adverse development have distorted the current results over the years.

With respect to the impact on Schedule P many look to Schedule P to provide a view loss development and reserve adequacy. That will be potentially distorted by the effect of a commutation agreement if the Schedule P detail is to support the amounts reflected in the annual statement.

The value of the five-year historical data, in terms of utility for analysis, could be lessened by virtue of the fact that some of the key trade ratios would be distorted.

One of the arguments in favor of treating the gain or loss as a component of other income or expense would be that it is consistent with the treatment for writing off agent's balances receivable. An argument could be made that there is a similarity here; there is credit risk involved; and, it might be appropriate to eliminate the gain or loss from the pure underwriting results.

There (Slide 7) are a number of balance sheet accounts that have to be considered. I'd emphasize that these considerations have to be identified on the front end, as part of structuring and pricing the agreement.

There are a number of balance sheet captions that need to be analyzed. Obviously, the net result would be that some cash or investments would have to be transferred to satisfy the consideration required under the agreement.

Other accounts that need to be analyzed are the ultimate value of the reserves that are to be reassumed. The reinsurance recoverable balances that have been reflected on the ceding company's financials, and that includes not only the reinsurance recoverable on paid losses, the case reserves, and the IBNR, but also any allowances for uncollectible reinsurance that may have been established and, to the extent that the reinsurer is an unauthorized company, any reserve that's been charged to surplus for the Schedule F penalty.

The other category of balance sheet captions that need to be identified and analyzed would include any reinsurance balances due which would include not only the net balances due as of the date of the commutation through normal reporting and processing under the original contract terms, but it would also include any funds that might be withheld under the terms of the treaty.

Any balances due as a result of retrospective rate credits or any additional commission or contingent commission allowances that have been reflected in the ceding company's or the reinsurer's financial statements must also be analyzed.

To demonstrate (Slide 8) some of the accounting considerations, by way of illustration, let's consider the following assumptions: the outstanding reserves ceded at the time of the negotiation are $100 million. Those are the remaining outstanding reserves ceded by the original ceding company. The discounted value of those reserves is approximately $65 million.

After performing pricing studies and considering all other factors the negotiated settlement price is $55 million. I'll take a couple of minutes now to talk about some of the possible accounting scenarios.

In the first scenario (Slide 9), the reinsurer might argue, that the $100 million obligation has been satisfied by making the $55 million payment. Since there is no further commitment to pay any monies to the original ceding company the reinsurer should recognize a $45 million gain.

The original ceding company might take the position that it would not have entered into this agreement if it had intended to lose $45 million and that the essence of this agreement is to invest the $55 million over time to fund the $100 million. The original

ceding company might suggest it should record a liability for $55 million and cash for $55 million, and not recognize any profit or loss on this transaction.

I think this first scenario raises a couple of issues. Both the statutory accounting model and the GAAP accounting model, require that reserves be carried at full ultimate value. Recording the value of these reserves at $55 million would be prohibited; as that would essentially be a form of discounting.

If, in fact, the component of these reserves was workers compensation or perhaps medical malpractice, there might be some provision for discounting under the statutory guidelines.

An alternative proposal might be to record the reserves at $100 million and the cash at $55 million, but also record a deferred charge, an asset equal to the difference of $45 million, which would be amortized over the expected pay-out pattern as the investment income is received.

The issue here is that there would be a question as to the admissibility of the asset, certainly for statutory purposes. For GAAP, the substantive issue would be that this would be tantamount to discounting the reserves.

A second example (Slide 10), which is very similar to the first, using the same dollar amounts and assumptions. The reinsurer would argue, that it has a $45 million gain. It has been realized and, in fact, should be recognized that way, consistent with the first example.

The original ceding company might argue, that the discounted value is $65 million, and since the $55 million received will not be enough to fund the $100 million ultimate liability, they should recognize a loss of $10 million.

The original ceding company would record the liability for $65 million, cash for $55 and an expense for $10 million. Statutory accounting principles and GAAP, require full value accrual accounting. If the original ceding company recorded a deferred charge of $35 million, there would be a question of admissibility for statutory purposes. Again, in substance, we are dealing with a discounting issue.

In the third scenario (Slide 11), both the reinsurer and the original ceding company reflect a $45 million gain and loss, respectively. The reinsurer had a liability of one hundred million, paid $55 million and recorded a gain of $45 million. The original ceding company had a recoverable of $100 million, only realized $55 million and, in fact, has recognized a loss of $45 million.

Until (Slide 12) the last couple of years, there wasn't any authoritative guidance under statutory accounting practices for

accounting for reinsurance commutations. There is nothing in the NAIC Accounting Manual. There wasn't any information in the Examiner's Handbook or the instructions to the annual statement or any other authoritative sources.

The NAIC Working Group on Emerging Issues tackled this issue back in 1985 and it is important to note that the same issues arose with respect to the accounting treatment for uncollectible reinsurance. The issues are very similar and the conclusions of the Working Group are virtually the same for both issues.

The (Slide 13) NAIC Emerging Issues Working Group concluded at their meeting of August 5, 1987, that the full gain or loss should be recognized immediately for both the reinsurer and the original ceding company.

Implicit in all of this is that the losses should be recorded at ultimate value and there is no provision for any deferred charges. Thus, Scenario C (Slide 11), where there was symmetry in the accounting where the $45 million gain and loss is recognized, is consistent with the conclusions of the Working Group.

Secondly (Slide 14), the gain or loss should be reflected in underwriting income. There is no provision for direct charges or credits to surplus and there are no amounts reflected in other income or other expense, and no provisions for any combination of those.

The one instance where you would have a direct debit or credit to surplus would be where the ceding company did not have the recoverable fully collateralized from an unauthorized company and, as a result of the commutation, in going through the calculations of the Schedule F reserve, there would be a credit to surplus for the Schedule F penalty.

The third conclusion (Slide 15) was that all amounts involved in the commutation should be reflected in the income statement on the balance sheet and reflected in the pertinent exhibits and schedules, including Schedules P and F.

All losses and loss adjustment expense entries resulting from the commutation should be made in Schedule P to the appropriate accident year and the year in which the transaction occurs. This will be significant for performing various reserve studies.

The fourth (Slide 16), (Slide 17) conclusion was that all of the balance sheet accounts should be analyzed and should be effected to reflect the economics of the transaction. It can get pretty complicated looking at the debits and credits, but it shouldn't be a big task at the accounting stage because all of these account categories have to be identified as part of structuring the settlement arrangement.

The fifth (Slide 18) conclusion is a requirement for specific separate note disclosure for material amounts related to loss commutation agreements.

With respect to GAAP (Slide 19), there is really no authoritative guidance on accounting for reinsurance commutations.

The issue was discussed (Slide 20) some time ago by the AICPA's Insurance Companies Committee. There was a draft discussion memorandum several years ago. However, my understanding is that there haven't been any formal conclusions reached by that group.

It is safe to say there has been some divergence of practice in accounting for commutation agreements and the level of disclosure that exists. I don't think there will be any formal guidance on this until the loss reserve discounting issue is resolved. That issue is on the Financial Accounting Standards Board (FASB) agenda but it appears that it will be several years before the FASB develops a definitive position on discounting of loss reserves.

In practice, companies are going to have to use the best information available. The statutory accounting model makes a lot of sense and is the treatment that would leave companies open to the least criticism.

It just seems inappropriate for a ceding company, using the fact pattern from the example, to take credit over a number of years for the reinsurance recoveries in the financial statements, build up surplus of $100 million and then when circumstances, such as a loss commutation indicate that they will never realize the full $100 million to then defer the loss when, in fact, they know that the value of the credit they have taken over time has been impaired. That type of situation and that accounting treatment could lend itself to potential abuses, including manipulation of reported financial results.

There is no authoritative guidance that has come from the SEC. Informally, I am aware of instances where the SEC has indicated that they do not support any deferral of the loss recognition by the original ceding company.

I understand that there was at least one instance where the SEC became aware that a company had entered into a commutation agreement, through either reading management's discussion and analysis or a note disclosure, and inquired directly of the company the accounting treatment that was afforded.

The company had followed the statutory model and that was consistent with what the SEC was looking for. So although there is nothing formal the indications are that the SEC would look for companies to recognize any loss on a commutation arrangement.

The key here, in addition to appropriate accounting is for the reader of the financial statements to have meaningful note disclosure when the results of operations for the year are significantly impacted by one or two single agreements, such as loss commutations.

A (Slide 21) couple of other considerations. As I previously noted, the effects of the commutation must be reflected in Schedule P. The affected losses must be allocated by accident year. For any actuarial analysis, where loss development is being presented for purposes of analyzing the development and assessing reserve adequacy, to the extent that there are loss commutations in the data they need to be analyzed so that their impact on the loss development can be understood.

In the example, the ceding company would reflect adverse development a number of years out, across all accident years, to the extent of the loss of $45 million. Likewise, the reinsurer's Schedule P would show favorable development of $45 million, because it was able to settle reserves of $100 million for a $55 million payment.

From a loss reserve development and analysis perspective there are two approaches that could be taken: One, some judgments could be made to override the distorting effect on the loss development trend. Secondly, depending on how pervasive the reinsurance program was throughout the accident years, one might consider going back and restating the data as if the reinsurance program hadn't been enforced, so that there was more representative loss development history for purposes of reserve analysis.

Another area that could be a problem is that while the commutation negotiations, discussions and settlement are all generally between the original ceding company and the reinsurer, the reinsurer is ultimately going to need to look to its retrocessionaries for their support, participation and agreement that the commutation is both prudent and valid; that could present some complications.

I'm aware of one situation where a company executed the front end of a commutation and has been a little reluctant to finalize all the accounting because they haven't gotten the support of their retrocessionaries.

If the retrocessionaire was participating in a quota share program, it would probably be a easier to negotiate with them than on an excess of loss program. Another factor would be to settle up any broker balances and adjustments to the broker fees that might be required.

Briefly, some points on tax planning strategies under SFAS No. 96. Under the new accounting rules, which will be required in another year or so for companies reporting on a GAAP basis, the

provisions of the Tax Reform Act, requiring discounting of loss reserves for tax purposes and not for book purposes, give rise to a temporary difference.

That temporary difference is referred to as a deferred tax asset and there are limitations on the recognition of the asset. There are provisions for tax planning strategies which would enable a company to realize that asset. The essence of the tax planning strategies is to adjust the timing of when the temporary differences reverse, to ensure that they offset taxable income.

One tax planning strategy that has been debated pretty seriously within the insurance industry is a reinsurance arrangement where through a loss portfolio, a company could accelerate the reversal of the loss reserve discount by paying the losses.

Another view that has been given some consideration in the industry is that a loss commutation might be another tax planning strategy. Certainly there are others but these should give you can idea of the types of things companies are considering which you may find yourself involved with at some point.

The other (Slide 22) consideration, which I mentioned earlier, is potentially having an allowance for uncollectible reinsurance recoverable balances. By way of illustration, using my earlier assumptions, the ceding company, is going to record loss reserves of one hundred million; they are going to get cash of $55 million and a loss on the transaction of $45 million.

Presumably, the ceding company was aware that there might be a potential collectibility issue related to this reinsurer and previously they may have established a reserve for uncollectible reinsurance recoverables. Assuming they had established a reserve for $70 million for this particular reinsurer. From a financial reporting standpoint, the line items that this might show up on would depend on what captions the company had used.

But, pretax income would be benefited by $25 million from the commutation. If the $70 million allowance was specifically attributable to the $100 million recoverable, they would have provided $70 million when, in fact, they really only needed to provide $45 million, since they received a cash payment of $55 million, and the net of effect of the transaction would be a gain of $25 million.

Thank you.

(Applause)

MS. HUTTER: Thank you, Scott. We now have time for questions and answers.

QUESTION: My question is, I think, for Jeff. Most assuming carriers in a commutation exercise have their own retrocessional

protection, which Scott mentioned just briefly. Often this retrocessional protection will be affected by the fact that you have now commuted a piece of this horrible business that was originally sent over to you. Can you tell us how, in practice, commutation prices might be affected by the fact that the assuming carrier has some retrocessional protection of his own?

MR. MAYER: Can you repeat the question?

QUESTION: In quick terms, what about retrocessionaires? In theory, if you are the assuming carrier and you have some aggregate on your own book, it may not pay you to commute a treaty at all, because you have got back-end protection for the loss that is being transferred to you by the cedent. So how does that affect the actual price negotiations and the final settlement on the commutation?

MR. MAYER: I think it is part of the negotiations. Again, in the calculations we used we had expected values. The assumption was that they come out the same whether you are the ceding company or the assuming company, but they don't have to and, in fact, they won't. And one of things influencing the reinsurer is his net line and that would just be a negotiation issue.

MR. OGDEN: I might add something. One situation that I ran into, we had a reinsurer that wrote an excess of loss coverage that had a retrocessionaire that wrote an excess of loss coverage. What we did in that case was to take all the claims information that we had for the ceding company on a gross basis, and we fit some loss distributions to those claims and we actually split the gross losses into pieces by layers and involved the retrocessionaire, reinsurer and ceding company all in the process. It did work out that eventually everyone was able to negotiate. I mean, everybody thought they were paying too much and not getting enough, but the distribution by layers was enough to convince everybody that they were not getting beat in the process. In fact, the retrocessionaire and the reinsurer both ended up better off. The reinsurer was insolvent. The retrocessionaire wasn't. But the retrocessionaire just contributed a fair share of the commutation, rather than what its ultimate liability would have been under the treaty originally.

QUESTION: Does the retrocessionaire have to be brought into this?

MR. OGDEN: They don't have to be brought into the calculation. The reinsurer could negotiate with the retrocessionaire and the ceding company, independently, but in that situation, everybody was involved because it was a big transaction and it was worth everybody getting involved.

Other situations, there have been cases where the retrocessionaires were quota share and they just paid whatever part of the commutation they had. But you have to price it. As

the reinsurer, if you can collect at all or if you have such a small net liability and you are comfortable collecting it, maybe you don't commute it. Maybe you just say, I don't have a problem, I'm just going to pay you the claims when they come due. I have never run into a liquidator who would be unhappy with that outcome. So, if you have enough retrocession so that you have a very small net line and you don't want to bother with it, then maybe you just don't commute.

MS. HUTTER: I think I would like to add a comment following on that, Dale, because I think rarely does the reinsurer net down to zero and purchase full retrocession. Even if it were the case, that a reinsurer had netted to a very low line on a particular ceding company, I think at a minimum the reinsurer could be viewed to owe a duty of care to the retrocessionaire to make the retrocessionaire aware of the commutation possibility. Because if the retrocessionaire is, in fact, paying for the losses, I think that the retrocessionaire would want to be able to evaluate that.

But, another complicating factor is that most of these situations arise out of treaty reinsurance relationships between the reinsurer and the retrocessionaire, so that one ceding company to the reinsurer is just one treaty in that whole conglomeration of business to the retrocessionaire. Generally speaking, in the reinsurance business we still try to believe that the reinsurer, in the long run, will make that retrocessionaire whole. So the considerations are pretty complicated. All parties, especially the reinsurer who is in the middle of the ceding insurer and the retrocessionaire, would be particularly aware of making sure that the retrocessionaire is involved in that discussion. Whether it actually influences the commutation to proceed or not, depends on the significance of the retrocessionaire's participation.

QUESTION: Question for Scott. If I understood your three scenarios, in all three cases both the reinsurer and the reinsured believed that the liabilities were 100 dollars or a 100 million or whatever the value was, and the question was how do we account for this. It seemed to me a very reasonable scenario that they would have differences of opinion and I'd like some feed back on that. That's not the same as mirror image accounting. Mirror image accounting, as I understand it, is once you agree that the dollars are X, there ought to be X dollars no matter what you do.

MR. MOORE: No, I think your point is a good point. The starting point of 100 and 100 on both sides was done for convenience of the presentation. I was trying to demonstrate full value accounting versus some of the discounting concepts that were presented in those scenarios. I think the bottom line is, you are not going to agree and come up with the exact same number as the ultimate liability, but the accounting theory is that if I have a recoverable for either 90, 100, or 110, and if I'm getting 55 million, the accounting is pretty straight forward -- I've

realized a loss. I haven't realized that asset that I had reflected. I've only gotten maybe 55% or 45% on that and the accounting would follow. The symmetry that I was talking about...you get into the regulatory environment...they talk about mirror imaging reserves. Regulators are looking to see that if you take a credit for a hundred that somebody else has a debit for a hundred. You just can't do that. It's not very often that I've seen ceding companies notify the assuming company what the IBNR is. In some cases they will, but that doesn't necessarily mean that is what the assuming company is going to book. They are going to do their own study, based on whatever their own net is and you won't necessarily see that kind of symmetry. Is that sufficient?

PARTICIPANT: I've seen situations where a treaty is commuted and both the ceding company and the assuming company record gains.

(Laughter)

MS. HUTTER: Yes. This is one of the really odd things that I see in commutations. Often the first time where the ceding company's estimate of ultimate losses turns out to be higher than the reinsurer's. Sometimes there is a history where at each reinsurance renewal the reinsurer will propose a premium and the ceding company makes an argument that the premium shouldn't be that high, because the ceding company does not expect to have that much in ceded losses. Suddenly the reinsurance relationship terminates and the parties almost seem to be switching sides. That could be a factor, Scott. The convenience of the example is understandable in choosing 100 for both sides, but I think often times it would be the ceding company who was trying to argue for 110 as the ultimate losses and the reinsurer might have been saying, no, I think it is only 90.

Well, we have run out of time today. Right now please join me in thanking the panelist today for a job well done.

CASUALTY LOSS RESERVE SEMINAR

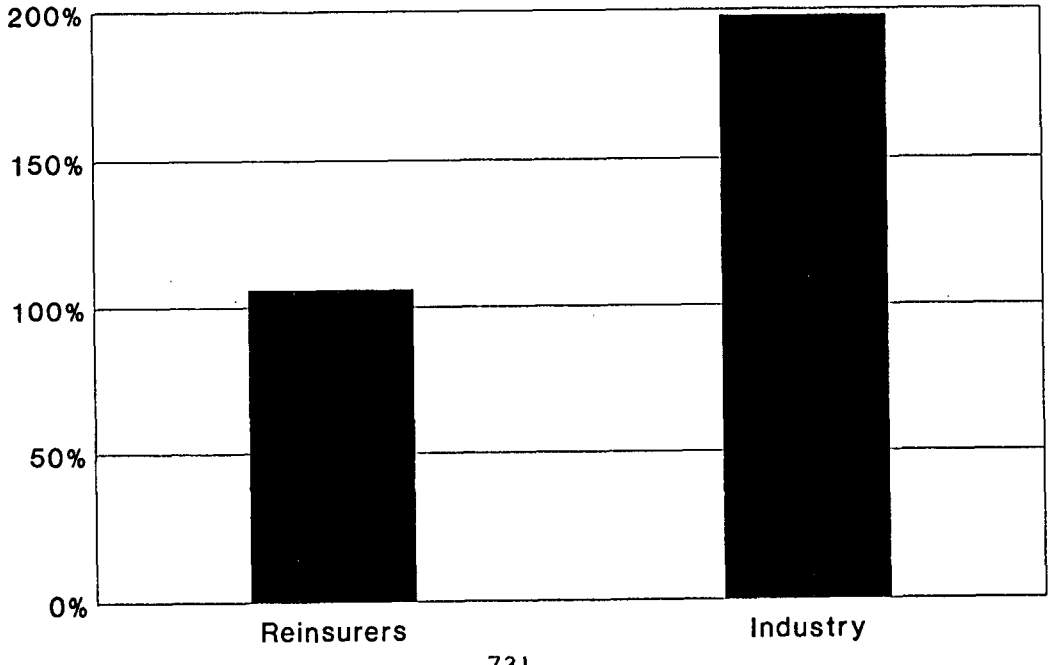
ACCOUNTING FOR COMMUTATION OF REINSURANCE CONTRACTS

Coopers & Lybrand | Solutions for Business™

Presented by Scott H. Moore

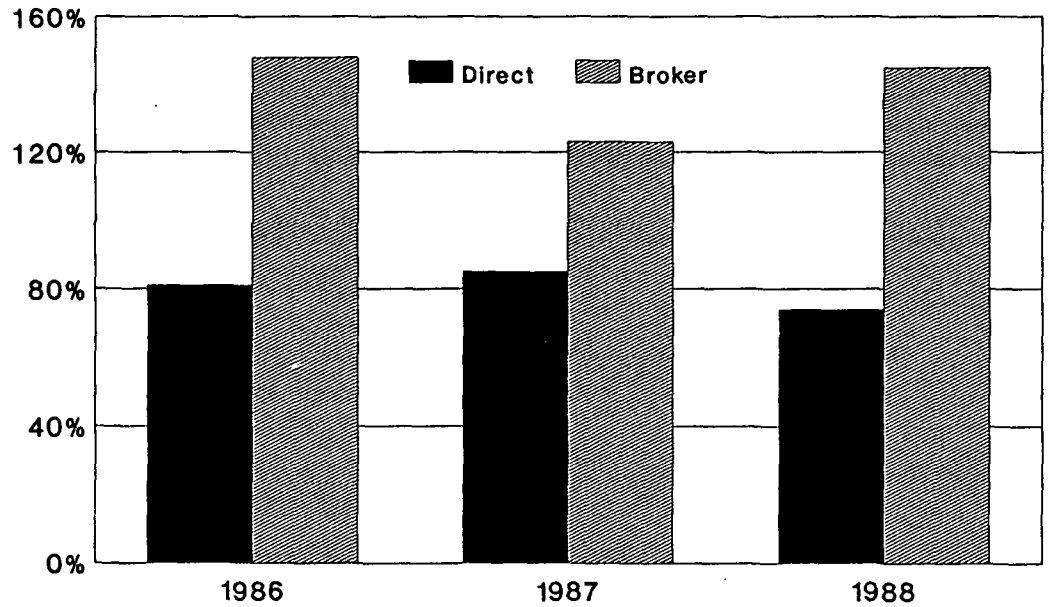
Slide 1

Reinsurance Recoverable as a Percentage of Policyholders' Surplus - 1988



Slide 2

Reinsurance Recoverable as a Percentage of Policyholders' Surplus



Slide 3

Reinsurance Commutations

- Reversal of an existing reinsurance agreement - ceding company assumes losses ceded to the reinsurer in exchange for consideration
- Consideration is generally a discounted amount of the expected ultimate liability
- Consideration is invested over time to cover future claim payments

Slide 4

Accounting Considerations

- Ceding Company
- Reinsurer
- Income vs. Surplus
- Underwriting Results vs. Other
- Balance Sheet Impact
- Disclosure

Slide 5

U/W Results vs. Other

- Underwriting Results
  - •• current year underwriting performance
  - •• Schedule P and Schedule F
  - •• five year historical data
- Other Income/Expense
  - •• consistent with treatment for write off of agents balances
  - •• loss development schedules not distorted

Slide 6

Balance Sheet Impact
Ceding Company / Reinsurer

- Cash
- Loss Reserves
- Reinsurance Recoverable
  - paid losses
  - unpaid / IBNR
- Reinsurance Balances Payable

Slide 7

Scenarios

Assumptions:

Ultimate value of reserves	$100 million
Consideration paid	$ 55 million
Discounted value	$ 65 million

Slide 8

Scenario - A

	Original Reinsurer	Original Ceding Co.
Loss reserves	$100	($55)
Cash	(55)	55
Gain (loss)	$ 45	$ 0

Slide 9

Scenario - B

	Original Reinsurer	Original Ceding Co.
Loss reserves	$100	($65)
Cash	(55)	55
Gain (loss)	$ 45	($ 10)

Slide 10

Scenario - C

	Original Reinsurer	Original Ceding Co.
Loss reserves	$100	($100)
Cash	(55)	55
Gain (loss)	$ 45	($ 45)

Slide 11

Accounting Considerations

- Statutory Accounting Practices (SAP)

Slide 12

NAIC Working Group on Emerging Issues - Conclusions

- Full income/loss must be recognized
  - reinsurer
  - ceding company

Slide 13

NAIC Working Group on Emerging Issues - Conclusions

- full income/loss must be recognized
- should be reflected in underwriting results

Slide 14

NAIC Working Group on Emerging Issues - Conclusions

- full income/loss must be recognized
- should be reflected in underwriting results
- all A/S schedules should be adjusted
  - Schedule P
  - Schedule F

Slide 15

NAIC Working Group on Emerging Issues - Conclusions

- full income/loss must be recognized
- should be reflected in underwriting results
- all A/S schedules should be adjusted
- adjust all appropriate B/S accounts

Slide 16

Balance Sheet Impact
Ceding Company / Reinsurer

- Cash
- Loss Reserves
- Reinsurance Recoverable
  - paid losses
  - unpaid / IBNR
- Reinsurance Balances Payable

Slide 17

NAIC Working Group on Emerging Issues - Conclusions

- full income/loss must be recognized
- should be reflected in underwriting results
- all A/S schedules should be adjusted
- adjust all appropriate B/S accounts
- disclosure in notes to financial statements
  - materiality
  - separate note disclosure

Slide 18

Accounting Considerations

- Statutory Accounting Practices (SAP)
- Generally Accepted Accounting Principles (GAAP)

Slide 19

GAAP

- No formal authoritative guidance
- Divergence of practice
- Will be impacted by resolution of discounting issue
- Securities and Exchange Commission
- Appropriate disclosure is key

Slide 20

Other Considerations

- Historical loss reserve data
- Retrocessionnaires
- Tax planning strategy under SFAS No. 96
- Allowance for uncollectible reinsurance

Slide 21

Illustration

	Ceding Co.
Loss reserves	($100)
Cash	55
Loss on commutation	($45)
Allowance for uncollectible reinsurance	70
Net gain	$25

Slide 22

1990 CASUALTY LOSS RESERVE SEMINAR

3G: REGRESSION METHODS

Moderator

Ben Zehnwirth
Insureware Pty. Ltd.

STOCHASTIC DEVELOPMENT FACTOR

MODELS

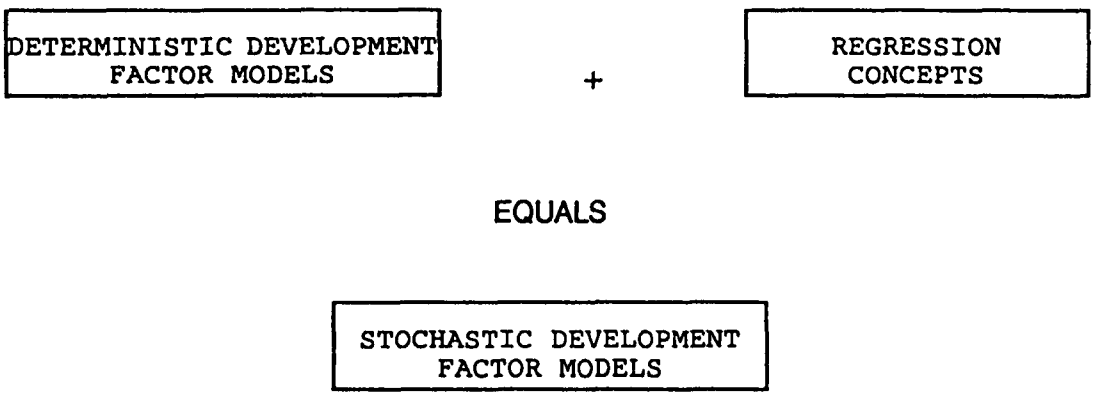
PAPER 1 PRESENTED IN SESSION 3G OF
CLRS, HELD IN DALLAS, SEPTEMBER 1990

THIS IS A COMPANION PAPER TO PAPER II
PRESENTED IN SESSION 6G.

Ben Zehnwirth, F.S.S., A.I.A.
A.I.A.A., B.Sc. (Hons), M.Sc., Ph.D.

0 INTRODUCTION AND SUMMARY

We begin with a loss development array for which accident years are completely homogeneous and deterministic and investigate its properties when the data are subject to trends. It is demonstrated that a deterministic relationship exists between the three directions, development year, accident year and payment (calendar) year. A number of rudimentary deterministic development factor models are introduced that possess the deterministic relationship satisfied by every loss development array. The deterministic development factor models are then extended and generalised to stochastic development factor models and the advantages afforded by this generalisation (a general FRAMEWORK) are described and illustrated on real life arrays. The Schemeta below depicts how we combine deterministic development factor models with regression concepts to obtain stochastic development factor models.



Schemeta

The recent surge of interest in stochastic loss reserving models has sadly created the impression, in some quarters, that stochastic models are only of theoretical interest and are not of practical use. We have aimed in this paper to demonstrate the practical applications of stochastic development factor models (with varying parameters). With this principal object in mind, we concentrate on modelling concepts, including:

. PARSIMONY;

. MAXIMUM INFORMATION;

. SIMPLICITY AND TESTABILITY;

. VALIDATION;

. STABILITY;

and methodological aspects including:

- SEPARATION OF SYSTEMATIC COMPONENTS FROM RANDOM COMPONENTS AND ASSESSMENT OF STABILITY OF FORMER;
- EFFICIENCY AND OPTIMALITY.

Two years ago, at the CLRS held in Atlanta, Zehnwirth (1988) discussed the advantages of stochastic regression models and contrasted them with the disadvantages of standard age-to-age development factor techniques. Kahane (1989) and Sundt (1989) also demonstrate the superiority of stochastic models discussed in the current paper. In a more recent paper Stavros (1990) lists the advantages afforded by extending standard age-to-age development factor models to stochastic development factor models. Indeed, Stavros illustrates how some of the stochastic development factor models described in the present paper may be estimated using a spreadsheet.

There are two categories of models discussed in the sequel:

- STOCHASTIC DEVELOPMENT FACTOR REGRESSION MODELS WITH FIXED (NON-RANDOM) PARAMETERS;
- STOCHASTIC DEVELOPMENT FACTOR REGRESSION MODELS WITH VARYING (OR RANDOM) PARAMETERS.

The second category of models are much more powerful and useful than the first. They accommodate the principle of parsimony by credibility weighting the data and consequently afford the following main critical advantages:

- SMALL(ER) PREDICTION ERRORS;
- INCREASED STABILITY;
- SEPARATION OF NON-ORTHOGONAL SYSTEMATIC TRENDS;
- AVOIDANCE OF MULTICOLLINEARITY;
- OBSERVATIONS ARE NOT ASSUMED TO BE NECESSARILY (UNCONDITIONALLY) INDEPENDENT.

In order to analyse any loss development array, we first describe a consistent and rational MODELLING FRAMEWORK for the analysis of any loss development array.

The main key advantages afforded by this FRAMEWORK include:

- EXTRACTION OF MAXIMUM INFORMATION FROM DATA BASE;
- FLAGGING OF CRITICAL CONDITIONS;
- DELIVERY OF STABILITY IN RESERVE AND PREMIUM RATING CALCULATIONS;
- COMPUTATION OF PREDICTION INTERVALS FACILITATING A MARGIN FOR ADVERSE DEVIATIONS;

. FUTURE LIABILITY PAYMENT STREAM (WITH STANDARD ERRORS) FACILITATING OPTIMAL ASSET/LIABILITY MATCHING.

MOST IMPORTANTLY, WE NEED TO QUANTIFY THE TREND IN THE PAYMENT/CALENDAR YEAR DIRECTION AND DETERMINE WHETHER IT IS STABLE OR NOT.

The paper is organised in six sections as follows:

Section 1: Describes the three directions (dimensions) of a loss development array, emphasising the non-orthogonality of payment year and accident year directions. Deterministic development factor models are introduced and discussed.

Section 2: Presents an introduction to regression models. Regression is the workhorse of Statistics and is also often misused and abused. Regression is the estimation of distributions, not just the estimation or fitting of equations.

Section 3: Presents a general family of stochastic development factor regression models that fall into two categories, viz., fixed parameter and varying parameter. A number of specific models belonging to the general model are described.

Section 4: Introduces varying parameter models. These models behave like credibility or exponential smoothing models.

Section 5: Discusses the principal modelling concepts and presents a number of test statistics. It is emphasised that a model contains 'information' and that each assumption of a model must be tested.

Section 6: Discusses the model identification process. It is emphasised that the 'best' identified model is sometimes not used for forecasting (projections).

Section 7: Presents a summary with conclusions.

THERE IS ONE ACCOMPANYING PAPER THAT APPLIES OUR MODELLING FRAMEWORK TO REAL LOSS DEVELOPMENT DATA. THIS PAPER IS PRESENTED IN SESSION 6G.

1. DETERMINISTIC AGE-TO-AGE DEVELOPMENT FACTOR MODELS.

1.1. INTRODUCTION

In this section we show, using some fundamental loss development arrays, the relationship between the three directions, **development year, accident year** and **payment year**. The deterministic relationship between the three directions paves the way for introducing a number of deterministic age-to-age development factor models. Development factors can be viewed (indeed, should be viewed) as trend parameters, equivalently, slopes of straight line segments.

1.2 LOSS DEVELOPMENT DATA

We assume, without loss of generality, that the loss development array is composed of incremental paid losses and that the exposure for accident year w is e(w). The incremental paid loss for accident year w and delay d will be denoted by p(w,d). The 'normalised' payment is

$$c(w,d) = p(w,d)/e(w) .$$

The best data array to analyse from the point of view of loss reserving are the incremental paid losses for the following reasons:

- we want to separate what is systematic from what is random in the payments;
- cumulating the data in the development direction masks the systematic component in the payments, especially if trends are changing in the payment year direction. See Section 1.3;
- we want to forecast future payment streams.

If you wish to obtain forecasts of incurred losses, then the incremental paids and case reserves should be analysed separately. Indeed, if incremental paids and case reserves are analysed separately, the corresponding 'inflation' parameters (see Section 3) will indicate whether payments lead case reserves or lag case reserves. Evidence of the former phenomenon will suggest that case reserves respond to payments and so there is very little information in the case reserves.

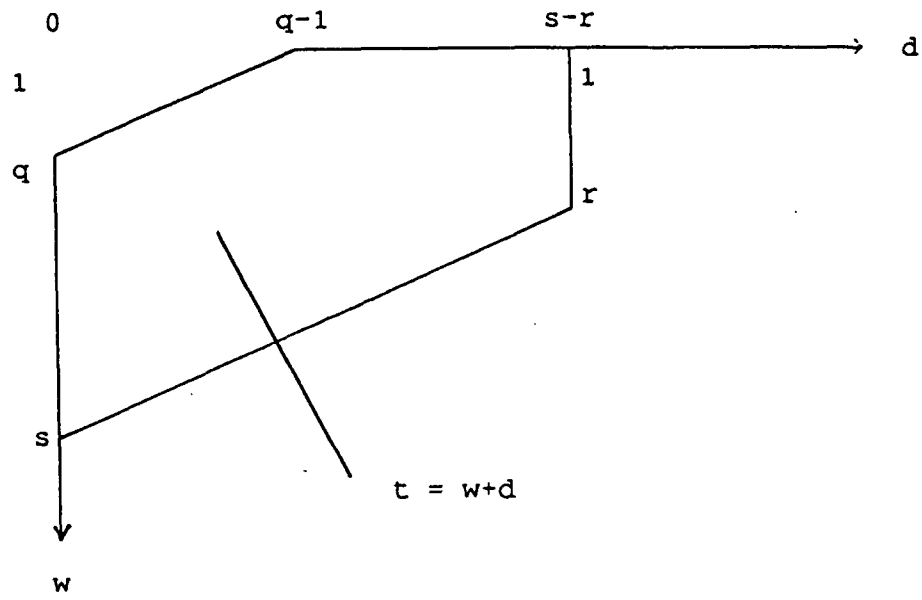
Furthermore, tracking of case reserves can be achieved using our prescribed modelling framework a la Fisher and Lange (1973).

TO AID THE EXPOSITION OUR DISCUSSION WILL BE IN TERMS OF INCREMENTAL PAID LOSSES. ALL THE MODELS WITH ASSOCIATED METHODOLOGY ARE APPLICABLE TO ANY LOSS DEVELOPMENT ARRAY.

1.3 FUNDAMENTAL PROPERTIES OF ANY LOSS DEVELOPMENT ARRAY

Loss development arrays necessarily involve three directions, viz., **development year** (or delay), **accident year** and **payment** (or calendar) **year**.

Development years are denoted by d; d=0,1,2,...; accident years by w; =1,2,...,s; and payment years by t; t=q,...,s.



Payment year t can be expressed as t = w + d.

The two directions, delay and accident year, are orthogonal, equivalently, they have zero correlation. That is, systematic trends in either direction are not projected onto the other. Most importantly, the payment year direction t is not orthogonal to either the delay or accident year directions. That is, a systematic trend in the payment year direction is also projected onto the delay and accident year directions. Similarly, accident year trends are projected onto payment year trends. See Section 3.

In order to aid the exposition we shall assume, without loss of generality, that the numbers in the loss development array are incremental payments. It is emphasised that all the arguments and concepts presented apply to all development arrays including incurreds, counts, averages and whatever.

We now illustrate the geometric properties of a loss development array with some data.

Consider the following triangle of incremental paid losses:

Triangle One

100	200	150	100	80	60	40	20
100	200	150	100	80	60	40	
100	200	150	100	80	60		
100	200	150	100	80			
100	200	150	100				
100	200	150					
100	200						
100							

This triangle satisfies the Cape Cod assumptions, viz., homogeneity of development factors across accident years and homogeneity of levels across accident years. Each accident year has the same initial starting value, that is, same value in delay 0. Suppose we subject the payments to a 10% yearly inflation across the payment years. We obtain the next triangle:

Triangle Two

100	220	182	133	117	97	71	39
110	242	200	146	129	106	78	
121	266	220	161	142	117		
133	293	242	177	156			
146	322	266	195				
161	354	292					
177	390						
195							

To obtain the t^{th} diagonal of the second triangle, we multiply each payment in the t^{th} diagonal of triangle one by $(1.1)^{t-1}$.

We observe the following:

1. The development years trends (equivalently, age-to-age development factors) in triangle two are 10% higher than in triangle one. Similarly for accident year trends.

2. For triangle two, age-to-age development factors are homogeneous across accident years (but are 10% higher than in triangle one).

Observation 1 implies that triangle two could be obtained from one by the two successive (and commutative) operations. Subject triangle one to 10% per year trend in accident year direction to obtain:

Triangle Three

100	200	150	100	80	60	40	20
110	220	165	110	88	66	44	
121	242	182	121	97	73		
133	266	200	133	106			
146	293	220	146				
161	322	242					
177	354						
195							

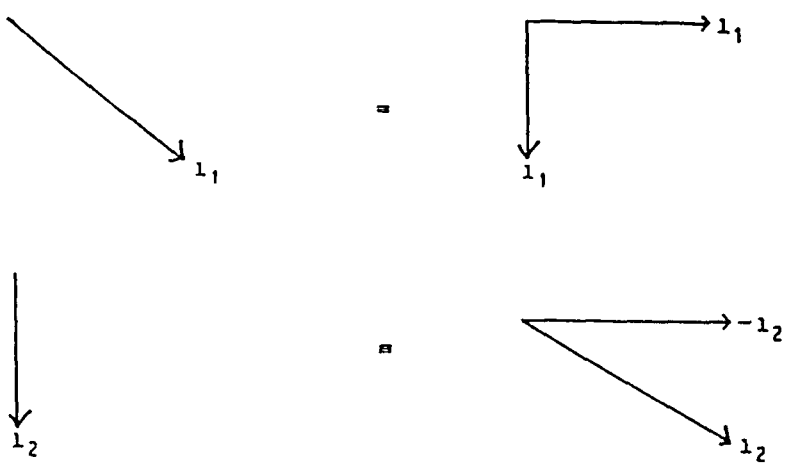
and then subject triangle three to 10% trend in the development year direction to obtain:

Triangle Four

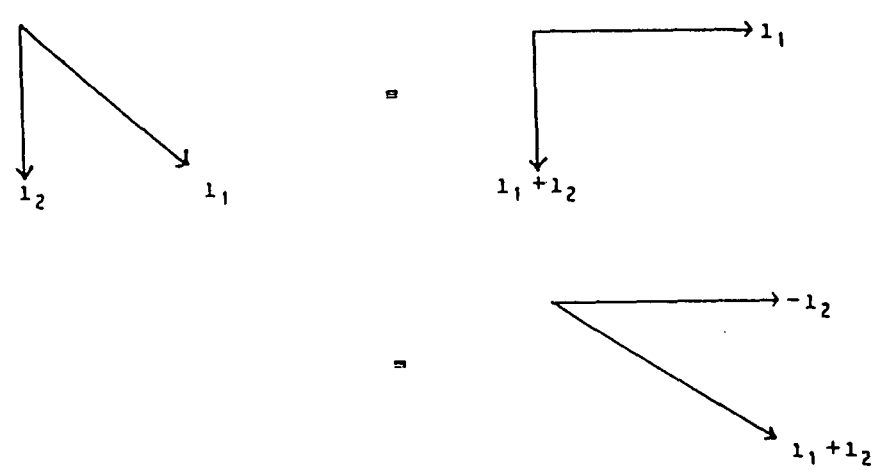
100	220	182	133	117	97	71	39
110	242	200	146	129	106	78	
121	266	220	161	142	117		
133	293	242	177	156			
146	322	266	195				
161	354	292					
177	390						
195							

Note that triangle four is the same as triangle two! A loss development array depicted by triangle two (or four) is said to satisfy the Cape Cod with constant payment year inflation assumptions.

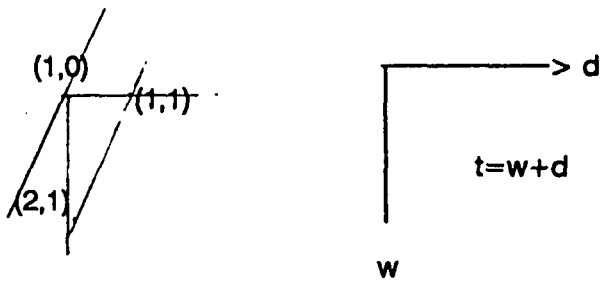
The following displays demonstrate the equivalence of systematic trends in general.



The above equivalence relations are exemplified by the relationships between the four triangles. We also have,



We describe in more detail the first equivalence (≈) relationship.



As you move from payment year t=1 to payment year t=2, the trend is i_1. When you move from cell (1,0) to cell (1,1), you are changing payment years so that trend is also i_1 along the d direction. Similarly, if you move from cell (1,0) to (2,1).

A GENERAL MODELLING FRAMEWORK MUST EXPLICITLY INCORPORATE THE ABOVE FUNDAMENTAL PROPERTIES OF ANY LOSS DEVELOPMENT ARRAY.

The abovementioned geometric properties of any loss development array are a fact of life. They can also be demonstrated algebraically.

1.4 DETERMINISTIC AGE-TO-AGE DEVELOPMENT FACTOR MODELS.

Denote the value in the cell corresponding to accident year in w and delay d by p(w,d). (N.B. Subsequent arguments apply irrespective of whether p is paid or not).

If e(w) denotes the exposure in respect of accident year w then the 'normalised' value in cell (w,d) is denoted by

$$c(w,d) = p(w,d)/e(w).$$

Let $y(w,d) = \log c(w,d)$.

The y values for triangle one are

Triangle Five

0	1	2	3	4	5	6	7
4.605	5.300	5.011	4.605	4.382	4.094	3.689	2.996
4.605	5.300	5.011	4.605	4.382	4.094	3.689	
4.605	5.300	5.011	4.605	4.382	4.094		
4.605	5.300	5.011	4.605	4.382			
4.605	5.300	5.011	4.605				
4.605	5.300	5.011					
4.605	5.300						
4.605							

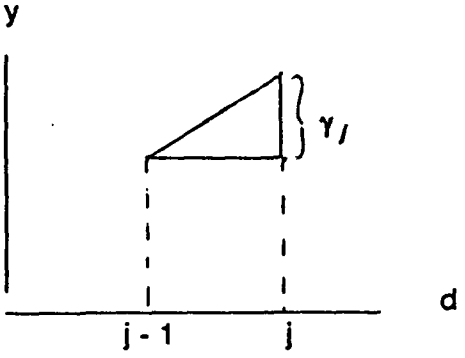
Let the Greek letter α (alpha) denote the value at delay 0 and let γ_d denote the difference

$$y(w,d)-y(w,d-1)-\log c(w,d)-\log c(w,d-1)-\log\left(\frac{c(w,d)}{c(w,d-1)}\right)$$

Since $$y(w,d) = y(w,0) + y(w,1) - y(w,0) + \ldots\ldots ,$$

we have $$y(w,d) = \alpha + \sum_{j=1}^{w+d} \gamma_j \qquad (1.4.1)$$

Note that α and γ_j are the same for each accident year w. The 'parameter' α denotes the initial value, or intercept or level whereas the parameter γ_j represents the trend, on a logarithmic scale, from delay j - 1 to j.



γ_j is the slope of the line segment (j - 1, y(j - 1)) to (j, y(j)).

Consider now triangle two. It was obtained from triangle one by subjecting it to a constant trend in the payment year/calendar year direction.

Let's denote the payment years trend on a logarithmic scale by the letter, ι (called iota).

The value y(w,d) that lies in payment year w + d is inflated by $\iota \cdot (w + d - 1)$.

So, for triangle two,

$$y(w,d) = \alpha + \sum_{j=1}^{d} \gamma_j + \iota \cdot (w + d - 1) . \qquad (1.4.2)$$

The last equation may be re-cast,

$$y(w,d) = \alpha + \iota \cdot w - \iota + \sum_{j=1}^{d} (\gamma_j + \iota) . \qquad (1.4.3)$$

This means that the levels increase across accident years by ι each year and each development factor γ_j has increased by ι. The development factors for Cape Cod with inflation are homogeneous across accident years but have each increased by ι, as we had for triangle two. Moreover, model (1.4.3) could have been derived by subjecting model (1.4.1) to an inflation ι in the two directions development year and accident year.

Equation (1.4.3) represents the deterministic Cape Cod with constant inflation model.

Since $\gamma_d = \log\left[\frac{c(w,d)}{c(w,d-1)}\right]$, it is a development factor on a logarithmic scale.

Equation (1.4.1) represents the deterministic Cape Cod model. Development factors (γ_d) are homogeneous and each accident year has the identical level α. Given the parameters α and (γ_d) of the model, it is straightforward to recreate the loss development array.

2. INTRODUCTION TO STOCHASTIC MODELS

2.1 INTRODUCTION

The central theme of quantitative techniques of forecasting is that the future can be predicted by discovering the systematic pattern of events in the past. Such a systematic pattern may be identified directly from historical arrays and combined with perceptions that the claims reserve may have of future systematic patterns.

The ability of a given statistical technique to forecast effectively in a specific situation depends largely on accurately identifying the systematic patterns and trends and selecting the correct technique and model to handle them.

In this chapter we present some fundamental principles of statistical forecasting, including concepts of uncertainty and standard error. Mean forecasts are meaningless without a quantitative assessment of uncertainty. Additional modelling and forecasting principles are discussed in Section 5.

Consider the experiment of tossing a symmetric coin 100 times. The probability of observing 50 heads is only 0.08, yet we expect 50 on the average. By that, we mean that if we repeated the experiment many times, the average of the observed outcomes is 50. It is important to also quantify how far the outcomes are from 50.

If, after repeating the experiment many times, we compute the average distance of the outcomes from the expected value (of 50), we obtain 5, approximately. That is, the standard deviation is 5. The value 5 is just as important as the value 50. The first time the experiment is conducted, we may observe 58 heads, the second time we may observe 45 heads, yet it is the same coin.

The value 50 is called the systematic component whereas the value 5 represents the quantification of randomness or noise. Even though we know everything there is to know about the coin, our forecast of 50 is subject to a 10% error (5/50 = 0.1)! We have no control over the inherent variability in the coin.

2.2 NORMAL DISTRIBUTION

The distribution most common in scientific work is the "normal" distribution, described by a bell-shaped curve; it was first investigated in depth by Gauss and is sometimes called the Gaussian distribution. It is constructed by assuming that the random variable can take on any value along some axis; the probability that it falls within any given interval is then made equal to the area under the same interval of the bell-shaped curve. The curve is completely specified by two parameters: the mean, μ (mu), which lies at the peak of the curve, and the standard deviation, σ (sigma), which measures how closely the values are distributed around the mean. The larger the standard deviation is, the more widely dispersed the data are.

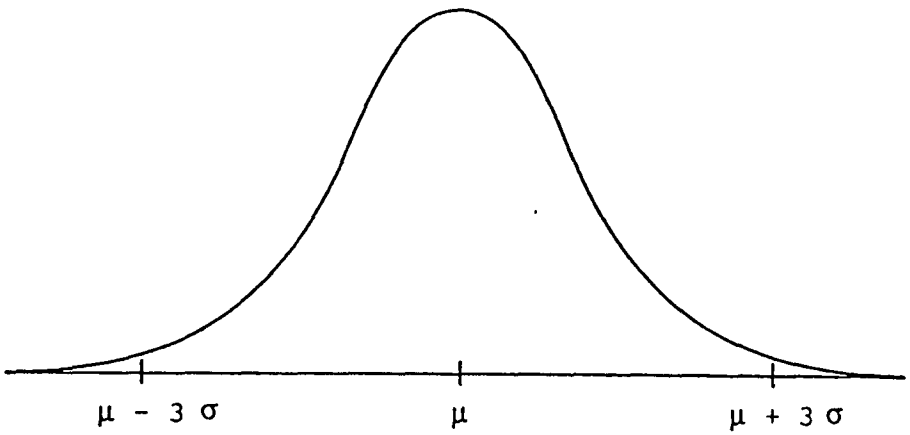


Figure 2.2.1 Normal distribution

A normal distribution (depicted in Figure 2.2.1) is bell-shaped and symmetric about the mean m. Although the range of a normal random variable Y is from $-\infty$ to ∞, the probability that Y takes very small or very large values is small. Put another way, it is 95% certain that Y lies within two standard deviations on either side of the mean. For more information on the normal distribution the reader is advised to refer to Hossack et al (1983).

2.3 RANDOM SAMPLE FROM A NORMAL DISTRIBUTION - THE SIMPLEST REGRESSION MODEL

In this section, we present some of the principles of regression modelling via a series of examples.

Example 1

Imagine that the IQ of Sydney actuaries is normally distributed with mean $\mu = 110$ and standard deviation $\sigma = 10$. The distribution is depicted in Figure 2.3.1 below. In probability theory a known mean and standard deviation are employed to predict future behaviour.

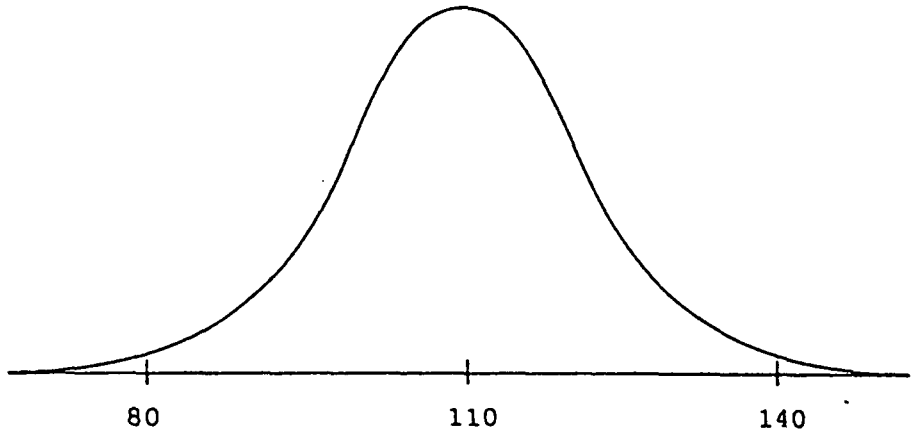


Figure 2.3.1 Distribution of IQ of Sydney actuaries

Our forecast of the IQ of a Sydney actuary chosen at random, is 110. This forecast is, of course, not spot on. There is a small chance that the IQ of an actuary chosen at random is less than 90. A 95% confidence interval is (90,130). If instead s is larger than 10, say 30, so that there is a very large variation in IQ's amongst actuaries, our forecast of 110 has a high likelihood of being wide of the mark. A 95% confidence interval in this case is (50,170).

The standard deviation σ of a distribution is important in determining the accuracy of a forecast. Without it, the forecast of 110 is quite meaningless. For a typical problem in statistics the mean μ and the standard deviation σ are unknown: from observed data the statistician must infer the mean μ and the standard deviation σ.

Example 2

Suppose that in Example 1 we do not know the values of μ and σ. However, we do have a random sample $y_1,...,y_n$ taken from a normal population of IQ's with mean μ and standard deviation σ. A plot of the random sample (equally spaced) is depicted in Figure 2.3.2.

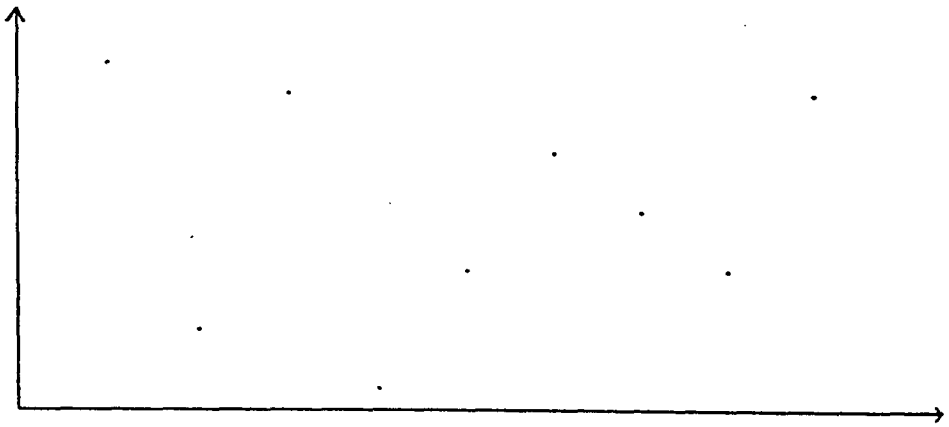


Figure 2.3.2 A random sample of IQ's

We assume that each y_i is a measure of μ with some degree of error. A model for this is each observation y_i is equal to μ plus a zero mean error term e, that is,

$$y_i = \mu + e_i$$

where each e_i is normally distributed with mean zero and standard deviation σ. The mean μ is the systematic component whereas the error term e_i is the random component. This model is the simplest regression model! The regressor is unity, that is, 1. The model is depicted in Figure 2.3.3 below.

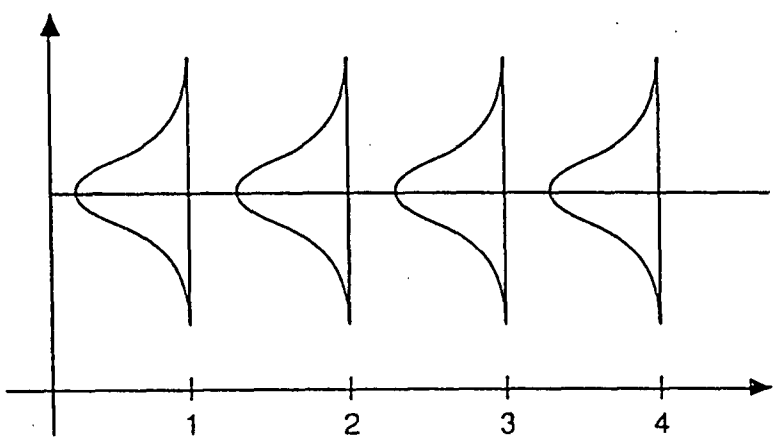


Figure 2.3.3 The simplest regression model

Equivalently, $y_1, y_2, \ldots, y_n$ are independent observations from a normal distribution with mean μ and standard deviation σ. In general we can write

DATA = SYSTEMATIC + ERROR ,

or

DATA = SIGNAL + NOISE .

Here, μ is the systematic component and e is the random (error) component.

The least squares estimator $\hat{\mu}$ of μ is obtained by minimising $\Sigma(y_i-\mu)^2$ over all μ . The answer, as expected, is

$$\hat{\mu} = \bar{y} = \Sigma y_i/n .$$

That is, the sample mean is the least squares estimator of the population mean μ. That is, the sample mean is a regression estimator! It is the best line with zero slope.

The Sum of Squares of Error (SSE) by fitting this model is

$$SSE = \Sigma(y_i - \hat{y}_i)^2$$

where $\hat{y}_i$ is the 'expected value' of y_i under the model. Since each y_i is predicted by $\bar{y}$ we have

$$\hat{y}_i = \bar{y} .$$

The estimate of σ is given by $\sqrt{(\sum (y_i - \bar{y})^2/(n-1))}$, the sample standard deviation.

The forecast $\hat{y}$ of the IQ, y, of a random Sydney actuary is $\hat{y} = \bar{y}$.

But there are now two sources of error in the forecast.

- The amount of noise in the process denoted by σ as in Example 1.
- Sampling error, or parameter estimation error. The quantity $\bar{y}$ is only an estimate of μ.

Accordingly, the standard error (estimate of standard deviation) of the forecast $\hat{y}$ is $(S^2/n + S^2)^{\frac{1}{2}}$ where S is an estimate of σ, the noise in the process, and $S/\sqrt{n}$ is an estimate of the sampling error inherent in the estimate $\bar{y}$ of μ.

Standard Error and Uncertainty

Since an estimate is based on information obtained from a 'sample' it is subject to sampling variability; that is, it differs from the figure that would have been produced if all the population values had been observed. A measure of the likely difference is given by the standard error. There are about two chances in three that a sample estimate will differ by less than one standard error from the true figure that would have been obtained if all population values had been observed, and about nineteen

chances in twenty that the difference will be less than two standard errors. The standard error measures the uncertainty associated with the estimate. The same arguments apply to the standard error of a mean forecast.

2.4 REGRESSION MODELS

In Section 2.3 we described the simplest regression model, viz., a random sample taken from a normal distribution (population).

Suppose we conduct the following experiment. We sub-divide the population of Sydney actuaries into sub-populations based on systolic blood pressure. All actuaries with the same blood pressure x belong to the same sub-population. Suppose there are p sub-populations denoted by blood pressures $x_1, x_2,...,x_p$. We now draw the frequency plot of IQ's in each sub-population. The distributions are depicted in Figure 2.4.1 below.

We observe: (i) each sub-population of IQ's has a normal distribution;
(ii) each sub-population has the same variance; and
(iii) the means of the sub-populations are connected by a straight line.

This model has two equivalent formulations:

$$E[Y|X=x] = \alpha + \beta * x \ ,$$

$$Var[Y|X=x] = \sigma^2$$

and

$Y|X=x$ is normal,

or

$$y_i = \alpha + \beta * x_i + e_i \qquad (2.4.1)$$

where each e_i is $N(0,\sigma^2)$.

That is, for a given X=x, the corresponding Y observation consists of the value $\alpha + \beta * x$ plus an amount of error e. The quantities α (alpha) and β (beta) are unknown parameters. The error term e is an integral component of the model.

Figure 2.4.1 represents model (2.4.1) graphically. For a value of X=x, Y has a normal distribution with mean $\alpha + \beta * x$ and variance σ^2. For each x value, the corresponding sub-population of Y values has a normal distribution with a variance σ^2. For different x values the means of the sub-populations are related linearly ($\alpha + \beta * x$), but the variances are the same (σ^2).

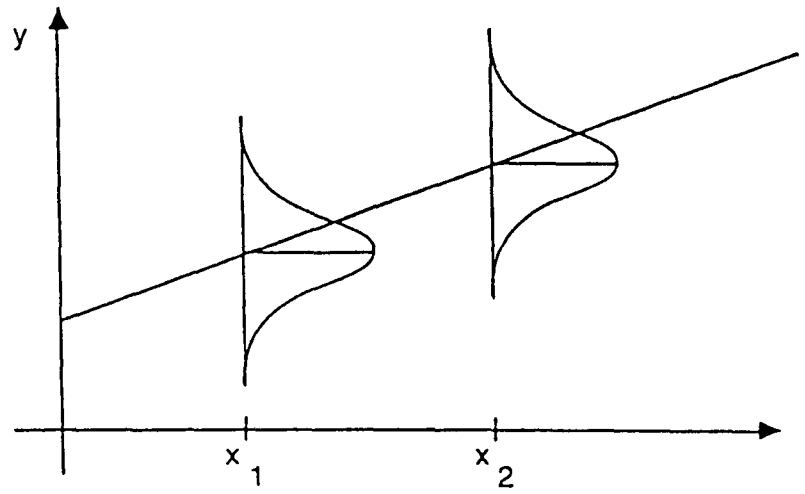


Figure 2.4.1 Representation of a linear model with error

Again,

DATA = SYSTEMATIC + ERROR,

where now,

SYSTEMATIC = $\alpha + \beta * x_i$.

Note hat this simple linear regression model contains a lot of information. Once we estimate the parameters α, β (and σ^2) of the model using a sample $(x_1,y_1), \ldots,$ (x_n,y_n), we have an estimate of the distribution of IQ's for any sub-population, alternatively, any x value.

Of course, each assumption of the model must be tested. Are the data consistent with the model assumptions?

(A1): Linearity of means

(A2): Constancy of σ^2

(A3): Normality of distribution of Y conditional on X=x.

The least squares estimators of the parameters α (intercept) and β (slope) are obtained by minimising the sum of squares of errors

$\Sigma(y_i-(\alpha+\beta*x_i))^2$

with respect to α and β . We let $\hat{\alpha}$ and $\hat{\beta}$ denote the lest squares estimators. The estimated regression equation is given by

$$\hat{y} = \hat{\alpha} + \hat{\beta} * x.$$

Typically the least squares line $\hat{\alpha} + \hat{\beta} * x$ does not pass through all the n data points. It does not explain all the random variation in the data $y_1,...,y_n$.

The difference between the observed and the estimated values of Y at $X=x_i$ is the deviation (or residual),

$$\hat{\varepsilon}_i = y_i - \hat{y}_i ,$$

which is an estimate of the error e_i at $X=x_i$.

Figure 2.4.2. shows the relationships among the theoretical regression line, the least-squares line and the sample points.

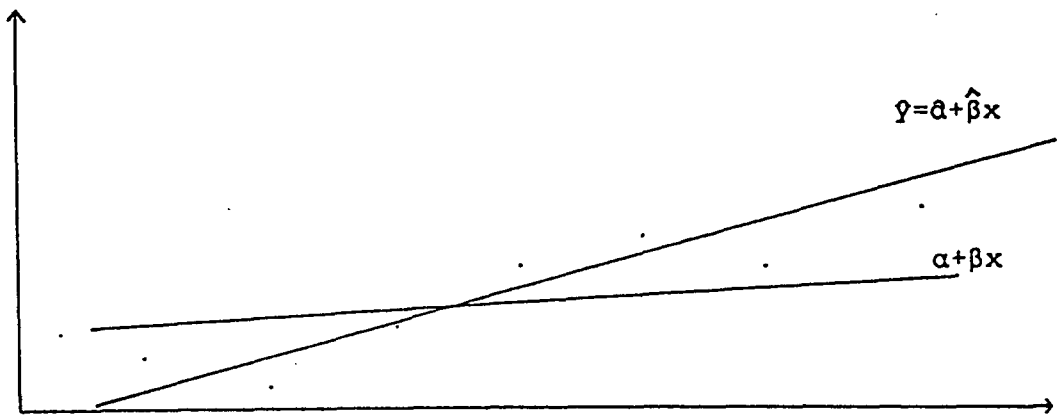


Figure 2.4.2. Relationship between theoretical regression line and least-squares line

In general for any regression model (and in particular here),

Total Variation in y = Variation explained by the model + Sum of Squares of Error

Equivalently,

Sum of Squares about the mean = Sum of squares due to model + Sum of Squares about model

Expressed notationally,

$$SST = SSR + SSE$$

TOTAL SUM OF SQUARES = REGRESSION SUM OF SQUARES + ERROR SUM OF SQUARES

and mathematically,

$$\Sigma(y_i-\bar{y})^2 = \Sigma(\hat{y}_i-\bar{y})^2 + \Sigma(\hat{y}_i-y_i)^2$$

This shows that, of the variation in the y's about their mean $\bar{y}$, some of the variation is explained by the model and some by the fact that the actual observations do not lie on the straight line. A way of assessing how useful a model will be as a predictor, is to see how much of the variation in y is explained by the model. We should be pleased if the variation explained by the model is very much greater than the variation about the model (noise), or, what amounts to the same thing, if the ratio

$$\text{R-squared} = \frac{\text{Variation explained by model}}{\text{Total variation}}$$

$$= \Sigma(\hat{y}_i-\bar{y})^2/\Sigma(y_i-\bar{y})^2$$

$$= SSR/SST$$

is not too far from unity.

If there is no error, then the line passes through all the n data points (a perfect fit), $\sum (\hat{y}_i - y_i)^2 = 0$, so that R-squared = 100%.

We also mention that

$$\text{R-squared} = r^2_{y,\hat{y}} \text{ , where } r_{y,\hat{y}}$$

is the correlation coefficient between observed values and expected values under the model.

With the assumption of normal error terms, it can be shown that the least-squares estimators $\hat{\alpha}$ and $\hat{\beta}$ are normally distributed with mean α and β respectively and variances $\hat{\sigma}^2_{\alpha}$ and $\hat{\sigma}^2_{\beta}$ respectively.

In the output of a regression program the quantities $\hat{\sigma}_\alpha$ and $\hat{\sigma}_\beta$ are called the standard errors of $\hat{\alpha}$ and $\hat{\beta}$ respectively. They may be used in drawing inferences about α and β. For example, to test the hypothesis H: $\alpha = 0$ (zero intercept) the "T-ratio" $\hat{\alpha}/\hat{\sigma}_\alpha$ is compared with an appropriate value from the T-distribution. A T- ratio whose absolute value exceeds approximately 2 will often be regarded as significant for our purposes, i.e., if

$$|\hat{\alpha}/\hat{\sigma}_\alpha| > 2$$

we leave the parameter in the model. Otherwise, we may assume it to be effectively zero.

The estimate of σ for model (2.4.1) is given by S where

$$S = \sqrt{(SSE/(n-2))}.$$

Corresponding to the observation x_0, the value y predicted by the model (2.4.1) is

$$\hat{y} = \hat{\alpha} + \hat{\beta} * x_0.$$

The standard error of the forecast $\hat{y}$ is given by

$$s.e.(\hat{y}) = S[1 + 1/n + (x_0 - \bar{y})^2/\Sigma(x_i - \bar{y})^2]^{\frac{1}{2}}$$

where S is the estimate of σ.

The standard error is a minimum when $x_0 = \bar{x}$ and increases as we move away from $\bar{x}$. For values of x outside our experience - that is outside the range observed - our predictions have an even higher standard error and are therefore less precise.

Our model describes the distributions of the Y values for each value of X. Our estimated distributions are: for $X=x_0$, Y has a normal distribution with mean $\hat{\alpha} + \hat{\beta} * x_0$ and variance $s.e.^2(\hat{y})$.

Note that a small R-squared may mean a large S and thus a large forecast error. On the other hand, even though an additional parameter added to the model increases R-squared, it also increases the forecast error by approximately S^2/n. A compromise has to be found between the number of significant parameters and small forecast errors.

For the user who is interested in a lucid exposition of regression analysis, the text by Chatterjee and Price (1977) makes for excellent reading.

2.5 RESIDUAL ANALYSIS

We have stated some of the basic theoretical results that are used for making inferences in the context of the simple linear regression model. Many of these results also apply to any regression model. It is emphasised that these results are valid and have meaning only if the assumptions (A1)-(A3) of Section 2.4 are satisfied. We have also assumed that the error terms are independent observations from a normal distribution with mean 0 and variance s^2. This assumption must be checked. For this reason, graphs of standardised residuals are of paramount importance.

"Almost all the greatest discoveries have resulted from a consideration of what we have elsewhere termed RESIDUAL PHENOMENA, of qualitative or numerical kind, that is to say, of such portions of the numerical or quantitative results of observation as remain outstanding and unaccounted for after subtracting and allowing for all that would result from the strict application of known principles." Sir John F.W. Herschel, Bart K.H. in **Outlines of Astronomy**, Lea and Blanchard, Philadelphia, 1849, p. 548.

Recall that the residuals are defined as the n differences

$$\hat{\varepsilon}_i = y_i - \hat{y}_i, \; i=1,2,...,n$$

where y_i is an observation and $\hat{y}_i$ is the corresponding fitted value obtained by use of the fitted regression equation. The residuals $\hat{\varepsilon}_i$ are the differences between what is actually observed, and what is predicted by the regression equation - that is, the amount that the regression equation has not been able to explain. The quantity S is the estimate of the average variation about the regression line. Accordingly, the ratio $\hat{\varepsilon}_i/S$ is called the 'standardised' residual. The standardised residuals allow us to identify any unusual observations. If our fitted model is correct, the residuals should exhibit tendencies that confirm the assumptions that we have made, or at least should not exhibit a denial of the assumptions. We should ask, "Do the (standardised) residuals make it appear that our assumptions are wrong?"

If the model being entertained holds (and n is relatively large) the n standardised residuals are independent observations from a normal distribution with mean 0 and standard deviation 1. Accordingly we expect approximately 1 in 20 standardised residuals to be greater than 2 or less than -2. Figure 2.5.1 depicts well behaved residuals.

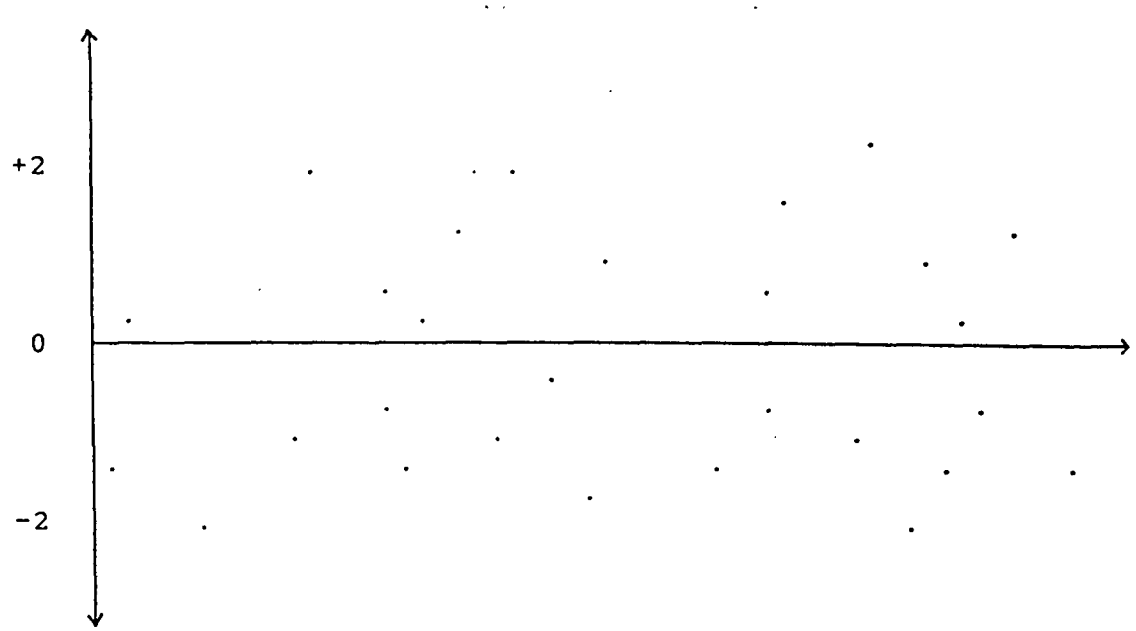


Figure 2.5.1. An example of well behaved residuals

The reader should bear in mind that residual plots should be regarded as diagnostic tools. In the context of claims reserving, our assumptions will not appear to be violated if plots of the residuals against (i) delay, (ii) accident years and (iii) payment years, do not exhibit any systematic trends or patterns. If a model is properly specified and explains most of the variation in the data, then the unexplained variation (residuals) should represent randomness (that is, white noise). There are tests both diagnostic and formal, involving residuals.

Anscombe (1973) has constructed four interesting data sets. The data and corresponding plots are given in Table 2.5.1 and Figures 2.5.2 - 2.5.5.

TABLE 2.5.1

FOUR DATA SETS HAVING THE SAME SUMMARY STATISTICS

XY	YI	X2	Y2	X3	Y3	X4	Y4
10	8.04	10	9.14	10	7.46	8	6.58
8	6.95	8	8.14	8	6.77	8	5.76
13	7.58	13	8.74	13	12.74	8	7.71
9	8.81	9	8.77	9	7.11	8	8.84
11	8.33	11	9.26	11	7.81	8	8.47
14	9.96	14	8.10	14	8.84	8	7.04
6	7.24	6	6.13	6	6.08	8	5.25
4	4.26	4	3.10	4	5.39	19	12.50
12	10.84	12	9.13	12	8.15	8	5.56
7	4.82	7	7.26	7	6.42	8	7.91
5	5.68	5	4.74	5	5.73	8	6.89

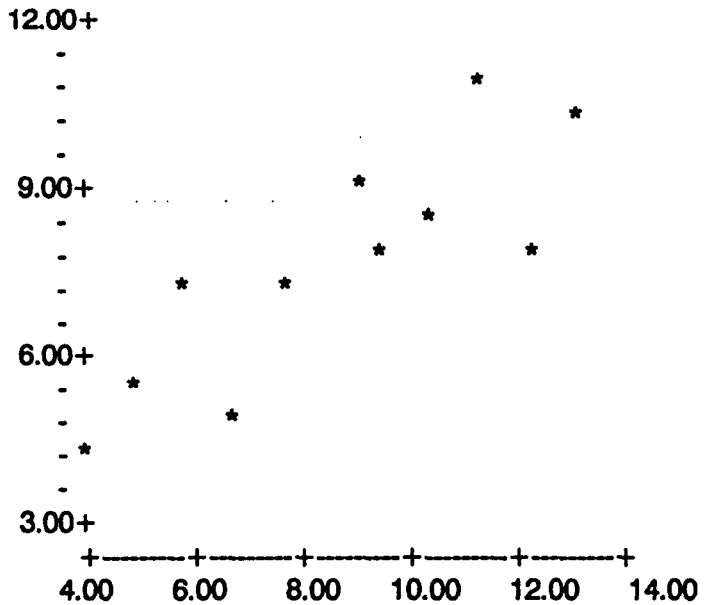


Figure 2.5.2 Plot of the data (x1,y1)

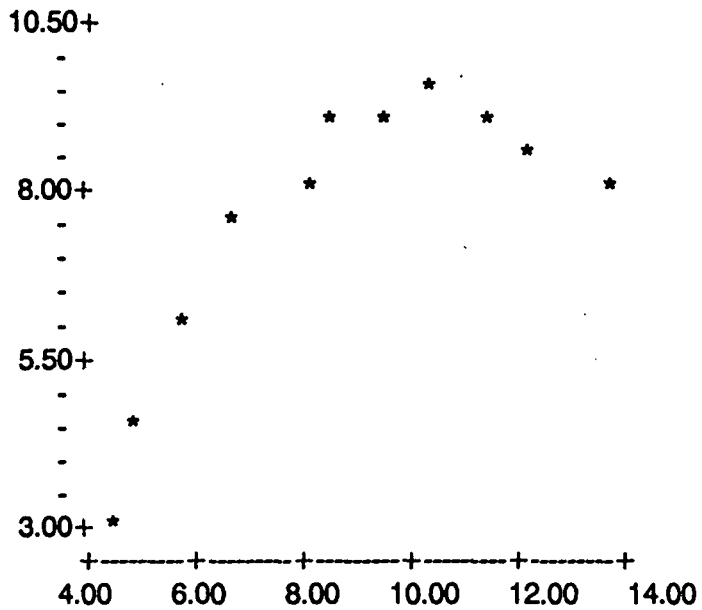


Figure 2.5.3 Plot of the data (x2,y2)

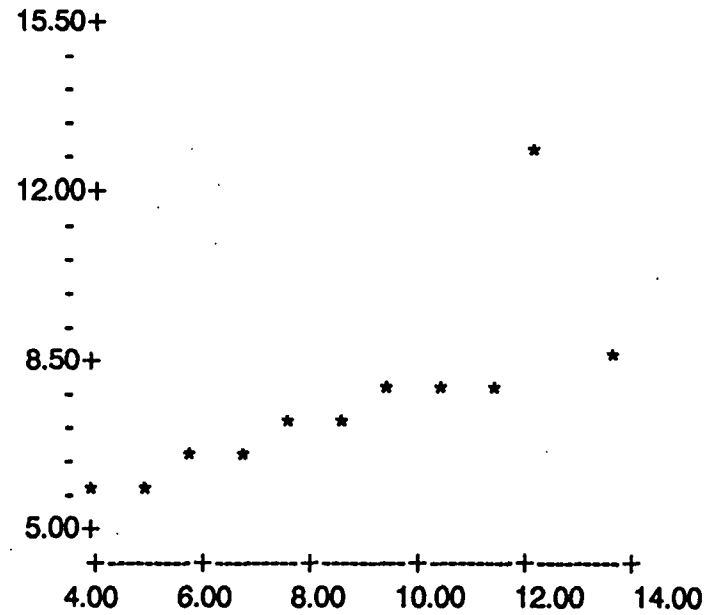


Figure 2.5.4 Plot of the data (x3,y3)

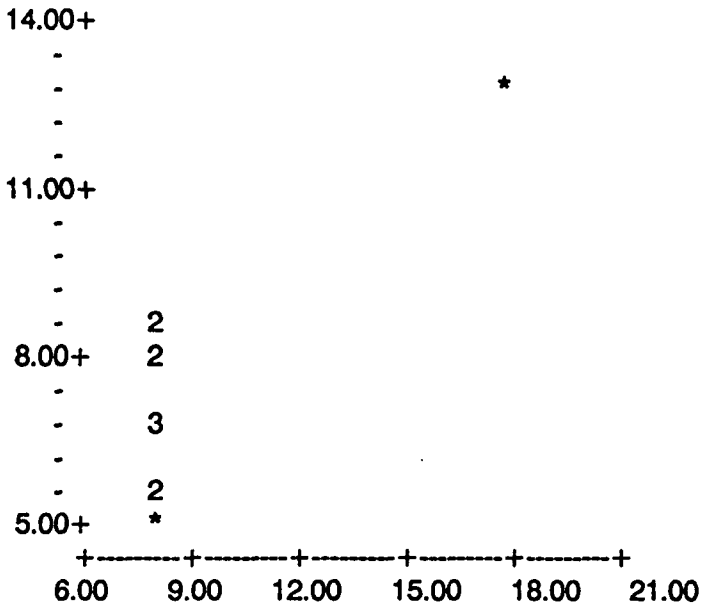


Figure 2.5.5 Plot of the data (x4,y4)

Each of the four data sets gives the same simple linear regression results shown in Table 2.5.2.

TABLE 2.5.2

REGRESSION FOR THE FOUR SETS OF DATA

PARAMETER	ESTIMATE	ST. ERR. OF ESTIM.	T-RATIO
ALPHA	3.00	1.125	2.67
BETA	0.50	0.1179	4.24

S = 1.237

R-SQUARED = 66.7 PERCENT

The T-ratio indicates that both the parameters alpha (α) and beta (β) are significant. The satisfactory value of R-squared and significant T-ratios do not ensure that the data has been well fitted, therefore, any analysis based exclusively on R-squared and examination of $\hat{\alpha}$ and $\hat{\beta}$ and their standard errors would not have been able to detect differences in patterns. Gross violations of model assumptions can seriously distort conclusions.

The residual plots for the four data sets are given in Figures 2.5.6 to 2.5.9. Only the first one seems satisfactory.

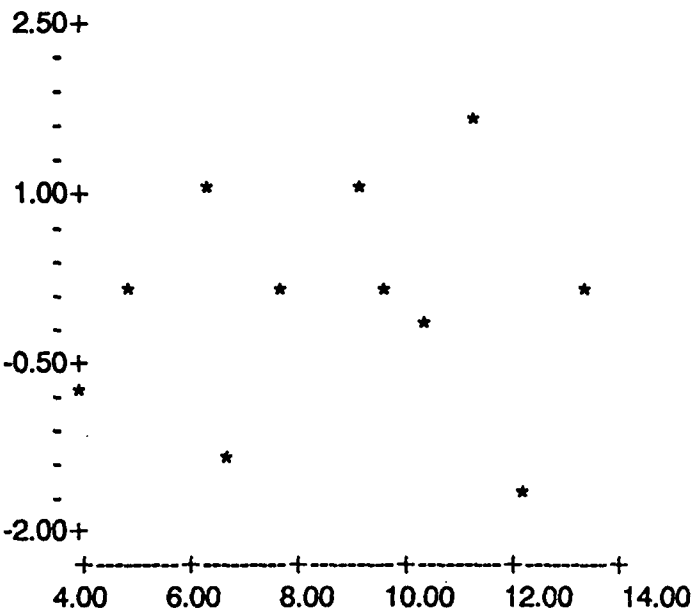


Figure 2.5.6 Plot of standardised residuals for first data set (Figure 2.5.2) against x1

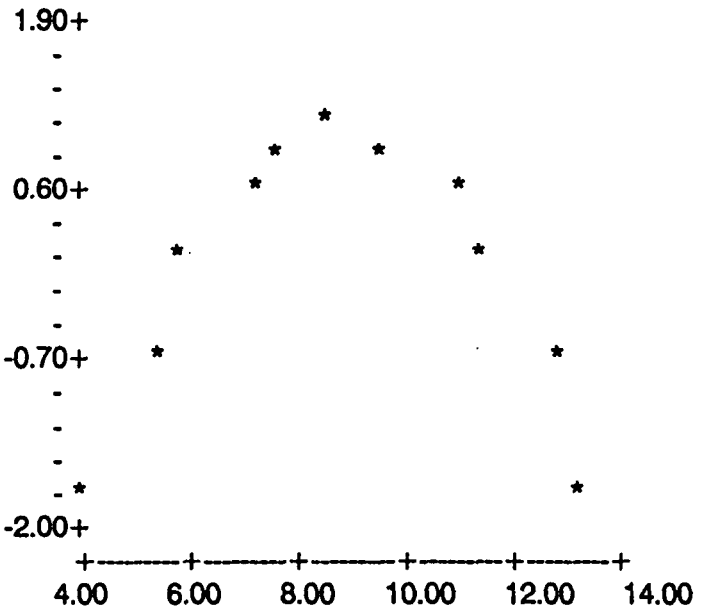


Figure 2.5.7 Plot of standardised residuals for second data set (Figure 2.5.3.) against x2

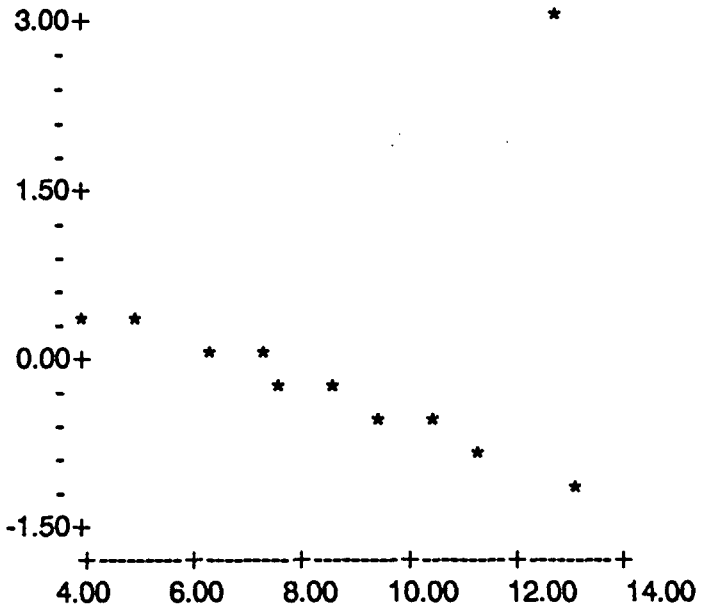


Figure 2.5.8 Plot of standardised residuals for third data set (Figure 2.5.4) against x3

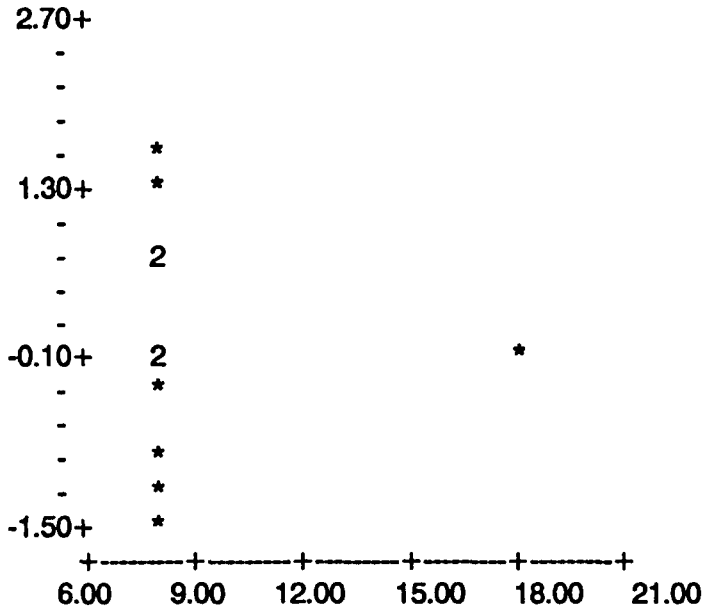


Figure 2.5.9 Plot of standardised residuals for fourth data set (Figure 2.5.5) against x4

3. STOCHASTIC DEVELOPMENT FACTOR MODELS

In Section 1 we introduced two deterministic development factor models, viz., Cape Cod and Cape Cod with constant payment year inflation. These are used as the first two building blocks for more general deterministic development factor models and an extension to stochastic models.

3.1 DEVELOPMENT FACTORS

We can represent the development run-off by using trend parameters, γ_j; j=1,2,...,s-r.

The parameter γ_j is the trend (on a logarithmic scale) from delay j-1 to j. In common parlance, the parameter γ_j is known as the base development factor, on a logarithmic scale, from development year j-1 to j. The development pattern for a single accident year may be expressed,

$$y(d) = \log c(d)$$

$$= \alpha + \sum_{j=1}^{d} \gamma_j \qquad (3.1.1)$$

The parameter α (alpha) represents the log (normalised payment) at delay 0. Figure (3.1.1) below depicts the development factors comprising straight line segments. Note that γ_j represents the slope of the line segment from development year j-1 to j, or equivalently, the difference y(j) - y(j-1).

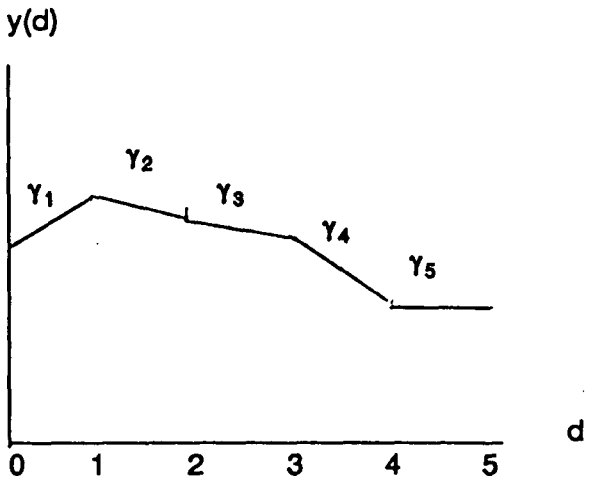


Figure 3.1.1

3.2 DEVIATIONS FROM SYSTEMATIC RUN-OFF

Recall from Section 2 that regression analysis is not just the fitting of equations - it is the fitting or estimation of distributions.

In order to extend equation (3.1.1) into a regression model we add an 'error' term thus:

$$y(d) = \log c(d)$$

$$= \alpha + \sum_{j=1}^{d} \gamma_j + \varepsilon \quad , \qquad (3.2.1)$$

where ε is an unobservable error term having a normal distribution with mean zero and variance σ^2.

Figure (3.2.1) below depicts this model.

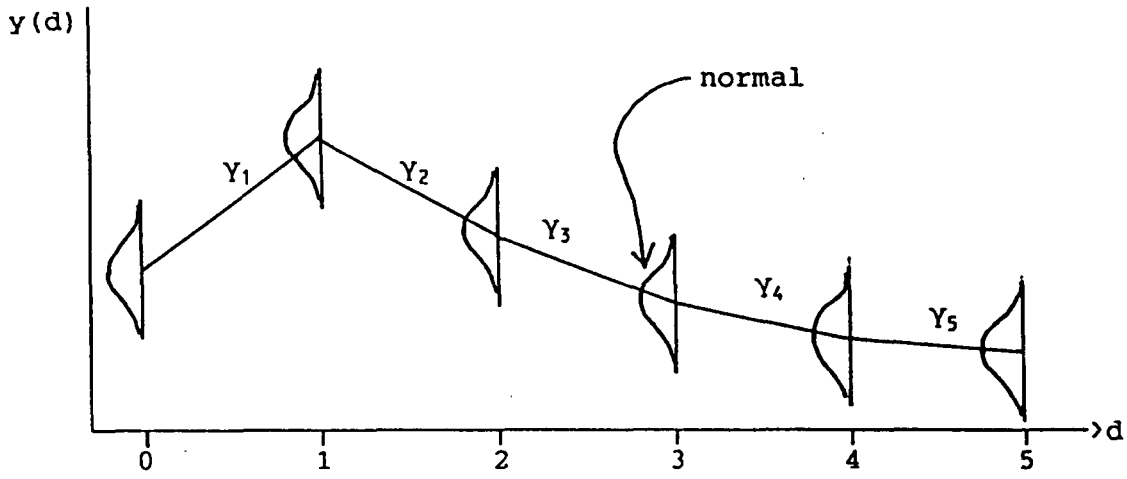


Figure 3.2.1

From equation (3.2.1) we have,

$$y(d) - y(d-1) = \gamma_d + \varepsilon_d - \varepsilon_{d-1} , \tag{3.2.2}$$

where ε_d is the 'error' at delay d.

Accordingly,

$$E\left[\log\frac{c(d)}{c(d-1)}\right] - \gamma_d \tag{3.2.3}$$

That is, the development factor γ_d is the mean of the log of the ratio on the absolute scale. A development factor is a parameter.

Based on model (3.2.1), the random variable c(d) has a log normal distribution with,

$$\text{Median} = \exp[\alpha + \sum_{j=1}^{d} \gamma_j] , \tag{3.2.4}$$

$$\text{Mean} = \text{mean} \cdot \exp[0.5\ \sigma^2] , \tag{3.2.5}$$

and

Standard

$$\text{Deviation} = \text{mean} \cdot \sqrt{\exp[\sigma^2] - 1} . \tag{3.2.6}$$

Since, $y(d) - y(d-1) \sim N(\gamma_d , 2\sigma^2)$, we have

$$E\left[\frac{c(d)}{c(d-1)}\right] - \exp[\gamma_d + \sigma^2], \tag{3.2.7}$$

so that the development factor on the $ scale (the mean of a ratio) is given by the last equation.

3.3 CAPE COD MODEL (CC)

The Cape Cod (CC) stochastic model is given by

$$y(w,d) = \alpha + \sum_{j=1}^{d} \gamma_j + \varepsilon \,, \tag{3.3.1}$$

where ε is an unobservable error term having a normal distribution with mean zero and variance σ^2.

The CC model assumes:

* homogeneity of development factors (across accident years);
* homogeneity of levels.

The distribution of each c(w,d) does not depend on w.

3.4 CAPE COD WITH CONSTANT INFLATION (CCI) MODEL

The Cape Cod with constant inflation model (CCI) is given by

$$y(w,d) = \alpha + \sum_{j=1}^{d} \gamma_j + \iota \cdot (w + d - 1) \,. \tag{3.4.1}$$

Note that each base development factor γ_j has increased by ι to $\gamma_j + \iota$ and the level for accident year w is now $\alpha + \iota \cdot w - \iota$, that is, the levels trend upwards by ι each accident year. So, what applies to the data, applies to the model!

3.5 CHAIN LADDER (CL)

The chain ladder (CL) model is described in Stavros (1990). It is a two-way ANOVA model where accident years and development years are two factors at various levels. The CL statistical model is the direct statistical extension of the standard age-to-age development factor technique. See Stavros (1990) for details. It is written

$$y(w,d) = \alpha_w + \sum_{j=1}^{d} \gamma_j + \varepsilon \tag{3.5.1}$$

The parameter α_w represents the effect of accident year w and the parameter $\gamma_j - \gamma_{j-1}$ represents the effect of development year j.

The following array satisfies the CL assumptions (with Var(ε)=0):

100	200	150	100	80	60	40	20
200	400	320	200	160	120	80	
50	100	80	50	40	30		
25	50	40	25	20			
150	300	240	150				
125	250	200					
100	200						
20							

The various merits and defects of the CL model are discussed in Zehnwirth (1989) and Stavros (1990).

Within the framework to be described, this model can be tested, significance of differences in development factors ascertained and, moreover, homogeneity of development factors across accident years tested in about five seconds! Standard errors of forecasts are also obtained.

The CL model involves 2s-r parameters. It is responsive to random fluctuations in the last few accident years and the last few development years.

The CL model extracts very little information from the loss development array. It does not relate the accident years and payment years in respect of homogeneity or heterogeneity or trends nor does it relate the development factors. Moreover, it does not related the payment years.

3.6 THE DEVELOPMENT FACTOR FAMILY (DFF)

The general DFF of models is given by

$$y(w,d) = \alpha_w + \sum_{j=1}^{d} \gamma_j + \sum_{t=q+1}^{w+d} \iota_t + \varepsilon \qquad (3.6.1)$$

This model has an α parameter α_w for accident year w - it represents the effect or level of the accident year. Between every two development years, we have a development factor or trend parameter γ_j (the factor from delay j-1 to j) and between every two payment years we have a trend (or inflation) parameter ι_t, the inflation from payment year t-1 to t. The error term ε is an integral part of the model. It is normally distributed with zero mean and variance denoted by σ^2.

The systematic component of c(w,d) is

$$\exp\left[\alpha_w + \sum_{j=1}^{d} \gamma_j + \sum_{t=q+1}^{w+d} \iota_t\right].$$

The quantity c(w,d) has a lognormal distribution with:

$$\text{median} = \exp\left[\alpha_w + \sum_{j=1}^{d} \gamma_j + \sum_{t=q+1}^{w+d} \iota_t\right],$$

$$\text{mean} = \text{median} \cdot \exp[\tfrac{1}{2}\sigma^2]$$

and

$$\text{variance} = \text{mean}^2 \cdot (\exp[\sigma^2]-1).$$

Each model in the rich DFF is a sub-model of (3.6.1) and models can be classified as either fixed parameter or varying parameter.

Note that

$$y(w,d) - y(w,d-1) = \gamma_d + \iota_{w+d} + \varepsilon_d - \varepsilon_{d-1} \qquad (3.6.2)$$

where e_d is the error at delay d.

Accordingly,

$$E\left[\log\frac{c(w,d)}{c(w,d-1)}\right] = \gamma_d + \iota_{w+d} \qquad (3.6.3)$$

and

$$Var\left[\log\frac{c(w,d)}{c(w,d-1)}\right] = \sigma^2(d) + \sigma^2(d-1) \qquad (3.6.4)$$

The parameter γ_d is called the <u>base</u> development factor (on a log scale) from delay d - 1 to d, whereas, $\gamma_d + \iota_{w+d}$ is the actual development factor on a log scale. The quantity, σ^2 (d), is the variance at delay d.

Now,

$$E\left[\frac{c(w,d)}{c(w,d-1)}\right] = \exp\left[\alpha_d + i_{w+d} + 1/2(\sigma^2(d) + \sigma^2(d-1)\right]. \qquad (3.6.5)$$

So, the development factor (LHS of (3.6.5)) on the $ scale is <u>not</u> $\exp[\ \alpha_d + i_{w+d}\ ]$.

In much of the actuarial literature and practice, there is confusion between

$$E\left[\frac{c(w,d)}{c(w,d-1)}\right] \quad \text{and} \quad \frac{E[c(w,d)]}{E[c(w,d-1)]}$$

The average of the ratios is <u>not</u> the same as the ratio of the averages. The former is termed the development factor, whereas the latter is termed the development mutliplier.

Each model in the rich family of DF models is a sub-model of (3.6.1).

Models can be classified into two categories:

- regression models of the type (3.6.1) having <u>fixed</u> (constant) parameters and therefore an integral number of free parameters;
- regression models of the type (3.6.1) having parameters that vary over time and are related stochastically. These models are credibility models.

The family of models described by equation (3.6.1) is very rich. The number of fixed parameter models is two raised to the power of the number of parameters. The number of parameters is 3s - r - q, so the number of fixed parameter models is 2^{3s-r-q}.

Many of the fixed parameter regression models cannot be estimated by any statistical software package (including Lotus 123), as a result of the phenomenon known as <u>multicollinearity.</u>

Finding the (ordinary) least squares estimates involves solving n (linear homogeneous) simultaneous equations with n unknowns, if there are n parameters. For example, when estimating a line there are two unknown parameters, viz, slope and intercept, so that are two simultaneous equations to be solved.

If the parameters are highly correlated (equivalently, collinear) some of the equations may be redundant so that the number of non-redundant equations is fewer than the number of parameters. Accordingly, there is no unique solution.

As a result of the relationship between payment year, accident year and development year described in Section 1.3, payment year is correlated with development year and accident year so that we cannot estimate many accident year and payment year parameters.

Consider the following model contained in the rich DFF (3.6.1)

$$y(w,d) = \alpha_w + \sum_{j=1}^{d} \gamma_j + \iota \cdot (w + d - q) + \varepsilon \quad . \tag{3.6.7}$$

This model is the CL with one inflation parameter ι . It may be re-cast:

$$y(w,d) = \alpha_w + \iota \cdot w - \iota \cdot q + \sum_{j=1}^{d} (\gamma_j + \iota) + \varepsilon \quad .$$

It is <u>not</u> possible to separate the α_w parameters from the ι parameter.

Since the level of accident year w is given by $\alpha_w + \iota \cdot w - \iota \cdot q$ the parameters cannot be identified uniquely.

Here the correlations between each α_w and ι would be - 1 and the standard errors of each α_w is infinite.

See Section 4 for a description of a 'similar' varying parameter or credibility model that does not suffer from multicollinearity problems.

3.7 OTHER FIXED PARAMETER DEVELOPMENT FACTOR MODELS

We have so far described a number of fixed parameter DF regression models including CC, CCI and CL.

We present other models included in the rich family (3.6.1).

1. $y(w,d) = \alpha + \varepsilon$.

   Here all the y(w,d) observations are regarded as random observations from a normal distribution with mean α and variance σ^2. The 'best' estimate of α, that is the Ordinary Least Squares (OLS) estimate, is the mean of the y(w,d) observations and the standard error of the estimate is given by S/N where S is the standard deviation of the y(w,d) observations and N is the number of observations. The model is identical to the one discussed in Section 2.3.

2. $y(w,d) = \alpha_w + \varepsilon$.

   Here the observations y(w,0), y(w,1),... are regarded as independent observations from a normal distribution with mean α_w and variance σ^2. This model is a one-way analysis of variance model where the different accident years represent the levels of a factor. The estimate of α_w is the mean of y(w,0), y(w,1)... .

3. $$y(w,d) = \alpha + \sum_{t=q+1}^{w+d} \iota_t + \varepsilon .$$

This model is a one-way analysis of variance model applied to the payment years. The mean of payment year t is

$$\alpha + \sum_{j=q+1}^{t} \iota_j$$

4. $$y(w,d) = \alpha_w + \sum_{t=q+1}^{w+d} \iota_t + \varepsilon .$$

This model is a two way analysis of variance model. The two factors are accident year and payment year. For some loss development arrays, this model may present good residual displays but high standard errors of parameters. This model is similar to the chain ladder model except that here age-to-age development factors are computed for each payment year rather than each accident year. The parameter α_w represents the "effect" of accident year w, whereas the parameter $\iota_t - \iota_{t-1}$ represents the "effect" of payment year t ($t \geq q+1$).

Note that there are many fixed parameter models that are reduced versions (fewer parameters) of models 2, 3 and 4 above. For example, a sub-model of model 2 is

$$y(w,d) = \begin{cases} \alpha_1 + \varepsilon ; 1 \leq w \leq 3 \\ \alpha_2 + \varepsilon ; 4 \leq w \leq s \end{cases}$$

3.7 HETEROGENEOUS SYSTEMATIC DEVELOPMENT FACTORS

The family of models (3.6.1) includes a wide variety of models that involve heterogeneous development factors.

Consider the situation where the base systematic run-off represented by the parameters (γ_j) remains stable, and payment year inflation changes only from payment year t_1-1 to t_1. The corresponding model is,

$$y(w,d) = \begin{cases} \alpha + \sum_{j=1}^{d} \gamma_j + \iota_1(w + d - 1) + e; & w + d \le t_1 - 1 \\ \alpha + \sum_{j=1}^{d} \gamma_j + \iota_1(t_1 - 2) + \iota_2(w + d - t_1 + 1) + e; & t_1 \le w \le d \le s \end{cases}$$

(3.7.1)

This model has heterogeneous systematic development factors across accident years. There is a break between payment years t_1- 1 and t_1. Systematic development factors are homogeneous across accident years for payment years $t \le t_1$-1 and also for payment years $t \ge t_1$. Figure 3.7.1 below depicts the two trapeziums within which systematic development factors are homogeneous. If payment year inflation is not stable, then systematic development factors are necessarily heterogeneous.

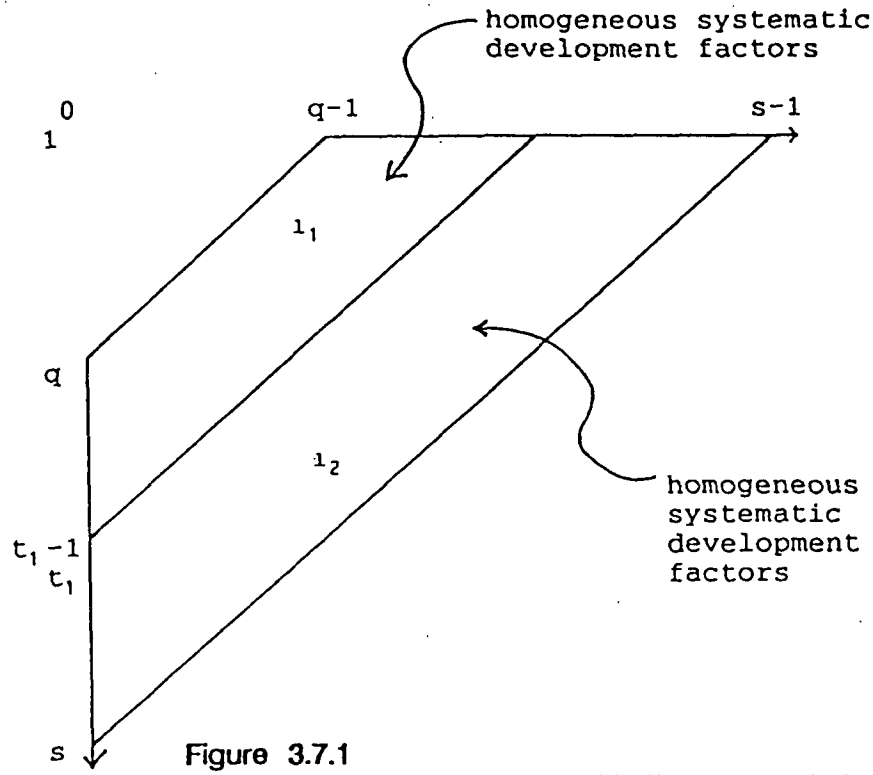


Figure 3.7.1

The change in inflation from i_1 to i_2 is depicted in Figure 3.7.2 below.

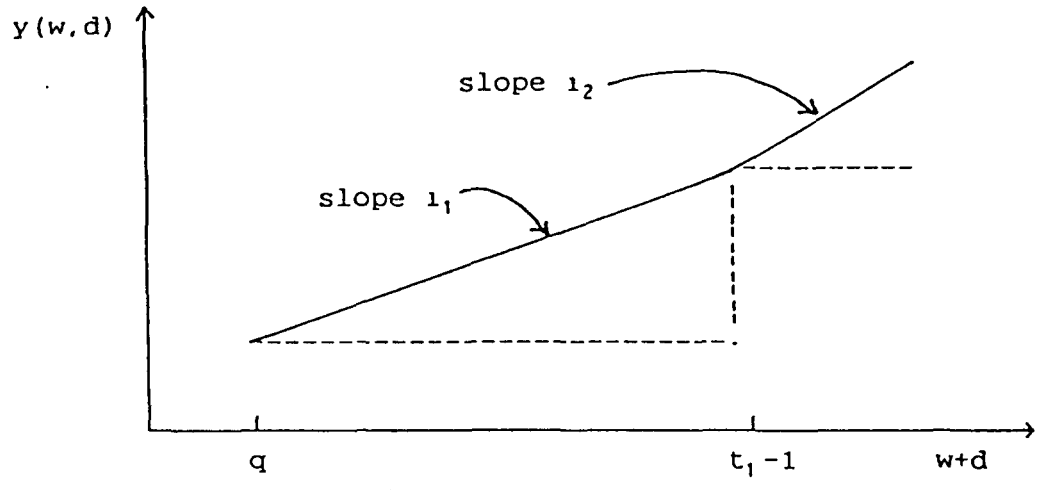


Figure 3.7.2

Inflation changes for i_1 to i_2 from payment year t_1-1 to t_1.

The figure below depicts three inflation rates. A constant inflation from payment years q to t_1-1, a constant inflation from payment year t_1-1 to t_1 and a constant inflation from payment years t_1 to s. Contrast this figure with Figure 3.7.2 .

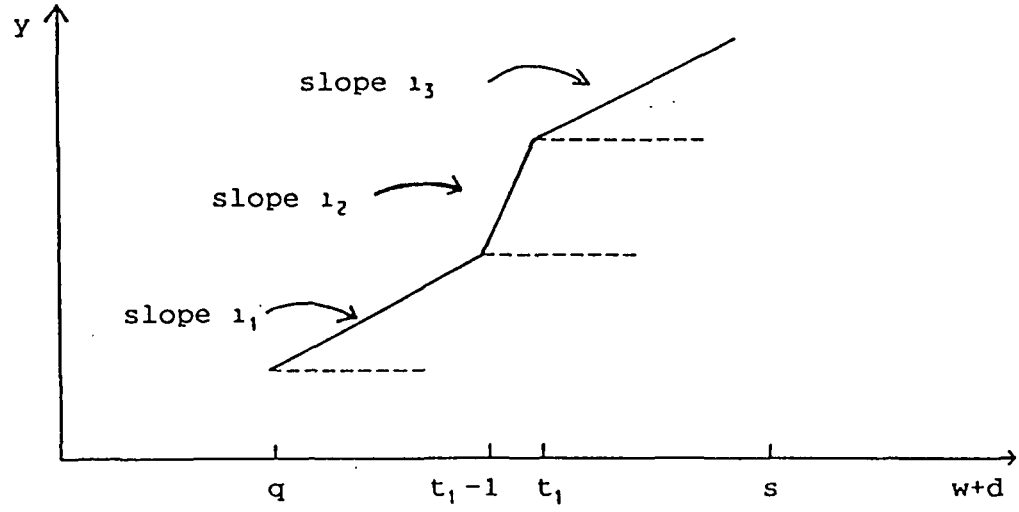


Figure 3.7.3

Model (3.7.1) can be interpreted as Cape Cod with two different significant payment year 'inflation' rates.

3.8 THE SEPARATION MODEL (SM)

The separation method separates the base systematic run-off pattern (assumed homogeneous across accident years) from exogenous influences, viz., payment year inflation (or effects). The deterministic model is expressed as

$$p(w,d) = e(w)\, b_d\, \lambda_{w+d}$$

where the { e (w) } are the exposures, proportional to number of claims incurred, $\{b_d\}$ are the development factors and the parameter λ_{w+d} expresses the 'effect' of payment year t = w + d.

The corresponding stochastic model is written as

$$y(w,d) = \alpha + \sum_{j=1}^{d} \gamma_j + \sum_{t=q+1}^{w+d} \iota_t + \varepsilon \qquad (3.8.1)$$

where the parameters $\{\gamma_j\}$ are the base systematic development factors and ι_t is the annual (force of) inflation from payment year t - 1 to payment year t.

The model is fixed parameter model with 2s - r - q parameters. It belongs to the DFF of models.

Note that this model necessarily assumes that there are significant changes in inflation rates between every two contiguous payment years and, moreover that there are significant changes in base development factors between every two development years. Accordingly, the actual systematic development factors are heterogeneous across accident years.

> N.B. A MODEL CONTAINS INFORMATION. ACCORDINGLY, A MODEL THAT REPRESENTS A LOSS DEVELOPMENT ARRAY CONVEYS INFORMATION ABOUT THE ARRAY.

3.9 HETEROSCEDASTICITY

The error, ε, in the equation (3.6.1) is assumed to have a constant variance - we call it homoscedastic. If the varance is changing, we call the error heteroscedastic.

Recall that we take a log transform of the data so that the variance of the error, ε, measures variability of percentages. Accordingly, heteroscedasticity implies changing percentage variability. The percentage variability of incremental paid losses may increase in late development years since the paid losses are based on a small number of claims with large variance of severity.

For an incurred losses array, however, the percentage variability in early development years may be higher than that in late development years. This phenomenon is explained by the fact that in the early development years the estimate of outstanding is inaccurate and represents a large component of the incurred.

We can use a multiplicative specification of heteroscedasticity. That is,

$$Var[e(d)] = \sigma^2(d) ,$$

where σ^2 (d), the variance at delay (development year) d, is given by

$$\sigma^2(d) = \sigma_0^2(1 + d)^{\delta} \quad . \tag{3.9.1}$$

The parameter δ (delta) is called the heteroscedasticity parameter. If it is not significant, that is, it is zero, then the error term is homscedastic and

$$\sigma^2 (d) = \sigma_0^2 \tag{3.9.2}$$

Heteroscedasticity is diagnostically detected by examining a variety of plots. The parameter δ can be estimated and its significance tested statistically. If the standard deviations of the standardised residuals tend to change across development years, then the presence of heteroscedasticity is indicated.

Heteroscedasticity may not be multiplicative, that is, may not be represented adequately by the single parameter δ. Non-multiplicative heteroscedasticity is not treated in this paper.

The models presented involve two equations on a logarithmic scale. Equation (3.6.1), describing the evolution of the mean, is called the primary equation, whereas equation (3.9.1), describing the evolution of the variance, is called the secondary equation.

4. VARYING PARAMETER/CREDIBILITY MODELS

The phenomenon of multicollinearity associated with fixed parameter models can be interpreted in terms of information. There isn't sufficient information in one loss development array to estimate payment year parameters and accident year parameters (especially, for more recent accident years).

If we include another α parameter for the last accident in our model we are using one single datum to estimate that parameter. That is, we assign full credibility to the last accident year's datum and zero credibility to previous years in respect of the parameter. A better approach may be to assign some credibility to the previous years data and less than full credibility to the last year's datum.

We are motivated to introduce exponential smoothing/varying parameter/credibility models, as a result of multicollinearity. Multicollinearity leads to fixed parameter regression models that (i) are unstable and (ii) have large prediction errors.

The technique of exponential smoothing has received widespread use in the context of forecasting a time series. It originated more than 40 years ago without any reference to an underlying model that makes the technique optimal.

We first present heuristic arguments for exponential smoothing and varying parameter models. The following illustrations and arguments may be viewed from two different perspectives. The data may be regarded as either

(1) sales data over time, or

(2) incremental paid losses for delay 0 across accident years.

(i) Constant mean level (one parameter)

Suppose we have a sequence of time series observations $y_1, y_2...,y_n$ such that

$$y_t = \alpha + \varepsilon_t, \qquad t = 1,...,n$$

where α is a constant mean level and e_t is a sequence of uncorellated errors with constant variance. Figure 4.1 below depicts such a series.

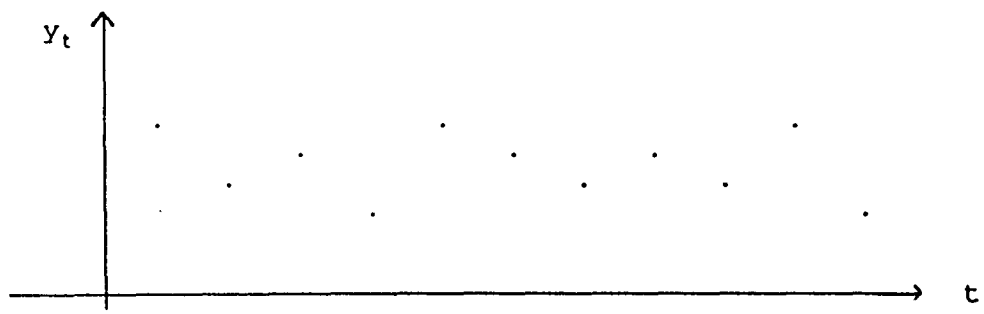


Figure 4.1

The model describing the data is our simplest regression model of Section 2.3.

Our model has only one parameter a so that the years are completely homogeneous (stablel).

If α is known, the best forecast of a future observation $y_{(n)+1}$, based on information up to time n, is

$$\hat{y}_{(n)+1} = \alpha .$$

If the parameter a is unknown, we estimate it from the past data $(y_1...,y_n)$ by its ordinary least squares estimate,

$$\hat{\alpha} = \Sigma\, y_t/n,$$

so that the one-step-ahead forecast of $y_{(n)+1}$ is now

$$\hat{y}_{(n)+1} = \bar{y} .$$

We can now write,

$$\hat{y}_{(n+1)+1} = \hat{y}_{(n)+1} + \frac{(y_{n+1} - y_{(n)+1})}{n+1}$$

The last equation indicates how a forecast from time origin n+1 can be expressed as a linear combination of the forecast from time origin n and the most recent observation. This is the simplest credibility formula, due to Gauss (1795), used when updating sample averages. Since the mean level a is assumed constant, each observation contributes equally to the forecast.

The above formula for updating sample averages is an experience rating (credibility) formula in the context of adjusting a premium, assuming the risk (parameter) does not change.

In computing $\hat{\alpha}$ $(=\bar{y})$ we assign the same weight to each observation. From the loss reserving perspective, we are assuming that the accident years are completely homogeneous. In order to estimate the next years premium, we use all the accident years' data!

We now turn to another example.

(ii) Unstable mean level (each year its own parameter)

Here,

$$y_t = \alpha_t + \varepsilon_t$$

where the mean level a_t changes dramatically in successive time periods. Each year t has its own parameter a_t. Figure 4.2 depicts a series of y_t values that may be generated by this model.

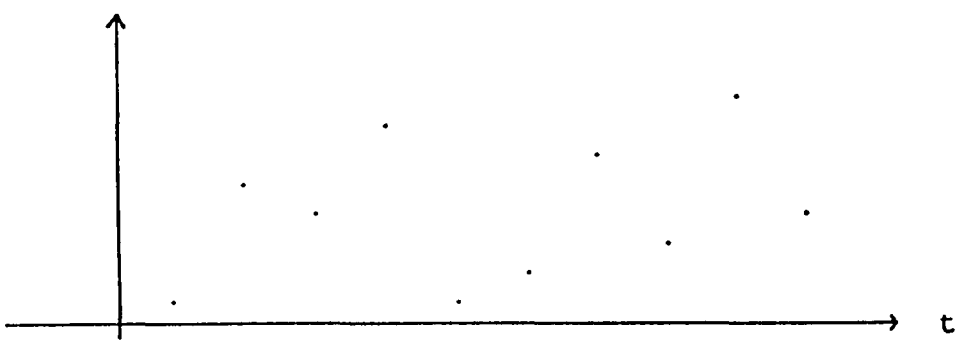


Figure 4.2

Here, the best we could do, is forecast $y_{(n)+1}$ by

$$\hat{y}_{(n)+1} = y_n \cdot$$

We are assigning zero weight to the past and all weight to the current observation. From the loss reserving perspective, accident years are completely heterogeneous so that each accident year's individual parameter is estimated by that year's individual experience.

(iii) Locally constant mean level, exponential smoothing and credibility

Often situations present themselves where the mean is approximately constant locally. Assigning equal weights to the past would be too restrictive and assigning zero weight would result in loss of information. It would be more reasonable to choose weights that decrease (geometrically) with the age of the observations.

We could have

$$\hat{y}_{(n)+1} = ay_n + a^2 y_{n-1} + \cdots\cdots$$

For n sufficiently large this may be written

$$\begin{aligned} \hat{y}_{(n)+1} &= \hat{y}_{(n-1)+1} + K(y_n - \hat{y}_{(n-1)+1}) \\ &= (1-K)\hat{y}_{(n-1)+1} + Ky_n , \end{aligned} \tag{4.1}$$

where $K = (a-1)^{-1}$. This is also a credibility formula.

Muth (1960) showed that the exponential smoothing formula (4.1) is an optimal forecast for the following model:

$$y_t = \alpha_t + \varepsilon_t : Var[\varepsilon_t] = \sigma_\varepsilon^2$$

$$\alpha_t = \alpha_{t-1} + \eta_t : Var[\eta_t] = \sigma_\eta^2$$

Here the mean level α_t process is a random walk. If $\sigma_\eta^2 = 0$ then we have the constant mean level situation (i) and if σ_η^2 is large we have the unstable mean level situation (ii). The parameter σ_η^2 should be chosen as small as possible at the same time ensuring that the trend in the data is captured.

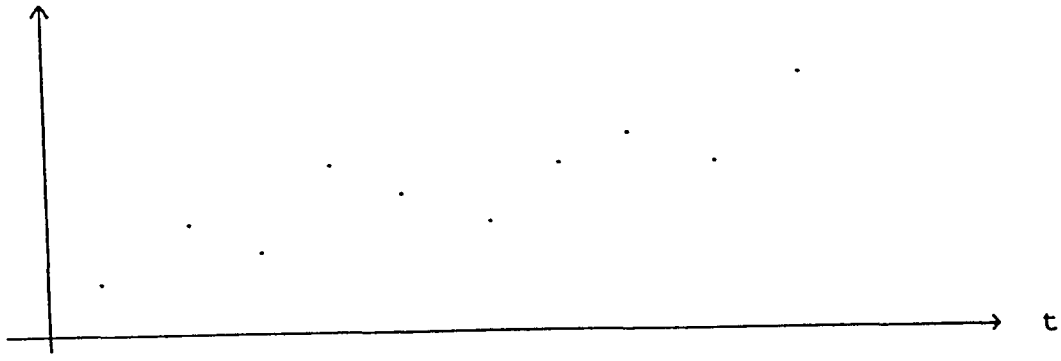


Figure 4.3

The exponential smoothing formula (4.1) formally credibility weights all the observations. It is an experience rating formula for a risk (parameter) that changes. If in the situation depicted in Figure 4.3, one were to assign zero weight to the past in place of using formula (4.1), then much information would be potentially lost.

We illustrate the methodology of formula (4.1) in the loss reserving context.

Suppose, for the sake of argument, there are only two accident years (but more than three development years), and the γ and ι parameters are zero.

We have,

$$y(1,d) = \alpha_1 + \varepsilon(1,d);\ d=0,1,2,\ldots,n_1\text{-}1(\text{say}) \tag{4.2}$$

and

$$y(2,d) = \alpha_2 + \varepsilon(2,d);\ d=0,1,2,\ldots.n_2\text{-}1(\text{say}) \tag{4.3}$$

The first accident year has n_1 observations and the second n_2 observations. Denote the sigma-squared assigned to observations by σ^2. Accordingly, $\text{Var}[\varepsilon(1,d)] = \text{Var}[\varepsilon(2,d)] = \sigma^2$.

The relation between α_2 and α_1 is given by

$$\alpha_2 = \alpha_1 + \eta : \text{Variance}(\eta) = \sigma_\eta^2 . \tag{4.4}$$

Substituting equation (4.4) for α_1 into (4.3) yields:

$$y(2,d) = \alpha_1 + \eta + \varepsilon(2,d) . \tag{4.5}$$

Combining the last equation with (4.2) we have,

$$\text{with} \qquad \begin{aligned} y(1,d) &= \alpha_1 + \varepsilon\,(1,d) \\ y(2,d) &= \alpha_1 + \eta + \varepsilon\,(2,d) \end{aligned} \qquad (4.6)$$

Since, conditional on α_1 the observations y(2,0), y(2,1), ... are correlated, we reduce by sufficiency to obtain:

$$\bar{y}_1 = \alpha_1 + \varepsilon_1$$

and

$$\bar{y}_2 = \alpha_1 + \varepsilon_2$$

where $\quad Var[\varepsilon_1] = \sigma^2/n_1 \quad , \quad Var[\varepsilon_2] = \sigma^2/n_2 + \sigma^2_\eta$

and $\quad \bar{y}_1 = \sum_{d=0}^{n_1-1} y(1,d)/n_1 \quad , \quad \bar{y}_2 = \sum_{d=0}^{n_2-1} y(2,d)/n_2 \; .$

The estimate of α_1 minimises the weighted error sum of squares

$$w_1(\bar{y}_1 - \alpha_2)^2 + w_2(\bar{y}_2 - \alpha_1)^2 \quad ,$$

where

$$w_1^{-1} = Var[\varepsilon_1] = \sigma^2/n_1 \quad ,$$

and

$$w_2^{-1} = Var[\varepsilon_2] = \sigma^2/n_2 + \sigma^2_\eta \; .$$

Similarly, the estimate of α_2 is obtained by minimising,

$$w_1(\bar{y}_2 - \alpha_2)^2 + w_2(\bar{y}_1 - \alpha_2)^2 \quad ,$$

where now $\quad w_1^{-1} = \sigma^2/n_2 \quad$ and $\quad w_2^{-1} = \sigma^2/n_1 + \sigma^2_\eta$

The estiamtes of $\hat{\alpha}_1$ and $\hat{\alpha}_2$ are given by respectively,

$$\hat{\alpha}_1 = (1 - z_1)\bar{y}_2 + z_1\bar{y}_1$$

and

$$\hat{\alpha}_2 = (1 - z_2)\bar{y}_1 + z_2\bar{y}_2$$

where,

$$z = \frac{\frac{n_1}{\sigma^2}}{\frac{n_1}{\sigma^2} + \frac{n_2}{\sigma^2 + n_2 \sigma_\eta^2}} \quad \text{, and} \quad z_2 = \frac{\frac{n_2}{\sigma^2}}{\frac{n_2}{\sigma^2} + \frac{n_1}{\sigma^2 + n_1 \sigma_\eta^2}}$$

Both $\tilde{\alpha}_1$ and $\tilde{\alpha}_2$ are credibility estimators. Consider the following situations.

Case (1)

$\alpha_1 = \alpha_2$ (= α, say). This is true if and only if $\sigma_\eta^2 = 0$.

Accordingly,

$$\hat{\alpha} = \frac{n_2}{n_1 + n_2} * \bar{y}_2 + \frac{n_1}{n_1 + n_2} * \bar{y}_1$$

= average of all observations.

Each observation is assigned the same credibility (weight) in estimating α.

Case (2)

$\alpha_1 \neq \alpha_2$, equivalently, $\sigma_\eta^2 \to \infty$ so that $\hat{\alpha}_1 = \bar{y}_1$ and $\hat{\alpha}_2 = \bar{y}_2$.

Here $\hat{\alpha}_1$ is only based on the first year's experience and $\hat{\alpha}_2$ is only based on the second year's experience.

The smaller σ_η^2 is (relative to σ^2), the more information is being pooled across the two years in estimating α_1 and α_2. We are credibility weighting the two years' data.

For a description of general recursive credibility formulae, see Zehnwirth (1985).

We now reconsider the overparametrized model (3.6.7) of Section 3.6.

A corresponding varying parameter/credibility model would constrain α_w to adapt from accident year to accident year. This would reduce the absolute correlations of α_w with iota and would lead to parameters that are significant. This avoids the problem of multicollinearity associated with the fixed parameter model. Moreover, more of the information in the data will be used with fewer parameters resulting in reduced forecast (standard) error and increased stability.

5. MODELLING CONCEPTS

5.1 INTRODUCTION

The mechanisms by which claim severities, frequencies and delays are generated are invariably complex. When a model is constructed, it is not intended to be an accurate description of every aspect of the claims processes. The aim is to simplify the underlying processes in such a way that the essential features are brought out. According to Milton Friedman (1953): 'A hypothesis is important if it 'explains' much by little...'. Similar views are expressed by Popper (1959): 'Simple statements... are to be prized more highly than less simple ones because they tell us more; because their empirical content is greater, and because they are better testable.'

From the statistical point of view, the key feature of a simple model is that it contains a small number of parameters. This is often known as the principle of parsimony. Moreover, a simple model is testable.

The purpose of constructing a model is to systematically account for as much of the variation in the observations with as few parameters as possible. Recall that the systematic movements not captured by the estimated model are termed residuals, and if the model is reasonably adequate, these residuals should be approximately random. Departures from randomness are an indication that the model is failing to pick up a systematic component in the observations, and an attempt should therefore be made to find a better model.

The following issues are critical to identifying a good model:

. parsimony and parametrisation;

. goodness of 'fit';

. predictive power (validation and stability) and theoretical consistency;

. information.

5.2 PARSIMONY AND PARAMETRISATION

Parsimony refers to a small number of 'significant' parameters. The consequences of adopting an inappropriate model will depend on its relationship to the true model.

Underparametrisation - it imposes invalid constraints on the true model.

Overparametrisation - the model is more general than is necessary.

Overparametrisation has different consequences to underparametrisation. Overparametrisation leads to high errors of prediction. The forecasts are extremely sensitive to the random component (in contrast to the systematic component) in the observations. Indeed, overfitting can be disastrous in certain circumstances. Underparametrisation, on the other hand, tends to lead to bias rather than instability.

The dangers of overparametrisation are illustrated with a simple example. Imagine we have some yearly sales figures, as depicted below in Figure 5.2.1, and generated by

$$y_t = 1 + 2t + 3t^2 + \varepsilon_t \ ,$$

say, where the ε_t's are random from $N(0,\sigma^2)$, and y_t represents the number of sales in year t.

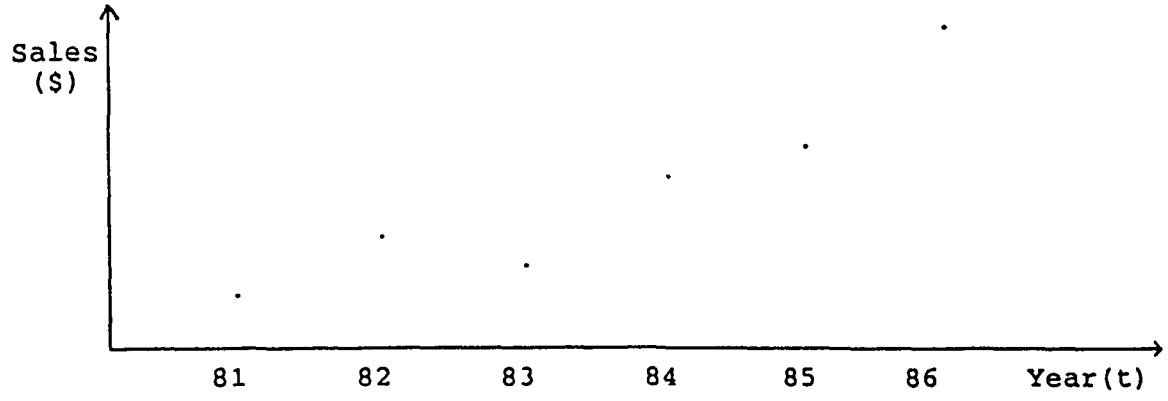


Figure 5.2.1

We wish to forecast sales for 1987. We could estimate a straight line model:

$$Y_t = \beta_0 + \beta_1 * t + \varepsilon_t \qquad (5.2.1)$$

This model produces residuals that are not random and is therefore rejected. The quadratic model,

$$Y_t = \beta_0 + \beta_1 * t + \beta_2 * t^2 + \varepsilon_t \qquad (5.2.2)$$

on the other hand, produces residuals that appear random. Moreover, R-squared is higher and parameters are significant.

We could try a fifth degree polynomial, viz.,

$$Y_t = \beta_0 + \beta_1 * t + \beta_2 * t^2 + \ldots . +$$

This model will produce zero residuals, that is, it will go through every data point and the $R^2 = 100\%$. However, it is useless from the point of view of forecasting. Why? If we change only one data point marginally, the forecast will change to a very large degree. Moreover, if we use the model in 1986 to forecast sales in 1988, re-estimate the model in 1987 to update our forecast for 1988, the two forecasts would be completely different. The data are NOT unstable. IT IS THE MODEL THAT IS UNSTABLE. The model is incredibly sensitive to the random component in the data. It should only be sensitive to the systematic trend! Incidentally, the chain ladder and any standard technique based on calculation of age-to-age development factors suffers from the same defect.

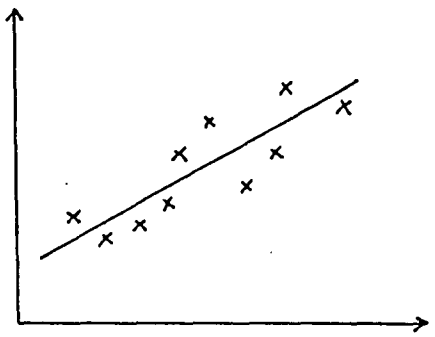
WE WANT A MODEL THAT DELIVERS STABILITY IN RESERVE CALCULATIONS WHEN UPDATING

The notion of stability is analogous to the notion of limited fluctuation in credibility practice when experience rating a risk - we do not wish to charge premiums that fluctuate violently from year to year!

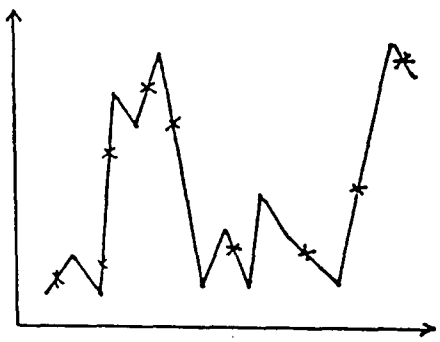
If your answers change from year to year, you should first question your technique or model. The systematic component in the data may actually be stable!

LACK OF STABILITY IS THE NEMESIS OF STANDARD ACTUARIAL TECHNIQUES

INSTABILITY IN SYSTEMATIC TRENDS ACROSS PAYMENT YEARS RESULTS IN HIGHER UNCERTAINTIES THAN A STABLE SYSTEMATIC TREND WITH A LARGE RANDOM COMPONENT.



Stable trend with random component



Unstable systematic trend with no random component

5.3 GOODNESS OF FIT

Goodness of fit refers to how well the forecasting model is able to reproduce the data that are already known. It is captured by a number of statistics including:

- R-squared, the coefficient of multiple correlation;
- S-squared, the mean squared error;
- Akaike Information Criterion;

. SSPE, the sum of squares of one-step-ahead prediction errors;

. Significance of parameters;

. Residual displays.

R-squared represents the proportion of variation in the data explained by **delay, accident year** and **payment year.** It is also the square of the correlation coefficient between observed and predicted.

A parameter is significant if there is sufficient evidence to support the contention that it is non-zero, and accordingly explains a significant proportion of variation in the data. Residuals are used for two purposes. In the first instance, to diagnostically identify systematic trends and structure in the data (that is, the type of heterogeneity) and in the second, to ensure that an estimated model has captured the systematic patterns and trends in the data.

The Akaike Information Criterion (AIC) is a statistic that allows the user to guard against overparametrisation. See Section 5.5.

SSPE is also a statistic that allows the user to guard against overparametrisation. See Section 5.6.

5.4 VALIDATION, STABILITY AND THEORETICAL CONSISTENCY

The important question is whether the estimated model can predict outside the sample. It is therefore important to retain a subset (the most recent one or two payment years) of observations for post-sample predictive testing. This post-sample prediction testing is called **VALIDATION.**

VALIDATION of the last payment year, or any payment year, is also related to the concept of **STABILITY.** If we don't use the last payment years' data to estimate the model, the ultimate losses should not differ from that obtained by using the last years' data by more than one standard error. We would like to identify a model that delivers **STABILITY** of reserves from year to year.

Theoretical consistency is another requirement of a good model. It should be consistent with what is known a priori, and any information outside the historical development array.

The chain ladder technique (age-to-age development factors), produces ultimate losses for accident years that may differ widely, even though the mix of risks and exposures do not change and quite often leads to instability in results when updating (adding another payment year's data). See Section 3.5.

5.5 AKAIKE INFORMATION CRITERION AND INFORMATION

In Section 2 we discussed the informational content of a model. For example, normal distribution, constant variance, linearity in means etc. The data also contain information. We use a model to extract the maximum amount of information from the data. The amount of information in a data set is much dependent on the systematic and random components. For example, a sample of size five from a normal distribution with mean 100 and standard deviation 1 contains more information than a sample of size 25 from a normal distribution with mean 100, but standard deviation 5. The less information there is in the data, the more important modelling becomes.

It has been emphasised that in comparing the goodness of 'fit' of various models, an appropriate allowance should be made for parsimony. This has a good deal of appeal, especially where the model may be based primarily on pragmatic considerations.

Akaike Information Criterion (AIC) is both a function of S^2 and the number of parameters in the model. It is an information theoretic criterion that can be also used for discriminating between two models, even if they are non-nested. It originated with the work of Akaike (1971).

In general the AIC is given by

$$AIC = -2\log(\text{likelihood}) + 2P .$$

For DFF models it reduces to

$$AIC = N\log[2\prod S^2(MLE)] + N + 2P,$$

where

(i) N = Effective # of observations,

(ii) s^2 (MLE) is the maximum likelihood estimator of σ^2 ,

and (iii) P deontes the number of parameters.

The aim is to select a model with a minimum (relative) AIC. Note that the AIC can be used to discriminate between any two models, irrespective of whether they have any parameters in common.

5.6 RECURSIVE RESIDUALS AND SSPE

Consider a time series $z_1, z_2, \ldots, z_n$ where $\hat{z}_{t+1}(t)$ is a forecast of z_{t+1} based on the data $z_1, z_2, \ldots, z_t$. That is, the forecast is based on the information up to time t only. The one-step-ahead forecast (prediction) error is given by

$$\hat{\varepsilon} = z_{t+1} - \hat{z}_{t+1}(t) .$$

The quantities $\{ \hat{\varepsilon}_t \}$ are also termed recursive residuals. The sum of the squared one-step-ahead prediction errors,

$$SSPE = \sum_{t=1}^{n} \hat{\varepsilon}_t^2 .$$

The letters SSPE stand for "sum of squares of prediction errors".

Readers familiar with exponential smoothing will note that the optimal smoothing constant of exponential smoothing is determined by minimising the SSPE.

By way of summary of quality of 'fit' statistics, consider the quadratic polynomial example of Section 5.2, and suppose there are at least ten data points. The relative magnitudes of R^2, AIC and SSPE as we fit polynomials of order one to six are:

- R^2 increases with more parameters;
- AIC decreases from polynomial of order one to polynomial of order two, subsequently increasing as degree of polynomial increases.
- SSPE behaves in much the same way as AIC.

Accordingly, a polynomial of degree exceeding two would have performed worse in a forecasting context than a polynomial of degree two, had we used them each year.

A relatively 'low' SSPE is preferable to a high SSPE. Naturally, there are other aspects of testing, including significance of parameters, model assumptions, R-squared, residual displays and the number of parameters.

The 'tests' should be seen as complementary rather than competitive.

5.7 OUTLIERS, SYMMETRIC DISTRIBUTIONS AND NORMALITY

Outliers are data points with large standardised residuals. Observations classified as outliers have residuals that are large relative to the residuals for the remainder of the observations.

Estimates of parameters and supporting summary statistics may be sensitive to outliers. Residual displays provide information on outliers. Moreover, if omission of outliers from the regression affects the output, then that provides more evidence that the omitted observations are in fact outliers.

An outlier may be a result of a coding error, in which case it should be assigned zero weight, or it may be a genuine observation that is unusual and accordingly has a large influence on the estimates unless it is assigned reduced weight.

To detect outliers routinely, we need a rule of thumb that can be used to identify them. A Box plot is a schematic plot devised by J.W. Tukey. The following steps summarise the general procedure for constructing schematic plots.

- Order the data.

- Find the median (M), lower quartile (LQ), upper quartile (UQ) and mid-spread (MS), where MS = UQ - LQ. [1]

- Find the upper and lower boundaries defined by

  LB = LQ - 1.5*MS

  UB = LQ + 1.5*MS.

- List all outliers. An outlier is defined as any observation above the upper boundary or below the lower boundary.

- Construct a Box plot as follows:

  (a) Draw a horizontal scale;

  (b) Mark the position of the median using "|";

  (c) Draw a rectangular box around the median, with the right side of the box corresponding to the UQ and the left side corresponding to the LQ. The length of the box is equal to the MS. The median divides the box into two boxes;

  (d) Find the largest and smallest observations between the boundaries and draw straight horizontal lines from the UQ to the largest observation below the upper boundary and from the LQ to the smallest observation above the lower boundary;

  (e) Mark all observations (outliers) outside the boundaries with hollow circles (o). If an outlier is repeated, mark the number of times it is repeated.

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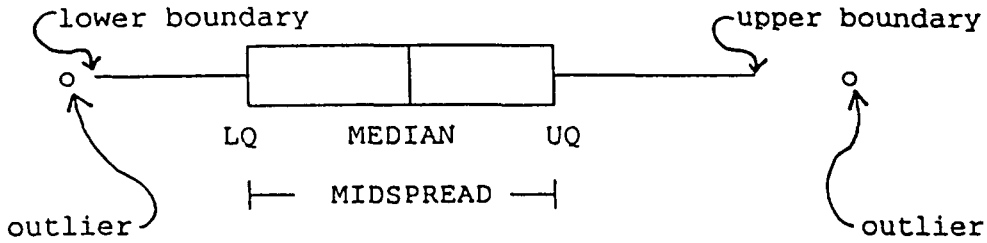
[1] Footnote: LQ and UQ are actually the lower and upper hinges. They are only approximately the quartiles.

Box Plot



We can also conclude (diagnostically) that a distribution is symmetric if the median is approximately half way between the LQ and the UQ.

Do not assign zero weights or reduced weights to observations sequentially. If observation A appears as an outlier and is assigned zero or reduced weight, it may then lead to a second observation appearing as an outlier and so on.

A DFF model assumes that the weighted standardised residuals come from a normal distribution. Accordingly a normal probability plot should appear approximately linear. That is, the plot of weighted residuals against normal scores should have points that fall close to a straight line. This means that the correlation should be close to unity.

6. MODEL IDENTIFICATION

The aim is to identify a model that separates the systematic from the random and moreover determine whether the systematic in the payment/calendar year direction is stable.

Recall that models contain information and accordingly the 'best' identified model conveys information about the loss development array being analysed.

For example, CCI (with constant development in the tail) indicates that the calednar year trend has been stable. This model should validate well and produce 'stable' outstanding estimates as recent calendar years are added or removed from the estimation.

There are a number of steps involved in identifying an appropriate model with predictive power.

Step 1: Preliminary analyses facilitate the diagnostic identification of the structure in data. Heterogeneity and its nature is also identified.

Step 2: Based on step 1 a model is specified.

Step 3: The model is estimated.

Step 4: The model is checked to ensure that all assumptions are satisfied. If the model is inadequate, it has to be re-specified (step 2), and the iterative cycle of model specification - estimation - checking must be repeated.

Step 5: The model is used to generate forecasts.

Step 6: The model is validated and tested for stability. If either criterion is not satisfied, the model has to be re-specified and the identification cycle repeated.

Step 7: FINISHED

The model identification cycle is displayed in Figure 6.1 below.

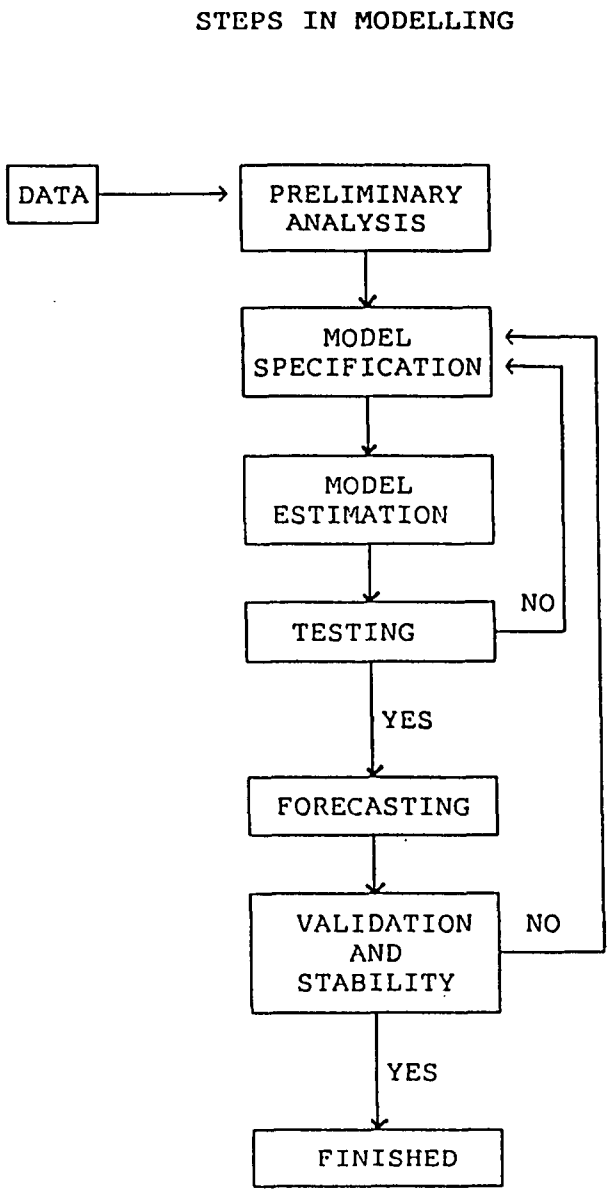


Figure 6.1 Model Identification Cycle

The final identified model may in some cases:

(i) not validate well;

(ii) not be stable;

and

(iii) may not necessarily be used for forecasting.

Consider the following example. Suppose (identified) trends in payment/calendar year direction are as depicted below.

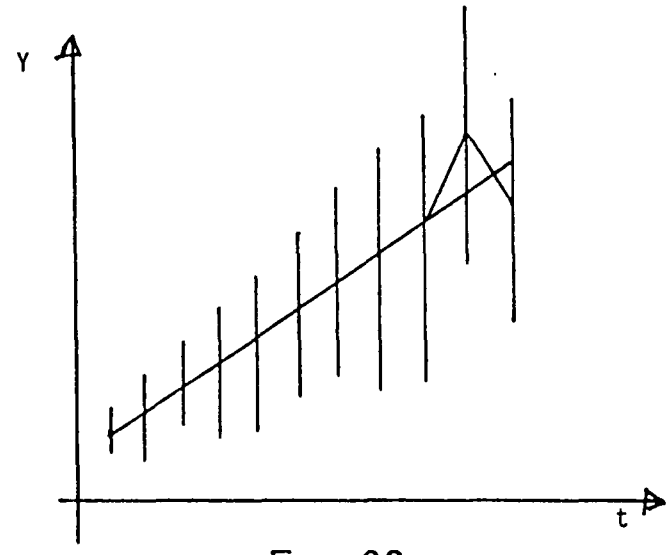


Figure 6.2

The trend has been stable for many years, 10% (± 2%), say. However, between the third last and second last it is 13% (± 1%) and between the last two -3% (± 1%). This 'best' model based on SSPE, AIC, significance of parameters etc. would forecast with a trend in payment year direction of -3%. In the absence of any other information one should forecast along the 10% (± 2%) trend line.

Moreover, it is clear that the 'best' model cannot validate the last two payment years well, and is not stable - the projections will fluctuate wildly if we remove hte last one or two years from the estimation.

7. SUMMARY AND CONCLUSIONS

Chapter 1 of the new landmark text Foundations of Casualty Actuarial Science states the obvious "...to state the obvious, that probability theory (whether classical or Bayesian) forms the basis of actuarial science". It also argues that credibility is the cornerstone of actuarial mathematics. The author is led to conclude that deterministic age-to-age development factor techniques are not part of Actuarial Science.

In the present paper we attempted to make loss reserving analysis part of Actuarial Science by introducing a consistent and rational development factor modelling FRAMEWORK based on a number of fundamental building blocks.

It was first shown that every loss development array satisfies certain geometric properties in respect of trends. These geometric properties were incorporated in the modelling FRAMEWORK.

Deterministic models were generated using the known geometric properties and were subsequently extended to stochastic models. Since fixed parameter models suffered from multicollinearity as a result of the non-orthogonality of payment year with accident year and development year, we were also motivated to introduce varying parameter/credibility models.

The FRAMEWORK is both consistent and rational - this can easily be demonstrated.

REFERENCES

Akaike, H. (1971). "Information Theory and extension of the Maximum Likelihood Principle", 2nd International Symposium on Information Theory, Petrov, B. and Cake, F. eds.

Chatterjee, S. and Price, B. (1977). **Regression Analysis by Example.** John Wiley, New York.

Fisher, W.H. and Lange, J.T. (1973). "Loss reserve testing: a report year approach", PCAS, 60, pp 189 - 207.

Friedman, M. (1953). "The methodology of positive economics", in **Essays in Positive Economics**, University of Chicago Press, pp 3 - 43.

Herschel, Sir John F.W. (1849). **Outlines of Astronomy**, Philidelphia, p548.

Hossack, I.B., Pollard, J.H., and Zehnwirth, B. (1983). **Introductory Statistics with applications in General Insurance.** Cambridge University Press.

Kahane, Y. (1989). "A modern approach to loss reserving in long-tail lines - the case of automobile insurance", **International Insurance Seminar**, Chicago, July 1989. (To be published).

Kremer, E. (1982). "IBNR - Claims and the Two-way Model of ANOVA", Scandinavian Actuarial Journal, 1, pp 47 - 55.

Popper, K.F. (1959). **The Logic of Scientific Discovery.** Hutchinson.

Muth, J.F. (1960). "Optimal properties of exponentially weighted forecasts." **J. Amer. Statist. Assoc.**, 55, 299 - 306.

Stavros, C. (1990). "Regression models based on log-Incremental Payments". **Institute of Actuaries Loss Reserving Manual**, Volume 2., Chapter 2.

Sundt, B., (1989). "On prediction of unsettled claims in non-life insurance", Sotrebrand (to be published in **Scandinavian Insurance**).

Zehnwirth, B. (1985). "Linear Filtering and Recursive Credibility Estimation", **ASTIN Bulletin**, Vol. 15, No. 1, 19 - 35.

_____ (1988). "Stochastic models versus age-to-age development factors". **Proceedings of the 1987 Casualty Loss Reserve Seminar.**

_____ (1989). "Statistical Chain Ladder". **Institute of Actuaries Loss Reserving Manual**, Volume 2, Chapter 1.

EXERCISE FOR SESSION 3G OF

CLRS HELD IN DALLAS, SEPT. 1990

THE FIRST DETERMINISTIC CAPE COD ARRAY IS SUBJECT TO TRENDS (ADJUSTMENTS) TO OBTAIN THE ADJUSTED ARRAY. IDENTIFY THE TRENDS (ADJUSTMENTS) USED ?

DETERMINISTIC INCREMENTAL PAIDS

DETERMINSTIC CAPE COD

	DEVELOPMENT YEAR													
ACCI. YEAR	0	1	2	3	4	5	6	7	8	9	10	11	12	13
1977	1000	2000	3000	2500	2000	1500	1200	1000	800	700	400	300	150	50
1978	1000	2000	3000	2500	2000	1500	1200	1000	800	700	400	300	150	
1979	1000	2000	3000	2500	2000	1500	1200	1000	800	700	400	300		
1980	1000	2000	3000	2500	2000	1500	1200	1000	800	700	400			
1981	1000	2000	3000	2500	2000	1500	1200	1000	800	700				
1982	1000	2000	3000	2500	2000	1500	1200	1000	800					
1983	1000	2000	3000	2500	2000	1500	1200	1000						
1984	1000	2000	3000	2500	2000	1500	1200							
1985	1000	2000	3000	2500	2000	1500								
1986	1000	2000	3000	2500	2000									
1987	1000	2000	3000	2500										
1988	1000	2000	3000											
1989	1000	2000												
1990	1000													

ADJUSTED DETERMINISTIC INCREMENTAL PAIDS

	DEVELOPMENT YEAR													
ACCI. YEAR	0	1	2	3	4	5	6	7	8	9	10	11	12	13
1977	1000	2080	3245	2812	2700	2227	1960	1878	1728	1739	1143	986	567	217
1978	1040	2163	3375	3375	2970	2450	2254	2160	1987	2000	1314	1133	652	
1979	1082	2250	4050	3712	3267	2817	2592	2484	2285	2300	1511	1303		
1980	1125	2700	4454	4083	3757	3240	2981	2857	2628	2645	1738			
1981	1458	3207	5292	5071	4666	4024	3702	3548	3264	3285				
1982	1604	3528	6086	5832	5366	4628	4258	4080	3754					
1983	1764	4057	6999	6707	6170	5322	4896	4692						
1984	2029	4666	8048	7713	7096	6120	5631							
1985	2333	5366	9256	8870	8160	7038								
1986	2414	5553	9580	9180	8446									
1987	2777	6386	11016	10557										
1988	3193	7344	12669											
1989	3672	8446												
1990	4223													

WHAT ADJUSTMENTS WERE MADE TO INCREMENTAL PAIDS TO OBTAIN ADJUSTED INCREMENTAL PAIDS ?

GIVEN THERE IS NO RANDOM COMPONENT THIS EXERCISE IS STRAIGHTFORWARD.

1990 CASUALTY LOSS RESERVE SEMINAR

4A/5B: BASIC TECHNIQUES III

Faculty

Susan K. Woerner
Tillinghast/Towers Perrin

Hank Youngerman
The Wyatt Company

MR. YOUNGERMAN: Good afternoon. Welcome. This is the Basic Techniques III part of the basic track for the Casualty Loss Reserve Seminar. My name is Hank Youngerman. I am a fellow of the Casualty Actuarial Society and I am a consulting actuary with the Wyatt Company in Washington, D.C. My co-panelist this afternoon is Susan Woerner; Sue is also a fellow of the CAS and a consulting actuary with Tillinghast in Arlington, Virginia, which is right outside of Washington.

I assume that at the end of the session someone will be outside collecting your admission tickets, which you only need if you need to get documented continuing ed. credit, and the questionnaires and your comments will be very helpful. Remember, this is Basic Techniques III, if you like the session. If you don't like the session, it has something to do with medical malpractice.

We will be happy to take your questions, particularly since we're not on any kind of an overly rushed time schedule; this session ends at 5:00, and that's the last one for the day, and then we have some time before the reception. So we will take questions, but we would kind of like it if you could hold them till the end and even if we run past 5:00, and the rest of you would like to go do other things, Sue and I will stay around for a little while, if you have questions you would like to ask us personally.

And I guess the last housekeeping item -- unfortunately I'm told that we have run out of handouts, which are just copies of the slides that we are going to show here, but if anyone wants -we'll see what we can do about getting some more printed up tonight. And, in any case, if you want to leave us your business cards we'll somehow that you get a copy of the handouts.

We're going to cover four things today. I'm going to cover the first two, which are expected loss ratio techniques, and tail factors; and Sue is going to discuss reserving separately for allocated loss adjustment expenses, and unallocated loss adjustment expenses. Now, just to jump right into things.

The expected loss ratio technique is really just an approximation. By itself, it's not a very good technique, but it's one that you use when you have limited information and it's a building block to something called the Bornhuetter-Ferguson method, which I'll discuss as part of the overall discussion of expected loss ratio techniques.

Basically, the expected loss ratio technique, -- I'll just call it the ELR method -- is kind of a budgetary item. It really just says that we know what the earned premiums are. And for one reason or another, we expect the loss ratio to be say, 75 percent over the course of the year, and then whatever hasn't been paid, whatever hasn't been reported, whatever we don't show on the books as a reserve, we'll just gross that up and that will be the IBNR reserve.

And so at the end of the year, if you have $100,000 in earned premium and $40,000 in reported losses, you say, we want to produce a 75 percent loss ratio and therefore we have an IBNR of $35,000. Now, obviously, the key to the expected loss ratio technique is the earned premiums and the expected loss ratio.

Well, generally speaking, in actuarial work the things that you can get from the accounting department we deal with as known quantities, and usually getting earned premiums is not much of a problem, especially in an insurance company, but the key variable is, what is your expected loss ratio? Now, frankly, often this just becomes a matter of actuarial judgment, and there are no hard and fast rules to go on. You just have to pretty much rely your years of actuarial experience and hope that you've seen enough similar situations that you can make a good judgment.

There are three things that we would most commonly look at: One would be the pricing assumptions. If you are an insurance company you might have developed your rates on the assumption that you have a certain lost cost and that you need to gross that up for expenses, so you might have said, well, we're going to set our prices to produce a 70 percent loss ratio.

If you are a self-insured entity, you may have some history going back that says, we've produced losses as a certain percent of the premiums that we paid our insurance company, and we know how we have established our contributions to the self-insurance fund, and so you can develop an expected loss ratio that way.

The second thing that you can use, if you are an insurance company, is Schedule P; specifically, I believe it's columns 27 through 29, looking at your historical loss ratios and assuming that the past will basically reproduce itself in the future.

And the third thing that you can look at is industry data, if you have some sort of a comparable basis. If you are writing general liability insurance and you believe that your premiums are representative of what the industry is charging for comparable coverage, you might look at something like Best's Aggregates and Averages, or other information that A.M. Best compiles, and say, well, if our prices are the same as the industry, our risks are the same, if the industry loss ratio is 80, then ours should be about 80.

Now, one -- the one thing that we'll talk about in a little more detail -- this is just a mock-up of Schedule P, and there's just a couple of points from this slide.

(Slide)

The main one is that you have to make sure that you are comparing apples to apples. We have used the summary slide here, but the important thing to remember is that you want to use the appropriate line of business. If you are setting reserves for

general liability, you don't want to be taking your loss ratio from the workers' comp. part of the exhibit.

Generally speaking, from the standpoint of Schedule P, some of the lines are very useful, something like automobile liability, workers' comp., medical malpractice But you have to be somewhat careful when you are using, particularly, the general liability schedule, because there are so many different things that go into the GL schedule, the GL part of Schedule P.

You get literally everything from products liability to directors and officers liability, to run-of-the-mill owners, landlords, and tenants. And so you have to be a little bit careful when you are doing that. Now, the other thing I mentioned before, is -- and it's kind of hard to see, since I don't think it reproduced at all -- but we have a blow-up of these columns 27 through 29.

(Slide)

Now, it seems on these slides -- I guess they use Easy Insurance Company as the name of the example company through the entire track, but they seem to have the numbers jump around a lot, so I don't know whether these are consistent with anything you have seen before.

But basically, as I said before, there is a lot of actuarial judgment that is going to go in. But this is the sort of thing you would use to guide your judgment. Now, one thing is -- you want to make sure that you are looking at the right column in the sense that if you are going to try to select an expected loss ratio on a direct and assumed basis, you want to focus on the column for direct and assumed, not the net column.

But of course the one that you are going to be most commonly faced with dealing with is the net column. That is the bottom line for the insurer. And so you have the constant actuarial problem that if you use data that is too recent, you get random fluctuations because it is a fairly short period of time. You can be unlucky in one year and that may not be a good indicator of your long-term trend. Also, the more recent data has less historical basis to it.

But if you go back too far, then you are taking information from years that may not be representative of current conditions. So, one of the very common things that you might do, if you wanted to project a loss ratio, is maybe look at something like a three or a five year average, which in this case is computed at the bottom of the slide.

(Slide)

You would also look at the loss ratios, here, and you would eyeball them, and this is kind of a tough one. But in general you would say, well the loss ratio has been pretty much

increasing. You had a good year in 1986, when it was down to 90, but other than that, it has been increasing pretty steadily.

And so, if you were just to look at this; this is just really an example of one of the places you would pull an expected loss ratio from. I guess if I were to eyeball this data -- as a rule, an actuary is not going to be incredibly rigorous, but you still need a result that you believe in. And so I would say, on here, you would probably be looking at an expected loss ratio, assuming no change in conditions, somewhere around 100 percent for 1990. And that is what you would use as input into the expected loss ratio method.

Now, obviously, I know if this were my company, if I had a lot of stock in this company, I'd be raising hell over these results, and I might be going down to my underwriting department and saying, rates are going up 25 percent, effective this morning. And if you were to do something like that, then you would not expect these results to continue out into the future.

So you have to be a little careful and make sure that if there has been a change in the nature of the operations of the company, that they are properly reflected in your projection of an expected loss ratio. So this slide is really just a little bit of arithmetic.

(Slide)

Now, I assume that most of these terms, like case reserve, IBNR reserve, that those and some of the accounting relationships are things that you covered in earlier sections. Is that correct? Okay.

So really all we've got here is, you just take the earned premium times the expected loss ratio, that's your expected ultimate losses by the ELR method, so you take your ultimate losses, subtract the paid losses, that's your total reserve, subtract the case reserves and that gives you your IBNR reserve.

And really, from an actuarial perspective, basically everything but the IBNR reserve comes from the accounting arm of whatever entity it is that you are establishing losses for. And really the whole of what the actuary does is try to determine the IBNR reserve. So, once again, they've decided to jump around with the numbers on the example, but this slide really just runs through the calculations on the earlier one.

(Slide)

You've got $100,000 in earned premium -- that's an accounting value. You've taken off your accounting hat and put on your actuarial hat, and you've said the expected loss ratio is 65 percent. The paid in -- paid losses and case reserves are, once again, accounting values, and so you've got a total reserve, the

100,000 times .65, that's your expected ultimate losses, 65,000 minus the $10,000 in paid losses, gives you a total reserve of 55,000; subtract the case reserves from that and you get 42,000 as your IBNR reserve.

Now, I suppose you might be wondering if I said -- as I said earlier, the method is so crude, and really in a way it's sort of ultimately crude. As I say, it's a budgetary amount. In a way, you just change the expected loss ratio, and you can come up with any bottom line that you want for your company. And why would an actuary even think of doing something like that?

Well, there's basically two reasons. One is that it is a building block toward the Bornhuetter-Ferguson method, which I'll talk about in just a couple minutes, which is actually a much improved method. But the other times that you are going to want to use it is basically when you have no history, really when you have nothing better to go on.

You would be using it for a new product line, you would be using it if you had a radical change in your existing product line. Another thing that is not on the slide is, you would tend to use it if you have an entirely new entity. You know, if you are a firm that is newly going self-insured for a particular line, if you have just established some sort of a captive insurer, when you don't have a track record to go on. That's when you are going to use the ELR method.

One of the pitfalls, something you have to be careful about, is you can't apply it blindly because you may get into situations where, particularly if you have a line where the losses get paid fairly quickly, you can actually get negative reserves if your paid losses exceed your ultimate expected losses, and so that's something that you have to watch out for.

And, of course, the one thing that certainly must be occurring to a lot of you by now is that even if you are very early in the history of an insurance company or self-insured or something like that; even if you have only been a year or two into the history of the company, well, one day one you might want to use the expected loss ratio method.

But if you are a year or two down the road, then to just keep going with the expected loss ratio method, you don't have enough history to start building a development triangle, but yet, in effect, if you use the ELR method, you are ignoring known information, you are ignoring the extra information you have by virtue of the fact that losses are coming in at a higher pace than you would have expected, at a slower pace.

So in essence, the Bornhuetter-Ferguson method, which sounds like an intimidating name, but it's really a very simple method that just sort of draws a compromise between looking at the case reserves and looking at the expected loss ratio method.

Now, the slides call it reserves based on ELR and case incurred, and this really is just the Bornhuetter-Ferguson method. And so, we've got -- I'm going to skip over this term, here, for just a second: one over one, minus LDF; and we'll come back to that because that's really the only part of this slide that's complicated at all.

(Slide)

This term here, the earned premium times ELR; well, that's your expected ultimate losses, and so that develops your IBNR reserve when you multiply it by this term, and then the rest of what you have here are just the reverse of some of the accounting identities that were in one of the earlier slides. You take the case incurred, you add it to the IBNR reserve and that gives you your total ultimate losses. And the same thing if you take the case reserve, plus the IBNR reserve gives you the total reserve.

Now, what it says down here, the factor in parentheses, and what they really mean is this factor. It's just the percent of losses unreported. Let's say you believe that 80 percent of your losses come in in the first year. So you started your company on January 1, 1989, and at December 31, 1989, you have, say $60,000 in losses that have been reported, the question is, what hasn't been reported?

And that's the IBNR, and of course, that's what you really need to determine as an actuary. And so let's say, for whatever reason, you believe that that figure is 20 percent. You believe that this term is 20 percent. Well, what you would do is take your expected loss ratio method, and let's say your earned premium was $100,000 and the ELR is 80 percent. Well, in essence, all you would do here is, you would say, I expected $80,000 in losses. I think that 20 percent of them are unreported as of this point in time.

And so you take 80,000 times 20 percent, and the IBNR reserve would be $16,000. You add your case incurred, which is $60,000, add the IBNR reserve of 16,000, and you've got ultimate losses of 76,000. That's the whole Bornhuetter-Ferguson method. That's really all there is to it. And as I say, it draws a very good balance between making use of what you know and the additional information, the piece you have to fill in that you don't know.

Now, in terms of where you come up with that percent of losses unreported, you know, these are development triangles and the age-to-age ratios, the selected age-to-age ratios, and the multiplicative cumulative factors, and I assume that everything down to about here has been covered in the earlier sessions.

And so all these IBNR factors are, well, really, take this 1.215. In essence that says that for every dollar reported to date, you have 21.5 cents left that's going to be reported later, and the ratio of a dollar to $1.215 is the same as the ratio of

82.3 cents to a dollar. And where did I come up with 82.3 cents? Well, that's just one, minus this .177.

So really this whole formula of determining the percentage of losses yet to be reported is just a little piece of algebra that takes you from the cumulative loss development factor down to your IBNR factor.

So in the case of Easy Insurance, the way you would apply the Bornhuetter-Ferguson method -- you take the earned premiums times the expected loss ratio and that gives you your expected losses. Now, if you were just applying the straight expected loss ratio method, in essence, then, you would forget about these next two columns. And in a way you would forget about the next three columns.

Your expected losses would be your ultimate losses, and then your IBNR would simply be this ultimate loss minus the cumulative incurred loss. But in essence, what that would do is be ignoring the extra information that you have, based on the fact that in some cases you are many years out. If your losses have been better or worse than what's expected, it would be pretty much foolish to ignore that information.

For example, in the case of 1984, your expected losses were $10,901. Yet you've actually had $11,250 reported to date. But why should you just go with $10,901? Your actual losses to date reported have been greater. So, I mean that's an example of why you use Bornhuetter-Ferguson, because it's a compromise.

So the actual calculation would just be, in the case of each year, take the expected losses times the IBNR factor; that gives you the IBNR for the year. Add that to the cumulative incurred losses, which is the cumulative total of the paid plus the individual case reserves, and that gives you your ultimate losses, which is basically the best reflection you have of all the information that you have to date.

Now, as a general perspective, as an actuary, this is not my method of first choice. If I have sufficient data I would much rather do some sort of an incurred or paid development. The fact of the matter is, though, that in so many cases, you have companies whose methods of doing business has changed, they've adopted new lines of business, you have captives or self-insured entities.

There are so many instances in which you just can't build yourself a nice five or six or eight or ten year development triangle. Then you have to use something like this, and as I say, I think it represents a very good compromise between what you know and what you don't know. Now, this slide is really just a comparison of what happens when you use different methods.

(Slide)

Because, of course, when your actual losses are exactly the same as your expected losses, well, then, all of your methods are going to come out to be pretty much the same; but, of course, if that were always the case, then we wouldn't be calling it insurance, we would be calling it something else. The fact that you have deviations is the heart and soul of this business that we're in.

But basically, as I say, this is a comparison of what happens when you use the different methods. In one case where the incurred losses, which really, I guess, should be reported losses, are twice as high as what was expected, and then in the other case, where the losses are about half of what's expected.

Now you can see that the straight expected loss ratio method, and the expected Pather method; those come up with pretty much the same results in either instance, which in effect is telling us that those methods do not make any use of the extra information that we gained by having observed our actual losses. The incurred development method, you can see, has a huge swing.

And that's really the principal limitation of the incurred development method, especially at early ages on a long tail line. The fact that for every extra dollar of loss that is reported under the incurred development method, you may be projecting somewhere out in the future that that means you are going to have an extra $5 or $10 or $20 of losses.

And both as a practical matter as well as just the common sense that you don't want to exaggerate swings based on a fairly thin volume of data, that's -- so that's a drawback of the incurred development method. And what's called here the ELR and incurred -- the Bornhuetter-Ferguson method, as you can see, it does have some swing, which indeed it should, but the swing is of a more reasonable nature than the incurred development method.

(Slide)

So this slide pretty much illustrates one of the main advantages of the Bornhuetter-Ferguson method, which is that it gives you some reflection of the changes of the deviation of actual from expected results, but it doesn't give you such a wide swing that it's unreasonable.

And the next couple slides are going to talk in a little more detail about some of the advantages, disadvantages, limitations, and so on.

(Slide)

Now, this one talks about some of the assumptions that go into the Bornhuetter-Ferguson method. One is that the premiums are an accurate measure of exposure. Now, really, anytime you are doing loss reserving you are not really very interested in what the premiums are.

I'm sure that your financial people and your stockholders are very interested in the relationship of your losses to your premiums, but realistically, when you are just trying to set a liability, the premiums are relevant only insofar as they try to give you a handle on what the underlying base of loss-producing potential is.

Looking at it another way, if you have two companies which are writing identical books of personal auto business, but one charges 20 percent more than the other, if the books of business really are the same, you would not expect the company that is charging more to have more in losses, you would expect it to have about the same in losses.

And just like I said earlier on the slide where it showed the loss ratios of 100 and I said that I would not put up with that if it were my company, so you have to be aware of the relationship between the pricing and the loss potential. It also makes the assumption that the expected loss ratio can be predicted. The problem, of course, it said -- the problem that is mentioned here is instability in accident -- your loss ratios.

But that's really -- that's only a problem to the extent that the method you are using to get your expected loss ratio is some sort of historical average. The problem is of much broader nature than that. The fact of the matter is that you are trying to guess what your expected loss ratio is, and any problem that you have in that -- but of course, the biggest problem is simply that you are trying to basically rub your crystal ball and look into the future.

So, to the extent that this method is dependent on knowing something that is inherently unknowable, you have a limitation of method.

Now the constant reporting pattern gets into the issue of the loss development factors. Any time you had a change, for example, introduction of automated claim system which would speed up your processing, backlogged processing, which would slow it down -- looking -- in essence, we look at the expected loss, the IBNR, as a completely independent part of the reserve equation from the reported losses.

If you have anything that speeds up or slows down the reported losses, that will affect your total reserve in a way that it really shouldn't. If you had a fire in your computer center and you couldn't process any losses for the entire month of December, you should increase your IBNR, but the Bornhuetter-Ferguson method wouldn't necessarily tell you to do that. You would have to make an adjustment to your IBNR factors.

(Slide)

This slide talks about some of the advantages and disadvantages of the Bornhuetter-Ferguson method. To me the biggest advantage is that it is a reasonable compromise. It makes use of what you know and it has a reasonable proxy for what you don't know. The disadvantage is that it does assume that the case reserves and the case development have no relationship to the reported losses. It's always a tough question.

Let's say you are writing a personal auto book of business and you expect your first quarter losses to be a million dollars and they actually come in at a million and a quarter. Well, the problem is you never really know. Or if you were unlucky, if you were just unlucky, then you are going to have to eat that extra quarter of a million dollars, but you don't expect it to persist quarter after quarter.

But if that represents some sort of a change, if there is something going on out there, and you may or may not have a guess as to what it is, but if there is something going on that is leading claim results to a new and higher plateau, then you want to reflect that, and the loss development methods will reflect that, whereas Bornhuetter-Ferguson will not. So it's a limitation, and it's basically something you have to be aware of.

The flip side of that is that the advantage of Bornhuetter-Ferguson is that it avoids overreacting to losses that have been incurred to date. In the example I just gave, that extra quarter of a million dollars will be reflected exactly once in Bornhuetter-Ferguson. It won't be assumed to repeat over and over.

It's suitable for a new, volatile or radically changed line of business. It can be used with no internal loss history, to a certain extent. You need some basis for your IBNR factors, but those are frequently available from external sources. You can get industry Schedule Ps or National Council on Compensation Insurance data, things like that.

And it's easy to use. I mean, as I said earlier, the entire Bornhuetter-Ferguson equation really pretty much fits on one line. And you know some of the other disadvantages -- the uncertainty of the projected ultimate loss ratio. Well, that's kind of a given, based on what I've said so far. That it ignores losses incurred to date -- well, I don't know if that's really valid. What it does is, it doesn't multiply the losses incurred to date.

But an advantage of the Bornhuetter-Ferguson as opposed to the ELR method is that it does give you credit, or debit, if you will, for the excess of losses reported to date over what's expected. And it relies on the accuracy of earned premium. That's usually the least of your problems. Every now and then you will have a situation where you have earned premium you can't rely on, but certainly if you are an insurance company, if you

can't rely on that, then you probably can't rely on anything. That pretty much covers it for the BornhuetterFerguson method.

The next thing I'm going to talk about, and this will move along a little more quickly, are tail factors. And basically, all tail factors are loss development factors. But what they do is, they take you from kind of the right edge of your development triangle out to the very end. Basically the definition here -- it's the amount of development expected from the observed data point, to ultimate.

So if you have constructed a development triangle that takes you out, say, to about age six or seven years, well, on the one hand, there's not a whole lot of development that typically takes place after six or seven years, and so it may not be -but yet you can not ignore it entirely.

And so what we are going to talk about is basically some rules of thumb, and it's built mostly around the idea that, first of all, sometimes you are not able to collect data. Sometimes you are not able to build your development triangle out 10 or 15 years, but yet, as I say, you can not ignore it entirely. And this slide shows why.

(Slide)

And we're back to Easy Insurance Company here. And you've got incurred losses over this seven year period of 100 and about $103,000, a total reserve of about 27,000, an IBNR of just short of 5,000.

Now these are the losses developed out to 84 months. Now if you just take those and accept that there will be no further development, the question is, how much are you going to miss? Well, you won't miss an awful lot if, for every one percent of development you are going to have development upward of about $1,000.

So let's say the ultimate development factor from 84 months on, is say, around four percent. Well, that means you are going to miss your estimate on the total incurred losses by four percent, which is certainly not a crisis. But it's going to change your indicated total reserve by four times as much, because this $102,000 includes a lot of losses that have been paid.

When you take out the paid losses, and you look at your total reserve, which is about 28,000, well, if you take 4,000 divided by 28,000, you're up in the realm of about 15 percent. And so basically by ignoring development from 84 to ultimate in that instance -- you could be off on your total reserve, your balance sheet liability item, by about 15 percent.

And that's a lot -- that's a lot more in the overall scheme of things. And it's going to cause an even greater distortion in

your IBNR because you have the same numerator, but your denominator keeps shrinking. Your IBNR in this example is only around $5,000. If you failed to develop your losses from 84 months to ultimate, you could miss your -- you could miss your IBNR by -- well, in this example, around 90 percent.

And so, even though it's not very large compared to your total losses, it's much larger compared to other balance sheet items, and you do have to be careful to take account of it.

Now we're going to talk -- this is going to be fairly quick -- about four methods, and to a certain extent all of these have elements of rule of thumb about them. One is external data, incurred to paid ratio, repeat the latest development and the half rule method, and the third and fourth have a lot of similarity to them.

Well, external data is really just looking at whatever you can find for something comparable, external to your own entity. Industry Schedule P data, if you were to -- and once again, you have to be careful that you are comparing apples to apples as far as lines of business, with the special caution that I said earlier about general liability.

You certainly would not want to use an industry Schedule P for all general liability and use that as a projection of something like directors and officers liability, which has a much longer tail. But, once again, if you were doing workers' compensation or medical malpractice or even automobile liability, you would probably get a reasonable approximation.

If you are able to get data from companies that are similar to yours -- if you are an insurance company, it's fairly easy, because insurance company annual statements are public record. If you are self-insured, then, you know, your competitors generally may not be all that eager to share the information with you.

But, frequently they are ways that you can get the data. If you have a consultant involved, usually the consultant will have data from similar companies that he's gotten through other work. The Reinsurance Association of America does a loss development study. This has to be used with a little bit of caution, once again, because of the apples to apples issue.

A lot of their data reflects different layers of insurance, and loss development is very different on a primary basis versus an excess basis. And the last, and probably the most common one is Insurance Services Office, or for workers' compensation, National Council on Compensation Insurance.

Both of those sets of data are very readily available. I know with ISO, generally speaking, if you look at the minutes of the various actuarial committees, they will have the tail factors that they use, and the same thing is true with the NCCI.

In the incurred to paid ratio, first of all I'll jump to the bottom of the slide.

(Slide)

It only applies to paid loss development. And what it really is saying, and it's very, very crude for this reason, is that you have reached a point in development where all of your case reserves are as accurate as they can be, and you are not expecting any further change in the incurred losses, only in the paid losses.

Now, of course, by the time you get out to six or seven years, your truly unreported claims have become very small. You will have a few of them in medical malpractice, because there the statute of limitations sometimes can extend out to some number of years after a child turns eighteen. But in most cases, by the end of seven years you do not have any new claims being reported, because the statute of limitations has expired anyway.

But in the case of paid development, for most lines, you still are paying losses. And so here, all you're really doing is saying that for paid development we're going to assume that the ultimate paid losses will equal the incurred losses reported to date. So you just divide the incurred losses by the paid losses, and that gets you your factor.

And of course, on the flip side of this, if you -- when you take the 1.055 and apply it back to the paid losses, when you do your paid development, the 9759 will come up to 10 million to -- to 10,292. So it's really, it's just kind of a circular method of saying that up to a certain age we'll use paid development, and after that we are going to use incurred development, but we are going to use incurred development with a tail factor of one.

And so in that respect it's very, very crude, but if you had nothing better to go on, if you don't want to make an approximation of an incurred tail factor, this is certainly better than nothing.

The half rule method is just a rule of thumb. It basically says that you have factors going out really as far as the eye can see, but eventually they get small enough that you don't have to pay any more attention to them. And that each factor is half of the preceding factor. So if you are 72 to 84 month factor is 1.037, divide .037 by two, and your next factor would be 1.019 to go from 84 to 96 months, 1.01 to go from 96 to 108, and so on out.

And then when you multiply all of them together, that would give you your 84 month to ultimate factor, which would be 1.041. Now at the bottom, here, it says test to verify if tail factor is sufficient. And the reason we put that on the slide is because this really is -- it's really a rule of thumb.

(Slide)

There's not as much scientific basis to it as there are some of the other things that we have talked about. And so when you use this, if you have no older data, than seven years, then in general it's a reasonable thing to use. But if you have some years that are older than eight years -- there are seven -- seven years, 84 months, then you might want to look and see.

Well, historically, if we had applied a 1.041 factor, would that have given us enough of an allowance for development from 84 months to ultimate? As I say, it's because it's a crude rule of thumb, that you don't want to just go ahead and use it kind of blindly.

And the last method is, repeat the latest development. That basically just says that whatever your last factor is, you assume that your last factor is adequate to give you sort of one more column. So in essence, what you would be doing, is you would be saying, here, 72 to 84 is 1.037, then you might draw another column, 84 to ultimate and you just put in 1.037.

And, once again, the same caution: test to verify if tail factor is sufficient. Now as it turns out, this method is almost mathematically identical to the half rule method. The difference between 1.037 and 1.041, even though that's a fairly modest difference, if it weren't for the rounding, you know, if it weren't for the rounding differences that were in the earlier slide, it really -- the earlier slide would have come out to about 1.038 or 1.039. So these two methods are very close, and so they just pretty much provide a rule of thumb.

Okay, so now, as I say, Sue is going to talk about methods for reserving loss adjustment expenses, and then, when we're all done, we'll be happy to take questions.

MS. WOERNER: I'm going to talk about something a little different than what you have been talking about all day, although when we get into it, you will see that it looks like the same old thing. As Hank indicated, I'm going to talk to you about loss adjustment expenses.

Now, first of all, what are loss adjustment expenses? It's basically any kind of cost involved with settling claims. That's all it is. It's not general costs, it's not acquisition. It's the cost the company incurs in adjusting and settling their claims.

First of all, I want to give you a little background, so you get a sense of what is involved with loss adjustment expenses.

Loss adjustment expenses historically have been given very little attention compared to the losses themselves. And you might wonder why this is the case. Well, I think there are a couple of

reasons. First, a few years ago, loss adjustment expenses were small compared to the loss amounts. So you could devote relatively little attention to them without serious repercussions.

A second reason relates to companies reserving with a target loss ratio in mind. After a company analyzed their losses, they could see where they stood relative to their target combined rates. They would limit the amount added for loss adjustment expense reserves. This way there was less explaining to do to the shareholders and others. Even though that wasn't the most appropriate way to go about reserving, it nevertheless happened, especially with stock companies. Mutual companies were less concerned about these kinds of issues.

The point is, loss adjustment expenses have not been given the attention they deserve, and now they are getting to be substantial. When I say substantial, I mean these losses can be as much as the actual indemnity payments themselves.

Your loss adjustment expenses can be quite high depending on the company and the line of business. In fact, for some professional liability lines of business, the amounts paid for loss adjustment expenses can be as high or higher than the loss payments. In fact, in the commercial lines, probably the more you pay in loss adjustment expenses the lower your losses are going to be. There is an inverse relationship.

In the area of asbestos claims, a company may make no indemnity payments, but look at the loss adjustment expenses. I have seen loss adjustment expenses on individual asbestos claims running as high as $500,000, $1 million or more.

It is not a good idea to ignore loss adjustment expenses. But a lot of companies think as long as they don't pay out a lot on losses, they're okay. Right now, as of 1989, and this is from Best data, it's industry-wide, all lines combined, the loss adjustment expenses were running about 19 percent of losses. In other words, they were equal to an amount that was approximately 19 percent of the ultimate losses.

And the problem is, it has been increasing, not just in an absolute sense, but in a relative sense as well. As recently as 1985 it was only 15 percent, and it has been going up steadily. So LAE is getting too big to ignored. It's about one-fifth of the amount paid in losses. If you had a line of business that represented 20 percent of your losses, you would not ignore that, but many companies continue to ignore the loss adjustment expenses.

Also, LAE reserves are very, very inadequate. For the industry as a whole, they are thought to be perhaps as inadequate as 50 percent. That means, for every dollar that is recognized as a liability on loss adjustment expenses, a dollar fifty should have been recognized.

Auto liability and workers' comp generally are thought to be only slightly inadequate. Where the big inadequacies are right now are in the general liability and medical malpractice lines.

The loss adjustment expenses, are divided into allocated -- the ones that can be assigned to individual claims; and unallocated -- the ones that cannot be.

Relative to one another, unallocated loss adjustment expenses tend to run in the range of six to nine percent of losses for the industry as a whole. Allocated run anywhere from five percent to over 100 percent, depending on the line.

Typically, for medical malpractice, it is not uncommon to see them running in the vicinity of 50 percent of the losses. For GL 40 percent is not uncommon.

The reserving is also done separately for allocated and unallocated. The reason has to do with the nature of these losses. The allocated losses can be grouped in the same way as the losses. That is because you can identify them by individual claims, which means you can configure those losses in the same way you would your loss data.

The unallocated, however, cannot be assigned to individual claims. To an accident year analysis, you would need to impose an artificial allocation procedure. So to allocate your unallocated, which sounds like doubletalk, you have to rely on some sort of artificial allocation procedure.

First, we are going to look at techniques for reserving the allocated loss adjustment expenses. Again, what are allocated? Those are the expenses that are identified with and can be assigned to an individual claim.

Examples of these are listed here. They would be cost of police reports, attorney fees, engineer evaluations, expert witness, adjuster fees, and appraiser fees, they could be medical costs associated with medical examinations, anything like that. Not surprisingly, the biggest one here typically is attorney fees.

We are going to look at two methods for reserving allocated loss adjustment expenses. There are a number of different methods, but we're only going to focus on two of them.

We will focus on the paid allocated loss adjustment expense development method and the cumulative paid allocated loss adjustment expenses to cumulative paid losses method. The name is worse than the method.

Now, first method is the cumulative paid development method. If you have attended any of the other sessions, have seen this kind of triangular configuration.

The first step, just to refresh your memory, is we slot the data by accident year at the different stages of development, for example, 12 months, 24, and so on. For 1987, at 12 months we had $108,000 paid at that point for allocated loss adjustment expenses. And at 24 months we had $245,000, and then by 36 months, for the accident year '87, we have paid a total of $437,000.

The next step in the process is to calculate the development factors. Again, looking at 1987, under the first column -- and we really should have these labeled -- the first column should say 12 to 24, and then the next, 24 to 36, and so on, across. But for '87, under the first column, the factor of 2.2685 is obtained by taking the 245,000 from the above triangle and dividing by the 108,000 for '87. That's the second step.

The third step is to calculate a number of different averages. These averages should be the same averages used in the paid development methods and in the incurred development methods. Just to briefly refresh your memory: TR stands for truncated average. You look at the column, throw out the high, the low; average the others. In average stands for inverse average. You invert all of them, average them, reinvert them. This average mitigates the effect of outlyers. If you can't afford to throw factors out, as in the truncated method, then this is a way of using more of the information that you have. The straight average, is just the average of all factors in the column. The weighted average is assigning different weights, giving the more recent years the heavier weights, and then your four-year average and the weighted four-year averages I think are fairly obvious.

Next, you have to select the factors. This is the most important step. This is where the judgment comes in. Here we have relied on picking the weighted average, until we get out into the later stages. Then we have relied on the straight average. There are many, many ways you can pick factors. The techniques presented here are just a few.

In terms of selecting the tail factor, you can use the method Hank just spoke about. You just repeat the last factor, and that's the method that we used here. Then, finally, after you have selected your factors, you calculate the cumulative factors shown there on the very last line.

For example, the losses for 1989 are $132,000. If I want to project those to ultimate, I can do that by applying the 10.2290 factor, shown under the first column. The factor takes the losses, at a given stage for an accident year, and then projects them to ultimate. This is illustrated on the next slide.

(Slide)

You know what you have paid to date for the allocated loss adjustment expenses by accident year. Your accounting department

should have that, and it should be in your actuarial data base as well. You have the development factor that takes those losses to an ultimate basis. You apply it, by multiplying it. There in the third column you get your estimated ultimate. That is the total amount that you are going to pay. But you know you have already paid a certain amount, which is shown in column one. You deduct what has been paid from what you are going to have to pay in total. What remains is the liability that you need to recognize. It is the amount yet to be paid, and that is the final column, the unpaid ALAE. Now this technique, again, is very, very similar to the techniques that you saw for paid losses and incurred losses.

As you might guess, there are advantages and disadvantages to this technique. Some of the advantages are shown on Exhibit 25. If you use this technique, it's very similar to paid losses. Also, it's easy and straightforward to apply. Also, this technique may work very well for the older accident years. Let's look at the disadvantages. The unfortunate thing about this method is, it doesn't consider any kind of a relationship that these allocated losses may have to the paid losses. And it can be heavily influenced by the amount of highly volatile initial payments.

What happens with allocated loss adjustment expenses for a given accident year is this: you tend to pay them out more in the later stages of the accident year than you do your paid losses.

For example, for a given accident year of 24 months you might have paid say, 30 percent of your losses at that point. For the allocated loss adjustment expenses, it would not be unusual if you had paid less than half of that, say 10 or 15 percent of the total amount at that same 24 month point.

And that is because the more difficult to settle claims take longer to settle. So you don't pay loss adjustment amounts on them until later in the development. So when you try to use the technique that I've just shown you, you may not have enough data in the early years on which to rely. But for the older years, you are starting to see what is going to be coming in, and you can get a much better idea what is going to develop there. So you want to be a little careful in applying that method. If you have a large volume on a given line, it should work very well. However, on lines like general liability, medical malpractice, it may not work well.

QUESTION: (Inaudible.)

MS. WOERNER: What are some other ways to get -- oh, what are some other ways? Well, you can use industry data, that's always a good way if your data is very sparse. You can use some of the techniques that Hank mentioned. That is, use the last development factor as the tail factor. For allocated loss adjustment expense, I would avoid having a tail factor lower than

I had used, for the paid losses. This is because they tend to be paid out over a longer period of time. But again, industry data is a good source. And sometimes that may be the only thing that you have.

The second method for getting at allocated loss adjustment expenses is the one with the long name: cumulative paid allocated loss adjustment expenses to cumulative paid losses. Here we need three triangles to start the method. The first one is just like we had in the first method, and it's cumulative paid ALAE.

The second triangle is your cumulative paid losses. As you might guess, on this method we're going to relate the allocated loss adjustment expenses to the losses. The third triangle is obtained by dividing the cumulative paid loss triangle into the top triangle, which is the cumulative paid ALAE. In other words, in the numerator you have the paid ALAE; in the denominator, you have the paid losses. That is, we are calculating ratios of these two amounts.

So what we are going to be using, then, as our basic triangle for this method, is this bottom triangle, here, which consists of ratios, the paid-to-paid ratios. Now applying it is no different than what we have seen in the other method. The only difference is, we are projecting ratios. And you go through the very same process.

You calculate the development factors, you go through the process of looking at a number of different averages and then, based on those averages, you make your selections. Now the selections here were made a little differently than some of the ones on the example I just showed you, and again, you have to use what makes sense for your individual company. There are no hard and fast rules.

Now, if you look at a number of different averages and they are all coming out very close to one another, you probably aren't dealing with a particularly volatile situation. You might want to pick something within the range produced by the various methods.

You may see some data that really gets quite ugly, and there the best thing you can do is to really understand your portfolio. Know what is going on. Know what forces are at work. Maybe you will want to talk to the claims people. If you see these averages changing -- or these ratios changing radically and -- and the factor is just jumping all over the place, maybe there has been a change in the organization of the claims department. Maybe the claims department changed reserving practices.

Maybe the claims department or company is letting independent contractors do more of the adjusting and taking away some of the duties from their in-house staff. Or, maybe just the opposite.

Maybe they have started hiring in-house attorneys because they don't want to pay external agencies to adjust the claims. If some of these circumstances occur, it can easily change these ratios. And if you see those kinds of things occurring and if you see strange patterns, it is a very good idea to not just pick some factors. Go and talk to the people involved. The best place to start is the claims department. Find out if they have made changes in their procedures.

Again on Exhibit 27, we select factors that we think will be representative of the conditions that are likely to prevail in the future. That's our goal. Of course, the only thing we have to go on is the past, our own good judgment, and what people in the company tell us and how much we believe them.

Again, you calculate your cumulative development factors, and these are the factors that will project your ratios to ultimate. Then on Exhibit 28, you see how this method works.

(Slide)

You need more information here than you did on the other method. Again, we have taken the ratios of the paid ALAE to the paid losses at each of the points in time. For instance, for 1989, that ratio, .0190, was at 12 months. The one right above it, for '88, is at 24 months, and 36 and so on, up the line.

Now, we apply our cumulative development factor just as we have done on the losses, and we project that ratio to an ultimate basis. Here's what we are saying. For each of these accident years, ultimately, in column three, we think that the relationship of the allocated losses to the actual loss is going to follow this pattern.

For instance, in 1989, we can estimate that our allocated loss adjustment expenses will be about 6.3 percent of our ultimate losses. We need to know what our ultimate losses are. And that is the information found in column four. We would have obtained that information from performing the loss analysis. These could be ultimate losses developed from any method, paid or incurred, because at ultimate they are equal anyway. So you apply your factor in column five. For instance, here on 1989, you multiply that .063 times the $20,646,000 to get $1.3 million. You know that you have paid $132,000 already, so the difference between what you think you are going to have to pay and what you did pay is a liability that you should be recognizing. In the case of 1989, that liability would be $1,169,000.

Adding them all up you get the total liability, for loss adjustment expenses, which is $3,665,000. For those of you involved with commercial lines, often you will see the allocated loss adjustment expenses included with the losses. How many of you look at your losses that way? Okay. That's not unusual. And that isn't a bad way of doing it. In fact, it's very

traditional, in commercial lines, to treat it that way. And it's a good way, because the combined approach reduces volatility. It's a good method only as long as the relationship between losses and ALAE isn't changing radically. If the relationship is no longer stable, you may need to look at them separately. But if this is a fairly stable relationship over time, it is acceptable to add ALAE to your losses, especially on commercial line s. Then when you do your projections, just project losses and allocated loss adjustment expenses together.

QUESTION: To my knowledge, the only way that I have access to them separate, would be on like a quarterly underwriting reports from
(Inaudible)

QUESTION: And I mean that's just a whole daily involvement (Inaudible)

QUESTION: How would you decide if they've been fluctuating or not, when that's the only --

MS. WOERNER: Well, you could look at your Schedule P data. The question was: How can you decide if the relationship is changing? Is it appropriate, now, to look at your losses separately from your allocated loss adjustment expenses?

You could get the information from Schedule P. It's shown there separately. You could just look at the ratios. Usually just looking at the ratios will give you some idea.

Also, it's a good idea to go back to the source, maybe the accounting department, and make sure they haven't changed their allocation procedures. It may not be the claims department doing something. You know, don't ever feel hesitant about talking to the people involved because you can get a lot of information that way. Sometimes you don't have a choice. You have to look at them combined because that's the only way you can get the losses and ALAE.

Now, advantages and disadvantages to this method. The advantages would be, it recognizes the relationship of the allocated loss adjustment expenses to losses. In other words, it relates it to something else. It is a straightforward methodology, and it's predictable in terms of the way it's applied. The third item here is, it provides a tool for monitoring the relationship of your allocated loss adjustment expenses to losses. Now I couldn't emphasize enough how important monitoring can be if you don't use this method. Monitor that relationship. This is something you can do monthly, even, if you get cooperation from accounting and data processing and some of the other areas in the company. It's a good way to alert yourself to changes that are occurring. Then you can start asking questions. It can be a very good tool.

The disadvantages obviously would be if you have over- or underestimated your reserves, and you are applying a factor to that number to get your allocated loss adjustment expenses, then you are going to underestimate or overestimate your allocated reserve as well. In other words, the redundancy or inadequacy is going to carry over into your ALAE estimates. Also, the method is a little more complex, but not much after you get your ratio triangle.

Now those are the two methods that are often used for allocated loss adjustment expenses. There are a number of other methods that can be used as well, but we really don't want to get into those in a basic session.

Now, the next area, and the final area to be covered in this session is unallocated loss adjustment expenses. Again, what are these? ULAE are the ones that cannot be assigned to individual claims. They represent the cost of running your claims department, salaries, rent, these kinds of things.

Now because the data cannot be configured in the same way that your allocated loss adjustment expenses can, and your losses can, we have to use a totally different approach to reserving for ULAE.

This is one of the commonly used approaches. It's not the best, but it's simple and easy to apply, and you can use it as a lower bound. This method has a tendency to underproject the needed reserve.

This method is called the 50-50 rule. And it's really very simple in terms of its assumptions. You have a claim. Let's assume that when you open that claim, 50 percent of your unallocated costs will be incurred at that time. When you close the claim, the other 50 percent is incurred. Now, is that true? No, but, who know what it should be? Without doing time and motion studies, no one really knows. It's not a bad rule, and it has one other little advantage: it's accepted by regulators, and they understand it.

Before we get into a numerical example of this method, I want to point out that it essentially involves three steps. First, we look at the latest three calendar years. In this case, it would be '89, '88, and '87. And we ask, how much did we pay for unallocated loss adjustment expenses in each of those years. Then divide the losses into your unallocated loss adjustment expenses to get a ratio for each of the three most recent calendar years.

Second you apply 50 percent of the ratio to the known case loss reserves. Why 50 percent to the known case loss reserves? Well, at the time those claims were opened, you already recognized half of the cost at that time. So you don't want to recognize it again or you are going to be doubling up. You just want to recognize the half that is going to be involved when they close.

The third step involves the IBNR claims. You have not opened them, obviously, and certainly haven't closed them, so you want to recognize the full cost of the unallocated adjustment expense on those claims. And that is really all that is behind this method.

There are a couple of things to keep in mind. If this method sounds too good to be true and too easy, it is because it is too good to be true. What you need to remember when applying this method is this three year average may not produce the most appropriate factor. In fact, you may need to use a considerable amount of judgment at this point.

You should be on the lookout for steadily increasing or decreasing factors. This alerts you to the fact that something is changing. And if you can determine what is driving this change, that can help considerably in the factor selection process.

The next thing you should keep in mind are changes in expense allocation procedures. As I said earlier, you can farm claims adjusting out or you can do it in-house. If there have been changes like that, you need to be aware of them because they can mate rially impact application of this method. Also, your accounting department may be trying to upgrade their allocation system. This can impact the results produced by the "50/50" rule method.

Now, we're going to look at the numerical example for this method, the "50-50" rule. If every company were like the Easy Insurance Company, I'm afraid Hank and I would be out of business, but let's take a look at it anyway.

Here we have our three calendar years, and we have the paid losses in the first column. The paid ULAE amounts are in the first column, the paid losses in the second column. Now divide the paid losses into the paid ULAE in the third column. And you get these ratios. You should notice that these ratios are increasing.

Why would they be getting bigger? Well, I don't know, but that's the kind of question you ought to be asking before you pick a factor. It might be the company changed allocation procedures. It might be the claims department has restructured. Or it may be something no one really understands.

In this case, what we have done is to total all of the years. We've calculated at the average. The bottom line here is .0784. We're going to use that as an estimate of what we think ultimately the relationship between ULAE and ultimate losses will be.

Now on the next exhibit, Exhibit 35, we have the final calculation.

(Slide)

We had our ratio, here, the one that we developed on the Exhibit 34, just before this one, the .0784. 50 percent of that ratio is .0392. The known case loss reserves are $22,989,000. We have the IBNR reserve at $5,296,000.

Now we calculate the ULAE reserve with this information. We have already recognized the cost associated with opening these claims. Now we use half of that ratio, because that's the half associated with closing them. The next step in the process is to apply 100 percent of the ratio to the IBNR reserves. Again, we use 100 percent because those claims have not been opened or closed.

After doing the calculation, the ULAE reserve is equal to $1,316,000. That's how you get the estimate. Again, we aren't applying factors to ultimate losses. We're applying them to the reserves themselves.

Since I don't have a slide for it, I would like to mention the advantages and disadvantages of this method. Advantages would include the fact that it's simple to apply, regulators understand it and like it. the big disadvantage centers around the fact that it often comes up short. Since a lot of companies use it that could help explain why we have some of the inadequacies relative to the LAE reserves.

Also, any time your loss reserves are over- or underestimated, it's going to be reflected here, because you are factoring your ULAE reserve off of your loss reserves. As for the 50-50 rule, who knows if that's right or not? We know that work is done continuously over the life of a claim. In order to be more accurate, some companies have done time and motion studies and set up their reserves based on that. The 50-50 rule doesn't apply to every company.

As a final point, I just want to reemphasize to everyone that less adjustment expenses involve very large sums of money. We haven't been paying enough attention to them. They are very inadequate for the industry as a whole, and we really need to devote more time and effort to bring them to an adequate level. That concludes my part of the presentation. If you have any questions, feel free to ask Hank or myself. Thank you very much.

1990 CASUALTY LOSS RESERVE SEMINAR

BASIC TECHNIQUES III

BASIC TECHNIQUES III

I. Expected Loss Ratio Techniques

II. Tail Factors

III. Allocated Loss Adjustment Expenses

IV. Unallocated Loss Adjustment Expenses

BASIC TECHNIQUES III

Expected Loss Ratio Techniques

EXPECTED LOSS RATIO (ELR)

The anticipated ratio of incurred losses to earned premiums.

Sources:

(1) Pricing assumptions.

(2) Historical data such as Schedule P.

(3) Industry data.

ANNUAL STATEMENT FOR THE YEAR 1989 OF THE .....
(Name)

SCHEDULE P — ANALYSIS OF LOSSES AND LOSS EXPENSES

Notes to Schedule P

(1) The Parts of Schedule P
Part 1 — statement information on losses and loss expenses.
Part 2 — history of incurred losses and allocated expenses
Part 3 — history of loss and allocated expense payments.
Part 4 — (deleted discount information now in Part 1 and Notes to Financial Statements. Reserved for future use.)
Part 5 — schedule for claims-made policies
Part 6 — history of bulk and incurred but not reported reserves.
Schedule P interrogatories

(2) Lines of business A through M are groupings of the lines of business used on page 14 the state page.

(3) Reinsurance A, B, C, and D (lines N to O) are
Reinsurance A = nonproportional property (1988 and subsequent).
Reinsurance B = nonproportional liability (1988 and subsequent).
Reinsurance C = financial lines (1988 and subsequent)
Reinsurance D = old Schedule O lines 30 (1987 and prior)

(4) The instructions to Schedule P contain directions necessary for filling out Schedule P.

use appropriate line of business detail

SCHEDULE P—PART 1—SUMMARY
(000 omitted)

1 Years in Which Premiums Were Earned and Losses Were Incurred	Premiums Earned			Loss and Loss Expense Payments							
				Loss Payments		Allocated Loss Expense Payments					
	2 Direct and Assumed	3 Ceded	4 Net (2 – 3)	5 Direct and Assumed	6 Ceded	7 Direct and Assumed	8 Ceded	9 Salvage and Subrogation Received	10 Unallocated Loss Expense Payments	11 Total Net Paid (5 – 6 + 7 – 8 + 10)	12 Number of Claims Reported—Direct and Assumed
1. Prior	XXXX	XXXX	XXXX								XXXX
2. 1980											XXXX
3. 1981											XXXX
4. 1982											XXXX
5. 1983											XXXX
6. 1984											XXXX
7. 1985											XXXX
8. 1986											XXXX
9. 1987											XXXX
10. 1988											XXXX
11. 1989											XXXX
12. Totals	XXXX	XXXX	XXXX								XXXX

Note. For "prior," report amounts paid or received in current year only. Report cumulative amounts paid or received for specific years.
Report loss payments net of salvage and subrogation received.

Years in Which Premiums Were Earned and Losses Were Incurred	Losses Unpaid				Allocated Loss Expenses Unpaid				21 Unallocated Loss Expenses Unpaid	22 Total Net Losses and Expenses Unpaid	23 Number of Claims Outstanding—Direct and Assumed
	Case Basis		Bulk + IBNR		Case Basis		Bulk + IBNR				
	13 Direct and Assumed	14 Ceded	15 Direct and Assumed	16 Ceded	17 Direct and Assumed	18 Ceded	19 Direct and Assumed	20 Ceded			
1. Prior											XXXX
2. 1980											XXXX
3. 1981											XXXX
4. 1982											XXXX
5. 1983											XXXX
6. 1984											XXXX
7. 1985											XXXX
8. 1986											XXXX
9. 1987											XXXX
10. 1988											XXXX
11. 1989											XXXX
12. Totals											XXXX

****

Years in Which Premiums Were Earned and Losses Were Incurred	Total Losses and Loss Expenses Incurred			Loss and Loss Expense Percentage (Incurred/Premiums Earned)			Discount for Time Value of Money		32 Inter-Company Pooling Participation Percentage	Net Balance Sheet Reserves After Discount	
	24 Direct and Assumed	25 Ceded	26 Net*	27 Direct and Assumed	28 Ceded	29 Net	30 Loss	31 Loss Expense		33 Losses Unpaid	34 Loss Expenses Unpaid
1. Prior	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX			XXXX		
2. 1980											
3. 1981											
4. 1982											
5. 1983											
6. 1984											
7. 1985											
8. 1986											
9. 1987											
10. 1988											
11. 1989											
12. Totals	XXXX	XXXX	XXXX	XXXX	XXXX	831XX			XXXX		

*Net = (24 – 25) = (11 + 22)

Exhibit 4

BASIC TECHNIQUES III

EXPECTED LOSS RATIO TECHNIQUES

Example of ELR From Schedule P

EZ Insurance Company

Schedule P – Part 1B – Private Passenger Auto Liability/Medical

Years in Which Premiums Were Earned and Losses Were Incurred		Loss and Loss Expense Percentage (Incurred/Premiums Earned)		
		27 Direct and Assumed	28 Ceded	29 Net
1	Prior	XXXX	XXXX	XXXX
2	1980	78.3	135.4	77.8
3	1981	84.8	153.1	84.2
4	1982	86.7	99.7	86.6
5	1983	87.2	167.8	86.5
6	1984	96.3	160.8	95.7
7	1985	98.1	157.3	97.5
8	1986	90.9	129.7	90.4
9	1987	94.4	106.2	94.2
10	1988	98.8	106.5	98.7
11	1989	100.2	117.7	99.9
12	Totals	XXXX	XXXX	XXXX
	3 year average	97.8	110.1	97.6
	5 year average	96.5	123.5	96.1

BASIC TECHNIQUES III

Expected Loss Ratio Techniques

Estimating Reserves Based on ELR

Earned Premium	x	ELR	=	Expected Ultimate Losses

Ultimate Losses	–	Paid Losses	=	Total Reserve

Total Reserve	–	Case Reserve	=	IBNR Reserve

BASIC TECHNIQUES III

Expected Loss Ratio Techniques

Estimating Reserves Based on ELR

Example:

Earned Premium = $100,000

Expected Loss Ratio = .65
Paid Losses = $10,000
Case Reserves = $13,000

Total
Reserve = ($100,000 x .65) – $10,000
= $65,000 – $10,000
= $55,000

IBNR
Reserve = $55,000 – $13,000
= $42,000

BASIC TECHNIQUES III

Expected Loss Ratio Techniques

Estimating Reserves Based on ELR

(1) Use only when you have no history such as:

- New product lines.
- Radical changes in product lines.

(2) Can generate "negative" reserves if Ultimate Losses < Paid Losses.

BASIC TECHNIQUES III

Expected Loss Ratio Techniques

Reserves Based on ELR and Case Incurred

$$\left(\begin{array}{l}\text{Earned}\\ \text{Premium}\end{array} \times \text{ELR}\right) \times \left(1 - \frac{1}{\text{LDF}^*}\right) = \begin{array}{l}\text{IBNR}\\ \text{Reserve}\end{array}$$

$$\begin{array}{l}\text{Case}\\ \text{Incrd}\end{array} + \begin{array}{l}\text{IBNR}\\ \text{Reserve}\end{array} = \begin{array}{l}\text{Ultimate}\\ \text{Losses}\end{array}$$

$$\begin{array}{l}\text{Case}\\ \text{Reserve}\end{array} + \begin{array}{l}\text{IBNR}\\ \text{Reserve}\end{array} = \begin{array}{l}\text{Total}\\ \text{Reserve}\end{array}$$

*LDF is the cumulative Loss Development Factor based on incurred losses.

The factor in parentheses is just the percent of losses unreported.

Exhibit 9

BASIC TECHNIQUES III
Expected Loss Ratio Techniques
Reserves Based on ELR and Case Incurred

EZ INSURANCE CO. AUTO LIABILITY
CUMULATIVE INCURRED LOSSES

ACCIDENT YEAR	DEVELOPMENT STAGE IN MONTHS 12	24	36	48	60	72	84
1983	$8,382	$9,781	$10,110	$10,219	$10,268	$10,280	$10,292
1984	9,337	10,847	11,092	11,192	11,235	11,250	
1985	10,540	12,205	12,551	12,690	12,725		
1986	11,875	13,832	14,238	14,413			
1987	13,343	15,542	16,066				
1988	14,469	16,776					
1989	16,561						

	INCURRED LOSS DEVELOPMENT FACTORS 12-24	24-36	36-48	48-60	60-72	72-84
1983	1.167	1.034	1.011	1.005	1.001	1.001
1984	1.162	1.023	1.009	1.004	1.001	
1985	1.158	1.028	1.011	1.003		
1986	1.165	1.029	1.012			
1987	1.165	1.034				
1988	1.159					
1989						
SELECTED LDF'S	1.162	1.029	1.011	1.004	1.001	1.001	1.000
CUMULATIVE LDF'S	1.215	1.046	1.017	1.006	1.002	1.001	1.000
IBNR FACTOR $= 1 - \frac{1}{LDF}$	0.177	0.044	0.017	0.006	0.002	0.001	0.000

Exhibit 10

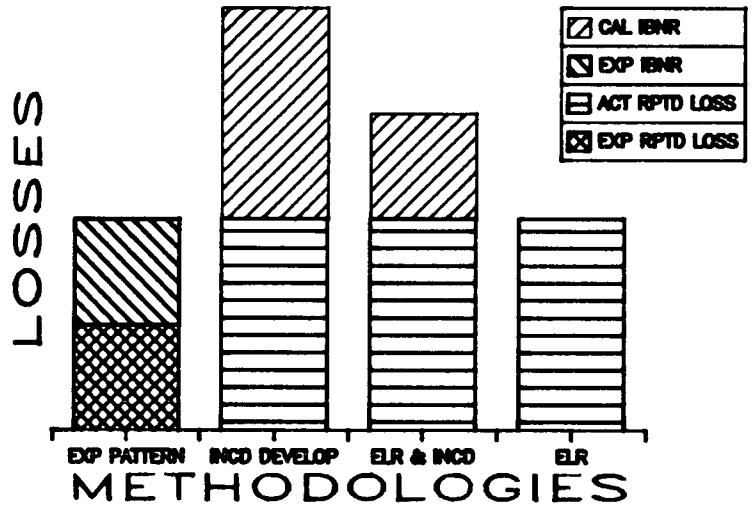
BASIC TECHNIQUES III

Expected Loss Ratio Techniques

Reserves Based on ELR and Case Incurred
EZ Insurance Co. Auto Liability

ACCIDENT YEAR	(1) EARNED PREMIUM	(2) EXPECTED LOSS RATIO	(3)=(1)x(2) EXPECTED LOSSES	(4) IBNR FACTOR	(5)=(3)x(4) IBNR	(6) CUM. INCRD LOSSES	(7)=(5)+(6) ULTIMATE LOSSES
1983	$17,153	0.60	$10,292	0.000	$ 0	$10,292	$10,292
1984	18,168	0.60	10,901	0.001	11	11,250	11,261
1985	21,995	0.60	13,197	0.002	26	12,725	12,751
1986	24,173	0.60	14,504	0.006	87	14,413	14,500
1987	25,534	0.60	15,320	0.017	260	16,066	16,326
1988	31,341	0.60	18,805	0.044	827	16,776	17,603
1989	38,469	0.60	23,081	0.177	4,085	16,561	20,646
					$5,296		

COMPARISON OF RESERVE METHODOLOGIES
INCURRED LOSSES 2 TIMES EXPECTED



COMPARISON OF RESERVE METHODOLOGIES
INCURRED LOSSES HALF OF EXPECTED

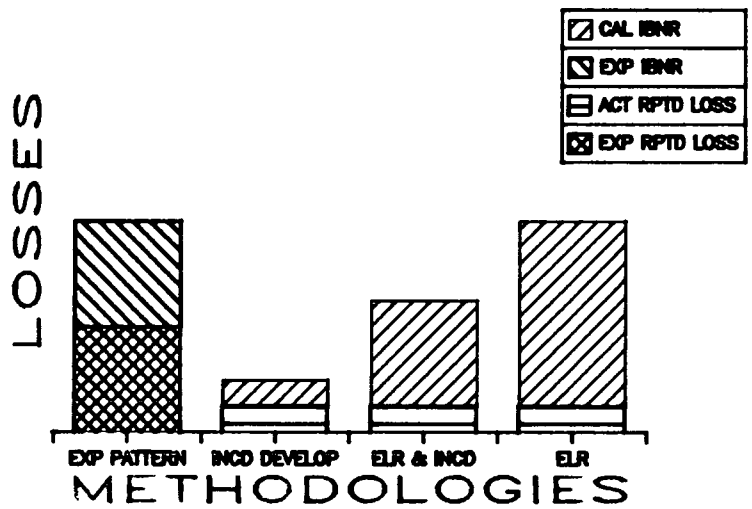


Exhibit 11

Exhibit 12

BASIC TECHNIQUES III

Expected Loss Ratio Techniques

Reserves Based on ELR and Case Incurred

ASSUMPTIONS

- PREMIUMS ACCURATE MEASURE OF EXPOSURE
- EXPECTED LOSS RATIO PREDICTABLE
- CONSTANT REPORTING PATTERN

SAMPLE PROBLEMS

- PRICING INCONSISTENCY
- INSTABILITY IN ACCIDENT YEAR LOSS RATIOS
- INTRODUCTION OF AUTOMATED CLAIM SYSTEM
- BACKLOG IN PROCESSING

BASIC TECHNIQUES III

Expected Loss Ratio Techniques

Reserves Based on ELR and Case Incurred

ADVANTAGES	DISADVANTAGES
. COMPROMISES BETWEEN LOSS DEVELOPMENT AND EXPECTED LOSS RATIO METHODS	. ASSUMES THAT CASE DEVELOPMENT IS UNRELATED TO REPORTED LOSSES
. 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	

BASIC TECHNIQUES III

TAIL FACTOR METHODS

TAIL FACTOR

The amount of development expected

from the last data point to ultimate.

Exhibit 15

BASIC TECHNIQUES III

Impact of Tail Factors

EZ Insurance Co. – Auto Liability

AY	Estimated Ultimate Losses Based on Incrd Dev. Thru 84 months
1983	$ 10,292
1984	11,264
1985	12,757
1986	14,504
1987	16,342
1988	17,551
1989	20,130
	$102,840

Indicated Total Reserve
= Ultimate – Pd to Date
= $102,840 – $75,094
= $27,746

Indicated IBNR
= Ultimate – Incrd. to Date
= $102,840 – $98,083
= 4,757

EVERY 1% DEVELOPMENT BEYOND 84 MONTHS INCREASES:

Ultimate Losses by $1,028 or 1%.

Indicated Total Reserve by $1,028 or 4%.

Indicated IBNR by $1,028 or 22%.

BASIC TECHNIQUES III

Basic Tail Factor Methods

1. EXTERNAL DATA
2. INCURRED TO PAID RATIO.
3. REPEAT LATEST DEVELOPMENT.
4. HALF-RULE METHOD.

BASIC TECHNIQUES III

Tail Factor Methods

External Data

- INDUSTRY SCHEDULE P DATA
- SIMILAR COMPANY'S DATA
- REINSURANCE ASSOCIATION OF AMERICA LOSS DEVELOPMENT STUDY
- ISO OR NCCI DATA

BASIC TECHNIQUES III

Tail Factor Methods

Incurred to Paid Ratio

EZ INSURANCE CO. AUTO LIABILITY

INCURRED LOSS AT 84 MONTHS	$10,292
PAID LOSS AT 84 MONTHS	$ 9,759

TAIL FACTOR FROM 84 MONTHS TO ULTIMATE

= INCURRED ÷ PAID

= 10,292 ÷ 9,759

= 1.055

- USE ONLY IF CONFIDENT THAT INCURRED LOSSES ARE FULLY DEVELOPED.
- APPLY ONLY TO PAID LOSS DEVELOPMENT.

BASIC TECHNIQUES III

Tail Factor Methods

Half Rule Method

EZ INSURANCE CO. AUTO LIABILITY

PAID LDF FOR 72-84 MONTHS = 1.037

$\frac{1}{2}$ x .0370 = .019

$\frac{1}{2}$ x .0185 = .010

$\frac{1}{2}$ x .0093 = .005

$\frac{1}{2}$ x .0046 = .003

$\frac{1}{2}$ x .0023 = .002

$\frac{1}{2}$ x .0012 = .001

Tail Factor from 84 months to ultimate

= 1.019 x 1.010 x 1.005 x 1.003 x 1.002 x 1.001

= 1.041

Test to verify if tail factor is sufficient.

BASIC TECHNIQUES III

Tail Factor Methods

Repeat Latest Development

EZ INSURANCE CO. AUTO LIABILITY

	Age to Age Development Factors					
	12–24	24–36	36–48	48–6	60–72	72–84
Avg. Paid LDF	1.796	1.233	1.131	1.083	1.054	1.037
Avg. Incrd LDF	1.163	1.030	1.011	1.004	1.001	1.001

84 Months to Ultimate

Paid Loss Tail Factor = 1.037
Incurred Loss Tail Factor = 1.001

Test to verify if tail factor is sufficient.

BASIC TECHNIQUES III

ALAE RESERVING METHODS

ALLOCATED LOSS ADJUSTMENT EXPENSE (ALAE)

Expenses that are incurred with and are assigned to an individual claim.

Examples:

Cost of police reports.
Attorney's fees.
Engineer's evaluation.
Expert witness fees.
Adjuster fees.
Appraiser fees.

BASIC TECHNIQUES III

ALAE RESERVING METHODS

1. PAID ALAE DEVELOPMENT.

2. CUMULATIVE PAID ALAE TO CUMULATIVE PAID LOSSES.

BASIC TECHNIQUES III
ALAE Reserving Methods
Cumulative Paid ALAE

Exhibit 23

EZ INSURANCE CO. AUTO LIABILITY

ACCIDENT YEAR	MONTHS OF DEVELOPMENT 12	24	36	48	60	72	84
1983	$71	$166	$286	$416	$527	$611	$677
1984	83	189	313	458	584	672	
1985	93	213	361	523	657		
1986	103	226	394	581			
1987	108	245	437				
1988	128	280					
1989	132						
	DEVELOPMENT FACTORS						
1983	2.3380	1.7229	1.4545	1.2668	1.1594	1.1080	
1984	2.2771	1.6561	1.4633	1.2751	1.1507		
1985	2.2903	1.6948	1.4488	1.2562			
1986	2.1942	1.7434	1.4746				
1987	2.2685	1.7837					
1988	2.1875						
1989							
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: DOLLARS IN THOUSANDS.

BT24
7/10/90

Exhibit 24

BASIC TECHNIQUES III

ALAE Reserving Methods

ALAE Reserves Based on Paid ALAE Development

EZ Insurance Co. Auto Liability

ACCIDENT YEAR	(1) ALAE PAID TO DATE	(2) SELECTED FACTOR	(3)=(1)x(2) ESTIMATED ULTIMATE	(4)=(3)-(1) UNPAID ALAE
1982	$677	1.1080	$750	$73
1983	672	1.2277	825	153
1984	657	1.4180	932	275
1985	581	1.7953	1,043	462
1986	437	2.6295	1,149	712
1987	280	4.5938	1,286	1,006
1988	132	10.2290	1,350	1,218
TOTAL	$3,436		$7,335	$3,899

NOTE: DOLLARS IN THOUSANDS.

BASIC TECHNIQUES III

ALAE Reserving Methods

ALAE Reserves Based on Paid ALAE Development

Advantages	Disadvantages
Similar to paid losses; easy & straight forward.	Ignores relationship to losses.
May work well for older AY's.	Heavily influenced by amount of highly volatile initial payments.

BASIC TECHNIQUES III

Exhibit 26

ALAE Reserving Methods

Cumulative Paid ALAE to Cumulative Paid Losses

EZ Insurance Co. Auto Liability

CUMULATIVE PAID ALAE

ACCIDENT YEAR	12	24	36	48	60	72	84
1983	$71	$166	$286	$416	$527	$611	$677
1984	83	189	313	458	584	672	
1985	93	213	361	523	657		
1986	103	226	394	581			
1987	108	245	437				
1988	128	280					
1989	132						

CUMULATIVE PAID LOSSES

ACCIDENT YEAR	12	24	36	48	60	72	84
1983	$3,361	$5,991	$7,341	$8,259	$8,916	$9,408	$9,759
1984	3,780	6,671	8,156	9,205	9,990	10,508	
1985	4,212	7,541	9,351	10,639	11,536		
1986	4,901	8,864	10,987	12,458			
1987	5,708	10,268	12,699				
1988	6,093	11,172					
1989	6,962						

CUMULATIVE PAID ALAE TO CUMULATIVE PAID LOSSES

ACCIDENT YEAR	12	24	36	48	60	72	84
1983	0.0211	0.0277	0.0390	0.0504	0.0591	0.0649	0.0694
1984	0.0220	0.0283	0.0384	0.0498	0.0585	0.0640	
1985	0.0221	0.0282	0.0386	0.0492	0.0570		
1986	0.0210	0.0255	0.0359	0.0466			
1987	0.0189	0.0239	0.0344				
1988	0.0210	0.0251					
1989	0.0190						

Note: Dollars in thousands.

BASIC TECHNIQUES III Exhibit 27
ALAE Reserving Methods
Cumulative Paid ALAE to Cumulative Paid Losses

EZ Insurance Co. Auto Liability

ACCIDENT YEAR	MONTHS OF DEVELOPMENT 12	24	36	48	60	72	84
1983	0.0211	0.0277	0.0390	0.0504	0.0591	0.0649	0.0694
1984	0.0220	0.0283	0.0384	0.0498	0.0585	0.0640	
1985	0.0221	0.0282	0.0386	0.0492	0.0570		
1986	0.0210	0.0255	0.0359	0.0466			
1987	0.0189	0.0239	0.0344				
1988	0.0210	0.0251					
1989	0.0190						
	DEVELOPMENT FACTORS						
1983	1.3117	1.4061	1.2929	1.1735	1.0988	1.0682	
1984	1.2903	1.3546	1.2965	1.1749	1.0940		
1985	1.2793	1.3668	1.2734	1.1585			
1986	1.2132	1.4065	1.3005				
1987	1.2611	1.4422					
1988	1.1930						
1989							
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

Exhibit 28

BASIC TECHNIQUES III

ALAE Reserving Methods

Cumulative Paid ALAE to Cumulative Paid Losses
EZ Insurance Co.

ACCIDENT YEAR	(1) RATIO TO DATE	(2) CUM. DEV. FACTOR	(3)=(1)x(2) DEVELOPED PD TO PD RATIO	(4) ULT. LOSSES	(5)=(3)x(4) ULT. ALAE	(6) PAID ALAE TO DATE	(7)=(5)-(6) INDICATED ALAE RESERVES
1983	.0694	1.0682	.0741	$10,292	$ 763	$ 677	$ 86
1984	.0640	1.1411	.0730	11,261	822	672	150
1985	.0570	1.2510	.0713	12,751	980	657	323
1986	.0466	1.4625	.0682	14,500	989	581	408
1987	.0344	1.8889	.0650	16,326	1,061	437	624
1988	.0251	2.6795	.0673	17,603	1,185	280	905
1989	.0190	3.3134	.0630	20,646	1,301	132	1,169
							$ 3,665

Note: Dollars in thousands.

BASIC TECHNIQUES III

ALAE Reserving Methods

Cumulative Paid ALAE to Cumulative Paid Losses

ADVANTAGES	DISADVANTAGES
. RECOGNIZES RELATIONSHIP OF ALAE TO LOSSES.	. OVER OR UNDER ESTIMATION OF LOSSES REFLECTED IN ALAE ESTIMATES.
. STRAIGHTFORWARD METHODOLOGY PREDICTABLE.	. MORE COMPLEX THAN PAID ALAE DEVELOPMENT.
. PROVIDES TOOL FOR MONITORING RELATIONSHIP OF ALAE TO LOSSES.	

BASIC TECHNIQUES III

ULAE Reserving

UNALLOCATED LOSS ADJUSTMENT EXPENSE (ULAE)

Expenses incurred in connection with settling claims which are not readily assignable to specific claims.

Examples:

Salaries of claims staff.

Rent and utilities apportioned to claims function.

BASIC TECHNIQUES III

ULAE Reserving

THE "50/50" RULE

Assumes 50% of ULAE is paid when the claim is opened, and 50% is paid when the claim is closed.

BASIC TECHNIQUES III

ULAE Reserving

THE "50/50" RULE

1. 3 year average of the ratio of calendar year paid ULAE to paid losses.

2. 50% of the ratio applied to known case loss reserves.

3. 100% of the ratio applied to IBNR reserves.

BASIC TECHNIQUES III

ULAE Reserving

Considerations in Applying "50/50" Rule

Average over 3 years may not produce appropriate factor. May need to judgmentally select factor based on:

- Steadily increasing or decreasing factors.
- Changes in expense allocation procedures.
- Changes in claims handling policy regarding use of independent adjusters.

BASIC TECHNIQUES III

ULAE Reserving

Example of "50/50" Rule

EZ Insurance Co. – Auto Liability

Calendar Year	(1) Paid ULAE	(2) Paid Losses	(3)=(1)÷(2) Ratio
1987	$1,038	$14,107	.0736
1988	1,244	15,906	.0782
1989	1,459	17,709	.0824
Total	$3,741	$47,722	.0784

BASIC TECHNIQUES III

ULAE Reserving

Example of "50/50" Rule

Ratio of ULAE Paid to Paid Losses	.0784
50% of Ratio	.0392
Known Case Loss Reserves	$22,989
IBNR Reserve	$ 5,296

ULAE Reserve
= (.0392 x 22,989) + (.0784 x $5,296)
= $901 + $415
= $1,316

Note: Dollars in thousands.

1990 CASUALTY LOSS RESERVE SEMINAR

4B: CLAIMS MANAGEMENT PERSPECTIVES

Moderator

Michael L. Toothman
Tillinghast/Towers Perrin

Panel

Karen H. Balko
Aetna Life & Casualty

Michael G. Zipkin
Tillinghast/Towers Perrin

(Title Slide)

MR. TOOTHMAN: This is Session 4B, Claims Management Perspectives. My name is Mike Toothman. I'll be moderating and participating in our session.

Just a couple of housekeeping items. First, please fill out your evaluation forms at the end of the session, and those of you who want Continuing Education credits, fill out your ticket and give it to the young lady at the back of the hall when you leave. Also, at the end of the session there will be time for questions.

Because the session is being recorded, we would appreciate it if you would use the two floor mikes and identify yourself when you ask a question. I hope that won't be an impediment to getting people to participate in the session. We would like to have some good discussion at the end. We have done this session a couple of times before. Last year, as it turned out, we had the same time slot.

Some people tell me the toughest time slot is right after lunch, because people are getting sleepy because they just had a meal. Last year, I was told that the toughest time slot was this one, right at the end of the day. The reason I was given is because by this time of the day half of the people are having sexual fantasies instead of paying attention to what we are saying. I was going to ask for a show of hands on how many people were going to pay attention to us, so that I'd know what the rest of you were doing, or at least know who was doing what, but we'll forego that.

We are going to use a different format than what you've seen in most of the sessions. We're not going to give any prepared speeches. In fact, we're going to present a little skit to you. Now, you don't have to worry, we're not going to sing and dance, and we don't really have any elaborate staging.

But we hope to use our role-playing to illustrate some real issues in the involvement between the actuarial function and the claims function. We think these issues are very important. They are issues that we see in my work as a consultant very frequently. They're very common within the industry, and I think we can have a little fun while we're doing this, too. So hopefully it will be instructional, educational, but a little bit entertaining, so if you have a little fun, that's okay, too.

The scene of our skit is at the offices of a company by the name of Professional Reliable. Now, Professional Reliable is a fictitious company; the people are fictitious; any relationship to real people, living or dead, or real companies, living or dead, is purely coincidental. Professional Reliable writes only one line of business; it's physicians and surgeons malpractice.

The concepts that we are illustrating are not dependent upon the line of business at all, so if you are not interested in malpractice don't worry, this still applies to you. We see these same kind of concepts for reinsurance companies, for primary companies, companies writing personal automobile insurance, any other line. So don't worry about the line of business that we've chosen.

Professional Reliable was formed as a result of a medical malpractice crisis, and it has now been in business for a little over six years. It's in its seventh year of operation. Things have been going pretty well. A lot of money was coming in the door, not too much was going out.

The president of the company feels pretty good. All of his colleagues are very complimentary to him when he goes to the country club about what a good job they've done and how they do things so much better than the industry. And so the company has been feeling pretty good about everything. But now their auditors have discovered a reserve deficiency.

And the auditors have provided a qualified opinion. We didn't have time to get a second opinion before the auditors had to issue their opinion on the financial statements, but we have now retained an outside consulting firm to review what the auditors have done and try to straighten out this mess and hopefully provide us with a more favorable result.

The first scene -- we'll do this in two scenes -- but the first scene opens with the consultants paying their first visit to the company. And before we raise the curtain on our little show, let me introduce our cast to you. (Cast Slide), First, I'm going to play the role of the Chief Executive Officer of Professional Reliable. All right, now, I'm not really a Chief Executive Officer, but I get to have some fun with our fictitious casting.

I'm a Consulting Actuary with Tillinghast, a Vice President and Principal in our St. Louis office, a fellow of the Casualty Actuarial Society and a member of the American Academy, and I've been Vice President of the CAS for the past four years.

Our second player is Karen Balko. Karen will play the consulting actuary. She is with Aetna Casualty and Surety. She's been with them for 13 years in total; in the last five years she's been in their claims department. And I believe you've been the first actuary to really be employed as part of the claims department staff.

Prior to the Aetna, she spent eleven years with the Hartford. Karen is a Fellow the Casualty Actuarial Society and a Member of the American Academy. She's the mother of two and she tells me that she's addicted to auctions. And I believe that that ought to give her great insight into the current operation of the American tort system, and therefore qualifies her eminently for this discussion.

Karen is not typecast, but our third cast member is. Mike Zipkin always wanted to be a claims consultant, and he grew up and became one. He's a Vice President and Principal of Tillinghast. He's in our Washington, D.C. office and heads our claims consulting staff nationwide. Mike also has a law degree, but he's never practiced as part of the plaintiff's bar, or I guess of the defendant's bar. He's found plenty of applications for his law education just by working within the claims function.

With that we'll let our first scene open. As I say, I have spoken with Karen and Mike by telephone and we have provided them with some data. They've had the auditor's report, so they have had the opportunity to do some preliminary analysis, but this is the first time that I have met with them.

MR. TOOTHMAN: Good morning, Karen, Mike. I'm glad you're here today. I'm looking forward to the results of your analysis. As you know, I'm pretty concerned about what the auditors have had to say to me, here, so I'm really hopeful that you'll be able to provide some good news for me and that we'll be able to get a much lower number.

MS. BALKO: Well, Mike, we're glad we're here. We don't know the number we'll come up with will be lower, but we'll give it our best try.

MR. TOOTHMAN: Good. I appreciate it.

MS. BALKO: Why don't we start by looking at what the auditor gave you? As you know, you're holding no IBNR, but the auditors suggested that you should hold $25.5 million.

(Slide 1)

MR. TOOTHMAN: Of course, you realize that our policy form is a claims-made policy form, and we had it drafted by some very good attorneys. There are very tight reporting provisions, so, by definition, we aren't holding any IBNR, since it's claims made.

MS. BALKO: Well, I think you have to realize that there are really two parts to IBNR. There's a part for unreported losses, but there's also a case basis, development part.

MR. TOOTHMAN: Okay.

(Slide 2)

MS. BALKO: Why don't we start by looking at your data first? This is actually the history of your claims department's activity. First column, here, is the report year, and the second column is earned premium. The rest of the area is what we call a loss development triangle. And let me explain.

In your first year of operation, your claim department saw $5 million worth of losses after the first 12 months. That's $5 million that includes the paid losses, and the case basis is outstanding. At 24 months, those losses could develop to $7 million, and after 36 months, they were already up to $8.4 million. They develop on until now they are at $10.3 million. In your latest year, which is now, the claim department is already at $13 million.

MR. TOOTHMAN: Okay.

MS. BALKO: What the auditors are trying to do in the analysis is look for patterns in this information. They actually start by looking at the relationships between the columns. On this slide you see that they've developed what they call report-to report ratios.

(Slide 3)

What I talked about before, the 24 months related to 12 months, is shown in the first column. And you can see that in the first three diagonals the data is pretty stable, but I believe that there is possibly a change in the fourth and fifth diagonals. The auditors, because you have no information in the 72 to ultimate period, assumed that there is no more development after 72 months, based on industry data.

MR. TOOTHMAN: The auditor showed me this exhibit, too, and that's one of the things that bothers me about their analysis. The whole reason that we started this company was because we didn't feel the insurance industry was doing a very good job writing malpractice business, and we thought we could really do better.

And when you base your reserve analysis on industry data, I'm just afraid that's not applicable to us. We hired top claims staff; we're defending claims, we don't just pay the claims the way the insurance companies do. If we don't think their claim is meritorious, we defend that thing, and, you know, we're not like the industry. And in fact, we think that we are adequately enough reserved that we may even be overreserved.

I think there probably is a lot of redundancy in those reserves. So we need -- we need to focus on that, whether that's an appropriate assumption.

MS. BALKO: Well, I hear you, Mike, but let's go on.

What the auditors tried to do was, they took arithmetic averages of each of these columns and they selected the average values. They are shown at the bottom of this exhibit.

What they are really trying to do is square the triangle. (Slide 4) It doesn't matter how long it takes to develop the losses; it

could be that 72 months or more. What they are trying to get to is the ultimate level of losses. They applied the development factors and squared the triangle. In order to get the IBNR, they took the reported losses, which was the last diagonal on your loss development triangle, and multiplied them by the cumulative loss development factors to get estimated ultimate values. (Slide 5) The ultimate, minus the reported, is the IBNR. In this case, they showed $25.5 million.

MR. TOOTHMAN: Just crazy, isn't it, Karen? I don't understand it at all.

MS. BALKO: One thing that they didn't reflect was the change in your retention in your fifth and sixth years. You changed from $100,000 to $250,000.

MR. TOOTHMAN: I'm glad you noticed that. We thought that was an important change, and I'm not sure the auditors recognized it either. You know, we just came to the conclusion that this business was so profitable we ought to keep more of it -- keep that profit for ourselves.

MS. BALKO: Well, what that means, though, is that it takes longer for losses to reach their ultimate value. So I took their analysis and increased the development factor for years five and six and carried through on the analysis and came up with an IBNR of $30.9 million.

(Slide 6)

MR. TOOTHMAN: Thirty point -- Karen, wait a minute. You're going in the wrong direction, Karen. I -- I hired you to come in here and help me get a lower number.

MS. BALKO: Well, Mike, there are some problems with this method. For example, in those fifth and sixth years, if you have some large losses, the large loss development factors may be overly developing those losses.

MR. TOOTHMAN: I should think so.

MS. BALKO: So we wanted to try a different method, and you'll see, on the next slide, we have the BornhuetterFerguson method.

(Slide 7)

This method takes expected losses and applies a predicted unreported pattern to obtain the IBNR. On this slide we started with earned premium and we multiplied by a loss ratio of 1.05. We picked 1.05 because your rates are discounted for anticipated investment income.

MR. TOOTHMAN: Karen, you might have to go over that once more for me. It looks to me like if you're starting with a presumed

loss ratio of 105 percent, that you are already starting with the assumption that we are going to lose money on this business. Is that right?

MS. BALKO: No, this is your break-even loss ratio on an undiscounted basis.

MR. TOOTHMAN: You mean that we are discounting our prices?

MS. BALKO: Yes in anticipation of investment income.

MR. TOOTHMAN: So this doesn't really assume that we are going to lose money, then?

MS. BALKO: No.

MR. TOOTHMAN: Okay.

MS. BALKO: Anyway, when we multiply the earned premium by the loss ratio, we get expected losses, and we get the unreported percentages from the development triangles that we looked at earlier. The product of the expected losses and the unreported percentages gives the IBNR. You'll see that we brought the answer from $30.9 down to $22.3.

MR. TOOTHMAN: That's better. That's better. At least you're moving in the right direction. What do you call this method, again? I think I like this one better.

MS. BALKO: Bornhuetter-Ferguson.

MR. TOOTHMAN: Bornhuetter-Ferguson, thank you, Karen.

MS. BALKO: You'll also notice that in the last two years, the estimated ultimate loss ratio is slightly better than what it was; not good, but better.

MR. TOOTHMAN: Still, I'm not sure I understand why, but -- but anyway, go ahead.

MS. BALKO: Well, we see some indications that there are changes in your claim handling practices, so we asked Mike Zipkin to get involved.

MR. TOOTHMAN: Karen, I understand what you've said so far, and much of this is what the auditor showed me before. But, I still don't understand why it's producing the numbers it is, or whether the whole technique makes sense. I mean, it just seems crazy to me. We -- we've done everything different from what the industry has done.

We have hired the best claims people, we have got the best attorneys involved settling our cases, we've got this claimsmade form, which I always thought meant that there wasn't any IBNR,

and now you are telling me that we need $22 million, or the auditors are saying $25.5 million IBNR. That seems crazy to me, it just doesn't seem to make sense at all.

MR. ZIPKIN: Excuse me a minute, Mike. Let me see if I can help you clarify what appears to be a discrepancy between what you are saying and what Karen is saying. There really are substantial differences between the case basis reserving process that you are describing and the actual reserving process that Karen is talking about.

MR. TOOTHMAN: And you've got a claims background, right, Mike? That's what --

MR. ZIPKIN: Yes, I'm a claims guy, and I'm telling you --

MR. TOOTHMAN: Have you seen our case reserves, yet?

MR. ZIPKIN: I have looked at one of your cases and I want to show you what that case looks like.

MR. TOOTHMAN: Let me show you an exhibit I prepared, first.

MR. ZIPKIN: Okay, go ahead.

MR. TOOTHMAN: Okay? Put up the next slide. (Slide 8) We did a study. Because after we got the auditor's report, I was a little concerned, so we did a study. And we only had a hundred cases open at the end of last year. And that's what the auditors were looking at. We closed 50 of those cases in the last seven months.

So I had them pull every one of those 50 claims files, all those that are closed. And this slide shows you what was up. At the end of last year, we had $750,000 up on those cases, and we closed those for a total of only $625,000. That's a 20 percent reserve redundancy. Now, it seems to me that we've got excess reserves. I don't understand where we're getting 20-some million dollars.

MR. ZIPKIN: Well, let me finish my comments, and then you can make up your mind as to whether or not you do, in fact, have the redundancy you think you do. Because what you are talking about is a closed-claim review on a case basis reserving method, and what Karen is referring to is the actuarial reserving method, and I can assure you that there are some substantial differences between the two.

MR. TOOTHMAN: Yes, 20 percent redundancy to $22 million; that's what the difference is.

(Slide 9)

MR. ZIPKIN: This is one of your cases that I want to refer you to. The vertical axis, or the column on the left-hand side, is the dolloar amount of the adverse loss development, or the increase in the case reserve from zero dollars, when the accident occurred, of course, to $15,000, $75,000, to $100,000, to $150,000 The horizontal axis represents the passage of time in months across the approximate three year life of this case, and the diagonal line represents the stairstepping diagonal, which is an unfortunate term, which represents the various stages that the case goes through on its way to being reported registered, assigned, reserved or evaluated, investigated, negotiated, and settled.

MR. TOOTHMAN: This is one of our cases?

MR. ZIPKIN: This is one of your actual cases which was isolated during our preliminary review.

MR. TOOTHMAN: Mike, you said something about stairstepping. I've always heard our people say that that's not a very good thing. Is that what my guys did here?

MR. ZIPKIN: No. Stairstepping is a very unfortunate and misunderstood term. What your people did do was to correlate the investigative development of the case with the reserve. It is not stairstepping to increase the reserve from $15,000 to $75,000 to $100,000 to $115,000. Stairstepping is when you have a $115,000 case to begin with, and you put $5,000, $10,000 $20,000 on that case; that is to increase the reserve on the case incrementally, over a period of time, without any correlation between the rserve and the investigative development of the case.

MR. TOOTHMAN: Is that what our claims department did, here?

MR. ZIPKIN: No.

MR. TOOTHMAN: Well, why didn't they know it was $150,000 originally? Or $115,000?

MR. ZIPKIN: Well, this case raises three questions, or several questions that I think you are referring to on a case basis side. The first question is, if this case was in fact worth say $115,000, why is it being settled for 105,000? Second question is, if it was in fact worth $105,000, why wasn't that amount up in the very beginning of the case?

And the third question, which we think is very, very important to you is that if this is, in fact, a representative case, aren't all of your cases in this same kind of shape, representing the 20 percent redundancy that you referred to in your earlier study? The fact is that it would have been, in our opinion, an untimely and entirely inappropriate method for your claim department to have reserved this case for $105,000 in the very beginning.

In the first place, this case did not involve much, if any, medical malpractice or medical injury as a result of whatever actions may have been taken. So your claim department was entirely justified in putting up what they put up on this case, which was something like $15,000, when the case was reported to them and initially set up and registered by them.

MR. TOOTHMAN: Okay.

MR. ZIPKIN: Now, the case underwent two very dramatic changes over a period of time, neither of which could have been foreseen when the initital reserve was established.

MR. TOOTHMAN: Well, this one showed a redundancy at closing, too, right? Just like the others did.

MR. ZIPKIN: This case showed a redundancy at closing, but there is a reason for that. Now, the reason that I'm about to give you for the adverse development of this case, from the $15,000 level up to $105,000 in settlement, was caused by the fact that this particular plaintiff was injured a good deal more than you initially suspected when you first got the case. Also, more importantly, your doctor altered the medical records, despite your admonitions never, never to do that. Now, your doctor's motives were correct. He was simply trying to clean up his medical records before the case was ever reported to you. But when this came to light in the form of a deposition commentary by your defense counsel, your defense counsel prevailed upon your claim department to increase its reserves to what we consider to be the proper figure of $115,000.

MR. TOOTHMAN: Well, Mike, if we knew all this, why didn't we set the reserve higher initially?

MR. ZIPKIN: Because you didn't know it. That's the point. When this case first arose, you did not know that this doctor had altered his medical records and that you were going to be put in this kind of jeopardized type of situation. In terms ofthe redundancy that occurred in this case, we have a second question: if this case was, in fact, worth $115,000, why did it not settle for $115,000? Why did it settle for $105,000 instead? The answer is that relatively late in the life of the case, when your claim department was close to negotiating and settling the case, they discovered that the plaintiff was causing very serious problems for his lawyer.

He was refusing to show up for depositions and interrogatories; he was refusing to cooperate with your efforts to settle the case. For example you found out -- again, relatively late in the life of the case, that the plaintiff's lawyer was having difficulty contacting his own client. He was having difficulty locating his client.

There were a couple of instances where you were negotiating a settlement with the plaintiff's lawyer in his office, and he didn't know how to get hold of the plaintiff in order to discuss your settlment efforts with him. Your claim department moved in, and they were able to settle this case for $105,000, thereby exhibiting a redundancy in terms of the reserve.

MR. TOOTHMAN: If they were having all those problems with their witnesses and everything, maybe we should have just tried the case and won the whole thing.

MR. ZIPKIN: It's possible that you could have tried the case, and it's possible that you could have won the whole thing. It's also possible that you could have gotten a $9 million verdict on a case worth a lot less than that, on balance, we think it was a well-handled claim.

MR. TOOTHMAN: Okay. Good.

MR. ZIPKIN: But what this case points out is the very substantial differences between the case basis reserving process that you are talking about and the actuarial reserving process that Karen is talking about. I'm not suggesting to you that the actuarial process is absolutly perfect. What I am suggesting to you is that the case basis reserving process is a notoriously inappropriate method for establishing ultimate liability.

The reason is not because claim people are stupid. The problem is that they don't have the information they need to accurately project ultimate liabilities. If you want a statistically valid indication of ultimate liabilities, you have to use an actuary, not a claims person.

Again, the actuarial process is not statistically perfect, but for its purposes is better than, one-at-a-time ase handling, reserving and settlement activity. That is, the actuarial reserving process is a much more statistically valid method for determining aggregate ultimate liabilities than the case basis reserving method that you are talking about.

MR. TOOTHMAN: I appreciate what you are saying, Mike. I guess you're saying I'm going to have to try to understand all of these numbers Karen has had. But I guess the bottom line is -- whether the auditors are right and we need $25.5 million, or whether Karen is right and we need $22 million.,-- the bottom line is, we just can't handle that much. You know, if these numbers are right, we might as well close up shop, because we've been wrong all along.

MS. BALKO: Let's not be hasty. Remember the changes we saw in the loss development diagonal?

MR. TOOTHMAN: Yes.

MS. BALKO: I think we would like to review this with your claim department.

MR. TOOTHMAN: Okay.

MS. BALKO: Mike, I think you have a plan.

(Slide 10)

MR. ZIPKIN: We intend to conduct a study of your claim department operations. Now, our study is an interactive, communicative and cooperative process; a joint venture, so to speak between us and your claim department --

MR. TOOTHMAN: Okay.

MR. ZIPKIN: -- in which we interview management, claim management and claim department personnel such as yourself and your claim management personnel and anybody they refer us to. We also review a sampling of claim files and review claim procedures, practices and statistical data; all as indicated by your oral and written rules and regulations, promulgations, claim manual bulletins, procedural memoranda and other documentation. And what we are looking for in this kind of a review are changes in your claim department operation such as these.

(Slide 11)

Now, we have four changes that we look for, here. Law or legislation affecting liability, legal defenses or damages: I can assure you that when your state moved from contributory negligence to a comparative negligence basis, it did change the way your claim department reserved its cases. It had to, because before your claim department was putting up very minimal, if any, reserves on your contributiory negligence cases; whereas, under comparative negligence they were required to put up substantially larger case reserves. That was the result of a legislative change in this particular state.

We also look at jury verdict patterns, whether there have been higher awards because of jury verdicts -- shock verdicts as we refer to them -- where you don't expect to pay money, but you get hit with adverse jury verdict awards, thereby requiring your claim department to review its cases and to see if they have any more bombs like the one that I'm talking about.

We also look at procedures and practices for reporting, reserving or closing of claims. Because the rate of closing of claims is a very important actuarial indication, we evaluate this area because we know that an actuary would look as if he were evaluating your claim department operation.

Lastly, we look at your personnel workloads and claim department organization to see if there has been any kind of a change in the

mix of experienced versus inexperienced personnel, whether your claim organization or workloads have changed, thereby causing your folks to under-reserve or overreserve your cases. The point is that your claim department may not be aware of the aggregate effect that these changes are having on your bottom line financial results.

As I indicated, the claim department handles its cases one at a time and doesn't attempt to deal with these cases on an aggregate basis; whereas Karen and your auditors are dealing with aggregates.
So what we attempt to do is to come between the aggregate and the individual case basis reserving process, turn our attention toward the claim department, then turn back toward the actuary and present our findings in an aggregate manner.

MR. TOOTHMAN: Well, I'd be happy to have you do this, Mike. You say you're looking for changes that have gone on, and I'm afraid I can't hold out a whole lot of hope for you there. We've had the same person running our claims department since we started the company a little over six years ago. He's a fine claims man. He tells me we're doing things the same way we always have, so I'm just not aware of what kind of changes you might find.

But if you think this will help, I'll certainly authorize the study, because frankly, we can't stand these numbers right now. And if this will help us get a lower number, it's worth doing.

MS. BALKO: Well, we can't guarantee it will bring in a lower number, but we'll look at it. We'd also like to look at your allocated loss adjustment expense. We think that perhaps you're paying too much money, that you're not getting reasonable costs for the services that are being provided to you.

MR. TOOTHMAN: Okay, I'd be happy to have you look at that, too. What else? Is there anything else you want to cover?

MS. BALKO: Well, perhaps Mike in his regular activities will also look at the reinsurance.

MR. TOOTHMAN: Well, I'll tell our claims people that you'll be coming. How long will the study take, Mike?

MR. ZIPKIN: Well, my guess is that the study will take approximately two weeks. And we would appreciate it very much if you would tell your claim department that we are coming, because their tendency is to be much more cooperative if they know that you are behind the study.

MR. TOOTHMAN: I'm sure they will cooperate with you fully, but I'll take you down and introduce you to our claims department vice president right away, so there won't be any problems there. Then you can get started on Monday, and I'll see you in a couple of weeks?

MR. ZIPKIN: Yes.

MR. TOOTHMAN: Good. I'll look forward to that, and hopefully there will be better news for me at that point in time.

That's the end of scene one. While Mike and Karen are off doing their work, let's pause a little bit to reflect on just where this poor CEO finds himself. He had a pretty successful medical career, and at the time that he was ready to retire, all of his colleagues were telling him that there were all these problems, and the insurance industry didn't really understand what they were doing, and prices were going up.

And they said, we think we could insure this business ourselves and do it a lot better. And he was just the man to head up this company and do it, and indeed, all the money -- you know, for six years, it's gone great. Lots of money has come in, and they haven't paid much out. Among his colleagues, he's a hero, kind of a legend in his own time.

He's got investment bankers knocking on his door, wanting to help him invest all the money that the company has made, and everything was going pretty well. And now, all this might be tumbling down around him. All of a sudden, he's got this piece of bad news, so he's really pretty concerned about how this might affect him personally and whether this company is still viable or not when they thought everything was going very well.

So, he's got a lot of pride at stake. There's probably a lot of emotion involved here. So he lets two weeks pass. Mike and Karen and their team are in the company, in the claims department, doing their study. And now they've finished up and they've called and said that they are ready to come back and present the result of their study. So I'm looking forward to some improved numbers now. Scene 2 opens at the next meeting as Mike and Karen come back to report on their findings.

MR. TOOTHMAN: Karen, Mike, it's good to see you again. I hope you've got some better news for me this time. I could use some good news after the last few weeks.

MS. BALKO: Well, Mike, I'm glad to be back. And what we have for you is probably different news. Why don't we start by letting Mike explain what he found in the claim audit?

MR. TOOTHMAN: Do I need to go take some drugs before I hear this? You've got me worried, Karen.

MR. ZIPKIN: Mike, what we have for you is some good news and some claim news.

MR. TOOTHMAN: I don't like the sound of that.

MR. ZIPKIN: What we have is a reiteration of what you showed us before. You looked at 50 closed claims, as I recall. You had $750,000 in reserves in those cases and you settled them for $625,000, and you expected that that kind of a case basis result on closed claims could be carried out throughout all of your current outstanding cases.

That is not true. Our studies have routinely found that the adverse development that takes place on the still-open cases is more than required to offset the redundancy that you experience on your closed claims. Now, there are some statistical reasons why that is the case, but let it suffice to say that when you look at closed claims you are talking about cases that are closable. Meanwhile, you have to take into account the still open development on your outstanding cases. Take a look at this slide, for example.

(Slide 12)

We looked at $750,000 worth of cases on the cases that you closed. That was from your previous study. But we also looked at $1 million worth of cases on 50 cases that were open during this entire period of time, and as we can see, $1,750,000 worth of closed and open cases has suddenly become $2,125,000 because of the still-open cases. your closed claim results haven't changed at all.

Although closed claim results are very valuable, because we know what ultimate is-- we know what you paid, you can't make assertions on the basis of this information, which is notoriously inept and biased. When you look at the continued adverse development on your still-open cases, you find that you are behind in your reserves by approximately 21 percent.

Let me put it to you differently. For every case that is reserved for $115,000 and settles for $105,000, I'll show you a case that is reserved for $30,000 on its way up to $105,000. And you must take those open cases, which are subject to that kind of adverse loss development, into account, side by side with the closed claims that you are looking at.

MR. TOOTHMAN: I think I understand what you are saying, Mike.

MR. ZIPKIN: Okay. Now, more importantly, when we talked to your claim department they told us the same thing that they told you, that they haven't changed anything. As a matter of fact, I know your claim vice president, from my old days, before I went nuts and decided to go into consulting, and I will tell you that he is absolutely correct. He has not changed anything visibly, on the surface, since he enacted these claim measures that you are currently operating under.

(Slide 13)

But we took a look at a large sampling of pending cases, and what we found -- this is just six of them--if you look at the first five columns - you'll find that they are not remarkable. They tend to look just like any other claim review we have ever conducted.

But take a look at the last column where you have the amount of reserve change. Your current reserves reflect that in every single instance -- this is only six cases, but I can assure you that it is an accurate reflection of what we saw in all the cases--there are substantial reserve increases in all of your cases occurring in just three months of the year: June, July and August.

Now, we realized that something had to have happeneed to cause that kind of reserve increase activity. And you will recall that shortly before this period of time, you experienced some real shock verdicts, some unusual losses. In fact, one case where you didn't expect to spend anything you paid over $2 million because a jury forced you to make that payment. Do you recall that case?

MR. TOOTHMAN: Yes, I remember that case. That was the Hayhurst case; he had a tractor roll over on him, I believe.

MR. ZIPKIN: Yes. Now, if you can recall the case, you can recall your reaction to hearing about a $2 million verdict. You went down into your claim department with a two-by-four and started hitting people over the head with it. You were very, very upset.

MR. TOOTHMAN: Yes, they had to have the secretaries leave because of what I was saying.

MR. ZIPKIN: Yes, you were quite angry.

MR. TOOTHMAN: I -- I was upset.

MR. ZIPKIN: You were quite angry about that case. As a result of that case, your claim department pulled out all of its cases and reviewed its entire book of claims. Now, we know that when a claim department does that, reserves go up. It's almost inevitable that reserves will increase substantially when a claim department reviews its cases.

They call it reserve strengthening; we call it adverse loss development. What they have done is they have compressed the time frame within which normal adverse development takes place. Instead of taking two years to put up their reserves they do it now. As a result of that kind of a review, we have concluded that they have permanently changed their case basis reserving approach.

They are putting up higher reserves today than they would normally put up, which means that they have reached forward into

the future, and they are compressing, permanently, the time frames within which these cases are reserved.

MR. TOOTHMAN: Mike? Okay. If they put up higher reserves than before, then aren't we more adequately reserved now than we were previously?

MR. ZIPKIN: Yes, I think you are.

MR. TOOTHMAN: Well, are we over-reserved now, then?

MR. ZIPKIN: No, I don't think you are over-reserved. I think you are more adequately reserved. That means that earlier in the life of the cases, the reserves are being put up at higher amounts. It does not mean that at the end of the line in every single case you are carrying a higher than justified case reserve.

MR. TOOTHMAN: And what is the impact of this, Mike? Are -we more adequately reserved than before.

MR. ZIPKIN: First, you have a permanent change in case basis reserving practices, which we find to be permanent as opposed to a onetime-only, nonrecurring phenomenon; and secondly, you are putting up your reserves earlier in the life of your cases. Your case basis reserves, which, as I have indicated, are an important component of the actuarial loss reserving process, are not the only piece of the actuarial loss reserving process.

That's where the mistake is being made here.

MR. TOOTHMAN: Okay. Well, what do we do about it?

(Slide 14)

MS. BALKO: Well, let's go back and look at the loss development triangle we had before. The pertinent point out of what Mike told you is that the change that we saw is permanent. We think that where the auditors had selected averages based on the entire column, what we want to do is use the information in the last diagonal. We think this represents your new philosophy in the claim department as well as the the changed retentions.

So what we've decided to do is replace the selected averages that the auditors used with the numbers that I show on the bottom of this slide.

We also know, now, that 72 months is ultimate for your company.

MR. TOOTHMAN: Okay.

(Slide 15)

MS. BALKO: When we finished the analysis, squared the triangle, we also found that the method that we had used before was appropriate. There are no large claims in the fifth and sixth report years. (Slide 16). Again, following the method, using reported losses, the new selected loss development factors, we find that the ultimate losses minus reported, shows a need for IBNR of $11.5 million.

MR. TOOTHMAN: Well, that's a lot better than before, Karen.

MS. BALKO: But you still need IBNR for case reserve development.

MR. TOOTHMAN: I think I understand why, now. Thank you.

(Slide 17)

MS. BALKO: So maybe we can summarize by saying that although the auditors showed a $25.5 million need, the second opinion shows only $11.5 million.

MR. TOOTHMAN: Well, Karen, I think you and Mike have convinced me that, indeed, I do need some reserves up on this business, even though it's claims made. You said you were going to look at some other things. Did you have something else? Is there any way we can reduce this number even more?

MR. ZIPKIN: Mike, you and Karen expressed a concern -- I won't call it an alarm, but you were concerned about your loss adjustment expenses. Were they too high? And if so, what could be done to lower them?

What we found in our review of your cases and your loss adjustment expenses, particularly the relatively small amount of independent adjuster expense that you incur plus your legal expenses, your attorneys' fees and so on -- we found that your independent adjusters and your attorneys were doing a fairly good job of what you were asking them to do. The problem that we noted was that you were asking them to do too much.

What we found, for example, in our review of your cases, was that although you were taking depositions and interrogatories, -- pretrial discovery, as it's called,-- you were also including in the file a ton of unnecessary paperwork and that's a very expensive proposition. That is, on top of that paper you would have a letter from the lawyer explaining what that paper meant. No one was ever reading the paper. No one ever reads that kind of paper.

Therefore, you were incurring what we consider to be abnormal expense in accumulating unnecessary paper and putting it in the files.

MR. TOOTHMAN: But Mike, in our first meeting we talked a little bit about our claims philosophy and how we had decided from the

outset that we were going to aggressively defend cases. Isn't this just part of aggressively defending those cases and trying not to pay on claims that are undeserving?

MR. ZIPKIN: No. You can aggressively defend the cases. That is an attitudinal response that is entirely acceptable in the insurance industry. But you can do that without accumulating all this expense in unnecessary paperwork.

MR. TOOTHMAN: Okay.

MR. ZIPKIN: What we believe is that you need a study of this area. We have specialists in our firm who can review this work for you. We don't think you ought to proceed, however, without a formal, documented proposal from us which sets out the background and purpose for the review, the consulting personnel that will be utilized and the approach that will be taken, and the approximate cost of this study. We do not think you ought to proceed until you have received some assertions from us on that point.

MR. TOOTHMAN: Can you describe for me just a little bit better just what it is you would do?

(Slide 18)

MR. ZIPKIN: We would come in and we would take a look at your claim files. We would talk to your people about the manner in which they are incurring their independent adjuster and legal fees; we would look for limitations that are imposed upon your legal expenses and investigations and we would look for other evidence of control of these claim expenses, such as the direct involvement of your claims staff personnel.

MR. TOOTHMAN: Okay.

MS. BALKO: Now Mike, this is real money. Let me show you an example. (Slide 19). From the prior projections, there is over $93.6 million of indemnity and expense. About one-third of this is expense, and two-thirds is indemnity. Based on case basis outstandings and IBNR, there is over $38.1 million yet to spend. If your expense ratio is at 50 percent, you will spend $19.1 million on legal and other attorney's fees. However, if we can curb the spending and make your ratio only 40 percent, we will save you $3.9 million.

MR. TOOTHMAN: Boy, that's great, Karen. You've got my attention with that number. Can we really save this much? Is that realistic?

MR. ZIPKIN: Yes. You can save approximately $4 million in legal fees. Now, as I suggested to you, I would approach this on the basis of a formal proposal and a formal study in line with that proposal before I would begin to count my nickels and dimes that add up to $3.9 million.

MR. TOOTHMAN: By all means, Mike. I'd be happy to see that proposal, and if we can really save this kind of money, that's certainly worth looking at.

MR. ZIPKIN: Well, we will go back in and give you a proposal within a few days for conducting that kind of a review.

MR. TOOTHMAN: Good, good. I appreciate it. Karen, is there anything else that we need to cover?

MS. BALKO: Yes, I believe there's some more on reinsurance that Mike discovered.

MR. ZIPKIN: We get nervous when we see a claim department that is responsible for two functions rather than one. One is the function of determining how much money should be recovered on an individual case, or on an aggregate basis; and secondly, the function of actually going after that money and collecting it from their counterparts on the reinsurance side.

What we would prefer to see is a situation in which an accounting department or an accounting function is used to determine how much money is required to be recovered, with the claim department's efforts, limited to the actual recovering of that amount of money.

MR. TOOTHMAN: You're talking about the reinsurance recoveries, now?

MR. ZIPKIN: Yes. What we find routinely in our studies is that where a claim department is responsible for both functions; that is, the determination of how much ought to be recovered, and then recovering it, an awful lot of money is left on the table. They simply don't do an adequate job of that kind of recovery, because they are not statisticians, they are not accountants, and they are not usually capable of determining how much money is owed them.

They are very capable of recovering that amount of money through the subrogation or reinsurance recovery door, but they are not good at determining how much money ought to be recovered.

MR. TOOTHMAN: You're talking particularly about tracking the aggregates, I guess.

MR. ZIPKIN: Yes. What we've found was that in your particular case, you're doing it right.

MR. TOOTHMAN: Good.

MR. ZIPKIN: What we found is that you are determining how much money ought to be recovered on both an individual case and an aggregate basis, particularly on an aggregate basis, through the accounting function, and then your claim department recovers

that amount of money. So you are doing it correctly, and we were able to determine that from our review as we have spelled it out for you in this proceeding.

MR. TOOTHMAN: So there is no problem in that area, then, is what you are telling me?

MR. ZIPKIN: Yes, that's correct.

MR. TOOTHMAN: Okay. Is there anything else we need to talk about?

MS. BALKO: No, I don't believe so, Mike.

MR. TOOTHMAN: Well, Mike, I'll look forward to your proposal for the claims study. I want to thank you. Eleven and a half million dollars isn't what I had hoped for, but it's a lot better than what we were talking about a couple of weeks ago. And you have opened my eyes. I understand now that there is need for some reserves, and I'm only sorry that I didn't have you here to explain that to me a couple years ago. Maybe we could have avoided some of this problem.

But thank you very much, and Mike, I'll look forward to your proposal.

That's the end of our skit. Thank you.

Now, as I said, this was a fictitious situation. At one point, I used to say that we don't really see all these situations in any one company, but I think I've since found a few instances where I have.

But in any case, the various things we've seen here are the kinds of things that we see frequently within the insurance industry, and I'm sure that many of you can think of some other examples, but hopefully this illustrated some of the interaction that is necessary if you are going to understand what you are doing in making reserve evaluations. You can't do it in a vacuum.

There are a couple of other slides I'd like to go through quickly.

(Slide 20)

I'm going to run through these. They're in your handouts, so I'm not going to discuss these at any great length. I don't feel that a claim audit or a claim review is necessary for every reserve review, but if you are planning on doing both, you might very well want to do the claim audit first, for a number of reasons.

The claim audit can verify the accuracy of the claims runs, provide some information about how reinsurance recoveries are

being handled, give you some feedback on the reasonability of the case reserves and, most importantly, highlight changes that have occurred in the claims department. Now, one thing I often find to be beneficial is to do a quick look at the numbers, a very preliminary actuarial review first, to see if I see something funny going on in the numbers, and then have our claims people in.

And oftentimes, then, I can pinpoint an issue that I want them to spend -- pay particular attention to. We just had a case in our own -- one client we were working with, where we didn't think a claims review was going to be necessary. We looked at the claims all the actuarial information and performed our analysis.

It was clear that the adequacy of outstanding case reserves was the critical issue and that a lot of changes had occurred in the way the reserves were being handled. So we then asked the claims consultants to go in and look at that. And we were able to point them towards the particular issues that we needed feedback on, because we didn't really know how to correct the problem or how to address the issue without the feedback from our claims people.

So sometimes I like to at least take a preliminary look at the actuarial analysis, have the claims people go in and then we can figure out what kind of adjustments to make.

(Slide 21)

If you suspect a problem with claims handling, you might want to do the audit first. Here, we get into the changes. A lot of these were illustrated in the skit. If you see higher development factors, you sometimes don't know whether that means the claims are being settled more quickly and there's need for less adjustment than before, or that something has happened with the development pattern -- it's now longer than before -- and those are exactly opposite types of adjustments.

So, if we can understand what has happened in the claims department: changes in procedures, changes in their claims philosophy, -- perhaps they have just gone to a more adequate level of reserving -- we've had situations where companies using a formula reserving process drastically increased the formula reserves, for instance.

Changes in personnel without any obvious change in procedure almost always cause some change in the triangle. The new guy doesn't want to get caught short. He can always go in and raise the reserves quickly on a case basis to make sure that they're adequate, and it's the old guy's problem then. A change in personnel will often cause things.

And then we illustrted in the skit -- Mike mentioned changes in law of comparative negligence rather than contributory negligence, or whatever.

(Slide 22)

Finally, as we talked about, problems discovered in the actuarial analysis can oftentimes be illustrated only -- or be explained only -- by having the claims audit done, and this slide runs through a list of those types of problems. The fifth one is one that we might want to talk about for a minute. That's worded in kind of a funny fashion: changes expected, based on conversation with management not seen. It doesn't mean that the management isn't seen; it means that we can't see the impact of the change on the reserve numbers. And sometimes if our claims people go in, we can get a better explanation for just how important that is, and whether it is something we are likely to see and it is just too early, it hasn't shown up in the numbers, or whether it really won't be as significant as management feels that it might be.

I had one case where a company said they pulled out of all the urban areas, and they were out of the places where they were getting high jury awards, and it made a lot of sense to us. Then we started looking at the numbers, and they had never had more than 2 percent of their business in those areas to begin with, so it really didn't have a very large impact.

We can talk about any of the items during the question and answer period, if you'd like, but I think a lot of these were illustrated by the skit.

Now, Karen has very interesting perspective, being an actuary in a claims department. There are several actuaries in that role now, or at least a few -- several compared to what it used to be. It used to be almost no one. Do we have any other actuaries in the audience that -- that are in claims departments? I see one, varies in that role.

Karen do you want to share some of your perspective with us now?

MR. ZIPKIN: Before Karen begins, I'd like to say something in support of what Mike has just told you. I give a lot of talks, and I find myself standing up in front of actuarial societies frequently. One of the comments that I frequently make is to quote from a statement that says: "A review of company claims practices should always be made to assure that correct assumptions are being made by the actuary regarding the claims process."

And I ask "Where did that statement come from?" It's kind of an examination question, but one that you really can't fail. Typically, only two or three of the attendees will raise their hands, and the answer is usually that it comes from some kind of claim publication, or claim magazine or claim newspaper or claim book. Not true. The statement comes from the Statement of Principles of the Casualty Actuarial Society. These are your rules, ladies and gentlemen, not mine.

MR. TOOTHMAN: And after I've just stated I don't always look for a claims audit; thanks for pointing out that I'm in violation of our principles.

MR. ZIPKIN: Every time a claims issue is raised, it does not require, in my opinion, a claims audit. It is possible for claims issues to be raised and not result in a claims review.

MR. TOOTHMAN: Now, like a good partner, he's going to bail me out.

MR. ZIPKIN: It may be necessary to conduct such a review, depending upon what the particular account requires, but all I'm saying is that it is not axiomatic, it is not automatic, that every time a claim issue is raised, a claim study is required. That would be one way that we would diminish the impact of these statements that are contained in the Casualty Actuarial Society's Statement of Principles.

MS. BALKO: Well, we know the Aetna is always in compliance and that's because I'm in the claim department. I might have been a little bit more comfortable in this skit playing, actually, Mike Zipkin's part, because what I do for the Aetna, most of the time, is look at claim activity. I don't particularly look at individual cases and second-guess the claim representative, but I do watch what goes on day in and day out.

There are data processing changes, policy changes, even work procedure changes. Something that may seem very mundane can sometimes kick up a real storm. The main benefit that we get from having an actuary in the claim department is communications. Claim people really don't know what actuarial principles are, but being in the claim department, they occasionally come to me and ask questions.

They rotate in from the field, spend some time in the home office, and get to know some of the reasons why we do things. They're never very timid when they go back to the field about calling and asking questions. The reverse of that is also true. Being in the claim department, I learn a lot from the claim people. I get my hands on claim files.

I started my position in the claim department by attending claim skills school, and with the new recruits, I learned how to take witness' statements, how to investigate, evaluate, negotiate, and settle. And I became appreciative of all the work that they go through. In that first claim skills school I actually started a network.

I met an awful lot of claim people, and I've increased the number that I know. And I can always go out to the claim department and ask what's going on. How do they handle a coverage A and coverage B claim on a single workers' comp. injury? What do they do with a second injury claim? Who fills out the ISO closed

claim form? What do they care about the statistical codes that are so important to ratemaking? Have they ever seen a second generation malpractice claim? What does it mean to them?

Lastly, I represent the claim department when I go to actuarial reserve review meetings. I bring a view of what is going on in the claim department; what is changing. We've never spent as much time looking at geographic differences as we do now. I have two actuarial students who work for me, and those are rotational positions. The students that come into those positions usually take an opportunity to go to claim skills school as well. But what's more, they also get their hands on claim files.

Recently, the reserving actuaries and the ratemaking actuaries needed to know whether or not workers' compensation asbestos claims actually come from products people are working with, or is it in the work place? As you can probably guess, there are fewer products now than there used to be that contain asbestos; so, if that's the case, 1990 exposure is almost nil.

However, if the exposure really comes from the work place, and whether they are removing asbestos or not, don't you expect that 20 years from now the current work force will also have asbestos claims? Those kind of answers don't come from aggregate data, they don't come from statistical codes, but you can find it by looking in a well documented claim file.

The actuarial people talk to each other. I know the language of the reserve actuaries and the ratemaking actuaries. My area also has a wealth of information. We've devised several data bases of closed and open claims. They can ask any kind of question, and we'll try to answer it. We are an indispensable source of information. With that, I'll stop preaching.

MR. TOOTHMAN: Actually, believe it or not, we are exactly on our schedule. Just as planned. We had hoped to leave about 20 minutes for questions and discussion; we've got that much left. If enough of you are still paying attention instead of being engaged in other activities, we can fill up the 20 minutes with some questions, here.

Anything that you'd like to discuss, or any questions you might have? Barry?

BARRY LIPTON (Fireman's Fund): Just a comment. I've often gotten into conversations about why even the -- if the claims department is doing a perfect job of assessing the exposure, based on the information in the files, there will always be the need for case supplemental reserves.

And I found the one simple explanation that claims people buy into relatively quickly: you're doing a perfect job of capturing all the exposure based on the information that is in the file; obviously, you can't be reflecting the information that's not in

the file. The information that is not in the file tends to be reported late and odds are that's more often bad news than good.

And their own experience through the years usually causes immediate agreement to that point, that the news that they -the things that they don't know are usually more often bad than good.

MR. TOOTHMAN: That's really the bridge between the case-bycase analysis and the aggregate analysis that the actuary does, isn't it? Yes, that bridge is an important bridge to make, and if you can get that point across, it really improves the communication with your claims people. With management, too. They can begin to reconcile the two areas.

Any other questions, comments?

We either weren't provocative enough, or we explained things perfectly. Any other thoughts, any other experiences you'd like to share? Yes?

Mike Martinie (ARDI Exchange): You mentioned that claims need to be done on an aggregate basis rather than on a case basis. On a start-up company that starts, obviously, with their first claim and maybe has 10 or 12 claims in the first year, at what point do you reach -- where you have to set those on a case basis, because you don't have the large amount of numbers to do an aggregate, where do you reach that point where you would then switch from a case basis to an aggregate basis?

MR. ZIPKIN: We normally find that industry-wide data can be used to supplement the case basis reserving process. And you make that switch when you don't need industry-wide data any longer to supplement. But that's the actuarial call, not ours. As claim people, we don't make that decision. It's up to the actuary who is doing the review to determine when the switch can be made from industry-wide data, which supports what they have in the way of aggregate case-reserving information, to a purely aggregate experience basis.

MR. TOOTHMAN: If I can try to clarify that a little bit, too, I think from day one you want to use a case-basis reserving process. Now, albeit you may decide that for certain kinds of claims you want to use a formula reserve for the first 90 days of the claim or something like that.

Other than that type of formula provision they use for a certain period of time to allow yourself time to investigate the case, and some claims departments do that, and that's fine. I'm not trying to argue against that.

But other than that, I'd say you are using a case basis reserving process from day one. What Mike was suggesting is that the case -- the sum of all the case reserves is not what should be used to determine the total reserve, or the total amount of liabilities

that you carry on the balance sheet. That's where you get into the aggregate analysis, and aggregate analysis -- when you are a new company, you have a very small number of claims -- can't really be performed based on the data of the company. There isn't enough data.

So you can supplement it with industry data or some other data, I don't know whether there is a session this time, but I know we've had sessions in the past on reserving for new companies and new products. So that's a whole other area of discussion. But the real point is, you don't use the sum of all the case reserves to represent the aggregate reserve number on your balance sheet.

But that doesn't mean you don't do case basis reserving. You still do that, to capture all the information you can from your individual case Comments?

More questions, comments? Yes, please.

Holmes Gwynn (Gainsco): On the appropriateness of closed claim studies: our claims department has kind of seen through that. But you can't compare the final reserve to the settlement amount, so what the claims department has done is, they've got their own report that computes an average reserve over the life of the claim.

And what they do is, they'll take the reserve for the quarter prior to the claim closing, so they don't get the final, final reserve, and they'll take the quarterly amount of the reserve at the close of each quarter during the whole life of the claim. Affectionately they call it the redundancy report, because every quarter they produce this, it does show a redundancy, even though I, the actuary, am showing that there is a very significant need for a large IBNR.

Have you come across this type of report? And what is the fallacy in producing that type of report?

MR. ZIPKIN: I think your claim department is blowing smoke at you.

MR. GWYNN: Exactly.

MR. ZIPKIN: I believe that you can look at the final reserve and the final settlement to determine; whether there is a correlation between case reserving and final ultimate settlements on those cases.

Now, what we have found is that if on a four year old case you have a dollar up today and tomorrow you settle that case for a million bucks, and if today you have a million dollars up on another case and tomorrow you settle that case for a dollar, on balance, you're adequately reserved. But you and I know that, based upon the management of the claim department in the setting

of reserves and the making of judgments on those cases, there's someting very seriously wrong with your claim department operation.

And while, on an aggregate level you are concerned about reserve adequacy, we're not looking for a number. If you want a number, you go to an actuary. We're looking for evidence of management of the claim operation, and in doing so we do our closed claim studies. We look at the correlation between the final reserve and the final settlement as a valid indication of how well that claim department is being managed.

And when we find a claim department that is reluctant to allow us to do that, we have to conclude that the claim department is very poorly managed. It doesn't mean that the claim department is stupid. It doesn't mean that they don't know the difference between a dollar case and a million dollar case. It means that when the case first came in the door they put a dollar on it, threw it in a file drawer, and sat there thinking that adverse loss development was something that occurs on a claim department basis.

They don't realize that adverse loss development will occur automatically and that it's up to the claim person to stay up with it, in terms of the investigative development of the case. So I would say to you that your claim department is clearly wrong -- absolutely, positively wrong -- if it is saying that it cannot equate final reserves with final settlements. That is not true.

MR. TOOTHMAN: One of Mike's problems as a consultant is that he's too subtle in his communications. Did we answer your question --

MR. GWYNN: Too much.

MR. TOOTHMAN: Okay. Anything else? Yes? Do you want your claims department criticized, too, John?

JOHN ZICARELLI (Argonaut Group): Well, actually I'm trying to make them better.

MR. TOOTHMAN: Good.

MR. ZICARELLI: But one of the things that came up near the end of your discussion was ways that the CEO could save money on allocated loss expense. And it seemed like the measure that you proposed was looking at the percentage of loss that was paid out and allocated on the closed, and then as a target, applying that measure to the reserves. Did I understand that right? And if I did, have you tried it? And is that something that's effective?

MR. ZIPKIN: I think you understood that correctly as it applies to this particular operation. As it applies to other operations, that may not be a valid method for controlling loss adjustment

expenses. You need to try other methods and use other methods to control those expenses, depending upon the severity of the situation.

MR. TOOTHMAN: John, if I can respond quickly, too, I would say that the point of the illustration was clearly highly simplified. And the point wasn't the appropriateness of measuring LAE as a ratio of loss, although I think it doesn't hurt to start there, to sometimes look at benchmarks, if you make sure to compare apples to apples -- as long as you are comparing an industry number for the same line of business, et cetera.

But the real point of that aspect of the skit was to illustrate something we find in a lot of claim departments, particularly smaller, newer operations, but I think you have found it in some very large companies, as well, Mike, Oftentimes claims are assigned to outside attorneys. It's expected those attorneys are going to take care of handling the claim, and the attorneys are not directed or controlled very well. Or outside adjusters, too.

Adjusters and attorneys. It's just left up to them to do what they do, and sometimes they do a lot more than is necessary and proper control of outside vendors -- adjusters, attorneys, whatever--can lead to lower expense ratios without sacrificing the quality of the claims management that is the real point.

MR. ZICARELLI: Yes, fair enough, Mike. I guess what I was looking for is your experience in using this particular statistic as a measure that you've gained ground or made some progress in implementing these things.

MR. ZIPKIN: Our experience has been -- in the medical malpractice field -- that you don't incur a great deal of independent adjuster expense in that particular line of business. We have found in other lines of business that independent adjusters frequently represent a very large proportion of your allocated loss adjustment expense problems.

Now, you can use paid-to-paid ratios if you want to. And we have found, in our experience, that claim people are notoriously inept at establishing proper reserves to cover the expense portions of their claims. The loss adjustment expense portions of their reserves are more frequently inadequate than anything else. That has been the result of our studies and our experience.

Therefore, we question whether or not it is appropriate for the claim department to reserve for loss adjustment expense, as opposed to an actuarial process which we have found to be much more validly in tune on a paid-to-paid ratio basis with what those expenses actually are, or will be, than claim department case basis reserving.

MR. TOOTHMAN I have two points. The first is to respond to you, John. I would say -- my use of a statistic as simplified as that

is more just as a red flag to see if things appear to be in line. It's a smell test, if you will and I wouldn't want to draw firm conclusions from it, but if a company's ratio seems to be way out of line with its peers, then I'd say that that's worth looking at.

I guess -- my second point is -- we may have a point of disagreement, here, Mike. I'm an advocate of case basis loss adjustment expense reserving, and again, not to use the sum of the case reserves as the aggregate reserve that goes on the balance sheet.

I think you need to do an analysis on LAE similar to what you do on losses. We have done some studies of companies in terms of reserve adequacy and reserve accuracy, meaning looking at the variance of -- from reserved to ultimate on a -- using absolute values. And we found that those companies that case reserve their LAE expense typically are both more adequate and more accurate in their total reserves than those companies that don't establish LAE case reserves.

MR. ZIPKIN: I guess it woud be a fairer statement to say that I, too, am in favor of case basis reserving for loss adjustment expenses. The problem is that it doesn't Always work as well as we would like it to. All I'm saying is that our experience has been that the loss adjustment expense reserving process has been notoriously deficient in the studies that we have conducted of insurance companies, reinsurance companies, and both self-insured and self-administered operations.

We have found that they don't do a very good job of predicting what those expenses are going to be on an ultimate basis.

MR. TOOTHMAN: Another question in the back? Did I see one? Was there a question back there? Okay. Anyone else? Well, we've got time for one more. Well, in that case, let me wrap up.

I think what we've tried to show in the skit -- clearly with regard to the claims function here, but I believe it's illustrative of what I feel the basic message is to the entire Loss Reserve Seminar, at least one of the basic messages, certainly the one to the actuary -- and that is that you can't do actuarial loss reserving in a vacuum. You need to understand the environment, the situation of the company or the line of business with which you're dealing.

There just is no black box. You can come here and go through the basic track things, and learn methods, and learn the stuff that the actuaries learned on the reserving exam, on part seven, and if you just crank those methods out and say, that's my number, that's my reserve, without thinking about it, without understanding what's happening within the company, you run the risk of making serious errors in the reserving process.

I think it's really necessary to understand what's going on in the company, what's impacting the numbers, and then you can make the appropriate adjustments in the numbers and can know which methods to use. There are assumptions that underlie every one of the actuarial methods, and if you don't adjust where those assumptions are inappropriate or use a different method, you're going to get the wrong answer. It's as plain as that.

So I think that's a lot of what we're trying to illustrate here. It's important to understand what's going on in your claims functions. It's also important to understand what's going on in the underwriting department, with marketing people, and what's happening with pricing and things like that. So again, there's no black box. Comment?

DARWIN HANY (State Farm): I'd like to suggest that maybe that's a two-way street. I think it's very important that the claims people know what you are trying to accomplish and what you are looking for them to accomplish, consistent with what they are doing, and to let you know that they are not doing that and beware of what might happen, so I think it's a two-way street.

MR. TOOTHMAN: To a great extent, I agree with that. There is one school of thought which, stated in the extreme says, don't tell the claims people how adequate reserves are in total because they'll change what they're doing, and then they mess up the numbers. And whether they're adequate or inadequate, as long as they're consistent, we can adjust for it. There is some truth to that.

I've had instances where claims departments got so much feedback and they keep trying to respond, and then we find we're always chasing our tail. But given that caveat, I really do agree with you. I think two-way communication is generally beneficial, really within all areas of the company. We have too many areas of insurance companies that tend to operate in a vacuum and understanding each other goes a long way.

With that, unless anyone else has some comments, I'd like you to thank our cast members. I appreciate their work. Thank you very much for your attention.

Claims Management Perspectives

A TWO-ACT SKIT

CAST
(in order of appearance)

Chief Executive Officer: Michael L. Toothman

Consulting Actuary: Karen H. Balko

Claims Consultant: Michael G. Zipkin

PROFESSIONAL RELIABLE

Summary of IBNR Indications

($Millions)

	Held	Audit	Indicated Inadequacy
Physician & Surgeons	0.0	25.5	25.5

2

PROFESSIONAL RELIABLE

Physicians and Surgeons

($Millions)

Report Year	Earned Premium	12 Mos.	24 Mos.	Reported 36 Mos.	Losses @: 48 Mos.	60 Mos.	72 Mos.
1	10.0	5.0	7.0	8.4	9.6	10.3	10.3
2	12.0	6.0	8.4	10.1	12.9	12.5	
3	14.0	7.0	9.8	13.9	15.1		
4	16.0	8.0	13.7	15.8			
5	18.0	12.0	15.6				
6	20.0	13.0					

PROFESSIONAL RELIABLE

Physicians and Surgeons

Report-to-Report Ratios

Report Year	12/24	24/36	36/48	48/60	60/72	72/Ult.
1	1.40	1.20	1.14	1.07	1.00	
2	1.40	1.20	1.28	.97		
3	1.40	1.41	1.09			
4	1.72	1.15				
5	1.30					
Selected Average:	1.44	1.24	1.17	1.02	1.00	1.00
Cumulative:	2.13	1.48	1.19	1.02	1.00	1.00

PROFESSIONAL RELIABLE

Physicians and Surgeons

($Millions)

Report Year	Earned Premium	Reported Losses @ 12	24	36	48	60	72
1	10.0	5.0	7.0	8.4	9.6	10.3	10.3
2	12.0	6.0	8.4	10.1	12.9	12.5	12.5*
3	14.0	7.0	9.8	13.8	15.1	15.4*	15.4*
4	16.0	8.0	13.8	15.8	18.5*	18.9*	18.9*
5	18.0	12.0	15.6	19.3*	22.6*	23.1*	23.1*
6	20.0	13.0	18.7*	23.2*	27.2*	27.7*	27.7*

*Projected

PROFESSIONAL RELIABLE

Physicians and Surgeons

Projection Method (000's)

Report Year	Earned Premium	Reported Losses	Loss Development Factor	Estimated Ultimate Value	
				Losses	Loss Ratio
1	$10,000	$10,300	1.00	$ 10,300	103.0%
2	12,000	12,500	1.00	12,500	104.2
3	14,000	15,100	1.02	15,402	110.0
4	16,000	15,800	1.19	18,856	117.8
5	18,000	15,600	1.48	23,085	128.3
6	20,000	13,000	2.13	27,702	138.5
	$90,000	$82,300		$107,845	119.8%

IBNR = $107,845 - 82,300 = $25,545

PROFESSIONAL RELIABLE

Physicians and Surgeons

Projection Method (000's)

Report Year	Earned Premium	Reported Losses	Loss Development Factor	Estimated Ultimate Value	
				Losses	Loss Ratio
1	$10,000	$10,300	1.00	$ 10,300	103.0%
2	12,000	12,500	1.00	12,500	104.2
3	14,000	15,100	1.02	15,402	110.0
4	16,000	15,800	1.19	18,856	117.8
5	18,000	15,600	1.60	24,960	138.7
6	20,000	13,000	2.40	31,200	156.0
	$90,000	$82,300		$113,218	125.8%

IBNR = $113,218 - 82,300 = $30,918

PROFESSIONAL RELIABLE

Physicians and Surgeons

Bornhuetter-Ferguson Method (000's)

Report Year	Earned Premium	Initial Expected Loss Ratio	Initial Expected Losses	Unreported Percentage	IBNR	Reported Losses	Estimated Ultimate Value Losses	Estimated Ultimate Value Loss Ratio
1	$10,000	1.05	$10,500	0%	$ 0	$10,300	$ 10,300	103.0%
2	12,000	1.05	12,600	0	0	12,500	12,500	104.2
3	14,000	1.05	14,700	2	288	15,100	15,388	109.9
4	16,000	1.05	16,800	16	2,723	15,800	18,523	115.8
5	18,000	1.05	18,900	38	7,088	15,600	22,688	126.0
6	20,000	1.05	21,000	58	12,250	13,000	25,250	126.3
	$90,000				$22,348	$82,300	$104,648	116.3%

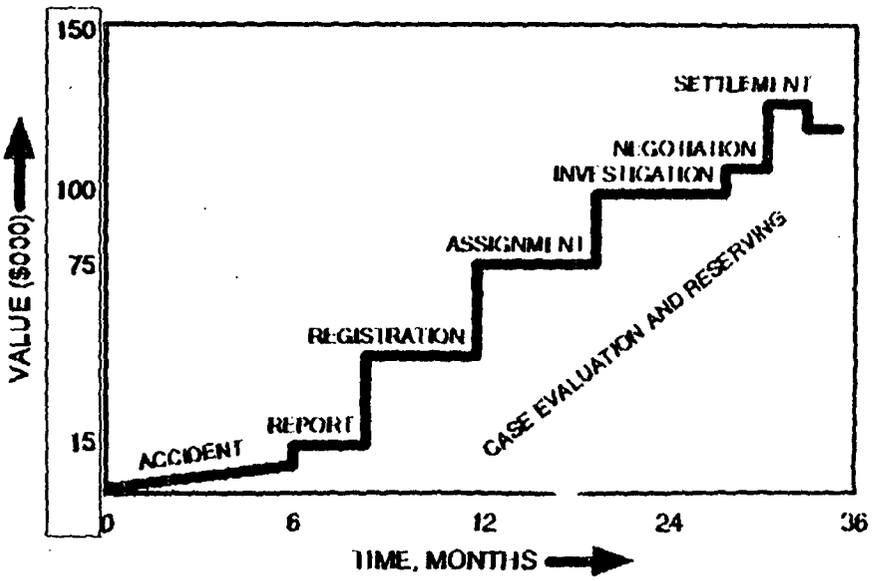
PROFESSIONAL RELIABLE

Physicians and Surgeons Liability

Study of Reserve Adequacy

50 Cases Closed in Last Seven Months

12/31 Estimated Value	**750,000**
Closed Value	**625,000**
Reserve Redundancy	**20 %**



Claim Review

- Interview Claim Management and Supervisory Personnel
- Review Claim Files
- Review Claim Procedures, Practices, Statistical Data

Claim Review

- Includes Review of Changes in:
  - Law or Legislation Affecting Liability, Legal Defenses, or Damages
  - Jury Verdict Patterns (Higher Awards, etc.)
  - Procedures/Practices for Reporting, Reserving, or Closing Claims
  - Personnel, Workloads, Claim Department Organization

PROFESSIONAL RELIABLE
Physicians and Surgeons Liability
Study of Reserve Adequacy
100 Cases Open @ 12/31 Year Six

	Value @ 12/31 Year Six	Value @ 7/31 Year Seven
50 Cases Closed	750,000	625,000
50 Cases Open	1,000,000	1,500,000
100 Cases	1,750,000	2,125,000
		+21%

CLAIM FILE REVIEW

Professional Reliable

File	D/A M/Y	D/R M/Y	Initial Reserve	Subsequent Reserve Change to: Amt.	Date M/Y	Amt.	Date M/Y
043216	3/3	4/3	15,000	30,000	6/3	90,000	6/5
057392	2/3	6/3	20,000	–	–	60,000	6/5
068973	2/3	8/3	20,000	80,000	1/4	100,000	7/5
084010	2/3	10/3	15,000	50,000	12/3	72,000	6/5
099691	12/2	10/3	15,000	–	–	35,000	6/5
103201	1/3	10/3	15,000	25,000	6/4	32,500	6/5

PROFESSIONAL RELIABLE
Physicians and Surgeons
Report-to-Report Ratios

Report Year	12/24	24/36	36/48	48/60	60/72	72/Ult.
1	1.40	1.20	1.14	1.07	1.00	
2	1.40	1.20	1.28	.97		
3	1.40	1.41	1.09			
4	1.72	1.15				
5	1.30					
Selected Average:	1.44	1.24	1.17	1.02	1.00	1.00
Cumulative:	2.13	1.48	1.19	1.02	1.00	1.00
Selected Average:	1.30	1.15	1.09	.97	1.00	1.00
Cumulative:	1.58	1.22	1.06	.97	1.00	1.00

PROFESSIONAL RELIABLE

Physicians and Surgeons

($Millions)

Report Year	Earned Premium	Reported Losses @ 12	24	36	48	60	72
1	10.0	5.0	7.0	8.4	9.6	10.3	10.3
2	12.0	6.0	8.4	10.1	12.9	12.5	12.5*
3	14.0	7.0	9.8	13.8	15.1	14.6*	14.6*
4	16.0	8.0	13.8	15.8	17.2*	16.7*	16.7*
5	18.0	12.0	15.6	17.9*	19.6*	19.0*	19.0*
6	20.0	13.0	16.9*	19.4*	21.2*	20.5*	20.5*

*Projected

PROFESSIONAL RELIABLE

Physicians and Surgeons

Projection Method (000's)

Report Year	Earned Premium	Reported Losses	Loss Development Factor	Estimated Ultimate Value Losses	Loss Ratio
1	$10,000	$10,300	1.00	$10,300	103.0%
2	12,000	12,500	1.00	12,500	104.2
3	14,000	15,100	0.97	14,647	104.6
4	16,000	15,800	1.06	16,748	104.7
5	18,000	15,600	1.22	19,032	105.7
6	20,000	13,000	1.58	20,540	102.7
	$90,000	$82,300		$93,767	104.2%

IBNR = $93,767 - 82,300 = $11,467

PROFESSIONAL RELIABLE

Summary of IBNR Indications

($Millions)

	Held	Audit	2nd. Opinion
Physicians & Surgeons	0.0	25.5	11.5
Indicated Inadequacy		25.5	11.5

Control of Claim Expense

- Limitations on Independent Adjuster Investigations
- Limitations on Legal Expense
- Limitations on Investigation and Legal Documentation
- Direct Involvement of Staff Claim Personnel

PROFESSIONAL RELIABLE
Physicians and Surgeons Liability
Analysis of Claim Expense

CURRENT PROJECTION				POTENTIAL SAVINGS		
Indemnity	=	$62.4		Indemnity Case Reserves	=	$30.4
Expense	=	31.2	(50%)	Indemnity IBNR	=	7.7
						$38.1
				Expense @ 50%		19.1
				Expense @ 40%		15.2
				Difference		$3.9

If Planning To Do Claim Audit and Actuarial Study, Do Claim Audit First.

Information Provided:

- Accuracy of Claim Runs
- Excess/re-insurance recoveries properly handled
- Reasonability of Case Reserves
- Changes

If Suspect "Problem" With Claim Handling, Do Claim Audit First

- Changes in Procedures
- Changes in Philosophy
- Changes in Personnel
- Changes in Law/Jury Verdict Patterns

Problems Discovered During Actuarial Study Requiring Claim Audit To Determine Interpretation

- Changes in Claim Reporting Pattern
- Change in Claim Closure Pattern
- Change in Case Reserving Pattern
- Change in Payment Pattern
- Change Expected Based on Conversation With Management Not Seen (need to be permanent)
- Discuss Inappropriateness of Closed Claim Studies
- Change in LAE Ratios

1990 CASUALTY LOSS RESERVE SEMINAR

4C-1: TRENDS IN TORT LIABILITY: A TRIAL LAWYER'S PERSPECTIVE

Moderator

Schuyler B. Marshall
Thompson & Knight

A PARTICIPANT: I'm here this afternoon to introduce someone who is going to speak to us, come into the lion's den, Attorney Schuyler Marshall. But before I get to the introduction, I would like to remind you of a couple housekeeping things. Since you've been to sessions already before this morning, you know that if you want Continuing Education credit, you need to fill out the little slip and hand it in as you are leaving. We would also appreciate if you fill out the evaluation form and also turn that in as you are leaving.

Attorney Schuyler Marshall is a senior partner in the local firm of Thompson & Knight, a very prestigious firm, let me also add, as I'm somewhat familiar with the Texas bar. Mr. Marshall went to the University of Texas School of Law, where he was associate editor of a Law Review, president of Phi Delta Phi, and a justice of the student court.

He was voted Outstanding Young Lawyer by both the State Bar of Texas and the Dallas Bar. He has been a trustee of the Texas Insurance Trust, including a stint as chairman of that organization. He is a certified specialist in civil trial law; he has lectured and spoken on many topics, including one especially near and dear to, I'm sure, all of our hearts, the professional liability of lawyers, accountants, architects and engineers. He did leave out actuaries, but I'm sure we can forgive him for that.

Mr. Marshall.

MR. MARSHALL: I have had experience on both sides, as Jane alluded to. I was with the insurance trust and was involved in helping form Texas Lawyers Insurance Exchange, which as some of you are aware, is a captive reciprocal exchange that provides malpractice coverage for lawyers.

And then, thinking that I was off the hook for my community service, I was then asked to be its claims coordinator until it could afford to hire one, so I actually handled the first 55 claims myself. So I have an affinity with what you go through, I'm sure, when you're involved in trying to evaluate a claim.

I'm going to limit my remarks. Trends in tort litigation is something that a person could speak on, without repetition for several days. I would like to do is call your attention to what I think are going to be some of the most difficult issues currently and probably not answer those issues, because they're not clear answers. That's why they are difficult.

I've provided a handout with citations to the key cases that you might want to read in order to limit reference to case citations here. What I intend to deal with is FIRREA, CERCLA, and then hot points of emerging issues in tort litigation, which I'll cover in the middle. Your job was hard enough before you had to start dealing with all of these government acronyms. In Texas, certainly, FIRREA is a hot topic that must be dealt with.

Let me just say one thing before I begin. Peoples concern about juries in Texas. Many of you are not from Texas, and I'll just give my perspective as a defense lawyer, here. In the first place, you know, Texas is a big state, and the jurisdictions are very, very different.

I think that, for example, Dallas, is a -- probably one of the more conservative markets in the country. Some of the near West Texas areas -- Midland, Odessa, San Angelo, Amarillo, Lubbock -- very, very conservative. And so you have to look at this part of the state differently from what you would look at the west -gulf coast.

The other thing I would point out is that our supreme court has come out with some totally wacky decisions, and -- almost embarrassing decisions. And what has happened is simply this. The defense bar tried to raise money to run good candidates for the supreme court. We're a very, very large state in which somebody can get elected almost on name recognition, and not enough money was raised on the defense side.

On the plaintiff side, large amounts of money were raised. Prominent plaintiff lawyers contributed $100,000 or more on the theory that with the right supreme court, ultimately the settlement value or the end result by decision of cases in the office is going to go up more than a million dollars, so it's a good investment. That's the way they looked at it and that's why we had the supreme court that we had four or five years ago.

Fortunately, I think we're in the process of turning it around, and our chief justice and most of the other justices are very, very strong and have unquestioned integrity. So that's not a trend in litigation, but it certainly affects everything we do. We're fighting a battle here in Texas, and the tide's turned. And you may see this in other states as well.

Let's talk about FIRREA, a very difficult issue, particularly as regards directors' and officers' liability. FIRREA is, of course, the Financial Institutions Reform Recovery and Enforcement Act of 1989, and it will have a very substantial impact on liability, insurance coverage and indemnification issues for directors and officers.

William Seidman, the chairman of the RTC, recently estimated that 60 percent of the failed S&Ls were victims of fraud by insiders, borrowers and agents. Before FIRREA, there were substantial liabilities that would be impaired under -- common law, state regulatory, and various FSLIC rules, such as the loans to one borrow rule.

What FIRREA adds is a whole new set of liabilities, plus a government agency with lawyers, accountants, the FBI at its disposal, doing everything they can to uncover problems or even things they think are problems, and bring suits. And that's when we defense lawyers come into play and where you get involved.

FIRREA defines liable parties in a new way as: institution affiliated parties. This includes directors, officers, agents, et cetera, even shareholders found to be, "participating in the affairs of the institution." When you talk about new trends, I'd say whenever a new act is passed, usually in a state of panic by Congress, a lot of ambiguities get in the law, so you'll see a lot of litigation concerned with defining what the statute means.

What is a shareholder who is, "participating in the affairs of the institution?" Nothing in the legislative history and certainly nothing in the statute explains that any further, although I suspect that the courts will probably work it out to mean something akin to a control person, in securities laws. That person can be liable under FIRREA.

Directors and officers and other, "institution-affiliated parties" may be held personally liable in actions either by FDIC or by other plaintiffs under FIRREA. Damages for improper use or investment of an institution's assets can include lines or principal and appropriate interest.

I've defended legal malpractice cases involving S&L fraud, and one of the biggest defenses we felt we had was the causation issue.

For example, the loans to one borrow rule is a very specific rule that basically provides a calculation of how much an institution can loan to one borrower, and there are two levels; one is secured by real estate, one is not. The FDIC has essentially said if there is a violation, then pay me. Defense counsel felt there are good causation issues that could provide a defense to liability under the loan to one borrower rule.

In other claims brought on behalf of failed banks and S&Ls we have also felt good causation defenses existed. But here, FIRREA seems to skim over it. And I'm very concerned about -- about the kind of charge that might be given under FIRREA, in which a court may say, Well, there's a regulatory violation; ergo, damages, and skip over the whole proximate cause and actual cause-in-fact defenses.

And it -- it's clear that someone liable can be liable for the entire amount of principal and interest, although it's not spelled out in the statute exactly what interest that will be. It also takes away some important defenses that existed under common law and state regulatory schemes.

For example, liability is not limited anymore by the business judgment rule, under FIRREA, under many federal statutes, state statutes, and decisional law, good faith reliance on outside experts, such as lawyers or accountants, provides a defense. FIRREA takes that one away. So they're trying hard to make it a more strict liability than would normally flow from a regulatory violation when there is violation of FIRREA.

There are civil penalties that are -- that are put into the act that are incredibly punitive. There are three tiers of civil penalties. One is $5,000 a day for as long as the violation continues. And keep in mind, some of these violations can be undiscovered for months, and then discovered, and you have a huge potential bill. Such violations would include late, false or misleading records, and many other violations of regulations, however innocent.

So that if, for example, there's a report that's due and it's filed late, you may owe a penalty, or if it's filed incorrectly, even innocently so, that penalty may exist.

The second tier is a fine of $25,000 per day for as long as the act continues and that would involve broadly -- and I'm trying to simplify a very technical statute -- unsafe and unsound practices. And there is some case law under both FSLIC and FDIC regulations that we could look to to see what can be regarded to be unsafe and unsound practices.

The difficulty here is that these government agencies really look at these situations with 20/20 hindsight. And they have called unsafe and unsound practices which I've seen institutions involved in where there really was no fraud, there was no insider dealing, and the people who were running the institution were really trying to make money and perhaps take what they thought was a businessman's risk. After the fact, that becomes unsafe and unsound in the governments eyes, even when similar risks previously resulted in nice profits for the institution.

The third level is a million dollars a day for knowing conduct, intentionally violating the violating the regulations. This, broadly speaking, covers malfeason and conduct. As you know, D&O policies frequently named directors and officers as additional insureds. Whether civil liabilities under FIRREA are covered depends, of course, in the policy language.

Another issue that will have to be worked out is what happens if an institution has to pay these fines and then sues somebody who is an insured under a general liability policy? Do you have to worry about coverage there? A lot will depend, in my judgment, on the nature of the act that resulted in the fine, whether it could be considered to be property damage to the institution, and you are going to see a lot of case law trying to sort that out. I'll get to some more analogous points in a moment.

The federal common law applies to FIRREA, and so you may have difficulty with local counsel because they're going to be used to state law, and instead, they're going to have to look at federal decisions. And the -- most importantly, the jury charges will be purely governed under not only federal procedural law but federal common law.

And I think you are going to see general charges in all these FIRREA cases where the judge gives a few definitions, and asks the jury who wins and how much. That's the type charge that a defense lawyer hates to see. There is, as I said, little case law, but normal CG&L policy typically, the ones that I've seen, cover the institution and the directors and officers as other insureds.

And then you've got all this litigation going on now between issuers of the D&O policy and CG&L policy as to which one responds or which is primary. The D&O policies typically have provisions that require exhaustion of other insurance and other insurance provisions themselves.

The one case that I would call to your attention, and it's not in this cite, because it's an old one that you may be familiar with is Continental Casualty Company versus Pacific Indemnity Company in which the Court held that the other insurance provision operates to avoid or reduce liability of D&O carriers only to the extent that another policy provides coverage for the same risk or loss.

So that's a very fact-laden inquiry, and that just -- most of the issues and cases that you see ongoing now are fact-based, and they focus pretty carefully on the plaintiff's pleadings. Is this a claim that raises issues that involve the same risk or loss? That's the issue. Now, I've got an unfortunate comment to make, here, but, you know, I think this is something that you're going to see is that plaintiff's lawyers are becoming increasingly aware of all of these coverage issues.

And as they read these cases and see what's covered and what's not, I think you'll see them drafting their pleadings to bring into play as much responsive insurance as exists. And I certainly see that in my practice. And I think you can read a complaint or read a petition and see just how sophisticated the plaintiff's lawyer is concerning insurance.

Let's leave FIRREA and deal for a moment with other business torts. I'm going to limit the discussion to five or six areas where I think you're going to see some significant trends and significant litigation.

Negligent misrepresentation is a tort that exists in most states. It's codified in Section 552 of the Restatement of Torts. It is frequently a basis of liability for accountants. It's a type of negligence that avoids privity. In effect it says, if a person makes a representation that is negligent, then anyone who is foreseeably harmed by that misrepresentation can sue.

Most of the case law here has to do with the proximate cause issue: Was this a foreseeable plaintiff who received this? So an accountant who issues a report, knows that the report's going

to be used for a specific purpose to induce third party X to do something, like lend money, then in that case clearly X could sue the accountant, in most jurisdictions, for negligent misrepresentation.

Is this an occurrence out of which property damage or personal injury can arise? I would have thought negligent misrepresentation, -- would not likely be considered to give rise to property damage or personal injury. However, courts in California, Iowa, Louisiana and Arizona have so held -- and New Hampshire -- so far has held squarely to the contrary, recognizing all those decisions and holding: No, this is not covered. So you're going to see a lot of litigation in this area.

D&O policies may apply but they have personal injury and property damage exclusions and should apply only if economic injury can also be pled. For example, in securities cases or business fraud, if economic injury is alleged that can be differentiated out from property damage or personal liability, then I think, yes, it is entirely possible for a D&O policy to provide coverage.

Wrongful termination is a tort that is asserted, of course, in Texas and elsewhere increasingly. Normally, courts hold that this is not an insured occurrence because it was an expected and intended result by the insured. In other words, it is an intentional act when the insured terminates somebody. And so most of the case law here holds: no coverage. But if a claim for defamation is added, then this will probably trigger the general liability policies coverage for personal injury and, at a minimum, raise a duty to defend.

In lender liability, there is possible general liability and D&O coverage also. For example, if there is a claim of emotional distress, such as bodily injury, then probably it'll be covered under the CG&L policy. If there is a corporate plaintiff alleging damages, then frequently those damages will come under the property damage section of the policy.

So here again, it's going to depend very heavily on how the plaintiff couches the pleadings, what sort of causes of action are alleged, and what sort of damages are being sought. The biggest trend that I can point to here, again, is the plaintiff's awareness of all these issues. There have even been allegations of collusion between plaintiff's and defendant's counsel recently in California to create coverage.

A defense counsel who participates in such activity would argue that it's a part of his duty to zealously represent his client, the defendant, to make sure that the defendant can maximize his coverage for the event.

Ethical dilemmas, such as accrue when defending a case where there are coverage issues, are something you can't escape. It's part of the life of a trial lawyer. My view is that -- that the correct answer to the dilemma of coverage is that the defense lawyer has to be totally single-minded, and that is to defend the claim against the plaintiff.

And so, obviously, he's not able to try to skew things in favor of the insurance company by taking discovery or reporting facts to avoid coverage, but equally true, he's not entitled to try to work for the insured against the insurer on a coverage-related issue.

Let's turn to CERCLA, a statute you'll have to deal with increasingly in the '90s. CERCLA is the Comprehensive Environmental Response Compensation and Liability Act of 1980, as amended by SARA -- another acronym; bureaucrats love them -- Superfund Amendments and Reauthorization Act of 1986.

Now, this is an area that presents enormous liabilities and where there's a lot of litigation going on now regarding coverage. The act provides extremely stringent liability. In fact, a court recently noted, and I quote this: "CERCLA, as we read it, is not a legislative scheme which places a high priority on fairness to generators of hazardous waste." And I certainly agree with that assessment of the act.

Maybe Americans are prone to the syndrome of overreacting, and the environment is certainly important, but it seems that this act may be an overreaction in several respects. The act was written in response to problems like Love Canal and major sites that everyone could agree needed to be cleaned up and cleaned up as quickly as possible without really regard to the cost.

However, as it was written, it addresses not just major sites, but in the words of a New York court, "every conceivable area where hazardous substances could be located." So, for example, you see filling stations where there's a change in ownership, the new owner can't get coverage because they can't get a certification that there has been no battery acid spilled, that leaded gasoline has not leaked underground.

Nobody will insure them and they are not willing to go into business without insurance. So, CERCLA applies to, the mom and pop gas station as well as the biggest superfund sites. Under CERCLA the government can order a responsible party to perform cleanup or the government can clean up the site itself and file a cost recovery action against any responsible party.

Also, private parties may sue under CERCLA or may seek contribution for costs involved in the cleanup. CERCLA liability arises from, "the release or threatened release of a hazardous substance or waste." The hazardous substance definition is very, very broad. And I won't try to read it, but it can include a

primary product or a product sold for use in a manufacturing process that results in a compound, which is itself hazardous.

Even trace amounts of a hazardous substance in a primary product can subject a manufacturer to a liability. Also, under CERCLA, liability is strict, joint and several, even to a defendant who supplies only a de minimus amount of hazardous substance. Typically, the courts work these out in terms of trying to find out what percentage of the hazardous substance was contributed by each of the defendants.

The bad news is that if you've got a deep-pocket defendant who contributed one percent, that defendant is liable for 100 percent of the cost, and it's up to him to go seek contribution from his other jointly and severally liable defendants. This is a message that general counsel and clients are amazed to hear, but unfortunately, it's right there in the law. And I don't see any way to avoid that unless it's by amendment of the statute.

Persons liable are defined to be PRPs, potentially responsible persons. Another surprise; this includes current owners and operators of a facility, past owners or operators of a facility, any person who arranges for disposal or treatment of a hazardous substance at a facility, any person who transported a hazardous substance to a facility. Now, if you think about that, if you're ever in the chain of title at any time when there's a hazardous substance on site, you are jointly and severally liable for the entire cleanup.

Now, some of the clients that we have to give this great news to are banks, for example, who foreclose on the mom and pop filling station and resell it. Maybe they only owned it for a day; they're just as liable for anyone else for the cleanup, if one's involved, because of their ownership, past or present, of the facility. So we advise our clients to do an environmental survey before they take possession of any property that could involve past or present hazardous substances.

To be liable a plaintiff must prove that the defendant was a person, that he owned or possessed hazardous substances; that he arranged for disposal or treatment, or transport to a facility; that there was a release or threatened release of a hazardous substance, and the release caused response costs. Now, only one case so far has held that the mere sale of a product containing hazardous material results in liability.

The issue frequently is disposal. Now, there's a lot of case law that looks at disposal arrangements, as to whether or not a product is, simply being sold to a third party in an arm's length sale or whether this is a disguised transaction to really dispose of the material. This issue is very fact-intensive, and it comes up a lot.

The case that goes the furthest, in my opinion, in imposing liability under CERCLA is one that is cited in your handout: U.S. versus Aceto Agricultural Chemicals. Aceto manufactured pesticide under contract for numerous defendants. And the Court held that since the manufacturing was being done under contract that they owned the pesticide during the manufacturing process and were therefore liable for the cleanup of Aceto's plant.

Under the reasoning of this case, upstream suppliers could be held liable. A party who contracts for a product whose manufacturing process could either produce a hazardous substance as the end product or as a by-product could also be held liable. The points here is to call your attention to things you should watch out for in assessing risk. Parties should not deposit anything at a known site. They shouldn't sell by-products, scrap or waste, unless there is a compelling reason to do so.

And there are some things going on that are a little bit troublesome. Products are being sold overseas that contain known hazardous material, such as PCPs, or contaminated grease. That perhaps is a way to avoid immediate U.S. liability, but it's extremely troublesome from a moral standpoint, if something truly is cancer-causing or otherwise hazardous.

And I suspect that because of the amount of this and other potentially harmful products being sold abroad and the inventiveness of plaintiff's lawyers, there may well be litigation brought by foreign plaintiffs, against U.S. parties under CERCLA, and it will be quite interesting to determine how the courts work that out as to whether there is liability abroad. The experience of Union Carbide suggest there will be.

Why the concern, under CERCLA, at a conference like this? The answer is that the environmental response costs which can be absolutely enormous, may be damages under a comprehensive general liability policy. This is currently a very, very hot issue and the courts have not been at all consistent. Historically, courts have held that the cost of compliance with equitable remedies does not constitute money damages. And, of course, CG&L policies indemnify only for money damages.

The second case cited in the outline, Borne versus Massachusetts, is one in which the Supreme Court speaking through Justice Brennan recently recognized the difference between money damages, which the Court said, "are intended to provide a victim with monetary compensation for an injury to his person, property or reputation," versus equitable action for specific relief, such as specific performance, or an order to clean up a site, which is viewed as an equitable remedy.

The Court even recognized that an equitable remedy can, "require one party to pay money to another". So here you have the Supreme Court in 1988 recognizing that throughout the common law there has been a difference at law and at equity.

In fact, many of you know that until this century, you frequently had to go to a different court entirely to get an equitable remedy before the equity and law courts were merged. So that distinction is well grounded in the tradition of the common law, and the Supreme Court says it is still viable.

The problem is that these lower courts ignore the Supreme Court. This was dicta, and they simply ignore the distinction. And it makes a vast difference in terms of coverage. This was a medicare case, so it's not controlling, but it is important because it recognizes the distinction.

In another dictum, however, in Pennsylvania versus Union Gas Company, the Supreme Court just referred to government's remedies under Superfund as money damage remedies without any analysis. The Supreme Court needs to rigorously analyze what is involved here. It hasn't come up yet.

The cases that have directly considered the issue in the lower courts have been split. One of the best cases holding response costs are not damages is the Maryland Casualty Company case decided by the Fourth Circuit. The Court refused to interpret damages as equivalent to cleanup costs, and ruled for the insurer.

The Court's reasoning, I thought, was pretty good and that was, that damages could be sought under various remedies, including trespass, nuisance, and so forth, just straight common law remedies. If damages were sought, clearly their policy would be responsive.

Here, clean-up costs were sought. The Court reasoned that the clean-up cost did not equate to damages because they were so much higher than what traditional damages were. In other words, the damages would basically be the destruction of the property, which was X. The clean-up costs were about a thousand X in that case. So the Court said, you know, these are simply not damages, they're not the same thing.

Maraz, the next case that I've cited, reached exactly the same result, also out of the Fourth Circuit. Continental Insurance Companies versus Northeastern Pharmaceutical, referred to as the NEPACO case, also held damages are not clean-up costs. It's a good case because it considered all the conflicting decisions. It's well-reasoned, because it considered all the arguments on both sides and held that in an insurance context, "damages refers to the legal damages and does not include equitable monetary relief."

Now, other courts criticize ARMCO and NEPACO, for what they say is a technical distinction between law and equity, which they say is contra to the insured's reasonable expectation of coverage. I find it to be almost silly, to make that argument, because people have relied on existing law when they have contracted.

And these courts that reach these results say, well, let's ignore the law that defined money damages and let's look at what the insured's reasonable expectation of coverage was. So you have cases like Aerojet General, out of California. The trial court had held CERCLA response costs were not damages.

The appellate court reversed, citing a string of California cases, saying that ambiguity should be resolved in the insured's favor in an insurance context. The funny thing was, they never said what the ambiguity was. So it was a very result-oriented decision, and therefore I don't think that persuasive.

Boeing versus Aetna was decided by the Washington Supreme Court in 1990. It held that response costs under CERCLA are damages to the extent that these costs are incurred because of property damage. And it really emphasized the EPA's complaint, here, to find coverage. So here, again, the drafting of the complaint is very important to the coverage issue.

One way to look at this case is that, presumably, Boeing doesn't lose often in Washington state. But there's a very good dissent; probably the best reasoning in any of these cases is the dissent in Boeing. And if you have any problem come up in this area, I'd say that would be a great starting point to familiarize yourself with many of the arguments.

The dissent summarizes the best arguments, I think. Pointing out in very well-reasoned, well-written -- from a legal standpoint -- terms that response costs are restitutionary remedies, but not damages, and therefore should not be covered. He goes through the legislative history of CERCLA and points out that it was set up to impose clean-up costs on those who, "profited or otherwise benefited from commerce involving hazardous substances."

So there was a lot of language in the Congressional Record here about an element of punitiveness here, and an element of trying to prevent recurrences of similar acts. And third, and closely related to the second point, he argues that insured responsibility to clean up its own waste should be uninsurable as a matter of public policy simply because of the legislative history.

There is a lot to be worked out as to coverage, because you only have these few cases. They're in conflict in the Supreme Court. It's probably ultimately going to have to resolve these issues, but I would say in the meantime you should look carefully at the allegations of the complaint. And these cases, and particularly Boeing, will help you assess a risk in determining coverage.

Now, as to the amount, the cost of a clean-up, we do a lot of environmental work, and I've never seen a low estimate. These estimates can be enormous and probably much more than you initially reserve.

I'm out of time, Jane. Thank you.

1990 CASUALTY LOSS RESERVE SEMINAR

4C-2: RESERVING FOR D&O AND PUBLIC OFFICIALS E&O

Moderator

David B. Gelinne
American International Group

Introduction

Today I will discuss issues in reserving for Directors and Officers Liability insurance. In keeping with the description of this session I will emphasize the impact on this process of tort reform. However, I will also discuss several other factors which we have encountered which make reserving difficult for this line.

This is not a technical discussion concerning reserving of a particular D&O claim. My discussion will emphasize the overall reserve, with concentration on how we determine the bulk reserve component rather than the case reserve component. Unfortunately, the D&O line is not the type which lends itself to the mathematical science of the actuarial profession. Rather, this discussion will describe how we attempt to reserve for D&O at AIG and how this process has been impacted by tort reform and other issues.

I will begin with a brief discussion of the D&O policy. Then I will briefly review the D&O experience in the 1980's, which prompted the various tort reforms. This will be followed by a discussion of how we reserve for this volatile line. Finally, I will discuss the major tort reforms relevant to D&O and how tort reform has impacted this process.

Concerning the reserving function, I conclude that there is a significant need to communicate with other departments in order to overcome various reserving difficulties peculiar to this line. In addition, segmentation of experience is extremely important in order to enhance credibility. Concerning the various tort reforms, it is evident that they have not yet produced their intended effects, and that in all likelihood there will be only limited improvement in the D&O area in the long run, as a result of these reforms.

I will be happy to answer any questions at the conclusion of my presentation.

The D&O Policy

An understanding of the D&O policy is necessary in order to evaluate the potential impact of the various tort reforms.

The D&O policy usually has two separate insuring agreements. The first provides coverage to the organization for its responsibility to indemnify its directors and officers under applicable charter, bylaws and/or state statutes. The second agreement provides personal coverage to the insured directors and officers directly for those situations where corporate indemnification is not available. Under the corporate indemnification agreement, the insurance company assumes no duty to reimburse defense costs prior to final disposition. Under the liability agreement, the insurance company will advance defense costs. Most tort reforms in D&O either expand the areas eligible for indemnification by the corporation or limit the personal liability of individual directors.

Unlike other types of professional liability coverages, the D&O policy does not stipulate a duty to defend.

The policy is claims made, which should help simplify the estimation of the bulk reserve, as there is no pure IBNR component. However, this is not the case, as I will discuss later.

The limit of liability is an aggregate for both insuring agreements, and is cost inclusive. I should make a distinction here. Legal fees expended by the insured company in defense of their directors will be considered part of the indemnity and erode the limit. Legal fees expended by the insurer for monitoring counsel do not.

There is usually a corporate retention and separate lower retentions for each director. However, the new policy which AIG currently writes places both coverage parts within one agreement and utilizes only one retention. Defense costs are applicable to the retention.

Many of the exclusions on a D&O policy evolved through adverse loss experience in a particular area. Paramount among these are the exclusions for claims arising out of personal profit (insider trading), claims brought by one insured against another (one vs. one), and defense of hostile takeovers.

A Brief History of D&O Liability in the 1980's

Although D&O insurance has existed for about 50 years, it was not until the 1980's, when merger activity and business failures in certain industries and regions around the country triggered extensive litigation, that the D&O crisis began to take root. From 1982 to 1987, American corporations underwent an unprecedented wave of mergers, acquisitions and divestitures. This activity was particularly dangerous to directors because of the inherent conflicts of interest faced by boards.

The conflict which directors face during takeover situations concerns a duty to shareholders to ensure a fair price for their shares. However, they also have a duty to protect the interests of the corporate entity. A third interest would be the self-serving one of preserving their jobs.

In the past, courts would have relied on the business judgment rule. This principle holds that a corporate director or officer cannot be held liable for a mere error of judgment, as long as he has, independently and in good faith, made an informed business decision which a reasonably prudent businessman might make upon taking into account the best interests of the corporation.

However, due to the significant financial repercussions involved with mergers and acquisitions, courts have increased their scrutiny of the process by which management decisions are made. The most celebrated case, Smith vs. Van Gorkam, found the directors liable were found liable for accepting an offer to sell the company because they did not undertake significant deliberations, even though the offer was nearly 50% higher than the current market price. Since this decision, thorough investigation and deliberation have become the cornerstone to the business judgment rule.

The gradual erosion of the business judgment rule had a disastrous effect on the willingness of directors to sit on corporate boards. In August of 1987, Industry Week reported that a survey of 1,126 directors indicated 32% had considered retiring because of increased liability.

The Wyatt Company, which conducts periodic surveys of the D&O industry, indicated in their 1989 report that companies involved in merger, acquisition, or divestiture activity showed twice the frequency and susceptibility to D&O claims in 1989 as those firms not involved in this type of activity.

Reserving for D&O

Before I begin my discussion concerning the effectiveness of the various tort reforms in the D&O line, I thought it would be interesting to discuss in a general way the manner in which we reserve for this line. I should point out that the actuarial department at AIG is structured somewhat differently than those at other insurance companies. Managers are responsible for both the pricing and reserving of the specific products in their areas of responsibility. Therefore, much of what I say also applies to the pricing question as well as the reserving issue. In fact, our first line of defense for reserving difficult lines such as this is getting an adequate price up front.

I would also like to point out that at AIG we have seen, helped defend, and paid more D&O claims than probably any other insurer. Although the methods which I describe are fairly simple, other companies may have difficulty applying them, since they lack a continuous history in this class.

The two major points which I would like to emphasize in this discussion are the need to communicate with other departments and the need to segment the book to enhance its credibility. At AIG the communication is facilitated by the close physical proximity of the various departments. All of the underwriting is done in the home office in New York City. We also have a claims department in the home office dedicated principally to the D&O product.

In this line, a relatively few number of large claims contribute a significant amount of loss dollars for any given year. The usual mathematical methods do not provide satisfactory answers. Therefore, there is a need to supplement the limited data with informed judgment. This judgment comes from frequent communication with the claims and underwriting departments.

The notion of not being able to rely on standard actuarial methods is highlighted in the difficulty with interpreting D&O loss development triangles. Certainly the explosion in D&O loss costs first witnessed in the early to middle 80's could not have been predicted based on the development history of older years. Likewise, the development patterns of the 1982-1984 period have proven to be inapplicable to more recent years. The reasons are enumerated below.

1. Changing Case Reserve Adequacy

   The considerable knowledge base gained during the D&O liability crisis allowed our claims department to more quickly and accurately case reserve the more recent years.

2. Changing Mix of Business

   The quality of our portfolio improved as we underwrote towards the more stable classes and regions and away from the volatile industries.

3. Changing Limits

   As the D&O market hardened, there was a material reduction in capacity. For an individual account this translated into a reduced limit on the policy. Currently, there appears to be no shortage of capacity and limits are now beginning to increase. The average limit on the portfolio will have a material impact on loss emergence.

4. Policy Form Changes

   As underwriters began to understand the D&O exposure more fully, the policy form was changed to ensure that certain situations, where no coverage was intended, were in fact not covered. The hostile takeover exclusion and the one vs. one exclusion are examples of how the policy form was tightened to exclude unintended coverage.

5. Tort Reform

   Of course, the various tort reform changes have served to further complicate this problem.

All of these factors serve to invalidate the D&O loss development triangles which form the basis of most standard techniques which an actuary can employ. If that is not enough, I should also add that the D&O business in the 1982-1984 period was written with a mixture of three year and one year terms. Therefore, Policy Year statistics became difficult to analyze. Accident year triangles were not affected, and we were forced to rely on them for profitability studies as well as reserving.

In order to help us overcome the problems discussed above, we schedule periodic meetings with the claims department to discuss the significant claims. The severe D&O claims can take five to ten years or more to settle. We have found that although it is extremely difficult for our examiners to place an early accurate value on a claim, they do a very good job of identifying the claims which may prove to be severe. However, this information is of tremendous help to the reserving function. Simple sensitivity studies allow us to feel comfortable with a given year of experience much sooner and more accurately than strict review of a volatile loss triangle would allow.

Once we have identified a year in which we feel comfortable with the loss ratio, it becomes a simple matter to index this result forward to project a result for the current period. Premium per million of limit is used as our rate level measure. This measure of rates is most meaningful only after the book has been segmented into more homogenous classes. For example, the rate for a nonprofit class may be a fraction of the rate for a commercial D&O class. Combination of these groups when the relative volume is shifting by year can distort the loss ratio projection.

In addition to segmenting on a profit vs. nonprofit basis, we also look at our book by asset size and by industry. In fact, we have separate underwriting departments for the banking and insurance industries in order to gain more expertise in these difficult classes. In its D&O report, the Wyatt Company also captures information by size and by industry.

Loss cost trends are difficult to determine, due to the low volume of data and the lack of a measurable exposure base to correlate with D&O losses. We usually provide the underwriters with results based on a few trend assumptions in order to obtain a feel for the sensitivity of the numbers. The Wyatt report mentioned above indicates that frequency trends continue into 1989 at 5-15% per year, while severity trends are 8-10% per year.

We have also found layering of our losses and exposure quite valuable. As the D&O market hardened in the middle of 1985, there was a significant reduction in the average limit. Layering the losses and keeping track of our in force count by limit became extremely important. Layering is also necessary in order to estimate our net reserve position, since most of our reinsurance is excess of loss.

I hope this gives you a rough idea of how we reserve for D&O at AIG. I cannot stress enough how important it is to have close contact with both claims and underwriting. Next, I would like to describe the various types of tort reform concerning D&O.

Tort Reform in D&O

Tort reforms concerning D&O were first enacted in 1986 by the state of Delaware in response to the insurance crisis. Since over 40% of the N.Y. Stock Exchange is incorporated in Delaware, much of my discussion will address Delaware's statutes. First, I would like to point out that tort reform in D&O is much different from the usual tort reforms applicable to other lines. For instance, joint and several liability and the collateral source rule have virtually no impact in D&O. Generally, the caps on non-economic damages also do not apply, although Virginia and a handful of other states cap the liability of an outside director under certain conditions.

There are two major areas of tort reform for D&O. The first concerns limitations on directors liability. The Delaware law authorized shareholders to make changes to their charter to limit or eliminate directors and officers liability for "duty of care" violations (to the corporation and to the shareholders as indicated above). The provision is not self-enacting; therefore, there is no tort reform unless the shareholders act. Other states have passed statutes limiting liability which are self-enacting.

The second area of tort reform concerns the expansion of indemnification rights. These statutes allow corporations to indemnify their directors for third party actions. The Delaware version permits broad indemnification in third party actions unless the director did not act in good faith, or in a manner he reasonably believed to be in the best interest of the corporation.

At first glance, it would appear that expanding indemnification provides no saving to the D&O insurer, since the first coverage part guarantees reimbursement to the corporation for these costs. However, it is important to understand that these statutes were passed to support a broader public policy goal: to encourage individuals to continue to serve as directors. Secondly, there are potential savings to the insurance company in not having to advance legal fees. For example, the director may be found guilty of committing an illegal act which is not covered by the policy. However, our claims department has cautioned me that these potential savings are subtle at best.

Measuring the Effect of Tort Reform

The empirical evidence available to date seems to suggest that there has not been much of an impact from these tort reforms. The Wyatt Company indicates that the frequency of claims made against directors and officers of the survey participants has more than doubled, from 19% in 1978 to 47% in 1989. They also show that the rise in claim frequency has ranged from 5-15% per year through 1989. This information is dramatic because it indicates that there has been no reduction in frequency due to tort reform or any other cause.

The Wyatt provides similar statistics for severity. They estimate the 1989 projected average indemnity payment at $2.17 million, combined with an average defense cost of $1.30 million, resulting in an average 1989 claim severity of $3.47 million. They also indicate that the severity trend continues into 1989 at 10% per year. Legal defense fees are trending at 8-10% per year. These statistics suggest that there is no benefit from tort reform on the severity side as well.

Finally, the Wyatt company also includes an average premium index over time which indicates that rates have increased steadily through 1988, well after the enactment of most tort reforms, and have only decreased by 7% in 1989. The drop in 1989 is understandable, given the current competitive pressures in the market, and therefore, I do not believe it can be attributed to tort reform. This suggests that market participants refuse to recognize a significant impact from tort reform in their pricing strategies.

There is no question that the availability of D&O insurance has increased dramatically since 1986. This increase could be due to the tort reforms briefly described above. However, in all likelihood it is the result of re-entry into the market by additional players, drawn by the substantial rate levels commanded in the hard market years.

Why Tort Reform May Not Be Effective In D&O

The discussions I have had with claims and underwriting are consistent with the empirical data presented by Wyatt, and suggest possible explanations for the failure of tort reform in D&O.

First, the tort reform reductions to D&O liability do not appear to go far enough. There are a number of areas where directors can still be held liable. For example, the Delaware law does not protect officers of the corporation. In addition, it does not cover a director for breaches of the duty of loyalty, acts made

in bad faith, intentional misconduct, knowing violation of the law, improper personal gain, or damages to parties other than stockholders. Some of these exceptions are extremely difficult to work with. For example, nowhere in Delaware law are the phrases "duty of loyalty" and "improper personal benefit" defined. If the latter is not limited to the actual receipt of money, a director could theoretically be charged with improper benefit in the form of continued tenure, simply by voting against a hostile takeover. There is no end to the imagination of a plaintiff's attorney.

Often, one or more of the actions listed above are alleged in a D&O suit, and most D&O policies cover these situations. In addition, state liability laws do not apply to federal statutes such as SEC, RICO, and antitrust violations.

There are two other points which need to be made concerning liability laws. First, standards of liability and their exceptions are issues of fact which must be determined by a jury, resulting in unpredictable outcomes. For this reason, many tort reform laws have not been tested. Second, most directors are more concerned about the cost of defense than the question of guilt. As long as plaintiffs' attorneys continue to bring suit, D&O will be an expensive cover.

There are also a number of loopholes for the laws which expand indemnification. For a long time the SEC has taken the position that SEC violations cannot be indemnified, although they can be insured. It has also been suggested that public policy may limit indemnification under other Federal laws as well. Finally, indemnification is only valuable to a director when the capacity to indemnify is present. Insolvency or change of control may change the situation tremendously.

Conclusion

I hope I have succeeded in providing an appreciation of the reserving process for directors and officers liability insurance. In addition to tort reform, there are many qualitative issues which come into play. However, concerning tort reform specifically, I have made the argument that insurers should not expect a significant reduction in costs. From the director's perspective I would certainly not rely on this relatively new legislation to eliminate the need for a D&O policy. As long as courts remain the forum of choice in matters of corporate governance there will be a continued exposure to liability. Furthermore, new areas of liability seem to emerge almost every day. A recent U.S. Comptroller's study of 162 bank failures concluded that poor management by directors and officers played a significant role in 89% of these failures. This has prompted the FDIC and the Office of Thrift Supervision to commence numerous actions against the directors and officers of failed institutions. Here we go again.

1990 CASUALTY LOSS RESERVE SEMINAR

4E-1: ACTIVE LIFE RESERVES FOR OCCUPATIONAL DISEASES

Moderator

Robert K. Briscoe
Milliman & Robertson, Inc.

MR. BRISCOE: My name is Robert Briscoe. I am a senior consultant with Norman Robinson, and we are going to talk today about something we call active lives valuation, specifically applying to casualty risks. The subject is both old and new -- I've been doing this for about 18 years now -- but it has not been widespread beyond certain narrow areas of workmen's compensation. So, what I'd like to talk about mostly today is application somewhat beyond what I've done, but I will try to go through my experiences in dealing with one area of this.

The normal focus of any casualty work is to take a series of past events, claims, and to project what they cost, and to sort of come to a screeching halt as of some point in time, today, the last accident year that you are concerned with. Seldom in casualty work do we look forward in time to see what is going to come up next year, or the year after, or down the line. There are cases where, not looking forward in time, fails to capture elements of cost that should be brought into focus today. And that's basically what we are going to talk about today. Occupational lung disease in workmen's compensation is the point at which this was all brought into focus, starting about 16, 17 years ago.

For the latecomers here, there is a handout up front. John, maybe you could take a few of those back to the room, and then anybody else who walks in.

About 20 years ago, U.S. Congress decided that they were going to start a very widespread program to compensate coal miners for occupational lung disease, and that program has developed over the years into some active lives treatment of what are otherwise occupational disease/workman's comp claims. These claims are different than normal workman's comp claims. They take a long period of time to develop in the claimant.

In other words, a 20-year old claimant or a 30-year old claimant almost never comes up with a real claim. They tend to appear at the end of the claimant's career, either along retirement, if the claimant makes it to retirement.

Those of us who have worked in the coal industry, there have been an awful lot of employees and claimants who were laid off sooner than retirement. But it's still the same. It's the end of their career. And, if we were to attempt to recognize the cost of these claims at the end of the claimant's career, then we would have almost no opportunity to collect that cost from any reasonable productive efforts of the claimant; cost accounting perspective.

Back in the early and mid-seventies, having sort of figured a lot of this out when we started thinking about what these claims were going to mean, we turned to what is the most closely analogous situation somewhere else, which are pensions. A pension has some of the same characteristics of an occupational disease claim in

that it is something an employer earns over a span of time in his career. The payments only start at the end of his career, and they are costed while the person is still working over a period of time.

(Exhibit)

I have set up a sort of simplistic explanation here, an illustration of this process. The box here represents what is normally done in casualty costing practice. We've got a claim, it's attached to this year, therefore our cost for that claim is a cost this year. In this case, in this day and age this number is a bit low, but $100,000 is not an atypical cost for an occupational lung disease claim, or indeed many other occupational disease claims in workmen's comp.

The basis of the pension model here is to simply say that I am not going to wait until the claim emerges to recognize the cost of this claim. I am going to start earlier; conceptually, perhaps, as early as the first date of hire of this employee. By starting then, I can take my $100,000 cost and work it back to an annual contribution; that that contribution plus interest over the person's career will come up with my $100,000 the day the claim is made. Then, of course, you would have the present value of the claim to pay it off for however long it takes to pay it off into the future.

This is, obviously, completely different than most other things. In casualty it's a pretty direct borrowing of pension methodology. And, for a self-insured employer, it gives him an annual cost that is controllable, doesn't contain any major surprises, doesn't have a whole group of people who happen to be laid off on one day coming up with a claim, and there being $2 million of claims in one accident year. Those are the advantages, basically, to the method.

This method has been widely adopted in the coal industry. There are very few major coal companies who have not had one of these valuations done. There are relatively few that are not actively using it to cost their Black Lung cost. The transfer of this model to other activities in the casualty line, I'm going to cover sort of last after we go through some of the mechanics of doing this.

Just sort of interest to you, I'd sort of like to take a sort of poll of who we've got here so I may direct a little bit of what I say in certain directions. How many consultants have we got here? How many people from the insurance company? Anybody else? A self-insured employer, anybody? Okay.

From the standpoint, since we have got half and half split up between consultants and insurance companies, let's talk about insurance a little bit. A pension model is something that an employer does. Where would we use this kind of thing from the

standpoint of a workman's comp insurance policy? Well, in fact, we have used it in our insurance environment quite extensively, as a matter of fact. And the place you find its use is essentially in underwriting of large risks who have an occupational disease problem, either real and demonstrated, or perceived.

The problem with occupational disease is that it can be there, obvious, the claims are flowing, and everybody knows about it. So, you somehow try to figure out how many claims there are going to be next year, and what their cost, and what the premiums should be. Or, you think they may have it, nobody has had a claim yet, which is generally outside of Black Lung so far. But, perhaps, there is a whole group of 50-year old employees sitting at this company who may become a claim in the next two years. Are you going to issue a policy this year, assuming they are not there, or what?

The advantages of what I am going through the process of describing here, even if the purpose is simply to underwrite a workman's comp policy, tends to provide a lot more information than normal underwriting procedures might. And I have been involved in doing this on a very large scale in the coal industry over many years. It turned out to have many good attributes.

Let's go through the process quickly and then, perhaps, go back to some of the theoretical aspects. What do you need to do something like this? What does it take? Well, basically, you start with a census of the work force that you are dealing with. You need to know when they were born, when they were hired, where they are, if somebody wants to split the results up in several different pieces.

There are other things that are nice to know: marital statuses, past histories of certain things. You may or may not be able to dig those out of somebody's records. I've sort of done this in an illustration of some floppy disks here because it used to be incredibly difficult to get. It is getting incredibly easy. Most employers now have some employee census on a computer, and they simply hand you a disk.

The second thing you need to have, obviously, are records of claims. In the occupational disease aspect of this you are always interested in all the claim data you can ever get. You need to make assumptions about histories, assumptions about what's going on, whether you are insuring those claims or not, whether they belong to somebody else. If you get any data at all on them, it's always helpful.

The third element that is a good idea, and basically necessary here, is to know, not only who is working, and who might have already filed a claim, but who might file a claim. And the people who might file a claim are everybody who has worked for this employer for some past period of time.

There are statutes of limitations on workmen's comp that might prevent a claim from -- If you go back more than X years, you can't have a claim now, because the statute has run. There are some occupational disease programs, like the federal Black Lung program, that have no effective statute of limitations. So, in order to have any grasp of what your exposure is, you really need to know who worked there, kind of thing. With these three data elements, you have the basic data that you can mechanically run the valuation from.

The other ingredients to distil here involve making a very large series of assumptions, depending on what you are doing, and how you are doing it, and maybe more assumptions here than a pension actually uses in a pension plan. There are frequently more highly variable assumptions. In other words, some of these assumptions make the difference between a big number and a small number kind of thing.

I sort of divided the assumptions in two general groups. You've got demographic assumptions, mortality, withdrawals; who is going to leave this work force and not be a claim into the future; retirements: Those fall into a fairly well established methodology coming from pensions. You have to begin to make assumptions as to what proportions of people are going to retire in each age, each year; and claim frequency. This is obviously a direct demographic reflection of whatever problem you are dealing with here, get some idea of how many of these claims are going to tumble out of the work force.

There is also an obvious set of financial assumptions. You have to establish what benefits they are going to get. This is sometimes not easy in workmen's compensation. You have to run everything at an interest rate. And in some cases, again, the federal Black Lung program being an obvious one, you have to deal with a benefit inflation aspect that really has two dimensions. Number one, you have to pay what future benefits for future claims are going to be in the future year they are going to arise. You also, in some cases, have to deal with escalations of existing claims. The federal benefit goes up every time they give the federal work force a raise.

What can you do with all of this? There are probably as many ways of displaying this data as there are actuaries doing it. This is the display I have used for many years. It's sort of been worked out to be sort of understandable by accountants and so forth who end up with the things.

The first grouping of values there are really pension time methodologies. For those of you who are not familiar with pension-type things, you remember ever going through what a normal cost was. There is no simple and one-minute answer what normal cost is. There are a number of different pension methodologies, using entirely different calculations, that are called the same thing. We will come back to that in a minute.

But for now, line A represents the value that we are going to project from the active work force, future, forward in time. Conceptually, that value contains all of the claims that are ever expected to happen from this work force. Just as a pension valuation will have a total present value that is the projection of all pension benefits for the work force.

QUESTION: Is this future claims for --

MR. BRISCOE: These are distinguished from everything below them by the fact that they are future claims. No claim -- none of them have happened yet. They will start from the valuation day to day and go forward. Those claims are projected out with whatever benefits are attached to them, and everything is present valued back to a number. Now, that five-million-dollar number is not used directly anywhere further, but it's there to show you the magnitude of the projection that's been made.

Conceptually, in doing these things -- again borrowing from pension methodology -- we are projecting claims from the work force that's here. We are not going to make any assumptions about new workers coming into that work force. If the work force is 1,000 people today, you are simply going to extrapolate the claims from that 1,000 people. If they hire another 100 people next year, then those new hires will be recognized next year. This avoids making a whole another level of assumptions as to what the future operations level of some particular organization will be. But we do recognize new hires. We simply do it in the year they come in.

Lines D are a valuation of the reported claims. This is true casualty projection. You can do this any way you would normally project them, and should, obviously. When we are dealing with very large lifetime occupational disease claims, federal Black Lung claims or so forth, we have tended to steer away from trying to do average claim calculations here. And at least in my practice over the years, we have simply gotten a data base of each claim and run the claim out, life annuity, on its own merits.

It's pretty easy to take a left turn and try to compute an average cost for claims that have a high possibility of cost levels kind of thing, but you can't do that. You can value claims any way you would normally value them. Line D is a standard casualty projection. You are stopping as of the valuation date and dividing claims into accident years in a fairly normal manner. You should keep in mind there that in an accident year, for an occupational disease claim in workmen's compensation, is quite different than an accident year for a claim that is the result of a real accident.

By convention, through some other decisions that were made in the seventies, and earlier, occupational disease claims are assigned to a policy year/accident year based on the last day the claimant

worked. That's a very artificial construct. In some ways you have to take claims and look at them in other ways to make sense out of them. It takes a little looking at. You don't have an accident here. In almost anything we are talking about here, we are not going to be talking about a claim that happened on a particular day. It was filed on a particular day, the person last worked on a particular day kind of thing.

IB&R, same thing. Normal casualty methods can and should be used, although the biggest variable in IB&R here is not, perhaps, trying to do a triangle, although if you have enough claims from a wide enough group, triangles will make sense. But the first thing that I have always looked for, in terms of IB&R, is that list of who last worked. Theoretically, if an employer had no one leave his work force last year, there would be no claims from last year. So, IB&R is a function of all the normal delays that claims go through.

Occupational disease claims have even more delays than normal claims. But it is also a function of the number of people who could be an IB&R claim. It's relatively rare for a large employer to have no one leave the work force, but it's not infrequent these days to see very few people leave from one year to the next.

QUESTION: What about someone who left this particular employer two years ago when somebody else had just got laid off?

MR. BRISCOE: Well, there is an interesting -- To some degree, that's going to depend -- How you treat those people will depend on what exposure you are trying to deal with. By example, from the coal industry, if a coal company lays off somebody today, and that person goes to work for someone else, one of two possibilities has happened: He either goes to work for another coal company, in which his claim will probably be against that coal company, or he went to work for a local gas station. And if he waits three years and files a claim, it's still my claim.

I have never been particularly successful in finding out where people went, although I have run the exercise a couple times in certain cases. But having some idea about where people are going, is helpful. In the coal industry, it's been easy for the last four or five years. Since no coal company has hired anybody since God knows when, to speak of, you just assume that they have not gone to work for another coal company.

If you were to be dealing with some other occupational diseases, then it might become very important where people are moving to. If people just transfer from one company to another in an industry, you may be getting rid of claims. If they go out of the industry, but they still experience, even theoretically, the same exposure, you may still get rid of them. If they go to somewhere where the exposure can't be present, then the claim is going to come back to the employer.

So a fair amount of scoping around to see what you are dealing with, who you are dealing with, what the medical exposures of the problem are, is necessary here. There is a handout here that might allow you to catch up.

Having made a projection of future claims from the work force, having valued all the claims we know about and can reasonably project are IB&R claims, we then go down and pick up the amount of money that's sitting in the plan -- it's called a plan, for lack of a better definition at this point -- which conceivably could be real money, although in my experience so far, that's relatively rare; or likely it would be a reserve on the book of the self-insured employer; or if you are in an insurance environment, it might be premiums sitting there, accumulated in some way.

We then will calculate how much money we don't have, basically. The unprovided liability. Keeping in mind that all of this are present values except the full provision itself. Having calculated how much money is unprovided, as of valuation date, and keeping in mind that there is absolutely no intention here to be fully provided, except at some far future date -- and the whole idea of this is to accumulate money over time to build a fund over time -- we then are going to calculate an amortization of that number.

And now, I'll go back to some pension stuff here. We take those $5 million worth of liability, we have worked out a methodology to come up with an annual cost of the future part of that liability. We have divided $5 million in two pieces. And these numbers I just made up, they may not quite make sense, but we divided this in two pieces. We divided it into a piece, the past service liability that relates to service that's already happened between the date of hire and today.

We have related -- we have the rest of the liability to an annual budget, an annual level cost, which could be level, or it could be other things, depending on the cost methods. We will pick that up later in the discussion. We are only going to count the past service part in the same bucket with our claims and come down to the unprovided liability. Then we are going to take that amount of money, and we are going to evenly, levelly, amortize it at interest over some future period. That future period can be many things. If it's a coal company, we've usually chosen to amortize it over the remaining life of the mine. We have 20 years of coal here.

However, there are other things. You can very rationally amortize it over the average remaining work life of the population and the value, which probably are within a 15 or 20-year span too, at a very abnormal age distribution. You might - I have done this in the past -- amortize that over a contract period. You are selling coal, and you've got a contract to sell it for 10 years. You are making widgets, and you've got a

contract to sell all the widgets you can make for 10 years. You don't know whether you're going to make anymore widgets after 10 years.

You pick an amortization period that makes sense, from a business perspective, whoever you are dealing with. That gives you an annual cost for that element, and you pick up the annual cost and the normal cost element, and you have a beginning of your plan cost. And you may stop there. If you are actually putting cash money in a place where you can watch it grow with interest, that's where you would stop.

If, as in most cases -- at least in my practice so far -- the self-insured employer is simply establishing a reserve on his books, then we have to deal with all the interest caught up in this present valuing. And to do that, we have to begin imputing interest as a cost, each year, to come to the end-of-the-year cost.

Let me go on -- I know everybody has got some questions about this, and I am going to try to fill in some of the gaps. And then at the end I am going to leave time to talk about all of this.

For those of you who haven't been around pensions too much, we have a concept here of something called an actuarial cost method, which is a very complicated beast. There were many, many of them, if you go back 10 or 15 years. From back about 20 years, almost every pension actuary had his own favorite. And he either took one from somebody else and bent it around to his own devices, or invented a whole new one. The terminology is not very standard. It's getting much better. If you pick up a recent pension textbook you'd get a much better explanation if you go back a decade.

But, basically, the first idea here is, there is no -- we don't have to use one. In the casualty side of this, we are inventing this from scratch. There are no rules yet. Doesn't mean there won't be some day. But, at the moment we are free to do almost anything. In many cases, the decision that's been made here is to not use a formal actuarial cost method. To simply take the present values that you collected -- active lives, claims, IB&R -- lump them together, levelly amortize it over interest, over whatever period you chose. Probably half the Black Lung valuations that have ever been done, have been done that way, kind of thing. And in many cases it's a good idea.

It's always a good idea to simply pick a simple level amortization if the period that you are trying to fund this over is fairly short: five years, seven years, three years kind of thing. In order for any other actuarial cost method to make sense, you've got to have a fairly big span of time out there to pick a pattern to go with.

The other two ones that have had any serious use, in terms of formal actuarial cost method so far, is what's called the entry age normal cost, which used to be the most common pension methodology. And today we've got something called unit credit. I'm not going to really try today to go deeply into either one of these. They are a sort of a world unto themselves. But what we are really talking about here is how you take a benefit, that's eventually going to be paid, and what rationale you use to spread it over somebody's working life.

Essentially, entry age normal cost looks at what the benefit is going to be when it starts to be paid, what's the value of the claim out there 20 years hence. And then divides that up evenly across every year of service for any individual. When you get done doing that, you begin to see patterns emerge that reflect the ups and downs of the population. If the population is leaving rapidly, that pattern will be different than if they are not. If the age distributions are different, you will follow those.

Unit credit is now becoming a mandated actuarial cost method for most pension plans, pension reporting, reporting stuff to regulators in pension. Unit credit attempts to say that every year of service is earning X amount of benefit. That works real good for pensions because pensions almost always work that way.

In what we do here, it's a forced construct to use unit credit. Deciding how much of a benefit is going to attach to each year of service for a claim, when only five percent of the population is going to get it, ends up being a very artificial kind of assumption. I don't recommend it.

The reason I put it up here is, that as the regulation of pensions gains further and further hold out there, eventually these kinds of valuations are going to be presented to accountants and auditors, and the only actuarial cost method they have ever seen is unit credit. So, sooner or later unit credit is going to have to get reconciled with, or do it our way and call it unit credit, something that's going to bring it together. It hasn't happened yet, but I foresee it in the future.

Since the purpose of all of this is to build a fund over time, how you do that is pretty essential to the whole thing. So far, in the broadest application of what we are talking about here, which has been in Black Lung, most of the coal companies most of the time have opted not to really fund this. In some cases they didn't have the money, some cases they had better uses for the money. But in most cases so far we have seen this go on the books as a book reserve. Now, that's got advantages and disadvantages.

Obviously, the interest rate becomes a driving force of what the annual cost is after a while. On the other hand, you don't have

to go chase around what the value of the assets is. So far, there's not been a lot of the -- In pensions, a fairly large amount of time in doing one of these things in the pension plan is to figure out what the real value of the assets is this year. We haven't had to do too much of that so far, but in other applications where money has been put down, that might happen.

It would be nice, and I spent a lot of time back in the seventies and early eighties trying to deal with situations where you could put this money in a tax-protected place. In Black Lung there is a very specialized trust that Congress allowed years ago, that allows you to put Black Lung money aside and get it protected from interest taxation over the years; keep the accumulated interest earnings. It hasn't been used a lot, because it's irrevocable, you can never get the money out.

It may be possible to invent some insurance applications where some elements of tax protection and protected accumulation happen, but it's difficult. If an insurance company has got this money, they don't pay taxes on it. So, in many, many cases the theoretical goal that everybody learned in MBA school, that you are supposed to figure out how to get this money in a tax-protected place, is going to be a very difficult goal to attain.

However, in my experience, generally, the employers who have this problem -- occupational disease, or whatever, and some of the other problems we will talk about in a minute -- are generally employers who don't pay a lot of taxes anyhow. And tax protection becomes somewhat of a non-issue kind of thing. It will obviously float up and down with whatever taxes corporations are paying at the point that you are dealing with.

One of the entry spots to this, when you begin talking about this to somebody, is to begin to talk about what's the money going to do, where is it going to be, kind of thing. Obviously, eventually, the claims, they have to be paid for in cash. Where does this all go? You might want to start with occupational disease before we go beyond it.

I would say that this methodology has been successful in the coal industry for Black Lung. There are very few coal companies today that don't know where the money is that they are going to pay all the Black Lung claims from. Black Lung has been an enormously unpredictable difficult-to-understand and get-yourarms-around problem kind of thing. The methodology has both given coal companies a predictable -- I won't say level, because it certainly hasn't been level, but at least a cost that can be smoothed out between the big ups and downs.

There are many other occupational diseases floating around out there. Very few of them have emerged yet. Those of us who have studied it, don't know when some of them are going to emerge, kind of thing. If workmen's compensation, in general, wasn't in such a state of disarray with high costs and unpredictabilities,

some of these occupational diseases would have already emerged. But for Black Lung, there probably would have been legislation in the U.S. Congress to pick up a number of other occupational diseases floating around in there. How long will Black Lung continue to hold down congressional scrutiny of other situations, impossible to predict.

There are occupational disease breakouts in various states, in small pockets, among one or two employers kind of thing. It's out there. It's very difficult to get your hands around it. We may never have a situation where one single occupational disease spreads so far so widely as Black Lung did. It hit every coal company in 30-odd states kind of thing. I don't know that we will ever see one single disease become a major problem to a major industry.

What is a major problem across almost every state and every industry, is regular workmen's compensation. And I think that one possible application of the methodology that we are talking about here, will eventually be to deal with some of the problems in workmen's compensation that are not really occupational disease but have some of the same characteristics. One of them is pretty obvious, and that is cumulative comp.

Carpal tunnel syndrome is probably the best known of these things; there are others. But here is a disease that takes a fair amount of time to build up: five, seven years, ten years. Doesn't happen overnight. When you get the claim, you again have a claim that really doesn't have an accident date. What year does it belong to? Don't know. How should we pay for this, when maybe we ought to be spreading it over something other than just recognizing it as a point claim.

The biggest item here in regular workmen's comp is soft tissue back injuries. These are back claims where, yes, there is an accident date. There is an accident date because the claimant had to put one down on his application for the claim. The safety people had to put one down in their first reported injury. So there is an accident date.

The reality behind soft tissue back injuries is, that most of our backs begins to hurt when we are in our forties or fifties. If we are in a heavy industry job, or even a light industry job where you have to pick up a box of copy paper some day, you're going to hurt your back. The fact that your back already hurt for the last eight months, gets lost in the structure of workmen's compensation.

But, the problems with these, and I think for those of you who have struggled with trying to figure out what claim frequency and claim severity in workmen's comp may be, a great deal of the problems in regular workmen's comp costing, arise from the fact that these claims are somewhat age dependent, or really age dependent in many cases.

You can have a work force that's made up of 20, and 25, and 30-year olds who have virtually no back claims at all. The ones they do have, the few they do have, are real accidents. Somebody really did bend over and snap something, or break something, or bruise something. So they can be age dependent. The methodology here recognizes age dependency and puts up the number in the right place as people advance through the work force. They also tend to happen at the end of the careers.

Now, the end of a career may not be when somebody retires. It may well be when they get laid off, or when something else bad happens to them, a divorce, or family problem, or something else; the plant is going to move kind of thing. There are lots of different ends of careers.

But the fact is that really serious soft tissue back claims, the ones for which there is no medical evidence of something being broken, or bruised, nothing you can ever see on X-ray, many, many of these claims are related to a life crisis. Many of those life crises hit later in the age groups of forties and fifties rather than earlier. So, to the extent that we could spread out, and smooth out, and recognize age differences coming at us in future time, there may well be an application for this methodology there.

And, lastly, I would suggest that there are other casualty exposures where, recognizing that something is going to happen in the future, even though it hasn't happened yet, may be useful. The one example I put in the write-up here is product liability claims. It may well make more sense to spread them over the life of the product rather than the -- which is going to be ten years in the future, five years in the future, or whatever. If you put your mind to it, you can think of other examples of this kind of thing.

Let's talk a little bit about -- Let's go back a minute to insurance underwriting because I think there is a useful place here. How can you use this to look at an employer and decide whether you want to write the big workmen's comp policy or the big product liability policy? Well, in one sense you don't care what his cost is going to be four years from now. That's certainly true. You are trying to come up with only the cost of the accidents you are going to insure for one year or whatever. But you do care about whether he has had a lot of these claims, whether there is a demographic hump in his work force that is going to produce a lot of claims next year kind of thing.

So the exercise here does two things in underwriting, in my experience. Number one, it gives you a fairly good idea of what you are about to insure, even if you are only going to insure one year. Second of all, it allows you to develop a cost for that employer that he can actually use. And we did this in the coal industry, and we are still doing it in some degree.

Even though he is paying an insurance premium to you, and no matter what you are going to do with that premium, how you are going to adjust it, or anything, you are also giving him a cost that he should attribute to whatever he is selling or producing. So you give somebody something that he otherwise wouldn't get. It also tends to formulate a relationship between the insured and the employer. There is a plan here, the plan is multi-year, therefore you have something going to deal with competition for somebody else who might try to insure him.

A couple of things that we sort of need to keep in mind here -- let's go back to assumptions for a minute -- making o casualty projection of how much a set of losses are worth. An obvious goal is to be very right, as right as you can possibly be. Here we make a lot more assumptions. We have to deal with the future of a work force, the future of what are workmen's comp benefits in the state going to look like 10, 15 years from now kind of thing.

We don't need to be as right, at least in the active lives part of the valuation. You do need to be as right as you can in reported claims. But you don't need to be as right, because you are going to adjust this year by year. Start off with a claim frequency. If you can get a lot of data about the claims that are going to happen from somewhere, that's great. But if you can't, then you make your best estimate of what the claim frequency is. One year later, you either have a few claims or you won't. Five years later you will have a few claims, and you will begin making adjustments.

It's a self-adjusting process, so that five or ten years out you have replaced a lot of assumptions with a lot of reality. When you get to your goal, the 20 years -- for the sake of argument - hopefully you have adjusted it down and kept it to be correct. So it has a different connotation in terms of making assumptions, which I think, logically, to do two things: It allows you to be more adventurous in thinking of all the possibilities. My philosophy has always been that we should at least recognize every major possibility in the future even if we don't think it's going to happen much. If it does happen five years out on time, having written one paragraph in a report saying this might happen, allows you to introduce a large number that came from that source much easier kind of thing. So it allows you to plan some wild things sometimes.

There have been parts of the federal Black Lung program that I, five, or 10, or 15 years ago, said I think this might happen. A few of them have happened, and everybody scoffed. There have been a few I put in that have never happened, so I took them out a little bit later. But you don't need to be held to the same standard of making assumptions as you might for a much narrower valuation for just a small group of claims.

The other area, of course, is, that you are dealing with present values. This departs, in large measure from a lot of casualty work. In many cases, claims that have -- the same claim that's happening now, that you are trying to project off in the future, there have been some of them in the past. Whoever set the reserve on those may have simply come up with an undiscounted value. So there is quite a bit of rearranging of people's mind-sets here in, perhaps, dealing with the difference between some undiscounted values, which might be quite large.

In the Black Lung area here, in some state programs we deal with undiscounted values as large as $600,000 and $700,000 per claim. It's a lot easier when you collapse them back down to a present value of $200,000 or $300,000. But it gets into some interesting conversation between what some claims department might have said the claim was worth a year ago and what you are now saying it is worth.

I would hope -- I have been in three sessions this morning. I think four questions were asked. I would hope that we have got some questions here. One of my old associates is sitting here, has been part of some of this work over the years, so, John, you've got to ask at least one question. Let's take some questions, try to open up the discussion here, and see where we can go.

QUESTION: Is there any way that these kinds of population compensates for the normal post-retirement medical benefits that would be associated with the people who end up with occupational --

(Tape 4E-1, Side 1, ends.)

MR. BRISCOE: First of all, if that benefit somehow crosses over to the liability benefits you are dealing with -- say workmen's comp claim, and so forth -- you need to integrate the two. As we move into formal recognition of post-retirement medical benefits, there will be integrations with workmen's comp and perhaps other kinds of things. Since those valuations, post-retirement medical specifically, are going to be done using the same methodology generally, it would be possible to integrate them, kind of thing. The --

QUESTION: (Inaudible)
is not normally done that way?

MR. BRISCOE: Well, we really haven't had too many integrations yet. Were we -- and I have done a few, but not many, yet -- but were we to do a traumatic workmen's compensation and an occupational disease workmen's compensation valuation, two of them, then they would have to be integrated because the same people who get back claims, may well get an occupational disease claim. So, you are really doing two of them, and then taking differences and so forth.

Medical benefits are going to be extremely interesting in the future. As cost containment builds up for medical kinds of things, there are going to be carve-outs -- workmen's comp does this -- if medical or the two integrate in different ways. So, I think there will be some fairly complex integrations. There may be some others I can't even think of, or haven't thought of yet. Integration will be important. Pension sometimes integrate with some of these benefits, and may in the future. Pension disability, certainly in workmen's comp, sometimes meet in time and space.

I guess the thought here is, that you can't do one of these in a vacuum. You need to be aware of the other benefits available to the claimant, and aware of how they work, at least in general terms. You may end up doing part of this, and some other actuary doing some other part. There may be a necessity for some communication kind of thing.

You may well have to educate the client that there is an interaction. I always walk around looking for interactions, and sometimes find them, kind of thing. You can sometimes look a little foolish if you don't look for them and the client finds them first, kind of thing. So, it's best to start asking questions.

QUESTION: When the tax people and the audit people are presented with ventures like this, they look on them favorably?

MR. BRISCOE: The auditors, in my experience, love them. They look just like a pension plan, from a gross perspective. They pick them up and do the same things they will do with the pension plan, and walk away pretty happy.

Tax people, the coal industry has been at this now for 15 years. Very few of them have tried to take any serious deductions for anything, but the few that I am aware of that have tried, have gotten away with so far. Not to say IRS won't wake up some day. I think it would take immeasuring decades before IRS picks this up, unless you are trying to take a zillion-dollar deduction. Then, obviously, it will be going to be picked up from day one.

For an occupational disease that hasn't really happened yet, but the employer wants to do something about it, starting today, and the number stays fairly low, I doubt -- no matter what the employer did tax-wise, I doubt that it would become a problem for a while.

Workmen's comp, there is no self-insured tax deduction. They almost got there in the early eighties, and Congress, the minute they saw the courts coming in that direction, yanked it away. I can't imagine that, with the federal budget deficit, that a formal self-insured tax deduction is just going to happen in our careers. Would be surprised.

The one case in the Black Lung area where a 501C21 trust is allowed, that does provide tax protection, it was snuck through Congress, they didn't know what they were doing when they did it. If a lot of money ever got deducted out of that, Congress would probably wake -- Treasury would wake up and take it back. That hasn't happened yet. Taxes, as I say, are a sort of non-event here, kind of thing. Part of this cost --

QUESTION: (Inaudible)
insured. Not if the real insurance company decided to --

MR. BRISCOE: If the insurance company, yeah. The insurance company has a problem here, and the problem is that you have a reserve for reported claims and IB&R which is the same as any other reserve for that, that you can have. If that's the deduction, fine. If that's got some rules about what part of it is a deduction, they are going to apply. If you are correcting a chunk of money over and above that as an active lives valuation, then it's not going to be looked at as too much of a deduction unless -- I have seen IB&Rs get pumped up year by year to cover that. Those things get caught after a while. But, for a couple years you wouldn't have any problem. Who is going to say what the IB&R is or isn't.

Over a long-term period, an insurance company has a great deal of difficulty protecting these kinds of funds. It's not to say that different things can be invented out there, trusts, and other agreements might not happen, but it will be a very difficult area to accumulate money tax-free in an insurance environment. It's not impossible, but there is no clear path to it either, kind of thing.

A question back there, or just --

QUESTION: Just a comment: First of all, I'd like to congratulate you on your knowledge of workmen's compensation insurance. I have been in it a long time. It's the kind of thing
(Inaudible)
The baby boom generation that's dropped between the
(Inaudible)
when the insurance investigators gain a lot of understanding of the
(Inaudible)
experience, and what they are going to experience, by looking at some of the demographic things you were talking about (Inaudible).

MR. BRISCOE: I very much agree with you. I have seen it in my own practice, we see more of it coming. Many, many of the large-scale problems in workmen's comp are really an age-driven kind of problem, or a termination driven. Louisiana had a mushroom cloud of back claims when the oil industry collapsed. It will take another decade for them to get them out of the

system. But it is pretty obvious where they came from. They were 35-year old back claims because these guys all got laid off.

I think this kind of methodology -- and I think it's important to note that there are many things you can do with this even if you are not presenting the results to the employer at all. Some of the valuations here -- I want to go and insure dry cleaners in state X. I want to go penetrate that market.

If you can gain access to some census data of average ages and age distributions of the population that you are about to insure, you can begin to run some of these projections and look at how claims might emerge. Maybe there is a big bump of claims coming in seven years, kind of thing. And that can lead to underwriting decisions: I am going to write for two years and stop, I am going to wait two years before I start, kind of thing. Not that it is an exact science, but there are answers laying in the age-related demographics of this that simply can't be discerned if all you are doing is focusing on the frequency of claims that have happened. It is especially true in occupational disease, but I think it's also true in back claims and other things.

One other area that I will point out here, that I think is also -- This more relates a little bit to individual self-insured employers. But, self-insured employers, keeping in mind many of them just got self-insured less than 10 years ago, are having immense difficulties in spreading the cost of workmen's comp, whatever that cost is, across their profit centers. They have all set up various allocation schemes that send dollars to the gain or loss of some manager, and there is a great deal of difficulty out there in the area --

Are we running overtime?

Voice: Yes.

MR. BRISCOE: A great deal of difficulty in trying to allocate that stuff in a meaningful manner. One big claim hits one profit center, everybody loses sight of the fact how is the claim reserve done, and like that way, or hell breaks loose. So, this offers a level mechanism, a levelling rational mechanism, for doing that.

I will stop, and thank you. I will be out in the hall if anybody has any other questions.

1990 CASUALTY LOSS RESERVE SEMINAR

4E-2: CANADIAN STANDARDS OF PRACTICE

Moderator/Panel

David J. Oakden
Tillinghast/Towers Perrin

Panel

Robert Potvin
The Wyatt Company

MR. OAKDEN: I am David Oakden, a consulting actuary with Tillinghast, a Towers Perrin company. Today, Bob Potvin and I hope to bring you upto date on Canadian Standards of Practice. As many of you will know, all companies licensed to transact business in Canada are required to submit an actuarial report annually. Bob Potvin will discuss this report from the perspective of the insurance regulator. Then I will discuss this report from the perspective of the CIA, vis-a-vis standards, and also from the perspective of a consulting actuary. In addition to the content of the report, Bob and I hope to cover in this brief session other items that are of interest to valuation actuaries in Canada.

Bob Potvin has many years of regulatory experience in Canada. At the present time he is a consulting actuary with the Wyatt Company. Prior to joining Wyatt last year, Bob was Chief, Actuarial Affairs, with the Office of the Superintendent of Financial Institutions or OSFI. Unlike the U.S.A., we have a central regulator in Canada, and OSFI is responsible for the solvency regulation of most Canadian companies - in fact, the vast majority of them - and OSFI is also responsible for the solvency regulation of all foreign insurers licensed to transact insurance on a branch basis in Canada. It is also possible to have a provincial license in Canada, and most provinces follow OSFI's lead very closely. Therefore, I think it would be fair to say that OSFI sets the tone for insurance regulation in Canada.

At OSFI, among other things, Bob was responsible for reviewing the actuarial reports, and for preparing a document from OSFI describing the guidelines of these reports. I am sure that these guidelines are going to form the basis of Bob's remarks this morning.

Bob.

MR. POTVIN: Thank you, David. I notice you covered the first half of my speech.

If I can go very quickly into the second half here: As David mentioned, I was with the regulators for quite some time, so what I want to do today is simply to give you some insights on how the standards that were set up in Canada came about during the period. A lot of it was based upon what was done previously on the life insurance side, and subsequently on the pension side as well.

The federal regulators have long wanted to have casualty actuaries certify in the property and casualty side because it would round off, essentially, all of the insurance field. But, obviously, because of the lack of numbers of qualified actuaries, this was put off until they felt it was appropriate to act on it. This was finally done in 1987. With the amendments to the Federal Insurance Acts that there would be a requirement for certification for all insurance companies from a qualified actuary.

The term "actuary" is defined in the legislation in Canada as a Fellow of the Canadian Institute of Actuaries. In 1965 the Canadian Institute of Actuaries was incorporated by a federal act. Its principal role was to regulate the standards applying to all actuaries in Canada, and subsequently most legislation, both at the federal level and at the provincial level, was changed to incorporate that definition of an actuary and standardize it in that way.

So in 1987, all insurance companies, including all property and casualty companies were expected to have certification from an actuary. But even then, there were not all that many casualty actuaries around. There was therefore a five-year interim period where reserve specialists could also be used. The reserve specialists would have to have the approval of the superintendent.

As a general rule, the reserve specialist could certainly be approved very quickly in any company that had very little long-tail business. For those companies that did have long-tail liability and could not get a full fellow, as associate of the Casualty Actuarial Society would suffice. There were various rules to make sure that the person doing the certification did have the qualifications to do it.

So the five-year transition period ends in 1992, and unless the Acts are changed in some way or other, every P&C company in Canada, will be required to obtain a certification by an actuary.

Now, as David mentioned, there is a dual jurisdiction in Canada: The Federal Government supervises all companies incorporated at the federal level, as well as all British and foreign companies that operate in Canada on a branch basis. But

the provinces can also incorporate companies. In particular, Ontario and Quebec have passed similar requirements for certification with a similar five-year transitional period. So we are all more or less in step

The interesting thing is that, with the provincial legislation in Ontario and Quebec, it meant that most companies would have had to get certification anyway, even if the Federal Government had done nothing. All insurers need a licence to transact business in a province, and that licence would have been subject to these requirements.

Having determined what we now want actuaries to do, the question then became who is qualified to do it. As I said, legislation was very simply changed to say that an actuary is a Fellow of the Canadian Institute of Actuaries. What that did was to say to the CIA, "You are responsible for making sure that the people who sign these things are qualified to do so."

Now, on the surface there is something like 1500 actuaries in Canada who would be qualified to act under that definition of the legislation. But most of these people, obviously, had their background in life insurance or pension, and they would probably be loathe to get involved with property and casualty especially if they read, I think, Article 3 in the Standards of Ethics that you have to feel qualified to do it before you accept to do one of these jobs. So, even though there is a large number of qualified actuaries in that sense, there is still a very small number of FCIAs who would be really willing to work in the property and casualty field at this time.

Nevertheless, the regulators succeeded in pushing on to the CIA, and quite properly so, the question of determining who is qualified to do it, and how to regulate it, and how to make sure they do it properly.

The next thing, then, was to determine, what is it that we want them to do. The first issue had to do with the form of the opinion. The CIA has recommended one form of an opinion which dates back, I think, at least a few years before the 1987 amendments to the Act.

The Act itself determines a certain form of opinion. But the big difference is this: You can either ask for a certificate which basically says, "I'm an actuary, everything is all right, trust me." Or you can say, "Give us a report. This is your opinion? Justify it." And the full report, then, would go through into all the details, list the assumptions, and support them. And the federal legislation has definitely opted for that second option. Again, this is nothing new. It was required on the life side for many years, and so it was just a question of using that same pattern and applying it to the property and casualty area as well.

Actually, when certification is required for non-actuarial users, the full report probably is unnecessary because the user is going to have to trust the actuary anyway. But if the user is sophisticated enough in actuarial matters -- and certainly the Canadian regulator qualifies in that respect -- then the full report is preferred.

The full report can add much more information to what the regulator has than what he gets out of the annual or the quarterly statements from the companies. So it is possible that the report may never be challenged in any way, but it may add a lot to the work of the regulator in various other fields.

The next question had to do with the actuary's authority in delivering his opinion. There are basically three approaches: The first one is where the actuary reviews what the company has chosen to do, and then reports on whether or not it is acceptable. A second level is where the actuary actually determines the reserves that the company is then obliged to use. And then there is a third level, a higher level, where the actuary not only determines the proper reserves every time the financial statement is prepared, but he constantly reviews the company's financial position and future prospects to ensure that it will remain solvent.

Now, under the first approach, we are essentially dealing with an actuarial auditor to a certain extent. His opinion will state whether or not what the company has set up as a provision is at least equal to a proper provision. If he states that it is not, it then becomes the regulator's problem to deal with the company on that issue. However, most companies would prefer to change the reserves than to have the actuary produce a negative opinion. But at least the intent is that the actuary reports on what the company has done. This is the approach that was adopted, at least for the moment, for the property and casualty companies.

The second standard is where the actuary actually determines a good and sufficient provision, and the company is obliged to use it in all of its statements. This is also in the legislation, but it applies to life insurance companies. And because this is seen as a higher level of responsibility, the legislation goes further and requires the appointment of what is known as a valuation actuary.

The concept here is that a company, the Board of Directors of the company, must appoint the valuation actuary. The valuation actuary reports directly to the Board. He determines the good and sufficient provisions. If the valuation actuary is replaced by the Board of Directors, notice must be given to the Superintendent of Insurance, and so on. This second approach is what has been used, I guess, in the last 10 years or so, in terms of life insurance valuation. Probably in the long run the same thing might occur in property and casualty, but that would be for the future.

Now we have a third one. The CIA has proposed recently a new approach in Canada that of the appointed actuary. And under this concept the actuary would have far-ranging responsibilities to ensure ongoing solvency of the company including, when necessary, reporting the company to the regulators. While this proposal has yet to be discussed at length with all the interested parties, it does coincide with the regulator's desire to introduce in the legislation some whistle-blowing requirements on the part of the actuary. And I think that David will talk a little more at length on that principle.

Now, there are other standards of practice, and these include the usual principles that we see in the Statement of Principles published by the Actuarial Standard Boards, Casualty Actuarial Society, Canadian Institute of Actuaries, and so on. But, essentially, loss reserving is really a scientific discipline based on statistical methods. And, so, while these principles really become guidelines for appropriate scientific methodology, rather than a clarification of generally accepted conventions, To that extent they are not seen as standards as much as principles of procedures.

Having determined what the actuary should do, and how he should do it, the next question was, what should we look for in the report itself from the actuary. It's nice to have uniformity, and it would be nice if all the actuaries could report on what they are doing in exactly the same way. It certainly would make the regulators' work a lot easier, but obviously this can't be done.

So, while trying to allow a maximum of flexibility to the actuary in how he approaches his work, and how he reports on it, a notice was put together which was meant to indicate what we expect to see somewhere in the report, and to suggest some way of presenting it. The notice is distributed to all the property and casualty companies. It's the same sort of a system that we have used in the life side in the past. It is sent to all property and casualty insurance companies, as I say, and I believe the one for 1991 is due to be mailed out in two or three weeks. If you would like a copy of the notice for 1991, you can leave me your business cards and I will ask my friend at OSFI to make sure you get one. Anyway, the notice, then, is to indicate what we are looking for without unduly restricting the way the actuary makes his report.

For property and casualty insurance companies, the actuary's opinion is expected to refer specifically to the reserves that appear in the annual statement. He is expected to express an opinion as to whether or not those reserves are at least equal to a proper provision. The expression, "proper provision", is not defined by legislation.

On the other hand, in the life insurance section of the legislation, it says that the actuary must determine a good and

sufficient provision. But again the legislation does not define what a good and sufficient provision is. The CIA, however, says that a proper provision is more than barely sufficient, it is a good and sufficient provision. So at least the CIA tells us the two terms are the same. But even the CIA doesn't define for us what a good and sufficient provision is either.

And perhaps the problem is in the fact, at least for property and casualty companies, that we have yet to define what constitutes a proper provision for adverse deviation. And because of this lack, the regulator in Canada is quite reluctant to allow for the discounting of reserves. He has indicated that he is not against the principle, as such, but he would like to see proper provision for adverse deviation developed first, and then the discounting at that time would be appropriate.

Finally, the regulator requires in the report that the actuary consider explicitly the recoverability of the reinsurance. The actuary is not expected to do a full valuation of the reinsurer, but he is expected to be aware of any problems of collection of the reinsurer's balances and to take credit for that reinsurance which is reasonably expected to be collected.

Finally, this leaves one last aspect, and that's the review of the reports themselves. When the actual reports are received by the federal regulator, they are reviewed to make sure that they qualify under the legislation, that they have respected all the requirements, and so on. They are also used extensively, either by the analyst who has to deal with the company on an ongoing basis, or by the examiner at the time of the examination. And, in fact, if there are problems with data reconciliations, quite often it is at the examination level that these are discovered.

But the reports in respect of certain companies, those that cause concern, those that may be having some difficulties, are also subject to a full actuarial review by the actuarial staff of the regulator. And the idea here is not so much to come up with a second opinion, which will almost always be different than the first one, but rather to assess whether or not what has been received is acceptable.

Now, the standards that should apply by the reviewer have to be a little lighter than what we would expect from the valuation actuary himself. There should be a range which makes the report and the recommended reserves acceptable. Still, the regulator does not simply accept the report as such, but wants to make sure that in certain companies and certain circumstances he is satisfied that what the actuary has done, is quite acceptable.

If it is not fully acceptable, but it is a mild difference of opinion, then discussions would be held with the actuary, and amendments at the next valuation might be suggested. These might be cases where the actuary is expected to expand on certain aspects of his valuation or consider alternatives to his chosen assumptions.

But in the extreme case, the report could be rejected by the regulators. This might be caused by serious flaws in methodology, or assumptions that are unacceptable, leading to results that are totally impossible to accept. In that case the regulator would probably seek a third opinion and act upon the third opinion. Naturally, when that does occur, it means that the regulator has serious concerns about the company and now has serious concerns about the actuary as well.

The whole idea here is to involve, in a proactive way, in the regulation of financial institutions in Canada, the other experts that are part and parcel of the whole process. It is meant to take into account what the actuary is doing, what the accountants are doing, and to make them part of a dialogue on the continuing involvement, on the continuing review and assessment of the company itself. This reflects the philosophy of the Canadian regulator, at least to take a proactive role in this area.

I hope that explains what we have tried to do in Canada. Thank you very much.

MR. OAKDEN: I'd like to now spend a few minutes talking about the standards of practice for actuaries in Canada.

(Slide 1): These guidelines are contained in the document entitled Canadian Institute of Actuaries' or CIA's Recommendations for Property and Casualty Insurance Company Financial Reporting for the rest of this talk I'll simply call them the Recommendations. Since many of the U.S. standards are similar - in fact almost identical to Canadian standards - what I would like to do is concentrate on the small number of standards that are perhaps a little different from the U.S.A.

(Slide 2): This slide is an overview of how the recommendations were put together. Basically, the first version was a cut and paste of the CAS principles for loss reserving, and the CIA standards for Life Insurance Financial Reporting.

To that cut and paste a few minor pieces were added, and it is really those issues that I will be talking about for the rest of my five or ten minutes here. Before talking about that, I'd just like to give a brief history of the recommendations.

(Slide 3): The first draft of these recommendations was put together in 1984, and as some of you go through the sections that ought to be identical to the CAS recommendations you will notice that they are a little different. The differences arise because it was based on an earlier version and we just have not yet updated all the sections consistent with the CAS, but the intent is that the two are basically the same and have the same meaning.

In 1986 Council approved these recommendations for a trial period of one year. The intent in 1986 was that after a trial period of one year, these recommendations would be given final approval by Council. That would occur in 1987 which roughly corresponds to the passage of the Act that Bob just referred to.

Well, in 1987 it was clear that there was not unanimity or even a consensus among practising actuaries in Canada about these recommendations, so the draft period was extended for an additional year. In 1988 we still hadn't reached consensus, so the draft period was extended for a further year. And in 1989 we still had not reached consensus, however, council decided there was sufficient agreement and approved the recommendations.

I was on Council when the recommendations were approved, and as a person who had served for many years on the committee that developed the recommendations, I supported them wholeheartedly, in fact spoke in their favour at Council. However, after the Council meeting I was met by a lynch party of actuaries that weren't too happy with the recommendations. Clearly there are several Canadian actuaries that have concerns about these recommendations. Their main concern is that these recommendations put significant onus on the actuary, above and beyond what a U.S. actuary would have to face.

(Slide 4): First, just a few quick definitions. Because of legislation and usage in Canada, a few words are a little different. The recommendations talk about claims liabilities, not about loss reserves. They mean more or less the same thing. In Canada, however, claim liabilities are calculated net of subrogation and salvage.

Loss Adjustment Expenses: We tend to talk about claims adjustment expenses. We use external and internal instead of allocated and unallocated. Once you get those things straight, it isn't too difficult.

Another term, policy liabilities covers liabilities and assets related to the policies in force. Namely, unearned premiums, premium deficiency and deferred policy acquisition.

(Slide 5): Conformity: If you do not feel you can follow the recommendations, then you are required to contact the Committee on Property and Casualty Insurance. I served as chairman of that committee for a period of time, and I was contacted, I think once or twice, by some U.S. actuaries. I think in all cases I was able to assure the actuary that what he was doing was in keeping with good Canadian practice.

I would urge you, if you feel you cannot follow the recommendations, to contact the Chairman of the Committee. The current Chairman is Bill Weiland, and you can find his name and number in the CAS yearbook.

Documentation: The recommendations require that members compile and retain adequate documentation. Bob Potvin has spoken at length about the report that the regulators require. And as a practice, all actuaries in Canada put this documentation together in a report which is submitted to OSFI along with the Annual Statement.

(Slide 6): Data: The one point here that I think is important to make is that the recommendation states that it is the member's responsibility, i.e., the actuary's responsibility, to ensure that the data is reliable and sufficient. That does not mean that the actuary has to do an audit on the loss data that he is looking at. In fact, there is an understanding with the Canadian Institute of Chartered Accountants that says that we can rely on their work, and they can rely on our work.

Therefore, I think as a minimum, you can rely on the audited financial statements. But I think you should balance to the "audited financial statement" the paid and the outstanding losses for the current year. If this is done on a repeated basis, then one can ensure that the entire triangle at least balances. Typically you would look at loss ratios in your report, so the earned premiums and the unearned premiums should also be reconciled to the audited financials. You must do more than rely upon the triangles that you are given.

Also, formal communication should take place between the actuary and the auditor. Guidelines for this communication are contained in a booklet put out by the CIA, on the role of the actuary and the auditor. You should make it clear to the auditor if there is any aspect of the dat that you wish to have him audit.

Also, in addition to the points I have on the slide, I think that a reasonableness chick is absolutely essential. If the data does not appear to be reasonable, it's up to the actuary to follow up and to document that follow-up in his report. I would urge you to be especially careful on this particular point. I think the onus here is fairly significant.

(Slide 7): Part 3 - Considerations: I'm not going to spend any time on this. It's virtually word for word out of the CAS Principles.

(Slide 8): Part 4 - Policy Liabilities: There are a lot of things that you have to look at in Canada that you don't have to look at in the United States. With the unearned premiums, the major consideration is not to verify the calculation of the pro rata unearned premium, but to represent to the regulators that the unearned premiums exceed the expected losses on the policies in force.

Deferred Policy Acquisition Costs (DPAC): That is an area in which there is some overlap between the auditors and the actuaries. The way I've looked at that is that the actuary is responsible for the recoverability, i.e., that the loss ratio is sufficiently low to permit the deferred acquisition expenses to be recovered from profit, and the accountant is worried about the deferrability of the expenses. In fact, I don't spend any time worrying about whether expenses are deferrable or not, as long as the total DPAC is recoverable from future profits.

There is a note on the bottom about investment income. The memo that Bob talked about suggests very strongly that all items be calculated on a non-discounted basis, which I believe would also apply to deferred policy acquisition expense. This is somewhat

contrary to GAAP as it is practised by most accounting firms in Canada, and therefore in the calculation of deferred policy acquisition expenses, I do a calculation of losses on a discounted basis.

However, I should point out the next item is premium deficiency. And by premium deficiency I mean an additional provision if the expected losses exceed the unearned premium. Premium deficiencies are not expected to happen very often, but in compliance with the regulations, I believe you cannot use investment income to offset any premium deficiency. However, if you are using investment income on your deferred policy acquisition expenses, and if the auditors agree, it may be possible to increase the DPAC to offset the premium deficiency. However, the premium deficiency does get into your statutory tests and affect your solvency ratio, so that calculation is important.

Any reinsurance rate adjustments, sliding scale commission, or contingent brokerage commission are items that you have to look at. I think these items occur on virtually every company statement. In addition any other item which depends upon the loss experience of either the gross or the ceded, business is subject to review by the actuary. In the particular circumstances, you should be careful to make sure that you have covered any policy provision that would have material impact on the company.

(Slide 9): Here we come to Part 5 - Methods and Assumptions: You have to disclose the impact of changes in methods and assumptions. I am not sure, precisely, what it means to change your methods and assumptions. However, if you change from a paid development method to an incurred development method from one year to the next, in my opinion you would have to disclose that. I personally disclose the impact of changes in my report to report development factors. I don't think that it's absolutely necessary, but it does not hurt to provide a little extra information to be on the safe side. You should note that if you change methods, it should be disclosed; if you make any material changes in some of your factors, that should also be disclosed.

(Slide 10): Discounting: Now, perhaps, to get to what is one of the most controversial areas, but one that for the present time is still relatively simple: The recommendations of the CIA require that liabilities - that's both policy and claims liabilities - be discounted unless it is contrary to regulation. It is, however, currently contrary to regulation, and therefore the actuary doesn't have to discount. In fact, I guess if he wants to follow these regulations, he can't discount them. So the bottom line is, the situation there is pretty much the same as it is in the U.S.A.

I put Provision for Adverse Deviation on the same slide because I think these two items go together. The recommendations require that the liabilities be estimated on a conservative basis, or that they contain a provision, not necessarily explicit, for adverse deviations. The recommendations also state that this provision is added to the discounted reserves. Therefore, if the reserves are not discounted, the discount can be used to offset the provision for adverse deviations. Therefore, most undiscounted provisions will not require an additional margin.

There have been discussions between OSFI and the CIA about the discounting of losses and the provision for adverse deviation. I think the only prediction I can make is that nothing is going to happen this year. I don't know if something will happen next year. It certainly is not obvious something will happen, but I think that the standards for a provision for adverse deviation, have not yet been developed, and I think the time frame is such that it would be impossible to meet a deadline for this year.

(Slide 11): This completes my overview of the recommendations. I would like to conclude by discussing the CIA's appointed - or as some people call it, the anointed - actuary concept. This concept would apply to life and property and casualty actuaries, however, it has received a much better reaction from life insurers.

Before I talk about the reaction from property and casualty insurers, I will briefly outline the role. The role, which is virtually identical, for life and casualty is as follows:

- the appointed actuary be appointed by the Board of Directors, which gives rise to the name, appointed actuary;

- the actuary has the right of access to relevant records, accounts, and documents;

- the actuary submits a report in addition to his usual actuarial report, on transactions which could have a significant adverse impact on the financial position of the company. This report is to go to the Board of Directors. If satisfactory action is not taken, in the actuary's opinion, then the actuary must report this to the superintendent of insurance;

- in addition to commenting on the current position of the company, the actuary is required to comment on the expected future position. These comments should contain projections of future surplus levels as well as asset and liability projections.

As an example of the third point above, if you were the appointed actuary for a company writing $5 million in premium, with $3 million in surplus and a catastrophe potential of $10 million with no catastrophe reinsurance, the actuary would have to alert the Board of Directors to the fact that the company needed catastrophe protection on its business. If the company did not purchase catastrophe reinsurance, the actuary would be required to notify the superintend of insurance.

It is not intended that these reports, especially to regulators, would be very common. But it's there if something pretty serious occurs.

The main concern expressed, through the Insurance Bureau of Canada, which is the industry organization in Canada, was the report on the expected future position of the company. I think here that they were arguing, that property and casualty companies were quite different than life companies, and that the actuary really couldn't make any meaningful projections past December 31st. In fact, many actuaries in Canada supported that position.

I personally think that an actuary does have something to say about the direction the company is headed. I think that this item might be resolved if the time period is specified. I think that actuaries can make good projections for at least six months and provide important insights for a longer period.

When I mentioned that there had been a lot of criticism from the industry, the actuaries and the IBC are talking and I believe a compromise will be reached. Even if no agreement is reached on expected future positions, I think the first four points would enhance the role of the actuary very significantly and perhaps give the actuary, the support he needs to carry out what in some cases can be a difficult assignment.

(Slide 12): Just one last comment on a couple of other items. First, peer review. The CIA, as a policy, is moving very strongly on peer review especially for life company valuations and for pension plans. They would like to move in the same direction on property and casualty insurance. Because the standards were developed at a later date, and because the practice is very small, and not as well developed, the property and casualty area is behind the life area. However, using what's happened on the life side as a guide, I expect that peer review will start out by each actuary doing a self-review, basically filling out a questionnaire. The questionnaire will basically list the major standards and ask you to check off whether you followed those standards or not.

I expect a more formal peer review to be implemented later, and I would say it would be at least two years before anything more formal is instituted, but you should be prepared.

Right now the recommendations are fairly terse, and certain sections, of course, could be subject to many interpretations. It's anticipated that some explanatory notes will be developed and some technique papers will be provided for the practising consulting actuary. The first technique paper we are working on is the paper that would provide a technique for calculating the provision for adverse deviation.

Also a quick note on FCAS's who wish to become members of the Canadian Institute. A special exam has been given twice, and it's going to be given one more time in October. Therefore, anyone wanting to become an FCIA would have to write that exam. I should also mention that students currently writing exams can write Part 8, Canadian, if they want to become a Fellow of the CIA. And upon completion of your FCAS, if you have Part 8, Canadian, you could qualify for membership in the CIA upon application.

I apologize for running late. I guess I'm prepared to stay here for a couple of minutes for questions, if anyone has any. I just have one comment to make before that: We have not prepared a handout for this session, but Bob and I have agreed on a handout that we will distribute to anyone who would leave their cards here, summarizing the basic points we've covered today, and we will try to get that in the mail next week.

QUESTION: Hi Dave, I kind of applaud the new recommendations in terms of enlarging the omnipotence of the actuary in Canada. However, I do have a question, and that is whether or not the actuaries themselves feel qualified to take on some of the responsibilities, particularly the ones that have you blowing whistles, if you will, both either the Board of Directors under the appointed actuary concept or the regulators, for things that go beyond normal loss reserves.

I would ask whether people feel competent that they know the business well enough, that they can take on that kind of responsibility. For example, a small Canadian company that decides to expand into writing U.S. liability business. That's the situation where I think that could have significant adverse impact, financial impact, on a company.

If you don't understand that as an actuary, and that I think takes more than just passing ten exams, there is a lot of business experience that goes into that, a lot of maturity, are you going to be sued later on for not blowing the whistle? And I see a lot of liability potential, E&O potential, for actuaries that I'm not sure people that are 32 years old, with limited experience in the business really are capable of taking on. I just wondered what the CIA, or you, or whoever is supporting that, had in mind when they put that in.

MR. OAKDEN: First of all, of the casualty actuaries in Canada, probably half would oppose this appointed role. There certainly is significant opposition to it based on the concern you raised. Getting on to your question, as an actuary, I am torn. There may be some subtle things like expansion into U.S. markets that a 30 year old actuary may not realize is a dangerous move. But there are also situations, as a consultant, that you see where companies are doing things that you know are dangerous. I just don't believe as an actuary we have a right to remain silent and hide behind recommendations that give us that right.

Now, as these recommendations are put together, it's your duty to report to the Board of Directors. It's not your duty to blow the whistle to the Federal Department of Insurance. Hopefully your report to the Board of Directors, and perhaps in many cases it might be, I think, initiated by a report to management, rather than the Board of Directors, to make sure you've got your facts right. But it's something that we are having to come to grips with, and at the present time the CIA is writing guidelines that would make these points a little more definite. But I agree with you, it does create significant extra responsibilities, and is certainly an E&O concern.

MR. POTVIN: David, quite apart from what happens with the concept of the appointed actuary, I understand the regulator is looking into the possibility of including in its own legislation the requirement of whistle blowing on the part of actuaries in the same way as it now is in the bank Acts on the part of auditors; in that if you know of something, you just don't sit on it and say, well, I didn't have to worry about it when I was doing my reserve, and I knew all about it, but . . .

And when they do that, I also think that they would want to do it on the basis of the concept of valuation actuary where, having accepted that position, and you are competent to do it, then you are also responsible for the whistle blowing aspects as well. And if they do change the Act and go in that direction, then I don't think they're going to be looking for a two-stage deal where you report, first to the Board of Directors, and then, if they don't do something to satisfy you, then you report to the regulators. It would be to the regulators first, and then they will deal with the Board of Directors.

QUESTION: I would like to ask Harry's question a little differently. If there is something imprudent going on, and I see it, I can report it. Is it going to be assumed that there are internal controls in place so that I can track what is going on? Or if I come in as a consultant, do I just have responsibility for what I see and . . . **(INAUDIBLE)**

MR. OAKDEN: One item I didn't comment on, was that the actuary is supposed to have a continuous, ongoing relationship with the company as opposed to a one time a year consulting engagement to certify the loss reserves.

These recommendations right now are in the process of discussion and I do expect some changes. But as you've heard Bob say, the regulators expect certain things as well. So there are two markets out there to accommodate.

We are about 20 minutes late, so if there are no more questions . . .

1990 CASUALTY LOSS RESERVE SEMINAR

4E-2: CANADIAN STANDARDS OF PRACTICE

Slides

David J. Oakden
Tillinghast/Towers Perrin

Slide 1

CIA Recommendations for Property & Casualty Insurance Financial Reporting

Slide 2

CIA Recommendations for Property & Casualty Insurance Financial Reporting

Standards of Practice for Casualty Actuaries in Canada

Based on:

- **CAS Principles**
- **CIA Standards for Life Actuaries**

CIA Recommendations for Property & Casualty Insurance Financial Reporting

First Draft 1984	
September 1986	Draft approved for 1 year trial period
September 1987	Draft approved for additional year trial period
September 1988	Draft approved for additional year trial period
November 1989	Final recommendations approved by Council

CIA Recommendations for Property & Casualty Insurance Financial Reporting

Part 1 - Definitions

Canadian	U.S.
Claim Liabilities (net of sub/salary)	Loss Reserves
Claims Adjustment Expenses External Internal	Lost Adjustment Expenses Allocated Unallocated
Policy Liabilities	Unearned Premium Deferred Acquisition Expenses Other Provisions

CIA Recommendations for Property & Casualty Insurance Financial Reporting

Part 1 (Continued)

Conformity

- Members should consult the Committee on P&C Financial Reporting when unforeseen circumstances make recommendations inappropriate

Documentation

- Members should compile and retain documentation

Note: Regulators would like complete documentation included in report and most actuaries now submit a complete report

CIA Recommendations for Property & Casualty Insurance Financial Reporting

Part 2

Data

- It is the members responsibility to ensure that the data is reliable and sufficient
- Actuary may rely on the work of the auditor
- Auditor may rely on the work of the actuary

Note: As a Minimum

- Paid and outstanding losses for current year should balance to auditors annual statement
- Earned/unearned premium should also be balanced

CIA Recommendations for Property & Casualty Insurance Financial Reporting

Part 3

Considerations

- **Taken from CAS Principles**

CIA Recommendations for Property & Casualty Insurance Financial Reporting

Part 4

Policy Liabilities

- **Unearned premiums**
- **Deferred policy acquisition expenses**
- **Premium deficiency**
- **Reinsurance rate/commission adjustments**
- **Broken contingent commission**
- **Other**

Primary consideration is expected losses on the unearned premium

Note: Investment income is unusually included when estimating deferred policy acquisition expenses although this is "technically" contrary to OSFI directives

Premium deficiencies are calculated on a non-discounted basis

Slide 9

CIA Recommendations for Property & Casualty Insurance Financial Reporting

Part 5

Methods of Assumptions

- Impact of changes in methods and assumptions should be disclosed
- e.g. impact of changing from paid to incurred development should be disclosed

Slide 10

CIA Recommendations for Property & Casualty Insurance Financial Reporting

Part 5 (Continued)

Discounting

- Liabilities should be discounted unless contrary to regulation
- Since it is currently contrary to regulation situation is similar to U.S.

Provision for Adverse Deviations

- Liabilities should be estimated on a conservative basis, i.e. they should contain a provision for adverse deviations
- Current practice is to assume that non discounted reserves are conservative enough

Note: CIA and OSFI are discussing discounted reserves and PAD. No changes are expected for 1990

Slide 11

CIA's "Appointed Actuary" Concept

Broader and more Formal Role for Valuation Actuary

- Similar Role for Life & Casualty
- Appointed by Board of Directors
- Right of access to relevant records, accounts and documents
- Report transactions which have significant adverse impact on financial position of company
  - To directors
  - To superintendent if satisfactory action not taken
- Report on current position and expected future position
  - Current report includes surplus, and assets as well as liabilities

Slide 12

Peer Reviews and CIA Involvement

- Self review using a questionnaire will be developed shortly
- More formal peer review will be introduced depending on experience with life company actuaries
- Explanatory notes and technique papers will be written to aid the valuation actuary

Admission of FCAS's of FCIA

- Special exam
- Final sitting in fall of 1990

1990 CASUALTY LOSS RESERVE SEMINAR

4F-1/7F: FASB's POSITION ON DISCOUNTING LOSS RESERVES

Panel

Wayne Upton
Financial Accounting Standards Board

THE FASB PROJECT ON PRESENT VALUE-BASED MEASUREMENTS

WAYNE S. UPTON, JR.
PROJECT MANAGER

FINANCIAL ACCOUNTING STANDARDS BOARD

AT THE

1990 CASUALTY LOSS RESERVE SEMINAR

SEPTEMBER 10-11, 1990

THE FASB PROJECT ON PRESENT VALUE-BASED MEASUREMENTS

Late this year, the FASB plans to issue a Discussion Memorandum about issues related to the use of present value in accounting measurements. A Discussion Memorandum is a neutral analysis of issues and alternative views that is the first step in most major FASB projects.

First, though, some history:

- In 1884, the Austrian economist Eugen Von Böhm-Bawerk published his landmark work, History and Critique of Interest Theories. His definition of present value as a *preference* formed a foundation for much of the economic and finance theory that would follow.

- In 1930, the American economist Irving Fisher published, The Theory of Interest. His work continues to form the basis for most finance texts.

- In 1929, Professor John Canning published The Economics of Accountancy in which he built on Böhm-Bawerk and earlier work by Fisher. Canning's work was (and parts still are) ahead of its time. It is little known today outside of academic circles.

- In 1928, Professor William Paton authored an article, "Special Applications of Discounting." Like Canning, Paton's ideas received little support among practicing accountants.

- In 1966, the Accounting Principles Board (predecessor to the FASB) published Opinion No. 10, Omnibus Opinion--1966, in which the APB observed:

  > . . . Pending further consideration of this subject [tax allocation] and the broader aspects of discounting as it is related to financial accounting in general and until the Board reaches a conclusion on this subject . . . deferred taxes should not be accounted for on a discounted basis. [Paragraph 6.]

- In 1971, the APB published Opinion No. 21, Interest on Receivables and Payables, and was roundly criticized for "imputing interest."

- In 1980, the FASB published Statement No. 43, Accounting for Compensated Absences, in which the Board observed:

> Some respondents requested guidance on how an employer should estimate its liability for compensated absences. The respondents asked (a) whether the liability should be based on current or on future rates of pay, (b) whether it should be discounted, and (c) when the effect of scheduled increases should be accrued. The Board noted that it expects to be studying similar issues in its project on accounting by employers for pensions *as well as in a possible project on discounting* and, accordingly, concluded to defer a decision on such issues at this time. [Paragraph 20; footnote reference omitted; emphasis added.]

- In 1986, the FASB published Statement No. 91, Accounting for Nonrefundable Fees and Costs Associated with Originating or Acquiring Loans and Initial Direct Costs of Leases. This highly controversial pronouncement adopted views expressed by Professor Paton almost 60 years earlier.

- In 1987, the FASB published Statement No. 96, Accounting for Income Taxes, in which the Board observed:

> Conceptual issues, such as whether discounting income taxes is appropriate, and implementation issues associated with discounting income taxes are numerous and complex. Implementation issues include selection of the discount rate(s) and determination of the future years in which amounts will become taxable or deductible. The Board decided not to consider those issues at this time. [Paragraph 172.]

We stand today 100 years from Böhm-Bawerk, 60 years from Fisher, Canning, and Paton, and almost 25 years from the APB's first mention of a potential project on discounting. This is not a progression marked by blinding speed. Of course, accountants have considered present value and interest in other situations along the way, most notably in pensions and life insurance. Yet, a comprehensive idea of present value and its role in financial reporting has eluded us.

Why, then, has the FASB undertaken a project to study present value in accounting measurements?

In short, because the time seems right. The financial world is much changed since Fisher, Canning, and Paton. Accounting measurements that were acceptable in the 1960s may today be misleading. The upcoming FASB Discussion Memorandum will identify five factors that contributed to the Board's decision:

THE FASB PROJECT ON PRESENT VALUE-BASED MEASUREMENTS

Higher interest rates and economic developments have focused attention on interest as an element of an entity's performance. The developed world is moving toward an economy in which management must insist that all financial assets and liabilities earn interest. British economist John Hicks recently captured this trend with the comment:

> At modern rates of interest, to hold barren money even as a running asset has become costly; so it must be expected that means for economizing in it will be looked for and will be found--as surely they have! We are on the way to a credit economy, in which any money that does not bear interest has become no more than small change, or petty cash. . . .[1]

Traditional distinctions between classes of assets and liabilities may not be as relevant as they once were. Accounting pronouncements have historically limited present value-based measurement to monetary assets and liabilities--those whose amounts are fixed in terms of currency. Financial statement preparers and others often suggest that present value-based measurement "reflects the economics" of a transaction or event--even though the item may not meet the conventional definition of a monetary asset or liability.

Failure to employ present value-based measurements has led to questions about the representational faithfulness of financial reporting. Financial statement users and others have also suggested that undiscounted measurements prompt transactions designed to generate "accounting gains." They acknowledge that financial statements may not capture periodic changes in market value, but they suggest that statements should at least reflect present value at initial recognition.

The implementation of present value-based measurements varies considerably among accounting pronouncements issued by the Board and its predecessors. Actions by the FASB Emerging Issues Task Force and the AICPA's Accounting Standards Executive Committee have introduced additional diversity. Some suggest that this diversity will grow until the Board develops a consistent approach to present value-based measurement.

Recent work by other organizations has provided a foundation on which the Board can build. Several recent studies of present value and interest in accounting measurements suggested a need for an FASB project and provided useful insights. Those studies include works recently published by the American Institute of Certified Public Accountants, the Canadian Institute of Chartered Accountants, the Financial Executives Research Foundation, and the Institute of Chartered Accountants in England and Wales.

THE FASB PROJECT ON PRESENT VALUE-BASED MEASUREMENTS

What is the FASB project?

Perhaps that question is best answered by beginning with what the project is not. It is not a project designed to lead to a new comprehensive accounting model based on present value. Financial reporting uses a "multi-attribute" system, selecting different measurements in different situations. Ideally, the measurement selected is the one that best combines reliability and relevant information about an individual asset or liability. The Board expects that this approach will continue. It also is not a project that will change individual accounting measurements, at least for now. The work now under way may lead some to conclude that this or that measurement should change, but any specific changes are tomorrow's project.

Today's project examines why measurers decide to use present value-based measurements instead of some other measurement technique. The Board is interested here in two types of accounting measurements:

- *Direct measurements*--those based entirely on current assumptions and estimates. The determination of a property-liability insurer's claim liability is a direct measurement.

- *Accounting allocations*--measurements designed to dispose of historical amounts over time. A life insurer's liability for future policy benefits is the product of an accounting allocation in periods following initial measurement.

Once the measurer decides to use present value, he or she faces an array of questions that relate to how to apply the technique. These "how to" questions are often more difficult, at least for accounting standard setting, than the initial decision to use present value. We are especially interested in:

- The future events included in, or excluded from, cash flow estimates

- The extent to which joint inputs, interaction, and grouping affect the estimates

- The use of explicit adjustments for risk

- The selection of interest rates

- The handling of changes in estimates.

Finally, the Board is interested in how the results of present value-based measurements are reported in financial statements. It is axiomatic that present value changes with time and that the principal determinate of that change is interest. Yet, this interest element is

often reported in the financial statements as something else. In accounting for pensions, it is part of net periodic pension expense. In life insurance accounting, it is part of the net change in benefit liabilities.

The Discussion Memorandum begins by asking about the measurement objective served by present value in direct measurements. Measurers frequently can choose among several measurement attributes, especially in measurements at initial recognition. The ideal measurement attribute is the one that best combines reliable measurement and useful information. The Discussion Memorandum focues on this combination. What makes a present value measurement reliable, what information is it designed to communicate, and how well is it suited to that objective?

The discussion of present value begins with a premise that some may find troubling, but one that seems well established in accounting measurement. Present value measurement is nearly always a second choice. Measurers prefer measurements that reflect the current state of the marketplace--transaction price, current cost, and current market value--if those amounts are observable in the marketplace or are captured in a transaction. This preference springs from the perceived reliability of observable marketplace amounts when compared to measurements that must employ estimates of the future. The range of choice, then, reduces to two alternatives--present value and net realizable value.[2] When measurements that reflect the current state of the marketplace are available, prospective measurements are not an issue.

The need for reliable estimates is a critical constraint on the use of present value and an often-cited argument against its use. Yet, reliability is a matter of degree, not principle. Most would agree that estimates should be reliable enough and should not cost too much to obtain. "Enough" and "too much," though, are likely to produce considerable disagreement in any particular circumstance. The Discussion Memorandum describes reliability and factors that contribute to reliability in present value measurements. It then asks about the circumstances in which present value is the appropriate measurement attribute in a direct measurement. The document describes three alternative views and analyzes their implications:

- A broad view suggesting that present value is a measurement attribute designed to reflect the amount of discount between a current amount and a series of estimated future cash flows (the *present value discount view*)

- A narrow view suggesting that present value is a surrogate for some other measurement that would have been used, had it been available (the *measurement surrogate view*)

- A *selective view* suggesting that present value may serve different objectives in different situations.

The analysis next moves from the general to the specific. Once the measurer has chosen present value, how should he or she apply the measurement? Why a measurer chooses present value clearly has something to do with how the measurer approaches here. Unfortunately, selecting one of the alternatives above does not provide all that is needed to answer the specific implementation questions. Nor should such convenient linkages be expected. The implementation questions (other than interest rate selection) are general questions with a special role in present value measurement rather than unique consequences of selecting present value.

Of the implementation questions, only interest rate selection is unique to present value measurement. Accountants routinely wrestle with the others in a variety of situations, and each has implications that go beyond this project. Still, no discussion of present value can avoid talking about these questions. An analysis of measurements based on the present value of estimated future cash flows is incomplete, for example, if it fails to address the future events that form the estimate. The Discussion Memorandum analyzes each question with the limited perspective of its role in present value measurement, without presuming to deal with the greater implications.

The discussion of accounting allocations using the interest method mirrors that of direct measurements. Again, the focus is on the objective of the measurement. The analysis begins with the premise that the interest method is a special type of accounting allocation. All allocations attempt to represent the ultimate expected change in an asset or liability over time. However, the interest method is more than a simple allocation (like straight-line depreciation). It is a dynamic technique, measuring both increases (accrual of interest) and decreases (receipt or payment of cash). The interest method is less than a direct measurement, though, since it remains anchored in previously recorded information.

The document presents three alternative views if the interest method:

- A broad view suggesting that the interest method is always more relevant than other allocations (the *all-inclusive view*)

- A narrow view suggesting that the interest method is only useful as a means to measure and report interest income and expense (the *interest-allocation view*)

- A *selective view* suggesting that the interest method has more uses than advocated by the interest-allocation view but fewer than envisioned in the all-inclusive view.

The analysis then turns again to specific problems, many of which are quite similar to those encountered in direct measurements. Again, the implementation questions are broad questions that arise in many situations, but questions with special implications for the interest method. Accounting allocations present another set of problems--those that relate to changes in estimates.

The flow chart below illustrates the plan of the Discussion Memorandum's measurement chapters.

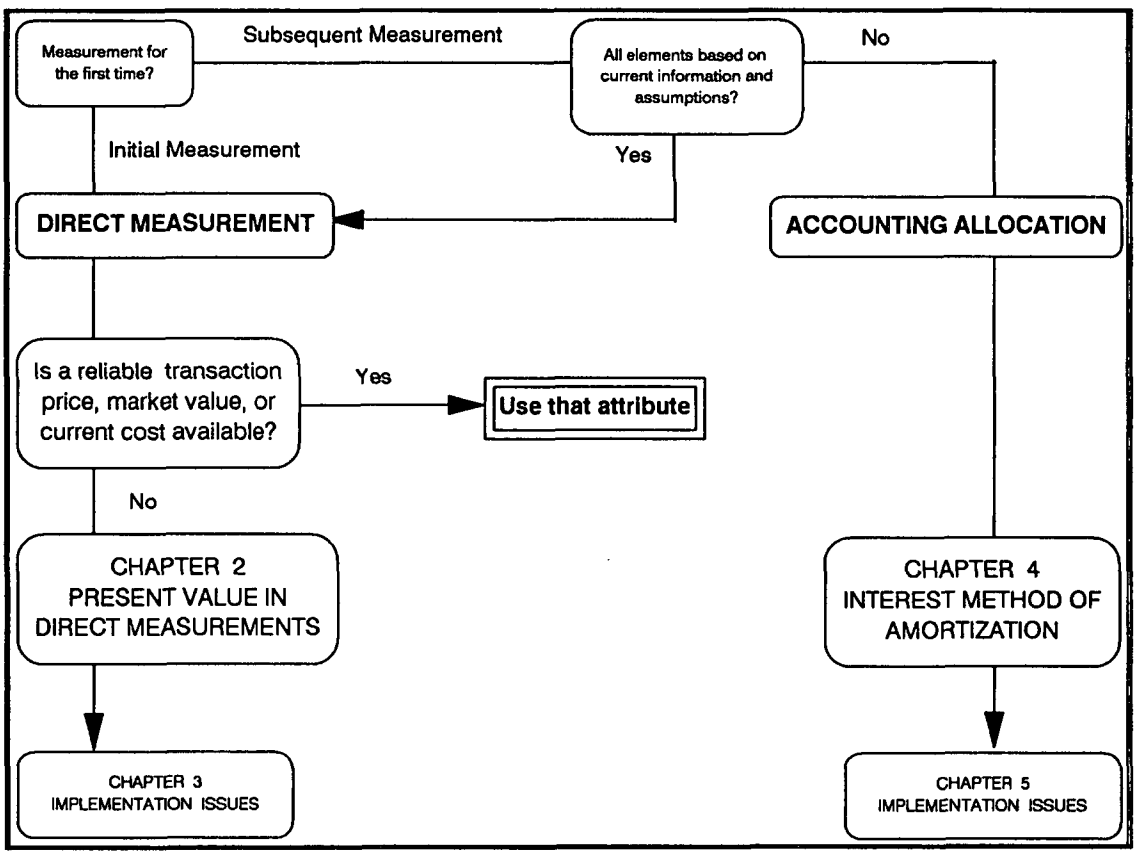


Figure 1 Plan of the Discussion Memorandum

There are several recurring themes in the Discussion Memorandum. They appear in different guises from one occasion to the next. None of the issues is unique to present value-based measurement, but each plays a special role on the narrow stage of present value.

Reliability. Reliability is a qualitative characteristic of accounting measurements that speaks to freedom from error and bias and faithful representation of what the measurement purports to portray. It is a pervasive constraint on all accounting measurements. It is especially important for the measurements addressed in the Discussion Memorandum, since they rely so heavily on estimates of the future. Unfortunately, reliability does not lend itself to analysis through examination of alternative positions. No one would advocate a measurement that is demonstrably unreliable, but few accounting measurements are perfectly reliable. The question, then, is one of degree.

Ability to estimate. The ability to estimate future cash flows and interest rates encompasses both the availability of necessary information and the cost of obtaining it. Present value-based measurements are usually more complex and difficult than alternative approaches. In particular, measurers often find that they are unaccustomed to the detailed record keeping required by present value-based measurements. Like reliability, ability to estimate is a constraint on present value measurements that exists only in degrees.

The additional cost of obtaining information with which to apply present value is difficult to establish. The measurer who confronts the questions raised in the Discussion Memorandum has already decided that an asset or liability should be recognized (or that a change in an already recognized item should be reported). Lacking other measurement alternatives, the measurer has assembled an estimate of the amounts of future cash flows. The estimated amounts should be developed with the same care and attention to detail, regardless of whether they will be discounted to present value. All that remains are estimates of timing and interest rate. Those are difficult, but they seem to add little incremental cost.

For many companies, the additional cost of present value-based measurement will lie in the additional systems needed to apply it on an ongoing basis. The added costs of a single present value-based measurement may be small, but the costs of monitoring the measurement from period to period may be significant.

Representational faithfulness. This issue refers to the ability of a measurement to portray economic phenomena. In this Discussion Memorandum, it encompasses both the objective of a present value-based measurement--what it attempts to portray--and the effectiveness with which it fulfills that objective. Present value is a powerful tool that

measurers can apply (at least mechanically) to the measurement of any asset or liability. However, the ability to express an asset or liability as a present value does not imply that the result is representationally faithful.

Inclusiveness. Measurers who adopt present value-based measurements must often choose among a variety of elements that might be included in, or excluded from, a present value computation. For example, a present value measurement might include assumptions about several different future events or cash flows from several different sources. Here the overlap between measurement and recognition is most clear. Including the estimated cash consequences of a future event, for example, is both a recognition and a measurement issue. It is measurement, since inclusion or exclusion is germane to measuring the asset or liability. It is recognition, since inclusion or exclusion has the same financial statement impact as separate recognition of the future event as an asset or liability in its own right.[3]

Measurement unit. This issue is a cousin to inclusiveness. Assets and liabilities often can be measured individually or grouped and measured together. A larger measurement unit usually allows the measurer to make different or additional assumptions in forming estimates. However, grouping similar items may also change the financial statement impact of changes in estimates.

Risk and uncertainty. All present value-based measurements emerge from estimates of an unknown, and unknowable, future. Even so-called risk-free financial instruments are free from only the risk of default. As a consequence, there is a strong connection between present value-based measurements and the chance element inherent in all estimates of the future. A market interest rate, for example, is said to include a "risk premium" designed to compensate the holder for assuming one or more risks of loss. Finance and economic theorists typically use the terms risk and uncertainty to describe the potential for favorable and unfavorable outcomes. In the Discussion Memorandum, though, the terms will be used in a more conventional sense of potential loss.

Few accounting measurements incorporate an explicit assumption about risk. The Discussion Memorandum raises the question of whether risk should be incorporated and, if so, to what extent. The Discussion Memorandum also asks whether the provision for risk should be an explicit adjustment to estimated future cash flows or interest rates or an implicit factor included in the selection of interest rates.

Interaction and consistency. The present value formula requires the measurer to make three estimates about every future cash flow--amount, timing, and interest rate. The three elements used to compute present value interact with one another. Measurers must therefore take care that the elements arise from consistent assumptions. For

example, some respondents to the 1989 FASB Exposure Draft, Employers' Accounting for Postretirement Benefits Other Than Pensions, suggested that assumed future health care costs exclude any estimate of inflation. While some favored an undiscounted measurement, others pointed out that a present value was still appropriate. They correctly observed, though, that present value would require a real rate of interest--one that excluded inflation. Any other interest rate is inconsistent with the assumption about future cash flows.

Where does the project go from here?

The Board plans to issue the Discussion Memorandum late this year. Copies of the Discussion Memorandum (one to a customer) are available free of charge from the FASB. As the name implies, a Discussion Memorandum is designed to promote discussion of the issues. Those who read the document are encouraged to provide written responses to the several issues raised. The Board typically holds a public hearing in conjunction with a Discussion Memorandum, so that those who provided written comments can expand on their views.

The Board has not reached a decision about the next step in this project, but several alternative approaches are possible:

- The Board might decide to stop, perhaps issuing a special report on the outcome of the written comments and public hearing. This seems unlikely, since accounting would advance little as a result.

- The Board might identify specific areas in which present value-based measurement should be adopted or existing uses should be altered. This also seems an unlikely outcome. The Discussion Memorandum deals with general and conceptual issues, not the specific problems of particular measurements.

- The Board might proceed to develop a new FASB Statement of Financial Accounting Concepts. Statements of Financial Accounting Concepts are intended to establish the objectives and concepts that the Financial Accounting Standards Board will use in developing standards of financial accounting and reporting. Unlike a Statement of Financial Accounting Standards, a Statement of Financial Accounting Concepts does not establish generally accepted accounting principles.

  Concepts Statements are subject to the same standards of exposure and due process as other FASB pronouncements. If the Board chooses this third alternative, it will deliberate the issues and prepare an Exposure Draft of a proposed concepts Statement.

Endnotes

1. J. R. Hicks, A Market Theory of Money (Oxford: Clarendon Press, 1989), pages 103-104.

2. Some suggest that net realizable value includes an element of present value discount, at least implicitly. The Board's concepts Statements define net realizable value as the mathematical sum of estimated future cash flows, unadjusted for time. This Discussion Memorandum will follow the concepts Statements' definition.

3. Clearly, many future events would not be recognized in today's financial statements were it not for the association between the event and an existing asset or liability. Standing alone, the consequence of the future event is not an asset or liability today, but including it in a present value measurement produces the same effect as recognition.

1990 CASUALTY LOSS RESERVE SEMINAR

4F-2/7F: EFFECTIVE PRESENTATION OF LOSS RESERVING ANALYSES BY GRAPHICAL MEANS

Moderator

John C. Narvell
Huggins Financial Services/Ernst & Young

Panel

Harold E. Clark
Bacon & Woodrow

MR. NARVELL: -- Mr Clarke may be already familiar to some of you in the audience. He has attended some actuarial conventions here in the United States and even wrote a paper that has made it into our proceedings. Harold is a graduate of Cambridge University; and that's not Cambridge, Massachusetts. He also has a Master's in statistics from Sussex in England. He qualified as a Fellow of the Institute of Actuaries in 1975. He became a partner of Bacon and Woodrow in 1978. Bacon and Woodrow is a consulting firm in Great Britain that is affiliated with Milliman and Robertson here in the United States. He has a somewhat unusual distinction in that he has only worked for one employer for his entire actuarial career, which I know for an American actuary, would be quite exceptional.

He, not surprisingly, has worked in pension and life areas, in addition to property/casualty work. This is because actuaries in Great Britain have one course of training for both life and property/casualty. It's not unusual for British actuaries to work on both sides before subsequently specializing. However, for the past five years, Harold has worked exclusively in the property/casualty area.

The topic today is Effective Presentation of Loss Reserve Results Using Graphical Means. Harold is going to try to limit his remarks to the presentation aspects of loss reserving and not to get into some of the more contentious areas of analysis.

Last year, for those of you who heard me speak or have had the opportunity to read the write-up that was in the proceedings of this seminar from last year, I spent a lot of time discussing various aspects of graphical analysis from the standpoint of the effort required to derive estimates of ultimate losses. Harold, fortunately, because of our short time frame, is going to try to stay away from that aspect and instead will zero in on presentation aspects.

Just as a quick introduction, Harold had the opportunity today to take some RAA data -- which thankfully is on diskette and you don't have to key in all the numbers -- and ran some quick projections, and shows the patterns of the GL losses on the screen there.

How many accident years do you have there, 1975?

MR. CLARKE: Seventy-five forwards.

MR. NARVELL: Nineteen seventy-five onwards through '88 is 14 years. So, for those people who think that general liability data is poorly behaved, here are 14 years laying practically on top of another that look very well behaved. The actual interpretation of this graph, and how you get to this point, I'll leave to Harold, and he can start from scratch, and show you other data sets. But at the end, if we have time for questions, we can come back and look at the RAA data.

We are perfectly willing to run overtime. Both of us are disappointed that we had a short time frame. For those of you that are interested in asking questions and running after five o'clock, we are perfectly willing to do that. And also tomorrow, we are at the last session of the day and we are willing to extend our time frame tomorrow also for those of you who are interested.

So, with that introduction, I give you Harold Clarke.

MR. NARVELL: While he is doing that, let me just make one more comment: One of the things that we wanted to accomplish today in our presentation was not just showing you the methods, but also showing you some of the technology. With a little bit of extra effort, we were able to get a projection screen that Harold has his little laptop plugged into. It is possible to arrange ahead of time, if you are making a presentation somewhere, and to either get a big screen TV or a projection system like this. All you have to do is bring your laptop PC with you, with your data and your presentation all set to go. For those of you who may feel intimidated by some of the electronics, it's becoming very straightforward these days, and we hope that you enjoy it.

MR CLARKE: For a loss reserver, probably about 80% of the effort you put into a reserve analysis, is actually doing the mathematics and carrying out the analysis. The other 20% of your effort goes into the actual presentation. However, for the recipient of your advice, probably about 80% of his perception as to whether you've done a good job, is based on your presentation. He is probably only going to spend about 20% of his time considering the quality of the analysis you have done. So just bear that in mind. For that reason, I am going to focus entirely on the presentation of the results and not talk about the analysis - thus from the recipients point of view we're talking about the 80%.

So let's consider the view of the recipient. He is looking for reassurance that the reserve estimates you have produced are reasonable. If he has produced his own estimates from some other source, he also wants to understand the reason for the differences between his estimates and your estimates. In particular, he is not interested in the fine detail of the mathematics. That is why he has employed you as he knows that you have got the necessary mathematical ability. He just wants reassurance that his reserves are reasonable and he is not interested in the fine details of the mathematics at all. I never present the mathematics. I always offer to. No one is ever interested!

I have found that the most effective way of presenting the results of reserve analyses is by using graphs on PC's. I have been doing this for the last two years in the U.K. All one takes along to a meeting is one's portable PC and a sheet of paper with the answers on it. You can normally find a screen at the meeting

that you can plug your PC into to present the results. That is all you need.

So, what are the advantages of using graphics on a PC?

- You can easily remove years with unusual development so it becomes clear what the general trend is.

- You can show the broad implications of making certain assumptions about what the estimated ultimate development level is. If someone suggests an alternative ultimate, you can key that in easily and compare it.

This means that you can start to set up an interactive dialogue with the recipient of your presentation. Consequently, he is then drawn into the conversation very much more easily than he would be if you were just going in there with sheets of paper with graphs on them. With paper, you just can't achieve the same degree of interaction and so agreement.

So the result of this sort of interaction in the presentation with the recipient is that he will actually understand the content of what you are talking about and place it in the correct context. Therefore I find he is much more likely to accept the results of your analyses. I find an immense difference between two or three years ago, when I was just going with sheets of paper, and now when I go with graphs on a PC.

So what are the advantages of graphs?

They can demonstrate the consistency between the paid and incurred development. By "incurred" I mean paid plus outstandings (case estimates). For instance, are both telling the same story? Do you think they are going to the same ultimate level? You can show changes emerging in the development patterns very easily, for instance due to changes in claims settlement patterns, or the effect of asbestos claims coming through. You can illustrate data errors coming through, for example from entering amounts in the wrong currency. Finally you can start to discuss the consistency between alternative estimates - your estimates and what the company thinks is going to happen, which it has got from its own source. All the main questions that tend to arise in presenting a reserve analysis can be dealt with by graphs.

In the remainder of the presentation, I am going to present two data sets. I will begin by showing some motor personal lines, and after that I'm going to show some non-proportional reinsurance from the United States.

(Exhibit 1)

If I am doing a presentation, the first thing I tend to do, is show each year individually, so that you can remind the company

what data they have actually given you, and I just go through each year one after another. In this case it is underwriting years, not accident years.

I show on each graph the development of the incurred claims, the development of the paid claims, and my estimate of the ultimate level. This example does not include the case where the company has got an alternative estimate. I will come to that in my second example.

(Exhibits 2, 3)

The graphs of individual years show what the data looks like; and I go through them one by one. As you can see, there are certain inconsistencies showing up, which are coming through very clearly looking at the graphs, but which would not be so obvious from looking at a table. By looking only at loss development factors it is much harder to spot the inconsistencies. The other advantage of a PC is that you can switch between the graphs much quicker than you could by turning over sheets of paper.

As the graphs demonstrate, there is a general consistent trend of setting the case estimates too high in the first year or so of development.

(Exhibit 4)

Now, with this graph for the penultimate year, 1988, you can easily show the level of the anticipated recoveries from the case estimates you are factoring in, to get the estimated ultimate level you are using to set your reserves; and that is an important thing to bring out.

(Exhibit 5)

With the graph for the latest year, 1989, you can show how much future development you are having to build in for the year with the largest reserve.

You can show the ultimate levels, either as loss ratios, which is helpful if you are talking to underwriters, or as amounts, which tends to be more interesting to people like finance directors. It's just a matter of who your audience is.

So you go through all the data year by year to give a feel of what it looks like. Now, how do you explain why you come up with your particular answers and where the particular problems have arisen? The best way I have found of doing that is to look at all the years combined, and then look at subsets of the years.

(Exhibit 6)

That is very similar to the graph that was up at the start. It shows the paid development, for all the years, 1976 through 1989,

on the same graph. The way I have got them on the same graph, is to scale them all to go to an ultimate of 100% as the final amount. So you are looking for consistency of the development pattern. If all the lines are very close together, as they were for the general liability case, you will know it is very consistent. Here you will see that it is not so consistent. In the second example, you will see it can be much worse.

What I am going to do now is remove some of the accident years and look at remainder to bring out the patterns underlying the data.

(Exhibit 7)

This shows the early years, 1976 through 1981 and you will see the development pattern is fairly inconsistent.

(Exhibit 8)

Now, let's see what happens if we look at the later years, 1982 through 1989, which are the years where most of the reserves are. You will see there are two distinct patterns occurring. There is a longer tail pattern in the more recent years, which is shown by the shape of the bottom of the band, and there is a shorter tail trend from the older years which go up much more steeply and then bend sharply over.

I took out one year (1986) which was showing a lot of distortion, and concealing the general shape. Now you can see a much clearer shape where the two oldest years go up fast before flattening out, while the other years have a consistent slower development. Next one takes out those two oldest years, so you are left with 1984 through 1989. This shows the consistent shape in the development much more clearly. You can also do it in other ways. You can build up from the most recent year adding a year at a time. This allows you to show how, sometimes what you are looking at is really a consistent pattern although it can be hidden by the older years.

(Exhibit 9)

Up to now I have been looking entirely at cumulative data, but you can also look at it incrementally. This is the same graph as before but showing incremental data, which is what Ben Zehnwirth looks at. What he does is, instead of fitting a curve to the cumulative loss development pattern, he fits a Hoerl curve - that goes up and comes down again to the incremental development. Now look at the tail. It is all over the place. That is expressing the increments as a percentage of the estimated ultimate. You will see as you go in to the tail that you have got a lot of noise in the tail after the first two years of development, which obviously causes problems in fitting it.

Another way of looking at this, which I think can be quite useful in presenting the results to management, is to look at just building it up a year at a time from the most recent year. So, first, you show the development of the most recent year, 1989, and indicate how little that has developed. Then you add on the second most recent year, 1988, and show how the second year has the same shape.

Now another year so you now have three years on top of each other, and so on. Thus the people you are presenting to can see how, laying one year on top of another, you are starting to develop a trend. That is an important thing to show to management. It also brings out very clearly where a particular year is peculiar.

I have so far just looked at the paid development. As I said earlier on in my presentation, one of the important things is to see if there is consistency between the paid and the incurred development; that is do they both tell the same message; or where they do not tell the same message, where it is different. You can carry out the same sort of analysis by looking at the incurred development.

(Exhibit 10)

One thing that you can see from that graph immediately, is that the company tends to over-estimate at the end of the first year and then pull things back as the year develops. Secondly, they tend to over-estimate by varying degrees. So there is a lot of inconsistency and the graph shows that very clearly.

For instance if you look at the hump above about the figure eight on the bottom line, you will see that it rises to various levels. In some cases it is just above the estimate of the ultimate. In other cases it is over 20 points above it. That is a big difference in the levels of over-reserving on case estimates at that point.

(Exhibit 11)

Here I am showing just the older years, as for the paid. You would really want to be very careful about projecting the development of the recent years from the incurred development in these early years. You want to show that and then show that you have allowed for it in your analysis. I am also going to do the same thing as I did before, where you build up from the most recent year.

(Exhibit 12)

I just show 1989. Then I include another year, 1988, which you can see has overshot the ultimate. If I add in the next year, 1987, you will see very clearly you have got two entirely different patterns. You can now easily start to get a discussion

going with the company as to the reason for this happening, for instance changes in the claims department. Now, I add in another year, 1986, where initially the company clearly put up heavy case reserves and then shortly afterwards brought them back sharply. I will do two more years, 1984 and 1985 and those again are showing a different pattern.

Now, you have presented your analysis and I can guarantee you will be getting a real reaction from the other side as to the reasons for what was happening and the inconsistency between the paid and incurred development, which has been brought out very vividly by the graphs.

(Exhibit 13)

I will now move on to the other data set I want to present. This is non-proportional reinsurance from the United States written in the London Market. Here I am showing both my estimate and also the company's alternative estimate. It is somewhat unusual development. You will notice that it suddenly takes off after about 15 years, which is when asbestos claims suddenly emerged. That is what is coming through in the tail. The important thing to notice from that graph is that there is a separate source of claims. I look at the asbestos claims entirely separately, putting up a separate reserve for them and I do not allow for any further development from that source in this analysis, as is obvious from the graph.

(Exhibit 14)

The same thing is happening in 1972.

(Exhibit 15)

The problem continues upto 1976.

(Exhibit 16)

However, if you look at 1977, the problem is starting to die away or just becoming submerged in the general development that is there.

(Exhibit 17)

This continues in 1978, where the problem appears to have disappeared and the development looks more reasonable and more modelable.

(Exhibit 18)

This shows all the years combined for incurred development. I will not show the paid development because I tend not to look at it much for long-tail reinsurance data. This is because it lags the incurred development by too much to be very useful for these

very long-tail classes. Now all years together is pretty, and shows the colour screen effectively, but as a presentation it is not very useful. Thus you need to take out the years that distort the general underlying pattern so you can demonstrate there is a consistent pattern that you have been able to model and show where the problems are. So I am going to take out all the years up to 1977 where the asbestos problem appears to start.

(Exhibit 19)

In this graph you can start to see there is some sort of a shape, but it is still very rough, and one that I really would not be very happy about analysing. You can investigate to see if there is a better underlying shape by excluding particular years. The first year to exclude would be 1977 which would probably still includes some asbestos claims. Also 1980 looks as though something very odd was happening to it so I would exclude that as well.

(Exhibit 20)

Now I have got combined development which covers all the years since 1978, apart from 1980 which looked unreasonable, and which

(a) for this sort of data looks reasonably consistent; and

(b) looks as though when trended, it could actually trend to an ultimate level.

Further, if you look at the bottom left hand corner and pick out some of the more recent years, like 1987, 1988, 1989, you will see that they lie inside the main band of the general trend that you are projecting.

Now, let's see what happened when I looked at the same data and the same sort of analysis, but based on the estimates the company wanted to put up, which the underwriter had suggested.

(Exhibit 21)

Here I show the data with the company's ultimate estimates. As before, I have taken out the early years to show a reasonable shape. Now, look at the recent years. If you look carefully you will see years that are clearly coming out of the top of the band, so the company is assuming a much shorter tail in its development pattern for those recent years.

This graph easily demonstrated what was happening. The company was assuming a much shorter-tailed development and what happened at that point was, the underwriter said, "Well, I think that's what's going to happen". But then, the finance director asked, "Why do you think it's going to happen?" He did not get an answer that satisfied him as to why they were shorter-tailed. And the graph clearly demonstrated the difference between the two analyses in about five minutes.

I will stop there in case anyone has got any questions.

QUESTION: Have you tried other types of graphs?

MR CLARKE: Nothing that I find at all useful. I have got one which is three-dimensional in another part of the analysis. It is very hard looking at that, to look at the surfaces and pick out what is happening, unless there is an obvious bump in the surface. If there is an obvious bump in the surface, it is brought out clearly by the sort of analysis I have already given.

Further you will notice I have concentrated on just presenting things with everything rescaled to an ultimate of 100%. An alternative presentation is to plot each individual year as a percentage of premiums, going to the ultimate loss ratio projected for that year. I do not find that very useful because all I get is a series of lines spread all over the screen and I cannot pick out the trend. So, I do not do it. It just does not seem useful as a presentational approach.

MR. NARVELL: John, just to follow up on what Harold said, I have tried 3-D graphs and have not had any satisfaction from them either. I think that it would be necessary to have one of those facilities where you can rotate the graph to an optimal angle where you can just get it at the right place where you are able to spot things. I don't think that we have the software available yet in order to look at the surfaces from a 3-D graph and really be able to make much interpretive information out of it.

QUESTION: What kind of computer software do you recommend that is similar to the software you have here?

MR CLARKE: The program was written in Quick Basic.

MR NARVELL: I use Lotus 1-2-3. Harvard Graphics has some advantages over Lotus 1-2-3 in that you can look at eight data sets simultaneously in Harvard Graphics whereas you can only look at six in Lotus. But Lotus you can trick and double up and show 12 or 18, depending on how you stagger the data.

There are other tricks that you can use to -- If you are trying to detect whether or not there has been a shift in your patterns, one of the things that I will do, in doing percent of ultimate curves like that, I will double up and put '72 and '73 in one curve, and then '73 and '74 in one curve. When you are doing percent of ultimates, you add the ultimates for '72 and '73 together in the denominator, and then the observations by age will be summed in the numerators. You can come up with curves for '72/'73, '73/'74, '74/'75, and you can look at a 12-year trend in six data lines and be able to see whether or not there has been some transition.

Or you can take even longer-term data, like RAA, over 25 years or something, and compress it down, and be able to see shifts in development patterns that have occurred over time.

Could you go back and show the incurred again? Let me just point something out in terms of looking at graphs like this. If you were to look at the numbers that he had underneath there for the excess reinsurance, if you can strip it down to the years that you had, just looking at that, you see a lot of upward and downward development. And if you were to try to figure out what the loss development factors were that are in there, most of you would look at the data and say there is so much garbage going on in that data, that there is no underlying pattern. I personally can't see anything when I look at the numbers; the answer is not there and I'm going to give up and I'm going to use RAA data.

Whereas, if you sit down and you look at a graph of the data, I am convinced -- and I hope you are also -- that there is indeed some underlying pattern going on there within that body of data. But if you tried to pick it out from the numbers -- handpicking loss development factors, throwing out the low ones and smoothing here and there, you'd go stark raving mad. But the graph does show that there is indeed an underlying pattern going on there. You should be able to have some software that can extract that pattern and permit you to use the pattern from this data instead of having to fall back on some industry average, of which the only certainty is, you're going to get the answer wrong because you're either going to get it too high or too low. Whereas you are more likely to reflect the characteristics that went into the underwriting in selection of this particular portfolio if you're able to use this particular body of data. Anymore questions?

QUESTION: Do you adjust for possible trends in severity?

MR CLARKE: I normally look at premiums as the first measure of severity. I would like to be able to look at something which adjusts for changes in premium rates, but I have not found anything sensible, so I have not done it. In an ideal world I would like to start looking at things with adjusted premiums rates, to strip out severity. In the market I work in, too much sophistication is not called for, for instance, in trying to analyse changes in the layers.

I think what you do have to get into is a discussion as to whether the company has changed its mix of business, which has made it shorter tailed or longer tailed, to ensure that by suitable adjustment you look at homogeneous groups.

QUESTION: In the first part of your presentation, before you showed the graphs, if someone asked you to go back to a previous screen, would you have to start over?

MR NARVELL: No. In Harvard Graphics you can go backwards. All you do is, go backspace instead of hitting return, and it just goes backwards a slide. The first part of the presentation was a slide show within Harvard Graphics, and it is very simple to put together. All those scrolls, and the fade-ins and fade-outs, that is all contained inside Harvard Graphics, and it is very simple to implement; surprisingly simple for how slick it looks.

MR CLARKE: Incidentally, that is the latest version which has just come out, 2.3, which allows you to put buttons onto particular screens so you can just jump around them randomly if you want to later on in the slide show.

MR NARVELL: The slides that I put together for my presentation last year, for those who saw it, were prepared in Harvard Graphics and then put onto a film recorder. But if I had had this software, I would have done it interactively instead of going through a film recorder. It allows you to prepare things much more quickly with a shorter time lead if you can just sit down with your PC, put it together, and then immediately present it instead of having to have slides made.

QUESTION: Can you use a light arrow with this sort of equipment?

MR NARVELL: A light arrow would work fine. A light arrow is just like a flashlight that you shine up on the screen. It does not affect the projector because it will only shine on the screen.

QUESTION: What sort of graphs go into your final reports?

MR CLARKE: I would tend to use graphs for all years combined, using colour plots, and then, I might have graphs in black and white for some of the main years to explain the trends. Just to make a forecast, I reckon that within two or three years my reports will be very thin, and they will come with a diskette in the back. The diskette will have all the graphical analysis on it. You will just have a very short report with the answers in it, and a diskette which justifies it.

MR NARVELL: I typically include one graph per line of business showing all of the data lines for that line of business. If there are too many years that I can't fit them all under one graph, then I may have two graphs per line of business. The other thing that is not on these graphs, that he might put on, is, if you're doing an LDF projection, is to show the actual percent of ultimate curve that was assumed in performing the loss development factor projections. The percent of ultimate curve is just the inverse of the cumulative loss development factors. So it's real easy to calculate. But you can show your assumed loss development pattern against what your ultimates are and your history, and in that particular case you can see that the data looks fairly rough but, nonetheless, if you fit a curve through the middle of it, you would be given some credibility that you'd come up with a realistic answer.

And the graphs look very different in black and white. Usually I produce black and white graphs for reports. The thing that you notice in black and white graphs is the general clustering of the curves as opposed to being able to differentiate which year is which. The color is much better for analysis, but difficult to reproduce in quantity. It doesn't have to be expensive. You can just have a standard laser jet and just print out black and white graphs, and photocopy them, and stick them in reports. They are quite effective.

QUESTION: This all looks good and it is interesting. I was just wondering if you have ever encountered any pitfalls in using a graphical approach either in the selection of reserves or the presentation of them?

MR CLARKE: Presentation ... not since I've started using something like this. I have found it works very well. I think I would find it very difficult to go back to using any alternative approach.

In reviewing reserves, you have obviously got to be careful that where things have happened, you actually allow for them. There is a temptation to choose ultimates so that everything is consistent. You have actually got to be very careful that where things are not consistent that you do not force them to be consistent and get the wrong answers. Thus, if you get something that initially does not look reasonable then you need to be sure to understand what is happening inside the business to make the graphs look inconsistent.

So that is the only pitfall of looking at graphs like this. You have got to be careful not to force consistency.

MR NARVELL: I would agree with that. One criticism that came up last year is that, well, of course, the graphs looks good because you have forced them to look good. That is not entirely true. You can see in this particular instance that there is no way that you could get the group of lines for the older years to overlap with the group of lines for the more recent years, because the ultimates just will not line up.

The other comment that I would make in terms of a pitfall of the graphical analysis, is that I have certain clients that ask me to produce conservative answers for the purposes of negotiating a commutation. It is one thing to disclose in text that the estimates are good and sufficient and are intended to provide a risk margin for the assumption of liabilities, but when the graphs come out they can be somewhat damning sometimes as to just how much risk margin might be in there. And the graphs can work against you if you have skewed numbers, one way or another. In the case of a commutation they highlight instances where there is over estimation and where the reserves are excessive. So if there is some subjectivity or reserve smoothing that has been implemented for whatever reason, the graphs can show that such a phenomena exists.

MR CLARKE: So be careful when you are acting for the seller of a business. You might be pushed to take an optimistic view of the reserves. This will show up to the recipient, as he will then graph them and say, I do not believe that. I have done that and as a result reduced a sale price.

MR NARVELL: It's very interesting that it is a double edged sword ... that we believe that the graphs, on a percent of ultimate basis, are so powerful that it is a weapon that we are afraid people will eventually use against us, in a circumstance where there was some subjective bias which was being introduced into the ultimates.

Thank you very much for staying at the end of the day. I'm sorry we ran over a couple minutes, but I appreciate your attention.

Private Car (Syndicate 1)
1976

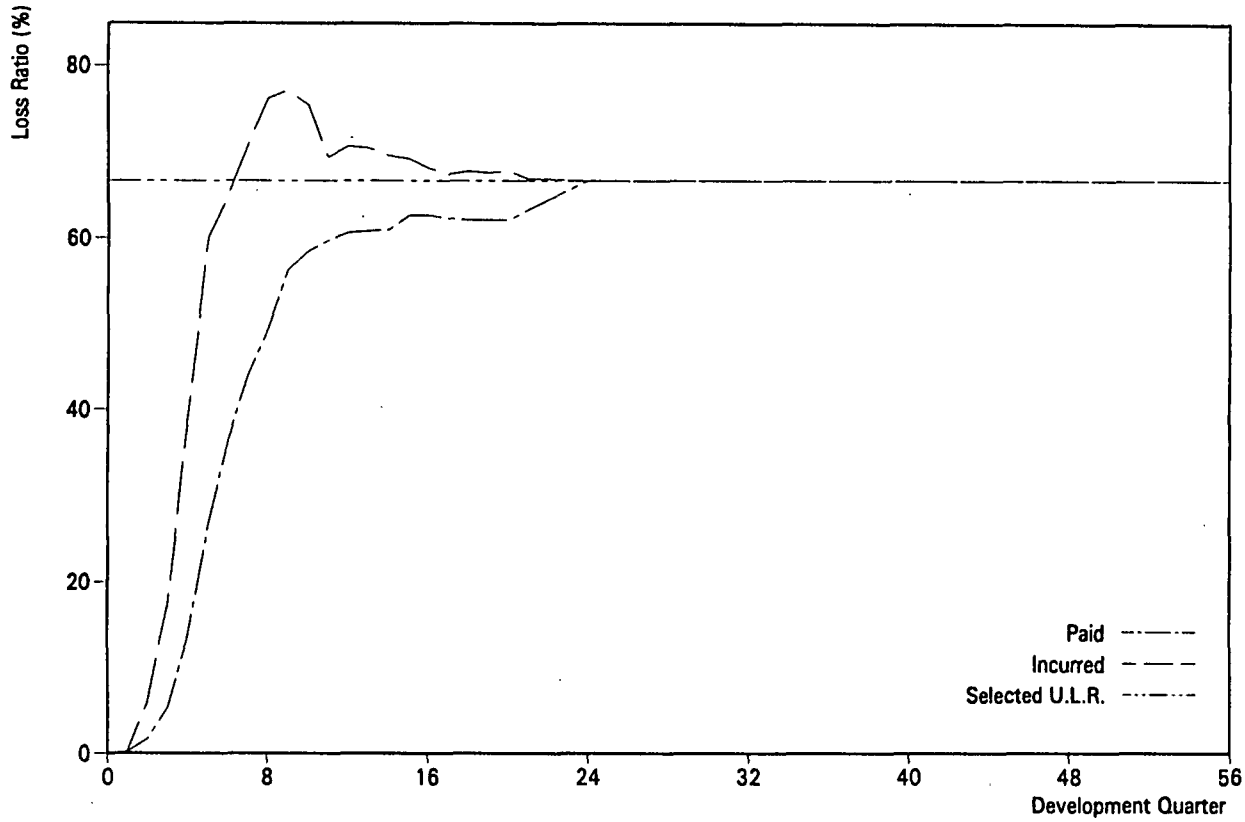


EXHIBIT 1

Private Car (Syndicate 1)
1980

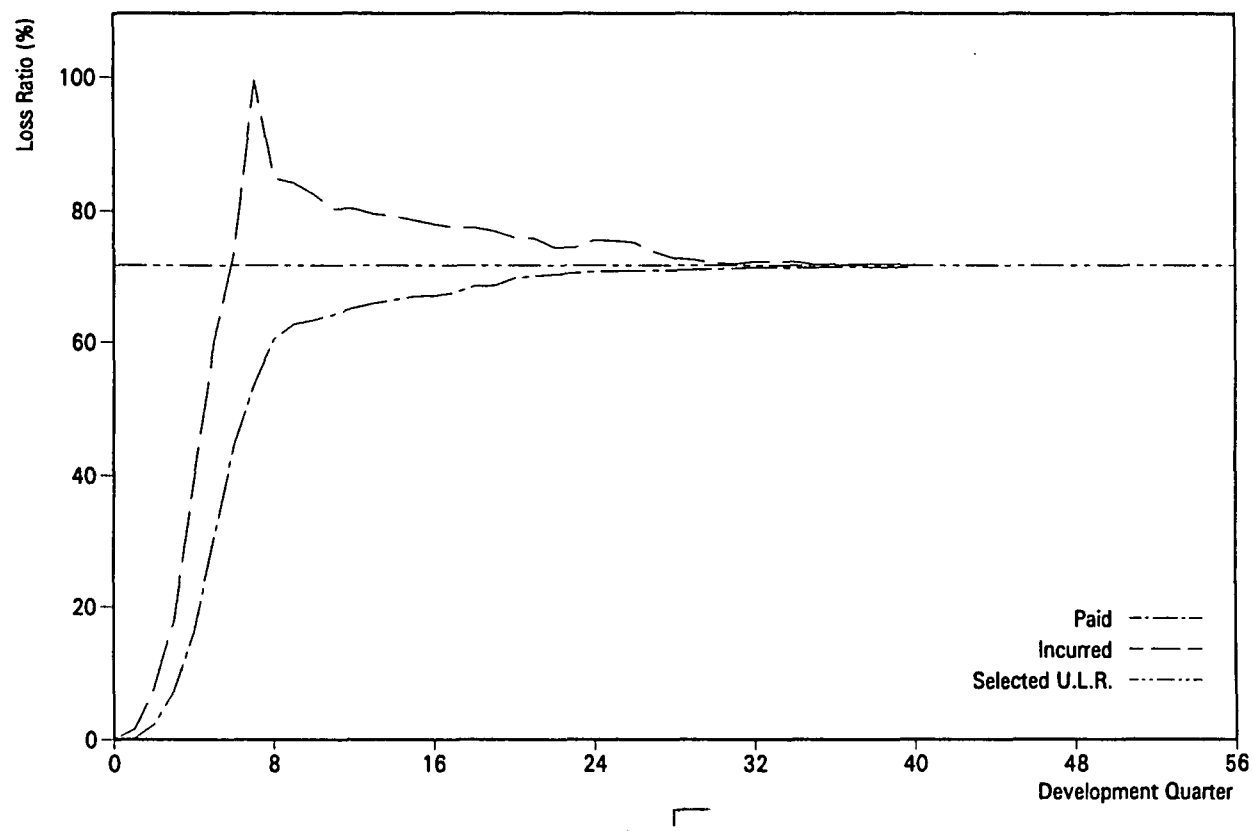


EXHIBIT 2

Private Car (Syndicate 1)
1984

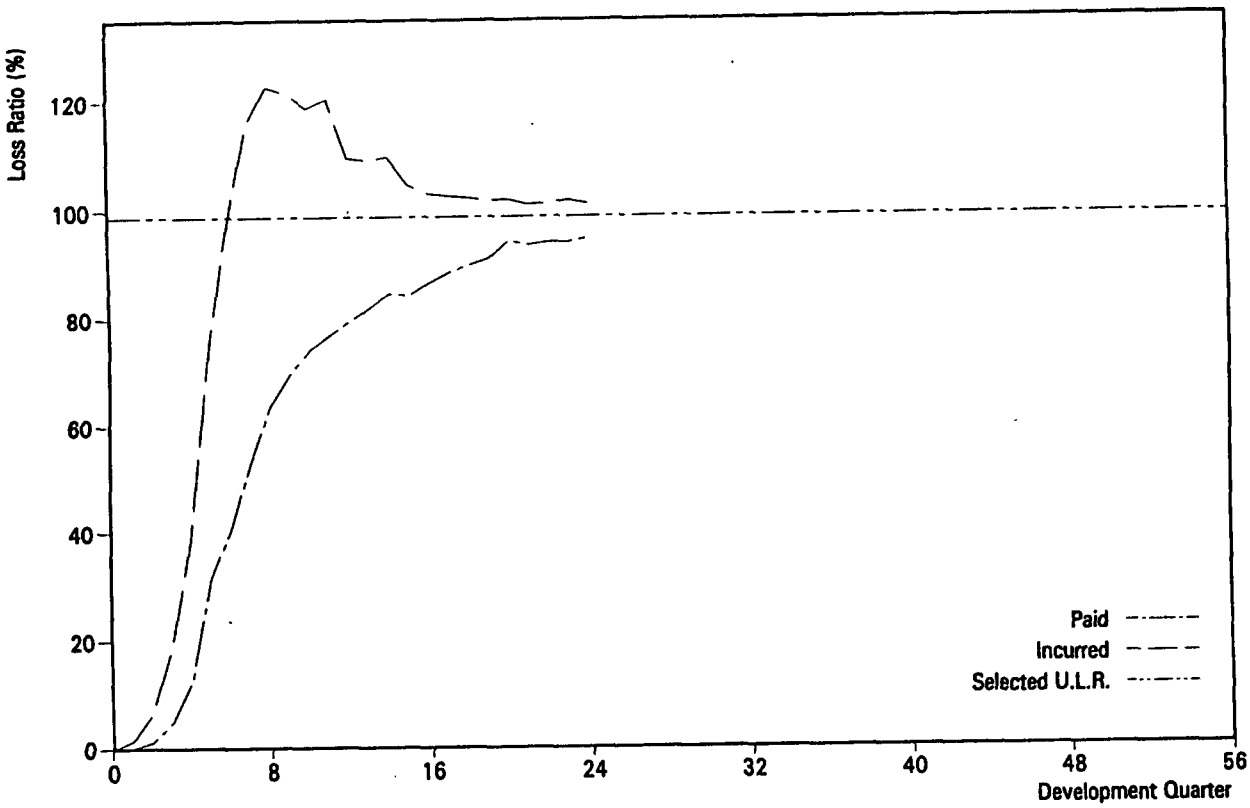


EXHIBIT 3

Private Car (Syndicate 1)
1988

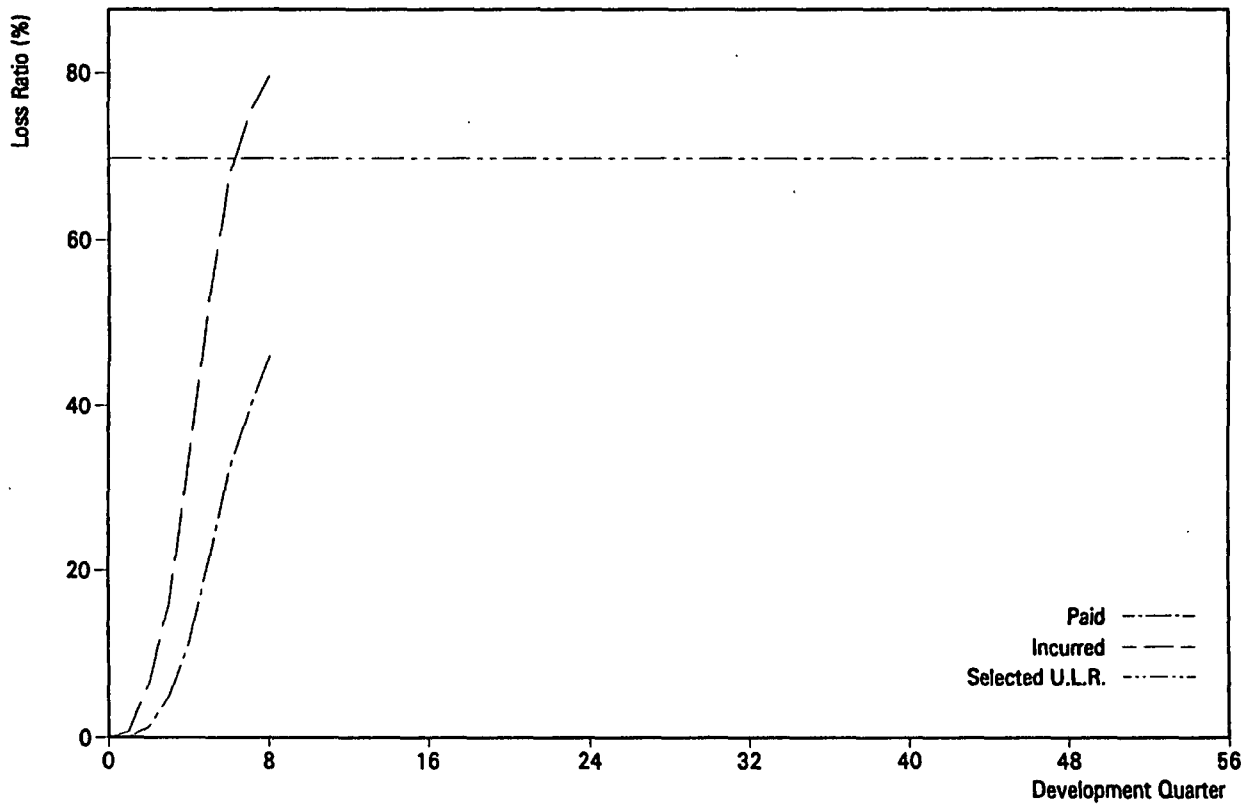


EXHIBIT 4

Private Car (Syndicate 1)
1989

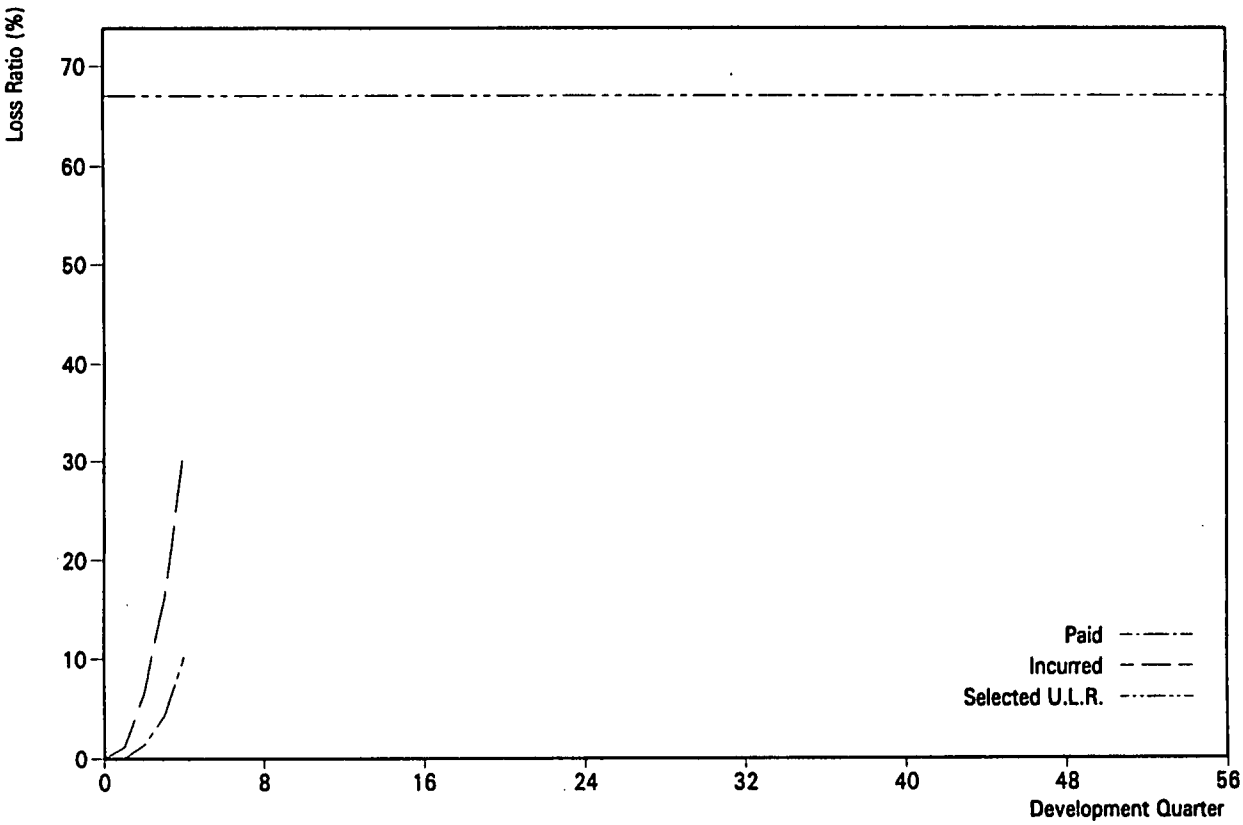


EXHIBIT 5

Private Car (Syndicate 1)

Cumulative Paid Claims As A Percentage Of Estimated Ultimate (1976 - 1989)

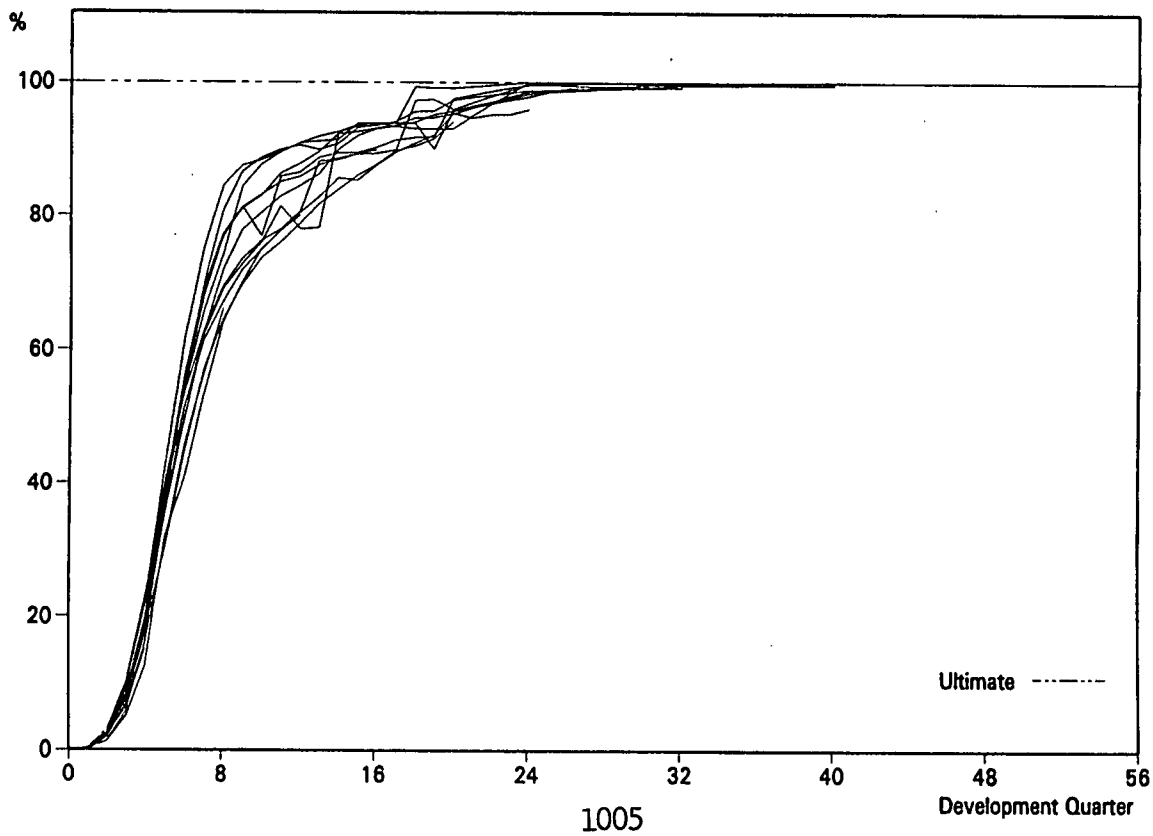


EXHIBIT 6

Private Car (Syndicate 1)

Cumulative Paid Claims As A Percentage Of Estimated Ultimate (1976 - 1981)

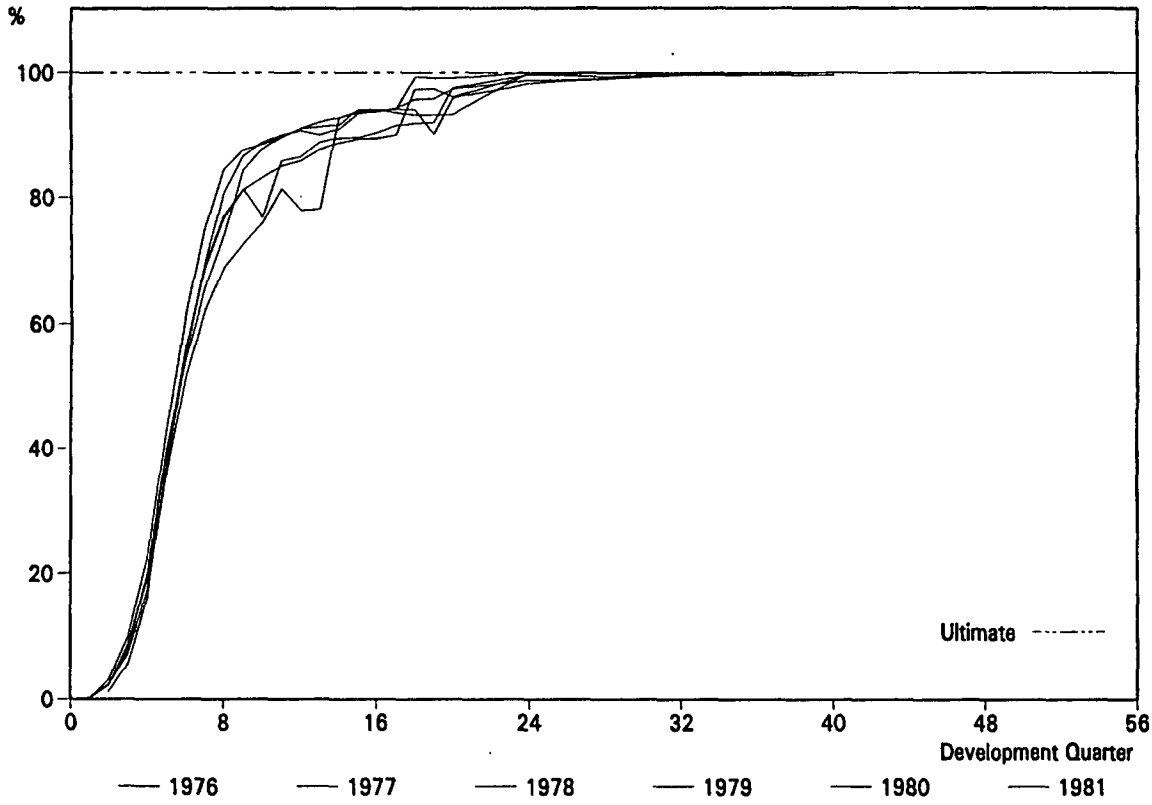
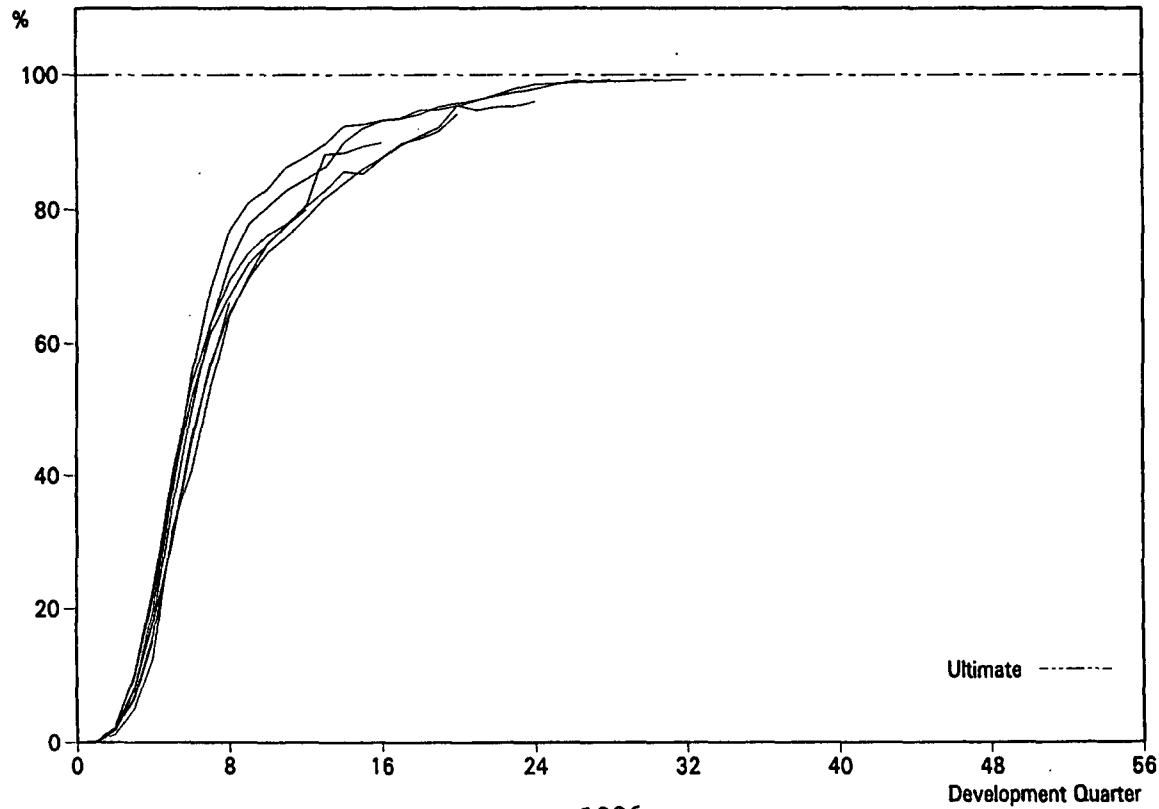


EXHIBIT 7

Private Car (Syndicate 1)

Cumulative Paid Claims As A Percentage Of Estimated Ultimate (1982 - 1989)



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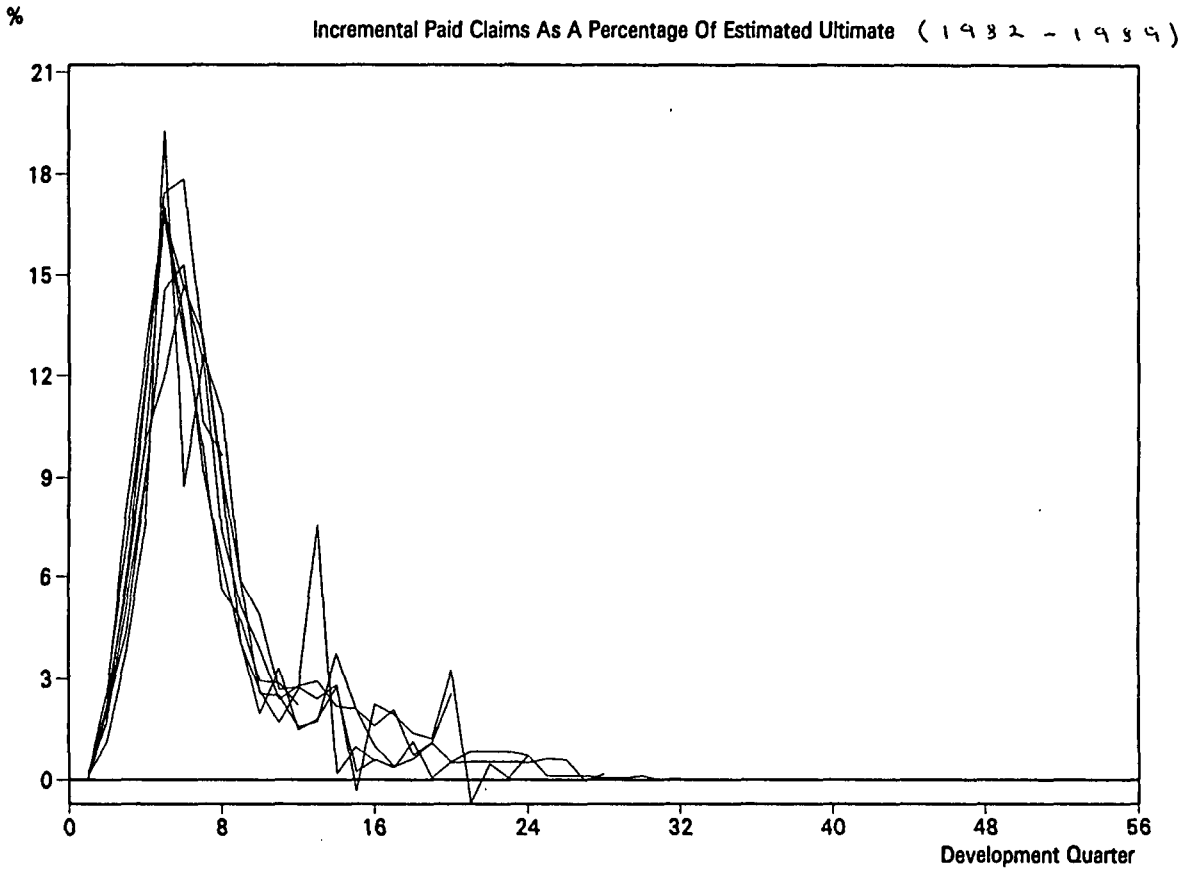
Private Car (Syndicate 1)



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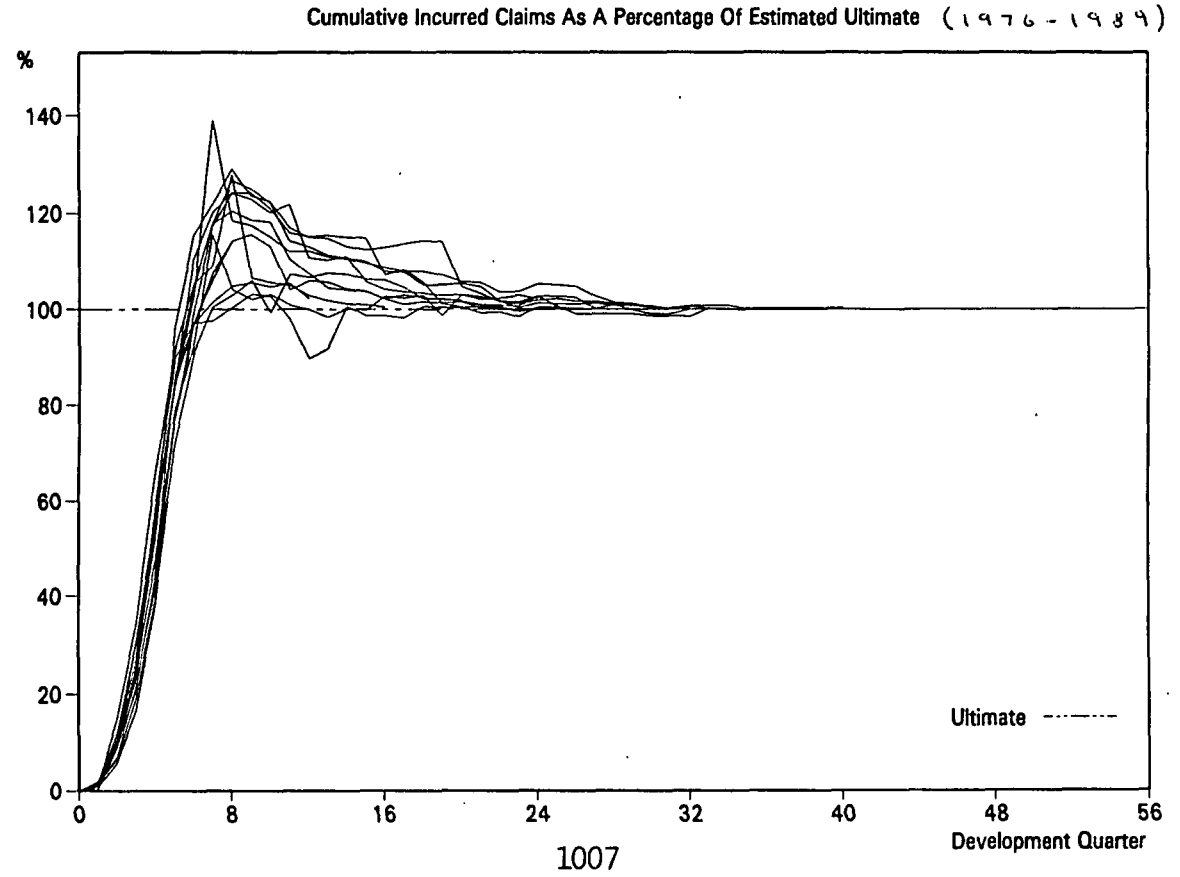

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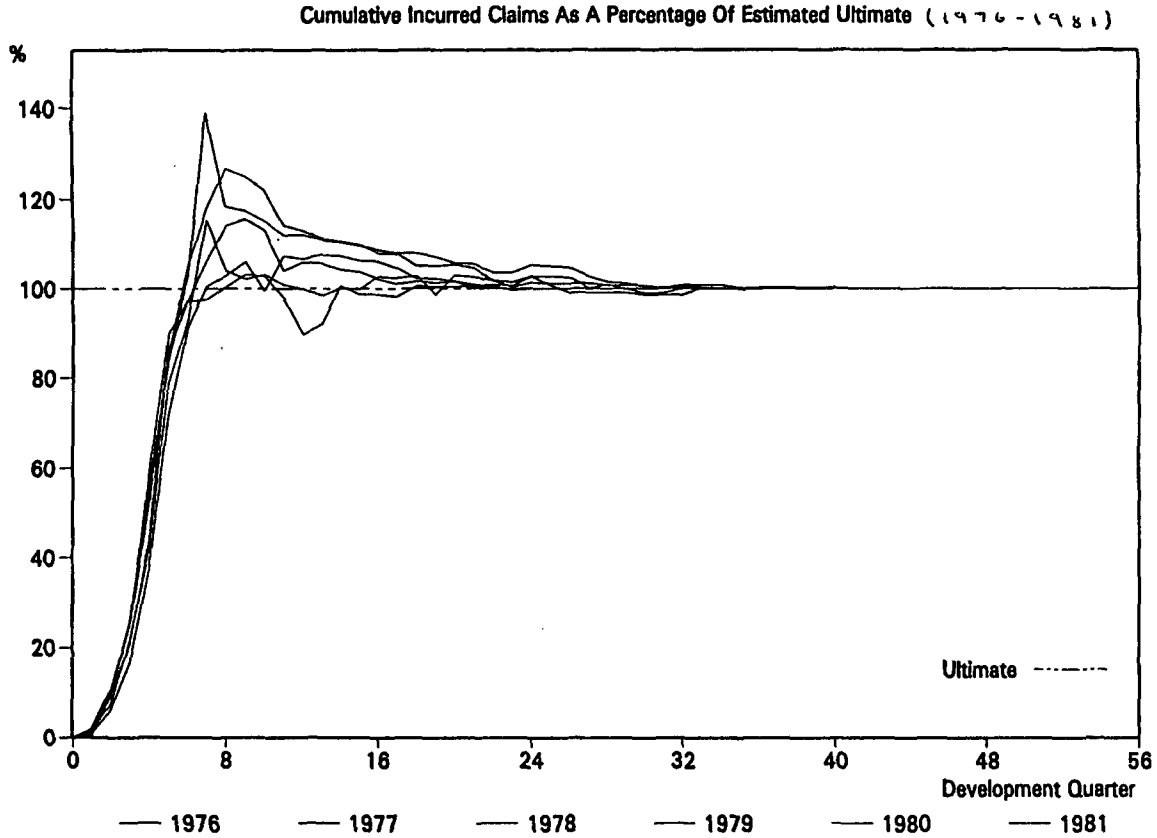

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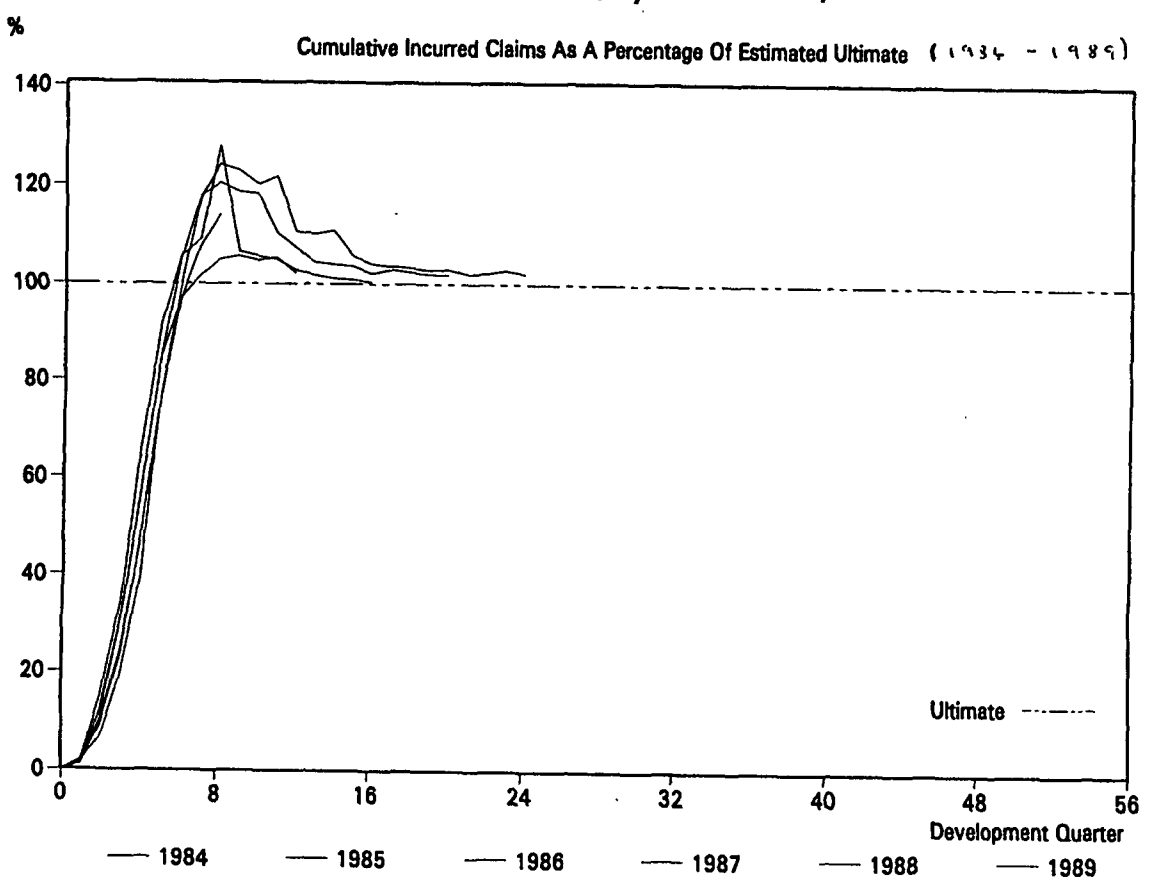


EXHIBIT 12

Non Marine - Non Proportional - US$
1971

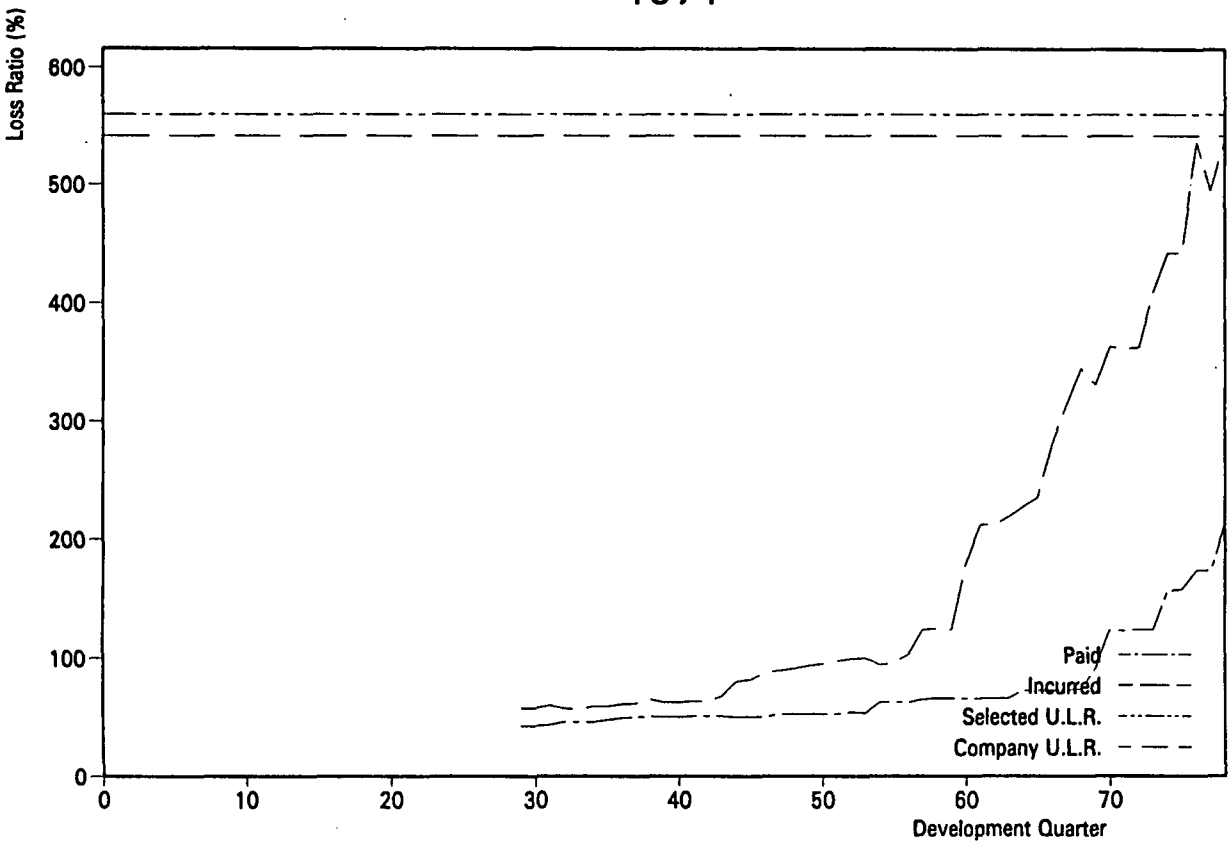


EXHIBIT 13

Non Marine - Non Proportional - US$
1972

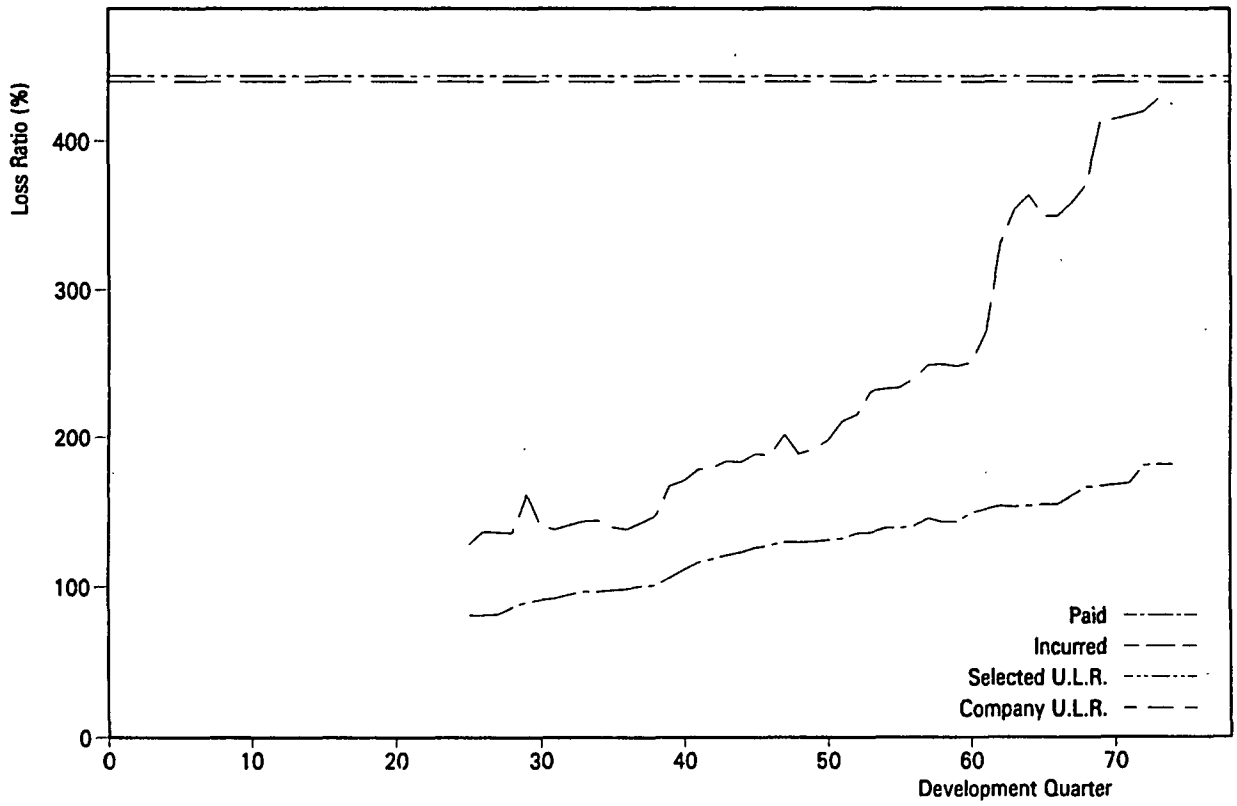


EXHIBIT 14

Non Marine - Non Proportional - US$
1976

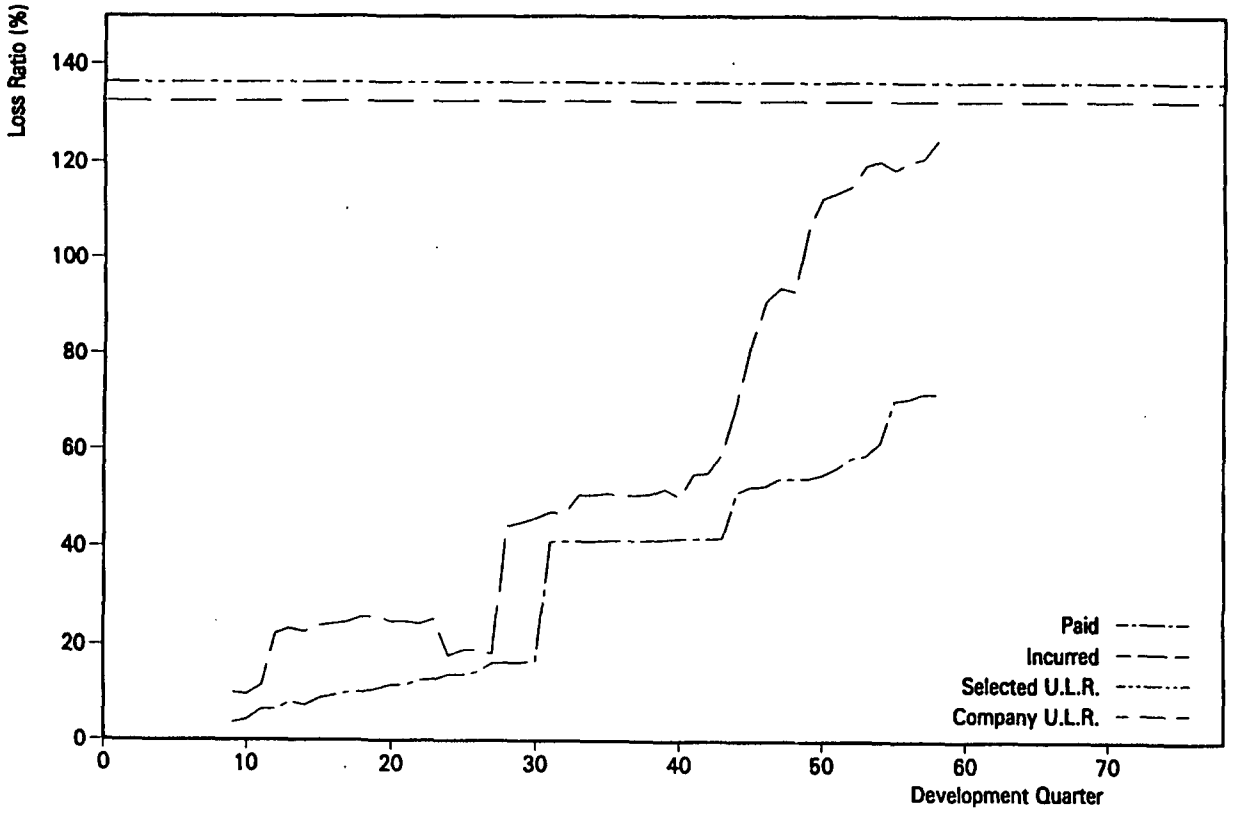


EXHIBIT 15

Non Marine - Non Proportional - US$
1977

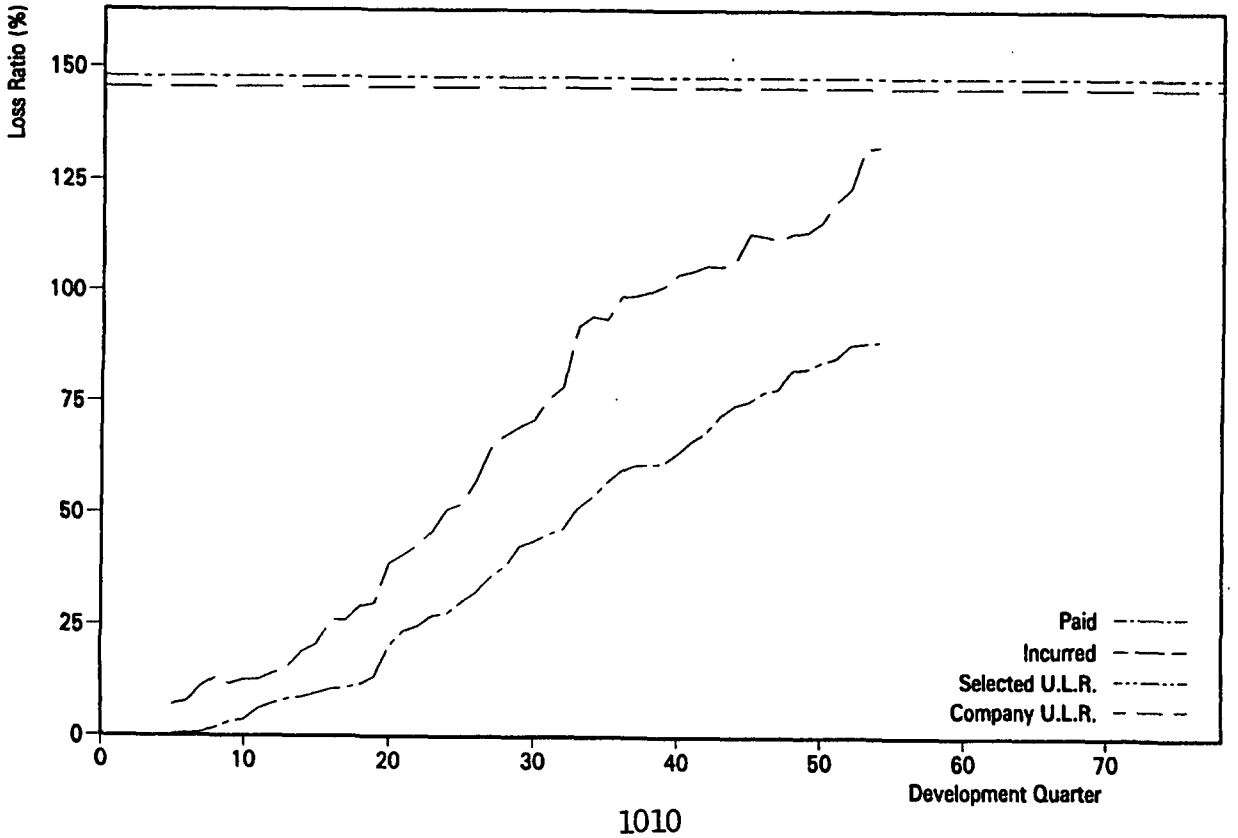


EXHIBIT 16

Non Marine - Non Proportional - US$
1978

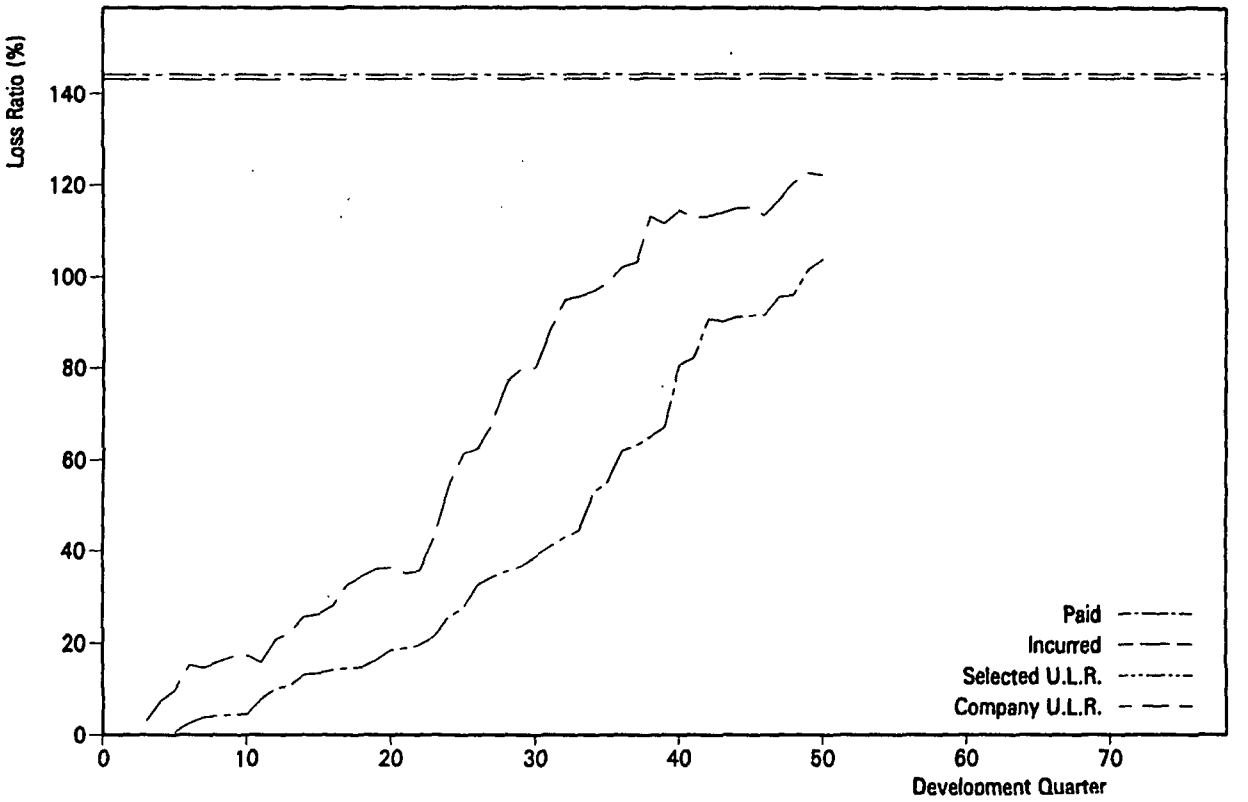


EXHIBIT 17

Non Marine - Non Proportional - US$

Cumulative Incurred Claims As A Percentage Of Estimated Ultimate (1971-1989)

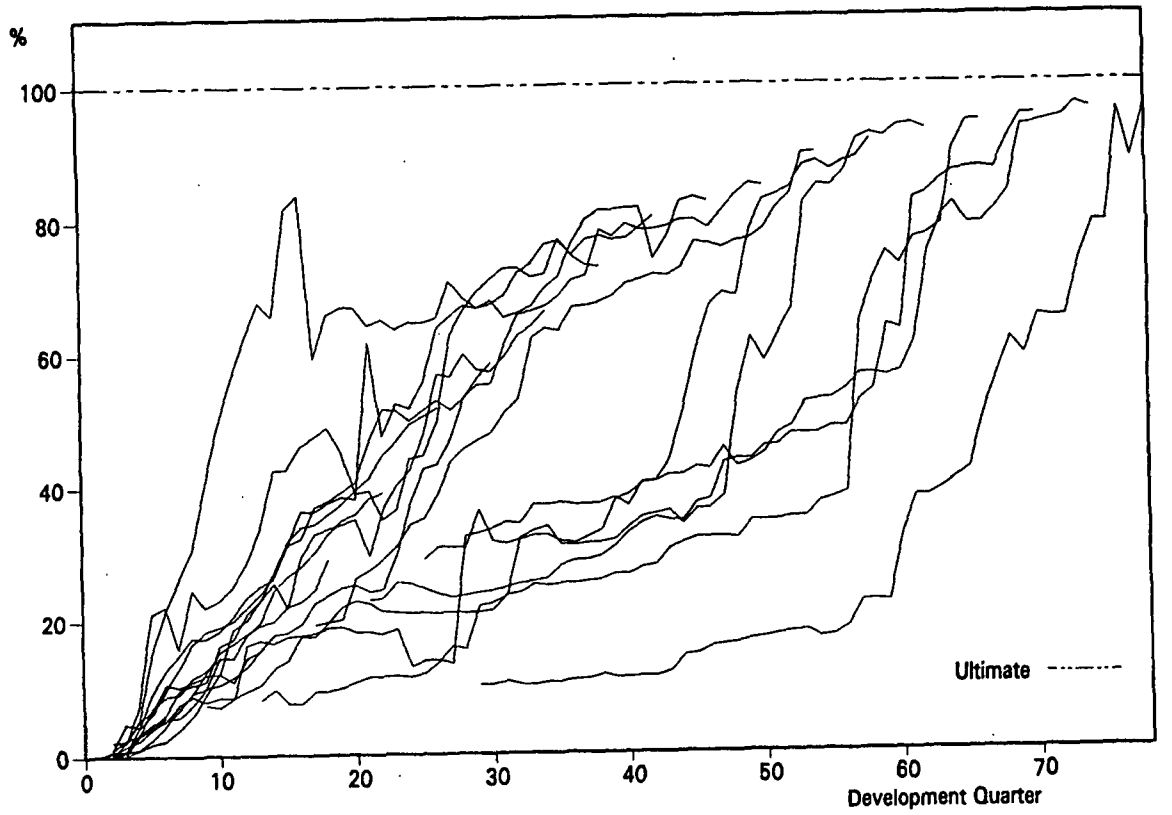


EXHIBIT 18

Non Marine - Non Proportional - US$

Cumulative Incurred Claims As A Percentage Of Estimated Ultimate (1977 - 1989)

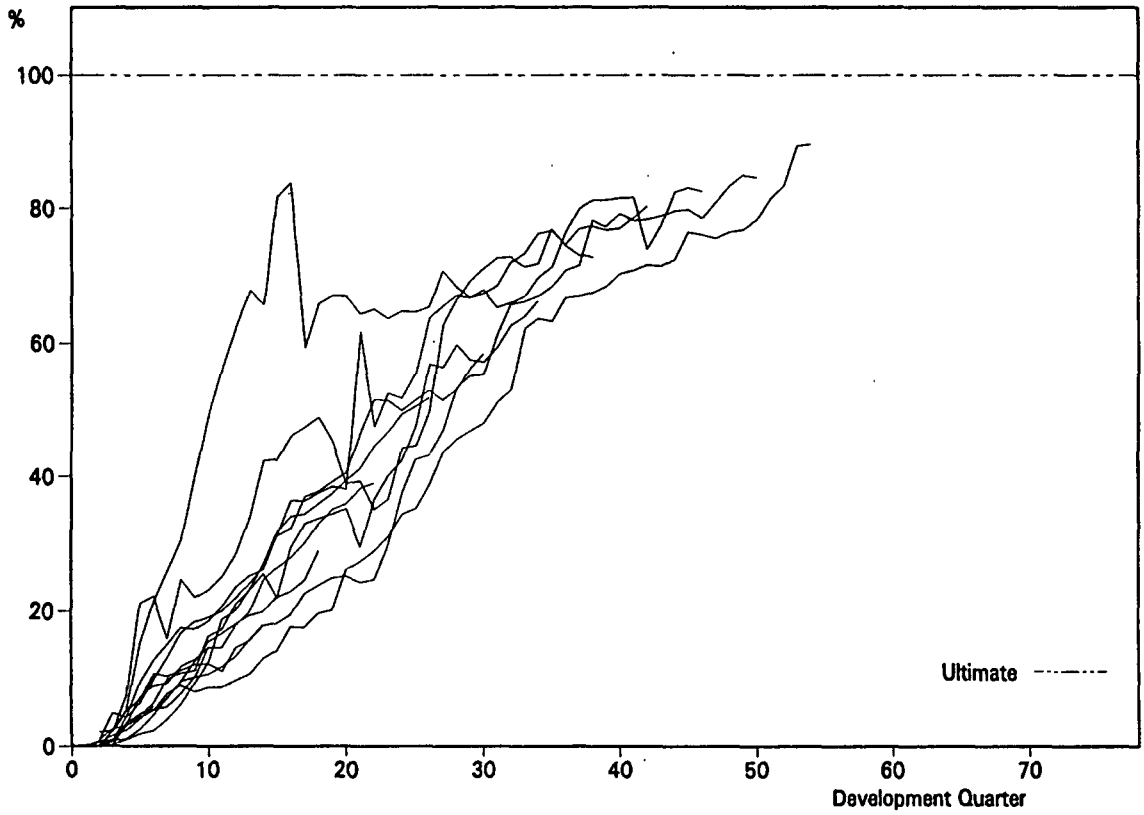


EXHIBIT 19

Non Marine - Non Proportional - US$

Cumulative Incurred Claims As A Percentage Of Estimated Ultimate (1978, 1979, 1981 - 1989)

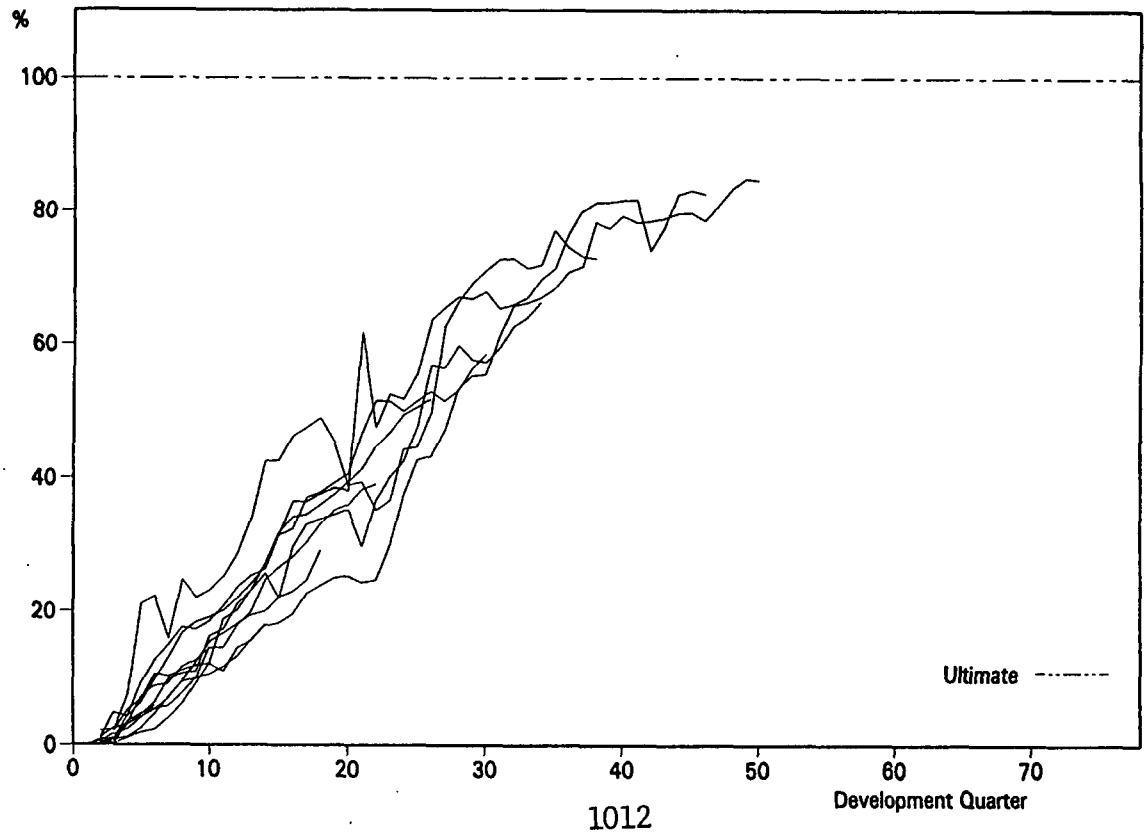


EXHIBIT 20

Non Marine - Non Proportional - US$

Cumulative Incurred Claims As A Percentage Of Company Estimated Ultimate (1978, 1979, 1981 - 1989)

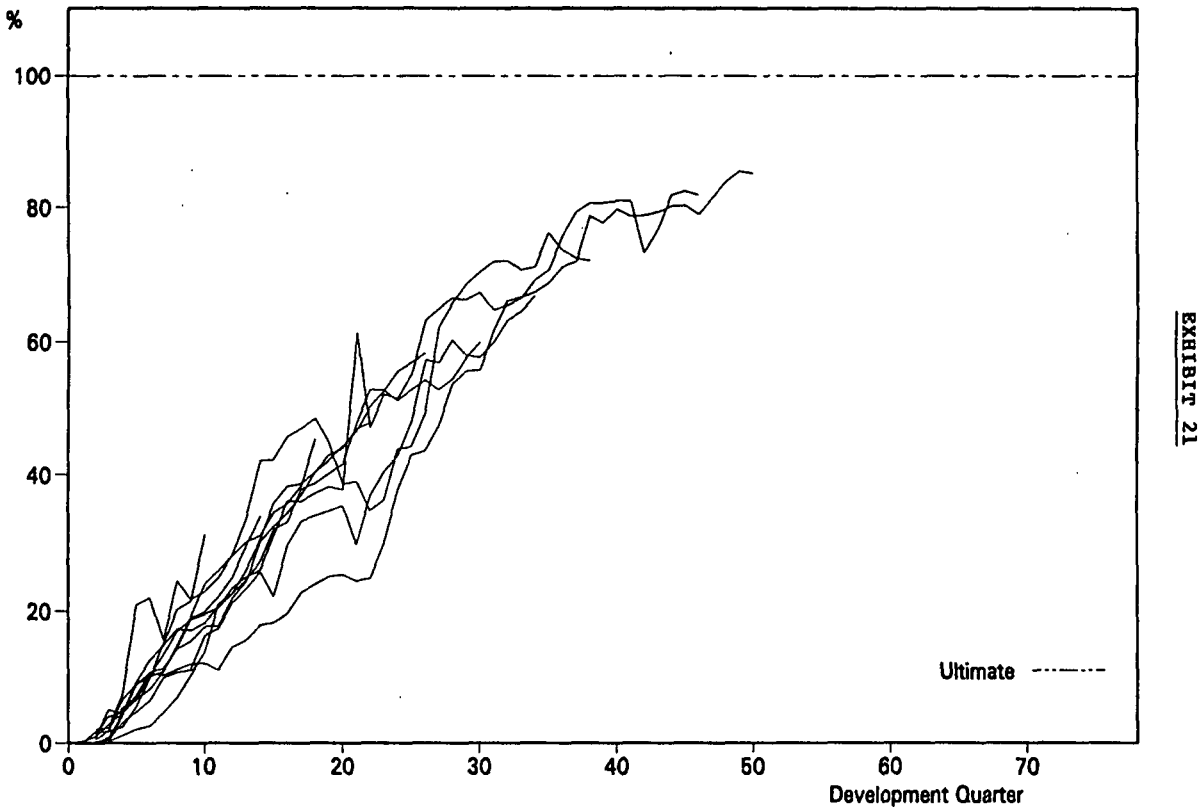


EXHIBIT 21

1990 CASUALTY LOSS RESERVE SEMINAR

4G: LOSS DISTRIBUTIONS FOR ALAE

Moderator

David R. Bickerstaff
Milliman & Robertson, Inc.

Panel

Glenn G. Meyers
Insurance Services Office, Inc.

MR. BICKERSTAFF: Section 4G. If your desired destination is somewhere else, you can leave now. A few housekeeping matters. First, Miss Cathy Smith, the lady in the grey suit in the rear, is the monitor for this session. She's the one that will get your card punched when you leave and take your filled-out slips, your critiques, or whatever you want to call them, for the session.

My name is Dave Bickerstaff. I'm a consulting actuary with Milliman and Robertson. I'm going to be the moderator, and I will also be your speaker today. Glenn Meyers of ISO will be the other speaker. I'll tell you more about him in a minute.

Our subject is Loss Distributions for Allocated Loss Adjustments Expense Reserves. Glenn and I have discussed this together, only just a couple of times actually, and we find that rather than trying to be totally mutually exclusive of one another in our presentations, we have, perhaps, as much as 50 percent overlap in our concepts that we are going to discuss. But since we are talking about two completely different data bases and lines of business, we thought that it would not be too redundant to cover some of the same topics and same type of modelling concepts. So if you miss it the first time around, maybe you'll catch it the second time.

I'm going to lead off. We would prefer, if there are general questions, if you could defer those till we are both done, which will take, maybe 20 minutes apiece, we think, thereabouts. However, if something comes up, which you think is -- you have a burning question that would be more appropriately asked on the spot, then go ahead with it. But we want to try to keep most of the questions towards the end.

I'm going to start out, then -- First of all, I guess there is a basic question we're trying to address here: What role, if any, does a distribution of loss adjustment expenses have in reserving? Now, the little comments that are in the booklet, mention two things, one of which is the construction of increased limits tables, something that Glenn has done quite a bit of work on, and particularly since he has been with ISO, but there's an automatic carryover, we think, from that issue which is not directly tied into reserving, but there is a carryover from construction of tables to reserving.

We are going to ask several questions: What role does the distributions -- what role does it have, and are there any particular lines of business or situations where the presence or the use of actual claim size distributions for ALAE, is it vital in some areas. First of all -- we may have to dim the lights just a tad here.

For starters, I have chosen to give a one-slide summary of some of the kinds of concepts that we all perhaps have encountered in our first exposure to ALAE reserves. This is not intended to be

a knock on anything that's done, or in any way derisive remarks here as to the kinds of things that you run across.

What I'm trying to do is to contrast a rather traditional approach to some very traditional lines of business where you probably could get by in your career without worrying about things like distributions, with some lines of business that both of us will talk about where the use of distributions will be extremely helpful, if not vital.

Allocated claim expense is becoming quite a -- is showing some alarming trends in liability lines. I think this pretty well goes across all lines. It used to be when you first took this subject up, you looked at allocated claim expense as sort of an add-on expense to indemnity reserves. You look at your indemnity reserves as the main ticket item, and then you add on 15 percent, 18 percent, or whatever, for ALAEs, just like if you were writing a ticket and you would put tax and tip down for your charges, that was your total charge. That's why sometimes I call this the American Express card method for allocated claim expense reserves because it's just like, you know, add on your tax and tip, and there is your total reserve.

These ALAE-to-indemnity functions take several forms. You have the old paid-topaid ratios; you'd go back and calculate those, and use that ratio for your ALAE reserve, or you could get a little more sophisticated and develop out these ratios and get a reserve-to-reserve ratio, et cetera. Or you could come down and say if these ratios to indemnity were not giving adequate results, you could look at ALAE as an independent entity, and you could run it out with incurred development, or paid development, or whatever kind of development you preferred, or a mixture of the two, and come up with results that are independent of indemnity.

Then if you had a question regarding net reserves versus direct reserves, you just simply extended these same concepts, and you can get ratios of net paid ALAE to net indemnity, or you could develop out your ALAE net independent of indemnity. Now, all of these things listed here, could, and probably have given reasonable and adequate results for many lines of business. Many fairly low severity lines, relatively low severity lines, and lines that are fairly quickly closed, as far as claims are concerned.

It's when you get into some other slower closing lines, that are higher severity, is where we think you are going to run into some problems with these traditional approaches. For example, when you are treating the net versus direct problem for a slow closing or high severity line of business, the kinds of reinsurance parameters that you typically can run across, the way they treat loss adjustment expenses can vary in one or two or three ways.

For example, you may have a situation where, in your reinsurance treaty, ALAE is 100 percent retained. Well, if that's the case -- it's very rare, by the way. If that's the case, you don't have a big problem here -- if all your loss expenses are retained, then half the game is over. But that is a rare situation.

Most of the time, as you know, when you have an excess of loss contract, the loss adjustment expenses are retained pro rata. In other words, if 25 percent of the claim -- On the indemnity side -- if 25 percent is net, then the ALAEs are also retain 25 percent. Then you also have the third possibility -- that is fairly rare itself, but we have all seen some of these situations -- where the retention is equal to the sum of the ALAE and/or indemnity.

There are situations that can happen here that can lead to some real problems unless you are looking at the actual ALAE distribution versus the indemnity distribution. For example, the actual retained threshold, the retention or the attachment point itself, may be subject to indexing where, if the claim is paid this year, your retention is 200,000; if it is paid next year, it's 225, and so forth, on down the line. So you've got a moving target there.

And then throughout the history of your business, the actual basic initial retention may have changed. It may have been 100,000 three years ago. It's now 250,000. There are some other things that you could probably add to this list that can produce very dangerous pitfalls in simply going back and looking at net losses or net ALAE versus net indemnity. In other words, the old traditional methods.

One other thing I could have thrown in that category is the fact that for some kinds of contracts, the retention is on a per-occurrence basis. In other words, all defendants in a case share the same retention as opposed to a per-defendant basis. This has implications for the underlying loss distribution that you're working with. Any of you could probably add several things to the list that, for some of the high severity liability lines, can produce biases by simply going back and looking at past history of net versus direct.

Now, how then do you solve some of these problems by use of a distribution? Well, in order to approach some of these idiosyncrasies we saw in the previous slide, we think that the best way to do it is to go back and look at all prior experience on a direct basis, both indemnity and expense; for each year project out the ultimates on a direct basis, and then for each year independently carve out the indemnity layers, the net versus retained, and based on that, carve out the loss adjustment expense. For each year they are based on the parameters or the reinsurance terms for that particular year. And the other two vital ingredients are the assumed distributions of loss adjustment expense and indemnity, by size.

And then this final thing brings up a point that I think is extremely important in looking at loss adjustment expenses, and it goes back to the original assumption, the way we used to do it. We have a percentage of loss adjustment expenses to all indemnity. Well, in many lines most cases that have expenses also have an indemnity. You don't have a lot of cases -- In, let's say, a quickly closing line, you don't have a lot of cases with loss adjustment expenses alone.

But on the two lines we're going to be talking about today, you could typically have, for all closed cases, 25 percent or less claims closed with indemnity, and the other 75 percent close with expense only. This is ignoring claims closed with no payment. You throw those out first. Of what's left, if you've got a situation where only one claim in four has indemnity on it, then what sense does it make to worry about ratios of expense to indemnity when three out of four don't even have any indemnity?

So a very critical step, we feel, is segregating claims with indemnity and claims with expense only. As I will demonstrate in a minute, the distributions are entirely different, and the way they apply to a reinsurance contract, is entirely different.

Now, this is somewhat of a digression that I thought it would be worth throwing in here. I mention these two categories of expenses: claims closed with indemnity, claims closed with expense only. But when you're looking at a body of data, really there is a third category. And that's claims with expenses paid on open cases. When you're looking at just paid ALAE, it could fall in any of those three categories.

This is an actual case, and would be interested in anybody's interpretation of this. We had quite a difference of opinion between the auditors. Here you've got a situation where, in this one particular case, we had a retention of $250,000. This was a professional liability case. At the point in time we were looking at the reserves, we had paid $600,000 of ALAE prepaid because the claim was still open. The claims department had still estimated another $200,000 of ALAE reserve. Indemnity reserve -- there had been no payments on indemnity yet -- was a million dollars. The question is, what is the net reserve on the case?

If you run it through the usual algorithm, you say, well, if you paid a million dollars on indemnity, if you use that for your gross direct indemnity reserve, then your net indemnity is going to be 250,000; that's your retention. Pro rata, the ALAE would be also one-fourth of the total. The direct would be 800,000, so the net would be 200,000. So we end up with a total ultimate incurred net of $450,000. We've already paid 600, so the net reserve would be minus $150,000.

Now, we had -- let's put it this way -- quite an interesting conversation about this claim with the auditors. How do you actually handle a case like this? It's not an unuusal case.

The real paradox is that the more you pay on indemnity, the better off you are, because the higher that number is, the lower the ratio is, and you end up with a net retained of lesser and lesser amount the more and more you pay on this case. So there is a disincentive to settle the case.

Again, just a digression. Just a little thing to ponder over. How it relates to what we are talking about is that, there are in fact many categories of ALAE, and you need to segregate these categories to get a good idea of what's going on.

Let's get into, then, the meat of the thing. So, for our claim size distribution for ALAE, again, we split this up into two pieces: claims closed with expense only, and claims closed with indemnity. So we are going to handle the ALAE on these two categories separately. Again, if there is a preliminary step, we think we have to segregate the percentage of claims closed with indemnity from the claims closed with expense only, because when you get done with these two separate distributions, you have to know what to apply them to.

Then we get to the first of the two distributions. For the ALAE distribution, claims closed with indemnity, we are interested in answering these questions: Is there a correlation between the expense amount and the indemnity amount? And if so, is there a way to predict, from some relationship, the ALAE expected given the indemnity? that was our target.

Now, this is the case study that we happened to work with. We had access to about 17,000 medical professional liability claims, closed claims, closed in the years '86 through '90, and in order to make the calendar years of equal depth, as far as how many accident years we went back, we used the past seven accident year components of each calendar year. These were from seven states which represented a good cross-section of states all over the country, and also as far as risk, high/low, populous, rural, whatever.

Since there was a difference in the average indemnity by year, we indexed the data from each year to one of the years, which was 1989, the last full year we had. The output that we were shooting for was a joint distribution of indemnity versus ALAE. We did this by going through the entire file and finding out which of 51 buckets the indemnity would fall in and, also, which of 51 brackets or buckets the expense on that one claim would fall in. These brackets or intervals were defined on a logarithmic scale.

Although I don't have a slide for this, I think on your next page we have actually defined what those brackets were. The maximum bracket for indemnity was $2 million. Actually, our top bracket was over $2 million. Our first bracket for both indemnity and expenses was zero, which meant zero, nothing paid. For the zero-zero bracket, which was no expense and no indemnity, we

threw all those out before we ever started. So, that defines the distribution, the way that we actually summarized the claims into this 51 x 51 matrix.

The next two sheets that you have, I do not have a slide for them, but basically what it does, it sort of gives you a scatter plot of the final output, the indemnity against the expenses. We've done it in two sections, the first one showing how many hits there are in each bucket, and the next one, second sheet, gives you just those cells for which the number of hits is four or greater. That one gives you a little more definition as to how the correlation goes.

Before I get into the actual correlation of these two things, we have shown some graphs and some output taking indemnity by itself first, and then expenses by itself, to show how these two things act independently. The distribution we have for indemnity over all expenses, worked out something like this. Out of the 17,000 claims, only 4,000 actually were closed with indemnity. So, this was a little spottier than the one you'll see for expenses.

One quick remark here, and we could of course spend a whole session on how you interpret this particular one, but we want to concentrate on expenses. You'll notice that the histogram here seems to be a little underrepresented on the right side. If this were, say, a log normal distribution, it is not quite symmetrical. You notice the X axis is on a logarithmic scale in order to observe, to see how well this would look as a bell curve on a log normal basis.

The thing to keep in mind on this point, however, is that we know that the claim data itself is subject to some policy limits. In some states I know that -- One state in here, the average limit was about $500,000. So that the claims themselves have been dampened as you get into the higher levels, and therefore we think this is not representative of the right-hand tail. It would extend out further if we had truly unlimited data.

Another way of representing that is just taking the cumulative distribution of it and it looked like so. Twenty percent of the claims were less than $10,000. The mean value, I think, was about $180,000 on this particular distribution. But, again, indemnity is not what we are mainly concerned with. ALAE is our main concern. The first distribution of ALAE on closed with indemnity looks like this, and, over the whole range of all our cases, all indemnity combined, has a mean of $15,500. The cumulative of that looks like so.

The other side of the coin, the bigger group, was the ALAE on closed with expense claims. It has a mean of $6300. Now, the coefficient variation of both of these two distributions -again, remember this is irrespective of the indemnity -- the coefficient variation is about 1.6 for these two distributions, both of them. But, as we will see later, that's not the

coefficient variation we are most concerned with. For reference purposes, that happens to be the CV of that distribution. That's the ogive of the ALAE on CWE claims.

But, as I said earlier, what we are mainly concerned with is the relationship between the expenses and the indemnity size. So what we've done in this graph, we've taken those 51 indemnity brackets, and for each of those brackets we calculated the average loss adjustment expenses, and we plotted the average against those brackets. The green line there is a graph of the average ALAE against each of the indemnity brackets. We did this on log-log paper and fit a straight line through there.

This was, by the way, a weighted regression so that each point is not equally weighted. There is much more volume in the middle areas than there are in the top. And a lot of the noise on the top of this line is due to the fact that there's not as many claims up there as there are in the middle. So this suggests -- I don't know if you can read this from the back of the room -- that we have a line of best fit, which is like 176 times X to the .4 power; X being indemnity, and Y being the expected ALAE given that indemnity bracket.

What we are going to be mostly concerned with is not the variability of the entire loss adjustment expense distribution. But, as you'll see in a minute, once we have found this relationship between loss expense and indemnity, we are now concerned with what the coefficient variation is within that bracket.

So, what we did here, we simply calculated for each indemnity bracket the coefficient variation of the expenses in that bracket. Of course, when it gets down to the tail end on the right, we are looking at just a few claims, or it gets a little noisy. But, overall, the coefficient variation was very close to 1.0. Let's put it this way: It was close enough to that level for us to feel that using a 1.0 CV within a bracket is close enough for government work, as they say.

Basically, then, what do we do with all this? And I'll close with this: Our target was to get a good handle on the relationship between net and direct. That is the area, we feel, where the old traditional methods may be found most wanting when we end up with some slow closing lines like professional liability, and high severity lines like professional liability; and because of the variety of reinsurance parameters that you run across. That is the area where we feel the use of distributions is not only helpful, but in some cases is probably vital to consider.

How do we use them? In our particular case we have just set up a simulator to actually run through X thousand claims, feeding in the parameters for each year, the parameters being the attachment points, the indexes, et cetera, et cetera, and actually

simulating direct losses and then net losses based on whatever reinsurance terms apply for a particular year.

So, in very, very watered down terms, this is what a module of a program might look like. And again, I have watered this down to just keep as few words on this slide as possible. We simply take, for each year we are concerned with, each year having its own set of parameters, and we go through, maybe, 10,000 claims - whatever we think is appropriate -- and we select an indemnity -- First of all, I did leave out one little thing here in my haste to be brief, but it is an important step.

We determined whether that claim is closed with indemnity or with expense. That's a very key point. As I said earlier, sometimes only one in four claims are closed with indemnity. So, once you get past that branch, if it's closed with indemnity we select that indemnity randomly from a predesigned distribution of indemnity size.

Then, given that indemnity, based on that relationship we had earlier between the expected loss expense versus the indemnity size, we select an ALAE. And given both of those, and given the attachment points for that particular year, we then can select the net indemnity and then, as a function of the net indemnity, we select the net ALAE. This is just a matter of adding up the direct losses and adding up the net losses to a bunch of accumulators by year, and we run through the whole thing, and when we are done we have, not necessarily absolute dollars, but we have a ratio of net idemnity to direct indemnity, and also a ratio of net expense to gross expense.

And that is how we have approached this problem. As I said, Glenn has used some similar concepts. He has used a different data base, a different line of business, and I think that if you miss some of these concepts from me, that Glenn will pick up on it.

Let me give you just a thumbnail sketch on Glenn Meyers. Glenn is currently assistant vice president in the Actuarial Development Department of Insurance Services Office in New York. Prior to that he was at the University of Iowa for four years, preceded by eight years at CNA, and two years at the Hartford. So he has had, or is having, a rather varied career.

He is the author of so many papers that I probably shouldn't even start to even list them because you've seen many of them and have enjoyed going through these papers. He has contributed to proceedings as well as the call paper -- You name it, he has been a contributor. Glenn, then, will discuss his approach to this problem using a products liability data base.

Glenn Meyers.

MR. MEYERS: What I want to say about this is that the work I have been doing on allocated loss adjustment expense should be viewed as part of a project that we are doing in an insurance office and reviewing the entire increase limits procedure. There are really three separate parts which I would hope we could have kept separate, but I see them being linked together as we go through this.

One, of course, is to come up with an overall loss severity distribution, or indemnity severity. And the other part is to analyze the effect of allocated loss adjustment expenses; and the third part is to look into the question of adverse selection by policy limits. I am going to be concentrating mainly on the second part, although as we go on you will see that most of these other issues are going to be creeping in here.

The problem that, just to take a look at it in its base form, is that we have an increase limits table that has something called a current severity. And then what we do is, we add some sort of allocated loss adjustment expense to this. When we show this kind of table, people say, wait a minute, you're going to tell me that the allocated loss adjustment expense is the same no matter what the policy limit is? We try to keep a straight face when we do this and say, yeah, that's what the table was telling us.

There is good reason for putting that in there, is that if you take a look at the contract itself, the basic limit itself covers the cost of all allocated loss adjustment expenses. And the idea, as soon as you buy the basic limits coverage, you of course have to cover, no matter how much you allocate a loss adjustment expense, all of it.

Now, of course the problem with that is, that if somebody buys a low limit, say, like $100,000, the defense of that isn't going to be anywhere near as vigorous as it would be if you had a policy limit of a million dollars. They will just simply sell it for that. Chances are that the opposing attorneys will realize that there isn't anymore money to get anywhere and they won't pursue it that much either. But, anyhow, this has been the rationale for this treatment. And it is because this rationale doesn't quite hold up is the reason we are investigating it.

One other thing that happens is, that we also are interested in doing something to help the reinsurers, and it turns out that the reinsurer, what contracts are worded quite a bit differently, is that the ALAE has quite often shared pro rata, or sometimes they treat ALAE as part of the loss itself, and subject that to the various policy limits. Our ultimate goal is to be able to handle both of these situations. I will be able to show how we are treating, at least this first part, right here. And the second one is going to have to wait for a little bit.

Now, what we do up here, is, we build something of a survey of the claims that we have that were in products liability, and we

had to make the similar kind of distinctions that Dave did. There are claims for which there is indemnity but no allocated loss adjustment expenses. What we have to do is, we somehow have to handle both of these.

The deterministic model that I wrote down here is that we have the expect allocated loss adjustment expense given that we know what the loss size is, and of course that the allocated loss adjustment expense is greater than equal to zero. This notation right here is a little bit imprecise and I apologize for it, but we actually know the X, and we are only considering Xs greater than zero, but we also know only that the allocated loss adjustment expense is greater than zero.

Then, of course, we got to consider the case of when we know the loss itself, and we just simply -- Then we have to build up the thing to account for the fact that there are those occurrences for which there is no indemnity but there is allocated loss adjustment expenses. So we just simply have to sort of build these whole things up.

We stayed off right here and, not terribly surprising, we came up with exactly the same sort of approach that Dave did in a sense that we think that there is a log relationship between the loss size and the allocated loss adjustment expenses. But we also recognized that there were several other variables that could also affect the allocated loss adjustment expense. We considered a number of them, is that we are doing this in products liability and we have three different products tables, and we wondered: Is this relationship different for the various products tables?

Now, another thing about our increase limits procedure is, that we are coming up with separate loss severity distributions by settlement lag. And so, what we wanted to do, is, in our relationship with loss and allocated loss adjustment expenses, we wanted to take a look at the effect of settlement mag.

Now, the other thing we wanted to do was, we wanted to take a look at the effect of accident year and also the effect of policy limit, like that. So, what we did is, we actually put this through a a general linear models kind of thing and -- What I did, is, I actually graphed the coefficients that are related with each of these variables, other than the loss size itself. And the coefficients we came up with, say, for example, for settlement lag, you can see that it was very low initially, but as we increased, and it increased rapidly for the early settle lags, and then it tended to level off a bit.

Now, the other thing we noticed right here was, that there is an accident year effect, and that's this part right here that seems to be going off in more or less a straight line here. What this is telling us is that when the loss size itself is being held fixed, the allocated loss adjustment expense is increasing over time. We have verified this from all kinds of extra sources of

information. Everybody knows that allocated loss expenses are getting higher over time, and this is just simply a verification of this.

Now, the other thing we did right here, is, we took a look at policy limit, and that sort of wandering around here, and it doesn't seem to be doing this in any particular pattern. It seems to be up, down, up, down, and the differences between the different policy limits does seem to be random. Now, I might want to make a very explicit right here, except a qualification about this. This is within settlement lag. So what we are saying is, that if you take a look at all the claims that were settled within a particular time, the allocated loss adjustment expense does not seem to depend upon the policy limit.

Now, the one difference right here, and this is where our efforts to take a look at adverse selection by policy limits does show us that the settlement lag distribution does indeed differ by policy limit. This is one thing we've got to watch very carefully. But in our model right here that has settlement lag, has one of the knowns, we are able to say the policy limit does not have much of an effect.

Then, after all this, what we have done is, that, we have simplified our model and we say that the log of the allocated adjustment expenses is going to be a constant times the log of the loss, plus a constant which depends upon settlement lag, and then plus a constant which depends upon accident year. Like that.

Now, let's get to the other part right here, is that we want to have something that says the probability that the allocated loss adjustment expense is going to be greater than zero, given that the loss is greater than zero. And the idea right here is that this probability should depend upon X and through simply a lot of trial and error -- no particular insight -- and we came up with this function right here that this probability is given by this function right here which is just one minus A to minus B, the parameter, which does vary by lag, times X to the lags root of X, if you want to put it that way.

The only thing we can say about this is that after a lot of trial and error this particular relationship seems to work, and what I have is simply a graph showing this sort of thing. I did this for two different lags. I have a settlement lag of two here, and if you can see that on here, the settlement lag of eight plus. As we notice that, they seem to level off after a while. And so, what we did, is, we can see that the predicted goes up in a nice fairly smooth curve here, and we can see that the residual seem to -- or the actual seem to bounce in a fairly reasonable way around it.

Now, the other thing we notice is that when we get to the later settlement lags, this slope upward is much more pronounced.

(Tape 4G, Side 1, ends.)

-- eight of these things. We could see that this slope upward simply gradually just gets more and more upward as we go on. So that gets to be the second part of our model.

Having put together a model, what we want to do is, we want to show how we go about and calculate some allocated loss adjustment expenses associated with the different policy limits. I don't expect you to grasp all of this -- it's almost a visual effect -- but the idea right here is that we are trying to take a look at the case where the excess reinsurance contract, where the ALE is paid in proportion to the loss.

The idea is we have a primary limit, an excess limit, we can see the pro rata portion here, and then we come up with the expected value of the allocated loss adjustment expense, given X; and then the idea is we define this function, and this function right here is such that we can see that this is the part that goes to the primary insurer, X minus L over X, or if we hit the higher limit right here, H minus L over H. Then we essentially then take the expected allocated loss adjustment expense, given X, times a probability of giving X. And you just simply add all these things up, pretend you are simulating, if you want. But we happen to do this by a numerical integration formula, and we are able to go ahead and do this. And then we can come up with the expected allocated loss adjustment expense for, say, like the layer between zero and H. And also we can get the allocated loss adjustment expense between that from zero to L.

The idea is that all the information is there. It is just simply a case of taking the probability of a loss, and the allocated loss adjustment expense that we expect to be associated with that size of loss, and just simply add them all up. That's what these integrals are really doing.

Then, what we did right here is, I actually came up with the way our increase limits table is likely to be affected if we go ahead and do this. Now, here, I put down the increase limits table that we had before this, and where we had the allocated loss adjustment expenses being the same. And here, what I did is, I took the result that came out of that funny looking integration formula that was on the previous page, and we can see that there is a real difference right here in the allocated loss adjustment expense, and we can see that it will affect the increase limits factors. We can see that the effect is actually very pronounced, very quickly. Like for 100,000 right here, it's a 1.62 in this case versus a 1.47, if you do it the old way. This is going to make a difference.

The next thing that happened was that -- This was a talk essentially that I gave to the casualty actuaries in reinsurance. And then when Dave called me up and said, would I want to do this for the loss reserving seminar, I thought well,

I'd better have something to do with loss reserves in here, just in case.

The thing that has bothered me, especially as I look at data that the companies report to us, is, that the state of allocated loss expense reserving is totally in shambles. Some companies seem to do it logically. Other companies, they put just complete junk in there. I've seen things like $500 loss, minus $500 allocated loss adjustment expense. What's going on here? There are a lot of things that are happening.

And I thought if I were to set a loss reserve that I believe in, the question is, what would this formula tell us that the allocated loss adjustment expense reserve should be. We have the information here that is needed to calculate that. There is one extra little wrinkle in this. If you think about it for a minute: Suppose you have a $1,000 claim, you expect the claim to be settled fairly quickly. If you have a $100,000 claim, you sort of expect this thing to take a while to settle.

Now, let's take a look at the information that we have here. We want to find right here the settlement lag distribution given that we know the loss size X. Now, as part of our increase limits work, what we are doing right here is, we are finding out two things, is that we are finding a separate severity distribution for losses by lag. That's part of what we are doing. The other thing we are doing right here is we are finding out the probability of getting a particular lag. In other words, we are getting the settlement distribution.

The idea, of course, what we want, is the lag given X, and so to find this thing, we use this thing called Bay's theorem to essentially reverse the conditional probabilities. That's what Bay's theorem is all about.

Now, once we have got the lag distribution associated with a claim, X, what we can do is we can find the expected allocated loss adjustment expense, given X, or we just simply sum up over all the applicable lags. That's the way we do this. Take a look what happens: Suppose you have a claim and you know that it has been open right here for, say, two years. Now, when you sum over the lags right here, you know that it's not lags 1 and 2, zero and 1. So the idea right here is that what you can do is, you've got to be careful right here to work this out for the lags that are applicable to what you already know about the claim.

You know that if the claim has been open 10 years, you just simply do these sums over the lags that you have that are greater than 10. Now, the idea right here is that, then, we are able to actually go ahead and come up with expected allocated loss adjustment expenses for various loss sizes.

Say, for example, we know that the loss size is 1,000, if we know that this is a brand new thing and the lag is greater zero, we

expect something $251. But we know the thing has been open for a couple years. It hops up to 1400. And if we know it has been open for a couple years more, we move our expected allocated loss adjustment expense up to 1900. Like that.

The same sort of thing right here: Suppose we take a $500,000 claim, and the thing is brand new right here, and we know that the lag, for all we know, it could just open and close at the same time, we can see that the expected loss, allocated loss, is 3,000, whereas if we know it's been open for a couple more years, it opens up to, what, a 34 to, say, 35,000. And, then, if it's open for a couple years more, it moves up to 38,000.

So what this does is, you can actually use this formula to go ahead, read your loss size X, see how long it's been open, and then take this forumla and apply it to come up with an expected allocated loss expense reserve. And, so, that's part of it that's not part of our increase settlements project. But since I'm here, I thought this was an easy exercise to do, so we just went ahead and did it.

That's all I have, so I guess we can turn it open to questions.

MR. BICKERSTAFF: Thanks, Glenn. If you would like to make a comment or a question, I think these mikes are alive here, you can state your name, rank, and serial number so that -- Is this being recorded, by the way?

MR. MEYERS: Yes.

MR. BICKERSTAFF: Any comments, questions, jokes, whatever?

QUESTION: (Inaudible)

MR. MEYERS: No. What we are doing is, we are doing by this policy limit purchased. What we have is direct data. And of course what's also given to us is the policy limit purchased, or what is coded has a policy limit purchased, anyway. That's what this rate reflects.

QUESTION: So it fills in adverse selections?

MR. MEYERS: Yeah, that's what we will be attempting to do, but the findings on adverse selections by policy limit purchased is that the severity distributions and the allocated loss adjustment expenses seem to be unaffected by the policy limit purchased. And that was interesting.

But, then, the next thing we did is, we did see that the settlement patterns do indeed vary by policy limit purchased. And that's how we intend to handle that.

QUESTION: I think there is a similar situation that I have seen in insurance. In fact I may have seen it, for instance, in occupational disease, when you get lower

(Inaudible)
deductibles, you often have lower pure premiums. In fact, you favorable selection.

MR. MEYERS: That's right.

QUESTION: (Inaudible)

MR. MEYERS: There are smaller claims. They are zero.
QUESTION: Well, I mean when they start out.

MR. MEYERS: One thing that's happening right here, pilot procedure for increase limits, it's entirely based on settled claims. That's controversial, and that's why we are keeping it a pilot procedure for a while until we are absolutely sure we are right.

QUESTION: The 31-35 policy
(Inaudible)

MR. MEYERS: I probably should have constructed that since this was -- We didn't look at an actual policy limit distribution, and probably the most correct number to put in there would be the total limits.

QUESTION: What you mean by total limits is generally the mix of everything?

MR. MEYERS: Yes. That particular exhibit didn't reflect that, and that's my presentation error.

QUESTION: So, in effect when you are looking at your policy limit, you expect a number graded from 31 to 35; is that right?

MR. MEYERS: No. That's the number that would be at that. What we should have put in there was the number less than 31/35 for the total limits, because it's an average of all those other numbers.

QUESTION: You mentioned in your workup that you adjusted your indemnity to the 1989 level.

MR. MEYERS: Right.

QUESTION: There was no similar mention of the allocated level.

MR. BICKERSTAFF: I beg your pardon. It was adjusted in similar fashion for each calendar year. The trend was about 10 percent per year on indemnity, almost exactly. But we used 1989 as our index base because we only had about half as many -- actually, less than half as many claims in 1990 as we did for '89. For ALAE, I think it was about a seven or eight percent trend that we indexed up to '89.

QUESTION: I was just curious how would you adjust your rate (Inaudible) if you were using the revised (Inaudible)

MR. MEYERS: For basic limits?

QUESTION: Basic limits, yes.

MR. MEYERS: We don't know, and that's one of the considerations we have to make when we calculate this thing. Right now we are saying that if you actually take a look at what happens at the policy limits, this is what we think is happening. The question is, what are we going to do with our basic limits calculation? We haven't got that thought out yet.

QUESTION: (Inaudible)

MR. MEYERS: What it does right here is that we are calculating a separated loss or indemnity distribution by settlement lag. Our current indications are that that does not vary by policy limit.

QUESTION: Is that distribution by settlement lag?

MR. MEYERS: Yeah, the distribution by settlement lag. Now, what does seem to vary by policy limit is how many claims are settled within the lag distribution for the claims. That's what seems to vary by policy limit.

QUESTION: (Inaudible)

MR. MEYERS: No. We're saying that there is. And the part where we see this is in the settlement lag distribution. That's where we're seeing it. This is nice. This is very nice, because what that means is, that we can use the claims from all the policy limits to come up with our severity distribution providing we use the claims only from the policy limit purchase to come up with the lags. We hope it holds up when we start doing this, investigating this more.

QUESTION: (Inaudible)

MR. MEYERS: Well, I've been there for two years. All I know is, when I came there two years ago somebody whispered increase limits in my ear and said go to it.

QUESTION: (Inaudible)

MR. MEYERS: What we want to do right here is, we want to put this whole thing together. We want to try it for a couple years. The one thing that we have been soundly criticized for is the volatility in our own increase limits factors as filed from year to year. We want to be sure we are right before we -- relatively sure we're right before we do this kind of thing. So, we're going to be running this through for a couple years. Then we will move on it.

MR. BICKERSTAFF: As I understand what you're doing, though, Glenn, the irregularity of how member companies are setting their ALAE case reserves doesn't really enter into what you are doing; does it?

MR. MEYERS: Not this part right here simply because that we are looking entirely on settled claims. Again, we may be making some interim changes to our procedures, mainly with respect to risk load. But this change, adopting this whole procedure, is, I would say, at least a couple years off.

QUESTION: (Inaudible)

MR. MEYERS: I'm not sure I understand what you're saying.

QUESTION: (Inaudible)

MR. BICKERSTAFF: Paraphrasing it, if I may.

MR. MEYERS: Yes.

MR. BICKERSTAFF: Are you isolating the lag effect of increasing claims from the underlying accident year trend?

MR. MEYERS: Yes.

MR. BICKERSTAFF: And I think the answer is yes, but I --

MR. MEYERS: The answer is yes. What we are really doing is, we are fitting -- We have an entire development triangle of severity distributions, and we actually make an attempt to fit that. We build the trending into a model.

QUESTION: If I should apply that, can it be expected then that the risk loads will increase?

MR. MEYERS: I don't want to make any statements about that right here. I'd like to keep this to losses, allocated loss adjustment expenses.

QUESTION: (Inaudible)

MR. MEYERS: No. These things are based on country-wide data.

QUESTION: In regard to the ALAE going up by lag, settlement lag, has any attempt been made to look at the impact of changes in lawyers' fees between the time of the incident, what you report, and settlement in the sense that legal fees be paid throughout the life of the claimant until time of settlement? And generally speaking, those would be paid at the rate in effect at the time the service is performed.

MR. MEYERS: We use only the data that's reported to us. If we could get the people to report lawyers' percentages of this, I suppose we could use it, but we can't do that.

QUESTION: (Inaudible)

MR. MEYERS: The only thing I could say about this, and we observe this, is that the severity distributions for the larger claims, there is not too many of these larger ones that settle in the earlier lags. However, there are a fair number of small claims that do settle. So, what happens right here is that, given that it is a $500,000 claim, it's going to be settling in those later lags anyway, by and large. But given that we have a $1,000 claim, and it's made it through this far, that's going to make a big difference.

So the idea right here -- In other words, just simply the distribution of -- It really comes from this Bay's theorem type thing that we do here, and what happens is that most of the $500,000 claims are settled a long ways, where these are settled in a much more varied way. I might also point out that, given that there might not be a whole lot, although there are some $1,000 claims (Inaudible)

QUESTION: (Inaudible)

MR. BICKERSTAFF: The two data bases we've got here, of course, are two widely recognized long-tailed slow closing high severity lines. We've got a few more minutes. I'd be curious if anyone here has attempted anything similar to what we have done here, as far as relationships between ALAE and indemnity on a more moderately severe line, let's say automobile liability or anything sort of in the middle deal.

QUESTION: I did something more than ten years ago with regard to liability versus settlement lag. I didn't do anything with the severity distribution. We did reach a point in settlement lag where you're spending more on LE than you're spending on indemnity (Inaudible)

MR. BICKERSTAFF: Anyone else? Anymore questions? Anybody thirsty? Thank you very much for your attention.

Loss Distributions for ALAE

Prepared for Casualty Loss Reserve Seminar
Dallas, Texas

Prepared by

David R. Bickerstaff, F.C.A.S.
Consulting Actuary

September 10, 1990

ALAE RESERVES 101

- Add-on to Indemnity (Amex Card Method)
  - Paid-to-Paid
  - Reserve-to-Reserve

- Independent of Indemnity
  - Incurred development
  - Paid development

- Net ALAE versus direct?
  - Function of net indemnity
  - Net incurred or net paid development

NET vs. DIRECT
Slow-Closing Liability Lines

- Treatment of ALAE
  - 100% retained
  - Retained pro-rata
  - Retention = ALAE + Indemnity

- Indexed Retentions

- Changes in Basic Attachment over time

NET ALAE RESERVES
Most Reliable Approach

1. Project direct for each year

2. Carve out net retained for each year, using:

   - Parameters for each year
   - Assumed ALAE/Indemnity distribution by size
   - CWI/CWE proportions

ALAE PAID ON OPEN CASE
A Classic Example

Retention per claim	$	250,000
ALAE paid on open		600,000
ALAE reserve		200,000
Indemnity reserve		1,000,000

What is net reserve?

Net ultimate:	
Net indemnity	250,000
Net ALAE(pro-rata)	200,000
Total	450,000
Less paid to date	-600,000
=Net reserve	-150,000

ALAE CLAIM SIZE DISTRIBUTION

- Claims Closed with Expense Only (CWE)
- Claims Closed with Indemnity (CWI)
- Preliminary Step:
  - Project percentage of claims CWI&CWE

ALAE/CWI DISTRIBUTION

- Correlation with indemnity?
- Given indemnity size, what is expected ALAE?

ALAE/INDEMNITY CLAIM SIZE DISTRIBUTION CASE STUDY

- 17,000 Professional Liability Closed Claims
- Calendar Years 1986-1990
  - Prior 7 accident years relative to each CY
- Seven States
- Indexed to Calendar Year 1989
- Final Output:
  - Joint distribution
  - 51x51 matrix of indemnity vs. ALAE brackets
  - Brackets defined logarithmically

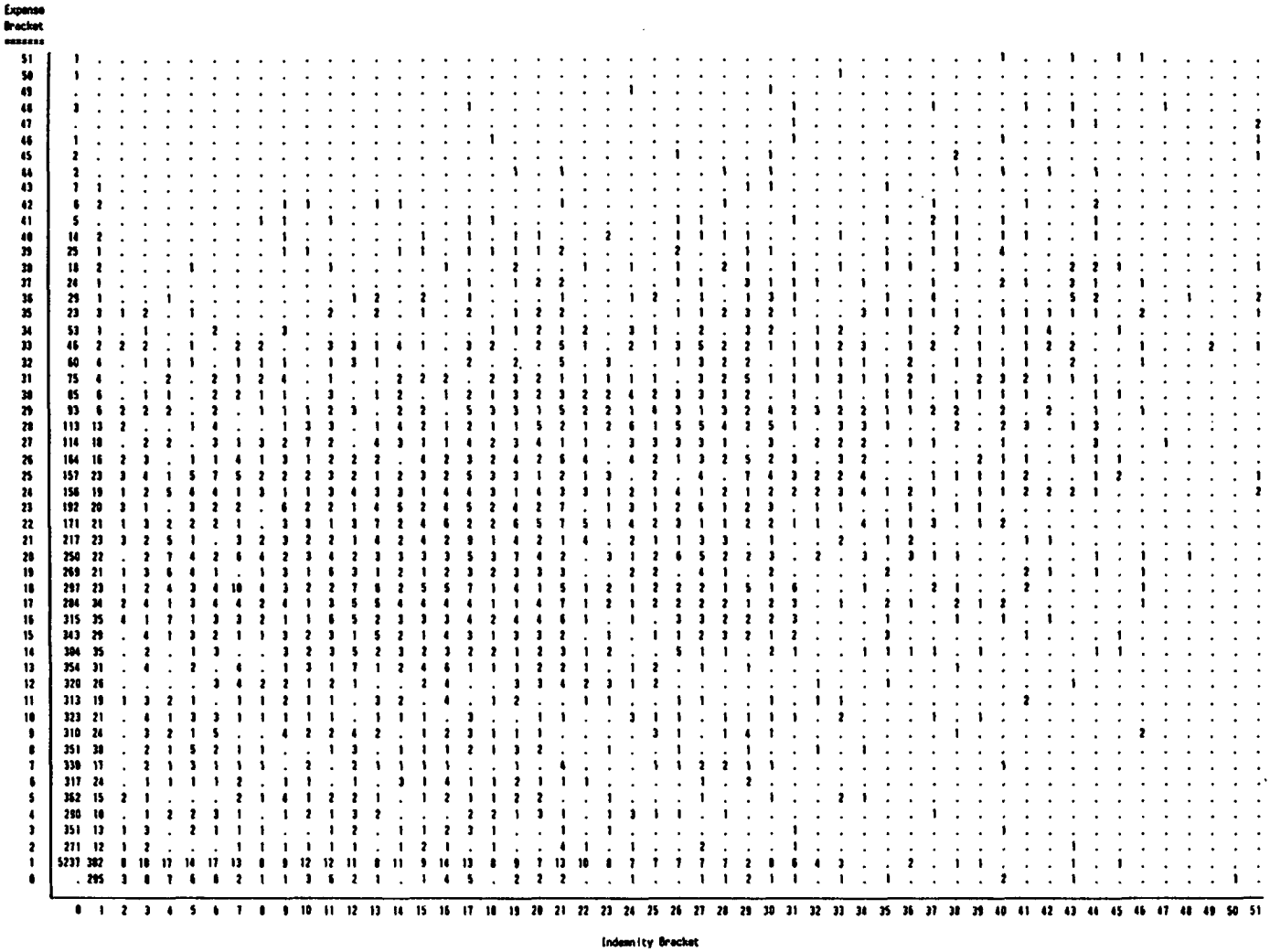
Definition of Expense Brackets

Bracket Number	Maximum Amount	Bracket Number	Maximum Amount
0	0	26	20962
1	2000	27	23028
2	2197	28	25297
3	2414	29	27790
4	2651	30	30528
5	2913	31	33537
6	3200	32	36841
7	3515	33	40472
8	3861	34	44460
9	4242	35	48841
10	4660	36	53654
11	5119	37	58941
12	5624	38	64749
13	6178	39	71130
14	6786	40	78139
15	7455	41	85839
16	8190	42	94297
17	8997	43	103589
18	9883	44	113797
19	10857	45	125011
20	11927	46	137330
21	13103	47	150862
22	14394	48	165729
23	15812	49	182060
24	17370	50	200000
25	19082	51	>200000

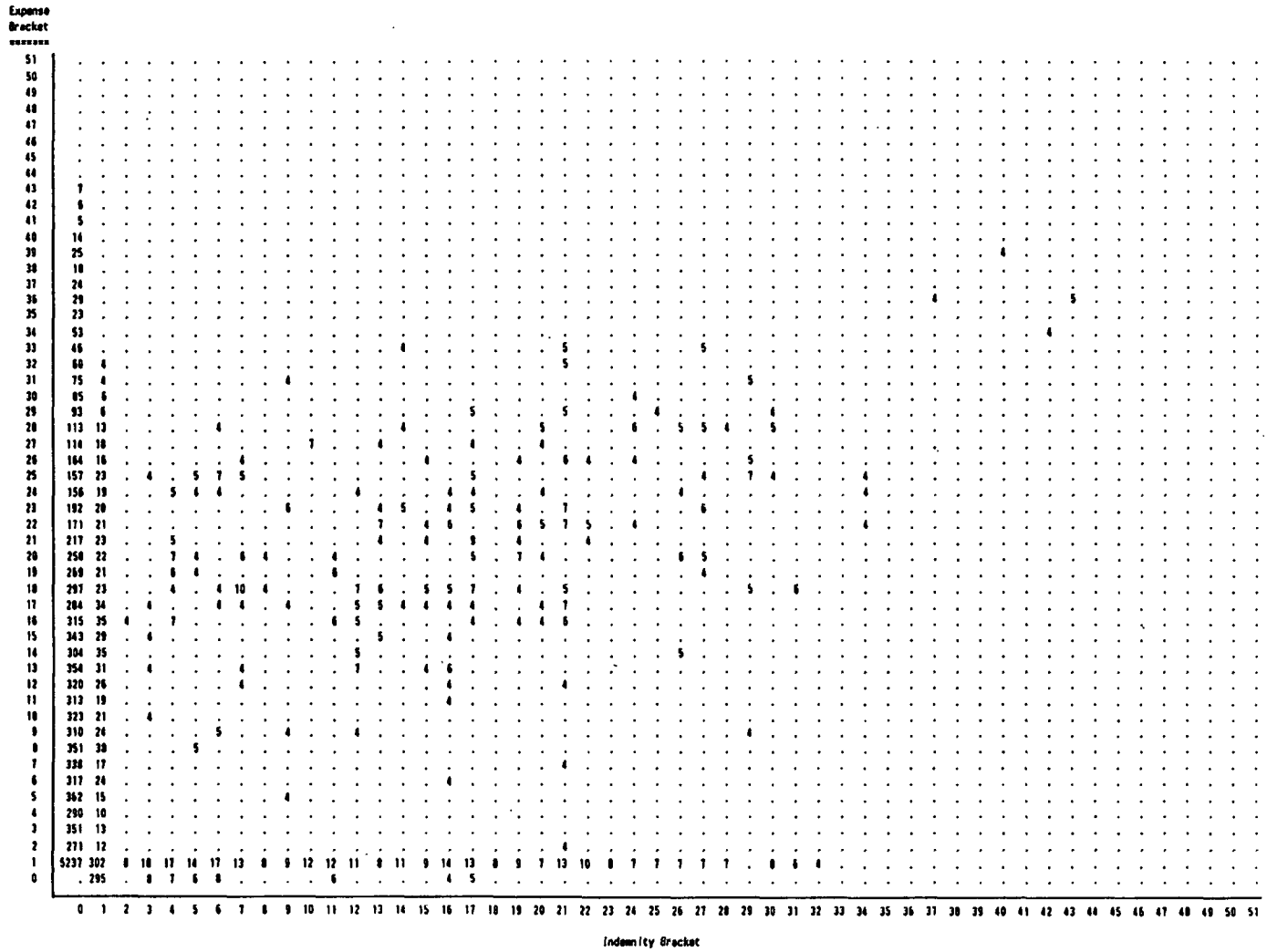
Definition of Indemnity Brackets

Bracket Number	Maximum Amount	Bracket Number	Maximum Amount
0	0	26	209623
1	20000	27	230279
2	21971	28	252971
3	24136	29	277899
4	26514	30	305284
5	29127	31	335367
6	31997	32	368414
7	35150	33	404718
8	38614	34	444599
9	42419	35	488411
10	46599	36	536539
11	51191	37	589410
12	56235	38	647492
13	61777	39	711296
14	67864	40	781388
15	74552	41	858387
16	81898	42	942973
17	89969	43	1035895
18	98834	44	1137973
19	108574	45	1250110
20	119272	46	1373298
21	131026	47	1508624
22	143937	48	1657286
23	158121	49	1820596
24	173702	50	2000000
25	190819	51	>2000000

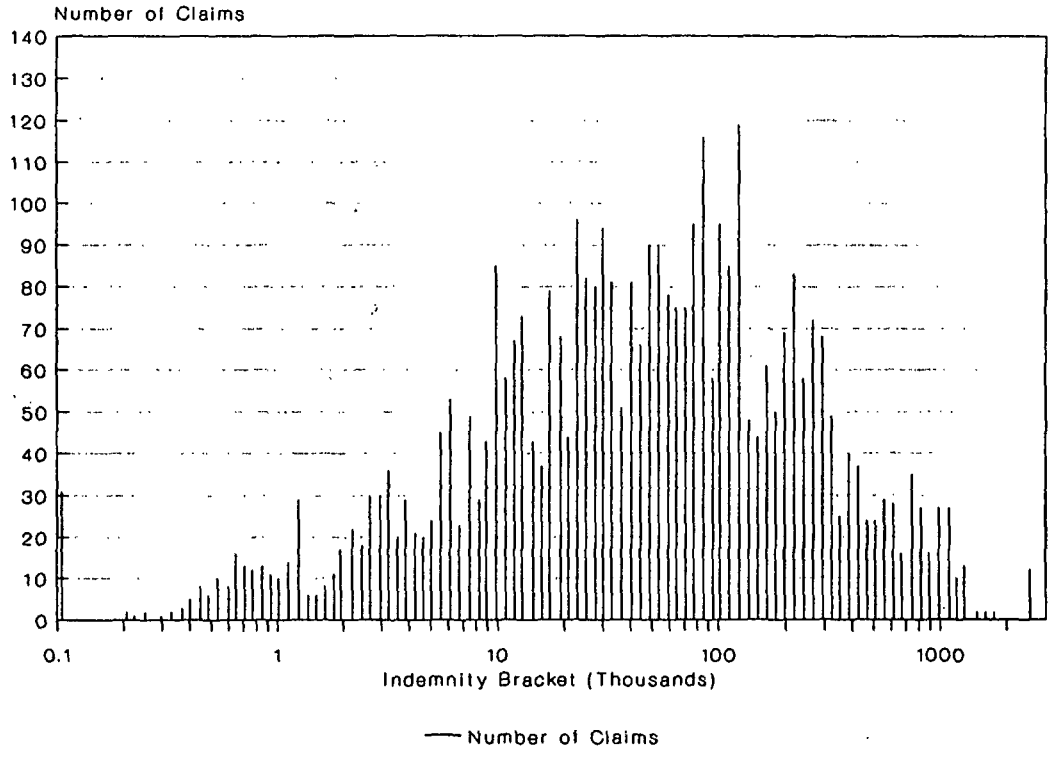
Distribution of Claims by Indemnity/ALAE Bracket
All Claims



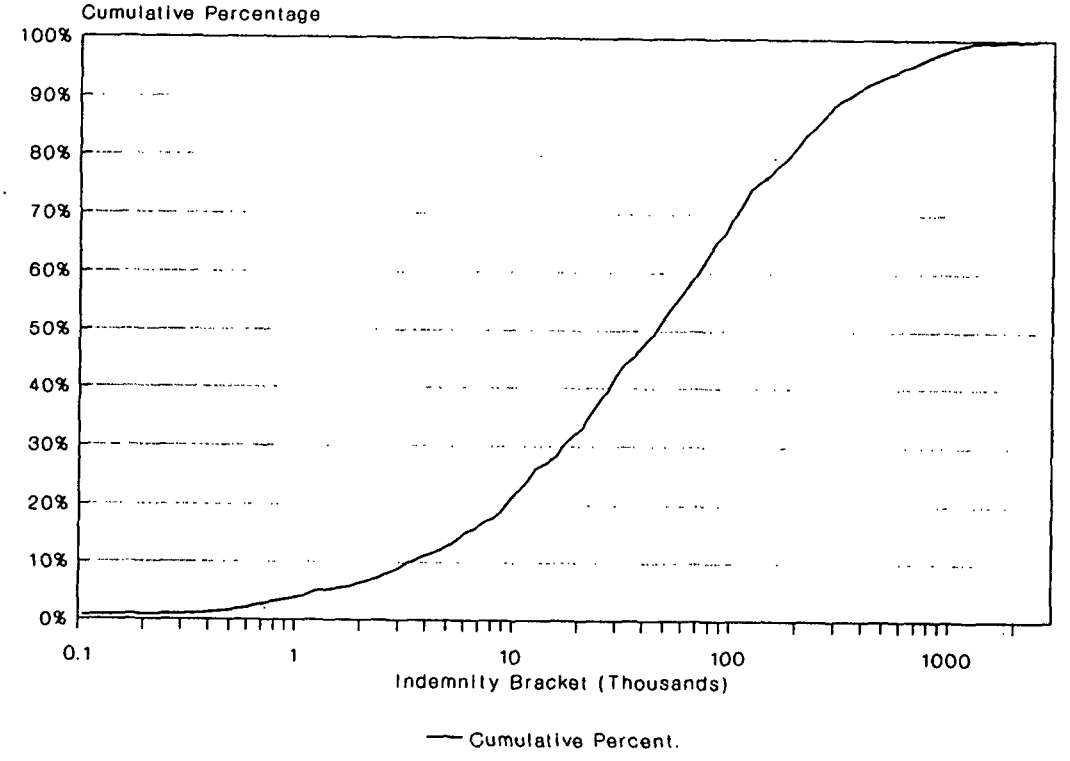
Distribution of Claims by Indemnity/ALAE Bracket
Brackets with 4 or more Claims



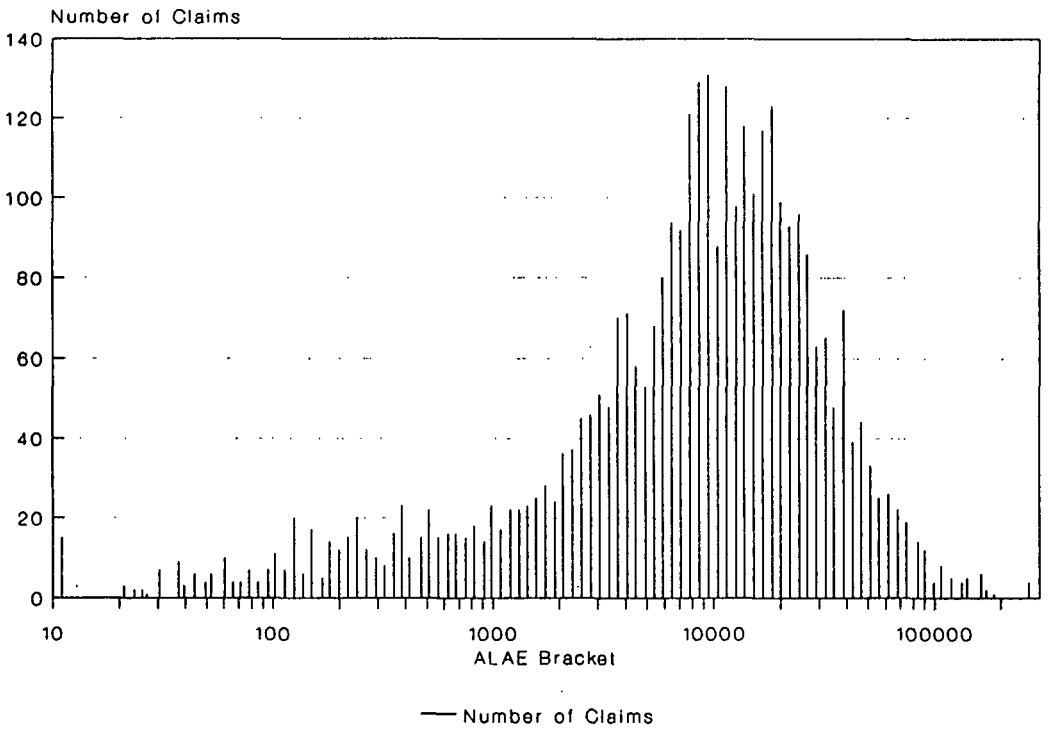
DISTRIBUTION OF INDEMNITY BY CLAIM SIZE



DISTRIBUTION OF INDEMNITY BY CLAIM SIZE

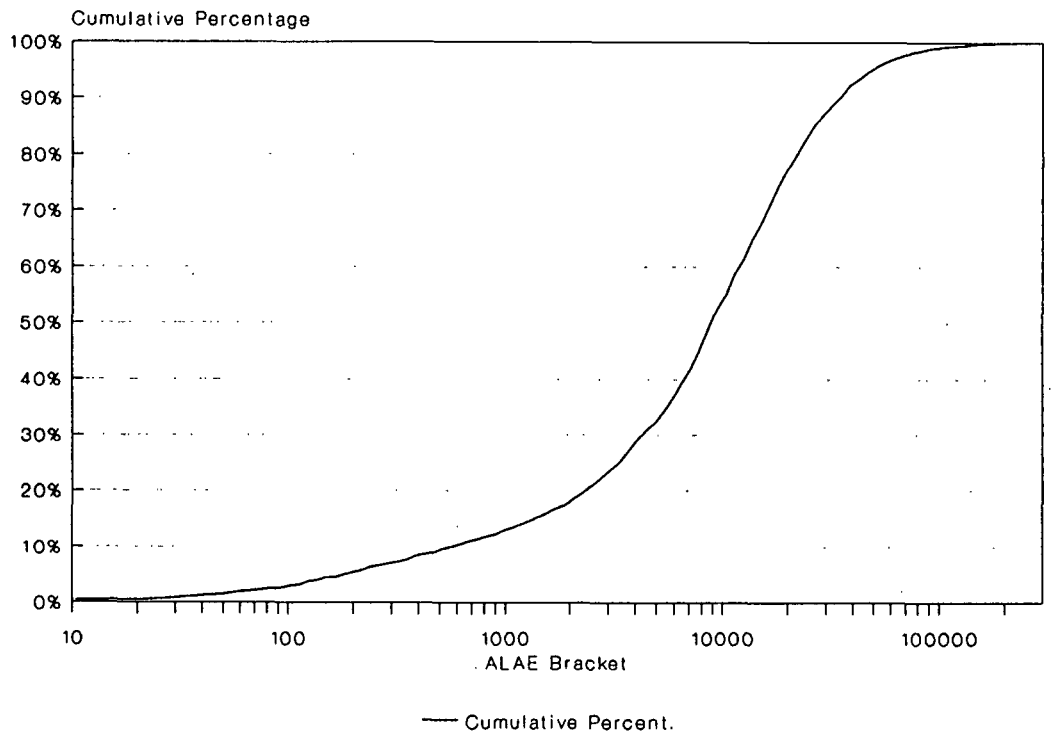


ALAE ON CWI CLAIMS
Distribution by Claim Size



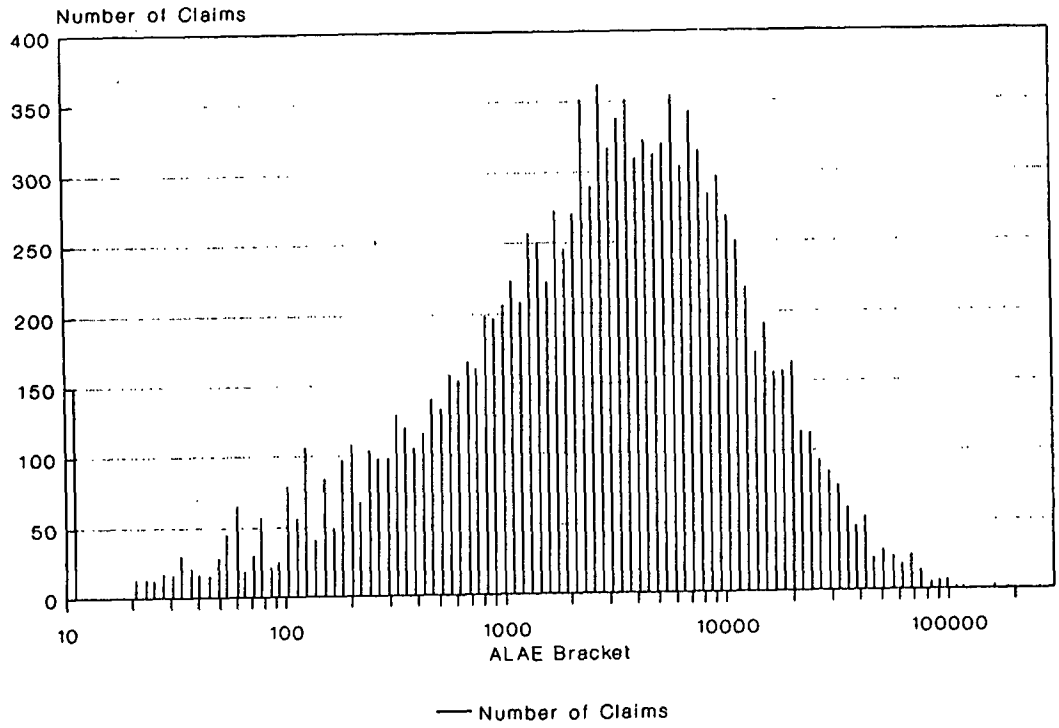
ALAE mean of $15,579.

ALAE ON CWI CLAIMS
Cumulative Distribution by Claim Size



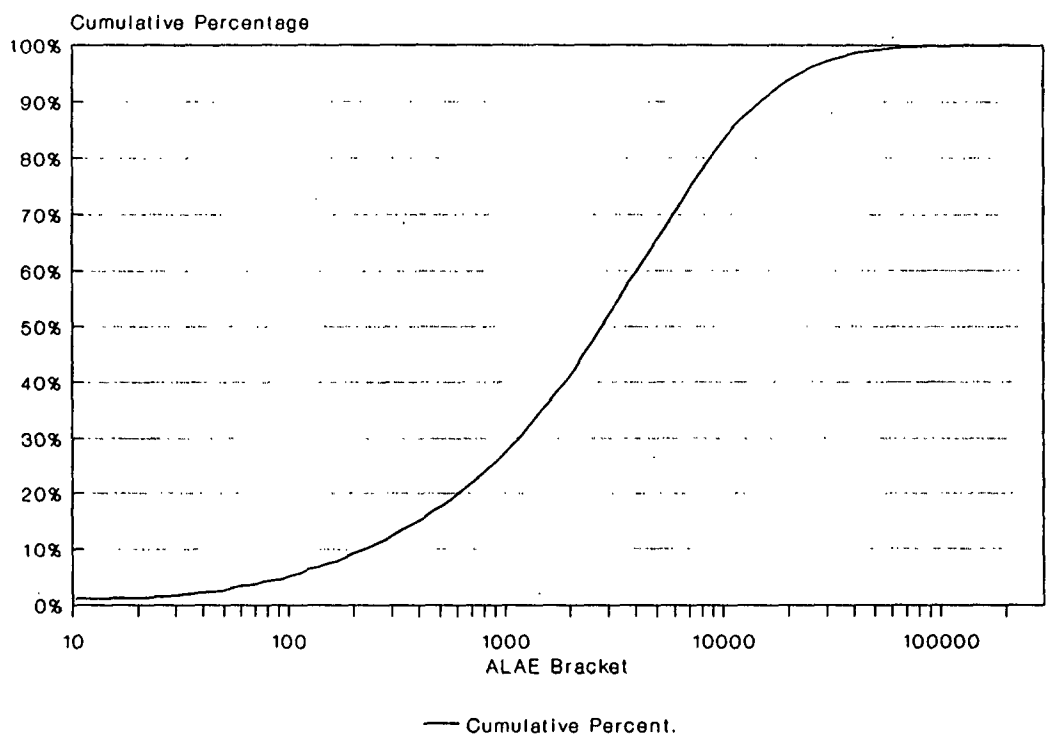
ALAE mean of $15,579.

ALAE ON CWE CLAIMS
Distribution by Claim Size



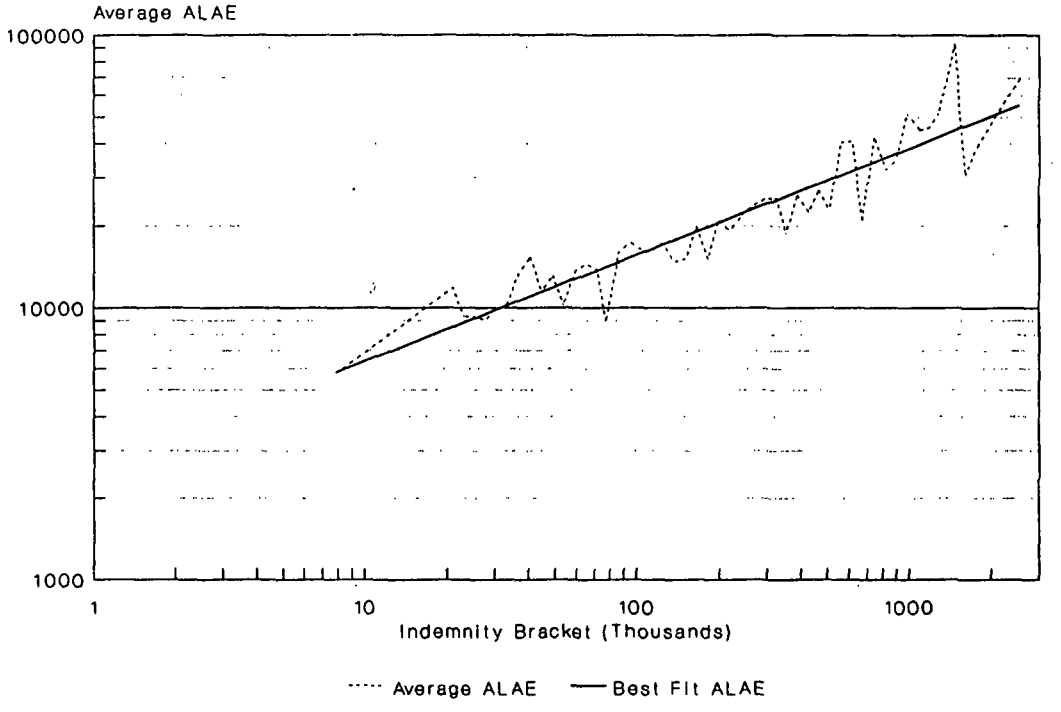
ALAE mean of $6,318.

ALAE ON CWE CLAIMS
Cumulative Distribution by Claim Size



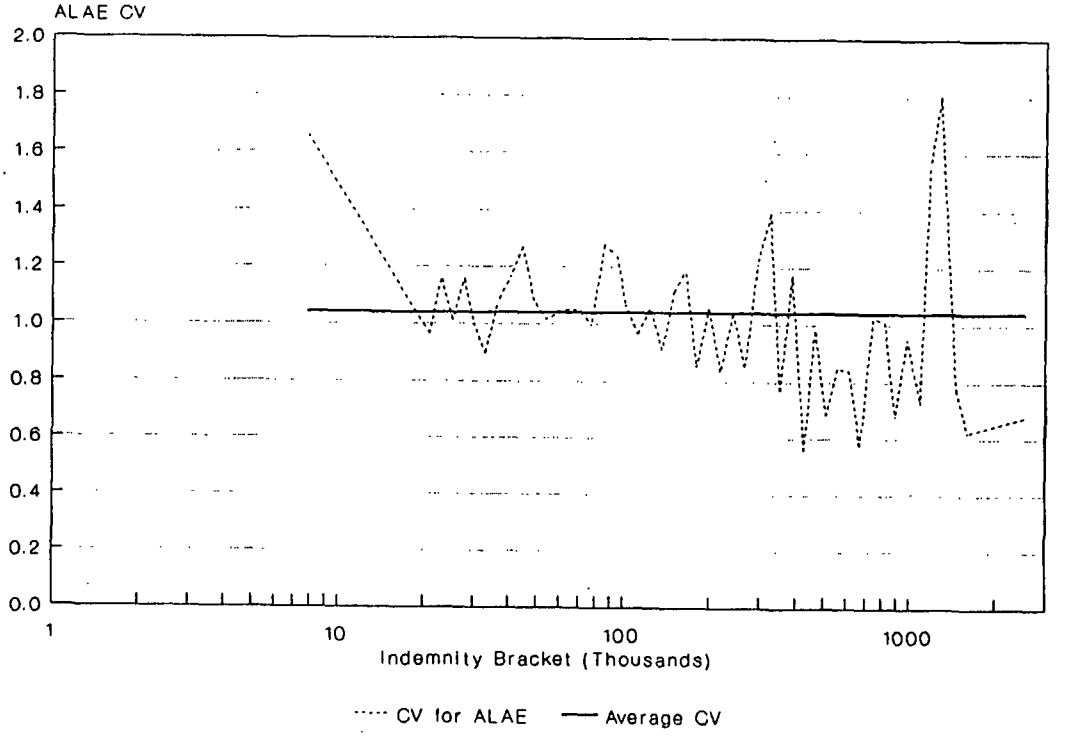
ALAE mean of $6,318.

AVERAGE ALAE
By Indemnity Bracket



Line of best fit
Y=176.5782*X^.389662

CV FOR ALAE
By Indemnity Bracket



SIMULATION MODEL

Net ALAE/Indemnity

```
For each year
  For each claim
    Select indemnity
    Select ALAE, given indemnity
    Determine net indemnity
    Determine net ALAE
    Bump accumulators
  Next claim
Next year

Tally results
```

Variation of ALAE by Occurrence Severity

Glenn Meyers

Insurance Services Office

Increased Limits Factors (without risk load)

Policy Limit	Occurrence Severity	ALAE	Increased Limits Factor
25,000	5,176	3,135	1.00
100,000	9,103	3,135	1.47
500,000	14,171	3,135	2.08
1,000,000	16,221	3,135	2.33
5,000,000	20,557	3,135	2.85
10,000,000	22,292	3,135	3.06

The insurance contract reads:

Basic limit price covers the cost of all ALAE.

Comments

- **Do we believe this works in the real world?**
- **Excess reinsurance contracts are worded differently.**
  - **ALAE shared in proportion to the loss**
  - **ALAE is part of the loss**

Model for ALAE

A - ALAE
X - Occurrence Size

$$A = S \times P \times Z$$

$$S = E[A \mid X > 0 \text{ and } A > 0]$$

$$P = Pr\{ A > 0 \mid X > 0\}$$

$$Z = \frac{\text{Total ALAE}}{\text{ALAE for nonzero occurrences}}$$

$$A > 0 \text{ and } X > 0$$

Original Model

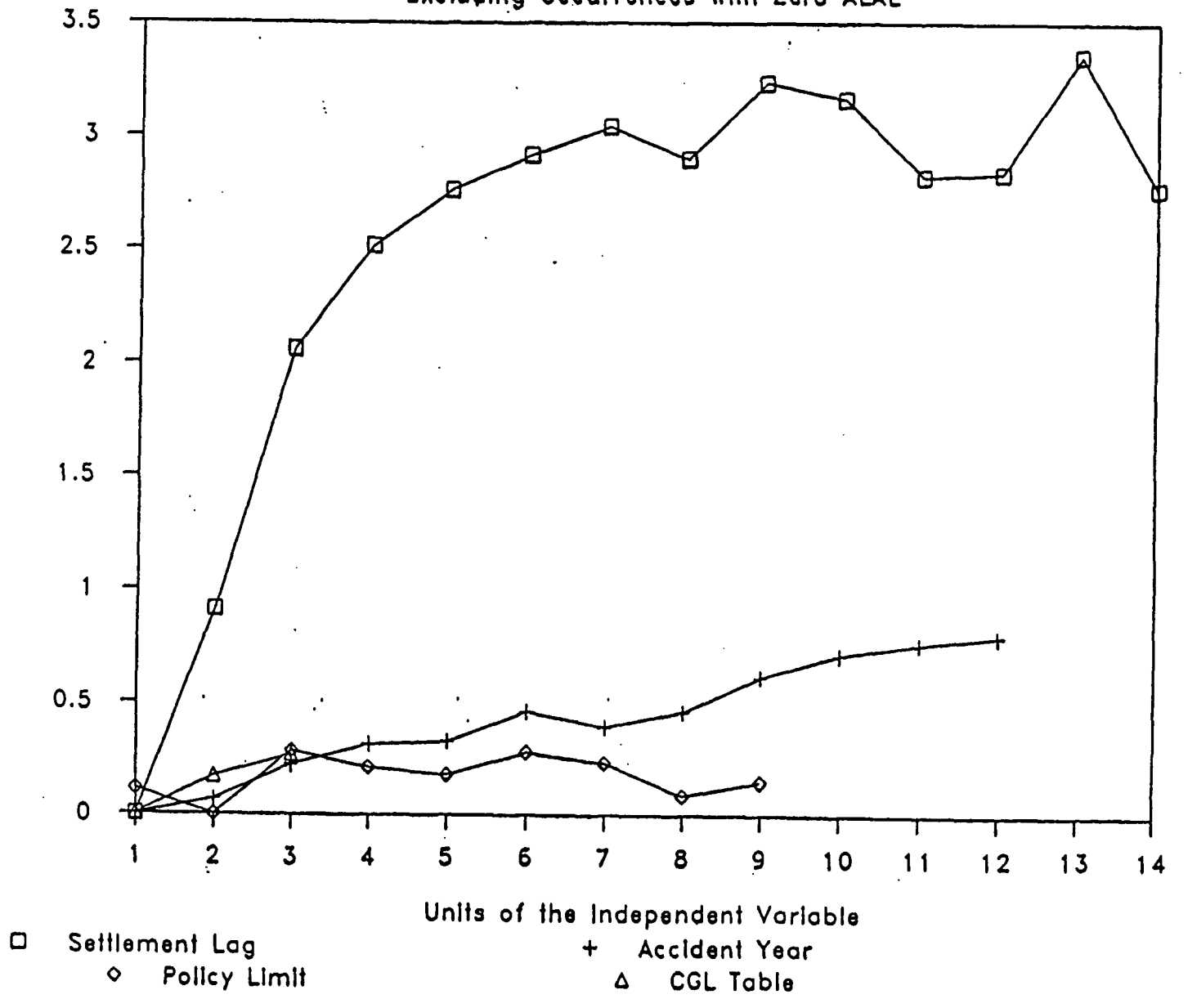
$$\log(A) = a \cdot \log(X) + b(\text{CGL table}) + c(\text{settlement lag}) + d(\text{accident year}) + e(\text{policy limit}) + \text{error}$$

Selected Model

$$\log(A) = a \cdot \log(X) + c(\text{settlement lag}) + d(\text{accident year}) + \text{error}$$

Effect of Independent Variables on ALAE

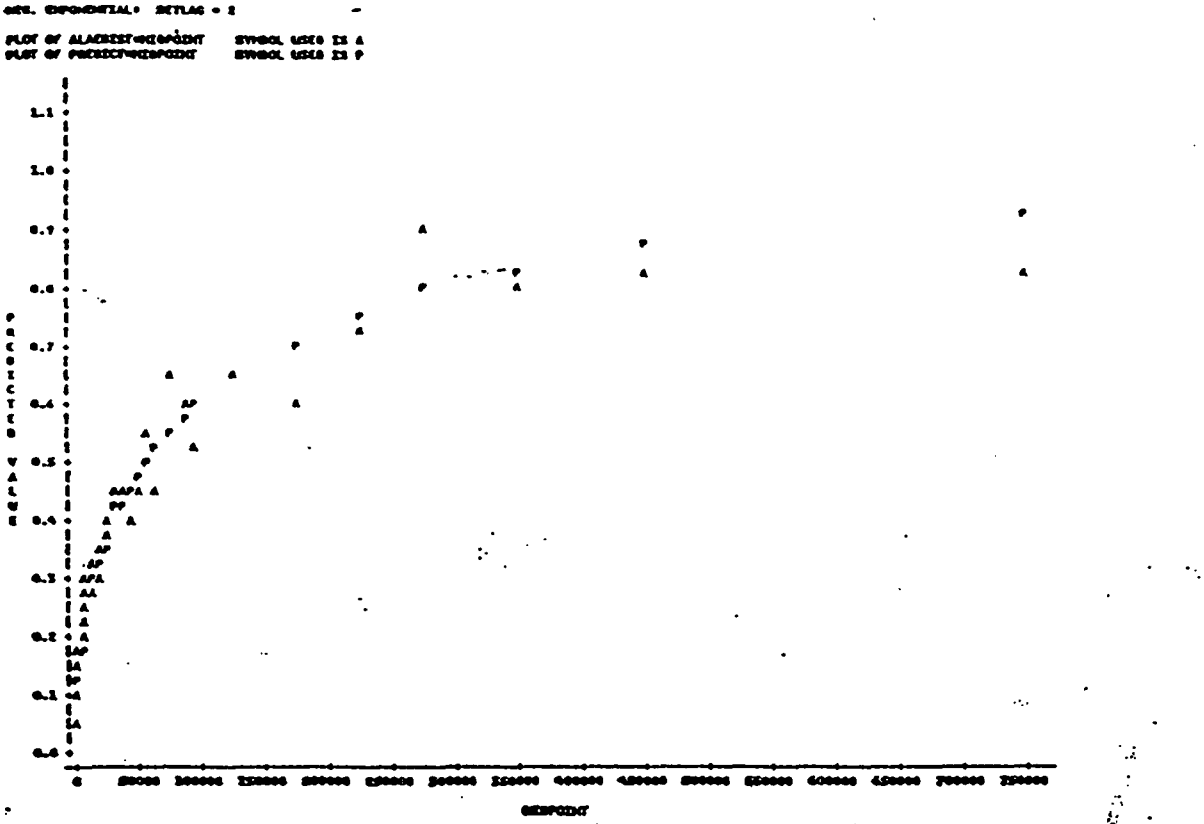
Excluding Occurrences with Zero ALAE

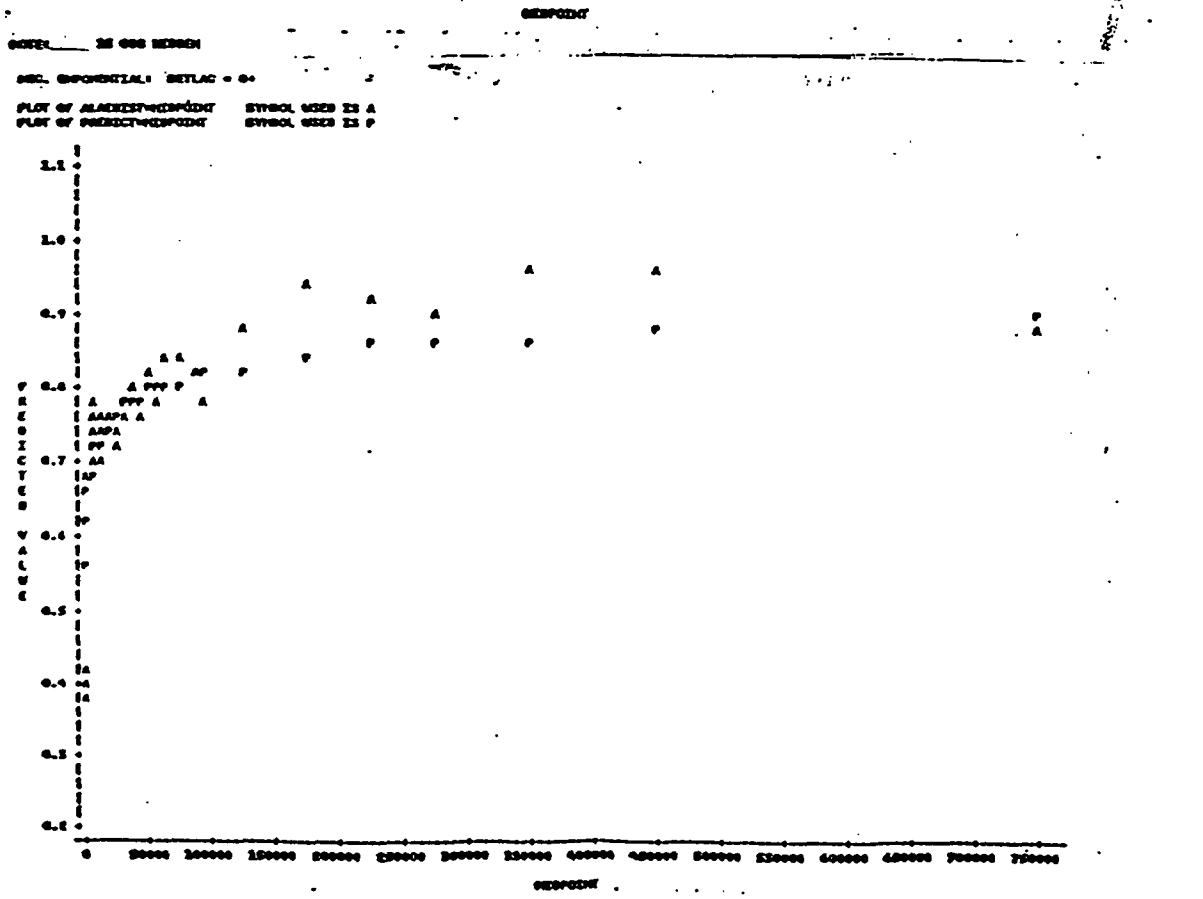


$$\Pr\{ A > 0 \mid X > 0) = 1 - e^{-b \cdot X^{\frac{1}{lag}}}$$

lag = min{settlement lag, 8}

b varies by lag





We now consider excess reinsurance contract where ALAE is paid in proportion to the loss.

L = Primary limit

H = Excess limit

$\frac{X - L}{X}$ = proportion of loss paid by reinsurer when loss = X

f(X) = p.d.f. of X

For X > 0:

E[A | X] = Expected value of A given X > 0 × Pr{A > 0 | X > 0}

(note - E[A | X] is a sum over lags)

Define Expected ALAE for layer from L to H

$$R(L,H) = \int_L^H \frac{X-L}{X} \cdot E[A \mid X] \cdot f(X) \cdot dX + \frac{H-L}{H} \cdot E[A \mid H] \cdot \int_H^\infty f(X) \cdot dX$$

Expected ALAE for layer from 0 to H

$$R(0,H) \cdot \frac{\text{Total ALAE}}{\text{ALAE for nonzero occurrences}}$$

Expected ALAE for layer for layer 0 to L (with reinsurance to H)

$$R(0,H) \cdot \frac{\text{Total ALAE}}{\text{ALAE for nonzero occurrences}} - R(L,H)$$

Increased Limits Factors (without risk load) Reflecting ALAE Differences

Policy Limit	Occurrence Severity	ALAE	Increased Limits Factor
25,000	5,176	2,066	1.00
100,000	9,103	2,630	1.62
500,000	14,171	2,974	2.37
1,000,000	16,221	3,043	2.66
5,000,000	20,557	3,127	3.27
10,000,000	22,292	3,135	3.51

Increased Limits Factors (without risk load) Not Reflecting ALAE Differences

Policy Limit	Occurrence Severity	ALAE	Increased Limits Factor
25,000	5,176	3,135	1.00
100,000	9,103	3,135	1.47
500,000	14,171	3,135	2.08
1,000,000	16,221	3,135	2.33
5,000,000	20,557	3,135	2.85
10,000,000	22,292	3,135	3.06

ALAE as a Percentage of Loss

Policy Limit	Occurrence Severity	ALAE	ALAE/Severity
25,000	5,176	2,066	0.40
100,000	9,103	2,630	0.29
500,000	14,171	2,974	0.21
1,000,000	16,221	3,043	0.19
5,000,000	20,557	3,127	0.15
10,000,000	22,292	3,135	0.14

ALAE Reserving

Problem - Given loss reserve, X, find E[A | X]

Complication - We expect lag to increase with X

$$\Pr\{\text{lag} \mid X\} = \frac{\Pr\{X \mid \text{lag}\} * \Pr\{\text{lag}\}}{\sum_{\text{lags}} \Pr\{X \mid \text{lag}\} * \Pr\{\text{lag}\}}$$

The lags used in the sum will depend on how long the claim has been open.

$$E[\, A \mid X] = \sum_{\text{lags}} E[A \mid X, \text{lag}] * \Pr\{\text{lag} \mid X\}$$

	----------ALAE----------		
Loss Size	Lag ≥ 0	Lag ≥ 2	Lag ≥ 4
1,000	251	1,431	1,916
5,000	1,636	3,241	4,381
25,000	6,188	8,035	18,707
100,000	14,844	16,283	18,707
500,000	33,490	34,569	38,965

1990 CASUALTY LOSS RESERVE SEMINAR

5A/6B: BASIC CASE STUDY WORKSHOP

Faculty

Myron L. Dye
United Services Automobile Association

Timoghy L. Schilling
Tillinghast/Towers Perrin

MR. SCHILLING: That has to be five for five. I haven't been to a session yet where the audio has worked properly or at all.

Okay. Presumably, you all have been to the first one, two, or three of the basic sessions and gone through several of the basic techniques that are used in loss reserving. What we are going to do here is extend on that and present some situations where there may be a problem with the data and present some techniques that can be used to handle these data problems.

(Slide)

In this particular example, we will assume that you are working for an insurance company which writes personal lines business country-wide, and because your company spent thousands of dollars to send you to this seminar, you have been given the responsibility to set reserves for the homeowners line of business as of 12-31-89.

(Slide)

Exhibit 2 shows the basic data triangle, a cumulative paid loss triangle for accident years 1980 through 1989, with development from 12 months through 120 months. This is a nice, smooth triangle with year-ending points; below that is a triangle of link ratios, or RTRs, with various averages below that. This should be very typical of what you have seen in the prior basic sessions.

Let's just say that you have been given this assignment to calculate the reserves, and so you start going through the process. You get the data input, crank out the averages, and start making your initial selections. You end up with, as shown on the last slide, selected link ratios and cumulative loss development factors.

You may want to look at the triangle. As I said before, we are going to try to present an example where something looks a little bit out of the ordinary - there is a data problem or an unusual occurrence in one of the years; we are trying to adjust for it.

The first thing I do when I look at triangles is to look down the columns and across the rows, for any numbers that don't fit because they are so large, for zeros and things that look out of the ordinary. And as I look across these rows, I don't see anything that looks totally out of the ordinary. Nothing jumps out at me. But when I look down the columns, a few things look a little bit out of the ordinary in the 12-month column.

In 1985, there are paid losses of $113,000 at 12 months, and that was the first year they went over $100,000. I would want to know why. Was there a premium increase or a volume increase? Was there an acceleration of payments? Why is that number so much larger than any other prior year? But, for the time being, let's just go on and keep that in mind.

Continuing down the column, the next entry is back down to $97,000; the next is $104,000; that looks reasonable. Then I jump up to $132,000, the all-time high number. Why? And then the last one, 1989, is $210,000; that is ridiculously high. The answer could be that we doubled our volume, or we bought another P & C company and the data is in here. There could be a lot of legitimate reasons; however, if there are no obvious reasons, you have to look deeper.

(Slide)

Let's go on to Exhibit 3. This simply takes the losses from the prior exhibit, applies the cumulative loss development factors, and arrives at an estimate of ultimate losses, which we will call Estimate No. 1. Please make a note that the total shown on the bottom is for 1980 through 1988; it does not include 1989. The estimate for those years is $1,243,586, excluding the last three zeros.

In the last two columns are shown some prior estimates of ultimate losses for accident years '80 through '88. These differences are not huge. The differences between the estimate as of 12/88 and Estimate No. 1, as of 12/89, is .7 percent. In some companies, that may be perceived as a large difference. As a consulting actuary, working with small to medium-size companies primarily, I would be pleased to see anything this close.

Also, you may want to stop at this point and look at your ultimates. We just did an estimate, as of 12/89; again, go down that column and look at those ultimates. Starting with 1983, out estimate is about $150,000, plus or minus, say, $15,000 or $20,000. In 1988, estimated ultimate losses increase to $203,000. In 1989, the estimate is $325,000. I am concerned about these last two years, because, if we didn't have a premium increase, we just saw a doubling of our loss ratio, and a few people, in most companies, would be very unhappy about that.

So far we have taken a straightforward cut at this data and developed some ultimates. Let's see what we do in Exhibit 4.

(Slide)

The comment here (this is not my comment; these slides were prepared by someone else, and Myron and I are just delivering the explanation of these slides) is that Estimate No. 1 is considerably different from prior estimates. Yes and no. In total, it is only .7 percent higher, but you have to keep in mind, if you look back at Exhibit 3, that you are including accident years all the way back to 1980. You don't expect to see much development in calendar years 1988 or 1989. So you learn something here.

If you would like to disguise some of the change, include several older years with your totals, because older years don't change much. And that is really what has happened here.

The comment that Estimate No. 1 is considerably different from prior estimates is most likely referring to accidents years '85 through '88, maybe even only '86 through '88. The differences there, again, are not huge, in my opinion, but they are at least a couple of million dollars. I guess if you are discussing millions of dollars, and you are not working for State Farm or Allstate, then it is probably a significant number.

(Slide)

Going back to Exhibit 4, the question is posed: What might be the cause of this difference? Let's just assume there were larger differences. Any suggestions for why you now are coming up with an estimate different from the prior estimates?

(No response.)

MR. SCHILLING: Why don't we just go through a few. You might want to jot some of these down. The obvious one is, the data has changed. Every estimate is going to be different than the prior one; it is just a questions of how much different. Is it a dollar different, a thousand dollars different, a million dollars different? So there is going to be some amount of difference because you have more current data.

The second point is that -- we will assume that a different person did this review. You were the person that went to the Loss Reserve Seminar; now you have been given this assignment. Let's assume that you did not do it the year before. Anytime you have a change in the personnel doing the loss reserve review, you should expect to see a difference in the results, the reason being that there is judgment involved here. It is not a cookbook, throw it into the machine, crank out the answer, there is only one right answer method. So we expect some difference.

Another reason could be that perhaps the same person does the reserves two years in a row; people tend to change from year to year. You become more conservative, perhaps,

because you have done three of four reserve reviews in a row. Every time you shot low, so you say, "I'm not going to shoot low this time." Subjectively, unconsciously perhaps, you are picking factors higher than you would have in prior years.

A third possibility is a data error. It could be that when the data processing or information systems area of your company processed the data for this review, they included some data that didn't belong there, maybe a very small piece of something that doesn't belong. They may have processed direct data instead of net. There are a number of different errors that could have entered into the data. If you are working in a PC environment where you are pulling data off paper reports and inputting it into a PC, there is room for all kinds of data errors. So that is a good place to start if you think that your results are too far away from what they were the prior year.

In this example, we have chosen not to look at any of those errors, but rather to focus on an intrinsic aspect of homeowners losses and that is the presence of catastrophe losses. For those of you whose companies write business on the eastern seaboard, I am sure you have seen some catastrophe data in 1989, due to the storm activity. Catastrophes cause significant volatility in the data.

It really makes a difference what state you are talking about. If you are talking about Colorado, the statement isn't necessarily true, because catastrophes happen nearly every year. It is rare that a catastrophe, like a major hail storm, doesn't hit Colorado Springs or Denver. So, in that case, it is always in the data. But there are a lot of states where catastrophes happen rarely, once every 10 years or less frequent than that, and that can cause a lot of aberration in data.

There are other states, like Texas, where catastrophes happen regularly, but it is maybe only once every three years that you have a major catastrophe. That presents an even more difficult problem for loss reserving because a lot of the catastrophes are in the data here and there, not just in one isolated spot where you can remove it.

If you remove the catastrophe data from the rest of the data, you will have data that will develop differently than the cat. data. So what we have done in this example is go back to the first paid loss triangle and remove all of the catastrophe losses.

(Slide)

So we go on to Exhibit 6. You may want to compare this to Exhibit 2. It is kind of hard to do side by side. I took these out and compared them side by side just to see where the major differences in the data are. Is the cat. data just in one year, or is it all over the place? We will see, in subsequent data, that there is cat. data, cat. losses, in every cell of this triangle. So this is a situation where it is probably a state like Colorado where there are some catastrophe losses every year.

So the method here is to remove the catastrophes and just go through the process again: calculate the averages, pick the factors, and move on. You may want to compare the factors from Exhibit 6 with those that are on Exhibit 2. What you will find is that the factors, the link ratios that were selected on Exhibit 6, in every case are higher than those that were selected on Exhibit 2.

(Slide)

If we have removed the catastrophe losses, we can't just throw them away. When I first started my career at a medium-size property and casualty company , the underwriters always wanted us to exclude the catastrophes and never put them back in. Unfortunately, that usually results in fairly inadequate rates. You have to keep them around, so Exhibit 7 shows the catastrophe-only losses, and they are sizable.

You can see that for 1989, at 12 months, $83,000 of losses had been paid out of the $210,000 there were there on the combined triangle on Exhibit 2. So now we have an explanation of why that $210,000 was as large as it was. We have just explained a

significant portion of it. You can also see, when you look down the 12-month column, that 1989 was the worst year ever, as of 12 months, for catastrophe losses. So this data may be reflecting actual experience due to the hurricanes on the eastern seaboard.

Also, if you look at the link ratios that were selected for the catastrophe data, you can see these factors are all lower than the prior triangle. So you have a definite difference in the way catastrophe losses develop compared to noncatastrophe losses. That is why these triangles are split. It is conceivable that, if growth of business was modest and catastrophes were consistent, by accident year and by development period, it wouldn't make much difference whether you split the triangle or not.

But the more likely situation is that growth will fluctuate, and catastrophe losses as a percentage of total will change from year to year. If you don't split them out, you are going to get aberrations, which could cause your estimates to be significantly misstated.

The most obvious case would be where you have never had a catastrophe loss, and then, in 1989 at 12 months, a catastrophe loss equal to all your other losses shows up. Well, you can't just take that total loss amount and develop it, because catastrophes will develop to ultimate sooner than the rest of the losses.

So we split the first triangle into the loss-only and cat.-only pieces. Now we are going to go on to Exhibit 8 and see what happens to our projections.

(Slide)

In the first column, we have our first estimate from the first triangle. In the second column is the estimate from the second triangle, which is a triangle which is loss-only. And the third column shows the cat. estimate. So to arrive at a total estimate for the second method, we add columns two and three. If we then take the difference between

column one and column four, which is shown in column five, we can see that Estimate 2 is lower by $7.5 million.

(Slide)

All right. So we have made one adjustment. There are other possible adjustments to be made. Let's go on to Exhibit 9 and look at another aspect of a homeowner's policy that causes the need for a separate analysis. As you know, if you have worked with homeowner's, the policy is divided into sections, section one being the physical damage losses to the dwelling and the contents, and section two being the liability losses.

The need to look at physical damage and liability separately becomes more and more important as your company writes higher limits of liability on section two. If you are writing $100,000 homes with $25,000 liability limits, then this is not a major problem. But if you are writing $60,000 homes with $300,000 liability limits, then this is more of a problem.

Essentially, the difference is that the physical damage losses to the dwelling are fairly short-tailed. You have a fire or a hail storm, the appraiser is out there within a few days, and hopefully within a month the repairs have been made. But certainly, before that, the loss has been reported to the insurance company, and a fairly accurate estimate of that loss is known. Homeowners liability is very similar to auto liability or other liability lines, you are dealing with an unknown situation, attorneys, the court system, and so forth. So, given that the homeowner's policy is a combination of physical damage and liability, it really begs to be split into those two pieces for loss reserving.

(Slide)

So, in Exhibit 10, we have taken Exhibit 6 (which had the cats. removed already) and split that into physical damage and liability. Exhibit 10 shows the physical damage data.

Again, just go through the same process of calculating link ratios and making selections. Again, if you want to compare this back to Exhibit 6, you will see that these link ratios are all lower than Exhibit 6, which is what we would expect.

(Slide)

Move on to Exhibit 11, and we see the liability losses. Again, it is the same procedure. You are running into a little bit of a problem here though. If you can look at 10 and 11 side by side, this is probably what you will see in most cases. There are not very many liability losses. In this example, I would say it might be 5 percent of the total noncat. losses. It is not going to be much more than 10 percent, unless you have a strange liability limit to insured value limit. But when you look at the loss development factors, you can see that these are all significantly higher than any of the others we have looked at so far and look a lot more like automobile BI.

Okay. So we have split the noncat. losses into the two pieces, so again we have to go back and make the projection, which is what we do in Exhibit 12.

(Slide)

Column one is the total estimate, including the cats. Column two shows the estimate for the physical damage losses; column three, the liability estimate. It says "paid liability." That probably should be labeled "liability estimate." And column four is the cat. estimate.

So we originally had one triangle, and we now have three triangles. We are going to add those all up to get Estimate No. 3 in column five. Again, we have a difference; it is a $3 million difference, and it is $3 million lower than Estimate No. 2.

The actual numbers that are used here are not extremely important. We could make up any example to demonstrate differences. The point is, these are legitimate things to look at. I know, from working with companies that write $10 million to $50 million of business, if you split their data into this level of detail, you can count the liability claims on your fingers. You are talking about perhaps three or four claims. You have to be careful.

This procedure is much more meaningful for larger companies that have a lot of cat. exposure and have enough total exposure so that they are going to generate a significant number of liability claims. If you use this procedure on a very small company, you have to be very careful what you do with the liability triangle, because you might end up with a really "thin" triangle where it is almost impossible to make link-ratio selections. Then you have to go on to the intermediate sessions to learn what to do with that situation.

(Slide)

Let's move on to Exhibit 13. We have talked about two adjustments: cats. and liability/physical damage split. Exhibit 13 gives you ideas about some other items that perhaps would cause you to split your data. The first item is that you may want to segregate your physical damage losses by cause of loss or peril category, such as fire, theft, wind, or hail.

Has anyone in this room ever seen that done, or does anybody's company do that for loss development? Okay. A couple of people are nodding yes. I have never seen it done. I would like to see the data. I would be surprised, myself, if you would see very much difference at all in development by peril, for these perils.

I guess my opinion is that whether the loss was caused by a fire or a storm should not have an impact on how long it takes that claim to be reported and entered into your data system. The settlement process is virtually the same. Maybe it takes a week longer to get

an accurate estimate of a fire loss compared to a hail loss, but I don't know if a week is going to make that much difference. So I think this has questionable value.

The second one is to take the physical damage losses and split them, dwelling versus contents. Again, I can't see, right up front, how that is going to cause a difference in loss development.

The third item indicated is that you may want to look at it by state or geographic region. This one I agree with strongly, and what you may find is that state or geographic region is telling you something else. For example, if you looked at California, you may find that the average liability limit is much higher than, say Iowa. That could reflect the attitude of people that live in California versus those who live in Iowa.

State may actually reflect true catastrophe exposure. For example, if you can divide the country into what you would call cat. states and noncat. states, look at states that you think have little cat. exposure. I am having trouble thinking of one; maybe Minnesota or Iowa. Then put Texas, the eastern seaboard and the Gulf states in a cat. category. A loss reserve analysis segregated by cat. and noncat. groups of states could eliminate the need to do separate analyses of cat. and noncat. data.

The forth item listed is that you may want to segregate the data in terms of risk type, preferred versus standard. Again, I have not seen that other than by looking at different companies within a group, and I have not really noticed any difference in the homeowner's development factors between those companies. I think what it might show is a different liability limit selection, with preferred risks generally selecting higher limits. There also may be a difference in the contents. If contents losses develop differently, then I would think that preferred risks are going to have more contents and be more likely to question the settlement on their contents.

There are all different possibilities. But when you see something that looks strange, you have to look in all the corners, and sometimes you never find out what the problem was.

(Slide)

On Exhibit 14, now we are going to compare all the estimates. In the first two columns, they show the prior estimates, and then they show the three estimates that you have calculated based on the various methods we have talked about. So there are five different estimates to look at, and in the last column a selection is made.

As I indicated before, I didn't prepare this slide, so I will not take credit for these selections. I have some problems with some of the selections. The obvious one is 1989 where you have three estimates, the low is 315, the high is 326, and the pick is 300. It sounds like a client of mine trying to tell me they don't have the extra $15 million to put up for reserves at the end of the year. 1988 is not much better. Every estimate is above 200, so I really don't know where the selection of 199 came from. Let's attribute it to a transcription error.

There were several versions of these slides, and I have a feeling that this last column never got changed. But it is a point to keep in mind, because I have seen some work where all different kinds of methods are used, and you have different estimates of ultimate, but what ends up being selected is not obvious. So maybe that is what happened here.

(Slide)

The second to last exhibit just shows, once you have made your selection of ultimate, how to get IBNR. This should have been covered in one of the prior sessions, but, essentially, what you are doing is taking the ultimates and subtracting the paid losses and the case outstanding; you end up with the IBNR. That's fairly straightforward.

(Slide)

In summary, the important thing is to divide your data in a meaningful manner, and that is going to vary from project to project. Do whatever is necessary to achieve a homogenous block of data.

And you can be fooled for many years, thinking you are looking at homogeneous data, not seeing any problems, and your projections look nice. You are ending up with ultimate losses that give you loss ratios of, let's say, 80, 81, 89, 78, 80; everything looks fine. Then you find out there was a problem, there was something in the data that you didn't know about, and the loss ratios should have been going 80, 85, 90, 95, 100. The company was in a lot of trouble, and you didn't let them know.

So these methods are useful, not only when the problem is obvious, but also when it looks like everything is nice. You may want to take that extra step and say, "do I really need to separate this out some way do some brainstorming, think about the underlying data and what kinds of changes could be taking place in the company that could cause this data to be misstated."

The second point is that the homogeneity of the data is critical in order to draw valid conclusions. The third point is that by homogeneity of data we simply refer to the similarity of the behavior of the data from the aspect of loss development. Going back to Exhibit 13 which suggests looking at periods and some other things, I am not sure that these things make a difference in the behavior of the loss development. It is a difference, definitely, but does it mean anything for loss development? That is the major question you have to ask.

Questions on the homeowner's example?

QUESTION: (Inaudible)

MR. SCHILLING: The question was, is it really wise to look at paid loss development on catastrophe data? Would incurred data perhaps be better?

In most cases, it probably would be better to look at incurred. It is going to be of more value for a company with fewer cat. losses. For a company that is large, country-wide and has a lot of cat. losses, it is probably not going to make that much of a difference.

It is going to just be like doing the noncat. piece between incurred and paid, because you have a nice triangle. It is going to be more important for the company that maybe goes a couple years without any cat. losses and then has some. Then, of course, the case estimate is what you want to look at. That is a good point.

QUESTION: Is it difficult to do that cat. development in an accident year segregation? I mean, a cat. that happens in January, for instance, is going to have a whole lot more development during the first 12 months than one that happens in December.

That is a weakness of the triangulation method and subdividing it into annual increments. A way around that is to do quarterly development. If you were State Farm, you could look at this monthly perhaps. I work with other lines of business where we do look at development monthly.

QUESTION: For the smaller companies, could you look at them individually?

MR. SCHILLING: For small companies that have a smaller cat. exposure, maybe one where cat. losses are 1 percent or less of their total in a typical year, but occasionally they hit up maybe to 5 or 10 percent of their total losses, the triangulation method is not going to work. You are going to end up with a triangle full of holes and hugh development factors. Then you have to be creative. You really just have to look at the individual cats.

I have a client that had no cats. for three years and then they had one in December. We went in and talked to the claims people and looked at the specific details of that case. Then there was some judgment as to how much we thought it would develop beyond that.

There can be very tough situations to look at. Hurricanes, if they would happen in December, would be much more of a problem for people signing loss reserve opinions. They are not real easy to estimate quickly.

As I said, these methods are more valid for very large books of business than for small books of business, in total. But it is important, even if you are a $10-million company, to split out that cat. data. At least you could split it out, do your loss development, and then put it back in without developing it. That is probably a better answer than having it develop at the same rate as the other losses, or applying some other development factor based on judgment.

Any other questions on homeowner's?

(No response.)

Okay. If you think of any while we are doing the auto example, there will be some time at the end it looks like.

MR. DYE: Next, we are going to look at the auto case study. This will be a little different from the homeowners case study in that the losses develop slower. It is a longer tail line. It is not as long-tailed as medical malpractice, but it will certainly develop more slowly than the homeowner's line.

(Exhibit 1)

We called the company the MVR Insurance Company. For most people that means motor vehicle record. In this case, it might mean, when we are through, the misvalued reserve insurance company. Nonetheless, the key points to note from this slide is that we are making reserves for private passenger auto for BI, for standard risks There have been significant changes in senior management in the last five years, in underwriting and claims, and you need to be aware of things like that because it can definitely impact your data.

The question is, you have hired a new analyst, what should that analyst do? Well, he should start off by looking at paid loss development, looking at development on known case incurred, and then we will come up with a few other things for him to look at. Even though he will think he is through after the first two steps, he won't be.

(Exhibit 2)

Looking at Exhibit 2, this shows paid development data as of December '89. This is very similar to all the triangles that Tim just showed you. It has cumulative paid losses at various points in time for accident years '80 through '89. Like Tim said, it is generally a good idea to look across the rows and down the columns and look to see if you see anything that looks out of line. You will notice a couple of things right off. When you look at the 12 months column, accident year '88 had a significant jump in losses, to $23.4 million then accident year '89 actually dropped some from accident year '88, to $23.1 million. So that is the paid loss numbers at 12 months, then next, you can compute all your link ratios, as was done before, and come up with various averages, make your selections, and then come up with cumulative factors. These selections here were obviously the four-year averages.

Now, you will notice also that down here in the lower right hand corner there is a number that is not developed anywhere at the top. This number is is a tail factor and, hopefully, they have covered this in the earlier sessions,. This number shows that after 120 months you still expect to pay some more losses and, in fact, you expect to pay about half of a percent more losses, from 120 months to ultimate.

(Exhibit 3)

We are going to use the paid losses to come up with ultimate estimates in a minute. Exhibit 3 is a slide similar to the prior one except these losses are known case incurred losses. So cumulative incurred losses are paid plus the known case outstanding. It excludes IBNR because it creates a lot of variability in your data. So you want to take out the IBNR and just use paid plus known case. So that is what incurred here means.

Basically, doing the same thing as before, you select factors. You will notice that there is no tail factor. What that means, as of 120 months, is that when you take into account your known case reserves, there is really not any additional development at that point in time to ultimate.

(Exhibit 4)

Using the prior two exhibits, we can develop the last two columns on Exhibit 4. These are the ultimate estimates based on the factors that we selected, multiplying them times the paid losses in Exhibit 2, and times the known case incurred as of the various points in time in Exhibit 3, to come up with the estimates of ultimate as of December, 1989.

For comparison purposes, we have also shown the estimates as of 12/88 and 6/89. You will notice that before, in 12/88 and 6/89, some of the estimates are outside the range of the paid and the known case incurred. For example, you can see that last four estimates for '85 through '88, as of 6/89, all of those selections were outside of the range that you would have gotten from paids and known case incurred ultimate estimates.

So whoever did this before was doing something differently from just using paid losses or known case incurred. That might give you a clue that maybe you shouldn't just stop here. the prior estimates may have been determined by more experienced actuarial analyst.

The other interesting thing is that when you look at the estimates and sum them up. from '80 through '88, the most recent estimate is definitely in a reasonable range compared with the prior estimates. Also, if you sum them up for all years, which is not shown here, the total estimate based on paid is $1.238 billion, and the total estimate for known case incurred is $1.241 billion. So there is only a $3 million difference. You might pat yourself on the back and say, "Well, I'm done. My estimate should be somewhere in that range." But that would make the session too short, if that were true.

(Exhibit 5)

On the handout, this says that the estimates they were only $6 million apart for accident year '89. Actually, that number should be $8 million, and it is $8 million on the slide here.

Once again, the total estimate for '80 through '89 was only $3 million different. Like I said, you might feel good about yourself and say you should stop there. The answer is no, we don't want to stop there, and we want to analyze the data a little further to see if there are any other unusual things going on.

Basically, what we are going to do is look at four additional ways to estimate ultimate. First, we are going to look at adjusting the paid losses for closed ratio problems. Next we will look at developing estimates based on the average loss per closed claim. We will also look at estimates based on the average incurred per reported claim. Then we will also analyze pure premium trends and see if we need to make any adjustments based on those.

(Exhibit 6)

First, we want to look at what the close ratio has been in this line. Before we can do that, we need to come up with estimates of ultimate number of claims for each accident year. To do that, we are going to use reported claims. The first triangle shows the cumulative reported claims for each accident year at various evaluation points. Based on this data, you can come up with claim development factors and select some factors.

Once again, you have a small tail factor, although it is only about $1.0001. Now you can come up with cumulative factors. Then you basically multiply the cumulative factors times the reported claims at various points in time to come up with the ultimate estimate for number of claims by each accident year. We will use these estimates later.

(Exhibit 7)

The estimates of ultimate claims based on number reported, are shown in the third from the last column here. Like I said before, they are the reported claims at various points in time times the claim development factors we just selected.

Once you have that, given that you know what earned exposures are, then you can compute frequency. This exhibit shows the ultimate frequency estimates by accident year. This wouldn't be complete unless you looked at the rate of change also, and the last column gives you the annual changes in frequency. One thing that should be somewhat of a concern is this .4 percent change in frequency for accident year '89. It looks very low to me. It would be the lowest year on the page. You need to notice things like that.

(Exhibit 8)

Moving on to Exhibit 8, now that we have an estimate of the ultimate number of claims, we can look at the number of closed

claims at various points in time and compute close ratios, which are basically the number of closed claims divided by the number of reported claims. These are the number of closed claims, and these are the close ratios based on the reported claims and the closed claims at various points in time. You can see what all the calculations are by each accident year at the various evaluation points.

Now, one thing that jumps out at you, when you look at the 12 month development column -- or at least it jumped out at me -- was the 1989 closed ratio is the lowest of any year shown. So that means, for some reason or another, we are closing claims more slowly than we have in the past. That is a problem.

The person who prepared this example also felt that '88 might be a little low, although I might have argued with that, because it is well within the range of some of the other years. So we are going to make an adjustment to '88 on the next slide, but that may or may not be apropriate.

Another number that we are going to need, not only for this example but also for a later example, are these numbers down in the lowest triangle, which show the cumulative paid losses or the average paid per closed claim. Another thing to notice here that will be important later is that '88, once again, jumped up significantly from '87, and then '89 dropped a little from '88. So that looks somewhat mysterious.

(Exhibit 9)

Now what are we going to do? Well, using the close ratio information, we can adjust for the low values. Basically, the third column shows the close ratio values that we had, that were just the raw numbers on the prior page. Now, what we are going to do is say, "Well, we think '89 was too low and also '88 was too low". Although, like I said before, you might argue that '88 was okay. Instead of using what they actually were, we are going to adjust these close ratios.

What we did here was take the prior four years average close ratio and substitute it for what actually occurred for that year. So, in other words, this .4839 was the average on the prior slide of the close ratio at 12 months for '85, '86, '87, and '88. Then you just take the difference between the adjusted and the actual close ratios, and that is the fourth column here, and then you have to calculate how many additional closes you should have had over what you actually had. That is calculated in the nextto last column here, although it was calculated improperly in this example.

The way you do that is, you take the difference in the fourth column, divide it by third column and multiply that number times the fifth column. The answer should have been 1,037, for '89 instead of 470 and 389 for '88 instead of 314. Anyway, the key

point is, you are going to have to add some additional closes because the current number of closes was understated, for some reason or another, in the last two accident years. This may be because you transferred claims to a regional office and so the claims were just lying around, whereas before they would have been handled more quickly. There could be any number of things that could be causing this. Maybe you have decided that it is appropriate to negotiate more on claims instead of trying to close them quickly, because, hopefully, you will save some on severity that way.

Anyway, if you change these numbers, it flows through to everything else. So you take the additional closes times the average paid onclosed to come up with an additional paid dollar number. In this case, accident year '88, instead of 913 should have been 1132, and '89 should have been 1585. Then you develop those numbers, using the same development factors that you were using before for paid losses, to come up with an additional ultimate paid dollar amount because of increasing the close ratios.

In '88, 2128 becomes 2637, and '89 becomes 15,037. So that is the amount your ultimate estimate was understated when you used paid loss development before, because your close ratio was too low in 1988 and 1989. So the revised paid estimates are 209,266 and 233,923.

I apologize for these corrections. Unfortunately, this is the first time that this session has been redone, so we are finding mistakes as we go through it. So that is the first additional method we are going to use. We basically adjusted the paid development technique for the closed ratio being too low.

(Exhibit 10)

Now the second method we are going to use will compute an ultimate estimate based on the average paid per closed claim. We calculated the first part of this on Exhibit 8. These, once again, are just the average paid amount per closed claim Remember that 1573 in '88 looks a little high, and 1528 in '89 may be about right or it may be low, given that it is lower than in '88.

With this 1573 being very high, notice that it creates a 12 to 24 month development ratio, 1.8493, which is much lower than anything else in the 12 to 24 month column. So when you make these selections, this four-year average, which is 2.0324, is outside the range of three of these factors. In my opinion, the selection might be too low. In fact, you might have selected something closer to the average, excluding the high and the low. If you had, that would increase your ultimate estimate, using this technique, by about five percent for accident year 1989, which would be 2.13 over 2.03.

(Exhibit 11)

Now, on that prior slide, we basically determined how we could develop an ultimate estimate. We will do that on Exhibit 12 based on the average paid per closed claim. Also, on Exhibit 12, we are going to develop an ultimate estimate based on the average incurred per reported claim, using the information shown here on Exhibit 11. First, we are going to come up with the average incurred per reported claim, come up with all our development factors, and then select an ultimate cumulative factor. When we apply these factors to the undeveloped overages, we are going to come up with estimates of the ultimate average incurred per reported claim shown on Exhibit 12.

(Exhibit 12)

The estimated average loss based on paid per closed comes from Exhibit 10. The average incurred per reported claim come from Exhibit 12. Then you take the estimated ultimate claims based on Exhibit 7 times the estimated average losses to come up with estimated ultimate losses.

(Exhibit 11)

I have to go back just a second. I want to make sure I point out all the mistakes, not just some of them. There was also a mistake made on Exhibit 11. You will see that two numbers got transposed in the selection of the 24 to 36 link ratio. It should have been 1.1211 for the selection instead of 1.2111. That flows through to the cumulative factors so that the cumulative factor from 12 to ultimate becomes 1.0909, and from 24 to ultimate, becomes 1 1746.

(Exhibit 12)

That changes these last two estimates of the estimated average loss based on incurred per reported claim. Instead of 5308, you get 4913; and 5655, you get 5234. Then, when you multiply the number of claims times the average claim, your ultimate losses for the last two accident years also change. For '88, it becomes 201,713, and for '89, it becomes 226,800. So the total, then, is 1,240,819.

I am correcting all the numbers just so you will have a correct sheet of numbers. That is important, but the numbers are really less important than the methodology. The key point that you should get out of this is that you are taking an estimated ultimate number of claims, multiplying it by two estimates of the average loss to come up with an estimated ultimate loss. There are two different ways to estimate what the average losses are. You can see that the bottom-line estimates can be somewhat different. This one is 1 254, billion and the revised estimate here is 1 241 billion.

(Exhibit 13)

Now we have a number of different methods that we have used to come up with estimates of ultimate. For reference purposes, we have the June estimates that we made for accident years '80 through '88. We have an estimate based on the known case incurred, which we made no adjustment to from the original two estimates that we made. We adjusted the paid loss estimate for the close ratio problem. We came up with an estimate based on average paid per closed times the ultimate number of claims and the average incurred per reported times the ultimate number of claims.

Once again, the numbers are slightly different from what is show here. The estimates are 1,256,026 for the adjusted paid losses, and 1,240,819 for the average incurred per reported claim.

Based on all these estimates, then, we can make some selections. As Tim alluded to in his example, the person who selected these generally picked the highest ones. That is a very conservative approach to use. You might pick something more in the middle of the range, or, if your management wants to make income higher and surplus higher, you might select at the low end of the range. Anyway, you can basically use all of these estimates plus your actuarial wisdom to make selections. They just need to be reasonable, given what your data looks like.

Even though some of this data changed, wouldn't have changed the selections made in 1988 and 1989 very much. I figure, at most, about $2 million. It would have been maybe $ 1 257 billion instead of $1.259 billion shown here. The reason I didn't change these estimates is because they flow through to some of the later exhibits.

(Exhibit 14)

You might have thought you were done on the prior slide. However, it is a good idea to look at at least one other thing, and that is what we are doing on Exhibit 14. Basically, we are going to look at our selections and we are going to determine the implied trend based on those selections.

At the top of this exhibit, you can see we have exposures, ultimate number of claims, ultimate dollars of loss, and changes in those from year to year. Based on these numbers, we can come up with frequency, which is claims divided by exposures; severity, losses divided by claims; pure premium, which is the product of those two; or, alternatively, pure premium is losses divided by exposures. Then we can compute these actuarial trends to see how reasonable you think our estimates are.

You can see frequency. We have computed that on a prior exhibit. Frequency changes by these amounts, being very low in '89. Severity changes by these amounts. '89 doesn't look that

unreasonable, because a lot of these high changes were frequency driven. But the pure premium trend for '89 would be the second lowest number on the page. A question is, given that for '89 we only have data at 12 months, do we want to stake our actuarial reputation on an 8.1 percent pure premium trend selection? That seems really low, and that is a pretty risky thing to do.

(Exhibit 15)

Given that, we are going to change the trend We are going to say that '89 is too undeveloped at this point to place much faith in the 8.1% pure premium trend. So we are going to make it higher. This is more or less a judgmental thing, although, in this case, 8.1% was changed to 11.7%, and 11.7% was calculated by taking the four-year average and averaging it with the eight-year average. This was an unusual way to calculate this number.

Since the four-year average was 10.9%, I might just have picked that. I might even have taken a three-year average, because the 3.6% for '85 looks like an outlier. It is hard to say. If you are going to take a four-year average, you might want to throw in a five-year, because the 19.2% and the 3.6% together look reasonable, but there is a lot of judgment in deciding what to do here.

I probably wouldn't have taken the four-year average and averaged it with the eight-year average on my own, but that is a way to do it. If we average those together, we come up with 11.7%.

Once we have adjusted the pure premium trend, that adjustment should apply somewhere. In this case, we adjusted severity, although you could have adjusted partially frequency, partially severity. It really doesn't matter, because the bottom line is, we just want to change the pure premium. When you change the pure premium and multiply it times the exposures, we are going to come up with a new, revised estimate of ultimate. That number goes to $245 million. So the percent change in losses is also changed to a 17.4% increase.

The bottom line on all of this is that your pure premium estimate really looked very low for the most recent year, and it is risky, when you have a very undeveloped accident year for a longer tail line like BI, to place a lot of faith in the estimate at 12 months. Do you have to look at your trends and say, "Well, I don't really believe what the data is telling me at this point, so I'm going to pick something a little more conservative, with a higher trend." That estimate, in this case, is $245 million. There is a lot of judgment in this. Like Tim said before, it is a lot more of an art than a science, in many cases. A lot of times, company management comes to the actuaries, and says, "There must be an exact answer for this." Well, there is not always an exact answer for everything. There is usually a range around the answer. In reserving, a lot of times you may pick the

more conservative end of the range. In pricing, you may pick more in the middle of the range. So there are a lot of trade-offs in these selections.

(Exhibit 16)

Now we have revised ultimate losses based on changing the pure premium trend. It would have been nice to show the totals here. The total ultimate losses are $1,276,540,000. You will recall that our original estimates, based on paid losses and known case incurred, were $1.238 billion and $1.240 billion, respectively. So this estimate is substantially higher than the earlier estimates. It is worthwhile to go through all these other iterations when your estimate changes that much.

To compute our reserves, as in the homeowners example, is basically a simple calculation. You take ultimate losses, subtract out paids,and that gives you your total reserve. Subtracting out case reserves, gives you your IBNR reserves.

(Exhibit 17)

The last slide summarizes what I said before. The paid and incurred development methods don't always put a reasonable range around an estimate of ultimate losses. In this case, we basically adjusted accident year '89 because the closed ratio was unreasonably low and because the severity numbers were also too low. Once again, additional analysis in this case was warranted.

The final promotional thing is, make sure the analyst goes to the Loss Reserving Seminar, and they will be able to figure out how to do all these fancy things.

Any questions?

QUESTION: Say you had new underwriting management, at what point would you start to believe the lower pure premium trend?

MR. DYE: That is a good question. The question is, if you get new underwriting people or new underwriting management, at what point do you believe lower pure premium trend, or even higher pure premium trend? Then there is a similar question, if you get new claims management, at what point do you believe lower or higher pure premium trend, because they may be doing things or not doing things the prior management was doing.

In the last several years,if a lot of claims activities were supposed to have significant impact on losses downward, we would take it into account when we saw it in our data. When it is a high profile thing like that, as soon as you start seeing it in your data, then you have to do it sooner, although you might want to wait a while. I am sorry this is very vague, but it is really a very judgmental thing. They may want you to recognize it before it shows up in the data.

QUESTION: I guess what I am saying is, if that '89 number came up and I told management that "No, the trends haven't really changed. Here, let me raise this $8 million," I'd have gotten criticized for not recognizing efforts to improve loss experience.

MR. DYE: And will. That happens. It is hard. It is a judgment thing; it really is. They will say that there are really good reasons behind the improving experience. But if you can show them the close ratio is down, they can't really argue with that adjustment. So you need to get into your data in more detail and try to find things like the close ratio that have changed. But if they can come back and say, "Okay. The close ratio is not any lower, and the average paid onclosed is down," then they have a pretty good case for your not making an upward adjustment to that number.

In fact, if we began to see that our trend in average paid onclosed is declining without a significant change in the close ratio, and if we know there is something going on in claims or in underwriting to improve our loss situation, then that will give you reason to believe those numbers are accurate.

Now, if you don't know of any changes that have gone on and your numbers just start changing, then you begin to wonder what is going on. It might be some change in your mix of business. It might be some change that one region is handling a lot more business, and another one is handling a lot less, so that is also a change in your mix of claims. There could be some other things going on too. Sometimes you might need to break down your data, like in the homeowners example, into more homogeneous groups, and maybe that way you can figure out what is causing the differences in the data.

QUESTION: Back on Exhibit No. 7, can you tell me how you calculated the estimated ultimate frequency?

MR. DYE: Okay. The estimate ultimate frequency is just the estimated ultimate claims divided by the earned exposures. So it is the third to the last column divided by the second column.

Another thing that I didn't really mention here that you can look at to see if it looks reasonable is the frequency at 12 months. It is calculated here, and you can see that, in this case, the changes in reported frequency look a lot like the changes in estimated ultimate frequency. So that is another thing you can look at. Sometimes that can tell you something.

If reported frequency is going down, then you might really have a problem. You may not be getting claims reported, for some reason or another. Maybe they are getting reported and they are not getting into the system because they are sitting on somebody's desk.

Any other questions?

(No response.)

MR. DYE: We got finished just a little early. I thank everybody for attending. If you would fill out your evaluation forms, we would appreciate it. We will work on the sound system and getting the typos corrected. Hopefully, next time it will be even better.

Thank you.

1990 CASUALTY LOSS RESERVE SEMINAR

BASIC CASE STUDY

HOMEOWNERS EXAMPLE

BT36
7/10/90

Exhibit 1

BASIC CASE STUDY

HOMEOWNERS EXAMPLE

Background

Your company, the XYZ Mutual Insurance Company, writes primarily personal lines on a national basis. Because you attended the Casualty Loss Reserve Seminar, you have been given the responsibility of setting reserves for the Homeowners line of business as of 12/31/89.

Exhibit 2

BASIC CASE STUDY
HOMEOWNERS EXAMPLE

XYZ MUTUAL INSURANCE CO.
HOMEOWNERS

Cumulative Paid Losses (000's)

ACCIDENT YEAR	12	24	36	48	60	72	84	96	108	120
1980	56,152	77,002	78,849	80,391	81,642	82,441	83,122	83,392	83,421	83,437
1981	58,292	78,925	81,029	82,618	83,451	84,626	85,093	85,559	85,594	
1982	68,667	91,912	95,907	97,671	100,076	101,430	101,692	101,861		
1983	74,852	125,261	134,172	142,975	148,654	150,003	150,948			
1984	81,826	119,340	126,544	130,216	132,819	134,849				
1985	113,260	152,791	157,027	158,835	161,403					
1986	97,275	132,144	136,659	139,410						
1987	104,040	147,375	152,632							
1988	132,207	179,768								
1989	210,192									

Development Factors

ACCIDENT YEAR	12 24	24 36	36 48	48 60	60 72	72 84	84 96	96 108	108 120	120 ULT
1980	1.3713	1.0240	1.0196	1.0156	1.0098	1.0083	1.0032	1.0003	1.0002	
1981	1.3540	1.0267	1.0196	1.0101	1.0141	1.0055	1.0055	1.0004		
1982	1.3385	1.0435	1.0184	1.0246	1.0135	1.0026	1.0017			
1983	1.6734	1.0711	1.0656	1.0397	1.0091	1.0063				
1984	1.4585	1.0604	1.0290	1.0200	1.0153					
1985	1.3490	1.0277	1.0115	1.0162						
1986	1.3585	1.0342	1.0201							
1987	1.4165	1.0357								
1988	1.3597									
AVERAGE	1.4088	1.0404	1.0263	1.0210	1.0124	1.0057	1.0035	1.0004	1.0002	
AVERAGE EXCLUDING HIGH/LOW	1.3811	1.0380	1.0213	1.0191	1.0125	1.0059	1.0032			
TIME WEIGHTED AVERAGE	1.4056	1.0412	1.0261	1.0222	1.0128	1.0052	1.0032	1.0004	1.0002	
4 YEAR AVERAGE	1.3709	1.0395	1.0316	1.0251	1.0130	1.0057	1.0035	1.0004	1.0002	
SELECTED	1.3709	1.0395	1.0316	1.0251	1.0130	1.0057	1.0035	1.0004	1.0002	1.0051
CUM'S	1.5494	1.1302	1.0873	1.0540	1.0282	1.0150	1.0092	1.0057	1.0053	1.0051

7/31/90
BT38

Exhibit 3

BASIC CASE STUDY

HOMEOWNERS EXAMPLE

XYZ MUTUAL INSURANCE CO.

Calculation of Estimated Ultimate Losses
($000)

Accident Year	Cum. Pd. Losses	Cum. LDF	Est. Ult. Losses (12/89 Est #1)	Prior Estimates of Ultimate 12/88	6/89
1980	$83,437	1.0051	$83,863	$83,688	$83,606
1981	85,594	1.0053	86,048	86,011	85,967
1982	101,861	1.0057	102,442	102,645	102,321
1983	150,948	1.0092	152,337	151,986	152,272
1984	134,849	1.0150	136,872	136,575	136,360
1985	161,403	1.0282	165,955	165,012	164,316
1986	139,410	1.0540	146,938	144,444	144,384
1987	152,632	1.0873	165,957	163,156	162,413
1988	179,768	1.1302	203,174	202,010	201,486
1989	210,192	1.5494	325,671	-	-
Total 1980–1988			1,243,586	1,235,527	1,233,125

Exhibit 4

BASIC CASE STUDY
HOMEOWNERS EXAMPLE

The 12/89 Estimate #1 is considerably different from prior estimates.

What might be the cause of this difference?

BASIC CASE STUDY

HOMEOWNERS EXAMPLE

- CATASTROPHES CAUSE SIGNIFICANT VOLATILITY IN THE DATA.

- DATA MORE HOMOGENOUS IF CATS EXCLUDED.

  - CATS DEVELOP DIFFERENTLY FROM OTHER TYPES OF LOSSES.

- MUST PROJECT CATS TO LOAD BACK IN.

Exhibit 6

BASIC CASE STUDY
HOMEOWNERS EXAMPLE

XYZ MUTUAL INSURANCE CO.
HOMEOWNERS EXCLUDING CATASTROPHES

Cumulative Paid Losses (000's)

ACCIDENT YEAR	12	24	36	48	60	72	84	96	108	120
1980	44,901	63,608	65,415	66,940	68,190	68,987	69,668	69,938	69,967	69,983
1981	49,404	69,578	71,659	73,240	74,071	75,245	75,712	76,177	76,212	
1982	56,588	77,415	80,680	82,378	84,522	85,723	85,979	86,148		
1983	55,023	86,584	93,805	101,911	107,530	108,843	109,694			
1984	64,742	98,872	105,892	109,538	112,140	114,150				
1985	81,892	117,315	121,395	123,161	125,713					
1986	83,478	117,817	122,190	124,901						
1987	100,343	140,984	146,144							
1988	111,534	155,271								
1989	126,343									

Development Factors

ACCIDENT YEAR	12 24	24 36	36 48	48 60	60 72	72 84	84 96	96 108	108 120	120 ULT
1980	1.4166	1.0284	1.0233	1.0187	1.0117	1.0099	1.0039	1.0004	1.0002	
1981	1.4083	1.0299	1.0221	1.0113	1.0158	1.0062	1.0061	1.0005		
1982	1.3680	1.0422	1.0210	1.0260	1.0142	1.0030	1.0020			
1983	1.5736	1.0834	1.0864	1.0551	1.0122	1.0078				
1984	1.5272	1.0710	1.0344	1.0238	1.0179					
1985	1.4326	1.0348	1.0145	1.0207						
1986	1.4114	1.0371	1.0222							
1987	1.4050	1.0366								
1988	1.3921									
AVERAGE	1.4372	1.0454	1.0320	1.0259	1.0144	1.0067	1.0040	1.0004	1.0002	
AVERAGE EXCLUDING HIGH/LOW	1.4276	1.0419	1.0246	1.0223	1.0141	1.0070	1.0039			
TIME WEIGHTED AVERAGE	1.4336	1.0462	1.0318	1.0278	1.0150	1.0063	1.0037	1.0004	1.0002	
4 YEAR AVERAGE	1.4103	1.0449	1.0394	1.0314	1.0150	1.0067	1.0040	1.0004	1.0002	
SELECTED	1.4103	1.0449	1.0394	1.0314	1.0150	1.0067	1.0040	1.0004	1.0002	1.0051
CUM'S	1.6299	1.1557	1.1060	1.0641	1.0317	1.0165	1.0097	1.0057	1.0053	1.0051

7/31/90
BT39

Exhibit 7

BASIC CASE STUDY
HOMEOWNERS EXAMPLE

XYZ MUTUAL INSURANCE CO.
HOMEOWNERS CATASTROPHES

Cumulative Paid Losses (000's)

ACCIDENT YEAR	12	24	36	48	60	72	84	96	108	120
1980	11,251	13,394	13,434	13,451	13,452	13,454	13,454	13,454	13,454	13,454
1981	8,888	9,347	9,370	9,378	9,380	9,381	9,381	9,382	9,382	
1982	12,079	14,497	15,227	15,293	15,554	15,707	15,713	15,713		
1983	19,829	38,677	40,367	41,064	41,124	41,160	41,254			
1984	17,084	20,468	20,652	20,678	20,679	20,699				
1985	31,368	35,476	35,632	35,674	35,690					
1986	13,797	14,327	14,469	14,509						
1987	3,697	6,391	6,488							
1988	20,673	24,497								
1989	83,849									

Development Factors

ACCIDENT YEAR	12 24	24 36	36 48	48 60	60 72	72 84	84 96	96 108	108 120	120 ULT
1980	1.1905	1.0030	1.0013	1.0001	1.0001	1.0000	1.0000	1.0000	1.0000	
1981	1.0516	1.0025	1.0009	1.0002	1.0001	1.0000	1.0001	1.0000		
1982	1.2002	1.0504	1.0043	1.0171	1.0098	1.0004	1.0000			
1983	1.9505	1.0437	1.0173	1.0015	1.0009	1.0023				
1984	1.1981	1.0090	1.0013	1.0000	1.0010					
1985	1.1310	1.0044	1.0012	1.0004						
1986	1.0384	1.0099	1.0028							
1987	1.7287	1.0152								
1988	1.1850									
AVERAGE	1.2971	1.0172	1.0041	1.0032	1.0024	1.0007	1.0000	1.0000	1.0000	
AVERAGE EXCLUDING HIGH/LOW	1.2407	1.0142	1.0022	1.0005	1.0007	1.0002	1.0000	1.0000		
TIME WEIGHTED AVERAGE	1.3164	1.0166	1.0042	1.0029	1.0025	1.0010	1.0000	1.0000	1.0000	
4 YEAR AVERAGE	1.2708	1.0096	1.0056	1.0048	1.0029	1.0007	1.0000	1.0000	1.0000	
SELECTED	1.2708	1.0096	1.0056	1.0048	1.0029	1.0007	1.0000	1.0000	1.0000	1.0000
CUM'S	1.3009	1.0237	1.0140	1.0084	1.0036	1.0007	1.0000	1.0000	1.0000	1.0000

7/31/90
BT40

Exhibit 8

BASIC CASE STUDY

HOMEOWNERS EXAMPLE

COMPARISON OF ESTIMATES (000's)

ACCIDENT YEAR	(1) 12/89 Est. #1	(2) Pd. Loss Ex. Cats	(3) Cat. Estimate	(4)=(2)+(3) 12/89 Est. #2	(5)=(1)-(4) Difference
1980	$83,863	$70,340	$13,454	$83,794	$69
1981	86,048	76,616	9,382	85,998	50
1982	102,442	86,640	15,713	102,353	89
1983	152,337	110,761	41,254	152,015	322
1984	136,872	116,029	20,713	136,742	130
1985	165,955	129,702	35,818	165,520	435
1986	146,938	132,907	14,631	147,538	(600)
1987	165,957	161,637	6,579	168,216	(2,259)
1988	203,174	179,442	25,078	204,520	(1,346)
1989	325,671	205,923	109,079	315,002	10,669
					$7,559

8/2/90
BT44

BASIC CASE STUDY
HOMEOWNERS EXAMPLE

HOMEOWNERS POLICY

SECTION I

- PHYSICAL DAMAGE TO THE DWELLING, CONTENTS, AND APPURTENANT STRUCTURES.
- RELATIVELY SHORT-TAILED LOSSES.

SECTION II

- PERSONAL LIABILITY INCLUDING BODILY INJURY, MEDICAL PAYMENTS, AND PROPERTY DAMAGE.
- DATA AT 12 MONTHS MORE VOLATILE.
- LONGER-TAILED LOSSES.

BASIC CASE STUDY
HOMEOWNERS EXAMPLE

XYZ MUTUAL INSURANCE CO.
HOMEOWNERS PHYSICAL DAMAGE LOSSES EX. CATS

Cumulative Paid Losses (000's)

ACCIDENT YEAR	12	24	36	48	60	72	84	96	108	120
1980	44,021	61,538	62,264	62,579	62,665	62,943	63,315	63,414	63,417	63,419
1981	48,184	66,356	66,940	67,411	67,666	67,840	68,074	68,350	68,352	
1982	55,061	74,143	75,233	75,715	76,597	77,033	77,096	77,118		
1983	53,481	82,350	87,280	93,533	97,892	98,530	98,643			
1984	62,830	93,066	97,543	99,754	101,431	102,063				
1985	79,628	111,489	113,054	113,424	113,539					
1986	81,446	112,198	113,902	114,690						
1987	97,328	134,275	136,278							
1988	108,427	148,638								
1989	122,854									

Development Factors

ACCIDENT YEAR	12 24	24 36	36 48	48 60	60 72	72 84	84 96	96 108	108 120	120 ULT
1980	1.3979	1.0118	1.0051	1.0014	1.0044	1.0059	1.0016	1.0000	1.0000	
1981	1.3771	1.0088	1.0070	1.0038	1.0026	1.0034	1.0041	1.0000		
1982	1.3466	1.0147	1.0064	1.0116	1.0057	1.0008	1.0003			
1983	1.5398	1.0599	1.0716	1.0466	1.0065	1.0011				
1984	1.4812	1.0481	1.0227	1.0168	1.0062					
1985	1.4001	1.0140	1.0033	1.0010						
1986	1.3776	1.0152	1.0069							
1987	1.3796	1.0149								
1988	1.3709									
AVERAGE	1.4079	1.0234	1.0176	1.0135	1.0051	1.0020	1.0020	1.0000	1.0000	
AVERAGE EXCLUDING HIGH/LOW	1.3978	1.0198	1.0096	1.0084	1.0055	1.0023	1.0016	1.0000		
TIME WEIGHTED AVERAGE	1.4039	1.0240	1.0181	1.0153	1.0056	1.0020	1.0018	1.0000	1.0000	
4 YEAR AVERAGE	1.3820	1.0231	1.0261	1.0190	1.0053	1.0028	1.0020	1.0000	1.0000	
SELECTED	1.3820	1.0231	1.0261	1.0190	1.0053	1.0028	1.0020	1.0000	1.0000	1.0000
CUM'S	1.4934	1.0806	1.0562	1.0293	1.0101	1.0048	1.0020	1.0000	1.0000	1.0000

7/31/90
BT41

Exhibit 11

BASIC CASE STUDY
HOMEOWNERS EXAMPLE

XYZ MUTUAL INSURANCE CO.
HOMEOWNERS LIABILITY LOSSES

Cumulative Paid Losses (000's)

ACCIDENT YEAR	12	24	36	48	60	72	84	96	108	120
1980	880	2,071	3,151	4,361	5,525	6,041	6,352	6,525	6,551	6,565
1981	1,221	3,222	4,718	5,829	6,406	7,404	7,638	7,827	7,858	
1982	1,527	3,271	5,447	6,663	7,924	8,691	8,884	9,029		
1983	1,542	4,233	6,526	8,378	9,637	10,313	11,123			
1984	1,886	4,742	7,575	9,111	10,803	12,167				
1985	2,163	5,807	8,341	9,736	12,178					
1986	1,985	5,588	8,058	10,211						
1987	2,908	6,709	9,863							
1988	3,111	6,628								
1989	3,480									

Development Factors

ACCIDENT YEAR	12 24	24 36	36 48	48 60	60 72	72 84	84 96	96 108	108 120	120 ULT
1980	2.3534	1.5215	1.3840	1.2669	1.0934	1.0515	1.0272	1.0040	1.0021	
1981	2.6388	1.4643	1.2355	1.0990	1.1558	1.0316	1.0247	1.0040		
1982	2.1421	1.6652	1.2232	1.1893	1.0968	1.0222	1.0163			
1983	2.7451	1.5417	1.2838	1.1503	1.0701	1.0785				
1984	2.5143	1.5974	1.2028	1.1857	1.1263					
1985	2.6847	1.4364	1.1672	1.2508						
1986	2.8151	1.4420	1.2672							
1987	2.3071	1.4701								
1988	2.1305									
AVERAGE	2.4812	1.5173	1.2520	1.1903	1.1085	1.0460	1.0228	1.0040	1.0021	
AVERAGE EXCLUDING HIGH/LOW	2.4837	1.5062	1.2425	1.1940	1.1055	1.0415	1.0247			
TIME WEIGHTED AVERAGE	2.4679	1.5020	1.2338	1.1937	1.1072	1.0495	1.0209	1.0040	1.0021	
YEAR AVERAGE	2.4843	1.4865	1.2302	1.1940	1.1122	1.0460	1.0228	1.0040	1.0021	
SELECTED	2.4843	1.4865	1.2302	1.1940	1.1122	1.0460	1.0228	1.0040	1.0021	1.0100
SUM'S	6.5581	2.6398	1.7759	1.4436	1.2091	1.0871	1.0393	1.0162	1.0121	1.0100

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BASIC CASE STUDY

HOMEOWNERS EXAMPLE

COMPARISON OF ESTIMATES (000's)

ACCIDENT YEAR	(1) 12/89 Est. #2	(2) Pd. Phy. Dam. Ex. Cats	(3) Paid Liability	(4) Cat. Estimate	(5)=(2)+(3)+(4) 12/89 Est. #3	(6)=(1)–(5) Difference
1980	$83,794	$63,419	$6,631	$13,454	$83,504	$290
1981	85,998	68,352	7,954	9,382	85,688	310
1982	102,353	77,118	9,175	15,713	102,006	347
1983	152,015	98,840	11,560	41,254	151,654	361
1984	136,742	102,553	13,226	20,713	136,492	250
1985	165,320	114,686	14,724	35,818	165,228	292
1986	147,538	118,050	14,741	14,631	147,422	116
1987	168,216	143,937	17,515	6,579	168,031	185
1988	204,520	160,618	17,497	25,078	203,193	1,327
1989	315,002	183,470	22,822	109,079	315,371	(369)
						$3,109

BASIC CASE STUDY
HOMEOWNERS EXAMPLE

OTHER DATA REFINEMENTS

- SPLIT PHYSICAL DAMAGE INTO MAJOR PERIL CATEGORIES SUCH AS FIRE, THEFT, WIND & HAIL, ETC.

- EXAMINE DATA SPLIT BY DWELLING VERSUS CONTENTS, ETC.

- DATA BY STATE OR MAJOR GEOGRAPHIC REGIONS.

- DATA BY TYPE OF RISK: PREFERRED VS. STANDARD.

Exhibit 14

BASIC CASE STUDY
HOMEOWNERS EXAMPLE
XYZ MUTUAL INSURANCE CO.

Comparison of Estimates
(000)

Accident Year	Prior Estimates of Ult. 12/88	6/89	12/89 Est. #1	12/89 Est. #2	12/89 Est. #3	12/89 Selected Estimate
1980	$83,688	$83,606	$83,863	$83,794	$83,504	$83,578
1981	86,011	85,967	86,048	85,998	85,688	85,868
1982	102,645	102,321	102,442	102,353	102,006	102,513
1983	151,986	152,272	152,337	152,015	151,654	152,183
1984	136,575	136,360	136,872	136,742	136,492	136,561
1985	165,012	164,316	165,955	165,520	165,228	164,634
1986	144,444	144,384	146,938	147,538	147,422	144,406
1987	163,156	162,413	165,957	168,216	168,031	162,389
1988	202,010	201,486	203,174	204,520	203,193	199,696
1989	-	-	325,671	315,002	315,371	300,718
Total 1980–1988	1,235,527	1,233,125	1,243,586	1,246,696	1,243,218	1,231,828
Total 1980–1989	-	-	1,569,257	1,561,698	1,558,589	1,532,546

BASIC CASE STUDY
HOMEOWNERS EXAMPLE

XYZ MUTUAL INSURANCE CO.
HOMEOWNERS

CALCULATION OF RESERVES
(000)

ACCIDENT YEAR	(1) Selected Est. Ult.	(2) Cum. Pd. Losses	(3) Known Case O/S	(4)=(1)-(2) Indicated Total Res.	(5)=(4)-(3) Indicated IBNR
1980	$83,578	$83,437	$87	$141	$54
1981	85,868	85,594	67	274	207
1982	102,513	101,861	391	652	261
1983	152,183	150,948	709	1,235	526
1984	136,561	134,849	982	1,712	730
1985	164,634	161,403	3,165	3,231	66
1986	144,406	139,410	2,768	4,996	2,228
1987	162,389	152,632	6,530	9,757	3,227
1988	199,696	179,768	9,971	19,928	9,957
1989	300,718	210,192	57,763	90,526	32,763
			$82,433	$132,452	$50,019

Exhibit 16

BASIC CASE STUDY
HOMEOWNERS EXAMPLE

SUMMARY

- Data should be subdivided as necessary to achieve the largest possible block of homogeneous data.

- Homogeneity of data is critical in order to draw valid conclusions about future loss development.

- Homogeneity of data refers to the similarity of behavior from the aspect of loss development.

1990 CASUALTY LOSS RESERVE SEMINAR

BASIC CASE STUDY

AUTO BODILY INJURY EXAMPLE

8/7/90
BT64

Exhibit 1

BASIC CASE STUDY
AUTO BODILY INJURY EXAMPLE

The MVR Insurance Company

The MVR Insurance Company is a large regional writer of personal lines business with a small amount of commercial auto. The company's primary market in private passenger auto is standard to substandard risks. There have been several changes in senior management in the last 5 years including the Vice Presidents of Claims and Underwriting.

You are in charge of the loss reserving function at MVR, and have recently hired a new analyst to do reserving for auto liability. The new analyst decides to first tackle private passenger auto Bodily Injury for the standard risk business since it carries the most reserve dollars.

What do you tell him to do?

8/7/90
BT67

Exhibit 2

BASIC CASE STUDY
AUTO BODILY INJURY EXAMPLE

The MVR Insurance Company
P.P. Auto BI – Std. Risk

Cumulative Paid Losses (000's)

ACCIDENT YEAR	12	24	36	48	60	72	84	96	108	120
1980	4,478	22,238	36,539	45,392	50,151	52,349	54,084	54,484	54,676	54,717
1981	5,913	27,263	42,380	52,598	57,785	61,091	62,205	62,996	63,189	
1982	7,847	30,416	49,379	62,058	69,364	71,632	73,258	73,774		
1983	7,942	33,599	57,247	72,060	78,186	81,863	83,466			
1984	8,866	44,859	71,986	86,001	95,860	100,704				
1985	12,145	50,640	77,476	95,406	105,698					
1986	14,586	59,162	96,839	118,079						
1987	17,854	76,286	116,268							
1988	23,383	88,713								
1989	23,072									

Development Factors

ACCIDENT YEAR	12 24	24 36	36 48	48 60	60 72	72 84	84 96	96 108	108 120	120 ULT
1980	4.9661	1.6431	1.2423	1.1048	1.0438	1.0331	1.0074	1.0035	1.0007	
1981	4.6106	1.5545	1.2411	1.0986	1.0572	1.0182	1.0127	1.0031		
1982	3.8761	1.6235	1.2568	1.1177	1.0327	1.0227	1.0070			
1983	4.2305	1.7038	1.2588	1.0850	1.0470	1.0196				
1984	5.0596	1.6047	1.1947	1.1146	1.0505					
1985	4.1697	1.5299	1.2314	1.1079						
1986	4.0562	1.6369	1.2193							
1987	4.2727	1.5241								
1988	3.7940									
AVERAGE	4.3373	1.6026	1.2349	1.1048	1.0463	1.0234	1.0091	1.0033	1.0007	
AVERAGE EXCLUDING HIGH/LOW	4.3117	1.5988	1.2382	1.1065	1.0471	1.0211	1.0074			
TIME WEIGHTED AVERAGE	4.2172	1.5914	1.2295	1.1055	1.0465	1.0216	1.0090	1.0032	1.0007	
4 YEAR AVERAGE	4.0732	1.5739	1.2261	1.1063	1.0469	1.0234	1.0091	1.0033	1.0007	
SELECTED	4.0732	1.5739	1.2261	1.1063	1.0469	1.0234	1.0091	1.0033	1.0007	1.0051
CUM'S	9.4873	2.3292	1.4799	1.2070	1.0910	1.0421	1.0183	1.0091	1.0058	1.0051

8/7/90
BT51

Exhibit 3

BASIC CASE STUDY
AUTO BODILY INJURY

The MVR Insurance Company
P.P. Auto BI – Std. Risk

Cumulative Incurred Losses (000's)

ACCIDENT YEAR	12	24	36	48	60	72	84	96	108	120
1980	37,303	41,575	49,241	52,565	53,827	55,001	54,989	54,862	55,082	55,088
1981	44,594	50,305	72,185	61,296	62,687	63,573	63,625	63,741	63,564	
1982	56,481	59,210	68,278	74,290	74,424	74,377	74,566	74,370		
1983	66,825	64,773	77,739	82,688	83,810	84,662	84,519			
1984	72,188	82,692	96,422	100,592	103,885	105,172				
1985	84,269	91,526	104,999	111,951	115,108					
1986	98,055	108,719	131,002	138,907						
1987	119,262	133,604	156,676							
1988	140,332	158,070								
1989	160,033									

Development Factors

ACCIDENT YEAR	12 24	24 36	36 48	48 60	60 72	72 84	84 96	96 108	108 120	120 ULT
1980	1.1145	1.1844	1.0675	1.0240	1.0218	0.9998	0.9977	1.0040	1.0001	
1981	1.1281	1.4376	0.8476	1.0227	1.0141	1.0008	1.0018	0.9972		
1982	1.0483	1.1531	1.0881	1.0018	0.9994	1.0025	0.9974			
1983	0.9693	1.2002	1.0637	1.0136	1.0102	0.9983				
1984	1.1455	1.1660	1.0432	1.0327	1.0124					
1985	1.0861	1.1472	1.0662	1.0282						
1986	1.1088	1.2050	1.0603							
1987	1.1203	1.1727								
1988	1.1264									
AVERAGE	1.0941	1.1710	1.0655	1.0205	1.0116	1.0004	0.9990	1.0006	1.0001	
AVERAGE EXCLUDING HIGH/LOW	1.1046	1.1706	1.0654	1.0221	1.0122	1.0003	0.9977			
TIME WEIGHTED AVERAGE	1.1000	1.1737	1.0629	1.0220	1.0101	1.0002	0.9989	0.9995	1.0001	
4 YEAR AVERAGE	1.1104	1.1727	1.0584	1.0191	1.0090	1.0004	0.9900	1.0006	1.0001	
SELECTED	1.1104	1.1727	1.0584	1.0191	1.0090	1.0004	0.9990	1.0006	1.0001	1.0000
CUM'S	1.4174	1.2765	1.0885	1.0284	1.0091	1.0001	0.9997	1.0007	1.0001	1.0000

Exhibit 4

BASIC CASE STUDY
AUTO BODILY INJURY EXAMPLE

The MVR Insurance Company
P.P. Auto BI – Std. Risk

COMPARISON OF ESTIMATES

Accident Year	-----Estimates as of 12/88------ Paid Losses	Known Case Incrd	Selected Estimates	------Estimates as of 6/89------ Paid Losses	Known Case Incrd	Selected Estimates	---Estimates as of 12/89-- Paid Losses	Known Case Incrd
1980	$54,700	$55,100	$54,942	$55,075	$55,090	$55,014	$54,996	$55,088
1981	63,175	63,839	63,580	63,672	63,596	63,539	63,555	63,570
1982	74,167	74,559	73,413	74,839	74,447	74,504	74,445	74,422
1983	84,525	84,735	84,700	85,027	84,461	84,586	84,994	84,493
1984	103,766	105,434	104,933	105,081	105,447	105,257	104,943	105,183
1985	113,619	115,481	115,324	115,024	115,440	115,512	115,317	116,155
1986	140,703	143,322	143,392	141,793	142,275	142,570	142,522	142,852
1987	171,611	171,308	173,891	168,032	170,282	171,646	172,065	170,542
1988	216,499	206,338	214,065	200,098	200,388	204,013	206,629	201,777
1989	-	-	-	-	-	-	218,886	226,831
1980-1988	1,022,765	1,020,116	1,028,240	1,008,641	1,011,426	1,016,641	1,019,466	1,014,082

Exhibit 5

BASIC CASE STUDY

AUTO BODILY INJURY EXAMPLE

Estimates for 1980–1988 are not much different, and estimates for AY89 are only $6 million apart.

Should you have your analyst average the two estimates, and stop here?

8/7/90

Exhibit 6

BASIC CASE STUDY
AUTO BODILY INJURY EXAMPLE

The MVR Insurance Company
P.P. Auto BI – Std. Risk

Cumulative Reported Claims

ACCIDENT YEAR	12	24	36	48	60	72	84	96	108	120
1980	12,523	15,508	16,265	16,570	16,736	16,824	16,856	16,873	16,884	16,887
1981	13,314	16,514	17,310	17,689	17,890	17,975	18,008	18,029	18,038	
1982	14,352	17,469	18,380	18,864	19,057	19,125	19,171	19,190		
1983	16,493	20,291	21,344	21,789	21,991	22,089	22,141			
1984	19,267	23,474	24,561	25,026	25,257	25,374				
1985	20,936	25,261	26,400	26,910	27,188					
1986	23,828	28,386	29,705	30,343						
1987	28,518	33,808	35,368							
1988	31,510	37,785								
1989	33,356									

Development Factors

ACCIDENT YEAR	12 24	24 36	36 48	48 60	60 72	72 84	84 96	96 108	108 120	120 ULT
1980	1.2384	1.0488	1.0187	1.0100	1.0052	1.0019	1.0010	1.0007	1.0002	
1981	1.2404	1.0482	1.0219	1.0113	1.0048	1.0019	1.0012	1.0005		
1982	1.2171	1.0522	1.0263	1.0102	1.0036	1.0024	1.0010			
1983	1.2303	1.0519	1.0208	1.0093	1.0045	1.0024				
1984	1.2184	1.0463	1.0189	1.0093	1.0046					
1985	1.2066	1.0451	1.0193	1.0103						
1986	1.1913	1.0464	1.0215							
1987	1.1855	1.0461								
1988	1.1991									
AVERAGE	1.2141	1.0481	1.0211	1.0101	1.0045	1.0021	1.0011	1.0006	1.0002	
AVERAGE EXCLUDING HIGH/LOW	1.2145	1.0480	1.0205	1.0100	1.0046	1.0021	1.0010			
TIME WEIGHTED AVERAGE	1.2053	1.0474	1.0209	1.0099	1.0044	1.0022	1.0011	1.0006	1.0002	
4 YEAR AVERAGE	1.1956	1.046	1.0201	1.0098	1.0043	1.0021	1.0011	1.0006	1.0002	
SELECTED	1.1956	1.0460	1.0201	1.0098	1.0043	1.0021	1.0011	1.0006	1.0002	1.0001
CUM'S	1.2991	1.0866	1.0388	1.0183	1.0084	1.0041	1.0020	1.0009	1.0003	1.0001

8/7/90
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Exhibit 7

BASIC CASE STUDY

AUTO BODILY INJURY EXAMPLE

The MVR Insurance Company
P.P. Auto BI – Std. Risk

Frequency Analysis

Accident Year	Earned Exposures	Annual Growth	Clms Rptd at 12 Mo.	12 Mo. Freq.	Annual Chng in Freq.	Est. Ult. Claims	Est. Ult. Freq.	Annual Chng in Freq.
1980	1,139,395	–	12,523	.0110	–	16,888	.0148	–
1981	1,177,769	3.37%	13,314	.0113	2.8%	18,044	.0153	3.5%
1982	1,213,003	2.99	14,352	.0118	4.7	19,208	.0158	3.5
1983	1,253,920	3.37	16,493	.0132	11.5	22,185	.0177	12.0
1984	1,302,367	3.86	19,267	.0148	12.1	25,478	.0196	10.5
1985	1,388,175	6.59	20,936	.0151	1.9	27,416	.0197	0.8
1986	1,503,832	8.33	23,828	.0158	4.9	30,899	.0205	4.3
1987	1,609,307	7.01	28,518	.0177	12.2	36,741	.0228	11.4
1988	1,712,211	6.39	31,510	.0184	4.0	41,057	.0240	5.2
1989	1,799,030	5.07	33,356	.0187	1.6	43,332	.0241	0.4

8/7/90
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Exhibit 8

BASIC CASE STUDY
AUTO BODILY INJURY EXAMPLE

The MVR Insurance Company
P.P. Auto BI – Std. Risk

Cumulative Closed Claims

ACCIDENT YEAR	12	24	36	48	60	72	84	96	108	120
1980	6,179	12,679	14,916	15,901	16,434	16,679	16,781	16,837	16,867	16,873
1981	6,620	13,591	15,800	16,920	17,554	17,816	17,945	18,001	18,029	
1982	7,045	14,014	16,667	18,050	18,676	18,945	19,093	19,156		
1983	7,817	16,338	19,584	20,916	21,573	21,888	22,043			
1984	9,516	19,496	22,516	23,993	24,747	25,130				
1985	10,481	20,658	24,047	25,701	26,599					
1986	11,595	22,902	26,935	28,967						
1987	13,590	27,515	32,313							
1988	14,868	30,493								
1989	15,103									

Ratio of Closed to Reported Claims

ACCIDENT YEAR	12	24	36	48	60	72	84	96	108	120
1980	0.4934	0.8176	0.9170	0.9597	0.9820	0.9914	0.9955	0.9979	0.9990	0.9992
1981	0.4972	0.8230	0.9128	0.9565	0.9812	0.9912	0.9965	0.9984	0.9995	
1982	0.4909	0.8022	0.9068	0.9568	0.9800	0.9906	0.9960	0.9982		
1983	0.4740	0.8052	0.9175	0.9600	0.9810	0.9909	0.9956			
1984	0.4939	0.8306	0.9167	0.9587	0.9798	0.9904				
1985	0.5006	0.8178	0.9109	0.9551	0.9783					
1986	0.4866	0.8068	0.9067	0.9547						
1987	0.4765	0.8139	0.9136							
1988	0.4719	0.8070								
1989	0.4528									

Ratio of Cumulative Paid Losses to Closed Claims

ACCIDENT YEAR	12	24	36	48	60	72	84	96	108	120
1980	$725	$1,754	$2,450	$2,855	$3,052	$3,139	$3,223	$3,236	$3,242	$3,243
1981	893	2,006	2,682	3,109	3,292	3,429	3,466	3,500	3,505	
1982	1,114	2,170	2,963	3,438	3,714	3,781	3,837	3,851		
1983	1,016	2,056	2,923	3,445	3,624	3,740	3,787			
1984	932	2,301	3,197	3,584	3,874	4,007				
1985	1,159	2,451	3,222	3,712	3,974					
1986	1,258	2,583	3,595	4,076						
1987	1,314	2,773	3,598							
1988	1,573	2,909								
1989	1,528									

8/7/90
BT55

Exhibit 9

BASIC CASE STUDY
AUTO BODILY INJURY EXAMPLE

The MVR Insurance Company
P.P. Auto BI – Std. Risk

Adjustment to Paid Development Due to Low Close Ratio

Accident Year	Adjusted Close Ratio	Current Close Ratio	Diff.	Current Closes	Additional Closes	Current Paid to Closed
1980	0.9992	0.9992	0.0000	16,873	0	$3,243
1981	0.9995	0.9995	0.0000	18,029	0	3,505
1982	0.9982	0.9982	0.0000	19,156	0	3,851
1983	0.9956	0.9956	0.0000	22,043	0	3,787
1984	0.9904	0.9904	0.0000	25,130	0	4,007
1985	0.9783	0.9783	0.0000	26,599	0	3,974
1986	0.9547	0.9547	0.0000	28,967	0	4,076
1987	0.9136	0.9136	0.0000	32,313	0	3,598
1988	0.8173	0.8070	0.0103	30,493	314	2,909
1989	0.4839	0.4528	0.0311	15,103	470	1,528

Accident Year	Additional Paid Dollars	Paid Age to Ult Factors	Additional Ult Paid Dollars (000's)	Prior Paid Estimate	Revised Paid Estimate
1980	$0	1.0051	$0	$54,996	$54,996
1981	0	1.0058	0	63,555	63,555
1982	0	1.0091	0	74,445	74,445
1983	0	1.0183	0	84,994	84,994
1984	0	1.0421	0	104,943	104,943
1985	0	1.0910	0	115,317	115,317
1986	0	1.2070	0	142,522	142,522
1987	0	1.4799	0	172,065	172,065
1988	913	2.3292	2,128	206,629	208,757
1989	718	9.4873	6,811	218,886	225,697

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BT56

Exhibit 10

BASIC CASE STUDY
AUTO BODILY INJURY EXAMPLE

The MVR Insurance Company
P.P. Auto BI – Std. Risk

Ratio of Cumulative Paid Losses to Closed Claims

ACCIDENT YEAR	12	24	36	48	60	72	84	96	108	120
1980	$725	$1,754	$2,450	$2,855	$3,052	$3,139	$3,223	$3,236	$3,242	$3,243
1981	893	2,006	2,682	3,109	3,292	3,429	3,466	3,500	3,505	
1982	1,114	2,170	2,963	3,438	3,714	3,781	3,837	3,851		
1983	1,016	2,056	2,923	3,445	3,624	3,740	3,787			
1984	932	2,301	3,197	3,584	3,874	4,007				
1985	1,159	2,451	3,222	3,712	3,974					
1986	1,258	2,583	3,595	4,076						
1987	1,314	2,773	3,598							
1988	1,573	2,909								
1989	1,528									

Development Factors

ACCIDENT YEAR	12 24	24 36	36 48	48 60	60 72	72 84	84 96	96 108	108 120	120 ULT
1980	2.4193	1.3968	1.1653	1.0690	1.0285	1.0268	1.0040	1.0019	1.0003	
1981	2.2464	1.3370	1.1592	1.0589	1.0416	1.0108	1.0098	1.0014		
1982	1.9479	1.3654	1.1603	1.0803	1.0180	1.0148	1.0036			
1983	2.0236	1.4217	1.1786	1.0520	1.0320	1.0126				
1984	2.4689	1.3894	1.1211	1.0809	1.0343					
1985	2.1148	1.3146	1.1521	1.0706						
1986	2.0533	1.3918	1.1338							
1987	2.1104	1.2975								
1988	1.8493									
AVERAGE	2.1380	1.3639	1.1529	1.0686	1.0309	1.0163	1.0058	1.0016	1.0004	
AVERAGE EXCLUDING HIGH/LOW	2.1311	1.3653	1.1541	1.0697	1.0317	1.0136	1.0040			
TIME WEIGHTED AVERAGE	2.0850	1.3555	1.1477	1.0696	1.0311	1.0143	1.0057	1.0016	1.0004	
4 YEAR AVERAGE	2.0324	1.3477	1.1464	1.0708	1.0315	1.0163	1.0058	1.0016	1.0004	
SELECTED	2.0324	1.3477	1.1464	1.0708	1.0315	1.0163	1.0058	1.0016	1.0004	1.0000
CUM'S	3.5522	1.7478	1.2969	1.1313	1.0565	1.0242	1.0078	1.0020	1.0004	1.0000

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BT53

Exhibit 11

BASIC CASE STUDY
AUTO BODILY INJURY EXAMPLE

The MVR Insurance Company
P.P. Auto BI – Std. Risk

Ratio of Cumulative Incurred Losses to Reported Claims

ACCIDENT YEAR	12	24	36	48	60	72	84	96	108	120
1980	$2,979	$2,681	$3,027	$3,172	$3,216	$3,269	$3,262	$3,252	$3,262	$3,262
1981	3,350	3,046	4,178	3,465	3,504	3,537	3,533	3,535	3,524	
1982	3,935	3,390	3,715	3,938	3,905	3,889	3,890	3,875		
1983	4,052	3,192	3,642	3,795	3,811	3,833	3,817			
1984	3,747	3,523	3,926	4,020	4,113	4,145				
1985	4,025	3,623	3,977	4,160	4,234					
1986	4,115	3,830	4,410	4,578						
1987	4,182	3,952	4,430							
1988	4,454	4,183								
1989	4,798									

Development Factors

ACCIDENT YEAR	12 24	24 36	36 48	48 60	60 72	72 84	84 96	96 108	108 120	120 ULT
1980	0.9000	1.1291	1.0479	1.0139	1.0165	0.9979	0.9969	1.0031	1.0000	
1981	0.9093	1.3716	0.8293	1.0113	1.0094	0.9989	1.0006	0.9969		
1982	0.8615	1.0959	1.0600	0.9916	0.9959	1.0003	0.9961			
1983	0.7878	1.1410	1.0420	1.0042	1.0058	0.9958				
1984	0.9402	1.1144	1.0239	1.0231	1.0078					
1985	0.9001	1.0977	1.0460	1.0178						
1986	0.9307	1.1514	1.0381							
1987	0.9450	1.1210								
1988	0.9392									
AVERAGE	0.9016	1.1172	1.0435	1.0103	1.0070	0.9982	0.9979	1.0000	0.9999	
AVERAGE EXCLUDING HIGH/LOW	0.9116	1.1165	1.0441	1.0117	1.0076	0.9984	0.9967			
TIME WEIGHTED AVERAGE	0.9130	1.1206	1.0411	1.0119	1.0056	0.9980	0.9978	0.9989	0.9999	
4 YEAR AVERAGE	0.9288	1.1211	1.0375	1.0092	1.0046	0.9982	0.9979	1.0000	0.9999	
SELECTED	0.9288	1.2111	1.0375	1.0092	1.0046	0.9982	0.9979	1.0000	0.9999	1.0000
CUM'S	1.1786	1.2689	1.0477	1.0098	1.0006	0.9960	0.9978	0.9999	0.9999	1.0000

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BT54

BASIC CASE STUDY

AUTO BODILY INJURY EXAMPLE

The MVR Insurance Company
P.P. Auto BI – Std. Risk

Comparison of Estimates from Average Cost Methods

Accident Year	Est. Ult. Claims	Based on Paid Per Clsd Clm Est. Avg. Loss	Based on Paid Per Clsd Clm Est. Ult. Losses (000)	Based on Incrd Per Rptd Clm Est. Avg. Loss	Based on Incrd Per Rptd Clm Est. Ult. Losses (000)
1980	16,888	$3,243	$54,768	$3,262	$55,089
1981	18,044	3,506	63,262	3,524	63,587
1982	19,208	3,859	74,124	3,875	74,431
1983	22,185	3,817	84,680	3,809	84,503
1984	25,478	4,104	104,562	4,128	105,173
1985	27,416	4,199	115,120	4,237	116,162
1986	30,899	4,611	142,475	4,623	142,846
1987	36,741	4,666	171,434	4,641	170,515
1988	41,057	5,084	208,734	5,308	217,931
1989	43,332	5,428	235,206	5,655	245,042
Total			1,254,365		1,275,279

8/7/90
BT60

Exhibit 13

BASIC CASE STUDY
AUTO BODILY INJURY EXAMPLE

The MVR Insurance Company
P.P. Auto BI – Std. Risk

COMPARISON OF ESTIMATES
($000)

Accident Year	6/89 Selected Estimates	Estimates as of 12/89 — Known Case Incrd.	Adj. Pd. Losses	Avg. Pd. Per Clsd.	Avg. Incrd. Per Rptd.	12/89 Selected Estimates
1980	$55,014	$55,088	$54,996	$54,768	$55,089	$55,090
1981	63,539	63,570	63,555	63,262	63,587	63,590
1982	74,504	74,422	74,445	74,124	74,431	74,500
1983	84,586	84,493	84,994	84,680	84,503	84,995
1984	105,257	105,183	104,943	104,562	105,173	105,175
1985	115,512	116,155	115,317	115,120	116,162	116,155
1986	142,570	142,852	142,522	142,475	142,846	142,850
1987	171,646	170,542	172,065	171,434	170,515	171,435
1988	204,013	201,777	208,757	208,734	217,931	208,750
1989	-	226,831	225,697	235,206	245,042	237,170
Total		$1,240,913	$1,247,291	$1,254,365	$1,275,279	$1,259,710

BASIC CASE STUDY
AUTO BODILY INJURY EXAMPLE

The MVR Insurance Company
PP Auto BI – Std. Risk

Evaluation of Accident Year Loss Trends

Accident Year	Earned Expos.	Est. Ult. Rptd Clms	Est. Ult. Losses (000)	Percent Change in Expos	Percent Change in Rptd Clms	Percent Change in Losses
1980	1,139,395	16,888	$55,090	–	–	–
1981	1,179,769	18,044	63,590	3.4%	6.9%	15.4%
1982	1,213,003	19,208	74,500	3.0	6.5	17.2
1983	1,253,920	22,185	84,995	3.4	15.5	14.1
1984	1,302,367	25,478	105,175	3.9	14.8	23.7
1985	1,388,175	27,416	116,155	6.6	7.6	10.4
1986	1,503,832	30,899	142,850	8.3	12.7	23.0
1987	1,609,307	36,741	171,435	7.0	18.9	20.0
1988	1,712,211	41,057	208,750	6.4	11.8	21.8
1989	1,799,030	43,332	237,170	5.1	5.5	13.6

Accident Year	Est. Ult. Frequency	Est. Ult. Severity	Est. Ult. Pure Prem.	Percent Change in Freq.	Percent Change in Severity	Percent Change in P. Prem.
1980	.0148	$3,262	$48.35	–	–	–
1981	.0153	3,524	53.99	3.5%	8.0%	11.7%
1982	.0158	3,879	61.42	3.5	10.1	13.8
1983	.0177	3,831	67.78	12.0	-1.2	10.4
1984	.0196	4,128	80.76	10.5	7.8	19.2
1985	.0197	4,237	83.67	0.8	2.6	3.6
1986	.0205	4,623	94.99	4.3	9.1	13.5
1987	.0228	4,666	106.53	11.4	0.9	12.1
1988	.0240	5,084	121.92	5.2	9.0	14.4
1989	.0241	5,473	131.83	0.4	7.7	8.1

BASIC CASE STUDY
AUTO BODILY INJURY EXAMPLE

The MVR Insurance Company
PP Auto BI – Std. Risk

Evaluation of Accident Year Loss Trends
Second Iteration

Accident Year	Earned Expos.	Est. Ult. Rptd Clms	Est. Ult Losses (000)	——Percent Change in—— Expos	Rptd Clms	Losses
1980	1,139,395	16,888	$55,090	–	–	–
1981	1,179,769	18,044	63,590	3.4%	6.9%	15.4%
1982	1,213,003	19,208	74,500	3.0	6.5	17.2
1983	1,253,920	22,185	84,995	3.4	15.5	14.1
1984	1,302,367	25,478	105,175	3.9	14.8	23.7
1985	1,388,175	27,416	116,155	6.6	7.6	10.4
1986	1,503,832	30,899	142,850	8.3	12.7	23.0
1987	1,609,307	36,741	171,435	7.0	18.9	20.0
1988	1,712,211	41,057	208,750	6.4	11.8	21.8
1989	1,799,030	43,332	~~297,170~~	5.1	5.5	~~19.6~~
			245,000			17.4

Accident Year	Est. Ult. Frequency	Est. Ult. Severity	Est. Ult Pure Prem.	——Percent Change in—— Freq.	Severity	P. Prem.
1980	.0148	3,262	$48.35	–	–	–
1981	.0153	3,524	53.99	3.5%	8.0%	11.7%
1982	.0158	3,879	61.42	3.5	10.1	13.8
1983	.0177	3,831	67.78	12.0	-1.2	10.4
1984	.0196	4,128	80.76	10.5	7.8	19.2
1985	.0197	4,237	83.67	0.8	2.6	3.6
1986	.0205	4,623	94.99	4.3	9.1	13.5
1987	.0228	4,666	106.53	11.4	0.9	12.1
1988	.0240	5,084	121.92	5.2	9.0	14.4
1989	.0241	~~5,479~~	~~131.69~~	0.4	~~7.7~~	~~8.1~~
		5,654	136.18		11.2	11.7

BASIC CASE STUDY

AUTO BODILY INJURY EXAMPLE

The MVR Insurance Company
P.P. Auto BI – Std. Risk

Calculation of Reserves ($000)

Accident Year	Selected Ult. Losses	Cum. Pd. Loss	Indicated Total Reserve	Case Reserves	Indicated IBNR
1980	$55,090	$54,717	$373	$372	$1
1981	63,590	63,189	401	375	26
1982	74,500	73,774	726	596	130
1983	84,995	83,466	1,529	1,053	476
1984	105,175	100,704	4,471	4,469	2
1985	116,155	105,698	10,457	9,410	1,047
1986	142,850	118,079	24,771	20,828	3,943
1987	171,435	116,268	55,167	40,408	14,759
1988	208,750	88,713	120,037	69,358	50,679
1989	245,000	23,072	221,928	136,962	84,966
Total			$439,860		$156,029

BASIC CASE STUDY

AUTO BODILY INJURY EXAMPLE

Summary

- The Paid and Incurred Loss Development methods do not always put upper and lower bounds on estimates of ultimate.
- Even if several estimates are close together, additional analysis may be warranted.
- Send that new analyst to the next CLRS!

1990 CASUALTY LOSS RESERVE SEMINAR

5C/6D: INTERMEDIATE CASE STUDY

Moderator

Andrew W. Moody
Signet Reinsurance Company

Panel

Layne M. Onufer
William M. Mercer, Inc.

MR. MOODY: This session is the Intermediate Case Study and we'll be presenting two case studies, one from a reinsurance perspective that I will be presenting. I'm Andy Moody. And one from a primary insurance company perspective that will be presented by Layne Onufer.

A couple of things to make you aware of first, we have a microphone in the back. If you have questions, it is best for the overall recording of the session, if you will go to the microphone and we'll answer your question. Otherwise the speaker will repat the question before it is answered.

You have evaluation forms. Please fill these out before you leave the session today. and leave them with the attendant who will be outside the room.

And third, you've been given handouts at the time of registration, when you arrived either yesterday or Sunday, but we intend to have additional exhibits for you when you arrived today. We don't have those exhibits, but if you will leave a card or your name and address, we will get those exhibits to you.

And now Layne will introduce me.

MS. ONUFER: It's my pleasure to introduce Andy Moody. He's a actuary with Signet Reinsurance Company, which is part of the W. R. Berkley Group. At Signet he is responsible for treaty pricing, for reserving all lines, and for statutory reporting. And that's probably not too dissimilar from what a lot of you also do. Before joining Signet, he held positions at Crum & Forster and Aetna Insurance Company. Andy holds a Bachelor's Degree from Central Connecticut State University, is an Associate in the CAS. He has a two year old son name Peter.

MR. MOODY: He's great by the way. As I stated before, I'll be presenting a case study from a reinsurance perspective. From the original handouts I expect that you've all gone over any number of times. You've got all the pertinent data. But some things I'd like to point out, in particular, Steady Re is in it's ninth year. That gives you an idea of how much data that you'll have to deal with in order to do your analysis. Also, the company has a very strong emphasis on planning. It seems to be one of the most important things that Steady Re Management does or feels tht is the most important thing that they do. This is manifested in two areas. One the...

QUESTION: (inaudible)

MR. MOODY: Their emphasis on planning, again, is particularly noted in two areas. One, their steady premium growth from year to year, which you can see down in column (inaudible) there. And, two, they hve a level expense ratio of 20% per year. This is indeed a steady company.

Another important fact that was noted in the original handout is the premium reporting pattern. Premiums for a treaty are reported 60% in the year tht the treaty was written, 30% in the first subsequent year, and 10% in the next year. That will come into play later.

Also in the original attachment, they note preferred limits and attachments. This is an expression or maybe an expression of the companies particular writing expertise. They may know something about these contracts or they may know more about these contracts than they will know about contracts in other laywer or perhaps in lines other than the casualty business that they write.

Also note the underwriting cycle as mentioned in the original exhibits. There are piak and trough years that they hve had high loss rations, years of low loss rations. And those peaks and troughs will be evident in nearly all the exhibits.

(Slide)

Exhibit 1 shows the results of the recent analysis that was done by the accounting department of Steady Re. And one thing to notice is that I've labeled the first column there, accident year, accident years 1981 through 1989. Steady Re writes their business all effective 1-1. Their treaties are effective 1-1. And they write them on a losses occurring during basis. Losses occurring during, meaning that they cover losses tht occur in the coverage peirod of the contract. Twelve month contracts meaing their losses are occurring from January 1 to December 31.

Another type of contract might be a risks attaching contract. And that would be more akin to a policy year kind of form where the reinsurance company would be covering losses for policies that the ceding company would have wirtten in the 12 month period. Therefore, the losses might be trestched over a 24 month period. But, for simplicities sake, we had these restrictions and the accident year is equal to underwriting year or policy year.

Column 6 shows Steady Re's loss ratios. Again, the pronounced cycle, good year in 1983. Good year, again, in 1988. Not so good in 1985. Overall, they are not doing too well relative to their stated goal of about 75% loss ratio. They have some reason to believe that perhaps this loss ratio is overstated and we are going to see if their optimism in that area is well founded.

The loss ratio in 1981 is quit ehigh. That's not so surprising. Late traveling premiums keeps the base of the loss ratio small. Losses are boing reported in the normal fashion. Not too surprising there.

Column 5, the calendar year earned premium, are effected not only by the writing patterns year to year, but also by that 60, 30, 10 pattern of reporting premiums.

And, lastly on this exhibit, the bottom of column 4, they have nearly 3 million dollars of IBNR. that's well over half their total ultimate losses for all years to date. That's a large amount. Not so surprising though given that they write relatively high layer casualty business.

(Slide)

In Exhibit 2 we can see their loss development data. The age to age development factors in the second portion of the exhibit there are quite steady up to 1983 and then there seems to be, perhaps, a shift in the pattern. This is the area where they think maybe they'll get some improvement in their results if something additional is done to look at that change in loss development pattern.

Note also that the selected factors at the bottom of the exhibit are somewhat higher than the average factors that you can be seen couple of rows above them. This is not a mistake, this is just a matter of the application of the judgment in the method. The person applying this test was, perhaps, a bit conservative, and didn't want to be penalized later when actual emergency might have been in excess of what they were holding in reserves.

(Slide)

Exhibit 3...oh, I'm sorry. Last thing on this exhibit is the one point for a tail factor. That clearly comes from nowhere else on this exhibit and it is derived in Exhibit 3.

Arithmetically this is kind of a difficult exhibit, but the essence of it is trying to compare Steady Re's loss development with loss development from a larger base. The larger base in this case being data from the Reinsurance Association of America's loss development study. And, in particular, what I've done is to compare the fractional portion of these loss development factors. That is, the part that is over and above 1, for the two groups. In Column 3 you can see that in more cases than not the RAA factor is somewhat lower than Steady Re's factor. On average, that relativity says that the RAA factors are about 11 to 12% below those of Steady Re. So with that differential in mind we can adjust all of the factors from the tenth year up to the twentieth year of the RAA pattern.

We can adjust those factors upward so they would reflect what we think might be typical for Steady Re. That's all noted in the bottom notes at the exhibit.

If we look at the factor from the ninth to tenth year, the 1.047, we're taking that fractional part, the .047, and multiplying it by 1 divided by .883, which is derived directly from that 11.7%. Again, that builds the .047 up to somewhere in the range of .055 or perhaps even a little bit higher. And, again, that's done to that whole column of numbers.

Then there are adjusted factors that are accumulated back up, multiplied all together to get the tail factor, 1.387. and we selected a 1.4 factor, 1.397 not being so much different from 1.4, but again, perhaps, being just a little bit conservative.

Do you have any questions about this exhibit or what you've seen so far? Yes.

QUESTION: Is there any reason why when you did the comparison that you selected and you took out the 1.4 factor? Would there be any reason to suspect that they had to be higher or lower? Do you know what I'm saying? If it had been higher in the past, maybe it might be lowered?

MR. MOODY: That's what the company is hoping. They are hoping that once they do an additional analysis, they look at that area of the pattern where, in Exhibit 2, we say a shift downward in the development factors, that maybe somehow we can justify that in the future, our tail factor will be smaller.

QUESTION: Is there any reason though why you should presume they will be or wouldn't be?

MR. MOODY: Well, I think as we get later into the exhibits, we will see some objective evidence of why we might use a relatively lower tail factor. But that's a good point. Anything else?

(Slide)

In Exhibit 4 shows a somewhat detailed history of the treaties that Steady Re has written. It shows limits and attachment points, in reinsured layer. For example, the first one there, $400,000 excess of $600,000. That means that Steady Re is picking up any loss that exceeds $600,000, but the most Steady Re will pay is $400,000. And they will pay that $400,000 on a 1 million dollar claim.

Across each row you see a history of the premiums written for each of the contracts. And note that the premiums across the row seem to have a dip downward in 1984 and perhaps 1984-1085, from prior year levels. And that's somewhat coincides with the underwriting cycle that you've seen in other exhibits.

Also...I'm sorry. I skipped over this...the reinsured layer. If you note in the years where there are premiums in the treaties that have premiums in 1984 and 1985 you'll notice that there are more and more treaties that have lower retentions. For example, treaty number 8 there has a retention of $100,000. That supposedly is one of the exception types of treaties that Steady Re will write, but they seem to have written more of it in the soft part of the cycle.

Across the bottom of the exhibit you can see the steady growth in the premiums overall for Steady Re. They've been achieving that part of their plan.

Also note about these premiums, that these are treaty year premiums so that...treaty year premiums as of 12/31/89, so that we push those premiums back. That 60, 30, 10% percent pattern of the premium reporting, we've pushed a 100% of that back to the year in which the treaty was written so that we can better track the pricing of the different treaties.

Again, the current analysis was done by the accounting department who has had some help from their auditors and has attended one Casualty Loss Reserve Seminar.

At this point, given the data, how do we proceed? You're doing this analysis, as the original handout says, as kind of a test as to whether or not you want to work for this company. so what do we do next? And do we want to take this job? So do we have any suggestions or any more questions?

The exception contracts that seem to crop in more and more in 1984 and 1985, do they suggest anything to you? Well, they suggest something to me. We're going to take contracts and look at the loss development data separately for treaties with lower attachments and treaties with higher attachments. And additionally, we're going to apply a different tail to the two sections of the data. and I think that gets into your question about using the lower tail. That's where it will come in once we've segmented the data. And additionally, we're going to develop premiums to ultimate. The premiums that are reported to date for treaties written in 1988 and 1989 have not been fully reported, so we want to get those premiums back in the analysis.

(Slide)

Exhibit 5 talks a little bit about segmenting the data. Well, we can't segment the data by the normal lines of business that a primary company might think of. We can't separate them by annual statement data. They are multi-line contracts. And the underwriters don't have any particular incentive to do the split. Yes.

QUESTION: (inaudible) Exhibit 5?

MR. MOODY: No, you don't have exhibits from 5 onward. That was an oversight and if you want these additional exhibits just leave a card after the presentation and we'll make sure that you get the additional exhibits.

And, as I was saying, the underwriters have no particular incentive to split the premiums out to line of business. And the incentive has declined somewhat over the last year or two from what the NAIC has done. One of my first duties at Signet was to produce a reasonable estimate for reporting our data on a Schedule P line basis, and I went through all kinds of effort to split out the workers compensation, GL and the auto to their individual lines and los and behold, as of the 1989 statement, we

had to push a lot of that all back together and report it in just the three reinsurance lines. So we can't do that kind of line split, but we can do the split for the higher and lower working layer casualty treaties. and, in particular, the Steady Re's underwriting guidelines suggest that a good split, a good breakpoint, would be attachment points or retentions that are $300,000 or greater. Attachments, retentions, those two terms are nearly synonymous. So, we're going to split the data using that as a breakpoint. Anything with an attachment $300,000 or greater, we're going to put into one category, anything with attachment less than $300,000. We're going to look at separately. We think that, perhaps, these treaties get a bit different treatment from underwriting acceptance criteria.

Again, as I noted back in Exhibit 4, the proportion in those two groups changes dramatically from 1981 to 1988. Those written in, I should say the lower retentions, runs from a low of 10% of the total premium in 1981 and 1988 to a high percent, these exceptions run up to 60% of the book as represented by premium in 1985. And this also seems to coincide with the change in the loss development patterns that we say in Exhibit 2.

Once we split the data though, creditability may become a problem. We're going to assume it is not, but if it does then there are other external sources that you might go to to build the data back up. You might do the same sort of overall relativity to the RAA factors, but within the actual data set that you have instead of for the tail. Or you might be able to go to ISO excess limit loss developments that are distributed occasionally when they do excess limit analyses.

Exhibit 7 and 8 that you'll be seeing show the data split out. But, before we do that, let's talk about some additional reasons that we might use for selecting the tail factors. You had some additional conversations with the claims people and the underwriters and it turns out the most of Steady Re's development is from new claims, not case development. this implies a shorter tail overall than the industry. Claim count development has been negligible after five years for the lower attachments and six years for the higher attachments. You've now started to point your questions to these people gearing towards doing that split of the data. And this relatively short tail of the claim count development has some justification, in the kind of business that they've reinsured and in certain treaty provisions that may limit the losses.

Claim count development, again, has been moderate after six years, due to the fact that many claims were reserved at or near limits, treaty limits. And the total development for the lower attachments after six years is running well below that of the RAAs. This will support that lower tail.

Your not 100% comfortable with using this comparison of the RAA data. RAA is predominantly based on a few vary large reinsurers.

And you believe that their business is maybe substantially different from yours, although we're still going to use them as the basis for a comparison. They are somewhat more hazardous and have higher limits. And, as you'll see later, the length of the two tails, has been cut a little bit shorter. Eighteen years on the low attachment, we've cut two years off. And nineteen years on the higher attachment business. We feel that these judgments are justified given the reasons stated above.

(Slide)

Moving on to the data as is have been split out. This shows the premium history of the treaties with the higher attachments. This is supposedly Steady Re's core business.

Note across the bottom that there is a decline in the premiums through the history in 1984 and 1985, but those premiums come back. Again, this very much parallels their underwriting cycle.

In 7B we'll see the application of the loss development reserve test. And note that in Column 2 we have higher development factors than we had before. We're working with the higher layer portion of the book. And this is a somewhat expected result. Tail factor has not changed and we'll see that in just a minute. And the cycle, as displayed in the last column, Column 6 is quite a bit less dramatic. They've also done better versus their goal of a 75% loss ratio, at least on this portion of their business, which is, again, presumed to be their core business.

(Slide)

The next exhibit shows the loss data and here's where Steady Re really lives up to their name. They have nice, steady loss development factors. Factors are still quite high though as they will continue to be. We're dealing with casualty business and in this case a relatively high working layer.

(Slide)

And the last one of the exhibits, 7, shows that development of the tail. We've cut things off one year shorter. We have a somewhat higher relativity though. the difference between the RAA data and the Steady Re's data has grown a bit since we were looking now at the high level attachments, but when we work down to the tail it works about to be roughly the same as it was before. And we're going to use that same tail of 1.400.

(Slide)

Now turning to the lower attachment business, looking at the premiums you can see that there is a peak in the premiums on this sort of business in 1985. And as we work across that row at the bottom of the exhibit, we can see that that portion, that premium takes a jump upward in 1989. Is something happening in the cycle

again? This maybe indicating something for your there, in terms of what's going on in the market. 8B shows the application of the loss development tests. The next exhibit shows that. And these factors are lower than what we had originally seen on the development and a lower tail factor. In this cycle, however, I've shown in Column 6 the cycle of the loss rations seems to be somewhat more pronounced. This is because of the larger relative swings. The larger growth in premiums. The growth and decline in premiums year to year for this segment of the book. and also do to the late arrival of the premiums, delayed reporting of the premiums. Again, some of the premiums that really match up with the losses from 1985, some of that premium has been pushed into 1986 and a little bit has even been pushed into the 1987 calendar year. So since 1985 was one of the peak years in the premiums, but we pushed the large percentages of those premiums forward, we've perhaps exaggerated that loss ratio. Likewise in 1988 we had a relatively low loss ratio. We've perhaps pushed some of the premiums of prior years up to that year and have perhaps have a loss ratio that is very much understated.

Exhibit 8C shows the loss development patterns again. Steady Re really does write a steady book of business.

And 8D once again shows the development of the tail factor. and here's where the largest change in the tail factor comes into play. This segment of the book doesn't even seem to be quite a bit different. The RAA factors are now higher than Steady Re's factors and therefore we're going to adjust that factor derived from the RAA data. We're going to adjust the tail factor downward. "And indeed we cut it in half.

(Slide)

In Exhibit 9 we combine the results of the two pieces back together. And we've also done some other things. As I talked about before in the exhibits prior to this we've seen that the calendar year earned premium had been pushed forward. Some of the premiums have been pushed forward into subsequent years because of the 60, 30, 10% pattern. Well, here I've pushed it all back into the year into which those premiums were intended to pay losses.

For example, in the original exhibit that parallels this, Exhibit 1, the $500,000 there in Column 5 showed up as $300,000. The remainder of that $500,000 shows up in the next two years in Exhibit 1, but as I've stated, you push it all back so that we match the losses and the premiums and get a more accurate statement of the results for that year.

We still have a cycle, as noted in Column 6, but it's less pronounced. And overall, they are at a loss ratio of about 70%. that's not so different from the 75% they originally stated as their goal.

And just a word about the development factors in Column 2. They are a weighted average of the factors that you'll see in Exhibits 7a and 8a in the parallel Exhibits 7b and 8b. So these will be less than those that were shown in Exhibit 1, but somewhere between the two sets of factors in Exhibits 7 and 8. And indeed the lower tail factor overall.

We wanted to get a second opinion on the required reserve for this book, so we applied a Bornhuetter-Ferguson test. And the earned premiums in this exhibit are the same as the earned premiums in the prior exhibit. Again, we want that good matching of premiums and the losses they were intended to pay. And the loss ratios that were selected in Column 2 have to be selected from somewhere. They can be gotten from ISO reports or perhaps more appropriately from the RAA which does publish industry wide loss ratios. The cycle is less pronounced overall than the ones that we've seen on the earlier exhibits.

Both in this exhibit and the prior exhibit you may have noticed that the IBNR is considerably reduced. The two tests came up with results that are very close. Initially our IBNR was somewhere in the range of 3 million dollars. Now we're under 2.5 million dollars. We've picked up a redundancy of about $500,000. That's driving that improvement in the overall loss ratio down from what was originally nearly 94 to what's now somewhere in the 78% region.

And then just to wrap things up on Exhibit 11 we want to select some ultimate losses. We want to look at the two tests. We have a loss development triangle to which we applied our factors to get ultimate losses and we have the Bornhuetter-Ferguson method. And we want to use the strengths of both tests. And the way I've done that is to select our ultimate losses based on a weighing of the loss development method and the Bornhuetter-Ferguson method. In particular I want to give greater weight to the Bornhuetter-Ferguson method in the more current years, 1989, 1988, 1987 and more weight to the loss development method in the earlier years 1981, 1982, 1983. The regular loss development triangle as labeled triangle ultimate losses there. In the current year for that kind of analysis, you have a very large loss development factor. I think for the lower attachments it was somewhere in the order of 6. And the higher attachments a number like 17 sticks in my head as what was used. so we are applying a very large factor that implies that we are applying it to a very small portion of the ultimate losses. So there is potentially a greater percentage variability in those losses reported to date. One large loss or the absence of a loss that you might typically have in that base can make the results of that kind of test be fairly erratic. Some of those discrepancies don't show up quite so critically in the BornhuetterFerguson test, where instead of using the actual losses to date for projection you use a percentage of a selected ultimate loss ratio as your IBNR estimate. There is still quite a bit of judgment that has to be applied in selection of that initial loss ratio, but assuming you

can do that with some confidence in does get better results in the more recent years.

So Column 3 shows the selections and when I first did this I was somewhat surprised by the overall result. Ultimate losses on my selected basis was less than the ultimate losses or either one of the tests I did. Well, that's the weighing process. In particular, the Bornhuetter-Ferguson method gives a lower result in accident year 1989 than does the other method. And that's basically the number I selected. so I'm picking the lower of the two numbers there. I didn't do that deliberately because I wanted to pick a low number, but that was the way the weighing worked.

Likewise, in 1982, the loss development method, in Column 1 gets the lower number and that's where it gets the larger weight in the older years in my waiting scheme. So overall I seem to be picking on the low side, but in this example that seems to be appropriate. It won't always be. It can happen the other way around, that your selected ultimate might actually be higher than anyone of your single tests.

Are there any questions? Any additional comments that you'd like to make? I guess I was perfectly clear then. Okay. I'll turn the microphone over to Layne now, after telling you a little bit about her.

Layne is a principle with the consulting firm of William M. Mercer, Inc. She's in the Irvine, California office. Her clients include Fortune 500 companies, self-insureds, and small to medium sized insurance companies. And her responsibilities deal with pricing, reserving, and profitability. Before joining Mercer, Layne held positions with Price Waterhouse, Continental Insurance Company, and Crum & Forster Insurance Company, where we missed each other, I think, by a few months. She is a Fellow of the CAs and a Member of the American Academy of Actuaries. She has three sons. I have one. Three has got to be tough. And she loves hot pastrami on rye and also pepperoni pizza. And those are two of my favorites too.

(Laughter)

MS. ONUFER: We don't need to record the dressing styles of the United States on this anyway.

Well, we have three challenges ahead of us today. Two I knew about when I came to the CLRS and one I found out about this morning.

Our first challenge, your challenge, together we are going to be consulting actuary. And you get to be a consulting actuary and go in and see how you can help this company out. Se what you can do. See what you can tell them. See what you can learn. See what you can observe.

Our second challenge is an instructional challenge. The material was have today, in my opinion, is very difficult material. Very difficult to understand the first time through. What makes it particularly difficult is that we are going to jump around between calendar year, accident year, and report year. And I'm going to do my best to announce when we are switching from calendar year to accident year to report year. However, I tend to get excited and I rush on by, so if you are getting confused stop me and ask me. I'll be glad to slow down a little bit.

Our third challenge is the fact that there are no handouts. And since this material is very, very difficult, it is difficult to follow without the handouts. So, again, I will attempt to work very, very slowly so that you can see the overheads. Okay.

We are a consultant. We have been called in by a very, very stable, well managed insurance company that writes general liability policies. And, in fact, they write manufacturer and contractor insurance policies. They've been writing the same kind of policies. They have been in business for twenty-six years and their book of business had remained stable for the last ten years. They have been writing the same insureds. And a couple of years ago I might have thought that this was kind of an unusual situation, but in the consulting business there are MICH companies out there with very steady books of business with good management that are well run. And this seems to be one of them. Very conservative kind of management.

They have given us a call because, I'm going to call this the auditor cycle. What happens is that the auditors go in and they look at these mid-sized insurance companies and they say, you guys really need an actuary. And these companies go out and hire an actuary and the actuary starts working there and they get frustrated, either because they are the only actuary in the company or the career path doesn't look particularly good and they run through a cycle of actuaries and then the company gets frustrated and they call in a consultant. And that's why we are here today. There has been an actuary or several in the past, but the company is now going back to consulting actuaries. I said very stable book of business, virtually the same policyholders, well managed company, very healthy balance sheet and that's where we'll start.

(Slide)

Piece of cake consulting job. Look at this balance sheet. Nice stuff. Assets 529 million dollars. Liabilities about 4 million. Nice healthy surplus. Taking a look at some of the NAIC early warning test to measure solidity. The four tests that we looked at, the five tests that we looked at they passed with flying colors. No problems at all. We also looked at an additional ratio reserves to surplus and that's just fine. This just goes along with our gut feeling that this a well managed conservative, good company.

We're going to go in. We're not going to do anything fancy for this company. We're going to do an incurred loss development method. We're going to do an paid loss development method. Pretty straightforward.

The company has mentioned that when looking at the loss development factors on the incurred triangle the next to most recent diagonal, in this case we'll see the 1987 diagonal, the factors were somewhat depressed. they were lower than they had been historically. and now on the current diagonal, they are somewhat higher than they had been historically. Nobody's panicking over this situation, but it's kind of an observation that they have made and they have asked us to look into why this might be happening.

(Slide)

So here we are, the incurred loss development method. Our dire is up here and factors here. I think you have this handout. If you look at the utmost recent diagonal...did I get that right... the one before it...no, you have the handout...you'll see that the factors are a little bit lower than they were historically. And if you look at the most current diagonal you'll see that the factors are somewhat elevated. down here are the selections and over here are the projected ultimate losses that the company has done.

(end of side one)

Accident year analysis...I'm sorry. Accident year analysis. Okay? And our traditional paid loss development methodology. If we take a look at these actors we see some, you know, they're not as steady as Steady Re, but they are reasonable looking loss development factors. I can look at these as pretty comfortable, as nothing significant seems to be happening in our loss development factors.

Again, a little tiny cliche is running in me, in an incurred loss development method, the paid method seems to be pretty steady. I'm going to go in and I'm going to put these two estimates side by side and make a selection and write my report. That's what we do.

Well, let's see what do we have here? I look at my estimate for 1979 accident year. It looks pretty good. In 1980 the two numbers are around 36 look pretty good. 53 look pretty good. 61ish, 62ish...it's not bad. 82 and a little elevated, that's not bad. You get up to 85 and you're looking at about 3 million dollars worth of difference. There' starting to be a little bit of difference between our estimates. I don't like it. If you're bothered...3 million dollars bothers me, but I can live with that. Looking at...where are we? Oops...112, 116, the difference is, again, there is a difference and it seems to be growing and it seems to be that the paid method is higher than the incurred method.

And next you're looking at 144 and 128. The difference is growing again. The paid method is giving us an answer higher than the incurred method. And in either you're looking at 180 and 137. We're looking at a difference of over 40 million dollars and now I'm uncomfortable. I can't just go average these to estimates like I'd like to do and go write my report. We can't go average adjustments like we would like to do and write our report. I think we have to look into why the paid method is giving us answers higher than the incurred method.

The company, again, is a well managed, relatively conservative company. Up until 1986 they just took the averages of the two estimates. And that seems reasonable to me. For 1987 and 1988, however, they gave them 75% weighing to the paid method and a 25% weighing to the incurred method. They don't know why the paid method is higher, but they have a feeling that they ought to give you a higher rate to their conservative company.

Well, we have to find out why this is happening, so we've set up appointments with the claims manager. And we've set up appointments with the head of underwriting.

We go to talk to the guy who is in charge of data processing and (inaudible) system back in 1978 and nothing has really changed since then. They've been using the same system. They've been happy with it. It's been successful. And basically he tells us nothing is different.

We go in and talk to the claims manager and we find out that he got hired right at the end of 1986, the beginning of 1987. and he has a philosophy that says, look, you don't put up a lot of dollars right away. What you do is you wait until you really know what's happening with the case and then you put up more dollars. And then if you find out more information you put up additional dollars. Don't go setting your reserve at $100,000 the first time you see the case roll in the door. get your information. Get your facts straight before you go putting up high reserves.

And the underwriter tells us nothing, absolutely nothing has changed. They are writing exactly the same insurance that they have been writing for the last ten years. All manufacturers and contractors...about the only thing we can say is that some of the contractors manufacturer light equipment and some of the contractors manufacturer heavier equipment. So you take into the financial stability of the insurers may be something is going on there. And he said, no these companies are doing really well. They are growing gain busters. And, in fact, the heavy manufacturers are growing even faster than the lighter manufacturers.

Okay. What do we do? (comment from audience) I'm sorry. Could you repeat that?

QUESTION: Split it, among other things.

MS. ONUFER: Okay. So one thing we've had that we ought to think about doing is setting the (inaudible) data between the light manufacturers and the heavy manufacturers. Why is that?

QUESTION: Well, there are different patterns and because you are getting a shift in the relative distribution business between the two, it could mean an overall result (inaudible) would be changing (inaudible) simply because of shift or (inaudible).

MS. ONUFER: Let me just repeat what he said. There appears to be a shift in the mix of the business toward the heavy manufacturers because they have been growing faster. And because of the shift in the business they probably do develop differently. We ought to segment the data and see what impact it has to develop these numbers differently. What else do we want to think about doing?

Oh, I keep forgetting this. The company had developed a report year system.

QUESTION: (Inaudible)

MS. ONUFER: I beg your pardon.

QUESTION: (Inaudible)

MS. ONUFER: Develop the case reserves separately from the IBNR.

QUESTION: (Inaudible)

MS. ONUFER: Okay. the triangles that we looked at were incurred, which is cumulative paid and case reserve. There wasn't any IBNR in that. And then we looked at paid.

QUESTION: (Inaudible) total reserves (inaudible).

MS. ONUFER: Oh, I see what you are saying. So develop the triangles on a report year basis. Oh, okay. That's a good idea.

QUESTION: (Inaudible)

MS. ONUFER: Yes. What we suggested is that we look at the development on a report year basis rather than an accident year basis. That would give us a sense of case reserve adequacy. What may or may not be happening with case reserve adequacy based on what this claims manager's philosophy...how that may be translating into the reported losses. Anything else?

Well, that's good because they are the only two slides I prepared. (laughter) Okay. As it turns out what we are going to look at first is the report year development. We're switching. We're out of accident year and we're into report year.

Oh, I forgot to give credit to Greg Graves who has done this presentation two years in the past and has done an excellent job. This is a really excellent case study. I didn't change it because I was just very impressed with the way that everything flowed. This exhibit, however, is confusing and so I want to walk through it very slowly.

(Slide)

Okay. Again, he's moved from an accident year, which categorizes claims according to the year in which the accident occurred. Moving over to a report year, and this is going to categorize claims according to the year in which the claim was recorded. So the report year can have claims from many accident years in it. The beauty of the report year is that when the report year is over we know exactly the number of claims that are involved in that report year. There is no growth. The claims that were reported in it is a then steady figure and it makes it the analysis a little bit more comfortable in that sense than an accident year.

(Slide)

Let's look at this. this is the 1985 report year. This 18 million 77.8 represents the average settlement size for a claim that was reported in 1985 and settled in the first twelve months. This 18.797 represents claims that were reported in 1985 and were settled in the twelve to twenty-four month period only. So that it is not a accumulative figure, which typically is the way that I see this exhibit, but an incremental exhibit. It says the average claim size, that twelve month period. Likewise 19.129 is the average claim size of those claims settled between twenty-four and thirty-six months. And the 20 million dollar figure, claims settled from thirty-six to forty-eight months. Okay. We have comparable figures for the 1986 report year, 1987 and 1988 report year. Okay.

(Slide)

The bottom is organized slightly differently. This represents the percent of claims, 37.3 represents the percent of claims that were closed in the first twelve months. This represents the percent of claims that were closed in the first twenty-four months. So it is a accumulative figure. If I wanted to get an incremental figure I would subtract 84.6, 37.3 from 84.6. and then by the end of four years everything has been closed. Any questions on this exhibit? I know that you don't have it in front of you, but when we mail it to you later it is confusing because these are stated on different basis.

(Slide)

What are we going to do next? Well, we're going to figure... we're going to fill in this triangle and turn it from a triangle

into a rectangle. Up here we are going to contemplate what the average claim settlement sizes ought to be. And here we are going to fill in the settlement rates.

(comment from the audience - inaudible)

Okay. How are we going to fill in these numbers? Yes.

QUESTION: On the bottom half of 1987, column (inaudible), 84.9, where does that come from?

MS. ONUFER: History. We're looking at...we're standing at December 31, 1988, so this represents the amount of claims that were closed at the end of 1987, the 37.4, and the 84.9 represents the claims that were closed at the end of 1988.

QUESTION: How do you know (inaudible)

MS. ONUFER: Pardon?

QUESTION: I must be missing something.

MS. ONUFER: Okay. With a report year...when the report year is over we know the number of claims that were reported. And this represents about 85% of those that were reported at the end of the year have been closed.

QUESTION: (inaudible)

MS. ONUFER: I'm sorry. Yes. Okay?

QUESTION: Yes. As a matter...I hadn't thought about that...this is dollars, this is counts.

QUESTION: (inaudible)

MS. ONUFER: Yes.

QUESTION: Thank you.

MS. ONUFER: Is that counts or amounts? MOODY: Counts.

MS. ONUFER: Counts. Okay. Well, how are we going to fill in this triangle when we can look at the trends across the rows. All these numbers represent average claim sizes in the first twelve months. The reason with they are increasing is because of general economic inflation and any other kind of inflation that may be going along, so we may want to apply some trend factors across the rows. We may also want to apply some trend factors down the columns. You notice that these numbers are increasing over time. Why do these numbers increase over time? Well, generally because the larger more difficult claims take longer to settle.

You'll see from the next slide that...again, I didn't prepare this slide, but I tried to back into some of the numbers and it looked as though Greg applied the trend across the rows, although I would have applied them both ways and kind of picked the number. And he may well have done that. So let's see what he did. Okay.

(Slide)

I think the top is pretty self explanatory and then the bottom since this is such a steady company there is no reason to think that the settlement patterns are going to change so we selected the same settlement patterns.

Now, because these are incremental numbers, if I weight these by the incremental...calculate the incremental numbers down here and weight these up here, I'll get approximately the average claim size that I expect for that report year. Okay.

Okay. The next one is a tough one. Get ready.

The first row is the actual average report year incurred. I take the reported report year losses, incurred report year losses and divide it by that solid steady number of claims. And this is what I get. These numbers. Okay? So this just what's happened. This is what's on my books today. This is what the claims manager says the average claim size is on a report year basis.

Based on the prior slide this is what we think the answers ought to be. Let me put that prior slide up for a minute. See if you can keep some numbers in mind. 18, 20, 22 and 24. I guess that's easy enough.

Remember that I said that those numbers were kind of ratings of these numbers. I actually...trust me, I went through and did the calculations and it works. And what I sort of observed was that the number overall came out to be somewhere between these two numbers, 18, 20, 22 and 24ish.

So in the 1985 report year, what is recorded and what we think ought to be happening is exactly the same. And so, therefore, there is no difference. It's zero. Again, no difference in 1986. For report year 1987, what we think the average claim size ought to be and what we are carrying, there is a difference of about $300,000...$300,000 per claim. Not tremendous, but there is a difference. And then disturbingly so, in 1988 there is a difference of 7 million per claim.

If I take these differences and I multiply it by the number of claims then I get what the suggested inadequacy is, about 1.4 million in 1987 and about 41 or 42 million in 1988. Quite a big difference.

So what appears to be happening here is that the claims manager, through his new philosophy, has done what we call "weekender low" of the case reserve adequacy, because he's more cautious in how he sets the claims.

The next exhibit, I think, is a fantastic exhibit. It's taken me about forty times looking at it before I finally understand it, but it is a tremendous exhibit for showing management and yourself exactly what is happening in company situation. It is difficult to explain. I'm going to take my time, but if you can grasp it, it is really a phenomenal tool, a phenomenal explanatory exhibit. I should give credit...this is a Fisher-Lange methodology. And if you need more detail about this particular methodology, how to set up the data, and how to culminate in this final exhibit there is the paper by Fisher-Lange will do it for you. I think it's called a report year approach, but I may be making that up.

(Slide)

I'll leave it up here to confuse you for a few seconds. Okay. We're going to move to a calendar year look see now. In this first set data there is the calendar year reserve position at the end of December 31, 1985.

This very first column represents what the company was carrying at the end of December 31, 1985. So on their books in their balance sheet was 58.6 million dollars of liability for loss in ALE.

the second column represents...we are standing at December 31, 1988...the second column represents the additional knowledge that we have now. Three years has gone by and what we really know is that the 1985 report year should have had 4 million dollars more of reserve at the end of 1985. We know that because we are standing at December 31, 1988.

And the final column tells us, we've just gone through a whole new analysis. The final column tells us what more information, what additional reserves should be put up based on this additional analysis that we just went through. And for the 1985 and prior report years, as we saw on the exhibit, there wasn't a shift.

We're gaining new knowledge about these report years, anyway, through that report year approach that we just looked at. Okay. So the balance sheet that the company was carrying in 1985 was a little bit like to the tune of 4 million dollars for losses.

Now we're going to look at the company reserves at the end of 1986. Again, these represent the balances of losses that the company was carrying at the end of 1986. this column represents the additional knowledge that we have because we are standing at December 31, 1988. And what we see is that the company should

have had about 4.6 million dollars up in the 1986 report year. And we got no new information from our new analysis and now the company's balance sheet, at the end of 1986, was about 4.6 million light on the reserve liability. and because it grew from 1986 to 1985, we say there is a slippage. And that slippage is about half a million dollars. so they were late in 1985 and they are getting a little bit worse now. I wouldn't be upset about this, but I would be at the next one.

(Slide)

This represents the position at the end of 1987. Again, this is what the company was carrying at the 1987. This is what we gained because we were looking at it a year later. And this is what our new analysis showed us. The reserve position is now 32 million dollars light and we've experienced 27 million dollars of slippage in this calendar year.

And, again, I can't think of any better exhibit than this one that shows what is happening. And finally in 1988 the company was carrying 67.8 million. We don't have any additional information because we are standing at the same point in time. And our new analysis suggests 43 million dollars of additional reserves and our slippage is about 10 or 11 million dollars.

Somebody pointed out in the last session, and this was a very good observation, that at the end of 1987 we should have seen that something was going on, because this, again, on a very steady, solid, conservatively managed company, same exact book of business, but the reserves that they are carrying at the end of 1987 are less than the reserve that they are carrying at the end of 1986. And why would the reserves go down? It doesn't make any sense. So there were warning signals at the end of 1987 if somebody heated them. Of course they didn't have the report year analysis, or perhaps they couldn't set this up and know. But now it seems pretty crystal clear that something was happening and it should have gone off as a red warning signal. and particularly if you look at the most recent report year in each calendar year analysis. We see the most recent report year had 46 million. Here are 52 million. We expect growth because of inflation. We don't expect the most recent report year at the end of 1987 to be less than the most recent report year at the end of 1986. that's funny. that's a warning sign. A red flag. Okay.

Well, we're going to adjust this data for the changing reserve adequacy. We're going to apply a book with Sherman technique. I think there is a paper called...do you know the name of the paper...Adjustments in Case Reserve Adequacy or something. I don't know. Excellent, excellent paper. It's written by Berquist Sherman, listed in the syllabus. The way the one generally adjusts for case reserve adequacy, is you take a look at just the outstanding amounts. And you look along the current diagonal. Imagine, if you will for a second, that this is a triangle of outstanding amounts. And you look along the current

diagonal, average outstanding amounts. And you look along the current diagonal and you detrend back down the column so that every number in this column is the same case reserve adequacy as the most current number that is only detrended. Okay?

So now you've got detrended, average, outstanding amounts. You multiply that by the number of outstanding claims and you've got the total dollars of outstanding reserve. You add that to your cumulative payments and you are back to your incurred basis. I know that's too fast, but it gives you a flavoring and Berquist and Sherman does an excellent, excellent job of explaining how to do it.

(Slide)

We're going to look at segmented data now. We know that there is a problem with the case reserve adequacy. You've just seen that on the past slide. Now we want to see what's happening between these light manufacturers and these heavy manufacturers. And what you're looking at now is an incurred triangle, but this incurred triangle in not the actual reported dollars, but adjusted reported dollars. Ala, book of Sherman.

And this is tough. You don't have this exhibit, but if you stare at it long enough you'll see that before where we were seeing an exhibit exhibiting an increasing trend in the loss development factors, this one here being somewhat less and then this one here jumping way up. Now the factors look pretty stable, relatively stable. Again, we're not Steady Re, but we're looking pretty good. But if yours is of the adjustment for case reserve adequacy...and, again, here is our estimate of ultimate losses.

I'm sorry. That was the light manufacturers. This is the light manufacturers, the pay triangle. The (inaudible) steady development before we had the data combined and you still see pretty stable development. There is, lucky, thank God, nothing is happening with the payment pattern. No one has decided to shift that around on us. I don't know why they didn't. That would have made it even more interesting.

(Slide)

This is the heavy manufacturers, again, adjusted incurred data not the actual reported, but the adjusted incurred. You could argue that there is a little bit of an up swing on the current diagonal, but basically I think it is looking pretty good. And the paid data which again (inaudible). Any questions?

You know, I mentioned earlier that we talked to the claims processing guy and he had noting to report, but I had gone into data analysis for a company very similar to this, very analogous to this situation, and when I went to talk to the claims guy he told me that he...not the claims guy, I'm sorry, the data processing guy...he told me that he really straightened the

company out. What he had noticed was that he had all these people who were including all these...as he claims came in he had these people who were inputting all these claims and the processes were overtired and he was having a hard time maintaining the same number of processors. People were quitting on him. So what he decided to do was that he would not report recorded record into the system until something was paid. so, therefore, he could decrease the number of processors and decrease the number of changes in the system and his budget was shrinking way down. He was really being efficient.

Well, anyway, back to the data segmentation. Any questions so far? This is the result of our data segmentation. This is the light manufacturers. If you recall, we were having a little bit of a situation in the more recent accident years where the incurred method were giving us an answer that was higher than the paid method. I'm sorry, the reverse. The paid method was giving us an answer that was higher than the incurred method. You can see here that these numbers look pretty good in that year. They look pretty good in that year. They look pretty good...we are back to an accident year...I'm sorry...I forgot to announce it...in that year. Again, looking pretty good there. Pretty good there. And, in fact, we've kind of flip flopped. It looks like the incurred, this time, a little bit higher than the paid now. Looking pretty good there. Looking pretty good there. Pretty good there. Looking pretty good there. And so on. So I think we can get comfortable about... (inaudible) a reasonable estimate of the ultimate losses.

What has this done to our company? Well, our company is going to have to put up 40 million more. And what does our balance sheet look like now? Well, our liability is 40 million dollars higher. Our surplus is 40 million less. So we've lost about half of our surplus. and we failed the early warning test. And we are a company that has to make some though decisions. And the moral of the story. Don't change claims managers. (laughter)

The final exhibit is an absolutely, incredible, wonderful exhibit. I really love. I've always wanted to do this kind of analysis myself, and I have either been too lazy or never had the time, but this is a really phenomenal exhibit coming up. You are really going to enjoy this one. Any questions on this new balance sheet that you are all enjoying right now? Okay. I have to hide this from you. I can't let you see it all.

(Slide)

What this exhibit does, is it says, what percentage of that on how many dollars of that 40 million dollars is attributable to the change in the case reserve adequacy? and how much of that 40 million dollars is attributable to the fact that we hadn't been segmenting the data prior to this? And it is my opinion, by the way, that...this is a practical opinion...that if the changing case reserve adequacy hadn't popped up, hadn't forced us to look

into the data more, there might have been many, many years before we recognized that we ought to have been segmenting the data. I don't know how many of you feel that way, but that was a subtlety that we kind of got by accident in here. What do you think?

(Slide)

This first number...I'm going to get this right, because I messed up a little bit the first time...the subgroups analyzed separately. Okay? This is the subgroups analyzed together. So the difference between analyzed separately and analyzed together tells us what the affect is or how much we are missing the mark by not segmenting the data historically. And the answer is about 19.5 million or 6.4% of the held reserves.

(Slide)

This is for the paid analysis, so we don't have to know there is no case reserve adequacy here. so we're a pretty clean number just bases on the paid analysis. Okay? Do the same kind of thing with the incurred data only now we're going to have the two effects linked together. Okay.

(Slide)

This is subgroups analyzed separately with adjustments for case reserve adequacy. Subgroups analyzed together with adjustments for case reserve adequacy. And if we are lucky than the differences between these two numbers and the differences between these two numbers should be about the same. Because, again, we are measuring the affect of (inaudible) doing the numbers separately. And we get about the same effect, about 18 or 19 million, 6 or 6.5%.

(Slide)

The next number is the subgroups analyzed together, but no adjustment for case reserve adequacy. So now we are comparing this number to this number as the effect of the changing case reserve adequacy. And the difference of those two numbers is 72 million dollars and the difference is 23.7% out of the total of about 30%. And I should have announced that we are switching back to accident year here. I'm sorry.

QUESTION: (inaudible)

MS. ONUFER: Sorry?

QUESTION: I must have misunderstood. (inaudible) because for analyzing groups separately (inaudible) case reserves there is a total increase of 90 million and (inaudible).

MS. ONUFER: Yes. That's what I forgot to announce. That 40 million dollar change is a report year change. It didn't include

the net reported claims. I was switching back to an accident year. I apologize for not announcing that in the beginning. So the difference between the 90 and 40 is about 50 million is the IBNR.

QUESTION: Which number impacts your balance sheet just the 40 million in the report year analysis?

MS. ONUFER: Just the 40 million. I'm not sure why that is. It's got me confused. I don't know. I have to think about that for a minute. Maybe I'll come up with partial brilliance. Maybe this isn't the pretty good that I though it was, and I'm smart for just claiming credit for it. (laughter)

QUESTION: I think part of the answer is 19 million, 20 million increase on that slide splitting the groups is already gearing the previous analysis. The previous analysis...well, you had the reserves right...given the change for mix of business...that 20 million has already been considered.

MS. ONUFER: I'm missing it. Run it by me again.

QUESTION: That's okay. I don't (inaudible).

MS. ONUFER: Okay. The only thing that I'm thinking...you have an answer?

MR. MOODY: No. A possible answer, but I'm not sure. The (inaudible) that they refer to in this exhibit is that the case reserved only or is that (inaudible).

MS. ONUFER: Which is it?

MR. MOODY: This exhibit talks about a healthy percentage of held reserves...

MS. ONUFER: Yes.

MR. MOODY: ...What is the basis? That's 22.7% of the case reserves or the total reserves?

MS. ONUFER: That's just case reserves.

MR. MOODY: Of?

MS. ONUFER: Of a percentage of reserves held, so it would just be the case.

MR. MOODY: Okay. That may be the answer. It may be that some of that 72 million...it may be that, yes, case reserves are inadequacy. The IBNR had made up for some of the inadequacy, but not all of it.

QUESTION: 72 million, at least compared to what they were holding before, was (inaudible).

MS. ONUFER: I'm sorry, say again.

QUESTION: What that difference of 72 million compared to the projection type before? Because they selected an ultimate loss that a weighing of the paid and the incurred. So the increase made of 72 million, but that is not going to correct the balance sheet because they didn't book the...the book mostly at 75% weighted on (inaudible).

MS. ONUFER: No. I think...let me go back. I think I have it figured out. I think you helped me do it. I think that there is.... I don't know what I think. I think that this 90 million is made up of two pieces, the IBNR that the were already holding and the additional IBNR that they are getting through the analysis. No. that doesn't make any sense either. I don't know. I apologize.

QUESTION: (inaudible) only showing loss (inaudible) reserves (inaudible)

MS. ONUFER: Well, it's funny that the liabilities were 44 here and they are just much larger here. Oh no, this is ultimate losses. I'm sorry. Maybe we got to that.

This is a change in ultimate losses that has gone up by 72 million dollars, but the actual change in reverses some of that has been paid. Maybe that's the answer. Okay. This is the change in the ultimate losses. The ultimate losses have gone up 90 million, but the actual change in reserve is maybe only 40 million. I'm guessing. I have to go take a look at it and fiddle with the numbers and get comfortable that the was the right answer.

MR. MOODY: The other exhibit that shows the emergency (inaudible) here.

MS. ONUFER: That will do it?

MR. MOODY: That might show...

MS. ONUFER: No. That was...

MR. MOODY: The slippage from year. It shows the slippage from year to year. The slippage in the latest year was somewhere in the order of...

MS. ONUFER: Forty million.

MR. MOODY: Ten million dollars on the...

MS. ONUFER I can't.

MR. MOODY: From 32 million to 42 million.

MS. ONUFER: Well, are there other questions while we are baffling through this. There may be things that I can answer.

QUESTION: How many companies actually contract (inaudible)? Is that common?

MS. ONUFER: I'm trying to think. The question is how many companies have report year data? I'll answer it and then maybe you want to answer it, Andy. It's all over the place. I don't know as a percentage. Some do. Some don't. That's all. I can' t even say fifty. I don't even know. Just some do and some don't. As a consultant, I'll ask for it. I should ask for it. And almost...in fact, I'll tell you the first year I asked for it the answer was no. And if there are no problems and the compan y does not see any problems and it costs money to create report year data the answer continues to be no. As soon as there is a potential problem and this may be a way of solving or getting to an answer as to what is causing the problem, then the answer t urns into yes.

MR. MOODY: I think with the advent of claims made policies, it has become a bit more common.

MS. ONUFER: That's a good answer too.

MR. MOODY: But, it is probably still not widely kept in terms of reports. But the data is there, I think, in most companies. All claim files have a date that this claim was reported to the company. So as long as you have that data in the data proce ssing tape file somewhere, you can get at it. I'm the first actuary with Signet and they have a very good system with basically all of their year end claim valuations back from day one of the company. So there I was able to reconstruct that report year data.

MS. ONUFER: That's a good answer. It is there if you want it. Does this mean that everybody understood everything that I said without any handouts? Or are they so gone, that it's not even worth questioning it? (laughter).

MR. MOODY: I think they understood.

MS. ONUFER: Okay.

QUESTION: Will we get copies of the handouts?

MS. ONUFER: Yes. If you would just leave your business card or a name and address or something then we would be glad to send you to handouts. And I'll even be glad to correct that one error that I saw on that one.

Anybody else? Thank you very much.

1990 CASUALTY LOSS RESERVE SEMINAR
INTERMEDIATE CASE STUDY
ANDREW W. MOODY, ACAS

In 1990 the Steady State Reinsurance Company of Old Bed Rock entered its ninth year. Steady Re is a company that takes pride in planning their operations for each upcoming year and then meeting those plans. Premium growth is the top priority in these plans. In this fashion Steady Re is always increasing their volume and keeping their expense ratios level at 20%, unlike other reinsurers who are more subject to the whims of the market. As their President says "We chart a steady course and maintain that rock solid heading." This steady course is exemplified in their 5% - 6% growth each underwriting year. It should be noted that an underwriting year's premium is reported 60% in the year written, 30% in the following year, and 10% in the second subsequent year.

Steady Re writes only one line of business, casualty excess and only on higher working layers. At the company's inception in 1981 underwriting standards state that the company will write business with attachments of no less than $300,000 and will participate only up through $1,000,000 of first dollar loss. A maximum limit of $500,000 is also adhered to. Some lower working layer contracts may be written but only for exceptional business.

The senior underwriter for Steady Re feels confident that the underwriting staff has been able to follow Steady Re's underwriting guidelines. Part of these guidelines is that a treaty should have an expected loss ratio of 75% or better to be acceptable. Exhibit 1 shows the results of the latest reserve review for year end 1989; this exhibit seems to contradict his feelings. The inception to date loss ratio is nearly 95% and only two years have loss ratios that are less than 75%. Concern over Steady Re's historical results is particularly strong since their results seem to be even more volatile than the underlying market cycle that had a trough in 1985 and peaks in 1982 and 1988.

However, some optimism has been expressed that results may be better than their latest analysis states. This optimism is due to a change in development factors starting with accident year 1984. Historical development patterns are shown in Exhibit 2. The optimism stems from the possibility that the reporting pattern has undergone some permanent change and that the latest calculation of required reserves may be overstated. One area where a fair amount of judgment has been applied is in the selection of the tail factor (Exhibit 3). Steady Re has assumed that their business is somewhat shorter tailed than the industry in general, as represented by the RAA. This seems may not be justified since Steady Re's development is on average 12% larger than the RAA's for each period.

To date reserve analyses have been performed by the head of Steady Re's accounting area. She has had some guidance from their independent auditors and has attended the CLRS once.

You have been offered the position of Actuary for Steady Re and have said that you will accept the position if you are permitted to do a reserve analysis and find the reserves to be adequate. You have also agreed to provide the analysis to Steady Re whether or not you take the position.

Steady Re has agreed to permit you to do your analysis. You have conferred with the head of the EDP department who tells you that data by treaty is available from inception of the company. However, due to a system conversion in 1986 individual loss data may not be available prior to that date.

How do you proceed and do you accept the position?

Any resemblance between the organizations or individuals described above to any actual reinsurance company or its personnel is purely coincidental.

(2)

STEADY STATE REINSURANCE COMPANY OF OLD BED ROCK

Casualty Excess

Calculation of IBNR Carried at 12/31/89

Acc. Year	(1) Losses Reported as of 12/31/89	(2) Loss Development Factor	(3) Ultimate Losses (1) x (2)	(4) IBNR as of 12/31/89 (3) - (1)	(5) Calendar Year Earned Premium	(6) Ultimate Loss Ratio (3) / (5)
1981	272,321	1.4000	381,250	108,929	300,000	127.08%
1982	249,900	1.4910	372,601	122,701	465,000	80.13%
1983	250,654	1.5879	398,017	147,363	543,500	73.23%
1984	289,524	1.7785	514,908	225,384	580,500	88.70%
1985	378,000	1.9741	746,208	368,208	614,000	121.53%
1986	262,417	2.7637	725,250	462,833	651,000	111.41%
1987	173,063	3.5929	621,788	448,726	690,000	90.11%
1988	85,000	5.9282	503,898	418,898	730,000	69.03%
1989	54,706	13.6349	745,908	691,202	776,000	96.12%
	2,015,584		5,009,829	2,994,244	5,350,000	93.64%

STEADY STATE REINSURANCE COMPANY OF OLD BED ROCK

Incurred Loss & Allocated Expense Incurred Development

Casualty Excess

Accident Year	1	2	3	4	5	6	7	8	9
1981	26,103	60,714	103,125	134,559	193,750	214,286	239,784	255,000	272,321
1982	25,581	59,500	101,063	131,868	189,875	210,000	234,988	249,900	
1983	27,286	63,467	107,800	140,659	202,533	224,000	250,654		
1984	43,765	96,000	156,000	196,706	264,000	289,524			
1985	77,824	162,000	252,000	306,353	378,000				
1986	64,208	135,595	213,563	262,417					
1987	48,551	106,500	173,063						
1988	36,544	85,000							
1989	54,706								

Age to Age Development Factors

Accident Year	1	2	3	4	5	6	7	8	
1981	2.3260	1.6985	1.3048	1.4399	1.1060	1.1190	1.0635	1.0679	
1982	2.3260	1.6985	1.3048	1.4399	1.1060	1.1190	1.0635		
1983	2.3260	1.6985	1.3048	1.4399	1.1060	1.1190			
1984	2.1935	1.6250	1.2609	1.3421	1.0967				
1985	2.0816	1.5556	1.2157	1.2339					
1986	2.1118	1.5750	1.2288						
1987	2.1935	1.6250							
1988	2.3260								
1989									
Average	2.2355	1.6394	1.2700	1.3791	1.1037	1.1190	1.0635	1.0679	
Cum.	12.6047	5.6383	3.4392	2.7081	1.9636	1.7792	1.5900	1.4951	1.4000

Selected Loss Development Factors

	2.3000	1.6500	1.3000	1.4000	1.1100	1.1200	1.0650	1.0650	
Cum.	13.6349	5.9282	3.5929	2.7637	1.9741	1.7785	1.5879	1.4910	1.4000

Exhibit 3

STEADY STATE REINSURANCE COMPANY OF OLD BED ROCK

Comparison of Casualty Age to Age Development Factors

From 1987 RAA Study With Steady Re Casualty Excess Factors

Time in Years		(1) RAA Weighted Factor		(2) Steady Re Factor	(3) % Diff [(1) - (2)]/[(2) - 1]
2:1		2.605		2.236	29.9%
3:2		1.588		1.639	-8.0%
4:3		1.300		1.270	11.1%
5:4		1.190		1.379	-49.9%
6:5		1.109		1.104	5.1%
7:6		1.090		1.119	-24.4%
8:7		1.055		1.063	-13.3%
9:8		1.038		1.068	-44.1%
10:9		1.047	*		
11:10	1149	1.038	*		
12:11		1.035	*		
13:12		1.022	*		
14:13		1.019	*		
15:14		1.027	*		
16:15		1.020	*		
17:16		1.029	*		
18:17		1.014	*		
19:18		1.019	*		
20:19		1.030	*		
	. . .				
30:29		0.993			
31:30		1.002			
Average % difference					-11.7%

Notes: RAA factors are average of latest 10 years of factors, separately by line. Then the lines are weighted, using Steady Re losses as weights. RAA Med Mal factors beyond 18 were extrapolated.
Indicated Steady Re tail factor from 9 to 20 years equals
product of asterisked RAA factors, adjusted for the RAA to Steady Re differential: [(1 / 0.883) * .047 + 1] * [(1 / 0.883) * .038 + 1] * . . . = 1.397
A tail to 20 years was selected.

Exhibit 4

STEADY STATE REINSURANCE COMPANY OF OLD BED ROCK

List of Casualty Treaties by Year

Treaty	Reinsured Layer	Earned Premium By Treaty Year - as of 12/31/89 1981	1982	1983	1984	1985	1986	1987	1988	1989
001	400,000 xs 600,000	98,000	102,000							
002	250,000 xs 750,000	195,000	207,500	205,000	176,000					
003	250,000 xs 250,000	50,000	52,500	56,000	55,000	54,000				
004	200,000 xs 800,000	60,000	64,000	68,000	57,000	54,000	59,000	66,000		
005	400,000 xs 600,000	97,000	99,000	105,000	84,000	89,000	90,000	99,000	141,000	93,000
006	250,000 xs 500,000			126,000	103,000	109,000	107,000	119,000	162,000	84,000
007	150,000 xs 250,000				125,000	112,000	118,000			
008	400,000 xs 100,000					61,000	62,000			
009	250,000 xs 250,000					76,000	79,000	110,000		
010	350,000 xs 150,000					75,000	76,000	103,000	67,500	59,000
011	350,000 xs 650,000						79,000	88,000	131,500	71,000
012	300,000 xs 700,000							125,000	173,000	88,000
013	300,000 xs 200,000									85,000
Total Earned Premium by Treaty		500,000	525,000	560,000	600,000	630,000	670,000	710,000	675,000	480,000

Note: Written premiums are reported 60% in the year written 30% in the following year and 10% in the next year

Segmenting Data

It is not possible to segment the data by line of business because most treaties are multi-line and because the underwriters have no incentive to properly allocate the premium.

A look at the treaty list in Exhibit 4 along with the underwriting guidelines suggest segmenting treaties by attachment level (e.g. lower working vs higher working).

- Steady Re's underwriting guidelines indicate a definite preference toward treaties with retentions that are greater than $300,000. This may imply that these treaties receive differing treatment for underwriting acceptence.

- The portion of the book that is written in the higher retentions varies from 10% in 1981 and 1988 to 60% in 1985. This seems to coincide with the change in loss reporting patterns displayed in Exhibit 2.

- The data in Exhibit 2 could be separated into two historical patterns, one for the lower attachment treaties, one for the higher treaties. Data credibility may become a problem.

- If credibility does become a problem then an alternative might be to use ISO excess limits loss development for the appropriat lines.

- Exhibits 7-a through 7-d and Exhibits 8-a through 8-d show the separated data.

Exhibit 6

Additional Reasons for Selection of Tail Factors

- Most of Steady Re's development is from new claims, not case development. This implies a shorter tail than the industry as a whole.
- Claim count development has been negligible after year 5 (low attachments) or 6 (high attachments) due to the type of business reinsured and to treaty provisions.
- Total development has been moderate after year 6, due to many claims reserved near the treaty limit.
- Total development after 6 years (low attachments) is running below the RAA's.
- The RAA is predominantly based on a few giant reinsurers, who are believed to write much more hazardous and much higher limit business than Steady Re.

The lengths of the two tails 18 years (low) and 19 years (high) are judgmental. However, the above reasons support shorter tail factors than the RAA in both cases while maintaining a longer tail for the treaties with higher attachments.

Exhibit 7-a
(High Attachments)

STEADY STATE REINSURANCE COMPANY OF OLD BED ROCK

List of Casualty Treaties by Year

Treaty	Reinsured Layer	Earned Premium By Treaty Year - as of 12/31/89 1981	1982	1983	1984	1985	1986	1987	1988	1989
001	400,000 xs 600,000	98,000	102,000							
002	250,000 xs 750,000	195,000	207,500	205,000	176,000					
003	250,000 xs 250,000									
004	200,000 xs 800,000	60,000	64,000	68,000	57,000	54,000	59,000	66,000		
005	400,000 xs 600,000	97,000	99,000	105,000	84,000	89,000	90,000	99,000	141,000	93,000
006	250,000 xs 500,000			126,000	103,000	109,000	107,000	119,000	162,000	84,000
007	150,000 xs 250,000									
008	400,000 xs 100,000									
009	250,000 xs 250,000									
010	350,000 xs 150,000									
011	350,000 xs 650,000						79,000	88,000	131,500	71,000
012	300,000 xs 700,000							125,000	173,000	88,000
013	300,000 xs 200,000									
Total Earned Premium by Treaty		450,000	472,500	504,000	420,000	252,000	335,000	497,000	607,500	336,000

Note: Written premiums are reported 60% in the year written 30% in the following year and 10% in the next year

Exhibit 7-b
(High Attachments)

STEADY STATE REINSURANCE COMPANY OF OLD BED ROCK

Casualty Excess

Calculation of IBNR Carried at 12/31/89

Acc. Year	(1) Losses Reported as of 12/31/89	(2) Loss Development Factor	(3) Ultimate Losses (1) x (2)	(4) IBNR as of 12/31/89 (3) - (1)	(5) Calendar Year Earned Premium	(6) Ultimate Loss Ratio (3) / (5)
1981	241,071	1.4000	337,500	96,429	270,000	125.00%
1982	220,500	1.5000	330,750	110,250	418,500	79.03%
1983	220,500	1.6000	352,800	132,300	489,150	72.13%
1984	186,667	1.8000	336,000	149,333	450,450	74.59%
1985	126,000	2.0000	252,000	126,000	327,600	76.92%
1986	94,917	3.0000	284,750	189,833	318,600	89.38%
1987	93,188	4.0000	372,750	279,563	423,900	87.93%
1988	67,500	7.0000	472,500	405,000	587,600	80.41%
1989	24,706	17.0000	420,000	395,294	588,200	71.40%
	1,275,048		3,159,050	1,884,002	3,874,000	81.54%

Exhibit 7-c
(High Attachments)

STEADY STATE REINSURANCE COMPANY OF OLD BED ROCK

Incurred Loss & Allocated Expense Incurred Development

Casualty Excess

Accident Year	1	2	3	4	5	6	7	8	9
1981	19,853	48,214	84,375	112,500	168,750	187,500	210,938	225,000	241,071
1982	19,456	47,250	82,688	110,250	165,375	183,750	206,719	220,500	
1983	20,753	50,400	88,200	117,600	176,400	196,000	220,500		
1984	19,765	48,000	84,000	112,000	168,000	186,667			
1985	14,824	36,000	63,000	84,000	126,000				
1986	16,750	40,679	71,188	94,917					
1987	21,926	53,250	93,188						
1988	27,794	67,500							
1989	24,706								

Age to Age Development Factors

Accident Year	1	2	3	4	5	6	7	8
1981	2.4286	1.7500	1.3333	1.5000	1.1111	1.1250	1.0667	1.0714
1982	2.4286	1.7500	1.3333	1.5000	1.1111	1.1250	1.0667	
1983	2.4286	1.7500	1.3333	1.5000	1.1111	1.1250		
1984	2.4286	1.7500	1.3333	1.5000	1.1111			
1985	2.4286	1.7500	1.3333	1.5000				
1986	2.4286	1.7500	1.3333					
1987	2.4286	1.7500						
1988	2.4286							
1989								
Average	2.4286	1.7500	1.3333	1.5000	1.1111	1.1250	1.0667	1.0714
Cum.	17.0000	7.0000	4.0000	3.0000	2.0000	1.8000	1.6000	1.5000	1.4000

Selected Loss Development Factors

	2.4286	1.7500	1.3333	1.5000	1.1111	1.1250	1.0667	1.0714	
Cum.	17.0000	7.0000	4.0000	3.0000	2.0000	1.8000	1.6000	1.5000	1.4000

Exhibit 7-d
(High Attachments)

STEADY STATE REINSURANCE COMPANY OF OLD BED ROCK

Comparison of Casualty Age to Age Development Factors

From 1987 RAA Study With Steady Re Casualty Excess Factors

Time in Years	(1) RAA Weighted Factor		(2) Steady Re Factor	(3) % Diff [(1) - (2)]/[(2) - 1]
2:1	2.605		2.429	12.4%
3:2	1.588		1.750	-21.6%
4:3	1.300		1.333	-10.0%
5:4	1.190		1.500	-62.0%
6:5	1.109		1.111	-1.9%
7:6	1.090		1.125	-28.0%
8:7	1.055		1.067	-17.5%
9:8	1.038		1.071	-46.8%
10:9	1.047	*		
11:10	1.038	*		
12:11	1.035	*		
13:12	1.022	*		
14:13	1.019	*		
15:14	1.027	*		
16:15	1.020	*		
17:16	1.029	*		
18:17	1.014	*		
19:18	1.019	*		
20:19	1.030			
. . .				
30:29	0.993			
31:30	1.002			
Average % difference				-21.9%

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Notes: RAA factors are average of latest 10 years of factors, separately by line. Then the lines are weighted, using Steady Re losses as weights. RAA Med Mal factors beyond 18 were extrapolated.
Indicated Steady Re tail factor from 9 to 19 years equals
product of asterisked RAA factors, adjusted for the RAA to Steady Re differential: [(1 / 0.781) * .047 + 1] * [(1 / 0.781) * .038 + 1] * . . . = 1.404
Tail to 19 years chosen as 10 years beyond current development.

Exhibit 8-a
(Low Attachments)

STEADY STATE REINSURANCE COMPANY OF OLD BED ROCK

List of Casualty Treaties by Year

Treaty	Reinsured Layer	Earned Premium By Treaty Year - as of 12/31/89 1981	1982	1983	1984	1985	1986	1987	1988	1989
001	400,000 xs 600,000									
002	250,000 xs 750,000									
003	250,000 xs 250,000	50,000	52,500	56,000	55,000	54,000				
004	200,000 xs 800,000									
005	400,000 xs 600,000									
006	250,000 xs 500,000									
007	150,000 xs 250,000				125,000	112,000	118,000			
008	400,000 xs 100,000					61,000	62,000			
009	250,000 xs 250,000					76,000	79,000	110,000		
010	350,000 xs 150,000					75,000	76,000	103,000	67,500	59,000
011	350,000 xs 650,000									
012	300,000 xs 700,000									
013	300,000 xs 200,000									85,000
Total Earned Premium by Treaty		50,000	52,500	56,000	180,000	378,000	335,000	213,000	67,500	144,000

Note: Written premiums are reported 60% in the year written 30% in the following year and 10% in the next year

Exhibit 8-b
(Low Attachments)

STEADY STATE REINSURANCE COMPANY OF OLD BED ROCK

Casualty Excess

Calculation of IBNR Carried at 12/31/89

Acc. Year	(1) Losses Reported as of 12/31/89	(2) Loss Development Factor	(3) Ultimate Losses (1) x (2)	(4) IBNR as of 12/31/89 (3) - (1)	(5) Calendar Year Earned Premium	(6) Ultimate Loss Ratio (3) / (5)
1981	31,250	1.2000	37,500	6,250	30,000	125.00%
1982	29,400	1.2500	36,750	7,350	46,500	79.03%
1983	30,154	1.3000	39,200	9,046	54,350	72.13%
1984	102,857	1.4000	144,000	41,143	130,050	110.73%
1985	252,000	1.5000	378,000	126,000	286,400	131.98%
1986	167,500	1.7000	284,750	117,250	332,400	85.66%
1987	79,875	2.0000	159,750	79,875	266,100	60.03%
1988	17,500	3.0000	52,500	35,000	142,400	36.87%
1989	30,000	6.0000	180,000	150,000	187,800	95.85%
	740,536		1,312,450	571,914	1,476,000	88.92%

Exhibit 8-c
(Low Attachments)

STEADY STATE REINSURANCE COMPANY OF OLD BED ROCK

Incurred Loss & Allocated Expense Incurred Development

Casualty Excess

Accident Year	1	2	3	4	5	6	7	8	9
1981	6,250	12,500	18,750	22,059	25,000	26,786	28,846	30,000	31,250
1982	6,125	12,250	18,375	21,618	24,500	26,250	28,269	29,400	
1983	6,533	13,067	19,600	23,059	26,133	28,000	30,154		
1984	24,000	48,000	72,000	84,706	96,000	102,857			
1985	63,000	126,000	189,000	222,353	252,000				
1986	47,458	94,917	142,375	167,500					
1987	26,625	53,250	79,875						
1988	8,750	17,500							
1989	30,000								

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Age to Age Development Factors

Accident Year	1	2	3	4	5	6	7	8
1981	2.0000	1.5000	1.1765	1.1333	1.0714	1.0769	1.0400	1.0417
1982	2.0000	1.5000	1.1765	1.1333	1.0714	1.0769	1.0400	
1983	2.0000	1.5000	1.1765	1.1333	1.0714	1.0769		
1984	2.0000	1.5000	1.1765	1.1333	1.0714			
1985	2.0000	1.5000	1.1765	1.1333				
1986	2.0000	1.5000	1.1765					
1987	2.0000	1.5000						
1988	2.0000							
1989								
Average	2.0000	1.5000	1.1765	1.1333	1.0714	1.0769	1.0400	1.0417
Cum.	6.0000	3.0000	2.0000	1.7000	1.5000	1.4000	1.3000	1.2500	1.2000

Selected Loss Development Factors

Average	2.0000	1.5000	1.1765	1.1333	1.0714	1.0769	1.0400	1.0417	
Cum.	6.0000	3.0000	2.0000	1.7000	1.5000	1.4000	1.3000	1.2500	1.2000

Exhibit 8-d
(Low Attachments)

STEADY STATE REINSURANCE COMPANY OF OLD BED ROCK

Comparison of Casualty Age to Age Development Factors

From 1987 RAA Study With Steady Re Casualty Excess Factors

Time in Years	(1) RAA Weighted Factor		(2) Steady Re Factor	(3) % Diff [(1) - (2)]/[(2) - 1]
2:1	2.605		2.000	60.5%
3:2	1.588		1.500	17.6%
4:3	1.300		1.176	70.0%
5:4	1.190		1.133	42.5%
6:5	1.109		1.071	52.6%
7:6	1.090		1.077	17.0%
8:7	1.055		1.040	37.5%
9:8	1.038		1.042	-8.8%
10:9	1.047	*		
11:10	1.038	*		
12:11	1.035	*		
13:12	1.022	*		
14:13	1.019	*		
15:14	1.027	*		
16:15	1.020	*		
17:16	1.029	*		
18:17	1.014	*		
19:18	1.019			
20:19	1.030			
. . .				
30:29	0.993			
31:30	1.002			
Average % difference				36.1%

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Notes: RAA factors are average of latest 10 years of factors, separately by line. Then the lines are weighted, using Steady Re losses as weights. RAA Med Mal factors beyond 18 were extrapolated.
Indicated Steady Re tail factor from 9 to 18 years equals
product of asterisked RAA factors, adjusted for the RAA to Steady Re differential: [(1 / 1.361) * .047 + 1] * [(1 / 1.361) * .038 + 1] * . . . = 1.200
Tail to 18 years chosen as 9 years beyond current development.

STEADY STATE REINSURANCE COMPANY OF OLD BED ROCK

Casualty Excess

Calculation of IBNR Carried at 12/31/89

Acc. Year	(1) Losses Reported as of 12/31/89	(2) Loss Development Factor	(3) Ultimate Losses (1) x (2)	(4) IBNR as of 12/31/88 (3) - (1)	(5) "Accident" Year Earned Premium	(6) Ultimate Loss Ratio (3) / (5)
1981	272,321	1.3770	375,000	102,679	500,000	75.00%
1982	249,900	1.4706	367,500	117,600	525,000	70.00%
1983	250,654	1.5639	392,000	141,346	560,000	70.00%
1984	289,524	1.6579	480,000	190,476	600,000	80.00%
1985	378,000	1.6667	630,000	252,000	630,000	100.00%
1986	262,417	2.1702	569,500	307,083	670,000	85.00%
1987	173,063	3.0769	532,500	359,438	710,000	75.00%
1988	85,000	6.1765	525,000	440,000	750,000	70.00%
1989	54,706	10.9677	600,000	545,294	800,000	75.00%
	2,015,584		4,471,500	2,455,916	5,745,000	77.83%

Note: (5) "Accident" year earned premiums obtained by triangulation.

Exhibit 10

STEADY STATE REINSURANCE COMPANY OF OLD BED ROCK

Casualty Excess

Bornhuetter-Ferguson Technique - as of 12/31/89

Acc. Year	(1) "Accident" Year Earned Premium	(2) Initial Expected Loss Ratio	(3) Initial Expected Losses (1) x (2)	(4) Expected Percentage Unreported Losses	(5) Expected Unreported Losses (3) x (4)	(6) Incurred Losses To Date	(7) Ultimate Losses (5) + (6)	(8) Ultimate Loss Ratio (7) / (1)
1981	500,000	75.00%	375,000	27.38%	102,679	272,321	375,000	75.00%
1982	525,000	72.50%	380,625	32.00%	121,800	249,900	371,700	70.80%
1983	560,000	72.50%	406,000	36.06%	146,394	250,654	397,048	70.90%
1984	600,000	75.00%	450,000	39.68%	178,571	289,524	468,095	78.02%
1985	630,000	90.00%	567,000	40.00%	226,800	378,000	604,800	96.00%
1986	670,000	92.50%	619,750	53.92%	334,179	262,417	596,596	89.04%
1987	710,000	80.00%	568,000	67.50%	383,400	173,063	556,463	78.38%
1988	750,000	72.50%	543,750	83.81%	455,714	85,000	540,714	72.10%
1989	800,000	72.50%	580,000	90.88%	527,118	54,706	581,824	72.73%
	5,745,000		4,490,125		2,476,655	2,015,584	4,492,239	78.19%

Notes:

(1) obtained by trangulating earned premium.
(2) obtained by estimating the premium adequacy level for each year.
(4) = 1-1/Cumulative age-to-ultimate factors from Exhibit 9.

Exhibit 11

STEADY STATE REINSURANCE COMPANY OF OLD BED ROCK

Casualty Excess

Comparison of Carried Versus Required IBNR as of 12/31/89

Acc. Year	(1) Triangle Ultimate Losses	(2) Bornhuetter-Ferguson Ultimate Losses	(3) Selected Ultimate Losses	(4) Losses Incurred as of 12/31/89	(5) Indicated IBNR (3) - (4)	(6) Carried IBNR as of 12/31/89
1981	375,000	375,000	375,000	272,321	102,679	108,929
1982	367,500	371,700	367,533	249,900	117,633	122,701
1983	392,000	397,048	392,079	250,654	141,425	147,363
1984	480,000	468,095	479,628	289,524	190,104	225,384
1985	630,000	604,800	628,425	378,000	250,425	368,208
1986	569,500	596,596	572,887	262,417	310,470	462,833
1987	532,500	556,463	538,491	173,063	365,428	448,726
1988	525,000	540,714	532,857	85,000	447,857	418,898
1989	600,000	581,824	581,824	54,706	527,118	691,202
	4,471,500	4,492,239	4,468,723	2,015,584	2,453,139	2,994,244

IBNR Redundancy: 541,106

1990 CASUALTY LOSS RESERVE SEMINAR
INTERMEDIATE CASE STUDY

LAYNE M. ONUFER, FCAS, MAAA

BASIC INFORMATION FOR XYZ INSURANCE COMPANY

XYZ Insurance Company is a stock insurance company writing general liability policies. It has been in business for 26 years, and has had a very stable book of business; in fact, in recent years, XYZ has continued to insure virtually the same group of insureds. It is an well-managed company, and has a healthy balance sheet (Exhibit 1).

XYZ has employed its own in-house actuary in the past who was responsible for conducting reserve reviews. This individual has recently left the company, and XYZ has employed you, a consulting actuary, to conduct its December 31, 1989 reserve review.

XYZ's actuary calculated reserves using both paid and incurred loss development factor methods, using data for the entire general liability book.

XYZ is a bit concerned about the last two years of loss development. Exhibits 2 and 3 show incurred and paid loss development, respectively, for the past ten accident years, along with loss development factors. XYZ's selected loss development factors are also displayed. In Exhibit 2, the latest diagonal of incurred factors is higher than for prior years, while the diagonal prior to the latest is lower than earlier years. The latest paid diagonal (Exhibit 3) is somewhat higher than for prior years, but the diagonal prior to the latest doesn't seem to be much different from earlier years.

The resulting estimate of ultimate losses using the paid method is higher than the incurred method for the last few years. Wishing to be conservative, XYZ management's selected ultimate loss gives a 75% weight to the paid methodology and 25% to the incurred for accident years 1987 and 1988, as shown in Exhibit 4.

XYZ hired a new claims manager in 1987. The new manager is a cautious fellow who believes in waiting for complete facts concerning injuries before setting reserves for claims. He also believes in aggressively pursuing claims to insure that

XYZ ultimately pays only what is necessary, when it is necessary, rather than simply setting a conservative reserve and waiting for cases to close. He has also just completed work on a new database which allows development on individual claims to be tracked by report date.

The underwriting department reiterates the fact that their client base has remained constant in the recent past. Their clients are companies who manufacture a variety of machine components; some of their clients concentrate on the more heavy-duty versions of these components which are used by large industrial corporations. Their clients have seen steady revenue growth over the past few years; those companies manufacturing the heavy-duty components have realized faster growth in revenues due to increase demand by the large industrial market segment.

CONSIDERATIONS

Issues that you may want to consider when analyzing XYZ's reserves include:

1) Claims handling practices used in the claims department

2) Characteristics of XYZ's client base

This case study is based on Gregory Graves' 1989 CLRS presentation.

X Y Z I N S U R A N C E C O M P A N Y

EXHIBIT 1

BALANCE SHEET AT 12/31/88
(in thousands)

A S S E T S		L I A B I L I T I E S / S U R P L U S	
BONDS	$373,512	LOSS/LAE RESERVES	$306,754
STOCKS	$67,511	UNEARNED PREMIUM RESERVE	$104,432
CASH	$9,050	OTHER LIABILITIES	$33,355
INVESTED ASSETS	$450,073		
AGENTS BALANCES	$29,300	TOTAL LIABILITIES	$444,541
OTHER ASSETS	$50,125	POLICYHOLDER SURPLUS	$84,957
TOTAL ASSETS	$529,498	TOTAL LIABILITIES / SURPLUS	$529,498

****

KEY RATIOS:	SCORE:	BEST'S TEST RESULT:
PREMIUM-TO-SURPLUS:	2.89	PASS
AGENTS BALANCES TO SURPLUS:	34.5%	PASS
RESERVES-TO-SURPLUS:	3.61	
LIABILITIES/LIQUID ASSETS:	0.99	PASS
CHANGE IN SURPLUS:	10.0%	PASS
ONE-YR RESERVE DEVELOPMENT TO SURPLUS:	15.0%	PASS

XYZ INSURANCE COMPANY

EXHIBIT 2

ALL LINES COMBINED

CUMULATIVE CASE INCURRED LOSSES AND ALAE (000's omitted)

ACC YR	12	24	36	48	60	72	84	96	108	120	PROJECTED ULTIMATE LOSSES & ALAE
1979	11,961	24,624	31,112	36,315	37,447	38,862	40,060	40,185	40,185	40,185	40,185
1980	13,674	27,825	35,777	42,438	43,779	45,149	46,519	46,663	46,663		46,663
1981	16,357	33,012	40,944	48,570	50,119	52,006	53,003	53,403			53,403
1982	18,482	37,978	47,477	56,639	58,782	59,925	61,373				61,655
1983	22,633	44,538	55,101	64,311	66,228	68,314					70,420
1984	24,312	50,724	63,534	72,022	77,087						81,970
1985	28,766	57,440	69,667	83,515							92,382
1986	33,828	61,870	86,283								112,220
1987	31,595	77,793									128,441
1988	40,408										137,997

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LOSS DEVELOPMENT FACTORS

ACC YR	12 24	24 36	36 48	48 60	60 72	72 84	84 96	96 108	108 120	
1979	2.059	1.264	1.167	1.031	1.038	1.031	1.003	1.000	1.000	
1980	2.035	1.286	1.186	1.032	1.031	1.030	1.003	1.000		
1981	2.018	1.240	1.186	1.032	1.038	1.019	1.008			
1982	2.055	1.250	1.193	1.038	1.019	1.024				
1983	1.968	1.237	1.167	1.030	1.031					
1984	2.086	1.253	1.134	1.070						
1985	1.997	1.213	1.199							
1986	1.829	1.395								
1987	2.462									
SELEC	2.068	1.269	1.176	1.040	1.032	1.026	1.005	1.000	1.000	1.000
CUM S	3.415	1.651	1.301	1.106	1.063	1.031	1.005	1.000	1.000	1.000

XYZ INSURANCE COMPANY

EXHIBIT 3

ALL LINES COMBINED

CUMULATIVE PAID LOSSES AND ALAE (000's omitted)

ACC YR	12	24	36	48	60	72	84	96	108	120	PROJECTED ULTIMATE LOSSES & ALAE
1979	5,036	16,398	25,839	31,117	34,687	37,134	38,785	39,666	40,060	40,185	40,185
1980	5,758	18,610	29,406	35,854	40,342	43,268	45,130	46,091	46,519		46,664
1981	6,887	22,146	34,423	41,366	46,283	49,625	51,803	52,844			53,518
1982	7,782	25,309	39,695	47,985	53,981	57,865	60,192				62,262
1983	9,529	30,163	46,439	55,359	61,635	65,926					71,120
1984	10,237	33,614	53,029	63,831	71,526						82,668
1985	12,112	38,688	60,557	73,553							95,262
1986	14,243	46,791	74,793								116,645
1987	17,738	58,999									144,450
1988	22,685										180,558

LOSS DEVELOPMENT FACTORS

ACC YR	12 24	24 36	36 48	48 60	60 72	72 84	84 96	96 108	108 120	
1979	3.256	1.576	1.204	1.115	1.071	1.044	1.023	1.010	1.003	
1980	3.232	1.580	1.219	1.125	1.073	1.043	1.021	1.009		
1981	3.216	1.554	1.202	1.119	1.072	1.044	1.020			
1982	3.252	1.568	1.209	1.125	1.072	1.040				
1983	3.165	1.540	1.192	1.113	1.070					
1984	3.284	1.578	1.204	1.121						
1985	3.194	1.565	1.215							
1986	3.285	1.598								
1987	3.326									
SELEC	3.251	1.570	1.204	1.121	1.071	1.043	1.021	1.010	1.003	1.000
CUM S	7.959	2.448	1.560	1.295	1.156	1.079	1.034	1.013	1.003	1.000

XYZ INSURANCE COMPANY EXHIBIT 4

SUMMARY OF ULTIMATE LOSSES AND CARRIED RESERVES
LOSS DEVELOPMENT METHOD (000's omitted)

ALL LINES COMBINED

ACC YR	PAID BASIS	INCURRED BASIS	SELECTED
1979	40,185	40,185	40,185
1980	46,664	46,663	46,663
1981	53,518	53,403	53,461
1982	62,262	61,655	61,958
1983	71,120	70,420	70,770
1984	82,668	81,970	82,319
1985	95,262	92,382	93,822
1986	116,645	112,220	114,433
1987	144,450	128,441	140,448
1988	180,558	137,997	169,918
TOTAL	893,332	825,335	873,976

LESS: INCURRED TO DATE (635,024)

XYZ HELD IBNR RESERVE: 238,953

NOTE: PAID AND INCURRED WEIGHTED EQUALLY FOR AYs 1986 + PRIOR;
PAID WEIGHTED 75% FOR AYs 1987, 1988.

XYZ INSURANCE COMPANY EXHIBIT 5

AVERAGE CLAIM COST FOR CLAIMS SETTLED IN INTERVAL INDICATED

ACTUAL RESULTS

AGE OF CLAIMS IN YEARS FROM START OF REPORT YEAR:

AGE (YEARS)	1985	1986	1987	1988
0	18,778	20,565	22,646	24,853
1	18,797	20,585	22,671	
2	19,129	20,948		
3	20,094			

PERCENTAGE OF REPORT YEAR TOTAL CLAIMS INCURRED SETTLED IN INTERVAL INDICATED

ACTUAL RESULTS

AGE OF CLAIMS IN YEARS FROM START OF REPORT YEAR:

AGE (YEARS)	1985	1986	1987	1988
0	37.3%	37.3%	37.4%	37.4%
1	84.6%	84.5%	84.9%	
2	97.3%	97.3%		
3	100.0%			

XYZ INSURANCE COMPANY EXHIBIT 6

AVERAGE CLAIM COST FOR CLAIMS SETTLED IN INTERVAL INDICATED

PROJECTED RESULTS

AGE OF CLAIMS IN YEARS FROM START OF REPORT YEAR:

AGE (YEARS)	1985	1986	1987	1988
0	18,778	20,565	22,646	24,853
1	18,797	20,585	22,671	24,881
2	19,129	20,948	23,116	25,370
3	20,094	21,992	24,483	26,868

PERCENTAGE OF REPORT YEAR TOTAL CLAIMS INCURRED SETTLED IN INTERVAL INDICATED

PROJECTED RESULTS

AGE OF CLAIMS IN YEARS FROM START OF REPORT YEAR:

AGE (YEARS)	1985	1986	1987	1988
0	37.3%	37.3%	37.4%	37.4%
1	84.6%	84.5%	84.9%	84.8%
2	97.3%	97.3%	97.4%	97.4%
3	100.0%	100.0%	100.0%	100.0%

XYZ INSURANCE COMPANY
CALCULATION OF REPORT YEAR RESERVE POSITIONS

EXHIBIT 7

	1985	1986	1987	1988
ACTUAL AVERAGE INCURRED (12/31/88)	18,867	20,662	22,477	17,791
ESTIMATED AVERAGE INCURRED	18,867	20,662	22,765	24,983
MARGIN PER CLAIM INCURRED	0	(0)	(288)	(7,193)
NUMBER OF CLAIMS INCURRED	4,227	4,385	4,932	5,787
REPORT YEAR RESERVE POSITION (in thousands)	0	(0)	(1,420)	(41,624)

XYZ INSURANCE COMPANY - RESERVE EQUITY POSITION EXHIBIT 8
(in thousands)

DECEMBER 31, 1985 RESERVE

REPORT YEAR	OUTSTANDING RESERVE @12/31/85	EMERGED SAVINGS @12/31/88	CURRENT POSITION	RESERVE POSITION	STRENGTHENING /(SLIPPAGE)
1982 AND PRIOR	(0)	0	0	0	
1983	1,698	0	0	0	
1984	10,798	0	0	0	
1985	46,098	(4,050)	0	(4,050)	
TOTAL	58,594	(4,050)	0	(4,050)	

DECEMBER 31, 1986 RESERVE

REPORT YEAR	OUTSTANDING RESERVE @12/31/86	EMERGED SAVINGS @12/31/88	CURRENT POSITION	RESERVE POSITION	
1982 AND PRIOR	(0)	0	0	0	
1983	0	0	0	0	
1984	2,019	0	0	0	
1985	12,576	0	0	0	
1986	52,397	(4,602)	(0)	(4,602)	
TOTAL	66,993	(4,602)	0	(4,602)	(552)

DECEMBER 31, 1987 RESERVE

REPORT YEAR	OUTSTANDING RESERVE @12/31/87	EMERGED SAVINGS @12/31/88	CURRENT POSITION	RESERVE POSITION	
1982 AND PRIOR	(0)	0	0	0	
1983	0	0	0	0	
1984	0	0	0	0	
1985	2,301	0	0	0	
1986	14,340	0	(0)	(0)	
1987	38,147	(30,911)	(1,420)	(32,332)	
TOTAL	54,788	(30,911)	(1,420)	(32,332)	(27,729)

DECEMBER 31, 1988 RESERVE

REPORT YEAR	OUTSTANDING RESERVE @12/31/88	EMERGED SAVINGS @12/31/88	CURRENT POSITION	RESERVE POSITION	
1982 AND PRIOR	(0)		0	0	
1983	0		0	0	
1984	0		0	0	
1985	0		0	0	
1986	2,640		(0)	(0)	
1987	16,024		(1,420)	(1,420)	
1988	49,137		(41,624)	(41,624)	
TOTAL	67,802	0	(43,044)	(43,044)	(10,713)

XYZ INSURANCE COMPANY EXHIBIT 9

LINE OF BUSINESS 1: LIGHTER M&C

CUMULATIVE CASE INCURRED LOSSES AND ALAE (000's omitted)

ACC YR	12	24	36	48	60	72	84	96	108	120	PROJECTED ULTIMATE LOSSES & ALAE
1979	5,612	13,167	17,541	19,695	20,201	20,222	20,222	20,222	20,222	20,222	20,222
1980	6,752	15,063	19,920	22,679	23,371	23,401	23,401	23,401	23,401		23,401
1981	7,642	17,781	23,087	26,078	26,869	26,903	26,903	26,903			26,903
1982	9,187	20,575	26,531	29,978	30,891	30,931	30,931				30,931
1983	10,611	24,031	31,013	34,567	35,456	35,493					35,493
1984	11,775	27,397	35,982	40,251	41,284						41,333
1985	13,600	30,933	41,048	46,724							48,093
1986	15,388	36,104	48,098								55,818
1987	18,143	41,739									63,609
1988	21,383										74,791

LOSS DEVELOPMENT FACTORS

ACC YR	12 24	24 36	36 48	48 60	60 72	72 84	84 96	96 108	108 120	
1979	2.346	1.332	1.123	1.026	1.001	1.000	1.000	1.000	1.000	
1980	2.231	1.322	1.138	1.031	1.001	1.000	1.000	1.000		
1981	2.327	1.298	1.130	1.030	1.001	1.000	1.000			
1982	2.240	1.289	1.130	1.030	1.001	1.000				
1983	2.265	1.291	1.115	1.026	1.001					
1984	2.327	1.313	1.119	1.026						
1985	2.274	1.327	1.138							
1986	2.346	1.332								
1987	2.301									
SELEC	2.295	1.313	1.127	1.028	1.001	1.000	1.000	1.000	1.000	1.000
CUM S	3.498	1.524	1.160	1.029	1.001	1.000	1.000	1.000	1.000	1.000

XYZ INSURANCE COMPANY

EXHIBIT 10

LINE OF BUSINESS 1: LIGHTER M&C

CUMULATIVE PAID LOSSES AND ALAE (000's omitted)

ACC YR	12	24	36	48	60	72	84	96	108	120	PROJECTED ULTIMATE LOSSES & ALAE
1979	3,150	10,114	15,608	18,107	19,404	20,052	20,222	20,222	20,222	20,222	20,222
1980	3,790	11,732	17,751	20,683	22,338	23,165	23,401	23,401	23,401		23,401
1981	4,290	13,689	20,816	23,988	25,749	26,630	26,903	26,903			26,903
1982	5,158	16,007	23,966	27,564	29,599	30,616	30,931				30,931
1983	5,957	18,638	28,017	32,028	34,137	35,191					35,535
1984	6,611	21,093	32,246	37,153	39,703						41,454
1985	7,635	23,963	36,546	42,622							47,716
1986	8,639	27,733	42,798								55,370
1987	10,185	32,233									63,462
1988	12,004										74,666

LOSS DEVELOPMENT FACTORS

ACC YR	12 24	24 36	36 48	48 60	60 72	72 84	84 96	96 108	108 120	
1979	3.210	1.543	1.160	1.072	1.033	1.008	1.000	1.000	1.000	
1980	3.095	1.513	1.165	1.080	1.037	1.010	1.000	1.000		
1981	3.191	1.521	1.152	1.073	1.034	1.010	1.000			
1982	3.104	1.497	1.150	1.074	1.034	1.010				
1983	3.129	1.503	1.143	1.066	1.031					
1984	3.191	1.529	1.152	1.069						
1985	3.139	1.525	1.166							
1986	3.210	1.543								
1987	3.165									
SELEC	3.159	1.522	1.156	1.072	1.034	1.010	1.000	1.000	1.000	1.000
CUM S	6.220	1.969	1.294	1.120	1.044	1.010	1.000	1.000	1.000	1.000

XYZ INSURANCE COMPANY EXHIBIT 11

LINE OF BUSINESS 2: HEAVIER M&C

CUMULATIVE CASE INCURRED LOSSES AND ALAE (000's omitted)

ACC YR	12	24	36	48	60	72	84	96	108	120	PROJECTED ULTIMATE LOSSES & ALAE
1979	3,359	8,291	11,949	15,320	16,963	18,286	19,538	19,931	19,962	19,962	19,962
1980	3,504	9,224	13,869	18,094	20,072	21,406	22,775	23,226	23,262		23,262
1981	4,626	11,067	15,874	20,586	22,863	24,632	26,076	26,501			26,542
1982	4,675	12,529	18,571	24,371	27,355	28,972	30,442				31,061
1983	6,363	15,031	21,447	27,441	30,658	32,820					35,512
1984	6,459	16,724	24,350	31,620	35,803						41,462
1985	7,975	19,338	28,261	36,790							47,570
1986	9,983	25,321	38,185								64,014
1987	13,452	36,054									88,499
1988	19,025										118,131

LOSS DEVELOPMENT FACTORS

ACC YR	12 24	24 36	36 48	48 60	60 72	72 84	84 96	96 108	108 120	
1979	2.468	1.441	1.282	1.107	1.078	1.068	1.020	1.002	1.000	
1980	2.632	1.504	1.305	1.109	1.066	1.064	1.020	1.002		
1981	2.393	1.434	1.297	1.111	1.077	1.059	1.016			
1982	2.680	1.482	1.312	1.122	1.059	1.051				
1983	2.362	1.427	1.279	1.117	1.071					
1984	2.589	1.456	1.299	1.132						
1985	2.425	1.461	1.302							
1986	2.536	1.508								
1987	2.680									
SELEC	2.530	1.464	1.297	1.117	1.070	1.060	1.019	1.002	1.000	1.000
CUM S	6.209	2.455	1.676	1.293	1.158	1.082	1.020	1.002	1.000	1.000

XYZ INSURANCE COMPANY

EXHIBIT 12

LINE OF BUSINESS 2: HEAVIER M&C

CUMULATIVE PAID LOSSES AND ALAE (000's omitted)

ACC YR	12	24	36	48	60	72	84	96	108	120	PROJECTED ULTIMATE LOSSES & ALAE
1979	1,886	6,284	10,231	13,010	15,283	17,082	18,563	19,443	19,837	19,962	19,962
1980	1,967	6,878	11,655	15,171	18,004	20,103	21,729	22,690	23,118		23,264
1981	2,597	8,457	13,607	17,378	20,533	22,995	24,900	25,942			26,616
1982	2,624	9,301	15,729	20,422	24,382	27,249	29,261				31,357
1983	3,572	11,525	18,422	23,330	27,499	30,736					35,608
1984	3,626	12,522	20,782	26,677	31,823						41,214
1985	4,477	14,725	24,010	30,931							47,460
1986	5,605	19,058	31,994								63,027
1987	7,552	26,766									86,936
1988	10,681										117,728

LOSS DEVELOPMENT FACTORS

ACC YR	12 24	24 36	36 48	48 60	60 72	72 84	84 96	96 108	108 120	
1979	3.332	1.628	1.272	1.175	1.118	1.087	1.047	1.020	1.006	
1980	3.496	1.694	1.302	1.187	1.117	1.081	1.044	1.019		
1981	3.257	1.609	1.277	1.182	1.120	1.083	1.042			
1982	3.544	1.691	1.298	1.194	1.118	1.074				
1983	3.226	1.598	1.266	1.179	1.118					
1984	3.453	1.660	1.284	1.193						
1985	3.289	1.631	1.288							
1986	3.400	1.679								
1987	3.544									
SELEC	3.394	1.649	1.284	1.185	1.118	1.081	1.044	1.020	1.006	1.000
CUM S	11.022	3.248	1.970	1.534	1.295	1.159	1.072	1.026	1.006	1.000

XYZ INSURANCE COMPANY

EXHIBIT 13

SUMMARY OF ULTIMATE LOSSES AND RESERVES
LOSS DEVELOPMENT METHOD (000's omitted)

ACC YR	LINE OF BUSINESS 1 LIGHTER M&C PAID BASIS	LINE OF BUSINESS 1 LIGHTER M&C INCURRED BASIS	LINE OF BUSINESS 1 LIGHTER M&C SELECTED	LINE OF BUSINESS 2 HEAVIER M&C PAID BASIS	LINE OF BUSINESS 2 HEAVIER M&C INCURRED BASIS	LINE OF BUSINESS 2 HEAVIER M&C SELECTED	ALL LINES SELECTED ULTIMATE
1979	20,222	20,222	20,222	19,962	19,962	19,962	40,185
1980	23,401	23,401	23,401	23,264	23,262	23,263	46,664
1981	26,903	26,903	26,903	26,616	26,542	26,579	53,482
1982	30,931	30,931	30,931	31,357	31,061	31,209	62,140
1983	35,535	35,493	35,514	35,608	35,512	35,560	71,074
1984	41,454	41,333	41,394	41,214	41,462	41,338	82,731
1985	47,716	48,093	47,905	47,460	47,570	47,515	95,419
1986	55,370	55,818	55,594	63,027	64,014	63,520	119,114
1987	63,462	63,609	63,535	86,936	88,499	87,717	151,253
1988	74,666	74,791	74,728	117,728	118,131	117,929	192,658
TOTAL	419,659	420,593	420,126	493,170	496,015	494,592	914,719

LESS: INCURRED TO DATE	(635,024)
NEEDED IBNR RESERVE:	279,695
HELD IBNR RESERVE:	238,953
SHORT/(OVER):	40,742

NOTE: PAID AND INCURRED WEIGHTED EQUALLY FOR ALL AYs

X Y Z I N S U R A N C E C O M P A N Y

EXHIBIT 14

RESTATED BALANCE SHEET AT 12/31/88
(in thousands)

A S S E T S		L I A B I L I T I E S / S U R P L U S	
BONDS	$373,512	LOSS/LAE RESERVES	$347,496
STOCKS	$67,511	UNEARNED PREMIUM RESERVE	$104,432
CASH	$9,050	OTHER LIABILITIES	$33,355
INVESTED ASSETS	$450,073		
AGENTS BALANCES	$29,300	TOTAL LIABILITIES	$485,283
OTHER ASSETS	$50,125	POLICYHOLDER SURPLUS	$44,215
TOTAL ASSETS	$529,498	TOTAL LIABILITIES / SURPLUS	$529,498

****

KEY RATIOS:	SCORE:	BEST'S TEST SCORE:
PREMIUM-TO-SURPLUS:	5.55	FAIL
AGENTS BALANCES TO SURPLUS:	66.3%	FAIL
RESERVES-TO-SURPLUS:	7.86	
LIABILITIES/LIQUID ASSETS:	1.08	FAIL
CHANGE IN SURPLUS:	-42.6%	FAIL
ONE-YR RESERVE DEVELOPMENT TO SURPLUS:	38.5%	FAIL

EXHIBIT 15

XYZ INSURANCE COMPANY

RELATIVE EFFECTS OF:

CHANGES IN RESERVE ADEQUACY LEVELS
CHANGES IN MIX OF BUSINESS
(000'S omitted)

I. PAID METHODOLOGY

NO "CHANGE IN RESERVE ADEQUACY" EFFECT

ULTIMATE LOSSES, ALAE - ALL ACCIDENT YEARS

SUBGROUPS ANALYZED SEPARATELY	$912,829
SUBGROUPS ANALYZED TOGETHER	$893,332
DIFFERENCE (CHANGE IN MIX OF BUSINESS)	$ 19,497
AS PERCENTAGE OF HELD RESERVES	6.4%

II. INCURRED METHODOLOGY

ULTIMATE LOSSES, ALAE - ALL ACCIDENT YEARS

SUBGROUPS ANALYZED SEPARATELY WITH ADJUSTMENT FOR RESERVE ADEQUACY	$916,608
SUBGROUPS ANALYZED TOGETHER WITH ADJUSTMENT FOR RESERVE ADEQUACY	$898,017
DIFFERENCE (CHANGE IN MIX OF BUSINESS)	$ 18,591
AS PERCENTAGE OF HELD RESERVES	6.1%
SUBGROUPS ANALYZED TOGETHER, NO ADJUSTMENT FOR RESERVE ADEQUACY	$825,335
DIFFERENCE (CHANGE IN MIX OF BUSINESS)	$ 72,682
AS PERCENTAGE OF HELD RESERVES	23.7%
BOTH EFFECTS AS PERCENTAGE OF HELD RESERVES	29.8%

1990 CASUALTY LOSS RESERVE SEMINAR

5E: LOSS RESERVING FOR SMALL INSURANCE COMPANIES

Moderator

Patrick J. Crowe
Kentucky Farm Bureau Insurance Cos.

Panel

Grover M. Edie
John Deere Insurance Company

Jeffrey R. Jordan, Sr.
Coopers & Lybrand

Arlene F. Woodruff
Farm Family Mutual Insurance Company

MR. CROWE: I'm sure that all of you are in the correct section. I thought I'd forewarn you that this is Session 5E, Loss Reserving for Small Insurance Companies. The objective of our session today is as stated in the program you received, but I would like to repeat it just to let you know what we're trying to accomplish this morning.

Actuaries working for small insurance companies face loss reserving challenges which may require special techniques. This session today will focus on some special situations encountered by small company actuaries, including availability of data, data processing support and communication of results to top management.

The panelists today will discuss the role of the actuarial department in the small insurance company. They will also discuss how they have developed practical adaptations of loss reserving systems to best serve their company environments.

I'm very proud of the panel that the CAS Loss Reserve Seminar has been able to put together for today's session. These people today will share experiences with you that they have encountered working in or for small insurance companies.

First of all, I should introduce myself. My name is Patrick Crowe, and I'm Vice President of Market Research and Actuary for the Kentucky Farm Bureau Insurance Companies. I guess the reason why I'm up here is because I also, as these people do, represent small insurance companies. I guess that's my claim to fame.

The Kentucky Farm Bureau Insurance Companies is a one-state operation. We are primarily a personal lines and we write approximately $240 million premiums in one state. So, you can see, we can be characterized as a highly concentrated insurer in a very well-defined geographical area.

Our first speaker this morning is Arlene Woodruff. Arlene is a fellow of the Casualty Actuarial Society and a member of the American Academy of Actuaries. She is the actuary for Farm Family Mutual Insurance Companies, which also happens to be one of my sister farm bureau companies. Although financially independent we're considered sister companies.

Arlene's operation is a little bit different than mine. Their company is a little bit smaller, but they write premiums in about 10 northeastern states, states that have the illustrious distinction of being Massachusetts, New Jersey, Maine, West Virginia, New York, Connecticut, New Hampshire, Vermont, etc.

I'm not here to tell jokes, but I have a story that I hope you find funny, and it happens to be a true story. I thought of it when I thought of Arlene working in New Jersey. I have a daughter, Elizabeth, who is in the sixth grade and she has a close friend of hers.

Like I said, it's a true story. Her name is Elizabeth, too. They are like two peas in a pod. They dress alike. They both have the same sarcasm of every living thing in the world. One day I asked the other Elizabeth's parents, why do you think these two people are so sarcastic about everything?

He said, you have to understand our Elizabeth was born and raised in New Jersey. She was raised to think that civilization ends on the borders of New Jersey. I immediately replied to him that we in the insurance industry feel the same way.

Our second speaker today is Jeff Jordon. Jeff Jordon is a senior actuarial consultant for Coopers & Lybrand in the Atlanta, Georgia, office. You may wonder why in the world is a consulting actuary on this panel. It's a very important reason. Jeff spends a considerable amount of his time providing actuarial support services for small insurance companies and self-insurance groups. Therefore, he has an extensive background in the problems that small insurance company actuaries face every day.

Our third speaker, Grover Edie, is Vice President/Actuary of John Deere Insurance Company. Grover's company is similar to my company. They write about $200 million, but that's where it ends. His company is what I would call a niche company in the sense they specialize in the farm implement dealerships, and their geographical area is much, much larger than I can even envision. They have operations in all 50 states.

So you have representations here of highly concentrated, onestate operations, regional operations, and niche writers in a commercial environment.

Before we begin this morning, although our presentations have been prepared, we'd like to get an idea of who our audience is, because the speakers would like to direct their comments accordingly. What I've done is I've tried to break down the industry group into three groups.

I call medium to large size groups, companies of $500 million or more. We would like to know the number of people who work for companies of $500 million or more, people who work for companies of $500 million or less, and the third group being those people who are employed by actuarial and accounting firms.

First, let's have a show of hands of people who work for companies with $500 million premium or more.

(A show of hands.)

MR. CROWE: Well, there's just a few. Last year when we had this session, we had about 20 percent of the group. I thought it was because people in the large companies want to learn how to really establish loss reserve procedures from in small companies.

Second group, how many people here are from small insurance companies of under $500 million?

(A show of hands.)

MR. CROWE: Well, that's great. That's a relief. The last group, how many people here are from accounting and actuarial firms?

(A show of hands.)

MR. CROWE: That's good, too. The largest group is the small insurance companies. Secondly, we'd like to have an idea of the background experience. I broke that into four groups; members of the Casualty Actuarial Society, actuarial students, loss reserve specialists, and those people working in accounting departments. So, could I first have a show of hands of people who are members of the Casual Actuarial Society?

(A show of hands.)

MR. CROWE: Those people who are actuarial students?

(A show of hands.)

MR. CROWE: Those people working in accounting departments?

(A show of hands.)

MR. CROWE: We've got a very good representation. The last group is loss reserve specialists.

(A show of hands.)

MR. CROWE: There's a couple people who know what that is. Maybe we can ask them later what a loss reserve specialist is. This is not a nuts and bolts session. I think the loss reserve seminar has done a great job providing you with basic technique shops, with intermediate workshops and also with advanced workshops.

Our goal here is to attempt to make the loss reserving process alive, just show you real life experiences that people go through every day working in actuarial departments for small companies. See, in large companies it is a little bit different animal. You may have large departments that their main function is reserving. Another department's main function might be research and development. another one might be product planning. Another one might be pricing.

Well, in small companies of our size, we do not have these luxuries. Generally, the people in our company have to perform about four or five functions. As Arlene says, she's the jack of all trades in her company, and I feel the same way. I feel like I'm a master of nothing and a dilettante in many different areas.

So the point is, and I mention this to Jeff often when he comes down to look at our reserves is that reserving in our company -- I hate to say it -- is a necessary evil. We don't have any time for loss reserving. So my first thought is how can I set loss reserves efficiently as possible so we can get back to how to survive, how to make a dollar this year, how to get those prices changed, and how to combat our marketing problems we're having. That's our main concerns.

But loss reserving is still very important for us, and I'll explain to you why later. My reason is that, sure we must find the time and resources for loss reserve analyses, but we also have to find time for other items. On the other hand, though, loss reserving is not only important to be accurate, and I keep preaching that to our company, the other thing for us to be is timely.

They have to be right on the spot. My responsibility to our chief executive officer and the vice president of our underwriting departments, investment departments, claims departments, and all the others, is that they have the most accurate information in the most timely manner possible. Only then can they make the most important decisions to run our operations. So, to me, another important factor is it's got to be timely.

I think my company and the industry is in the worst underwriting cycle in the history of insurance.

We're planning accordingly. This is the worst. We don't know if we're in the beginning of it, the middle of it, or the end of it. All we know is we're in the midst of the worst underwriting cycle we have ever gone through.

On the other hand, don't have too much pity for us because we're an extremely financially strong company. We want to maintain that position. Our concern is, we may not end up financially strong when it's over with.

The point is that if the underwriting cycle is one of the worst, it is very important for us to be able to worry about 1991 problems. So many companies are worrying about 1989 problems, et cetera. I want our company to worry about the problems of this year and tomorrow.

Yesterday's problems are all gone, and I feel sorry for companies that have to worry about those. You really can't do much about today's. The fun of the whole business is worrying about tomorrow's problems and opportunities. That's where setting timely reserves comes in. That's very, very important.

I'll give you an example. Last year end, when we set our reserves for our company, I think we did a very good job. I think they are reasonably accurate. I heard a term yesterday,

"representative reasonableness." I kind of like that term. I'm still not so sure what it means, but I think our reserves are representative reasonable.

As we did our tests throughout the year, they seemed to be fairly accurate. But we were really puzzled at last year end because we're noticing that for all of our automobile coverages and all of our property coverages, not only was severity going up, so was the frequency of the claims. They are accelerating at a frightening level, and I don't know if it is also true for your company.

So what came to my mind was, okay, we have the '89 reserve that's accurate, but what's really important, is 1990? I want to make sure that reserve is accurate. I want to make sure it's timely. So we estimated in 12/89 not only the '89 reserve based on historical patterns, but our changes in patterns due to winter storms and frequencies and severities.

Sure, we can't accurately estimate every trend, but we should put our indications in the financial statements as fast as possible. So what we did was we estimated what our additional reserves should be at the end of 1990: And then we projected what the reserves would be at the end of the year for the above changes.

And then we went through -- a mechanized reserving procedure. We started changing the factors in our formulas every month so when the financial statements come out, they will react to what we think is happening in 1990, not '89 or prior, because we think we've got that all taken care of.

As it turns out now, after the first eight months of the year, we were pretty accurate in predicting the changes in loss trends in our company. Now, why is that so important? Why I think it is so important is that our company management was able to start making decisions in January and February of this year on what's happening in this phase of the cycle, and not wait until December or March 31 or June 30 or the following year. That's where the timeliness comes in that's so important.

That's where the speed of this industry comes in. So we can help the pricing people, et cetera. You've got to be timely so your people can start planning as early as possible for whatever your problem is. That's enough diatribe on that.

What I want to do now is to introduce our speakers. Our first speaker today is Arlene Woodruff who, as I mentioned, is the actuary for Farm Family Insurance Company. Arlene is a fellow of the Casualty Actuary Society, and a member of the American Academy of Actuaries. She also has a degree in mathematics from the University of Connecticut. She started out in the actuarial field about 11 years ago with the Traveler's Insurance Company as an intern and then also as an actuarial analyst. Later on she

moved to the Insurance Services Office where she worked in pricing automobile coverages.

In 1981, she moved to the Farm Family Mutual Insurance Company, Albany, New York. Her responsibilities are rate making, loss reserving, data analysis, private development, special projects, and, as she says, jack of all trades. What Arlene is going to focus on the actuarial role in utilizing available data for loss and loss adjustment expense reserves. She is going to comment on data processing support in her company and, as she says, possibly nonsupport.

Arlene.

MS. WOODRUFF: Thank you, Pat. Good morning. As Pat said, yes, we're jack of all trades in small companies, as many of you know. In some cases, we even produce rate manuals when needed, do a lot of photocopying, and a lot of other nonessential actuarial duties. But they are essential to a small company.

We're a little bit different.- We don't have the resources. The first thing that you think of with a small company is credibility. That is a major item, and it's one item that I'm not going to get into right now. I believe Jeff is going to talk a little bit more about the data itself. What I'm going to talk about first is the other problems that a small company has.

In a small company, an actuary is a luxury. In the large companies, they need them. In a small company, when I started nine years ago at Farm Family, I was the only actuary there - with three years of experience, and three exams. They thought that was great. In the last nine years, we have four people in our department, and all of a sudden, we're becoming essential. If we were to leave now, there would be a big gap in the company. We've of grown around the company, and It's making an impression. They're relying on actuaries more. They're starting to see the usefulness of it.

The luxury is going and the essentialness is coming in. The one thing about the actuarial department, though, if everything is working, they don't like to put a lot of extra resources in it. If you can get the annual statement reserves out year after year after year, that's fine. You may say, "Things are changing. Next year I might need another person". The normal reply is "Oh, but you've been doing great for this many years. No problem. You can do it next year. Maybe you can; maybe you can't. But you give it a shot.

One thing that you have in a small company that you may not have in a large company is lack of time. In our company, this showed up very definitely in 1989. There we're some major changes to the annual statement. We read about them in the beginning of the year as we were finishing up the '88 annual statement and started to plan a little bit in advance. We had just wrapped up the '88

annual statement. We finally got the auditors all settled and had everything set up for me to go out on maternity leave. That really wrecks things in a small company. When somebody is gone for two, three, or four months, there is a hole. The maternity leave actually ended up being a lot longer than we expected and I came back to a whole bunch of problems.

The first thing we hit was New Jersey. Does anybody write in New Jersey here? A couple of hands. New Jersey auto? Excess profits report? Oh, smiling, I can see that now. In 1989, there were some changes to the Excess Profits Report. It used to be about a 20-page exhibit but between the Excess Profits Report, the DOI Report, and the Informational Filing Act, I think it was close to 200 exhibits. I came back in the middle of June, and It was due on July 1st. Nobody else knew what to do with it, so it sat on my desk. What do you do? You pull all four people off whatever they are working on and you say, "You're doing this for four, five, or six weeks, whatever it takes." We were a little late, but we got it out. Unfortunately, by then, we were in the middle of July.

The next crisis that hit while I was on maternity leave (that I didn't know about until I got back) was member health. You may be saying, "This is casualty. This isn't life". In a small company, you're sometimes asked to do things that are not traditionally property casualty. Member health became one topic that we had to work with. The life actuary was no longer there. He had left earlier in the year and they had nobody to deal with it. So we inherited member health. All of a sudden we were pricing member health options in the State of West Virginia. It is something that they don't really teach you too much about, but you pick it up and work with it as best you can.

We had some major changes to our auto system. That was another project I left. They were going to be working on that while I was on maternity leave, but they ran into some very serious problems so when I got back, we had to straighten those out. All very important projects- all with time deadlines. They all had to be done. Suddenly, we were into September. Now we can start looking at those changes for the annual statement.. maybe.

There are key people in small insurance companies. In my case, the actuarial department, there was a gap, when I was gone. As I said, the Excess Profits Report changes came in and there was none that could look at them. They had a couple of accountants look at the changes and say, "Well, it looks bad but not that bad. They can handle that", and just not realize the implications. There may not be a backup.

It doesn't have to be In 1987, we were still a little bit smaller than we are now. There were two ladies who inputted claim drafts and did the statistical coding to get them into our claims system. One of them found another job in November She stayed for an extra couple of weeks and then left for her new job. Over the

weekend, the other lady fell down the stairs and broke her back. All of a sudden, our inputting on the claims system was gone. There was none. The supervisor was doing what she could while trying to keep up with her own work. Unfortunately, that gives you a very, very bad IBNR situation at year end. And that's what we were facing.

The other thing in a small company is that you don't have room for a lot of egos. You don't have room for any kind of stars. We decided that we didn't want a very large IBNR problem at year end. So everyone learned to claim drafts all the way up to the vice-president of the company. Real life problems that I'm sure you don't see with State Farm and Allstate, but it happens to us

There are some advantages, though, to working for a small company. The biggest one that I know of is that you can talk to people. Compared to a group this size, our whole company has maybe two or three times this many people. So you can get to know a lot of people very quickly.

You go down to the cafeteria for a cup of coffee in the morning, and you can be talking to the senior vice president of marketing, asking how things are going. You find out trends that are happening before they happen. At lunch time, you can have lunch with some underwriters. "What's going on in your area?" You find out things that you probably wouldn't in a normal, large company. You can go to the photocopier and all of a sudden you're talking to claims inputters. "Gee, there's some stat coding that's changing." "Oh that's nice. How's it doing?" "It's terrible." You learn what kind of problems they're coming up with and how they're going to affect you.

Another advantage of working for a small company, we have detail reports- actual claims for the year. It's a big report, but we go through it every year end. Again, I can't see State Farm or Allstate actually flipping through individual claims at year end, but it helps us. Every once in a while, you can find something that is out of the ordinary, and you can correct the problem before you see a fluctuation in your data that just doesn't make sense. You can go and research it two weeks later, or you can catch things up front.

Anything that looks funny in your detail reports, you can investigate very easily just by talking to the right people. We had one year end where we had loss adjustment expenses that were developing absolutely horribly in the State of New Jersey, and we didn't know why. It was unusual and only in certain accident. We looked at our detail report. There wasn't any one large claim, though, that we could really attack. There were a few smaller ones, but not one of them should have made that difference. We talked to the legal department and they said, "Oh, there are no real big problems in New Jersey. Everything is going fine, at least in that particular line." We accepted that the first year.

The second year, we saw the same pattern. By then, you know there is something definitely wrong, but you don't know what it is. Again, we looked and there were a few large claims but nothing that unusual. But if you put the detail report for both years together, you found out that they were the same claims.

Again, that's something that you might not be able to do in a larger company. You can actually look at detail reports for more than one year and see different development coming out.

We went back to the legal department and said, "These are loss adjustment expenses. What's the problem?" This time we had claim numbers attached to them, so it was a little bit easier. The legal department said, "There are no legal expenses with these claims." We knew there had to be something else wrong, so we talked to the claims secretary. This is a much easier way of doing things. Talk to the person who actually does the drafts, who actually does the inputting. You find out a lot. "Oh, those are New Jersey unsatisfied claim and judgment fund claims. Those were unreimbursable, rehabilitation expenses." not legal expenses. So the legal department didn't even know about them. But they messed up our data. In that case, you can always take those unusual claims out of your data, work with a normal projection, and then put them back in as a bulk reserve. It's great. It works out 99 percent of the time.

You can also understand the process that goes on a little bit better because you see the person who is actually inputting things, who is actually working with a methodology. When the claims system went down, and we were actually inputting claims-that was a very fortunate occurrence for us. We learned about the system from working with the claims. At year end, I looked through the detail report and all of a sudden saw a loss adjustment expense claim for $111,985. I knew that was just not possible. You can't end up with $111,000 loss adjustment expense payment.

If you know the claims system, though, and you actually had been coding in this data, you would realize that the next entry down from the date was the dollar amount. The person had hit the enter key twice, and they had input put a date twice instead of a dollar amount. It messes up your data. Unfortunately, they had realized that it was an error and tried to reverse it the next day. And they <u>did</u> reverse it-out of the <u>wrong</u> line. So you not only had a positive $111,000 in one line, you had a negative in the other. Of course, they didn't catch it by year end because they thought it was fixed. We caught it at year end. So the next year they also had to correct a correction. We had two years of adjusting for the same error. It always happens that way. Those are some of the advantages of working with a small company.

We also end up with some actuarial problems that we can work with. The exhibits that you have are going to show you some

things that we did at 1989 year end. The first exhibit that you have is very simple. It's a data triangle. You've seen hundreds of them, I'm sure. It starts out with incremental losses paid. You sum those up to get cumulative losses paid. You have loss reserves on the bottom. By the way, this is a small company. These are not in hundreds of thousands of dollars. When you see 750, that's $750. I've got to specify that. I see in thousands in parentheses too many times. We don't do that.

On the next page you see your incurred losses, your incurred development factors; and on the bottom, you get your basic projections. You have your incurred losses, your age to ultimate factor, your projected ultimate losses, losses paid to date and the IBNR that's needed. It's a basic incurred development pattern, nothing special.

In 1989, though, you will recall that there were changes to the annual statement. One thing that the annual statement required was reserves on a direct basis. That was one of the projects that I had left when I was on maternity leave. That was one project that they had problems with. The next exhibit will show you what happened. I had said, "Please set up data triangles, of direct losses while I'm gone." This is what they came up with. They said, "For '85 and later, we had some data. For '84 and prior, we couldn't get it." I said, "What do you mean you couldn't get it?"

The reports had changed in 1985. The way that the report was shown in 1985 was-on a detail report you had a direct loss. Directly underneath you had a reinsurance amount. When you take the two of them you can subtract and get a net amount, which is what we were using for our reinsurance purposes If you went to '84 and prior reports, the numbers were automatically netted for you. So you didn't know the direct amount. You didn't know the reinsurance amount. That leaves you of with a gap.

We went to our systems department and said, "We know the data is there. Can you get us a run of direct losses from 1984 back to 1980 or so?" They said, "Okay. The person who knows this claims system is also working on your auto project and that has a 12/15 deadline on it. Which one do you want?" In a small company, unfortunately the auto system won out. It won out for two reasons. One, we had a state mandated deadline. Two, we had utilized interns a lot.

We said, "It's not very nice, but we can always use an intern. They can work with a lot of the data and pull it off in detail." That's what we had started to do when I had gotten back from maternity leave. So the systems department went merrily along their way with the auto system and we started in with our IBNR on a manual basis. It's not nice, it's not pretty, but doing manual calculations works. From September to December, we had one person working on individual claims and actually looking up amounts.

The next sheet shows what we did for the direct losses, to get the gap in the upper corner of your triangle filled in. (If you didn't have that filled in, you couldn't get incurred losses for accident years '80 through '84). We didn't want to go back and actually go through 1980 through 1984 claims. The data was in a warehouse which was offsite. It was a very cumbersome project. So we just said, "Let's not do it that way. We're going to come up with an adjustment factor which will take our net losses from 1980 through 1984 for those development periods and gross them up to a direct basis."

We looked at the numbers by line of business. We looked at a ratio of direct calendar year losses paid to net calendar year losses paid for each year for the individual lines. It ended up that the ratio varied a lot by line but it was actually fairly stable from year to year in any given line. So we decided that a quick and dirty adjustment factor to the older incremental paid data would at least get us somewhere in the ballpark. When you're adding enough of these numbers together, we're saying the error should be small. It should wash itself out by the time you're three and four years down the road. On Exhibit 3, that will show you the factor that we used. The error itself should be fairly small. If it wasn't small, we would adjust for it later on anyway.

Exhibit 4 shows you the results. We had incremental paid losses. We had cumulative paid losses. We still didn't have loss reserves. That wasn't something we were going to try and fudge. We just said, "That's fine. We've got a gap in the data." We still had a band of factors. If you look on the next page, (the incurred losses), you can see that you have several calendar years which fill in five lines of your diagonal.
This is pretty good. At least you've got some of the more recent years in there. You can compare them to your net factors and see how they stack up. This was what was required for the 1989 annual statement and what we were planning to do.

Unfortunately, we also had another change in 1989. On the next sheet, Exhibit 5, there's another problem that insurance companies face and that's changing retentions with your reinsurance. In 1988, you can see that we had $150,000 retention. Above the $150,000 was outside reinsurance. That was very easy to work with.

In 1989, our life company formed a wholly-owned subsidiary which was going to be our first layer of reinsurance from $100,000 to $200,000. It was very helpful to our company. Unfortunately, that meant we also had to set reserves for this new life company subsidiary, which meant that we had to calculate reserves based on retentions of $100,000, $200,000, $150,000 (for the older years), plus direct. So we went back to recalculating.

As everybody says in the Part 7exam materials, "recalculate what would have happened if this had been in effect during your data

triangle." That's easier said than done. Reconstructing claims is not fun. We had our intern, so we gave her specific instructions on what to do, and sent her to work. On some of the lines, it was very simple. A prior claim is a prior claim. Instead of a $150,000 retention, you move it to $200,000 or $100,000. However, there were some problems, you've got to be careful of claims that cross over lines and how your reinsurance treaties react to them, auto in particular. A BI loss is not just a BI loss. It's also a PD loss. It's also a collision loss. It's also a no fault loss. When you have various components, more often than not your reinsurance treaties combine all of the components into one claim and take it off the top. Then how do you go back and reallocate them among your lines? A claim system can do it automatically, but if you're doing it by hand, it's cumbersome. So we had this poor intern working on reconstructing individual claims.

Going up to the $200,000 layer was not all that bad because you had reinsurance reports already. You knew which claims were going to hit and you could just change the retention from $150,000 to$200,000. The claims that were between $100,000 and $150,000 caused another problem because they weren't on the reinsurance reports. Back to the detail reports one more time and start pulling them off one by one.

Exhibit 6 shows you our retentions at $200,000. We went back to 1985 because that was about all we had time for. We did this for each line plus all lines combined, and we saw a pattern that was starting to emerge. On Exhibit 7, at the $100,000 layer, we only got back to 1987 and the year end came Unfortunately, at that time you have to stop and you have to get your reserves out. You have no choice. We didn't have the luxury of going back four more years and getting more data. So that's what we had at year end.

Exhibit 8 shows a summary. This is what we found out. On the top we have direct losses. The second group is net of $200,000 reinsurance. The third group is net of $150,000 reinsurance. The fourth group is net of $100,000 reinsurance. There is a great pattern that emerges. It fluctuates by year. It fluctuates by line. But there's an overall pattern. If you look at the factors with stars, you will see it. The lower your retention, the lower the development factors. That's kind of what you'd expect. The longer claims, the larger claims, take a lot longer to develop, so you have larger development factors.

Also, we found that our claims department was a lot more comfortable with smaller claims. Once it hit a reinsurance retention, they were not as responsive to development on large claims. So there was development further out in the larger claims that were over our reinsurance retention.

What we did was, we used the $150,000 as an anchor because that was the one that we had the most data on. That was the one that

we had been working with for years and we could determine the reasonableness of the numbers. Then we varied the other retentions based on the line, based on the patterns that we saw.

It wasn't an easy job, but we ended up with four layers of reinsurance. You could subtract any one of them to get any particular combination that you wanted. After year end, the auto project was done. We went back to systems and asked them, "Could you please get that year end run that we need?" Believe it or not, they ran the report. It balanced exactly to what we had done manually, and then we could proceed for the next year. In a small company, you do what you have to do. There are some other advantages. We have free parking and get to dress up for Halloween, not too many large companies get that.

Thank you.

MR. CROWE: Thank you, Arlene, for sharing with us your experiences and how you've tried to adapt your knowledge and experience to your environment.

Our second speaker today is going to take us down a different road. Jeff Jordan is a senior consultant with the actuarial benefits and compensation consulting group of Coopers and Lybrand in Atlanta, Georgia. Jeff has six years experience as a casualty actuary, including two and a half years with CNA insurance companies and three-and-a-half years with Coopers & Lybrand.

Jeff is involved in performing loss and loss expense reserve analyses for all lines of insurance including personal lines, commercial lines and long-tail lines. He's also involved with rate making, for the commercial automobile, personal lines and long-tail lines of insurance.

Lastly, Jeff has been involved in evaluation of self-insurance funding levels, municipalities, hospital programs, et cetera. Jeff also is a fellow of the Casualty Actuarial Society and a member of the American Academy of Actuaries. He also holds a BS/BA degree in actuarial science from Drake University.

As I mentioned, Jeff is going to take us down a different road. What I asked Jeff to do for us is, given the limited data and computer and people resources in small companies, please illustrate for us how to use external data in analyzing loss and loss adjustment expense reserves for small companies. Jeff.

MR. JORDAN: As Pat mentioned, I'm going to try to cover two topics today. The first will be ways that you can use external data, or what I'll call industry data, to assist you in your reserve analysis. The second will be some broad observations on my part about what I see as some of the disadvantages and advantages of reserving in a small company versus a large company environment.

The first half of my presentation will be technical in nature. I'm going to talk about ways that you can use industry data to help you in looking at your loss reserves or your indemnity reserves, as opposed to loss adjustment expense reserves, which I'll talk about a little later.

I'm going to briefly talk about ways that you can use external data for three commonly used actuarial methods. The first are the development methods, meaning I'm talking about paid loss development and incurred loss development methods. The way that you can use industry data is (inaudible) that there's several sources of development patterns for industry aggregates, types of business, also within different states, etc.

You may be in a case where you've actually got your own data. You've got your own triangles, but you may not have a large enough database to have a lot of stability in your development patterns. So you may want to use the industry data more as a supplement to your own data or as a measure to see if it your development is higher or lower than the industry average.

You may also have instances where you are a newer company or you're a company that's recently entered a new line where you don't have a fully mature development pattern. You may have, for example, only 36 months of development on a long-tail line of business. You need to make some judgment about how that data is going to develop beyond the latest observation that you have. industry data is a good source to go to for that situation. You can use it to obtain your tail factor.

The second commonly used method that we use a lot with newer companies or small companies is Bornhuetter-Ferguson. That is a method where you have to begin with an expected loss level. Based on those expected losses for the segment of business you're looking at, you're going to apply a percentage unreported or a percentage unpaid to either get to an IBNR level, if it's a percentage unreported, or to get to a total reserve estimate, if you're applying a percentage unpaid.

Again, this is somewhat similar to the development method, in that if you have an industry reporting pattern or an industry payment pattern, you can use that reporting pattern to directly calculate your percentages unreported or your percentages unpaid. That's one of the inputs into the model for the Bornhuetter-Ferguson method.

The other input is the assumed expected losses. There are two common ways to get these. The first way is to apply a loss ratio to your earned premium. Again, there are several sources published for different types of business, different states, etc. which contain industry average loss ratios for particular segments. So you can use those to get your initial estimate of what your expected losses are going to be.

A second way that is used for some coverages is to get your expected losses by applying a pure premium to an exposure base. Again, there are industry statistics for pure premiums. So, for instance, if you're looking at a medical malpractice company, you should know how many doctors are insured. There's information available as to what the average loss per doctor is. If you apply that loss per doctor to your number of doctors, you can get to an initial estimate of expected losses for a particular accident year.

The last method that is commonly used is frequency/ severity, or number of claims times average loss per claim. What we find with the companies we work with is that it's usually a lot easier to get a grasp on the frequency than the severity.

If you're looking at a reported claim count pattern, claims usually get reported fairly quickly for most types of coverages. So you can usually have a pretty good idea how many claims you're going to have. The tough part of the equation is, what's my average loss per claim going to be. Again, you can go to industry statistics, for example, information from competitors who may have more data, and see what average loss per claim is.

One important caution I would make here is that you have to make sure you're looking at the same loss limits. It doesn't make sense if you're writing primarily policies with $100,000 limits to apply. An average loss per claim from data limited to $25,000 per loss.

You've got to be careful that you're looking at similar types of limits or your severities are going to be inaccurate.

The second way that we use industry data in our reserving problems is for loss adjustment expenses. What we find with the companies that we work with is that usually the techniques they use for loss adjustment expenses aren't as advanced as the techniques used for losses. Somebody may spend quite a bit of effort coming up with the loss reserves, but then somebody in the accounting department may just apply a few percentages to calculate the reserves for the loss adjustment expense.

Again, with the loss adjustment expense, you can use development methods if you have the data. You can do projections of paid allocated expense. You can also do projections of incurred allocated expense, assuming that your claims department is setting up case reserves for ALAC which, in a lot of companies isn't the case. Once in a while, you will also have a company with an unallocated payment pattern that's stable enough that you can use development methods to project ultimate allocated expenses as well.

One note on using industry data is that a lot of industry data used to come from Schedule P. it still does, but under the old Schedule P, the data for the allocated and unallocated reserves

was on a combined basis. So, you couldn't do a separate incurred allocated projection based on old Schedule P industry data. With the new Schedule P, you've got the allocated reserves separate from the unallocated, so there will be industry data available in the future to project both paid allocated and incurred allocated.

One caution to using industry loss expense information is that since there's usually a higher level of expertise on the loss reserving side, there may be a lot more variability in the industry data for the loss adjustment expenses because companies use more varied methods. Also the reserves themselves may not be as accurate.

The other methods that we commonly use for loss adjustment expenses are ratio methods or, in other words, ratios of allocated to loss and ratios of unallocated to loss. If you've projected an ultimate loss but the allocated expense information for your company isn't very good, you can apply a ratio of allocated to loss to your ultimate loss perhaps, to get an estimate of ultimate allocated for an accident year. Subtracting what is been paid to date will give you an allocated reserve estimate. Alternatively, you may have already derived your loss reserve. You can apply the allocated ratio to the loss reserve to directly calculate your allocated reserve.

The same things can basically be done with the unallocated. There is industry data available for lines of coverage regarding ratios of unallocated expenses to losses. The assumption here is usually the 50-50 assumption that you pay half of your unallocated expense when you open a claim file, and half of the expense when you close the claim file, and So when you're applying the industry ratios to your own data, usually the full ratio is applied to the IBNR because those claims haven't been reported yet, and half of the ratio is applied to case reserves because you assume that you've already paid half of the unallocated on the open claim files.

Other ways that we'll use industry data while doing reserve analyses for our clients are reasonability tests, meaning that we may do several projections of ultimate loss for a line of coverage for an accident year. Then, we'll do tests to see if the ultimates that we've projected and the selected ultimates that we've made make sense from year to year from several different perspectives.

We may look at loss ratios. If we have some information about the rate history, we may have some expectation of what the loss ratio will be for a given year. Other things we may look at, if we've got ultimate claim counts, are implied ultimate severities by accident years. Assuming that the book of business has been fairly consistent over time, you're going to expect the severities to increase at some particular percentage over time. Another thing you can look at, if you have exposures, are losses per exposure or pure premiums, implied by your ultimates.

A procedure that is more often used in rate making, but that also has applicability to reserving problems, is to look at loss trend data for a type of coverage for a particular state. You can use your ultimate selections to calculate on-level loss ratios like you might do for a rate filing. If you have a good estimate of the annual loss trend for a particular coverage and you know what rate action you've taken in the past, you can calculate on-level loss ratios based on your ultimates. If your database is large enough, there should be some stability in the on-level loss ratios.

Similar to loss trend information, you may have benefit level information for workers' compensation. The National Council publishes information on benefit level changes. You can use that information to see what type of effect you think it's going to have on loss ratios for work comp. There might also be types of coverages where there have been legislative changes, for example, where somebody's done a study to evaluate he effect of a tort reform. You might use that in your analysis.

Most of these reasonability tests are geared toward testing the reasonability of the ultimate loss projection for the recent accident year since that's where the most uncertainty is. You want to pay attention to make sure that what you've done for the most recent accident year makes sense relative to what you saw in the data for prior accident years.

The last thing I'm going to talk about regarding industry data is increased limit factors. We have some clients who have enough data to have stability only at lower limits, so they may make ultimate loss projections of losses limited to $25,000 or a similar low limit. Their own data is good for that purpose. But their net retention may be $100,000 per loss, at which limit their data gets thin and there's not a lot of credibility. We can use increased limit relationships based on industry data to try to evaluate what the losses may be in those higher layers relative to what has been projected in the lower layers of loss.

The other case where I've used increased limit factors is with a swing-rated, or a retrospectively-rated excess of loss policy. For instance, we had a long-haul trucking client that had an excess layer that was retrospectively rated. We used the increased limits information to try to evaluate what the loss experience in that excess reinsurance contract was going to be.

One thing to be careful about with increased limit factors is that a lot of them have risk loads built in. You may want to try to take out the risk load from the increased limit factor before you use it.

In wrapping up my discussion of ways to use industry data, I would like to make a very strong caution that you need to be as careful as you can that the industry data you're using is comparable to your own company's data. It's almost like a

computer. If you put garbage in, you're going to get garbage out. The same thing applies to loss reserving. If you start off with industry statistics that don't have much relevance to your company or the problem that you're trying to solve, you're probably not going to get an accurate loss reserve estimate. Also when you're using industry statistics because your data is thin, there is usually going to be a lot of judgment involved.

Some sources of industry data that we often consult are Best's publications. For instance, Best's Aggregates and Averages has a lot of good information in it. Best's Casualty Loss Reserve Development gives a lot of information by lines of coverage regarding about loss development on both a paid and incurred basis, and also loss adjustment expense. There's also Best's Insurance Reports and Best's Executive Data Services. I would guess that most of you that work for companies have those types of publications available.

Another source of information would be bureau data. The two most common would be ISO data and National Council data. One of the sources from ISO are rate filings in a particular state. These are usually public information. Many times they will have a lot of good information in them. A publication that the National Council puts out that we use frequently is called The Annual Statistical Bulletin. This contains development experience, benefit level change information, and a lot of other information.

There's also the Argus FC&S Chart, which is a National Underwriter publication. There's a publication that the New York Insurance Department puts out that's called Statistical Tables and Manual Statements.

Another good source of information rate filings of competitors. If you're in an niche market, you may have only two or three competitors. Most of the time rate filings are public information. You may want to go to your insurance department to review or get copies of those filings. The same would hold true for statutory annual statements. If you're in a niche market and you know your competitors, there may be information in the annual statements that you can utilize for reserving and possibly other purposes.

Moving on to my second main topic, I'm going to concentrate on the advantages of a small company under the assumption that you've got tighter lines of communication. I think Arlene touched on it quite a bit from her own personal experience that you often have a better feel for what's going on in your company if you're in a small company, as opposed to a large company. Larger companies have more layers of management. They are often more bureaucratic. In general, in a small company, you're probably going to have a better idea of what is going on in departments other than your own.

I'm going to concentrate on items that you may have more ready access to from the perspective of the claims department and the underwriting department. With regards to the claims department, I'm going to talk about things that, if you're confronted with a particular reserving situation, you may want to find information.

My assertion is that generally speaking in a smaller company, you may have more ready access to this type of information than you would have in a larger company.

For instance, you may know if there's been a change in the loss reporting pattern for a particular type of coverage. It may be common knowledge that the claims department has implemented a new computer system that makes the claims get into the system faster. There may also be changes in case reserving practices. I know some of my companies set up initial reserves when they get notice of a claim. Well, the claims department may have decided that that initial notice isn't going to be reserved at $2,000 anymore instead it's we're going to be reserved at $4,000. That's important information when you're trying to reserve because it's obviously going to affect your incurred loss patterns.

Another item which the claims department affects is settlement patterns. There may be something going on in the claims department that's making the claims get settled faster. That's going to affect what you do when you're trying to use paid loss development techniques.

A lot of the companies I work with are similar to Pat's company they only write in one state. When I go in and do my annual analysis at the end of the year, one of my questions to the head claim person is: what type of catastrophes did you have this year? What type of losses did you have that are going to affect what I do? The claims person can usually say well, on April 23, we had a tornado that went through this city, and we had this many dollars paid out or our estimate of the total losses is this amount. If you have a one-state company, the people in the claims department are usually very on top of the things that are affecting the losses.

The last thing would be legislative changes that may have a big impact on the business that you do. For instance, financial responsibility limits for auto insurance, comparative versus contributory negligence rules, statutes of limitations which may apply to coverages such as medical malpractice liability.

From the underwriting perspective, it may be easier in a small company to know what's going on in the underwriting department and how that's going to affect your loss reserves.

There may have been changes in the policy limits being writing. There may have been a limits distribution change that's going to affect how your view your numbers and approach your reserving problems. There may be changes in deductibles that the company

is emphasizing selling, for instance, for auto physical damage. There may have been an emphasis or deemphasis in certain territories within a state or among different states.

I have some clients that write primarily South Florida auto insurance. Some of them are trying to expand into the northern parts of the state, where the loss experience is expected to be better. So that's going to affect what I do when I look at the reserves. Hopefully, if they're successful in going into the north part of Florida, their severity or loss per claim is going to be less in the north than in the south. So that's something that I need to consider. There also may be additional information or more readily available information regarding what rate level you're writing at in a particular state for a particular coverage.

Now for some broad observations of what I see as some of the disadvantages that small companies are faced with in addition to what Arlene mentioned in her talk.

I think one of the big disadvantages is that when you come up with an answer from your analysis, you're going to be faced with a higher degree of volatility than if you had a bigger database. First, and probably most importantly, from the perspective of your overall reserve level, you may have a best estimate of what your reserves need to but the likelihood that you're going to be more than X percent above or below is probably going to be higher for a small company than a large company. Also, if you have enough data to use development patterns, if you're a small company you're probably going to see a lot more volatility in your development patterns, which is going to add another degree of uncertainty into your reserving work.

I mentioned reasonability tests to try to figure out if you're making good loss estimates for the most recent year or two. If you have a thin database, you may not see a nice upward trend in your severity, but you may see up/down, up/ down, and it may be hard to tell if what you've selected for the most recent year or two are really good estimates. This is just a function of randomness in your database.

The second disadvantage I see is having to sacrifice credibility at the expense of homogeneity. In other words, if you're a State Farm or an Allstate, you can split your data into all kinds of subsets that may be very homogenous and highly credible. In order to get data to use for reserving in a small company, you may need to take groups that don't have that much in common and group them together just so you can get enough data to actually do your analysis. So that's a big tradeoff.

The last. If people in the claims and underwriting departments get some knowledge of how you're using the information that they give you to estimate your reserve levels, it may actually work against you.

For instance, the claims department may feel that it's not doing a good job because you tell them there is IBNR. They may think well, we set up our reserves and we think they're adequate. Now you're saying we've got IBNR on top of the case reserves or that the case reserves we're setting up in aggregate aren't enough. They may make a decision inside the claims department, that they don't want that to happen. So they go in and increase all their case reserves.

What that does is introduce big inconsistency in your database. You've got more problems now than you did to begin with because you've not only got thin data perhaps, but you've also got data that isn't consistent over time. So the closeness can work against you in certain circumstances.

Another disadvantage Arlene talked about is from a time perspective or a staffing perspective which, not working in a small company, I'm not faced with that much. With us, a company comes to us with a particular problem. As consultants, it's our job to make sure the work gets done in as timely a manner as possible. Common reasons that we get called in to do a job is that there's not enough time in the company to do a particular project or there's just not the expertise that's needed to do it.

One final observation. I've been talking about small versus large. I think there is a rough analogy between consulting actuaries and actuaries in companies from the standpoint that if you're an actuary in a company, it's somewhat akin to being a small company because you have a very good knowledge of what the day-to-day operations are of the company. Whereas, in a large company, you may not have that closeness or that intimacy within the departments. From a consulting standpoint, I may only come into your company once a year. So I don't have that knowledge of what's going on day to day, and I may need to try to get all my information within a one month period. So I think that may be roughly analogous to what happens within a large company.

MR. CROWE: Thank you, Jeff. The third speaker is going to take us down a third road. Arlene was trying to talk about the problems she has adapting her data to her company. Jeff talked about using external data. We're going to go to a third area now. We're going to talk about communications. This is an area that I don't think many of us are very good at. I think Grover is.

Grover Edie has a Bachelor's degree from Florida State University in Physics. He's also a fellow at the Casualty Actuary Society, a member of the American Academy of Actuaries, and he's also going to receive his CPCU designation this year, 1990. Grover started out in the insurance industry as an underwriter. He spent his first two years as an underwriter. Then he spent the next 16 years working in various actuarial functions in several different companies, including ISO.

In 1987, he joined John Deere Insurance Company as vice president and actuary. As I mentioned earlier, Grover has a different perspective than other individuals because John Deere Insurance Company's primary market is commercial lines, where Arlene's and my company is primarily personal lines. So that's entirely different.

My company is a one-state operation. Arlene's is regional. Grover represents a company that writes in 50 states, very sparsely because their company writes about $200 million. Of that, $150 million is in the property and casualty field. So a lot of his premiums are sparsely spread out.

The last distinction that Grover brings to us is that John Deere, besides being an extremely successful company, they're a niche company because they specialize in the farm implement dealerships. The task that we've asked Grover is that in his presentation if he would focus on the actuarial role of communicating to top management on loss and loss adjustment expense reserves, we'll see how well he communicates.

MR. EDIE: Thanks, Pat. While I was sitting up here, I noticed a number of you chuckled a little bit when Arlene mentioned a couple of the problems that she had with her data. I, too, chuckled because I recognize that some of those problems are the same types of problems that I had.

You're aware that we all have those types of problems, large or small, niche, or regional or however we are. Those problems are probably a little bit more prevalent in the small company because of the nature of that operation.

What you should be telling top management, the information that you should be telling top management has been covered by Arlene and by Jeff, and by the other seminars, the other sessions we've had here, in the readings of the society and in other materials and available media for you. I'm not going to concentrate on that.

I'm going to make an assumption here. I made the assumption when I wrote the speech, and it's well -- apparently true. Many of you are working with small companies, working for small companies. I would think you would want to do a little bit better job of conveying the results of your work to top management. That's why you are here.

Too many times actuaries have the reputation of being very smart but very bad at presenting to nonactuaries the results of what they had. I'd like to start out be defining a couple of terms. Top management is a term that you'll have to define yourself. Some of you will define top management as the senior actuary or the senior manager you report to. Personally, top management to me is the president of the company because that's who I have to report this detail to.

I'm going to refer to the recipient of that information as your audience so that I can get away from using top management a little bit. I'm going to be talking about the conveyance of that information as a presentation. Now, too many times the presentation of information to top management is, you carbon copy that person on the bottom of the memo you send down to accounting to set up the bulk reserves.

You barely have time enough to get that thing typed, let alone come up with some kind of a presentation. But what I'd like to do is to encourage you to spend a little bit more time in conveying that information to top management so that you can be a little bit more effective in how you present that material and how they use that material.

One other piece of housekeeping -- I'm going to use the personal pronoun he, meaning both he and she. There are a lot of executives in insurance companies that are female and I recognize that. I just find the term he/she is very cumbersome.

You might ask, well, what happens if top management doesn't ask for this information? You'd better give it to them anyway. Now, oftentimes, top management wants to know what the IBNR is at the end of the year and that's the only time they ever care about it. If you're doing your job, you should be communicating that information to them on a periodic basis. I recommend that you communicate to them as often as you put together that review. Don't do it every week, if you do it that often. But I don't know of anybody in a small company that has that kind of time.

For those of you who have attended or will attend some of the other sessions on presentations, you might notice some duplication of what I'm going to say. That's good. That means you're paying attention to what's going on. However, I'm going to concentrate on some of the unique characteristics of presenting loss data on a bulk basis to top management at small companies. There are some unique differences in a small company.

One of the big differences is that audience. In a small company, it's very likely that the chief operating officer is going to retain some of the characteristics and assumptions of the profession in which he rose through the ranks. The CEO is less likely to be a journalist in a small company but more likely to have not too long ago been the chief of claims, the chief of underwriting, the head of accounting or whatever. That's an important distinction because the way you present that material in part is going to depend on the background that that individual had.

I don't consider that a criticism of managers of small companies, because as has been expressed before, they often remember the day-to-day operations of how these things all fit together. Remember that in making the presentations because they (your

audience) will, once again, want to fall back on how these things all fit together.

I'm also going to assume that you've done your homework. Those of you that work in a small company understand why I call it homework and not just work work. Oftentimes you have to drag it home, especially around the first of the year, to get your loss reserves done in time for accounting.

I'm going to assume that you already know what happened. You know why it happened, if that's important. You understand the impacts of the changes that you're making on those bulk reserves to your company's financial statements or to its solvency or solidity. If things didn't change, you also understand that as well.

Jeff mentioned some ratio processes. In a lot of small companies, we use a lot of ratio or automatic processes. For example, for interim reporting periods, you might set up IBNR as a percentage of the written premium. I recommend that you take a look at those processes, the values that are set up by those processes in those interim periods.

When it goes down to accounting and someone comes back and asks why that process developed this kind of a blip in your IBNR, you'd better have an answer. It's a lot easier to find out the answer and fix it if it's wrong or have a good explanation before that question is asked than to try to react to senior management when he comes back upset about the IBNR going up 20 percent in a month.

You know what's going on. Now let's concentrate on how we're going to communicate that to senior management. We've got an overhead. Those of you who picked up a packet, this is what the first piece of the packet looks like. If there weren't enough and you want to leave a business card, I'll see to it that you get a copy of it. That way, too, if you don't think it's worthwhile, we won't spend the money on postage.

(Overhead #1)

You have to know who your audience is, and that's important. That's a little bit more than "my audience is Bob Nixon." There is more than a name. You need to know if you're speaking to a former underwriter, an accountant, a claims person or what.
This is just a partial listing of those questions that you ought to have answers for before you present your reserves to top management.

In some cases, there won't be a single answer because you're going to be presenting it to more than one person. That can be a little bit difficult. Your audience might not even be adept or understanding of insurance concepts. As an insurance company that reports into a manufacturing entity, I can tell you that those things happen.

However, you can explain those kinds of terms, bulk reserves, if you're very careful in how you construct your materials and you're careful with your vocabulary. Try to work from the perspective that the individual understands. I have a lot easier time explaining it to an economist at Deere Company than I do to a machinist.

(Overhead #2)

The second overhead I have will talk to you a little bit about the purposes of your meeting. Now, you're saying, wait a minute, purposes. The purpose is to communicate this information to top management. Well, not always. Sometimes in a small company you might have to get the approval, the blessing, the okay, whatever you want to call it from top management before reserves are booked.

In that case, your purpose is to convince top management that you've done your job, the reserves are appropriate, and that you've considered all the factors that are necessary. Other times you are simply reporting what you've booked. You're letting top management be aware that these are the numbers. This is how they shake out. Your purpose is to try to get information to those people.

If you're reporting in to a group, oftentimes you'll have the CEO, the chief financial officer, a claims guy, and once in a while an underwriter is thrown in there for fun. You might be trying to reach consensus among a group of top managers that approve or agree upon your reserves before they are finally booked.

There are other reasons for informing top management of these reserves. That purpose ought to be in your mind before you go into it. There's two purposes you should have in mind. One is, what's your purpose? What are you trying to convey to top management? The second is, what do they expect to get out of you?

If you're trying to explain to them that the company is headed towards insolvency when they're concerned only about last quarter's earnings, you're going to be in for a rather interesting meeting. So realize that you're going to have two perspectives as to what you wish to accomplish in the meeting of representing your loss reserves.

Your presentation should answer these questions, both from your own perspective and from the perspective of those who are going to receive it.

(Overhead #3)

Now, the third overhead I've got has some miscellaneous questions. Just some other maybe not extraneous, but information

you ought to consider. How often the group meets is important because that tells you how much you can rely on the participants remembering what happened last time.

We meet monthly on IBNR reserves. I can expect that my CEO can remember from month to month what's happened. I have to bring him up to speed a little bit, but the memory is pretty much there. We meet once a year or once every six months on some other reserving processes.

I can't expect him to remember what we did six months ago or a year ago. So I've got to make sure that I've prepared the groundwork to present that material to him so that he's not caught off guard.

I put the second element in here just kind of as a caveat. What does everybody else use? (Still speaking from Overhead) I wouldn't recommend coming in with a video if everybody else uses overheads. That doesn't mean you can't alter your presentation method a little bit. I personally like to give my loss reserves in a room with one of these white dry erase boards. In fact, I feel a little naked without it here because in talking about loss reserves, I like to get the pen and get up and talk about some specifics.

That's because my CEO has an accounting background. He often likes to know the nuts and bolts of a particular item. I can explain it best on a board to four or five people when I go through that kind of a process. So you at times need to pick the presentation materials, but you also need to be a little bit loose and able to kind of think on your feet as those things go.

The other thing that you need to know is how much time do you have to achieve the purpose of communicating loss reserves to top management? Now, in a small company, that's maybe five minutes. If you've got all day to talk about your reserving processes, forget about preparation. You can do it; no sweat.

If you've got 10 or 15 minutes to speak about what you've done with the reserves this month, you had better either had spent some time preparing that specific set of reserves or spent some time before the reserving process started in coming up with a way of presenting them.

I find that the shorter the speech, the more preparation it takes me. You've got less time to convey the information. You've got to make it more concise and more compact to that individual. Realize, too, that 30 minutes talking about IBNR to an underwriter is eternity.

Jeff mentioned that top management is usually aware of exceptionally large losses or unusual occurrences that have happened in the claims arena. In going into this presentation to top management, you should know how those little aberrations in

your normal operating procedures -- that may be an oxymoron - normal operating procedures for a small company.

Anyway, you should know what those unusual occurrences do to your loss reserving process. When I walked into the meeting in April to discuss IBNR, my CEO wanted to know what the hailstorm did to the emergence calculations. I had to know the answer to that question before we walked into that, or else I would be going back and spending more time and losing ground and losing credibility. You need to know the answers to those kinds of questions. I recommend actually you volunteer the answers to those questions before they're even asked. It gives a little bit of credibility to the CEO or the individual that you not only knew the answer; you knew to research it before they asked it.

Now, a small company, there's a temptation to gather up all your computer runs, get some spreadsheets, make a couple of extra copies of your Lotus 1, 2, 3 spreadsheet and run in and give them to your CEO before you take them down to accounting.

I recommend you resist that temptation. If you're an actuary making a presentation to another actuary, that's fine. You can do that. But think a little bit about what your CEO or your top management would do if he were sitting next to you in a presentation on unallocated loss reserves or any of the other subjects we've talked about in this seminar this last couple of days.

I'll bet you that even the best of the presentations would lose the top management in your individual small companies. Realize that if you pulled the same stunt in trying to explain to them what happened to loss reserves, you're going to lose them just as well.

Now, what's the solution? You've got a problem here. You tell me that you need to spend time preparing for your presentation to top management and you tell me -- and you admit to me that there is no time to do so. Well, the only way to come about solving that dilemma is, first of all, to make some preparations before you start your loss reserving cycle, put together some computer programs that will generate the graphs that can explain it so that when you're done, you can just export it into a graphics package and you pop it right out.

That's not too hard to do. Ten or fifteen years ago that would have been difficult, but nowadays, in your spreadsheets or whatever programs you use to graph this up, it should be fairly simple to do, if you do it before you start the process out. You might even want to practice on last month's or last quarter's data to see how it works.

In fact, you might even want to consider taking last quarter's or last month's data, running it through that kind of a package and presenting it before your next presentation of changed loss

reserves to management to get them used to the process. Take it in and say, okay, remember what we talked about last April or last July, this is another presentation.

Ask your audience: "Do you understand it?" " Does it make sense to you?" " Would you like to see it in this format in the future?" Get a little bit of feedback. The questions they ask and the answers to your questions are going to give you a little better understanding on how to present it.

Secondly, you can work at educating your audience. That's why in that first overhead I said how long is your audience going to be expected to be a part of this process. If your CEO is 64 1/2 years old and going to retire in 6 months, don't spend a long time educating. It's not worth your investment.

However, you also need to be aware that in educating top management, you can't bite off big chunks of knowledge and information and try to teach them in big pieces. I recommend you give them little bits of information on a periodic basis, for two reasons.

One is, most top managers don't like to read memos that are longer than a page. They really hate memos, if they've got a whole lot of numbers in them. They don't like to read long memos. So you send them a four-page memo, you can figure it's going to sit in a reading file for six months and then go in the trash can.

Secondly, if you give them little bits of information on a periodic basis, it helps keep that memory process going. If you only present loss reserves to them on a quarterly basis, to present some other information about loss reserves on a monthly basis will help them remember and keep that continuity of thought going with them. So you won't have as big a job to do in the future.

I'd recommend actually that you do a little bit of both. Try to make a presentation that's a little bit more user friendly or recipient friendly, and take a little bit of time to try to educate them.

In going through your reserves, make sure you have an agenda for what you're going to cover. Well, you think, we're just going to cover the loss reserves. No. Make sure you write down those assumptions that you made that were important that you want to convey. Make sure you write down those situations, that hailstorm, how you took care of it, so that you'll mention it.

For that reason -- so you'll make sure you cover all the points, as well as you'll know when you're done. If you don't know if you're done with your presentation, you may tend to drag it on forever thinking well, gee, I hope I got everything. Management doesn't have the time for you to sit there and wonder out loud

while you go on a long diatribe about whether or not you finished your speech. The other thing is, you'll know whether or not you met the purpose of your speech.

One other comment, if you've got handouts, label them clearly. Remember how much easier it was when Arlene said go to Exhibit 5. This is what we're talking about. Then if she were to say, well, go to the exhibit that has this title on the top and this number on the upper left-hand corner. They don't even have to be in order. But label your exhibits.

One other item, confidence in how you speak to your audience is going to have a relationship with how confident your audience is in what you did. Now that doesn't make any sense. That's not logic. That's not fair, but it's fact. The better you can speak, the better you can present your loss reserves to top management, the more believable they'll be.

One other item. You should be very careful not to go into too much detail. You've got five minutes to present it, so that's not so bad. But if you spend five minutes going over trivia, you're going to blow the time that you have available to go across the important points to senior management.

(Exhibit A)

For those of you who are trying to listen to find out how we do reserves, and we present reserves here at John Deere Insurance, Exhibit A here, this is the way I present it to my CEO. He's an accountant. He likes numbers. He likes tab runs. This is what he's comfortable with, and this is what I give him. Give your top management what they're comfortable with. He likes to see what the size of the reserves are, how much they change, both in percentage and dollar amounts.

(Exhibit B)

The second exhibit is the one I use to his boss. Now, his boss is an FCAS. Now I can go through loss reserve triangles and he would understand it. But that's not appropriate. As the president of the insurance group, he wants to look at long-term changes. He wants to take a look at what's going on on a longer term basis and what those bigger trends are.

Now once in a while, you may have an occasion to present information to sales management people. I find that in addressing actuaries and accountants, you have to determine what form the information is in. But when you introduce operating results to sales people, you've got to be careful that you don't overwhelm them with data that's too detailed or too complicated for them.

(Exhibit C)

So this third exhibit is an example of what can be very effective in presenting operating results to sales people. (Laughter)

I'm glad to hear you're awake. Most of us don't have a lot of opportunity to present ourselves or make a presentation to large groups or even small groups in management.

If you treat the communication of loss reserves to top management as a presentation, I think you're going to find you'll increase your credibility and your believability as well as your position within the company. I'd encourage you to try to do it in that fashion.

Thank you. Here's Pat.

(Applause)

MR. CROWE: Thank you, Grover. That was very good. We ran out of time. I hope you don't feel like I do because everything that Grover said don't do, I've done many times. Our time is up. I would like to thank you for your time and attention, and I would like to ask you to thank all the panelists for putting forth the effort that they have this morning.

(Applause)

Lastly, Jane is in the back of the room with the evaluation sheets and the continuing education sheets to fill out.

1990 CASUALTY LOSS RESERVE SEMINAR

5E: LOSS RESERVING FOR SMALL INSURANCE COMPANIES

Overheads/Exhibits

QUESTIONS ABOUT YOUR AUDIENCE:

What exposure/understanding do they have regarding the processes you are reporting on?

How much detail does your audience like to go into?

Does your audience concentrate on the short term or is he interested in the long haul?

How long will they be involved in this process?

What is your audience interested in?

- Monthly results?
- Quarterly results?
- Stockholder impact?
- Solvency?
- Direct as well as Net?
- Tax planning and consequences?
- Meeting previously established profit margins?
- Others:

WHAT DO YOU WISH TO ACCOMPLISH?

RECEIVE APPROVAL?

REACH CONSENSUS?

INFORM?

GATHER INFORMATION?

OTHERS:

MISCELLANEOUS QUESTIONS:

How often does the group meet?

What presentation methods do other presenters use?
Overheads, handouts, graphs, etc.

How much time do you have to achieve your purpose?
Usually, the less time you have, the more time
you should spend in preparation.

MONTHLY I.B.N.R. AMOUNTS

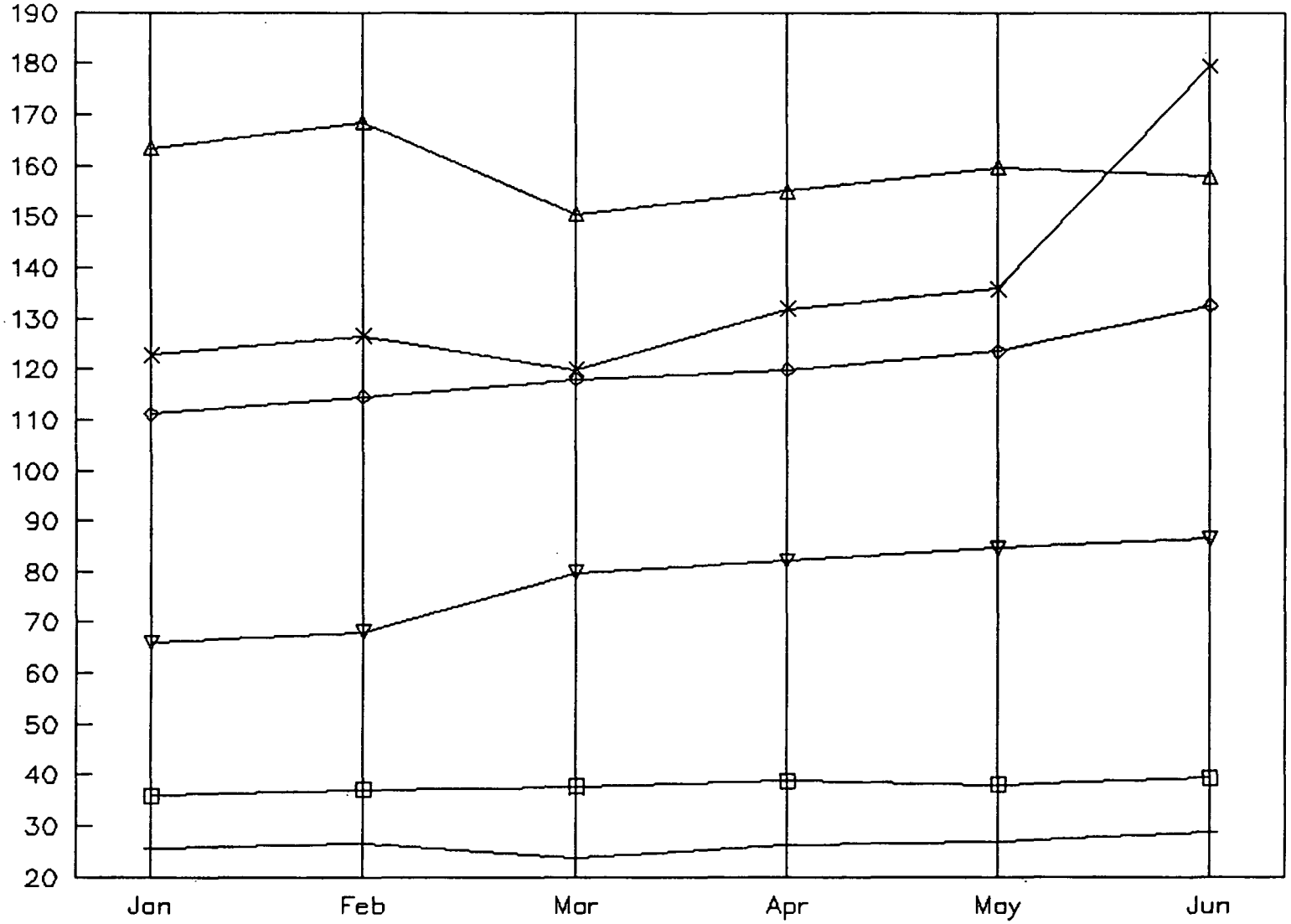
May to June, 1990

	Current Month	Previous Month	Dollar Change	Percent Change
Commercial Lines				
Fire	39,456	37,930	1,526	3.9%
Allied Lines	28,888	26,894	1,994	6.9%
Inland Marine	132,465	123,456	9,009	6.8%
Workers' Comp	157,953	159,753	(1,800)	-1.1%
Other Liability	179,535	135,795	43,740	24.4%
Auto	86,456	84,621	1,835	2.1%
Miscellaneous	654	456	198	30.3%
SUBTOTAL	625,407	568,905	56,502	9.0%
Personal Lines				
Homeowners	45,699	45,778	(79)	-0.2%
Auto	123,456	126,543	(3,087)	-2.5%
SUBTOTAL	169,155	172,321	(3,166)	-1.9%
TOTAL	794,562	741,226	53,336	6.7%

A

MONTHLY I.B.N.R. AMOUNTS

AS OF 30 JUNE, 1990



(Thousands)

1217

B

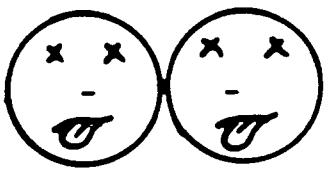
OPERATING RESULTS

JAN 

FEB 

MAR 

APR 

MAY 

JUN 

JULY 

AUG

C

1990 CASUALTY LOSS RESERVE SEMINAR

SESSION 5E

LOSS RESERVING FOR SMALL COMPANIES

Arlene F. Woodruff
Actuary
Farm Family Mutual Insurance Company

AUTO PROPERTY DAMAGE — NET REINSURANCE $150,000

INCREMENTAL PAID LOSSES

	12	24	36	48	60	72	84	96	108
1977	1,021,024	309,712	34,624	18,023	19,788	743	1,500	(88)	750
1978	828,022	264,675	34,129	17,531	3,035	2,280	0	0	0
1979	969,745	324,018	36,663	26,281	3,402	0	0	0	0
1980	813,099	306,133	14,800	9,571	500	2,201	0	0	4,077
1981	1,036,500	381,574	36,987	7,836	18,314	6,000	1,315	2,056	0
1982	1,453,398	483,306	52,416	7,523	0	(87)	2,997	(585)	
1983	1,464,966	481,183	34,784	19,478	13,798	(758)	(1)		
1984	1,768,872	584,322	95,613	21,612	12,852	1,887			
1985	1,925,334	852,120	92,302	33,787	930				
1986	2,231,563	1,104,474	124,107	68,557					
1987	2,804,617	1,437,141	170,939						
1988	2,865,611	1,376,157							

CUMULATIVE PAID LOSSES

	12	24	36	48	60	72	84	96	108
1977	1,021,024	1,330,736	1,365,360	1,383,383	1,403,171	1,403,914	1,405,414	1,405,326	1,406,076
1978	828,022	1,092,697	1,126,826	1,144,357	1,147,392	1,149,672	1,149,672	1,149,672	1,149,672
1979	969,745	1,293,763	1,330,426	1,356,707	1,360,109	1,360,109	1,360,109	1,360,109	1,360,109
1980	813,099	1,119,232	1,134,032	1,143,603	1,144,103	1,146,304	1,146,304	1,146,304	1,150,381
1981	1,036,500	1,418,074	1,455,061	1,462,897	1,481,211	1,487,211	1,488,526	1,490,582	1,490,582
1982	1,453,398	1,936,704	1,989,120	1,996,643	1,996,643	1,996,556	1,999,553	1,998,968	
1983	1,464,966	1,946,149	1,980,933	2,000,411	2,014,209	2,013,451	2,013,450		
1984	1,768,872	2,353,194	2,448,807	2,470,419	2,483,271	2,485,158			
1985	1,925,334	2,777,454	2,869,756	2,903,543	2,904,473				
1986	2,231,563	3,336,037	3,460,144	3,528,701					
1987	2,804,617	4,241,758	4,412,697						
1988	2,865,611	4,241,768							

LOSS RESERVES

	12	24	36	48	60	72	84	96	108
1977	259,200	38,500	14,800	6,900	3,780	1,890	1,500	750	0
1978	195,580	27,600	9,660	4,410	1,890	0	0	0	0
1979	220,800	36,800	18,900	3,780	3,000	1,500	1,500	1,500	0
1980	166,520	27,720	12,840	6,000	3,750	1,500	750	0	0
1981	294,840	42,780	21,000	7,500	3,000	2,250	1,500	0	0
1982	297,840	43,500	12,000	4,500	2,250	2,250	750	0	
1983	353,250	47,250	20,250	8,250	3,000	1,500	1,500		
1984	462,750	78,000	28,925	11,201	4,755	2,198			
1985	651,400	114,350	45,384	20,090	5,218				
1986	926,659	203,719	111,059	88,211					
1987	901,202	131,586	48,920						
1988	957,148	123,054							

INCURRED LOSSES

	12	24	36	48	60	72	84	96	108
1977	1,280,224	1,369,236	1,380,160	1,390,283	1,406,951	1,405,804	1,406,914	1,406,076	1,406,076
1978	1,023,602	1,120,297	1,136,486	1,148,767	1,149,282	1,149,672	1,149,672	1,149,672	1,149,672
1979	1,190,545	1,330,563	1,349,326	1,360,487	1,363,109	1,361,609	1,361,609	1,361,609	1,360,109
1980	979,619	1,146,952	1,146,872	1,149,603	1,147,853	1,147,804	1,147,054	1,146,304	1,150,381
1981	1,331,340	1,460,854	1,476,061	1,470,397	1,484,211	1,489,461	1,490,026	1,490,582	1,490,582
1982	1,751,238	1,980,204	2,001,120	2,001,143	1,998,893	1,998,806	2,000,303	1,998,968	
1983	1,818,216	1,993,399	2,001,183	2,008,661	2,017,209	2,014,951	2,014,950		
1984	2,231,622	2,431,194	2,477,732	2,481,620	2,488,026	2,487,356			
1985	2,576,734	2,891,804	2,915,140	2,923,633	2,909,691				
1986	3,158,222	3,539,756	3,571,203	3,616,912					
1987	3,705,819	4,373,344	4,461,617						
1988	3,822,759	4,364,822							

INCURRED DEVELOPMENT FACTORS

	12-24	24-36	36-48	48-60	60-72	72-84	84-96	96-108
1977	1.0695	1.0080	1.0073	1.0120	0.9992	1.0008	0.9994	1.0000
1978	1.0945	1.0145	1.0108	1.0004	1.0003	1.0000	1.0000	1.0000
1979	1.1176	1.0141	1.0083	1.0019	0.9989	1.0000	1.0000	0.9989
1980	1.1708	0.9999	1.0024	0.9985	1.0000	0.9993	0.9993	1.0036
1981	1.0973	1.0104	0.9962	1.0094	1.0035	1.0004	1.0004	1.0000
1982	1.1307	1.0106	1.0000	0.9989	1.0000	1.0007	0.9993	
1983	1.0963	1.0039	1.0037	1.0043	0.9989	1.0000		
1984	1.0894	1.0191	1.0016	1.0026	0.9997			
1985	1.1223	1.0081	1.0029	0.9952				
1986	1.1208	1.0089	1.0128					
1987	1.1801	1.0202						
1988	1.1418							
AVERAGE	1.1193	1.0107	1.0046	1.0026	1.0001	1.0002	0.9997	1.0005
SELECTED	1.1266	1.0127	1.0044	1.0023	1.0000	1.0000	1.0000	1.0000
TO ULT	1.1486	1.0195	1.0067	1.0023	1.0000	1.0000	1.0000	1.0000

	INCURRED LOSSES	AGE TO ULTIMATE FACTOR	PROJECTED ULTIMATE LOSSES	LOSSES PAID TO DATE	IBNR NEEDED
1977	1,406,076	1.0000	1,406,076	1,406,076	0
1978	1,149,672	1.0000	1,149,672	1,149,672	0
1979	1,360,109	1.0000	1,360,109	1,360,109	0
1980	1,150,381	1.0000	1,150,381	1,150,381	0
1981	1,490,582	1.0000	1,490,582	1,490,582	0
1982	1,998,968	1.0000	1,998,968	1,998,968	0
1983	2,014,950	1.0000	2,014,950	2,013,450	0
1984	2,487,356	1.0000	2,487,356	2,485,158	0
1985	2,909,691	1.0000	2,909,691	2,904,473	0
1986	3,616,912	1.0023	3,625,231	3,528,701	8,319
1987	4,461,617	1.0067	4,491,510	4,412,697	29,893
1988	4,364,822	1.0195	4,449,936	4,241,768	85,114
TOTAL	28,411,136		28,534,462	28,142,035	123,326

AUTO PD — DIRECT LOSSES

INCREMENTAL PAID LOSSES

	12	24	36	48	60	72	84	96	108	120
12/80						2,201	0	0	4,236	0
12/81					18,219	6,000	707	1,750	0	
12/82				7,523	0	0	0	0		
12/83			34,784	19,478	13,979	0	0			
12/84		594,103	95,608	19,458	12,248	0				
12/85	1,938,089	865,515	92,714	37,159	3,125					
12/86	2,239,759	1,091,939	127,212	73,548						
12/87	2,834,680	1,466,733	185,507							
12/88	2,858,233	1,384,359								
12/89	3,152,956									

LOSS RESERVES

	12	24	36	48	60	72	84	96	108	120
12/80						1,500	750	0	0	0
12/81					3,000	2,250	1,500	0	0	
12/82				4,500	3,750	2,250	750	0		
12/83			20,250	8,250	4,500	1,500	1,500			
12/84		78,000	30,150	12,400	6,000	3,000				
12/85	651,400	114,350	45,384	20,528	5,656					
12/86	1,101,659	381,029	284,559	261,711						
12/87	903,066	133,687	50,820							
12/88	963,214	124,003								
12/89	910,489									

FORMULA FOR DIRECT AGE-TO-AGE DEVELOPMENT FACTORS

$$\frac{\text{(CUMULATIVE NET LOSSES PAID x FACTOR) + DIRECT LOSSES PAID(Y) + DIRECT LOSSES PAID(Y+1) + DIRECT RESERVES(Y+1)}}{\text{(CUMULATIVE NET LOSSES PAID x FACTOR) + DIRECT LOSSES PAID(Y) + DIRECT RESERVES(Y)}}$$

AUTO PD

DIRECT LOSSES

INCREMENTAL PAID LOSSES

	12	24	36	48	60	72	84	96	108	120
12/80	816,189	307,296	14,856	9,608	502	2,201	0	0	4,236	0
12/81	1,040,439	383,024	37,127	7,866	18,219	6,000	707	1,750	0	
12/82	1,458,921	485,142	52,616	7,523	0	0	0	0		
12/83	1,470,533	483,011	34,784	19,478	13,979	0	0			
12/84	1,775,594	594,103	95,608	19,458	12,248	0				
12/85	1,938,089	865,515	92,714	37,159	3,125					
12/86	2,239,759	1,091,939	127,212	73,548						
12/87	2,834,680	1,466,733	185,507							
12/88	2,858,233	1,384,359								
12/89	3,152,956									

CUMULATIVE PAID LOSSES

	12	24	36	48	60	72	84	96	108	120
12/80	816,189	1,123,485	1,138,341	1,147,949	1,148,451	1,150,652	1,150,652	1,150,652	1,154,888	1,154,888
12/81	1,040,439	1,423,463	1,460,590	1,468,456	1,486,675	1,492,675	1,493,382	1,495,132	1,495,132	
12/82	1,458,921	1,944,063	1,996,679	2,004,202	2,004,202	2,004,202	2,004,202	2,004,202		
12/83	1,470,533	1,953,544	1,988,328	2,007,806	2,021,785	2,021,785	2,021,785			
12/84	1,775,594	2,369,697	2,465,305	2,484,763	2,497,011	2,497,011				
12/85	1,938,089	2,803,604	2,896,318	2,933,477	2,936,602					
12/86	2,239,759	3,331,698	3,458,910	3,532,458						
12/87	2,834,680	4,301,413	4,486,920							
12/88	2,858,233	4,242,592								
12/89	3,152,956									

LOSS RESERVES

	12	24	36	48	60	72	84	96	108	120
12/80						1,500	750	0	0	0
12/81					3,000	2,250	1,500	0	0	
12/82				4,500	3,750	2,250	750	0		
12/83			20,250	8,250	4,500	1,500	1,500			
12/84		78,000	30,150	12,400	6,000	3,000				
12/85	651,400	114,350	45,384	20,528	5,656					
12/86	1,101,659	381,029	284,559	261,711						
12/87	903,066	133,687	50,820							
12/88	963,214	124,003								
12/89	910,489									

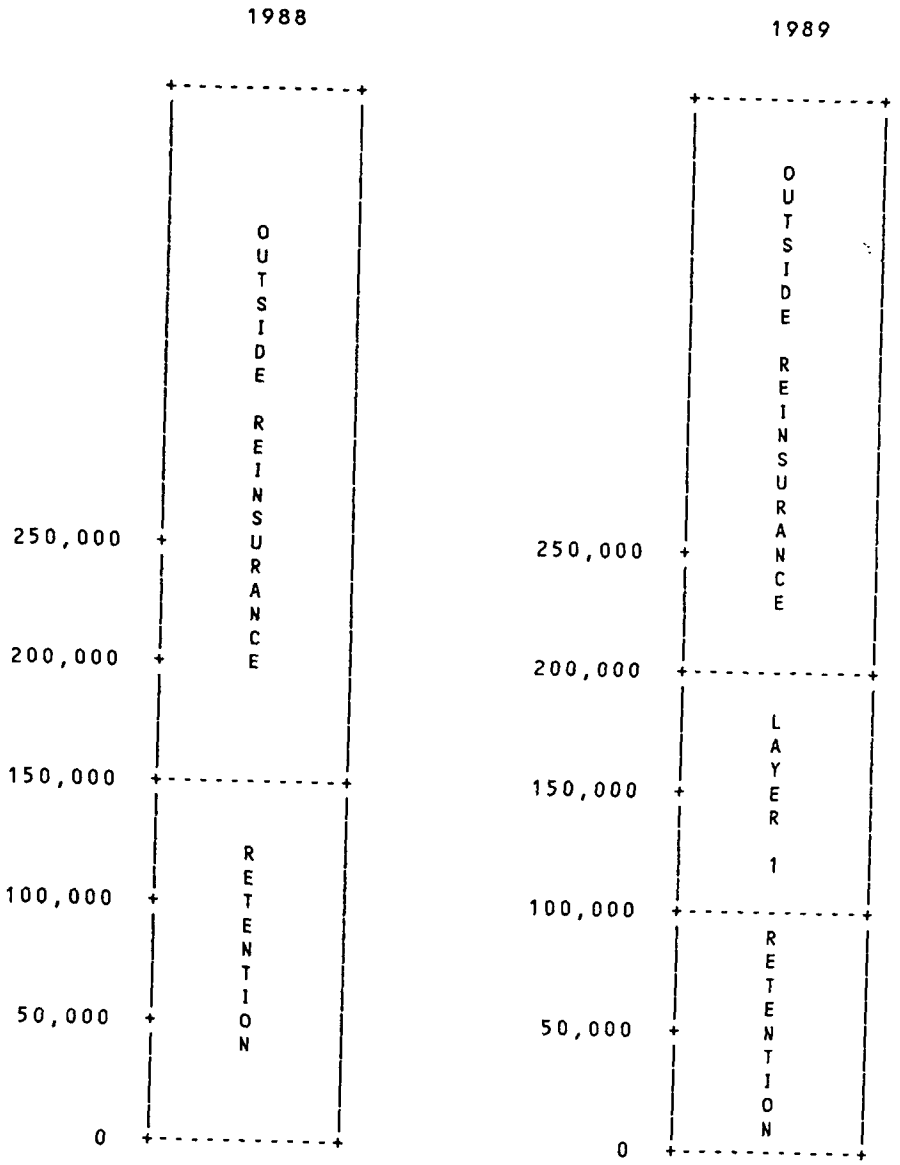
INCURRED LOSSES

Acc. Year	12	24	36	48	60	72	84	96	108	120
12/80						1,152,152	1,151,402	1,150,652	1,154,888	1,154,888
12/81					1,489,675	1,494,925	1,494,882	1,495,132	1,495,132	
12/82				2,008,702	2,007,952	2,006,452	2,004,952	2,004,202		
12/83			2,008,578	2,016,056	2,026,285	2,023,285	2,023,285			
12/84		2,447,697	2,495,455	2,497,163	2,503,011	2,500,011				
12/85	2,589,489	2,917,954	2,941,702	2,954,005	2,942,258					
12/86	3,341,418	3,712,727	3,743,469	3,794,169						
12/87	3,737,746	4,435,100	4,537,740							
12/88	3,821,447	4,366,595								
12/89	4,063,445									

INCURRED DEVELOPMENT FACTORS

	12-24	24-36	36-48	48-60	60-72	72-84	84-96	96-108	108-120
12/80						0.9993	0.9993	1.0037	1.0000
12/81					1.0035	1.0000	1.0002	1.0000	
12/82				0.9996	0.9993	0.9993	0.9996		
12/83			1.0037	1.0051	0.9985	1.0000			
12/84		1.0195	1.0007	1.0023	0.9988				
12/85	1.1268	1.0081	1.0042	0.9960					
12/86	1.1111	1.0083	1.0135						
12/87	1.1866	1.0231							
12/88	1.1427								
AVG.	1.1418	1.0148	1.0055	1.0008	1.0000	0.9996	0.9997	1.0018	1.0000
SELECTED	1.1310	1.0150	1.0044	1.0023	1.0000	1.0000	1.0000	1.0000	1.0000
(Year end factors) TO ULT.	1.1557	1.0218	1.0067	1.0023	1	1	1	1	1

	INCURRED LOSSES	AGE TO ULTIMATE FACTOR	PROJECTED ULTIMATE LOSSES	IBNR
1980	1,154,888	1.0000	1,154,888	0
1981	1,495,132	1.0000	1,495,132	0
1982	2,004,202	1.0000	2,004,202	0
1983	2,023,285	1.0000	2,023,285	0
1984	2,500,011	1.0000	2,500,011	0
1985	2,942,258	1.0000	2,942,258	0
1986	3,794,169	1.0023	3,802,896	8,727
1987	4,537,740	1.0067	4,568,143	30,403
1988	4,366,595	1.0218	4,461,787	95,192
1989	4,063,445	1.1557	4,696,123	632,678
		TOTAL		767,000


1988
250,000
200,000
150,000
100,000
50,000
0
OUTSIDE REINSURANCE
RETENTION
1989
250,000
200,000
150,000
100,000
50,000
0
OUTSIDE REINSURANCE
LAYER 1
RETENTION

PROPERTY DAMAGE — NET OF REINSURANCE $200,000

INCREMENTAL LOSSES PAID

	12	24	36	48	60	72	84	96	108	120
12/80										
12/81										
12/82										
12/83										
12/84										
12/85	1,938,124	864,692	92,917	35,506	2,689					
12/86	2,239,763	1,103,885	124,086	71,494						
12/87	2,833,212	1,445,848	182,445							
12/88	2,852,421	1,379,210								
12/89	3,150,243									

CUMULATIVE LOSSES PAID

	12	24	36	48	60	72	84	96	108	120
12/80										
12/81										
12/82										
12/83										
12/84										
12/85	1,938,124	2,802,816	2,895,733	2,931,239	2,933,928					
12/86	2,239,763	3,343,648	3,467,734	3,539,228						
12/87	2,833,212	4,279,060	4,461,505							
12/88	2,852,421	4,231,631								
12/89	3,150,243									

LOSS RESERVES

	12	24	36	48	60	72	84	96	108	120
12/80										
12/81										
12/82										
12/83										
12/84										
12/85	650,833	113,734	44,731	20,221	5,330					
12/86	998,916	273,830	178,529	147,354						
12/87	899,418	133,214	50,181							
12/88	960,101	123,358								
12/89	908,462									

INCURRED LOSSES

Acc. Year	12	24	36	48	60	72	84	96	108	120
12/80										
12/81										
12/82										
12/83										
12/84										
12/85	2,588,957	2,916,550	2,940,464	2,951,460	2,939,258					
12/86	3,238,679	3,617,478	3,646,263	3,686,582						
12/87	3,732,630	4,412,274	4,511,686							
12/88	3,812,522	4,354,989								
12/89	4,058,705									

INCURRED DEVELOPMENT FACTORS

	12-24	24-36	36-48	48-60	60-72	72-84	84-96	96-108	108-120
12/80									
12/81									
12/82									
12/83									
12/84									
12/85	1.1265	1.0082	1.0037	0.9959					
12/86	1.1170	1.0080	1.0111						
12/87	1.1821	1.0225							
12/88	1.1423								
AVG.	1.1420	1.0129	1.0074	0.9959					
SELECTED	1.1300	1.0150	1.0044	1.0023	1.0000	1.0000	1.0000	1.0000	1.0000
TO ULT.	1.1546	1.0218	1.0067	1.0023	1	1	1	1	1

	INCURRED LOSSES	DEVEL. FACTOR	ULTIMATE LOSSES	IBNR
1980				
1981				
1982				
1983				
1984				
1985				
1986				
1987				
1988				
1989	4,058,705	1.1546	4,686,181	627,476
			TOTAL	627,476

PROPERTY DAMAGE — NET REINSURANCE $100,000

INCREMENTAL PAID LOSSES

	12	24	36	48	60	72	84	96	108	120
12/80										
12/81										
12/82										
12/83										
12/84										
12/85										
12/86										
12/87	2,830,307	1,432,080	165,145							
12/88	2,849,085	1,365,711								
12/89	3,146,047									

CUMULATIVE PAID LOSSES

	12	24	36	48	60	72	84	96	108	120
12/80										
12/81										
12/82										
12/83										
12/84										
12/85										
12/86										
12/87	2,830,307	4,262,387	4,427,532							
12/88	2,849,085	4,214,796								
12/89	3,146,047									

LOSS RESERVES

	12	24	36	48	60	72	84	96	108	120
12/80										
12/81										
12/82										
12/83										
12/84										
12/85										
12/86										
12/87	900,480	130,672	48,920							
12/88	955,138	121,628								
12/89	904,544									

INCURRED LOSSES

Acc. Year	12	24	36	48	60	72	84	96	108	120
12/80										
12/81										
12/82										
12/83										
12/84										
12/85										
12/86										
12/87	3,730,787	4,393,059	4,476,452							
12/88	3,804,223	4,336,424								
12/89	4,050,591									

INCURRED DEVELOPMENT FACTORS

	12-24	24-36	36-48	48-60	60-72	72-84	84-96	96-108	108-120
12/80									
12/81									
12/82									
12/83									
12/84									
12/85									
12/86									
12/87	1.1775	1.0190							
12/88	1.1399								
AVG.	1.1587	1.0190							
SELECTED	1.1250	1.0120	1.0044	1.0023	1.0000	1.0000	1.0000	1.0000	1.0000
TO ULT.	1.1462	1.0188	1.0067	1.0023	1	1	1	1	1

	INCURRED LOSSES	DEVEL. FACTOR	PROJECTED ULTIMATE LOSSES	IBNR
1980	0	1	0	0
1981	0	1	0	0
1982	0	1	0	0
1983	0	1	0	0
1984	0	1	0	0
1985	0	1	0	0
1986	0	1.0023	0	0
1987	0	1.0067	0	0
1988	0	1.0188	0	0
1989	4,050,591	1.1462	4,642,787	592,196
		TOTAL		592,196

AUTO PROPERTY DAMAGE

INCURRED DEVELOPMENT FACTORS

DIRECT LOSSES

	12-24	24-36	36-48	48-60	60-72	72-84	84-96	96-108
1980						0.9993	0.9993	1.0037
1981					1.0035	1.0000	1.0002	1.0000
1982				0.9996	0.9993	0.9993	0.9996	
1983			1.0037	1.0051	0.9985	1.0000		
1984		1.0195	1.0007	1.0023	0.9988			
1985	1.1268	1.0081	1.0042	0.9960				
1986	1.1111	1.0083	1.0135					
1987	1.1866	1.0231						
1988	1.1427 *							

NET REINSURANCE $200,000

	12-24	24-36	36-48	48-60	60-72	72-84	84-96	96-108
1985	1.1265	1.0082	1.0037	0.9959				
1986	1.1170	1.0080	1.0111					
1987	1.1821	1.0225						
1988	1.1423 *							

NET REINSURANCE $150,000

	12-24	24-36	36-48	48-60	60-72	72-84	84-96	96-108
1977	1.0695	1.0080	1.0073	1.0120	0.9992	1.0008	0.9994	1.0000
1978	1.0945	1.0145	1.0108	1.0004	1.0003	1.0000	1.0000	1.0000
1979	1.1176	1.0141	1.0083	1.0019	0.9989	1.0000	1.0000	0.9989
1980	1.1708	0.9999	1.0024	0.9985	1.0000	0.9993	0.9993	1.0036
1981	1.0973	1.0104	0.9962	1.0094	1.0035	1.0004	1.0004	1.0000
1982	1.1307	1.0106	1.0000	0.9989	1.0000	1.0007	0.9993	
1983	1.0963	1.0039	1.0037	1.0043	0.9989	1.0000		
1984	1.0894	1.0191	1.0016	1.0026	0.9997			
1985	1.1223	1.0081	1.0029	0.9952				
1986	1.1208	1.0089	1.0128					
1987	1.1801	1.0202						
1988	1.1418 *							

NET REINSURANCE $100,000

	12-24	24-36	36-48	48-60	60-72	72-84	84-96	96-108
1987	1.1775	1.0190						
1988	1.1399 *							

1990 CASUALTY LOSS RESERVE SEMINAR

5F: LOOKING BEYOND THE NUMBERS

Moderator

Robert S. Miccolis
Tillinghast/Towers Perrin

Panel

Walter C. Wright, III
Price Waterhouse

Thomas M. Eversmann
PSM Insurance Companies

MR. MICCOLIS: My name is Bob Miccolis, I'm a consulting actuary with Tillinghast in Philadelphia. I'm going to be your moderator and narrator for this session. I'm also going to participate in part of the presentation. To my immediate left is Walt Wright. Walt is an actuarial consultant and a manager with Price Waterhouse in Hartford. Walt is an actuary, he's a fellow of the Casualty Actuarial Society, and he's done a lot of loss reserving work.

Next to him is Tom Eversmann. Tom is vice president Corporate Planning and Actuarial at Public Service Mutual in New York City. Tom's in charge of the actuarial area, but he's not himself an actuary.

In this session, we're going to be looking beyond the numbers. The other sessions at the seminar covered the numerical side. We are going to go beyond that. The first time this comes up is in the basic track in the basic considerations discussions where they go through definitions, and things to be cautious about. But here we're going to go give you a fuller illustration of what these considerations are all about.

We're going to talk about what you should know, and what you need to know, before, during, and after doing any kind of numerical analysis. We're going to be talking about things that can't be easily quantified, and things that could affect your quantitative analysis. We'd like you to come away with four major points.

First, whoever's doing the loss reserve analysis needs to have a very good understanding of the company, and the company's operations. Underwriting, claims, EDP, finance, accounting; those are all areas that can effect the loss reserve analysis. You need to know what's going on in these areas and how it may effect the loss reserves.

The second thing is that you need to ask questions about what's going on in those areas. And the third item is that you need to ask more questions. And the fourth major point is that you need to look for changes, even though the people you're talking to may not be able to identify them.

We're going to illustrate these points in a role-playing format, using two skits. This session has been given in past years and the first skit is a repeat, the second skit is a new act. I hope you'll enjoy them. We're also going to illustrate, through the second skit, how to use the questionnaire in soliciting information. The illustrations and the comments that you'll hear at the end apply both to the people who are doing the analysis from the inside, as well as outside auditors and consultants.

One skit is set up as an outside person coming in, and the second one is from an inside situation. We'll start the illustration in Act I. And Tom and Walt represent a company person; probably the CFO, played by Tom, and an outside consultant, played by Walt,

who's coming in for the first time to gather background information on the company and their operations, and their information.

This will be the first time a loss analysis is done for this company from an outside perspective, and we're going to illustrate the good things to do in an interview, and some of the mistakes that can easily be made in this type of interview. So, we'll start Act I with Walt and Tom.

WALT: Good morning, Tom. How are you?

TOM: Great, Walt. How are you?

WALT: Pretty good. Had a good flight, except for the fact that, you know, there's no smoking in the flight; it's a real nuisance.

TOM: Sorry, Walt, but there's no smoking in this entire building.

WALT: Oh, well, pardon me. Well, we better get down to business then, Tom. I haven't had much of a chance yet to become familiar with Upstart Insurance Company. What can you tell me about its history and organization?

TOM: Well, Walt, Upstart was founded in about 1925, primarily as a worker's comp writer. In the '40s and '50s, it moved into other forms of general liability. In the '60s, as packaging became more popular, it moved into that. And I'd say most of the risks throughout its history have been habitational and habitational related.

WALT: You mentioned multi-peril and habitational, exactly what lines of business do you write, and how are these lines distributed, in other words, by line, by state?

TOM: Okay. About half the business is written in package form. I'd say about 15 percent is auto, maybe about 15 percent is comp. We've been moving into some personal lines to gain some diversification. Probably 80 percent of the business is in New York State, the rest of it's pretty much in New England and in mid-Atlantic states.

WALT: I see. The SMP program, what type of business are you writing in that?

TOM: I'd say again, it's primarily our habitational book, 70 percent of that is apartments, condos, co-ops. Maybe 15 percent restaurants, 15 percent light manufacturing, maybe about 5 percent in there of miscellaneous stuff.

WALT: What's the miscellaneous, Tom?

TOM: Miscellaneous would probably be some light mercantile, maybe some products. We can give you an abstract of that, if you need it.

WALT: You mean an abstract for the miscellaneous class?

TOM: Yeah.

WALT: I don't think that'll be necessary, Tom, but I would like to have more information regarding the major categories; the dwellings, the restaurants, the manufacturing business. If you could give me a history, for the last five years, of premium in each of these categories, by state, I think that would be useful.

TOM: Sure, Walt.

MR. MICCOLIS: Well, Walt almost got killed there on the cigarette. Note that Walt didn't get off track on the minuscule data on the miscellaneous business. He stuck to his guns on the major classes, and the major focus of the business of the company.

TOM: Walt, what are you going to do with this information? I mean, how are you going to estimate our reserves?

WALT: Well, I guess I'll use the incurred loss development method to estimate what your reserves should be.

TOM: The incurred method, what makes you think that will work for my company?

WALT: Well, I'm from TPF & C M & R Mercer, we're the world's largest actuarial firm, and one of the best, and that's the method we always use.

TOM: Yeah, but how do you know it'll work? You don't know that much about us.

MR. MICCOLIS: Well, watch out here, Walt is getting himself into some hot water going down a particular method in the interview. Maybe he can get out of this, though.

WALT: Tom, you are absolutely right. It was premature of me to say I'd be basing the reserve estimates solely on the incurred loss development method. I'll probably use that method; it's a basic method, that usually is quite useful. So, it probably will be one of the preliminary tests that I use. But I'll also consider the ways that your company's operations may be affecting the choice of methods that are most appropriate, and affecting how those methods should be applied.

That's really the whole purpose of our meeting today, Tom, for me to gather that information so that I can apply techniques that are tailored to your company. I certainly won't use a cookbook

approach. Tom, what can you tell me about the underwriting of your business: guidelines and procedures, and so forth?

TOM: Well, let's see. All of the business is written through independent agents. We do have some large account business. We have some large producers as well. I think the largest would be about eight percent of our total book, but there are only a couple like that. We basically use ISO rates, and we use NCCI for our comp. I'd say the underwriting guidelines are pretty well documented.

WALT: Can I get a copy of those guidelines?

TOM: Sure.

WALT: Have there been any changes in the underwriting guidelines, in the last five years, for example?

TOM: I wouldn't say so.

WALT: So you're saying that the printed guidelines that you'll be giving to me, they should have a date of 1985, or prior, since there haven't been any changes in the last five years?

TOM: I seem to recall those were dated about 1987, but I don't think they've really changed from prior years.

WALT: Well, could I get a copy of the guidelines that preceded the '87 guidelines?

TOM: I'll see if we can dig one up somewhere.

WALT: I think that's important, Tom. I'd like to take a look and see what changed in '87. You mentioned that you use ISO rates for your SMP business. How do you evaluate those rates in terms of deciding whether they're appropriate for your business?

TOM: Well, we take a look at those rates relative to our own accident year indications, and see if they make sense.

WALT: Can you give me a history of those rate changes?

TOM: Sure, no problem.

WALT: What about rating plans; do you use scheduled rating plans, for example?

TOM: Yeah, we do.

WALT: And do you have a history of the credits that you've used?

TOM: Yeah, they've approximated about five percent over the years.

WALT: Do you have a report, Tom, that would give me that information?

TOM: No, that's pretty hard to develop. The SMP, which is the bulk of our business, doesn't really lend itself to that.

WALT: But you stated that the credit has been consistent at about five percent over the last five years. How do you know that, Tom, if you don't have documentation as to that?

TOM: Well, it's the underwriters, and I always believe the underwriters. They say that's based on their internal audits.

WALT: Well, I realize the underwriting managers aren't in now, but could you check with the underwriting department and get some documentation for those numbers?

TOM: I'll see what I can find. Why are you so interested in the schedule rating, Walt?

WALT: Well, on the flight down here today, I did have a chance to look at your annual statement, and looking at the loss ratios for your multi-peril business. I noticed that for the last couple of accident years you're anticipating a significantly reduced loss ratio. And there's really such a dramatic decrease in those loss ratios that I want to make sure that I gather enough information to be able to evaluate that. So I am interested in anything that you have that might effect my evaluation of those loss ratios.

MR. MICCOLIS: Notice here, Walt's doing pretty well. He got most of his questions in, he did his homework, he knows that SMP is a big part of their book, he went through the annual statement, he saw something was happening to the loss ratios, and he's trying to get some information out of Tom to try to explain that. He didn't strictly stick to a set of questions, he went and he looked ahead, he looked at the published information, and went to see how he could use it in terms of getting information.

WALT: Tom, I haven't really had a chance to look too much at the other lines of business yet, so I don't know if I'll need any detailed pricing information for the other lines, but it might turn out that I'll need that. If so, will it be available?

TOM: Sure, for the glit's pretty easy to get off the system, or the other lines, we have no discretionary credit.

WALT: Okay, very good. That'll be fine. Have there been any other major changes, Tom, that might have affected your SMP book of business?

TOM: Well, let's see. Back in the mid '80s, around '87 or so, when the market tightened, we really re-underwrote the book. I would say we had the opportunity to really look at preferred

risks, pricing was tight, our selection was improved, and we dropped about a third, or maybe even a half, of our in-force units over that time. Seems like we got out of a major program that was mercantile, it was mostly large department stores.

WALT: Those department stores that you were writing, you cancelled them, got off them completely?

TOM: Definitely, yeah.

WALT: That's interesting. Were they a major segment of your business prior to that?

TOM: Let's see, mercantile's probably less than five percent now; at that time it might have been 20, 25 percent.

WALT: I'm glad to know that, Tom, that's important for me.

MR. MICCOLIS: Well, surprise, surprise. No changes in underwriting guidelines in the last five years? A third of the accounts disappeared, 25 percent of the business went down to five percent. Walt didn't get the answers to his first question, but he persisted as part of the specific question about SMP and found out there was a major change in underwriting.

If he had only gotten those '87 underwriting guidelines he wouldn't have picked this up, and he wouldn't have known that the prior history included that mercantile business.

WALT: Tom, we touched briefly on the fact that you use ISO rates, and you do some evaluation of those rates to determine how they should apply to your business. Can you tell me more about that?

TOM: Well, yeah, we do use ISO rates. We have some deviations and we do do some schedule crediting. I'd say there are no deviations on the standard business, which we write in our subsidiary, Quick Start Insurance.

WALT: I'm sorry, you said you have a subsidiary, Quick Start?

TOM: That's right.

WALT: Gee, I didn't realize that.

MR. MICCOLIS: Well, another surprise. Walt had asked Tom to describe the company; it had been in business since 1925, just writing a few lines of business. Now we get down to rates and find out there's another company. If Walt had looked at the annual statement and flipped all the way back to the organization chart, he probably would have seen both Quick Start and Upstart were part of the same organization.

WALT: Tom, are there other significant changes that I should know about?

TOM: Well, Walt, you mentioned Schedule P at one point. You know, I know just enough about actuarial work to be dangerous. But if you're going to use Schedule P, then you might want to know about a reinsurance commutation that we did.

WALT: Sure, what can you tell me about that, Tom?

TOM: Well, basically, one of our larger reinsurers, on our casualty program, just looked like they were going to have a tough time making it, and we got worried. They approached us to commute that reinsurance, and we thought about it, we analyzed it, and we wound up doing it. So, when we booked it, we wound up crediting our outstanding losses as well as the paid losses, and that information flowed through our ledger and got into Schedule P.

WALT: I'm not quite sure that I understand, Tom. Can you clarify that for me?

TOM: Sure. Okay. Basically what we did was we credited our ceded outstanding, which we normally set up as debits in the annual statement. Those debits offset the usual credit balance in the outstanding, You know, credits on the right. And then when the reinsurer paid us, we took the money and booked that as a credit to loss payments, just like any other seeded recovery.

WALT: Gee, Tom, I'm having a problem. I wish you could speak a little more like an actuary, rather than an accountant. I'm still not sure that I understand just what you did in the annual statement.

TOM: My accounting always comes through, but let's go through it real slow. We took down the ceded, so we credited our losses. Basically, credit -- the ceded is usually, a debit balance. Do you follow that?

WALT: Yeah.

TOM: Almost like an asset.

WALT: Yes.

TOM: Okay. So that credit really equals an increase to the total outstanding. Does that make sense?

WALT: I think maybe I understand. Let me see if I can repeat it back to you. When you commuted the reserves, you took the loss reserves back; took them back from the reinsurer. So you increased your loss reserves?

TOM: That's right.

WALT: And that's what you mean when you say you credited the ceded reserves?

TOM: That's right.

WALT: Okay. And then you were paid for taking these loss reserves back?

TOM: You got it.

WALT: And so the payment, you reflected that payment by reducing your paid losses as shown in the annual statement?

TOM: That's right.

WALT: And that's what you mean when you say you credited your paid losses?

TOM: That's exactly right.

WALT: Okay. So you credited your paid losses, and you credited your ceded reserves. I think I do understand that, Tom, and I think I see how that will fit into your annual statement. That's the way it appears in your statement for '89?

TOM: You got it.

WALT: Okay. I'm glad to know that. I will need to be able to unravel that.

MR. MICCOLIS: Boy, this was tough. Did anybody understand Tom? Debits and credits, and Walt was looking for his accounting book, and he didn't figure that would work. Obviously it had a big impact on him, and he had to determine what was going on. Walt could have taken some notes and then said I'll come back to this later, but he persisted and tried to get Tom to come up with some kind of simple description of what happened and how Schedule P might be affected. But now, he's got to go a little further, because he's got to know what development data he's going to get, and how that's going to be affected by these commutations.

WALT: Tom, the claim department operations often have a major impact on the data that I look at. What can you tell me about Upstart's claim function?

TOM: Well, Walt, I think that function has been pretty consistent over time. There were some management changes, the former VP retired probably end of '83, early '84. Now that I think about it, we did get a new guy in there that's been a bit more aggressive. I mean, he was bringing in his training from a much larger company than we are. Seems to me in talking to him he said that he felt that the adjusters under the old regime had not been very aggressive about setting up cases. So I guess based on that, he started pushing them, and I guess they began to

strengthen reserves, or set them up a little bit faster than they had in the past.

WALT: Okay. So you're saying they have strengthened the case reserving process?

TOM: I believe so, yeah.

WALT: But, Tom, I don't think that happened.

TOM: Why do you say that?

WALT: Well, one thing that I looked at this morning was the ratio of your paid losses to your incurred losses. And if what you said really happened, then I'd expect to see those ratios decreasing as the case reserves increased. But I didn't see that happening, Tom, so I just don't think that can be the case.

TOM: Well, now that I recall, I know I've got a memo that says so, Walt.

WALT: Well, all I can tell you, Tom, is what I saw. But, you know, thinking about it, maybe I am wrong. I guess there's a possibility that that happened, if I'm looking at the ratios of the paid to incurred losses, then really there's both the numerator and denominator that I should be concerned with. So what you're saying is that the incurred losses, the denominator, would have increased?

TOM: Should be right.

WALT: And because of the case reserve strengthening, if that really happened, I guess that would be true, but I didn't see any changes in the ratios of paid to incurred. So maybe something happened with the paid losses, with the numerator of the equation. Is there anything that might have happened to have caused the paid losses to also have increased? Did you speed up the loss payments, by any chance?

TOM: Can't think of anything off the top of my head.

WALT: What about the claim department caseloads; have they changed over time?

TOM: Well, maybe some. Again, with this management change, I think the new guy brought in sort of a formula approach to allocating the cases to the adjusters. You know, based on the degree of complexity, whether the claim was in suit or not, X number of cases would go to each adjuster. But I really have a hard time seeing, you know, what, if any, effect that had.

WALT: Have there been any mandates to the claim department that they should speed up the processing of claims, for example? Or pay the easier claims, get them out of the way, anything like that?

TOM: I don't think so. Again, I know the new guy, being somewhat more progressive, would like to close a claim, settle it, get it out of here, at some "higher value" today, than maybe -- the present value of some future payment later, thinking it will save money over time.

WALT: But would that have represented any dramatic change from the ways things had been occurring in the past?

TOM: Can't see it.

WALT: I'm still puzzled then, Tom. I'd like to be able to give you full credit for the fact that you think that the case reserves have been strengthened, but I don't see that in the paid-to-incurred ratios, so I guess I'll need to do some further investigation. I'm wondering if I could speak to your claim adjusters, maybe they have some insight, in terms of how the claim payments might have been speeded up.

TOM: Walt, I think that would really be a waste of time.

WALT: All right. It's important to me, though, Tom. I really would like to talk to them.

TOM: At $400 an hour, I'm sure you'd love to. But, all these guys do is sit around and complain. They complain too much. They whine about anything that changes. And the claims VP is out for two weeks. I don't know what you'd get out of it.

WALT: What would they be whining about, Tom?

TOM: Any change. These are the world's most stubborn people, you know. They do save us money, because they're stubborn. Any change at all that comes along, they gripe about. The last one I know there was a big to-do about, a new IAS system that New York State put in.

WALT: I'm sorry, a new IAS system? What's that?

TOM: IAS stands for Individual Assignment System. My understanding is that the New Your Courts, where most of our claims are, most of our suit claims, had a central court calendar that all cases funnel through. When they finally got their act together and were ready to take the case to trial, then it would be assigned to a judge. Well, then you've got a judge that might have been on vacation or had something else going on, so, the system was really sluggish and there were so many outstanding cases that New York decided to just split the central calendar into individual calendars assigned to individual judges. When they did that, the judges became responsible for managing the load, got totally freaked about the amount of cases that they had and started pushing the companies and the plaintiff's attorneys to try to settle these cases. So now that I think about it, if they had pushed them to settle, they weren't going to court as often, but they are settling more cases.

WALT: Well, that sounds like that's the missing piece of information, Tom, that we were looking for. Maybe that is what caused the paid losses to increase. Can you give me some documentation on that that describes exactly what took place with that change.

TOM: Absolutely.

WALT: Okay.

MR. MICCOLIS: Note here that Walt had to really dig and dig and dig and go back and forth to get his information. Reserves were strengthened, at least that's what the memo said, but something had happened to the claim counts that Walt couldn't see in advance, and he finally got Tom to see the light and come up with his own explanation of what might have happened.

WALT: Well, Tom, I think that pretty much wraps things up. Your secretary was getting a copy of the latest actuarial review for me. So I'll take all this information back to Hartford, and start my preliminary analysis. After I finish that I'll probably need to come back and sit down with you a little bit longer to go over any new questions that have arisen.

TOM: Any time Walt.

WALT: Okay, Good talking to you Tom.

TOM: Good to talk to you.

MR. MICCOLIS: Well, let's just look at some of the high points. Some of the good things and bad things out of this interview. On the good side, Walt was persistent, almost to a fault, but he had to get this information somehow. Now, if Tom had just asked for the data, would have done some of his analysis before he realized that something was going wrong or that something wasn't easily explained. He may have used the old SMP data for the prior years and had an inappropriate tail factors because it had some bad mercantile business in it. Tom asked for documentation. The important thing there is not just to ask for it, but take notes and follow up to actually get the documentation. If the documentation isn't complete, go back again and ask for some more.

Walt realized that the methods he was going to use, both in asking questions and when he actually has to do his analysis, have to be flexible. They have to reflect the changes in the operation that have taken place. He requested clarification of any terms he didn't understand, the accounting treatment of the commutation, the IAS system, and the other things that he didn't understand. He also weeded out immaterial data, that is things that didn't seem relevant to the analysis.

Now, what are some of the highlights of what Walt didn't do quite right? Well, he went through his interview process somewhat haphazardly. I think his list of questions vaguely consisted of company, overall, underwriting and claims. He didn't have his questions organized in any kind of systematic basis. Although, even if he was better organized, the demonstration showed you can't just ask the questions in the order they're written down, because sometimes the answers don't come in the right order.

Tom mentioned the commutation program. Well, obviously, they bought reinsurance. And if Walt had looked in Schedule F, he would have seen that they bought reinsurance. But he didn't ask any questions about the ceded reinsurance program.

Loss adjustment expense, we didn't hear any question about them. Whether they were included in the case reserves or whether they're separately posted as a bulk reserve. Also the process by which claims are recorded versus reported, that's usually important and something that was looked over. The whole data processing and accounting area, was not looked into in any depth. Although, at the end, Walt asked for the latest actuarial analysis, he didn't get into how the actual IBNR's were set, or what the general process was.

Now your handout has a long list of questions (appendix) which were pulled from several different sources and put in a reasonable order. I'm not going to go through it in any detail, but we can have a free form discussion at the end, if you'd like. This questionnaire can be used in several different ways. It's more as an interview guideline rather than something that you'd hand to somebody and say, here, fill out this form and answer these questions. Although, in some cases, you may need to provide some of the
questions in advance so that they're better prepared to answer them.

The questions cover the background and the organization of the company, their underwriting and pricing area, the claims operation, the case reserving, the IBNR reserving area, ceded reinsurance, systems in accounting, and at the end, there's some questions on external environment. There's also a list of special areas. Each of these areas, MGA business, reinsurance assumed, excess, financial guarantee, loss reserve buy outs, and self insurance captives, would have separate sets of questions, because of the unique aspects of those types of businesses. So, hopefully this will be of some use to all of you in the future.

Now, what I'd like to do is ask Tom and Walt about their thoughts on this overall process. The process of gathering this type of information in terms of their experiences.

MR. MICCOLIS: In our second skit, we're going to illustrate how to use some of those questions, and Tom will give you an introduction to our Act II.

TOM: Thanks, Bob. I hope you're finding this amusing, since we don't, or I don't have any actuarial jokes, except for maybe two (Points to Bob and Walt). In the second skit, I will be playing the chief actuary at a well established company, called shifting Sands Mutual. As chief actuary, I've come from my predecessor company, Belly Up Fire and Marine, and I'm replacing a fellow who disappeared because of reserve problems here. I'm about to enter my first review session, face-to-face with Walt and Bob, and I've sort of left them stewing in my office for a little bit before I go in.

WALT: Gee, Bob, we never had to go through a review of this kind before.

MR. MICCOLIS: Yeah. In the past, we just gave our results to senior management. What does this new guy know about reserving anyway?

WALT: I don't know, but I'm worried, Bob. If he doesn't know anything about reserving, he's probably going to have us redo things the way they used to do things at Belly Up Fire and Marine. I just hate wasting all that time. He probably has no idea of the time and effort that the two of us put into this reserve analysis.

MR. MICCOLIS: Yeah, the two of us easily do the work of three people.

TOM: The three stooges. Bob, Walt, ready to get to it? I'm sure glad I looked at this report.

WALT: Tom, I'm not sure what questions you're going to ask us, but we've done our analysis the same way that we've always done it. In the past, we never had to discuss it in detail with your predecessor. After we had initially established the methods that we were going to be using, we've never had any other issues.

TOM: Issues? You don't call an $80 million increase in reserves, in one quarter, an issue? And, looking at this report there's no analysis, there's nothing that gets me to the root of the problem. What's going on here?

MR. MICCOLIS: Well, Tom, I guess we think the numbers speak for themselves.

TOM: All right, I've got to go through this with you guys to make sure that, you know, I can tell that you're comfortable with what went into your analysis. Next week I've got a management committee meeting and I have to present these results. I can't just walk into the president and say, "Here's a piece of paper that has $80 million on it." And I really doubt that he's going to say, "Tom, say no more, the numbers speak for themselves." It just isn't going to happen.

What I need, really, is to get some more background, and I also want to find out what qualitative factors you guys put into this analysis. As a good format, I've got a questionnaire that I picked up at the Casualty Loss Reserve Seminar. I've circled some questions. Yes, this will me get more familiar with Shifting Sands Mutual. Have you all seen this before?

WALT: No.

MR. MICCOLIS: No.

TOM: We used this all the time at Belly Up. Since I've been here, I've gotten to know a little about Shifting Sands organization as it stands today. What can you tell me about changes in the recent past?

WALT: Well, there were a lot of lay-offs after the last underwriting cycle. I know that the underwriting and field operation staff was cut back.

MR. MICCOLIS: Yeah, and we had a claims study about three or four years ago. That study said we ought to increase the claim staff.

WALT: And they're always making systems changes, but I'm not really sure what they've done with the staff level in the systems department. There always seem to be a awful lot of people over there.

TOM: Have you guys given any thought to how some of those changes might have affected your analysis?

WALT: No.

MR. MICCOLIS: No, not really.

TOM: Well, I may have to come back to that. We may as well go on. Let's move over to Section C of the questionnaire, it's on page two. What do you guys -- or how do you guys keep on top of underwriting, what's going on there?

MR. MICCOLIS: Well, Walt, aren't you always having lunch with Harry from underwriting? Do you get any information out of him?

WALT: Well, yeah, we have lunch about once a month. I try to get a scoop on their programs. But, you know, he's always complaining about his IBNR allocation. I don't really think he understands IBNR in the first place, let alone how it's allocated to him. But we end up taking most of our time talking about IBNR, and whenever I ask him about underwriting issues, he just gives me stock answers like, they write nothing but the cream of the crop.

TOM: Cream of the what? Well, look, let's go on. Do you guys get underwriting procedures and guidelines?

WALT: Yeah, they've got all this information about "excluded classes," and "refer to home office." It's all qualitative, there's no way to work it into our numbers.

TOM: Well, did you ever think about, maybe, comparing those guidelines over time to see what changed? Like, did you ever look at the changes in say, maybe field underwriting authority, or the impact of staffing levels in the field?

MR. MICCOLIS: No.

TOM: Did you ever go on an underwriting audit?

WALT: Are you kidding? Even if we wanted to, they wouldn't let us.

TOM: Let's go on. Let's take a look at questions three and four on page three. What about the mix of business, what's changed in that?

MR. MICCOLIS: Well, in the comp, we stopped writing that Loamhill Trucking business last year.

WALT: The only other thing I'm aware of, in the small business marketing area, they've made a big effort to go after tanning salons, and it's really been growing.

MR. MICCOLIS: Yeah, they're really going to get burned.

TOM: I'm sure they will. All right. Let's move right along here to question eight on the next page. Let's try an easy one. How do you all reserve for the residual market, the pool business?

WALT: Basically, we don't reserve for that, Tom. Accounting does that, they just book what's reported to them.

MR. MICCOLIS: Well, we do have the Minnesota comp pool in our data, and the South Carolina JUA, that's in there, too. We haven't been able to get that out of the data we use.

WALT: Yeah, yeah, that's right. There are a few exceptions, Tom, and, of course, with our systems department you can never really be quite sure what's in our data.

TOM: But how have you evaluated the reserves that are being set up on pools?

WALT: Like I told you, Tom, the residual market reserves are handled by accounting, and they book what's reported to them.

TOM: Yeah, but as actuaries, don't you think we ought to do an evaluation? I mean, reserves are our responsibility, and I have to sign the certification. And it'd be nice to know what's in our data base. Let's try question nine. Pricing, have you looked at what the pricing unit is doing, and what assumptions they've made? I know that there have been changes to ISO loss costs; they're doing a lot of work. Do their assumptions affect your reserve analysis?

MR. MICCOLIS: I'm not really sure what the pricing work has to do with reserving.

TOM: But, like, don't you all use methods that might use earned premiums, like, Bornhuetter-Ferguson?

WALT: Well, we use a variation there, Tom, a variation called the Ron 2 Method, it's named after two actuaries named Ron, and it's a lot easier to pronounce.

TOM: Yeah, but how do you pick a set of initial expected loss ratios?

WALT: Well, actually, Tom, I don't really have to. The approach that I use when I apply the Ron 2 Method, is first to do a loss development method and get a set of estimated ultimate loss ratios, then I take those ultimate loss ratios, and plug them right into the Ron 2 Method.

TOM: Doesn't that give you the same answer?

WALT: Yes. That's the beauty of it, Tom. Senior management loves to see the consistency of the two methods.

MR. MICCOLIS: Yeah, it really increases their confidence in our work.

TOM: I was wrong before, it's Laurel and Hardy. Well, anyway, on to question ten, maybe? Have you monitored relative pricing levels?

MR. MICCOLIS: Sure.

TOM: You do?

WALT: Yeah, we do. For auto, for example, we have a report that gives us rate changes by state, by year, gives us both the indicated and the approved rate changes.

MR. MICCOLIS: And in the umbrella book, we have a price monitoring system, keeps track of percent of annual premium.

TOM: Okay. What about for worker's comp and the package business? I mean, that's where we're having our reserve issue.

WALT: Oh, worker's comp is all bureau rates.

MR. MICCOLIS: The package business, they price that in all the little pieces, and they got scheduled credits on some pieces, and deductible credits on other parts. They make it almost impossible to keep track of.

TOM: Okay. The president, I was up to see him, and he gave me a report on pricing. Have you all seen this? It's from underwriting.

WALT: No.

MR. MICCOLIS: It looks like a pretty convenient summary of pricing activity, though.

TOM: You ought to get on the distribution, we'll have to look into that. And it would probably be a good idea, or good exercise, to walk through the pricing history on these things and see if it affects your initial expected loss ratios. Let's look at question 11, the last one in that section. Have you all compared the data that the pricing unit has with what we use in reserving?

MR. MICCOLIS: Well, they look at all the classification data, and what the competitor's rates are, what a product line, what the market conditions are. They aren't even concerned about annual statement line.

WALT: But our reserving analysis has to support the annual statement, so we can't use the pricing data.

TOM: But have you all ever, like, reconciled it?

MR. MICCOLIS: Well, once in a while we have to come up with something to answer questions for a rate hearing.

WALT: And we always are able to come up with some kind of a response.

TOM: I know there are some worker's comp pricing reports that have projections of ultimate, and they conveniently have incurred-to-date. Have we ever tried to match those up, for the comp line?

MR. MICCOLIS: Well, we haven't done it, but one of our actuarial students recommended comparing that. Maybe we ought to have him go ahead and do that.

TOM: Maybe I ought to promote the actuarial student. Let's move on to the claims section, D. We've had a number of meetings with claims because I think it's really important to get to know what they're doing and how it affects the data. Walt, have you gotten that history of historical settlement rates that they promised us?

WALT: Well, I haven't gotten it yet, but I am expecting it either later today, or tomorrow morning first thing.

TOM: Any guesses as to what the impact of that might be, based on what we discussed, on your indications?

MR. MICCOLIS: Well, gee, Tom, we've only been doing this for two months. We're really not quite sure how to handle this yet.

WALT: We're definitely planning to incorporate it in our fourth quarter review, and we'll be able to work in any changes in the settlement rates at that time.

TOM: Wait a minute. We've got an $80 million reserve issue today. We're not sure if these numbers are going to hold. There seems to be a lot of loose ends in your analysis. The president's concerned about these numbers, I mean the impact on the earnings-per-share is pretty significant for the quarter, and we don't want to see it go the other way next quarter.

We've got to salvage this. I think worker's comp is obviously our big problem. It's over half of the increase. We're going to get some additional information tomorrow from the claims department, and you don't really know what the impact will be.

MR. MICCOLIS: Well, we'll try to rework the numbers and see if we can get them down some.

TOM: Well, this management committee meeting I've got is next week. I hope you guys can crank it all weekend and we'll get together first thing on Monday?

MR. MICCOLIS: Sure.

WALT: Yeah, we'll try to get the numbers down.

TOM: Now, I don't want to give you all the impression that I just want you to get the numbers down. I mean, our goal really is to find the right number, and make sure that we're comfortable with it, and we can fully support it.

MR. MICCOLIS: Well, looking at this questionnaire, we haven't talked about this other stuff on ceded reinsurance and systems and accounting.

WALT: Couldn't we work on those things in the fourth quarter?

TOM: Well, I think we're going to have to. I mean, for the time being, we really need to focus on the worker's comp issue for the third quarter. Management already knows that the pricing has deteriorated on the other lines, so they kind of would be psychologically expecting an increase in reserves and I don't think it'll be a big surprise, and we could maybe dance around that.

WALT: This questionnaire, Tom, it seemed pretty interesting to go through. Where did you say you got that again?

TOM: At the Casualty Loss Reserve Seminar. Haven't either of you gone to one of those?

WALT: Well, we've had a pretty tight budget for the last several years. We're only allowed to go to one meeting a year.

TOM: You can get the transcript for $40. I'm sure you'd probably rather go to Boca Raton than the Airport Hyatt in Dallas.

(End side one.)

TOM: You really ought to go to the next seminar.

MR. MICCOLIS: Are the sessions really that good, Tom?

TOM: Yeah, I got this questionnaire at a great session called Looking Beyond the Numbers. The other sessions are pretty good, too.

WALT: We'll plan to go next year then, Tom.

TOM: Great. Okay, guys. See you Monday morning. I'll call you two in the office over the weekend to hear how you're making out.

MR. MICCOLIS: Okay.

MR. MICCOLIS: We're going to go through some comments now, about what each of us have learned in our practical experience that goes somewhat along these lines. The questionnaire that we gave out is, as you can see in the skits, is somewhat more of an interview guideline. It's not something you necessarily hand to a company, or to people inside the company, and say here, answer these questions. In some cases, you may have to prepare the questions in advance so the information can be put together.

I'd like to move on now. I'm going to ask both Tom and Walt to give some of their thoughts to you on the overall process, and their personal experiences in dealing with this kind of a process. And what they've seen and what the important points are. We can start -- Walt, can you start?

MR. WRIGHT: Well, as actuaries, and others responsible for estimating loss reserves, I'm sure that you all realize the important responsibility that that entails. I think most of us spend a lot of time making sure that our quantitative methods, and assumptions, are appropriate to do the best job that we can. But the qualitative aspects are also important, and often I think it's the qualitative aspects that might make the difference between a good loss reserve evaluation and a superior loss reserve evaluation.

So what I'd like to do is just kind of go over five nontechnical tips. I know you received lots of very technical tips yesterday, and I'm sure there'll be some more in the remaining meetings today. But I'm just going to emphasize five nontechnical tips that I think all relate to the first skit that we ran through this morning.

Number one, is be prepared. Start with a comprehensive set of questions like those that we passed out today. Otherwise, you really risk overlooking a whole line of questioning, such as changes to the ceded reinsurance program, or to data processing procedures. Further, if your analysis ever is questioned, a comprehensive list of questions contained in your work papers may serve as documentary evidence that you began your analysis in accordance with sound actuarial principles. So to be professional, be prepared.

Number two, don't be afraid to ask dumb questions, ask for definitions, clarifications, explanations. Your role is to obtain information, not to show how knowledgeable you are. If you don't understand something, ask. If you're not sure if you understand something, ask. Even if you do understand something, it doesn't hurt to ask for further clarification. In fact, by playing dumb, you may find out things that otherwise you'd never learn. So ask dumb questions, and learn all that you can.

Number three, focus on the important issues. Don't get sidetracked on irrelevant issues, no matter how interesting they may be to you. As you gather information, sort out the important issues from the immaterial, and keep probing the important. If you don't go through this sifting process, you're apt to end up with a lot of information, but little in depth understanding of the critical items. So keep your focus on the important issues, keep narrowing your inquiry in order to reach the best professional opinion that you can.

Number four, be persistent. Don't be overly concerned that you may be annoying. Your analysis will be judged by its thoroughness, not by whose feathers you ruffled. Be persistent in requesting what you believe is important. To do your job right, you need to dig in and probe. If the specific wording in a commutation agreement, for example, may be important to you, don't be satisfied until you get a copy of it. If large loss data is not readily available, but is important, don't be satisfied until you receive it. Be persistent so that your opinions will be based on all of the important information.

Number five, plan to ask a second round of questions. After you gather your initial information, you should begin your numerical analysis. But keep in mind that this may be only a preliminary analysis. As you do your calculations, new issues will surface. Then you can refocus your investigation, and ask another series of questions, if necessary. You have no obligation to stick with your preliminary findings. Your obligation is to go through the

iterations necessary to be satisfied with your analysis. So recognize at the outset that a second round of questions may be necessary.

To summarize: be prepared, don't be afraid to ask dumb questions, focus on the important issues, be persistent, and plan to ask a second round of questions. I think these five tips will help ensure that you do the best job possible.

MR. EVERSMANN: I just have a few comments based on my own personal experience. As Bob said, I'm not an actuary, but I did develop the reserving unit at PSM about six or seven years ago, and now have a fellow and a staff of students working for me in that area, so I don't have to do it any more. But I learned the hard way, and now they're learning it.

What we've talked about here is getting information, and if I have one piece of advice for you, it's to try to develop relationships with the people that you're working with either at our clients or the companies that you work for. It sounds pretty silly, it sounds pretty mundane, but I know from my experience in watching the people that now work for me that it's easy to lose sight of.

I heard it here one time: know a few good methods and listen. And I know my people know a lot of good methods and they apply them, and usually they'll wind up not having the time to go out and really listen. If you're a consultant, it's doubly hard, but you've got to get in there and talk to as many different functional people as you can; try to get introductions to them. If you're an inside person there's no excuse. There may be reasons, like it's a big company, and the claims people are somewhere else.

But it's just information that you really, really need to know. There's enough changes that go on in the numbers, if there weren't, everybody'd be happy and data would be very consistent and we could project things very nicely. That just doesn't happen.

Everything we've talked about here in the questionnaire serves as a good outline of the areas that you need to hit. It's information that's absolutely essential to your analysis. So, try to dig up those relationships, try to go in and talk to people, hit every major functional area. No one person will know all the answers. I think from Skit I you can see as I tried to stoneface Walt, you'll have the same thing happen, because most people in companies will say, "No, I don't want to be bothered, and how are you going to use this information, anyway?"

It's important, and the more you dig, the more you find out, and the more it really can affect your analysis. There's also the attitude that, particularly as a consultant, you want to go in and not be fed a line of stuff like, every company's going to

tell me that they re-underwrote the book, and the risks are a lot better, and we strengthened our case reserves, and everything else. You'll find that we don't need IBNR, or if anything, it should be negative. That's particularly true if you talk to the underwriters.

So you kind of get a jaded view, and say" well, what's the plan". I'm just going to get the BS. You have to sift through a lot and it's -- I think your job in developing as good actuaries, to also be good managers and good listeners to the information that's available to you, and bring it into your analysis. We'll all do a better job, I know I've found that it's helped me tremendously. So if you walk away today with anything from me, that's it. Form the relationships and get all the information you can, it really counts.

MR. MICCOLIS: I'd like to get some -- either questions, or personal experiences, or comments, from anybody in the audience. Do we have anybody at this point that has anything they'd like to add? While you're think about a question, one thing that we've seen that's been helpful is when two people conduct the interview.

Sometimes a doubling up is seen as an overkill, but you get into interview dynamics when one person is asking the questions and the other one is listening to the responses. It may help when two people get the responses a little quicker and be able to cycle back faster, where one person is really concentrating on the responses and trying to connect the responses from the interviews.

There's another session at this seminar on Presentations to Management, and one of the things that they emphasize there, is that management really needs to have a good explanation, especially when there's a change. They need to know why the changes are happening, so that they can accept those changes.

You're not going to be able to give those explanations very well, unless you've done the digging. Both before you've started your analysis, and after you've completed, at least, your preliminary analysis.

You really need to dig into all the areas we talked about; underwriting and claim systems, reinsurance, all the things that are listed in the questionnaire that might affect your reserve levels. Sometimes it's just a matter of picking one method over another, and that qualitative information may help you decide which method to use.

We did get a question last year about whether some of the process should be written, rather than oral. If you give the company the questions, as we said, and ask them to write down their responses, and then come back to them and question them further after a first round of written responses. Well, in some cases

that's courteous, or it can get the dialogue going, and it may give them an expectation of what kind of information you're looking for.

But as we saw through the two little skits, you can get those written responses, go through the interview, and then, basically, throw away the written responses, because people are trying to protect their own territory. But it may help get the process started. Anybody have any comments?

MR. LACEFIELD: Hi, I'm David Lacefield at Keystone Insurance. We had an experience similar to what occurred in the first skit, where we were observing the average claim payment rising rapidly. And, in discussions with the administration of the claims department they had no explanation for that, except that perhaps large claims, primarily in automobile liability, may have been getting out of control.

They instituted procedures to try and get a handle on that, and then, some months later in reviewing large claims, we found everything looked very normal, no claims had been handled inappropriately. But the average claim payment was continuing to rise very rapidly, and by going beyond the claims administration, and talking to supervisors and to branch managers, we found that effectively what had happened was they had raised the authority level on small claims for a group of new claims representatives, and it was the small claims that were being overpaid.

And it was one of those situations where we thought we had open lines of communication, we were asking all the right questions, and we were getting no explanation that worked. Do you find those situations coming about frequently?

MR. MICCOLIS: Absolutely, and sometimes in the skit, we talk about going on an underwriting audit, we would also add that participating in a claims audit as well, to actually find out what's being done in the field.

MR. EVERSMANN: There are times you really have to beat some people to death. I mean, these situations are not at all farfetched, and what we put in the first skit about the speed up of settlement and the case reserve strengthening, and then looking at paid-to-incurred ratios, and going "Not being changed," happened in my company a few years ago. I mean, in fact, it wound up being the subject of Jeff Mayer's paper, The Mayer-Fleming Approach dealing with simultaneous changes in case reserve adequacy and rate of payment.

I know that at the time we were getting wildly different answers on different techniques. This method would be 40 percent higher than that method, and what have you. We called in three different outside consultants, and we were also going through an insurance department review. We wanted to make sure we knew what we were getting.

One of the sets of consultants said, "Well, we don't see it." Well, two years later now the ultimates are lower than what I even projected, and they thought I was crazy. You've got to do the digging.

MR. MICCOLIS: Other people? Bob?

(Interference in sound on tape.)

QUESTION: -- of two different people, preferably in two different departments, and that way you can get an independent verification of the question. And that sometimes can save an actuary a lot of time in going down one road, when the answer you were given was wrong. So an independent verification is always good.

MR. MICCOLIS: Or asking two people even in the same department, to make sure you get the same answer.

Well, I thank you all. We're ending a little early, so you have an early break. Have a good time the rest of the session.

LOSS RESERVE QUESTIONNAIRE

Robert S. Miccolis, FCAS, MAAA

Tillinghast

LOSS RESERVE QUESTIONNAIRE

A. PURPOSE

This questionnaire is intended to develop information on:

- The major internal and external factors affecting the analysis and establishment of loss and loss expense reserves
- The general methods currently used to establish the company's loss and loss expense reserves
- The data needed to evaluate the company's reserves

B. BACKGROUND AND ORGANIZATION

1. Briefly describe the company's operations. Include a brief history of the development of the organization in terms of its primary purpose and fields of activity.

2. Provide an organization chart and a description of the major functional responsibilities at each level including both branch and home office areas. Include the number of employees in each functional area. Describe any

significant changes in the function structure of the organization or in staffing levels in the past few years.

3. Describe the company's major business segments. Include a profile of the company's business by major segment in terms of types of insureds, geographical distribution, lines of insurance, limits and deductibles, and any special coverages offered. Provide information by segment on the number of policies written and direct/net written premiums for the past five years.

C. UNDERWRITING AND PRICING

1. Describe the underwriting management organization. Who is responsible for underwriting overall and for each major business segment?

2. Describe the underwriting process for each major business segment and any changes in underwriting that have occurred over the last five years. Furnish information about the following areas:

- Underwriting manuals, written underwriting procedures, and risk selection guidelines
- Underwriting authorities (internal and external)
- Rating methods and procedures including classification systems

- Rating plans (e.g., experience rating, schedule rating, retro plans) and dividend plans
- Exclude classes, maximum limits, eligibility requirements, etc.
- Underwriting reviews
- Audits, inspections, or other reports

3. Describe each major business segment in terms of the underwriting characteristics (by line or by program) over the last five years. Indicate any major shifts in business, canceled programs, and any significant changes in coverage terms or pricing. Also, describe any major changes prior to the latest five years for any long-tail lines of insurance.

4. Provide a profile of premium volume for each major business segment as follows:

- By state and major cities
- By size of risk
- By major risk class
- By rating plan including retros and variable dividend programs

Have there been any significant shifts in the composition of these profiles within the past several years?

5. Describe any large or special risks that are not characteristic of the book of business.

6. Describe any material changes in policy forms and provide a copy of non-standard policy language.

7. Have there been any changes in policy term, e.g. six month policies vs. annual? Are any policies written for a term longer than one year?

8. How is business recorded for assigned risks (or other residual market mechanisms)? Has the company experienced any major changes in this area?

9. Describe how the company establishes its rates and price levels for each major product line including the use of bureau rates and deviations. Have there been any changes in these ratemaking procedures? Indicate the extent to which market conditions have dictated previous and current rate levels.

10. Outline any price monitoring systems in place for the past three to five years. How is the level of premium adequacy determined for the past two to three years? Have any corrective actions in pricing or underwriting been taken in the last three years?

11. Compare the data used for ratemaking with the data used for loss reserving.

D. CLAIMS OPERATIONS AND CASE RESERVING

1. Describe the claims organization and the distribution of responsibilities for administration, investigation, litigation, case reserving, settlement, and salvage/subrogation. Discuss any significant changes in the claims operations that have occurred in the past several years.

2. Describe the procedures for monitoring and settling claims including the use of outside adjusters and for handling litigated claims including the selection and monitoring of outside defense counsel. Briefly discuss the claims administrative process including initial reporting, review (diary) system and settlement authority levels. Provide a copy of the claims procedures manual and any bulletins or memos relating to claims procedures.

3. Discuss the average caseloads of the claims personnel. Have caseloads changed materially over the past several years? What has been the claims backlog situation and how is it controlled? Indicate the performance measures used to evaluate the claims personnel, particularly any quantitative factors that relate to number of cases settled, average settlement amount, and settlement amount vs. case reserve.

4. Describe the company's specific guidelines or objectives in setting case reserves. Have there been any changes in these guidelines over time?

5. Are any claims reserved through the use of formulas? If so, describe the types of claims using formulas, the formulas and any changes to the formulas over time.

6. Discuss how the company sets case reserves in terms of their current value (if the case were to settle today) and projected ultimate settlement value (allowing for future inflation). Indicate any historical changes or developments that may have had an effect of the historical reserve patterns.

7. How are case reserves established when a claim is first reported? Are there any cases that use initial formula (average) reserves, "no reserve" or "one dollar" reserves. How are incidents recorded?

8. Discuss the procedures used to review or audit case reserves. Are claim files evaluated by an independent consultant or outside party? If so, how often?

9. Has there been an audit of the claims department? If so, outline the results of this audit.

10. Do the case reserves include a provision for allocated loss adjustment expenses? Is there a separate case reserve for these expenses? When are these expenses usually paid?

11. How does the company test the adequacy of its case reserves?

12. What has been the company's philosophy and practice on settling claims vs. a rigorous defense? Any changes in this area?

13. Describe any special procedures or guidelines for very large or catastrophic claims or for unusual claims (asbestos, DES, environmental impairment or other toxic torts).

14. Have there been any noticeable changes in:

- settlement rates
- reporting patterns
- claim litigation rates
- average settlement costs
- number of small vs. large claims
- number or amount of reserve changes
- number of questionable or fraudulent claims
- number of claims closing with no payment?

15. Describe the process for establishing IBNR (or bulk) reserves. Outline the methods used to establish Annual Statement loss reserves (including IBNR) for each line of insurance. Provide supporting documentation for the Annual Statement reserves including any internal or external studies, audit reports or actuarial analyses of the company's reserves. How often are reserve reviews conducted?

16. Describe and supply documentation for the determination of allocated and unallocated loss expense reserves.

E. CEDED REINSURANCE

1. Describe the company's external ceded reinsurance program(s) by line or major business segment. Provide the following information by year:

- use of treaty and facultative reinsurance
- use of excess of loss and pro-rata reinsurance
- use of portfolio transfers
- major reinsurers
- retention amounts
- reinsurance limits (layers)
- use of aggregate deductible, aggregate limits, loss ratios caps
- treatment of allocated loss adjustment expenses

- details on any reinsurance subject to retrospective or loss-sensitive rating where additional premiums are possible
- details on contingent commission arrangements

What major changes have been made to the ceded reinsurance covers over time?

2. Have there been any commutations of the company's ceded reinsurance? If so, describe the details of the transactions.

3. Has the company evaluated the collectibility of its ceded reinsurance? If so, describe the portions that are considered uncollectible, the basis for that determination, and how the uncollectible reinsurance has been recorded.

4. Describe how reinsurance recoveries are recorded for paid losses, case reserves and allocated loss adjustment expenses. Can historical loss development statistics be produced on both a gross and net basis?

5. Is there any unresolved litigation regarding the company's ceded reinsurance? If so, outline the nature of the litigation and the potential magnitude of the recoveries.

F. SYSTEMS AND ACCOUNTING

1. When are the data files closed at the end of the various accounting periods? Have there been any changes in these procedures?

2. Have there been any changes in the data processing system that have caused changes in the rate at which claims are processed and entered on the books?

3. Have there been any material changes in coding or data processing procedures that would affect the consistency of the loss payment or reserve data over time?

4. To what extent are the loss reserve data audited or verified against source documents, Annual Statements, or other company reports?

5. Does the company utilize a "fast-track" procedure for certain claims? If so, how are such claims defined and has the definition changed over time?

6. Does the loss development history include payments that have been made but were not yet entered into the data system? If so, how are these

payments recorded to accident period, line of business, etc. How are such payments reported in the Annual Statement?

7. When partial payments are made, are the case reserves automatically reduced by the amount of the payment? Is it possible for an outstanding case reserve to be negative?

8. How are deductible reimbursements recorded? Are loss payments reduced by actual received reimbursement and do case reserves reflect expected deductible reimbursements? How are allocated loss adjustment expenses affected by deductibles?

9. Provide the definition of a "claim" as treated by the system. Indicate how multiple claimants from a single accident or occurrence are handled and how claims are recorded for each coverage (e.g., BI and PD).

10. How are reopened claims coded with respect to the report data of the original claims and the date of reopening?

G. EXTERNAL ENVIRONMENT

Describe any recent changes in each of the following areas that you believe may affect your underwriting or claims. If applicable, specify the lines or business segments affected.

1. Legal and judicial (specify state(s) if applicable)
2. Statutes or regulations (specify state(s) if applicable)
3. Social climate
4. Economic (e.g., rate of inflation)
5. Competition (particularly how it relates to pricing decisions and quality of business)

H. SPECIALS

Has the company had any significant business that falls into the following categories:

- Managing general agents (MGA's) or underwriting managers
- Reinsurance assumed
- Excess coverages (e.g., umbrella liability)
- Financial guaranty insurance

- Financial reinsurance (loss reserve buy-outs or loss portfolio transfers)
- Pools and associations
- Fronting for self-insurance, captives, risk retention groups, etc.
- Professional liability, errors and omissions (E&O), Directors and Officers (D&O), medical malpractice

1990 CASUALTY LOSS RESERVE SEMINAR

5G: CONFIDENCE INTERVALS AND PROFIT RECOGNITION

Moderator

Stephen W. Philbrick
Tillinghast/Towers Perrin

Panel

Spencer Gluck
Milliman & Robertson, Inc.

MR. PHILBRICK: Welcome to Session 5-G, Confidence Intervals and Profit Recognition. First a couple of quick housekeeping details. Remember that this session is being recorded. Please fill out your evaluation sheets so that we can make sure that if you don't like this it doesn't get repeated again.

A reminder that the opinions expressed are the opinions of the speakers themselves, not of their companies.

I am happy to see that interest in the subject of confidence intervals and profit recognition is growing. This is a subject that many consider to be highly technical. We are seeing more interest -- witness the number of people in this room -- and a separate session that was given yesterday morning, which I hope a number of you attended.

A lot of what I have to say will be motivation for why we ought to consider this subject.

I have some slightly different thoughts on the subject so I want to emphasize them. Our distinguished panel will give you the methodology, how to. Yesterday you heard why but they explained nobody knows how to. Well, they obviously haven't talked to Spencer because he is going to show you how to do all this stuff.

Before I get into some specifics, let's go back to some basics to set the framework for what we are talking about. What is insurance? What is this business that we are in?

Insurance contracts involve the exchange of assets that are certain for liabilities that are uncertain, either in amount or timing, (although that issue is being argued right now at the accounting -- at the AICPA level). An insured pays a fixed premiums to an insurer for which the insurer assumes responsibility for a defined set of contingent liabilities from the insured.

Now one other piece of background. Anyone who attended either the session yesterday morning on uncertainty, or Wayne Upton's presentation, heard reference to certain financial accounting concepts. These are the building blocks of accounting theory. There is one that I think is particularly relevant.

The guidance for recognizing revenues and gains is based on their being earned. Revenues are not recognized until earned. When are they considered earned? Revenues are considered to have been earned when the entity has substantially accomplished what it must do to be entitled to the benefits represented by the revenues.

Sort of a mouthful, but remember that they are not writing concepts for the insurance industry, they are writing concepts for all industries. So they can't get very specific.

What does this mean when it comes to insurance? What does the insurance industry do? Well, we earn premiums, but is that when we have completed our job? In the definition of insurance we see that what insurance does is take over contingent liabilities, and we have to eliminate those.

So I contend that the earnings stream ought to have something to do with what insurance does -- getting rid of uncertainty.

Now what has been the past way that we have handled the issues of uncertainty in loss reserves and the related issue of time value of money? Well, we have appealed to that important rule that two wrongs approximate a right.

The first wrong is that we have declared that reserves should not be discounted to reflect the time value of money. And simultaneously, we have decided that reserves should not include a margin for adverse development. Now, this, of course, is history and starting to become ancient history with respect to taxes. It is still the situation for statutory and GAAP, (although currently under discussion) but for tax accounting the tax man has finally said-I am not going to ignore the time value of money.

They haven't gotten around to do anything about the margin for adverse deviation, but they have eliminated one of the wrongs.

I don't believe I should have to spend much time convincing this audience that investment income is important. If you are talking to any of your brethren in the insurance industry who still believe that it is not important, you could ask them a question. Does anybody know in here what two very important events happened in 1951?

In 1951 the investment income for the industry exceeded the underwriting income and it has every year since. So if anyone tells you that investment income became important in the mid to late 1980s or even early 1980s -- 1951 is the year that it became the most dominant portion of our income.

I mentioned two important events happening in 1951. The other one was I was born.

During yesterday's morning presentation, Jerry Miccolis referred to the happy coincidence. This is the happy coincidence -- the happy coincidence causes this. He referred to the fact that there is some relationship in many lines of business between the amount of uncertainty and the amount of expected investment income.

That is either good in the sense that they tend to offset, or bad in the sense that it allows us to be lazy.

Let's look what happened under the old accounting rules, and when I say old, I refer to old tax rules; it is still the current statutory and GAAP rules.

We issue a policy for some premium. We expect to generate an economic gain, but it creates an accounting loss in the first year, whether it was statutory, GAAP or tax accounting. In the current accounting rules, we still issue a policy for some premium. We expect to generate an accounting gain.

For statutory and GAAP we still create an accounting loss. I should emphasize we create an accounting loss in the early periods, but not for tax purposes. The tax man doesn't like this deferral of income and wants it more up front.

In my opinion, the tax authorities have gone a little overboard. The gain that is recognized -- if you were to write a single policy, the gain that you should show for tax purposes exceeds the amount that is immediately realizable. In other words, you are going to show income that relates to cash you don't have in your hand. It relates to cash in the future.

Now some people find that specific fact very objectionable. I don't particularly have a problem with the fact that you don't have it in your hand. I think it is more important that you are recognizing income for something you haven't done yet.

The policy has been earned but you are not finished. There is still uncertainty out there that you haven't yet eliminated.
So I think a challenge to our profession is to establish reasonable rules for incorporating uncertainty and losses errors so that the profit reflected in each calendar year reflects the actual services rendered, which is the elimination of uncertainty.

We don't have a lot of time on this. The accounting profession is working on it. To just repeat what was said yesterday morning -- the accounting profession is working on it. If we don't give them some guidance, they will come with some answers and we may not like them.

I would like to go through a quick example to show how some of this works, rather than just talking theoretically. Suppose you are about to price a contract and here is what its outlook is.

I am going to over-simplify an insurance example. You believe that there are only three possible scenarios with equal probability. You can either have no losses at all, or you could have some losses, none of which are paid in year two and $200 paid in year four, or you could have $200 paid in year two and none paid in year four, or you could have $200 paid in each year.

Looking down at the expected, that means you would have expected payments of $100 at year two, another $100 expected at year four,

for a total of $200 expected. But the key point here is there is uncertainty. We could have a total of $400 paid. We could have only zero paid and the timing is uncertain.

Now I am not going to work with any of these numbers up here. I am only going to work with the expected, but keep in mind that this is an uncertain process.

How do we go about pricing this contract? For simplicity, I am going to calculate interest on what I call a modified simple interest. Interest is five dollars per hundred per year, so that you don't have pull out your calculator and figure out present value. You can do it in your head.

What is the present value of the year two payment? We expect $100 paid in year two, so at five dollars per year, we expect a discount of ten dollars. So consequently the present value of those expected losses is $90.

We also have $100 paid at year four. The present value of those $100 paid (with a discount of five dollars per year for four years) is $80. The total present value is $170. If you didn't feel you needed any margin for error, or any profit, (I will exclude expenses to make the calculations simple) -- you would be happy with $170 to pay off $200 over time.

But let's presume that you are not happy with $170 and you go through a calculation of how much of a risk margin you feel you need for taking this uncertainty. After all, you may end up having to pay $400. And you do a calculation and you decide that $15 is the appropriate amount. I am not about to tell you how to calculate the $15; that is a subject for another day.

But let's presume that you have decided that $185 is the market price of this contract out on the street. What happens? Here is what happens under the old tax law. At the end of the first year you have earned your premium. You collect $185. You earn it over the first 12 months, and so you have earned $185. You are not going to earn any more over the rest of the period, so a total all-time is you will have earned $185.

Now under the old tax law you have set up undiscounted reserves. The expected losses are $200. So you set up a reserve of $200. There will be no change in that over time, so no expected change in it; in specific circumstances it will change, but the expected value is that it won't change, and so ultimately you will have incurred losses of $200.

You will earn some investment income over time and the way I have set up my simple interest, you will earn $10 in the first, $10 in the second, $5 in the third and $5 in the fourth, a total of $30. Of course, the difference between the $30 and the $200 is $170 and that balances to our original expected -present value expected losses.

But what I want to focus on is-how does this come in over time? If we set up the numbers this way, we see that we show a loss of $5 in the first year and a gain of $10 in the second, a gain of $5 in the third and a gain of $5 in the fourth, for a total gain on this policy of $15. That was the anticipated profit, and if things come in on an expected basis you will end up earning $15. But you will show a loss in the first year and profits in subsequent years.

The tax man didn't like that because it put off recognition of income, hence receipt of taxes. So we came up with a new tax. The new tax law shows earned premium the same way. We still have $185. We start off with $170 as the present value of the incurred loss, but by the end of the year we have amortized $10 of it. So at the beginning of the year it is $170. At the end of the year it is $180.

The minus $10 and the $5 and the $5 represents the unwinding of the discount over time. I hope everybody now feels comfortable with at least the concept of the unwinding of the discount. It flows into the incurred losses.

The investment income is still the same; $10, $10, $5, $5; the cash in hand at the beginning and throughout time is still the same. So now what happens? We still earn $15 but we earn all of it in the first year. The new tax law is equivalent to saying when that last dollar is earned, you have completed your job. I don't happen to agree with that.

Now here is what I would prefer. Again, we start with the same earned premium. I will show the same incurred losses. I want to separately set up a risk margin. Let's set up the risk margin in the first year at $10, and then as things become known at year two, remember we either have a loss of zero or $200. So whatever it is, you now know more about your future - you know what has happened so far and there is less uncertainty in what is going to happen in the future.

So you release $5 of this risk margin and then when the final payment is made -- it is uncertain up until the time it is made, but once it is made, the uncertainty is gone, we release the other five. What happens under this scenario? And, of course, the investment income still remains the same.

What we see is a more even distribution over time. We earn some money in the first year, but we earn money in other years. It is something in between two incorrect extremes. Under the old tax rules (and the current accounting rules) we create losses in the first year on policies that we think are profitable and recognize profit later. The tax man's idea is that all the profit is up front.

So this is some motivation for why -- it is not so much the motivation for why I think there should be a risk margin. You

have to accept that there should be a risk margin. This is an explanation of what happens -- what happens if you have a risk margin. How does it affect the financials?

Let me show one other graph. This is a slightly different way of looking at it. It is a somewhat more general way. At time zero you price a policy; that policy is made up of expected losses. In day one, it is all IBNR, you could call it.

Then we have a margin. The top of this is shown as blue, but people who are super-critical should be informed that that is the top of the green and should be green. So we only have two items in here. We have our estimated losses which we will set up as IBNR and our margin.

Over time, what happens? We begin to know more about these losses. Some of them are paid. By the end of 12 months a certain amount are paid. We have a certain amount that are case reserves and we have another amount that is remaining IBNR.

Because the uncertainty is reduced, we have to release some of this margin into profit. The current accounting and old the tax rules would release all of this into profit. I contend that only a portion of it should be released because this some is now known, but much is still unknown. At the end of year two more is known. More is paid. The case reserve is getting a little smaller; IBNR is getting quite a bit smaller. So more of the risk margin is released into earnings.

Finally, in year four, we see that everything is paid and finally everything is released into earnings. So it is the change in those blue sections that represent release into earnings.

What is important to recognize is when we are talking about margins philosophies, we are not just talking about some theoretical issue of how much uncertainty is it, we are talking about a timing issue. On day one you price a policy and you build a margin into it.

The issue of putting margins in loss reserves should include the issue of how ought that margin to be released into earnings? These two are fundamentally related. There are many people who still look at the margin for profit that goes into pricing and the issue of a margin for loss reserves as two separate issues. They are not.

Again, there is the margin you put in your pricing and now that you have that margin, when does it become profit? I contend that it ought to become profit over time as you do what you are supposed to do to earn that profit. The mechanism for doing that is the creation of a loss reserve margin that goes down over time.

I hope that gives you some motivation for why this is important. So far I have only touched on why a margin is appropriate; why it is more than a technical actuarial issue for the ivory tower actuaries and why it ought to be of interest to everybody interested in stating the financials in an appropriate manner.

We still haven't gotten to how to do it. So we are going to let Spencer do that. Now in keeping with our loss reserve theme, we could describe this panel -- low frequency but high severity panel. Our speaker today is Spencer Gluck.

He is an actuary with Milliman and Robertson, with an extensive background in loss reserve analysis for primary insurers and reinsurers and his current practice emphasizes medical malpractice.

Previously, Spencer was a vice president for Kramer Capital Consultants, a manager in the actuarial division of Peat Marwick and a regional actuary for ISO. He is currently a Fellow of the Casualty Actuarial Society, a Member of the American Academy of Actuaries, and holds Bachelor's degrees in mathematics and a Master's in education from Cornell. I will turn it over to Spencer.

MR. GLUCK: Hello. I apologize that I don't have handouts today. If I did, they would simply be copies of my overheads. There is a copy of them in last year's proceedings and they haven't changed, but in any case, if anybody would like me to send a copy of the overheads, just drop me a card with your name and I will be glad to do so.

Okay. I am not actually going to tell you exactly how big the margin for uncertainty should be either. I will get to this slide in a minute. But I am going to give you some idea for quantifying the uncertainty in a loss reserve analysis.

Specifically here we are talking about a loss reserve analysis based on a regression analysis and I am going to be talking about a technique called bootstrapping, which is a technique which will give us a distribution of projected results in a regression analysis.

I want to get the terminology straight because I have been criticized in the past. The title of this session is confidence intervals and I have a few slides that say confidence intervals, but it has been explained to me that these are not in fact confidence intervals. They should be described as projection intervals. Confidence intervals, I believe, describe the distribution around the estimate of a parameter. We are not estimating a parameter here. We are making a projection.

In any case, I am not going to spend too much time on the regression analysis, itself. That is not intended to be the

emphasis here, but just for a little background, the examples we will be looking at -- we did a regression analysis on incremental paid loss data. We fit in a Hurl's curve which -I didn't attend Professor Zehnwirth's session on regression this time. But the last time I did attend he was using that curve, so you may see at least the form of the curve there.

(Slide.)

Another important to put in this analysis is that we fit the logs -- that we linearized the curve. We took the logs of the data and fit the logs and that is an important issue, too. We will discuss that later.

So in any case, when you see things that say actual data here, they are not really in this case the actual data, they are the logs of the actual data.

Okay, so this little pseudo-equation here puts basically what we are doing in a regression. We have a triangle of actual data and we do a regression analysis on it. One of the things that gives us is fitted data and we can look at the fitted data both for the past period that overlaps with the actual data and for the future period, the lower half of the triangle there which is what we are interested in.

It is important to emphasize here that when you are doing a regression model, the model is not just the fitted data or the curve. We use a curve and a distribution of errors about that curve to describe the data. It is really the curve and the error structure. The error structure is an essential part of the model and in fact, this whole analysis really is an analysis of the error structure. That is, of course, what gives us projections of the uncertainty in the amount of variation in the projection itself.

(Slide.)

So basically, here -- this little picture -- we have done our regression analysis and we look at the difference between the actual data and the fitted data and that gives us the residuals. The residuals, again, is the whole basis on which analysis proceeds.

Now it is important to emphasize here that for any of this to make sense, have any meaning, for any of these projections to be at all meaningful, the model must be valid. The model must give an unbiased -- not unbiased but it should describe the uncertainty fairly. The most important thing to say is what are the qualities that those residuals must have for us to have a valid model?

Here is the full list. Number one is the most crucial and important. There is no compromise with number one. The

residuals must be random. If there is anything systematic in them, it means your model didn't work. There is something going on in the data which you did not describe and because of that, the projections that you get out of it will have no meaning.

You won't be able to project how accurate they are, or anything. Nothing you will do will have meaning if there is unanalyzed, something systematic in the residuals which is unanalyzed.

Okay, furthermore, they should be independent. They should be identically distributed and in most cases, normally distributed. Now, the last three we will be able to adjust for or relax to some degree. In particular, with the bootstrapping approach, the assumption that those residuals are normally distributed is not specifically used.

So if the errors don't come out normally distributed but are otherwise random, independent and identically distributed you should have no problem here. Again, if you feel for some reason that they are not independent and identically distributed, you may be able to deal with those to the extent that you can model or measure the degree to which they are not independent or identically distributed -- you may be able to do something about it. We will discuss that briefly later, but from here on, I am going to presume that the first three qualities are met.
(Slide.)

Okay. Here are a few error plots -- I can't over-emphasize the importance that the residuals have those properties and the best way to check out whether they do is to look at some plots, some scatter plots.

The scatter plots themselves give a lot more information than any summary statistic because the most important thing we are looking at is for patterns in the scatter plots. What we would like to see is -- I guess the closest we come to see in this picture is something over here where you have basically errors that look like they are randomly scattered.

These are all the same residuals plotted along three different axis. You have a triangle of residuals. We plot them on the accident year axis, on a development period axis -- this one will tell you basically how well the curve is fitting the development pattern, and then on the calendar year axis.

This is intentionally a very bad fit we have got right here. You can see most noticeably on the calendar year axis that we have there is obviously a trend going on that has been unanalyzed and you can see it via that trend in the residuals. The unanalyzed trend; it also shows up in the accident year dimension.

(Slide.)

Here is another bad fit. The place that the real badness of fit is coming out you can really see it here, is in the development period direction. So here we clearly haven't fit the development pattern in this particular data set, as well.

I always like to point out in this case that the R-squared of this particular model is 90-66. Sounds pretty high. It is a terrible fit. And the results were completely ridiculous, but the R-squared was 90-66. So you need more than a couple of little summaries; you really have to look at the whole error structure and make sure that it seems to work.

On this particular old example that I have on the slides, this is the best we could get and probably not perfect, but it is the best we could get through randomly scattered-looking errors on this particular model.

Okay, so now we are going to presume that we looked at our residuals and analyzed them, calculated what statistics we could and concluded that we are satisfied at this point that they are random, that there are no unanalyzed patterns them; furthermore, they are independent and identically distributed.

So now we go forward. Remember, everything here that says data is logs of the data. Okay?

So now, we have to just say what do we believe about the error structure? We make a very simple assumption here in bootstrapping. Let's say we had a 15 x 15 triangle we were looking at. I believe that is 120 points, so we would have 120 residuals which would believe to be selections all from the same -- all independent selections, all from the same distribution.

So we presume, therefore, that the errors in fact come from a discrete distribution with 120 possibilities equally likely and those are it. So we presume that the empirical distribution of errors that we see in fact the distribution of errors.

That is the assumption we go forward with. So we go and create what we call pseudo-data. What we do is now that we know the distribution of errors, we can randomly generate new ones.
That is to say, we have a discrete distribution so we pick randomly from that distribution with replacement as many times as we have to to fill up both a past triangle's worth of errors, and a future portion of the triangle's worth of errors.

We now have the original curve, the fitted data in the past and the future, we add the randomly generated residuals and now we have pseudo-data in both the past and the future. That is a lot more convenient than real data where we only have the past.

With pseudo-data, we know the future as well so we can test how well the past predicts the future.

Okay, now we go back and we do that, take the same little pseudo-equation from the first page. Take the pseudo-data in the past period, we do a regression on that and that gives us fitted pseudo-data in the future period.

On this slide, the adjectives really start adding up. I throw in the adjective "converted" which is a little backwards because I really mean de-converted. When everything that said data before was logs of data, but now we are really interested in the errors in the projection itself. The fact of taking the logs and taking them back out certainly is a very important component in the errors we are talking about, and the distribution we are talking about.

So now I will de-convert the data, or I put it back to projected losses, from projected logs of losses. So now I can compare the converted pseudo-data, that is our version of what the actual is, to the converted fitted pseudo-data.

In other words, if you remember, the first thing we did was created pseudo-data past and future, so that is what you might think of as the actual future, convert it back now so that they are losses rather than logs of losses, and we also did a regression analysis on it so that we got a fitted pseudo-data and we convert that back to losses. So now we have a series of projection errors from this particular iteration of the process that are stated as projected losses.

Now the important word there is "iteration" since if we can create pseudo-data once, we can create it, again, or we can create it 1,000 times. And that is what we go about and do; we create it many times.

So then because we have created it many times, not only do we have this little triangle of projection errors, we have 1,000 such triangles of projection errors and that is why we can now analyze the distribution of the projection errors.

Again, the whole basis of this process is the pseudo-data and the pseudo-data is simply data randomly generated, assuming that the original model was valid. If the original model was valid, that model was a fitted curve and distribution of errors around the curve. By randomly reshuffling and reselecting from that distribution of errors, we get a bunch of different -according to the model this is what else the data might look like just due to randomness.

We can now, through this process, we can test how much that randomness in the data affects our projections. That is what we have gone about here.

It is important when we look at these 1,000 triangles, or whatever we have, of projection errors, that we consider them in total because they are not necessarily independent errors. So it

is not that we just have -- if there is 120 points in the lower triangle, we don't just have 1,000 times 120 points that we can just kind of shuffle around and treat independently. We have 1,000 triangles of projection errors which may certainly move together and when you talk about the parameter variance, they are in fact heavily dependent.

Okay. Now what we have all this data, what can we do? We can calculate pretty much any kind of statistic we want. When you have -- if 1,000 isn't enough, you can do it 10,000 times. It is just the limit of your computer power, and it takes a decent amount of computer power.

Bias. I mention bias as a first statistics. We expect to have bias in this particular analysis because we took the logs of the data and transformed them back. Therefore, the curve is not the mean in this particular kind of analysis. The fitted curve itself is not the mean. It corresponds to the mean of the normal distribution underlying the log normal distribution. If you can remember your log normals, that is the value E to the (inaudible) you get when you convert back from E to the normal it is not the mean of the log normal.

So, in effect, we do, because of the log transform we expect bias. We expect that the curve is not the mean value. Then of course we can go on and create higher (inaudible), variances, standard deviation -- I like to calculate the coefficient of skewedness because I have heard of it and I know the formula.

Confidence internals. There is a misnomer, again. It should be projection intervals, but basically we have a whole distribution of projections that have come out. And we have it any way we want it. We can talk about the distribution as it relates to the entire sum of the reserves for all years.

We can talk about the distribution as it relates for the reserves for any one accident year, for any one calendar year of payment, or any combination thereof.

We can also do a little more analysis and it is worth talking about. What variance we have measured, which is important because it is also important to talk about what sources of variances we haven't measured.

In a lot of the actuarial literature, they talk about variants, or variation or risks coming from two sources, process risk and parameter risk. In that formulation, process risk which is described as statistical error here is well understood, and then we kind of lump -- everything left is kind of called parameter risk and that is not what I mean by it here.

Here I mean I much more narrow. We are not talking about parameter risks or parameter estimation error here. I am talking about the parameters of the model and nothing more. So

basically, to discuss -- first we can talk about the total projection error and within our pseudo-environment here, our best projection, or projected result would be the expected value of the fitted pseudo-data that you see on the top.

That would be your projection. When we compared the actual pseudo-data to what the projection would be, that is the total error in the projection. We can break that up into pieces.

First off, we can say why is there error in the projection? One of the reason is even if the projection is perfectly accurate, there is statistical error. There is randomness in the process. That is what the whole thing -- that is what causes this whole thing. Even if we made a perfectly accurate projection of the expected value in the future, the true future value would not equal its expected and that is the measure here.

By looking at -- comparing the pseudo-data in the future period to its expected value, we see how much variation there is just due to the statistical process. You realize the second line could have been calculated easily without doing all that regression. One we generated the pseudo-data, that in itself was the process by which we reflected the statistical error.

Now, what I mean here by parameter estimation error is, let's presume that the form of the model is exactly correct and we know it is correct. We are just uncertain of the parameters.

Because there is variation in the data, any estimation of the parameters based on data is going to also have error in it related to the variation of the data. By the creation of the pseudo-data in the past period, 1,000 sets of it, we have some measure of variation of the data. And then by fitting the regression model to that and projecting it into the future, we can have a measure of how much the future variation, the future projection varies because of variations in the original data.

So here we are talking about the difference between the expected value of the fitted pseudo-data and the actual value. In other words, how much variation is there just in the projection alone which is caused by variation in the original data triangle. That is what we mean by the parameter estimation error. Now the most important thing I just said leading into the parameter estimation error is, we are assuming that the form of the model, as stated, is exactly correct.

That is unlikely to be true. So the unquantified piece of error here is in the model itself. Specification error. The model, as specified, probably is not exact -- it certainly at best is an estimate of the real process that is going on there. So if the model is mis-specified there is a whole other source of error which is not quantifiable because this whole process and this whole calculation here is based on the assumption that the model is correctly specified, an assumption that is not likely to be exactly true.

(Slide)

This is one where I regret that people don't have handouts in case they have trouble reading it, but it seems to be a pretty good overhead projector.

In any case, this is just an example of some of the things -some of the statistics that you can calculate from the results of a bootstrap analysis. What we have here is -- the way I have chosen to summarize it is, number one, to look at a total reserve projection and then to look at that reserve projection for each accident year, and furthermore, to look at it, to break it down in another way into each calendar year of payment.

Again, you could actually do this analysis on any one cell of the lower triangle because you would have 1,000 or as many bootstrapping iterations as you went through readings of that cell.

As we say, with this particular model we are using we expect the bias and we can measure that from the bootstrap right there, and so what we have done -- what I will call our best guess, here we take the original fitted data, we correct it for the bias as measured in the bootstrap and that gives us the corrected fit.

In columns 5, 6 and 7, I looked at the total projection error, as I described it, and just a few statistics there -- the standard deviation, variance -- although that is probably the variance in 1,2000 -- and skewedness, and as I described, according to the formulas on the previous page, can separately calculate to break the variance into the statistical and the parameter estimation.

Interesting to note here in this example, in grand total, you will see that the parameter estimation error is actually larger than the statistical error. On the other hand, if you look at any one of the smaller cells, you will see the parameter estimation error is substantially smaller. So you just can't add down the columns. These things are not independent.

In the statistical or process error column they are independent. We have assumed that the data themselves are independent. On the other hand, in the parameter estimation error, in one particular run of the model, to the extent that the parameters are mis-estimated, all of the projections in that triangle are mis-estimated together.
(End tape side one)
-- (continuing) looking at one cell think you don't have a big problem, but when you look at the total reserve analysis and realize that these errors do not offset each other in any way, you can have a big problem.

(Slide)
Just a quick look. This is just another way to array -- we have the data broken down the same way and I have -- just some

percentiles of the distribution of projections. Again, it says that nasty terms "confidence intervals" there.

(Slide)

Okay, just a few more pictures that we can produce out of this. Here is a histogram. I think this was a 500 iteration bootstrap. This is the distribution that came out for total reserves, and like I said before, we can look at a distribution of any particular subset of the total reserves that we might be interested in.

So here is a distribution for calendar year 1988. I guess the data was through 1987. So here is the distribution of payments in the next calendar year. This is the type of thing you might be interested in if you were using an analysis like this in investment planning and you wanted to have some idea in the variation of what payments would come due the next year and how much you wanted to invest. You might choose a certain percentile of the distribution of payments that come due next year to make sure you have that kind of cash available next year.

So there are, other than a specific margin that you might put in a financial statement, there are other reasons you might be interested in these kinds of distribution.

That is just another example for the reserves for a particular accident year, you can look at distribution as well.

(Slide)

I have a few more pictures that I will just run through briefly, just to show you. Here is a fit of the model itself to one particular accident year. As you can see, this is how it fits to a relatively well-developed accident year.

(Slide)

Here I have a corrected version of the fit. Now what I did here, like I said, what we use for our mean projection is the original curve. What you are looking at here is the original curve, and then corrected it for bias as we measured it from the bootstrap. If you look at that picture there is nondiscernible difference to the naked eye -- they look exactly the same.

But, in fact, they are slightly different; it just doesn't show up on the scale of this graph. If you saw when I put the statistics together, I don't think that those statistics grew from the same graph as these pictures. But there is significant bias.

Just like I said, when you apply it to all the individual little points, it may not be discernible to the naked eye, but as a percentage of the total reserve it was significant and the correction was important.

(Slide)

Okay. I have a few more pictures like that showing the curve fits the other accident years from the same model. I don't think there is any point in putting them up.

Let me hit on a few more points. I talked briefly about the fact that if you concluded that the errors were not independent or were not identically distributed that there might be something you could do about it. Your ability to do something about it is related to your ability to model the extent to which they are not independent or identically distributed.

Let's talk about identically distributed first. That is the easier problem. Frequently, you may be willing to assume that the shape of the distribution for the errors is the same, but that the amount of variance in the distribution changes according to one of the axes of your model.

Frequently, in these fits there is some change in the variance and the distribution on the development period axis, or the problem of hetero-(inaudible), that is, that the variance changes with one of the inputs to your model.

If you can model it, then you can correct for it. So let's assume -- for example, let's presume we may have enough errors in our plot to say that it looks like there is (inaudible) here and we can fit it. So if we have a model for (inaudible), then all we have to do is take our errors which are identically distributed except for the size of the variants and weight them properly, multiply them by weights so that they will now tend to be identically distributed.

Then what you do is take the now created, the weighted errors which are identically distributed, randomly select that and then divide the weights back out before you create your pseudodata. Because if there is (inaudible), you want your pseudodata to include that (inaudible) in the model. You just have to get them to identical so that you get to that point where you can select the errors randomly and then get the map.

What if they are not independently distributed? Again, it is based on your ability to model that. Most often we will be concerned with whether there is auto-correlation between the residuals. Generally we look either on any one of the really free axes in the triangle, but frequently we just look across and down to see if there is auto-correlation between the errors.

Now if we see that there is, and we can build a model from the residuals of that auto-correlation, then using that model we can start with the actual errors and generate a series of 120 or perhaps a few less independent points.

Again, once we have created the independent points, selected randomly from that model, we have to build the auto-correlation back into the residuals. Again, if the auto-correlation residuals have some affect on the model, we want to measure that.

So those, again -- so within this technique you can deal with errors that don't meet all the requirements, as long as they are truly random, and as long as you have the ability to model the extent to which they are not independently distributed or identically distributed.

Few other points. There are really two key elements to bootstrapping. Two key assumptions. One of them is that the empirical distribution of errors can be used as the actual distribution, and the second is this whole idea of using the model itself to create simulated data and running through the simulate data many times.

You can do it with one of those assumptions and not the other. The way you wouldn't be likely to do it is, you can say I will take the assumption that the empirical distribution is the actual distribution and then algebraically solve. That is possible. It is cumbersome and with computer power it is easier to do it this way.

The other way which we are thinking very hard about is to say, maybe we don't have enough residuals. Maybe 120 or -sometimes we have fewer in a smaller triangle -- 55 in a 10 x 10 triangle -- is not enough residuals to simply say the actual distribution of errors -- we say is the distribution. Maybe if we have a better idea of what the form of the distribution -of the errors is, whether we think it is normal or has some other shape, we can then solve for parameters of the error distribution based on our residuals, and randomly select from an error distribution that we select rather than directly from the empirical distribution residuals.

That is something we are looking into.

Okay. Last point. This curve that we are using here, for us it is just empirical. In other words, it wasn't because we have a theory that says this particular (inaudible) curve is the distribution of in-period payments. It seems to work.
Then we decide whether the model is valid not because of some underlying theory, but by examining the residuals and seeing if the residuals seem to have the qualities that indicated the model is working.

Tom Wright at Bacon and Woodrow has done some additional research on this and I think I will just report to you briefly. He is publishing his work and I can't remember the name of the journal -- within a couple of months.

In any case, he worked from first principle. Started with a collective risk model and some other assumptions as to how things come out over time and then said, based on that model, what would I expect the aggregated paid loss data to look like? Remarkably enough he did come up with the Hurl curve that way.

He said he wasn't trying to, but that is what he came up with. So we do have at least some theory, with some assumptions going into it that works from collective risk principles that will lead us to the Hurl curve. However, his theories didn't lead him directly to the log normally distributed errors and he went through a more complex non-linear process to fit his model.

It also leads to specific forms of the hetero-(inaudible) is likely to take. He also concluded that he thought the shape of the distribution would also vary with delays somewhat. So if wanted to model all that, we would have to vary skewedness and other elements of the error distribution before we selected randomly.

We are thinking about doing all that but we are a long way from getting to it.

Okay. I guess as a final point, we are just quantifying the errors that we can. Model specification error is a big issue. There is specification error. I am convinced of it, no matter what model you choose. Nobody is likely to hit on the model that exactly describes the process.

We are still fitting the model to a bunch of past data, assuming it will fit equally well to future data. Now of course, we did look at the calendar year trend in the past and made sure that it seemed to fit over time in the past, but nobody can say that really means the same model is going to fit in the future.

The future will be different from the past; there is other uncertainty. So I would not go through a process like this and say -- ah ha, look at that 95 percent number, and now we know for sure that there is a 95 percent probability that it won't exceed that number. There are too many areas of uncertainty that we can't quantify.

But I would say that this is a minimum. You can do this analysis and still that the 95 percent projection interval that you get out of this analysis is a pretty high number and know that the real one is probably even higher.

So it is a minimum and it can be used for many other planning purposes, as we discussed. Investment planning might be one that comes immediately to mind.

Okay, that is the end of my presentation and I guess we probably have plenty of time for discussion.

MR. PHILBRICK: Yes, we will have some time for discussion. Before I open it up to general questions, I want to ask a specific question of Spencer, just to respond to something. Just a little bit of background for it.

The Canadian Institute of Actuaries is a little further along than we are in terms of promulgating guidelines, or at least the need for uncertainty in loss reserves. My understanding is that they have put together documents roughly parallel to our statement of principles, that specifically states that loss reserves should contain a provision for uncertainty. There are people in Canada working on how to do that.

Dave Oakden is in the audience and I would ask, is that roughly correct?

MR. OAKDEN: I would not describe that as roughly correct. However there are some elements of truth in what you have said.

One, we have put together recommendations that require provision for adverse deviation. We have also stated in the recommendations words to the effect that if the reserves are not discounted, the non-discounting can be considered in your margin.

I think the current state of practice in Canada is that non-discounted reserves contain a sufficient margin. We do have a committee that is looking at a technique for calculating a margin because there is some hope in the near future that we will have discounted reserves.

This committee has tried at least two theoretical approaches and has failed and is now working towards getting a provision for adverse deviation on a -- I hesitate to use the word judgmental -- but I think basically the techniques that Spencer has outlined and similar techniques that we have looked at are great if you have a 15 x 15 triangle, but typically, for medium and small sized companies, sometimes you get a 2 x 3 triangle with some data that is not all that reliable. Any kind of a theoretical model falls flat on its face.

But using Spencer's model on industry data, we can come up with some minimums that ought to be used and then provide some guidance to the actuary as to whether he ought to use these minimums or under what circumstances he ought to use numbers that are higher than that.

So we are trying to take the theoretical approach to get some minimums and also to give the actuary some guidance as to how much you ought to increase these minimums under certain circumstances.

I would expect something to come out on that probably sometime next year, although the committee has been working now for three or four years and they have had a number of false starts.

MR. PHILBRICK: Thank you, Dave. I understand that Spencer is doing some specific work and perhaps he could do a two-minute commercial for the upcoming loss reserve seminar.

MR. GLUCK: Yes. I think they call it the Canadian Liability Seminar, or something. They don't like to use the words "loss reserves". But in any case, I will be on a panel there with Robin Harbage who shared this panel last year and he has a method that he uses at Progressive, which is more tied to development factor approaches that you are more used to seeing.

He has a method doing some random generation but also looking at the variation in development factors. So we have both been given some data on, I believe, it is Canadian National Auto System, and they have asked us both to run it through our approaches and models. So we will be comparing our results on that at the Canadian Liability Seminar, upcoming in October, probably around the 10th.

MR. PHILBRICK: We can open it up to general questions.

QUESTION: (inaudible)

MR. PHILBRICK: Thank you for that comment.

QUESTION: Second comment is that quite often we do by simulation -- it is quite possible to do it by analytic techniques and regression methods -- at least partially right, not exactly right. But I believe the regression technique is just full of analytic solutions (inaudible) trying to do by simulation.

I think if that doesn't come up and take over the microphone or whatever, I believe that is exactly what (inaudible).

MR. GLUCK: I am sure Ben will have something to say, so we will give him a chance. But I agree with you, but there are certainly standard errors can be calculated, especially in the linear model we are talking about here. Standard errors can be calculated directly.

I believe the full shape of the projection distribution is more difficult. I wouldn't say that it can't be done.

QUESTION: (inaudible)

MR. GLUCK: Right. Furthermore, but as you get into -- let's say we didn't take the log transform so that we were dealing with a non-linear model, and we are looking into a lot of nonlinear models, the mathematics become extremely difficult and cumbersome.

So the bootstrapping technique only has to be programmed once. It does take a lot of computer power to run it, especially on a non-linear model. Imagine you are doing an area of non-linear,

say, 1,000 times within the bootstrap. It does take computer power, but once programmed, it doesn't take a tremendous amount of brain power to solve a lot of non-linear models.

I believe most of the non-linear models are solvable only to approximations anyway. So we may be able to get equally good approximations and use the computer power. But I agree, there are often analytic solutions available and computer power is just a way to get them done with maybe a little less thinking.

MR. PHILBRICK: Ben, if you could come up to the microphone.

PROFESSOR ZEHNWIRTH: I didn't think Glen was going to draw me into the discussion. Just a number of comments. The bootstrap originated with the work of Efron, 1979, mainly in the area where you have very small samples, where the asymptotic results don't work.

For instance, if you look at the distribution of the T statistic we know that if the sample comes from a normal distribution, then the statistic has a T distribution. We also know that if we have a large sample, then the statistic also has a T distribution.

So the original application of the bootstrap is for very small samples where you cannot make assumptions about the distribution of the statistic. Not in large samples.

There are two types of bootstraps. There is the one where you actually bootstrap the original sample, the original triangle, the original data, and the other one where you bootstrap the residuals.

In the loss reserving context, neither works. It has only become more recently clear where the bootstrap actually works. Greg Taylor wrote a paper about three years ago. I think it was presented in the Minnesota Loss Reserve Seminar.

I think in that paper he indicates why the bootstrap doesn't work in the loss reserving context. I also agree, I guess, with Glenn, that if you have a many residuals, if you have a parametric model that you can test, then you use that information. If the residuals (inaudible) are normally distributed using the bootstrap you should get the same answers, but you are spending a hell a lot of computing time and you have to do that for every model you try out. Because you need to use the standard errors, also, as one of the many criteria to assess your model.

So every time you estimate a model you will have to use the bootstrap to calculate the standard errors. For another model you will have to do the same thing. That is an awful lot of computer time.

MR. GLUCK: That is true to a degree, but we had a lot of -there are a decent amount of statistics and diagnostics available when you fit the model before you have done the bootstrap that will at least help you assess the model. I agree; ultimately, you have to do the bootstrap and get the standard errors to completely assess the model, but we would hope that you won't do that on 50 possible models; that you will be able to narrow it down somewhat with both the scatter plots and other statistics that are available from the original regression analysis before we get that far.

PROF. ZEHNWIRTH: Well, you must be a better modeler than I am. Just one comment about what Dave Oakden said about the work being done by the Canadian Institute. What the Institute is looking at is industry-wide data. I think that Joe Cheng last year also talked about calculating margins or standard errors or uncertainty using industry-wide data.

What they did basically was to use some kind of standard actuarial technique, they removed the last 5, 6 or 7 calendar years, and they wanted to see how far off they were on their projections. Well, that is not the way you assess uncertainty. After all, the fundamental principal of insurance is that the more risks you have, the smaller margin you need per risk.

So you can't decide on the risk margin for an individual company based on the risk margin for the industry.

QUESTION: My name is Joe Cheng, Crum and Forster. I have some time to review those models. According to my opinion, it seems to me both methods is basically same. They used regression techniques and also they use (inaudible). The only difference is the estimating method, the (inaudible) simulation method and Ben is using just linear (inaudible) techniques.

Moreover, you cannot assess uncertainty in an 'individual' triangle by assessing industry-wide uncertainty.

I believe there is not much fundamentally difference between the two models. I believe (inaudible) has some improvements, how to (inaudible) problems on some very consistent statistics. Thank you.

MR. GLUCK: If I could just make a quick comment to what Ben said. Of course, he is right that the margin, it depends on how big the group is, but there are two types of error, parameter risk and process risk. The process risk goes down with writing more, the parameter risk doesn't necessarily.

So we heard yesterday morning that process risk isn't important if you do your job right. Then the only thing is parameter risk. I don't doubt that nobody in here accepts that totally, but let's not forget that there are two types of risk.

We have too long lived with the assumption that process risk is the only important thing and all you have to worry about is getting a large enough sample and you can get that down to a manageable level.

QUESTION: These methods are all very interesting and very high-powered, but they are not readily available. Those of us who have to do extrapolation for loss reserve calculations have lots of other curves available to us.

For instance, I use (inaudible) or logistic curve to fit the cumulative loss development factors. Of course, we are trying to make sure that the curve goes through the data as equally as possible so you have residuals with a zero expectation.

But it would be nice if these techniques were available in more detail so that we could actually try them out and see how well they work in actual practice.

MR. PHILBRICK: I think Ben would take exception to the fact that they are not available and he would be happy to talk to you about it.

QUESTION: They are available at a rather steep price, I believe.

QUESTION: (inaudible)

MR. GLUCK: I don't think so because a key part to this thing is that the estimation process itself is being tested. So when I run the bootstrap, I am using the same regression analysis that I used originally -- I am using 1,000 times over on pseudo-data.

So it is not enough for me to have your answers; I have to have your process as well. Because it is not just -- the variation in the pseudo-data itself -- let's say you gave me answers in a full triangle of answers so that if I had a whole series of residuals -- and I could test those residuals and we were reasonably satisfied that they had good properties of residuals so that the projection was valid -- we could do the creation of the pseudo-data part of the test which would give us the estimate of process risk.

But we couldn't do the other part of the rest because the other part of the test has to do with fitting the model over and over again to the pseudo-data. I would have to have your model, itself.

QUESTION: (inaudible)

MR. GLUCK: If your model was -- if we were talking about a model sufficiently detailed as to give us a whole triangle of independent answers, you know, each piece -- that is why we talk about not even looking at incremental pieces, that they are independent of each other and fit that (inaudible) enough of a

type of analysis which actually gives you fitted data so that we could describe it as a model and look at the residuals, then we could use the process to generate pseudo-data and thereby have some measure of the process risk. But we can't measure the risks and the projection method itself without having the projection method to work with.

MR. PHILBRICK: If John gave you not just his answers, or a triangle of answers, but arrived at his answers by some formula, some curve, and he told you the formula and the parameters, you would then be able to?

MR. GLUCK: I would say so, sure.

QUESTION: (inaudible)

MR. PHILBRICK: I will attempt to repeat the question, just in case somebody didn't hear it. The implication being that this was a model, the design for pay data. What about incurred data where there is correlation between the estimation.

MR. GLUCK: In general, I would agree. There are a couple of problems that come from trying to incurred data, but we are working hard on trying to solve those problems. I know, again, our colleagues over at Bacon and Woodrow have some models where they have model-incurred data. We will give them a plug, too.

Number one, there is a problem of using cumulative data in general. Usually when people look at incurred data they look at cumulative data. Once you look at cumulative data it is highly unlikely that you are going to have independent residuals.

Even if I look at incurred data I would like to somehow break that up into incremental incurred data. Incremental incurred data is more likely to be zero or negative and scattered that way so that the key there is, of course, I have to have a model that also can be zero or negative and that reasonably approximates that.

There has been work done with that; for example, a curve which is a difference of two curves -- makes you create some extra parameters to do that and you have to be concerned whether the model becomes over-parameterized. But you can get more complex curves by taking the difference of two curves.

A simple version of it which I saw in one of Robin's papers was a difference of two related exponentials which is only a three-parameter curve that might fit, or be used to fit to some degree to incremental incurred data.

Those curves, however, are not linearizable. They don't convert to linear by taking the logs so that you are strictly in the position of using non-linear fitting techniques. Again, one of the advantages I have in doing the bootstrap is because that when

it gets to non-linear equations, I know that I am not going to be able to solve parametricly these problems.

But of course, when you get to the non-linear, the bootstrap becomes extremely time-consuming. But computer keeps getting cheaper and cheaper. I worry about it less and less.

QUESTION: (inaudible)

MR. GLUCK: I only partly understood the last comment. You were talking about using the (inaudible) filter which creates a dynamic model. The model that we are looking at here was a static model, basically one curve assumed to fit the whole triangle.

QUESTION: (inaudible)

MR. GLUCK: I understand the advantages of using a dynamic model which allows the parameters of the model to change over time. I don't understand how you used that to solve the incurred data problem.

QUESTION: (inaudible)

MR. PHILBRICK: Chris and then Ben. Could you use the microphone?

QUESTION: This one is more practical just because my computer costs aren't as cheap, working on a PC, especially with storage. I am wondering how many iterations of bootstrap technique one would feel comfortable with making any conclusions from.

MR. GLUCK: In one case I know the answer is simple. We use the bootstrap, among other things, to estimate the bias in the model. That is an expected value and I won't give it to you off the top of my head, but I know that is an easy equation to figure out -- how many iterations of the bootstrap you would need to reduce -- to give you confidence in the estimate of the bias.

As you get to the various other statistics we added on, I am not really quite sure. This stuff was run on a PC, 386 PC. We used a hard disc rather extensively and if you are doing a big bootstrap you may fill up 10 or 15 meg of your hard disc just with bootstrap output, if you want to save all that output, which is okay if you save it for a little while and then make sure you get rid off your disc when you are done. But this was done on a PC, so it is not impossible.

PROF. ZEHNWIRTH: I guess I first would like to reaffirm one of the comments that Spencer made which I think is very important. Arthur Bailey, the celebrated American actuary, wrote a paper in 1952 on sampling. He basically said in that paper that we really observe, whether it be claims or claim numbers, or whatever, is really just a sample.

When you conduct statistical modelling you don't have a theoretical model or create a model that actually generated the sample that you have observed. What you try and do is capture the important features of the data, the trends, whether they are changing or not; the randomness in the data and you create a stochastic model where you could argue that that sample you are analyzing could have come from that stochastic model.

The other thing, just a very simple example where it is quite obvious that the bootstrap doesn't work -- it is very easy to see. Let's suppose you had seven sales figures over time and you estimate to it, a six degree polynomial.

The six degree polynomial will go through all the points. I think we all agree on that. Now all the residuals are going to be zero. Each residual is going to be zero, so each resampling, each bootstrap sample will be the same as the original seven sales figures. Each bootstrap sample will be identical. So that all your forecast errors will be zero. We know that it is not the case.

MR. GLUCK: I would like to point out that all the parametric models would fail equally well -- equally as the bootstrap in that case. Also, something I do with my residuals, which I don't know if it is done in all bootstraps is, I blow them up a little bit based on the relationship of the number of parameters and the number of the points in the model.

I am trying to -- maybe it would be something like N over M minus P. The same correction that you need to do when you estimate a sample standard deviation for the fact that you -so, that blow-up factor would become infinity in the case that Ben cited, also. So if the model is over parameterized, number one, we do try to do something about it in the bootstrap so that we don't understand the errors because of the over-parameterization.

Furthermore, if the model is ridiculously over-parameterized, I don't think the bootstrap fails any more than every other technique fails.

MR. PHILBRICK: I would like to bring this session to a formal close. I am sure Spencer will be willing to stay and discuss it some more, but if we could all give Spencer a round of applause for a good job.

(Applause.)

1990 CASUALTY LOSS RESERVE SEMINAR

6A/7C: COMMON PITFALLS IN RESERVE ANALYSIS

Panel

James C. Votta
Milliman & Robertson, Inc.

David C. Westerholm
William M. Mercer, Inc.

MR. VOTTA: (Continuing) Dave Westerholm is with William M. Mercer in Chicago. I would like a show of hands. How many people are taking actuarial exams or are members of the CAS?

(Show of hands.)

And how many people aren't actuaries? This is just so we can get a general idea of the audience's background.

(Show of hands.)

Dave is going to speak first and is going to describe some of the common traps that people can fall into who are not experienced in reserve analysis.

MR. WESTERHOLM: The first pitfall you want to avoid is to assume that the average value of claims closed during a given calendar period is a good estimator of the average value of claims still open at the end of that calendar period.

(Exhibit 1)

This slide displays the payout of accident year 1975 - it could be any accident year. The first three columns show the calendar year paid losses, closed claims and average paid loss. Calendar year 1975 figures show that 16,500 claims were closed for $4,950,000 at an average cost of $300 per claim.

During 1976, an additional $12,880,000 was paid in closing an additional 18,400 claims. The average paid claim during this calendar period was $700.

Columns 4, 5 and 6 are merely the cumulative year-to-date values of columns 1 through 3.

Columns 7, 8 and 9 are the hindsight reserve columns. Column 7 is the total needed reserve ultimate minus paid - calculated by taking $31,340,000, the ultimate loss, and subtracting the column 1 paid figures.

Column 8, the number of open claims, is calculated by taking the ultimate number of claims, 38,000, and subtracting the closed claims in column 2. The quotient of columns 7 and 8 produces the average hindsight reserve shown in column 9.

Looking at accident year 1975 at 12/31/76, or at two years of development, you see that we have closed almost 35,000 claims, or 92 percent of our ultimate claim count. However, we still have $13,500,000 in reserve which represents about 43 percent of our total losses.

At this point, 92% of your claims have been closed, only 3,100 claims remain open, and the average paid-to-date claim is $511. One might assume, at this point, that if $511 represents the

average of 92% of the claims, it should be a good estimate of the remaining 8% open claims.

As you can see, it is a pretty bad estimate. The required reserve is $4,358 for those remaining claims. Using $511 as your estimate, one-eight of what is needed produces a reserve which is 88 % deficient.

Had you had a little more insight, you might have used the average of those claims closed in the most recent calendar year. This an average was $700; better but still not very good. Had you used $711, you still would have produced a reserve which was 84 % deficient.

Comparing columns 3 and 6 with what you need in column 9, you can see that if you were going to use one of the averages, you are better off using the calendar year average paid loss in column 3.

This example demonstrates several "Rules of Thumb" already known to most experienced reservists. You close the small easy claims first - Those that generally don't go to litigation.

Your CWPs are generally reported and closed in the first 12 months. It is these two facts which bring your initial average way down. The claims that stay open, they are your larger, harder to settle ones that go to litigation.

So as a reasonableness check, when you are analyzing the reasonableness of your IBNR reserve, the average outstanding that it implies should be considerably larger than your average closed or paid-to-date claims. Don't be alarmed if it is several times larger. The degree of difference will vary by line of business.

Second pitfall: You do not want to assume that the savings on closed claims is a good estimator of the savings in the remaining aggregate reserves. This, from my experience, is one of the most important pitfall to fully understand.

(Exhibit 2)

In the top half of the slide, ten claims are listed along with their valuation at each year-end point in time from 12/80 through 12-85.

I have drawn a box around the value signifying the year in which each claim is closed. So for claim number one, you show an initial reserve of $30; closed in1982 for$20. Claim number seven was initially reserved for $100; closed in1982, for zero - A CWP. The total reserve for these ten claims started out at $940. When they were all closed, you ended up paying out $1,930; implying a 105 % deficiency in the initial reserve.

In the bottom half of the exhibit I have arranged the claims by year of closure. During Calendar Year 1981, three claims were closed - #' 2, 4 and 6. Their initial reserve, was $110; their final reserve was $110. They were closed for $40, a savings of 64%.

During 1982, claim #'s one and seven were closed. The initial reserve for these two claims was $130.family change reserves once a year at year-end for this example, if they are going to change them. The final reserve, was $150, and they ended up be closed for $20.

Savings, as a percentage of the initial reserve was 85 % of the final reserve, 87%.

Now in 1984, we closed claim number eight. Initial reserve was 250; final reserve was 1,000, closed it for 500. So what was our savings? We were 100 percent deficient based upon the initial reserve, but we realized a 50 percent savings on the final reserve, the one prior to closing.

Claim #'s nine and ten had an Initial reserve of $300; final reserve of $ 1,200, were closed for $1.350. This implied a 350 % deficiency based on the initial reserve, but only a 13% deficiency based on the final reserve

In total, based upon the initial reserve, a 105% deficiency emerged, based upon the final reserve, a 25 percent savings. emerged.

The key to this example, is the point in time reserve' you chose on which to calculate your savings or deficiency. The claim department generally uses the final reserve: The actuarial department, the initial reserve. This difference in timing is critical - always be aware of it.

(Exhibit 3)

The next pitfall to avoid is assuming that the ratio of calendar year paid allocated to calendar year paid loss is a good estimator of the ratio of your needed allocated reserve to needed loss reserve.

In the upper part of this exhibit, is a spreadsheet of incremental paid losses. This is for an insurance company that is incredibly consistent. They write the same business year after year which produces identical losses year after year. There is no inflation and there is no change in case reserving philosophy.

Each accident year has $1,000 paid out during the first 12 months, $2,000 the next 12, $500 the next 12, and $300 the next 12, producing an ultimate loss of $3,800 every year.

A comparable spreadsheet for allocated expense is shown in the middle of the Exhibit. $15 is paid out during the first 12 months, $70 the next 12 months, $35 the next 12, and $30 the next 12, an ultimate of $150. Every accident year produces a ratio of ultimate allocated to ultimate loss of 3.95%. Those claims that are closed during the first 12 months produce a ratio of 1.5%. Those closed during the next 12 months produce a ratio of 3.5%. Those closed during the third and fourth year produce ratios of 7% and 10% respectively.

This increasing ratio is typical. Those claims that stay open longer are those that get litigated. Those that are tougher to settle; claims for which you will spend more allocated dollars as a percentage of loss.

During 1984, the calendar year paid allocated expense and paid loss was $150 and $3,800 respectively (sum of #'s along top of diagonal on each spreadsheet) which produce a ratio of 3.95%. Applying this to the total needed reserve of $3,900 (sum of #'s below diagonal in loss spreadsheet) produces and allocated expense reserve of $154. The required reserve, however, is $230 (sum of #'s below diagonal in allocated expense spreadsheet). Use of the calendar year paid-to-paid ratio produces an allocated expense reserve that is almost the reason for this is that the mix of claims (in terms of allocated expense ratio - 3.5%, 7%, 10%) that underlie the 3.95% figure is significantly different from the mix 16 of remaining open claims.

(Exhibit 4)

The last pitfall we will discuss concerns the importance of the tail factor selection during loss development or in the reserve setting process.

There are 16 accident years shown on this slide. What we have got here, a bunch of accident years. The first column shows each accident year's incurred losses valued at 12/89. The next column lists the annual development period, in years, over which the "standard" link ratio would project the column 1 losses. The link ratio and ultimate loss development factor are shown in columns three and four respectively.

The ultimate loss development factor (column 4) times losses (column 1) gives us our projected ultimate loss and our resultant IBNR. Most of us when we are selecting these link ratios, will spend a considerable amount of time and effort calculating the first few link ratios - the big ones - spend, but almost no time, & do no analysis in selecting these near the tail.

Let's assume that instead of 1.412 for my 2-3 year link ratio, I picked 1.437 - an increase of 2.5 points.. That one change will increase the IBNR reserve by $12 million.

Let's examine the 6-7 year link ratio. Suppose we increase it by only 1.5 points from 1/084 to 1.099. If you make only that change, you have increased the IBNR reserve by $26 million.

Now let's go down to the 16 years to ultimate factor, which is 1.010. If it is increased by only 1.0 point to 1.02 you will increase your IBNR by $25 million. If you decrease it by 1.0 point, and make it 1.000, you will reduce your IBNR reserve by almost $30 million.

The pact that often gets overlooked is that the 16 - ultimate factor is impacting 16 accident years worth of losses while the 2-3 year factor although larger, is only affecting 2 accident years worth of losses.

These results are summarized in the bottom half of Exhibit 4.

There are other pitfalls you can fall into. These four are probably the most common.

On this slide (Exhibit 5), I listed 3 axioms of claim settlement; all of which have been demonstrated in our discussion of the pitfalls.

(Exhibit 6)

When you do a reserve analysis, you generally start with the assumption that history will repeat itself. Then you promptly say, I know it hasn't; what things have changed; and how can I quantify them?

The pitfalls that you encounter generally arise from a breakdown in this assumption. Either you failed to identify the internal and/or external changes that have occurred, or if you have done that, you have improperly assessed the impact of these changes in the data, or in your reserving methodology.

(Exhibit 7)

How can you avoid or minimize your chances of falling into one of these pitfalls? You want to develop some good statistical indicators. Closing ratios is one such indicator.

Closing ratios can be defined as the ratios of closed claims to the corresponding projected ultimate claim count or, from a claims department perspective, the ratio of new claims opened to number of claims closed during a given calendar period.

You these indicators will tell you if there have been any changes in the claims disposal rate through time and you can make adjustments for it.

By looking at report year run-offs, you can observe and analyze the underlying changes in the level of case reserve adequacy

through time. This will allow you to go back and adjust prior developments to bring everything up to the current level of case reserve adequacy.

From loss development perspective, you really don't care what the level of case reserve adequacy is, you just don't want it to change. Any redundancy or deficiency will manifest itself in the loss development you observe.

The worst thing you could do as an actuary is find out that the, claim department is always 20 percent deficient on their initial reserves and then go tell them that. They would naturally increase their reserves and, unless they told you this and you made the proper adjustments, use of historical LDF's would lead to overstated reserves.

Another way to avoid or minimize these pitfalls is to utilize different reserving methodologies: a paid methodology, an incurred methodology, a counts times average methodology, and a report year methodology.

If you have the luxury of having the data and the time to utilize each of these, you can just about guarantee yourself that any sources of bias that have crept into the data will be manifest in the ultimates that are produced - i.e., The ultimates produced under the various methodologies will differ significantly.

By trying to reconcile these differences, you will become aware of these pitfalls.

You also want to perform some reasonableness checks. Do some retrospective tests and sensitivity analyses. Look at some frequency and severity analyses and see if they make sense or track with industry patterns.

Let's use workers' compensation as an example. You can make models forever and you can come up with all kinds of goodness or fit ratios telling how great the model fits, but if the date ultimates you get for work comp imply a downward trend in average claim size, I am going to ask you to take another look.

What are the two things that drive the average cost of work comp claims? Medical costs and wages and the last time I checked they weren't going down.

If that happens, you can generally go back reexamine your assumptions, fine-tune them, still be able to use your model and have your average incurred claim size be increasing which is what you would expect.

That is not to say there can't be a reason why it shouldn't or couldn't go down, but you had better have very good reasons for this to happen.

When calculating claim frequency, most companies don't have good exposure data, and they use premium as a surrogate for it. They relate number of claims to premium. In general, rate levels and premiums have been increasing. So even if you had the same book of business that produced the same claims every year, if you relate it to premium you are going to find a decreasing trend in frequency.

The next slides (Exhibit 8) represent a series of checklists or questions that I use when doing reserve analyses. Not all of these items will apply in any given reserve analysis that you do, but I can just about guarantee that if you at least consider each of these items, you will not miss anything major or material in any reserve review that you do.

MR. VOTTA: Can you hear me without this? We are going to try to simulate some of the things that Dave was talking about through the use of a couple of case studies

For the first example, let's assume you are an actuary for a company and you have been asked to develop a reserve estimate and you didn't go through your checklist. You just went ahead, got your data runs and the first thing you looked at was paid losses.

(Slide 1)

You have triangle of paid losses, you develop link ratios; you select age-to-age factors, you cumulate them and you select a tail factor for future paid development based on our ultimate incurred estimate, which we will get to next, and the relationship of that to your latest paid value on your most mature year.

(Slide 2)

Next, we apply our paid development factors to the cumulative paid losses, develop an ultimate, subtract out the actual paid and get an indicated reserve. In this case, $633,000.

Assuming that we are carrying a million, we have got quite an indicated redundancy. Here, I have related the redundance to the carried, but you can also relate it to the indicated reserve.

(Inaudible)

(Slide 3)

We also use the historical case incurred losses to develop link ratios to apply to incurred losses for another estimate. I would like to comment on the selected future incurred development factor beyond 60 months. Notice that we have selected a development factor for the tail of unity. You have to make sure that that was a conscious effort. We didn't just assume it was one because we ran out of development or the fact that we saw one period, 48 to 60 where there wasn't any incremental development.

(Inaudible)

Once we've settled on the projected incurred ultimate for the 1984 accident year, we divide this estimate by the paid-to date for 1984 to get our selected paid tail factor. The idea is that since the more mature periods are almost 100 percent reported, at ultimate paid must equal ultimate incurred, a reasonable paid tail factor is one that equates the ultimate paid and ultimate incurred projections for the 1984 year. For longer tail lines you may want to look at the required paid tail factor to equate the two methods for more than the earliest year.

(Slide 4)

Turning back to our incurred development factors, we calculate age-to-ultimate factors, calculate ultimates, and subtract out the actual paids.

Well, in this case, things are turned around. We are showing quite a big deficiency. At that point you have got to ask yourself if you violated any of the assumptions that underlie your methods. Therefore, when you go back to your underwriting department and your claim department and try to get a feel for any changes that have gone on in the book.

We will begin with the underwriting department. They say there have been no recent changes in the book. The level of exposure hasn't changed; pricing is firm. They don't really see anything unusual.

You then go to your claim department and they say, yes, back in 1987 we started to increase stall. We went from using outside adjustments to in-house adjustments. The increased staff allowed for a complete review of all open files, which let to overall case reserve strengthening. At the same time we also took a "get tough" position on claims. Therefore, the number of claims in suit has been increasing both in absolute counts and as a percentage of total claims.

(Slide 5)

You then look at some statistical indicators that test the information that you have been getting from the claims department. What we have got here is a triangle of cumulative paid claims. We have assumed that if a claim is paid when it is closed, there is no partial payments.

Over on the right, you have ultimate claims. On the bottom we have related the cumulative paid claims, or closed claims, to our ultimate. The assumption that is inherent in this analysis is that you will have some means of making reasonable estimates of your ultimate claim counts.

The ratios of closed claims to ultimate claims are also known as "claims disposal ratios". Note the downward trends in the disposal ratios for each evaluation point.

That kind of makes sense if your claim department has taken a new attitude towards litigating claims. Claims stay open longer because you are fighting them. This observable trend in the rate of claim payments renders our historical paid development inapplicable to current paid losses. We therefore adjust to our historical paid losses in order to bring the history in the triangle up to the current diagonal's maturity level. The way you do that is a procedure that is outlined in the Berquist and Sherman paper published in the proceedings.

(Slide 6)

If the 1988 year at 12 months, was at a maturity level at 32 percent, meaning we closed 32 percent of our claims, we want to restate all the prior years at the same evaluation point to get them to 32 percent disposal level. So what we do is we taken 32 over 35, times our actual paid losses on the 1987 year and we use that as an adjusted paid loss for 12 months on accident year 1987.

Likewise, take 32 over 38, times the 1986 historical paid losses at 12 months to determine adjusted paid losses for that year. Then all the way out, throughout the triangle using the interpolation in the paper -- they use exponential, I use linear year -- and interpolate between the actual level of maturity for that accident year at that evaluation and the maturity that is indicated in the diagonal.

Now we have a restated paid loss triangle with all accident years at the same maturity level at each evaluation. We develop new link ratios and using the same tail, develop age-to-ultimate factors and come up with a new paid estimate.

(Slide 7)

This time it looks like our carried reserve is pretty good. We are almost right on it. However, you still have got a problem, since there is a big discrepancy between our paid estimates and our incurred estimates. So, keeping in mind what the claims department said about beefing up the case reserves... (inaudible) we will get some statistical indicators that might prove that.

(Slide 8)

What we are showing here is the number of claims open at each evaluation point by accident year

(inaudible)

We then divide the case outstanding losses into the average or the number of open claims and develop average outstanding values.

You will notice going down the 12-month evaluation column to the 87 year you will start to see a big change in the level of average case reserves. Also, this increase is observable for the 88 year at 24 months.

(Inaudible)

In fact, we are seeing big increases in the average case reserve along the entire 1987 diagonal.

Since we now have an observable change in procedure which has impacted the incurred loss triangle, our historical incurred development is no longer appropriate to project current incurred losses to ultimate. Therefore, we will try to make adjustment to the historical data in order to get it into a usable form. Based on your studies and discussions with the with the underwriting and claims people, you conclude that the severity line has been increasing at about 15 percent a year.

(Slide 9)

Then what we do is we leave the diagonals of average outstandings that we are comfortable with the 88 and 87 year, and beginning with the 86 diagonal we go back and restate the average case outstanding. We substitute the average case outstanding for 1987 at 12 months, deflated by 15%, for the average case outstanding for 1986 adjusted value divided by 1.15 for the 1985 average outstanding at 12 months. The 24, 36, and 48 month evaluations are adjusted by deflating the selected average outstanding for each evaluation.

We then take the adjusted average case reserves, times the number of claims outstanding, add those to our adjusted paid losses and come up with a new triangle of incurred losses from which we get new age-to-ultimate factors.

We then apply the adjusted incurred age-to-ultimate factors to our actual incurred losses and come up with new ultimates, subtract the actual paid to set a revised reserve estimate. You will notice that we get a reserve that is consistent with what we are carrying.

(Slide 11)

Now, are we done at that point? Across all accident years, our total losses are pretty close between the two methods. Going down the columns you will notice that beginning with 87 and then with 88, there is quite a difference between paid incurred ultimates. I might be comfortable taking an average of my paid incurred for 84, 85 and 86, but then once you get into 87 and 88, there is quite a range between the two methods.

That is where you might use other methods to come up with estimates for the less mature years. These methods may include counts and severity projections, pure premium and exposure methods, and expected loss ratio methods.

The problem is that, particularly with the paid estimates, you have got a lot of leverage in your development factors for the immature years which increases the chances of variability in your estimates.

With this first example, a red light went off because we had such a big discrepancy between the two methods. You don't always have such a warning. Let's assume that you are writing commercial lines business with excess of loss reinsurance involved.

(Slide 12)

This is your triangle of direct, or unlimited, incurred losses. Notice the amount of leverage in the age-to-ultimate factors. Factors this high are typical for long-tail lines. Suppose we go through and limit each claim to the actual net retention. From that you get a net triangle. Notice that the development is somewhat less because we are eliminating development on the excess losses.

(Slide 14)

Then multiplying the net losses times the net development factors and subtracting actual net paid losses gives an estimated net reserve. indicated reserve, $8.5 million reserve.

Assuming that the carried reserve is 83,000, we have an indicated redundancy. However, we have not considered the historical retentions underlying our net loss development. It may be prudent to study historical changes in the reinsurance underlying the net losses.

Let us assume that the per risk retention was $100,000 per claim through the 1985 accident year. With the 1986 hard market, your company was forced to keep a higher net, say $500,000 per claim.

(Slide 15)

Let's look at development limited to $100K. Notice that through 1985, the losses at $100K are equal to net losses.

(Slide 16)

At the same time, we also look at losses limited to $500K. This time, the losses at $500K equal net losses for accident years 1986 and subsequent. You will notice the future development at each evaluation is greater. $500K limit then at the $100K limit.

This leads you to a mixed bag of development factors by year, depending on the retention level that was in place. In order to project more accurate ultimate net losses we should use the development factors from the $100K triangle for accident years 1985 and prior. Like wise, we turn to development factors from $500K. For accident years 1986 and subsequent.

(Slide 17)

You turn the redundancy into a deficiency by using development factors that were more appropriate for the retentions in effect for each year.

(Slide 18)

Notice that the higher age-to-ultimate factors from the $500K triangle led to higher net ultimates for the 1986 through 1989 years. The point is that you should be aware of the assumptions that go into every method that you use. You have to ask yourself if the assumptions underlying your methods are valid. If not, data adjustments or methods not affected by invalid assumptions should be employed.

In this second example, the difference between just using a plain net incurred development and two separate triangles, each one applying to the retention for that year, was very significant.

1990 CASUALTY LOSS RESERVE SEMINAR

Exhibits

David C. Westerholm
William M. Mercer, Inc.

COMMON PITFALLS IN RESERVE ANALYSIS

PITFALL # 1

THE AVERAGE VALUE OF CLAIMS CLOSED DURING A GIVEN CALENDAR PERIOD IS A GOOD ESTIMATE OF THE AVERAGE VALUE OF THE CLAIMS STILL OPEN AT THE END OF THAT CALENDAR PERIOD.

ACCIDENT YEAR 1975 ----- COMPARISON OF AVERAGE PAID & OUTSTANDING CLAIMS

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	INCREMENTAL			CUMULATIVE			HINDSIGHT		
YEAR OF DEVELOP	PAID LOSSES (000'S)	# CLAIMS CLOSED	AVG PAID LOSS	PAID LOSSES (000'S)	# CLAIMS CLOSED	AVG PAID LOSS	NEEDED RESERVE (000'S)	# OPEN & IBNR CLAIMS	AVERAGE RESERVE
1 (12 / 75)	4,950	16,500	300	4,950	16,500	300	26,390	21,500	1,227
2 (12 / 76)	12,880	18,400	700	17,830	34,900	511	13,510	3,100	4,358
3	3,780	1,400	2,700	21,610	36,300	595	9,730	1,700	5,724
4	2,310	550	4,200	23,920	36,850	649	7,420	1,150	6,452
5	1,470	300	4,900	25,390	37,150	683	5,950	850	7,000
6 (12 / 80)	1,430	260	5,500	26,820	37,410	717	4,520	590	7,661
7	1,040	160	6,500	27,860	37,570	742	3,480	430	8,093
8	900	120	7,500	28,760	37,690	763	2,580	310	8,323
9	780	100	7,800	29,540	37,790	782	1,800	210	8,571
10 (12 / 84)	480	60	8,000	30,020	37,850	793	1,320	150	8,800
* * *	1,320	150	8,800						
ULTIMATE	**31,340**	**38,000**	**825**	**31,340**	**38,000**	**825**	**0**	**0**	**0**

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Exhibit 1
Page 2

PITFALL # 1: THE AVERAGE VALUE OF CLAIMS CLOSED IS A GOOD ESTIMATE OF THE AVERAGE VALUE OF CLAIMS STILL OPEN

COMMON PITFALLS IN RESERVE ANALYSIS

PITFALL # 2

THE SAVINGS ON CLOSED CLAIMS IS A GOOD ESTIMATOR OF THE SAVINGS IN THE REMAINING AGGREGATE RESERVES.

CASE RESERVE DEVELOPMENT
ACCIDENT YEAR 1980

CLAIM NUMBER	INCURRED LOSSES @ 12/80	12/81	12/82	12/83	12/84	12/85
1	30	50	20	20	20	20
2	50	20	20	20	20	20
3	50	50	40	20	20	20
4	50	20	20	20	20	20
5	100	100	75	0	0	0
6	10	0	0	0	0	0
7	100	100	0	0	0	0
8	250	350	500	1,000	500	500
9	50	250	500	500	1,000	1,150
10	250	200	200	200	200	200
TOTAL	940	1,140	1,375	1,780	1,780	1,930
EMERGED SAVINGS		-21%	-46%	-89%	-89%	-105%

CAL YEAR	CLAIM #'S CLOSED	INITIAL RESERVE	FINAL RESERVE	PAID ON CLOSURE	% SAVINGS INITIAL RESERVE	% SAVINGS FINAL RESERVE
1981	2, 4, 6	110	110	40	64	64
1982	1, 7	130	150	20	85	87
1983	3, 5	150	115	20	87	83
1984	8	250	1,000	500	(100)	50
1985	9, 10	300	1,200	1,350	(350)	(13)
TOTAL		940	2,575	1,930	(105)	25

PITFALL # 2: THE SAVINGS ON CLOSED CLAIMS IS A GOOD ESTIMATOR OF THE SAVINGS IN THE REMAINING AGGREGATE RESERVES

COMMON PITFALLS IN RESERVE ANALYSIS

PITFALL # 3

THE CALENDAR YEAR RATIO OF PAID ALAE TO PAID LOSS REPRESENTS THE RELATIONSHIP OF THE NEEDED ALAE RESERVE TO THE NEEDED LOSS REAERVE.

ESTIMATING ALAE RESERVES

INCREMENTAL PAID LOSSES ($ 000'S)

ACC YR	MONTHS OF DEVELOPMENT 12	24	36	48	ULT
1980	1,000	2,000	500	300	3,800
1981	1,000	2,000	500	300	3,800
1982	1,000	2,000	500	300	3,800
1983	1,000	2,000	500	300	3,800
1984	1,000	2,000	500	300	3,800

NEEDED RESERVE
$ 3,900

INCREMENTAL PAID ALAE ($ 000'S)

ACC YR	MONTHS OF DEVELOPMENT 12	24	36	48	ULT
1980	15	70	35	30	150
1981	15	70	35	30	150
1982	15	70	35	30	150
1983	15	70	35	30	150
1984	15	70	35	30	150
ALAE / LOSS	1.5%	3.5%	7.0%	10.0%	3.95%

NEEDED RESERVE
$ 230

CY PAID ALAE = 15 + 70 + 35 + 30 = 150

CY PAID LOSSES = 1,000 + 2,000 + 500 + 300 = 3,800

CY PAID ALAE / PAID LOSS (150 / 3,800) : = 3.95 %

ALAE RESERVE BASED ON CY RATIO: 3.95% X 3,900 = 154

ACTUAL NEEDED RESERVE = 230

RESERVE DEFICIENCY = 49.4 %

PITFALL # 3: THE CALENDAR YEAR RATIO OF PAID ALAE TO PAID LOSSES REPRESENTS THE RELATIONSHIP OF THE NEEDED ALAE RESERVE TO THE LOSS RESERVE

COMMON PITFALLS IN RESERVE ANALYSIS

PITFALL # 4

THE 'TAIL FACTOR' IN LOSS DEVELOPMENT IS OF RELATIVELY MINOR IMPORTANCE IN THE RESERVE SETTING PROCESS.

INCURRED LOSS DEVELOPMENT FACTORS

	(1)	(2)	(3)	(4)	(5)	(6)
ACC YEAR	INCURRED LOSSES @ 12/89	DEVELOP PERIOD (YRS)	INCURRED LOSS DEV FACTOR ANNUAL	CUMUL	ULTIMATE INCURRED	IBNR
1989	43,700	1 : 2	1.971	8.152	356,242	312,542
1988	79,200	2 : 3	1.412	4.136	327,571	248,371
1987	133,400	3 : 4	1.358	2.929	390,729	257,329
1986	185,100	4 : 5	1.252	2.157	399,261	214,161
1985	174,000	5 : 6	1.105	1.723	299,802	125,802
1984	126,100	6 : 7	1.084	1.559	196,590	70,490
1983	102,500	7 : 8	1.073	1.438	147,395	44,895
1982	106,600	8 : 9	1.064	1.340	142,844	36,244
1981	70,500	9 : 10	1.055	1.259	88,760	18,260
1980	77,700	10 : 11	1.047	1.193	92,696	14,996
1979	83,800	11 : 12	1.039	1.139	95,448	11,648
1978	87,400	12 : 13	1.031	1.096	95,790	8,390
1977	91,400	13 : 14	1.024	1.063	97,158	5,758
1976	67,000	14 : 15	1.017	1.038	69,546	2,546
1975	50,800	15 : 16	1.011	1.021	51,867	1,067
1974	41,800	16 : ULT		1.010	42,218	418
TOTAL	1,521,000				2,893,917	1,372,917

SENSITIVITY ANALYSIS

DEVELOP PERIOD	ANNUAL LOSS DEV FACTOR ORIGINAL	REVISED	CHANGE	TOTAL IBNR ORIGINAL	REVISED	CHANGE
2 : 3	1.412	1.437	0.025	1,372,917	1,384,992	12,075
6 : 7	1.084	1.099	0.015		1,399,513	26,596
16 : ULT	1.010	1.020	0.010		1,398,032	25,115
16 : ULT	1.010	1.000	(0.010)		1,343,389	(29,528)

AMOUNTS IN $000'S

PITFALL # 4: THE TAIL FACTOR IS OF RELATIVELY MINOR IMPORTANCE IN THE RESERVE SETTING PROCESS

KEY AXIOMS OF CLAIM SETTLEMENT

1. SMALL, 'EASY' CLAIMS TEND TO CLOSE QUICKLY; LARGER CLAIMS GET CLOSED MORE SLOWLY.

2. MOST CLAIMS GET CLOSED FOR LESS THAN THEIR CASE RESERVE, BUT THE RELATIVELY FEW ADVERSE LARGE CLAIMS GENERALLY MORE THAN OFFSET THIS FAVORABLE DEVELOPMENT.

3. THE BOOK OF CLOSED CLAIMS CONTAINS A MUCH LARGER PROPORTION OF SMALL, SHORT-TAILED CLAIMS THAN THE BOOK OF OUTSTANDING CLAIMS.

RESERVING PITFALLS

RESERVE ANALYSES START WITH THE IMPLICIT ASSUMPTION THAT THINGS HAVE NOT CHANGED.

PITFALLS GENERALLY ARISE FROM A BREAKDOWN IN THIS ASSUMPTION :

FAILURE TO IDENTIFY INTERNAL OR EXTERNAL CHANGES

IMPROPER ASSESSMENT OF THE IMPACT OF CHANGES IN THE DATA OR IN THE RESERVING METHODOLOGY

AVOIDING OR MINIMIZING PITFALLS

KNOW YOUR CLAIM AND UNDERWRITING DEPARTMENTS

DEVELOP STATISTICAL INDICATORS

- CLOSING RATIOS
- PAID - TO - INCURRED RATIOS
- REPORT YEAR RUN-OFFS
- AVERAGE PAID / RESERVE / INCURRED CLAIM SIZE

EXAMINE DIFFERENT RESERVING METHODOLOGIES

- PAID METHODOLOGY
- INCURRED METHODOLOGY
- COUNTS X AVERAGE METHODOLOGY
- REPORT YEAR METHODOLOGY

PERFORM REASONABLENESS CHECKS

- RETROSPECTIVE TESTS AND SENSITIVITY ANALYSES
- FREQUENCY AND SEVERITY ANALYSES
- COMPARE LOSS RATIOS TO :
  - EXPECTED LOSS RATIOS BASED ON PRICING & PURE PREMIUM
  - INDUSTRY (PEER CO'S) ACCIDENT YEAR LOSS RATIOS

INTERNAL DATA

CLIENT: _____ DATE: _____

COMPLETENESS	GOOD	AVERAGE	POOR	

COMMENTS

Comments regarding relevant data should address
- Organization of Data: Calendar / Policy / Notice / Exposure-Accident Year / Qtr
- Historical Evaluations: # years / quarter's evaluated monthly / quarterly / annually
- Data Elements: claim counts / losses / ALAE / ULAE / premium / exposures / etc.
- Level of Detail: LOB / subline / coverage / policy / claim / etc.

RELIABILITY/ QUALITY	GOOD	AVERAGE	POOR	

COMMENTS

Given the available data, is it reliable / accurate (independent of any credibility considerations) ?

STATISTICAL CREDIBILITY	GOOD	AVERAGE	POOR	

COMMENTS

Assuming the data is "reliable enough" to render an opinion, what is the statistical credibility of the data ? The degree of credibility you assign the data will directly impact the caveats / assumptions / qualifications you make.

EXTERNAL DATA

CLIENT: _____ DATE: _____

COMPLETENESS	GOOD	AVERAGE	POOR	

COMMENTS

Summarized version of "Internal Data – Completeness" requirements plus source of data (Best's / ISO / NCCI / etc).

RELIABILITY/ QUALITY	GOOD	AVERAGE	POOR	

COMMENTS

Given the available data, is it reliable / accurate (independent of any credibility considerations) ?

STATISTICAL CREDIBILITY	GOOD	AVERAGE	POOR	

COMMENTS

Assuming the data is "reliable enough" to render an opinion, what is the statistical credibility of the data ? The degree of credibility you assign the data will directly impact the caveats / assumptions / qualifications you make. How compatible / applicable is it to the Internal Data ?

SUMMARY OF DATA ADJUSTMENTS / JUDGEMENTS / ASSUMPTIONS

CLIENT: ____________________ DATE: __________

DESCRIPTION:	CREDIBILITY*	
		HIGH
		MEDIUM
		LOW
SENSITIVITY TEST RESULTS:		

DESCRIPTION:	CREDIBILITY*	
		HIGH
		MEDIUM
		LOW
SENSITIVITY TEST RESULTS:		

DESCRIPTION:	CREDIBILITY*	
		HIGH
		MEDIUM
		LOW
SENSITIVITY TEST RESULTS:		

DESCRIPTION:	CREDIBILITY*	
		HIGH
		MEDIUM
		LOW
SENSITIVITY TEST RESULTS:		

*CREDIBILITY RATING

HIGH: STATISTICALLY DERIVED / SUPPORTED

MEDIUM: INFORMED JUDGEMENT + STATISTICS

LOW: INFORMED JUDGEMENT

CLIENT: _____ DATE: _____

BUSINESS CATEGORY:			
METHODOLOGY USED TO ESTABLISH / REVIEW BOOKED ALAE RESERVES			COMMENTS
METHODOLOGY	ESTAB	REVIEW	Comments should assess the applicability / efficacy of the method(s) used to establish the booked reserves on both an absolute (i.e. optimum methodology) and a relative (i.e. in light of actual data and time constraints) basis.
PAID LINK RATIOS			
INCURRED LINK RATIOS			
ALAE RES / LOSS RES			
COUNTS X AVERAGES			
AY PAID ALAE / PAID LOSS RATIOS			
ALAE RATIO: INC ALAE / EP			
MODEL			
OTHER:			

BUSINESS CATEGORY:			
METHODOLOGY USED TO ESTABLISH / REVIEW BOOKED ALAE RESERVES			COMMENTS
METHODOLOGY	ESTAB	REVIEW	
PAID LINK RATIOS			
INCURRED LINK RATIOS			
ALAE RES / LOSS RES			
COUNTS X AVERAGES			
AY PAID ALAE / PAID LOSS RATIOS			
ALAE RATIO: INC ALAE / EP			
MODEL			
OTHER:			

CLIENT INTERVIEW QUESTIONS

INTERNAL FACTORS AFFECTING LOSS RESERVES

CLIENT: _____ DATE: _____

BUSINESS CATEGORY:	
UNDERWRITING & PRICING	
CHANGES IN PRICING STRATEGY / RATE ADEQUACY	Check the box if the category listed on the left applies, and make any appropriate comments
CHANGES IN POLICY LIMITS / DEDUCTIBLES / SIRS / BENEFIT LEVELS	
CHANGES IN UNDERWRITING GUIDELINES / PROGRAMS.	
CHANGES IN NEW / RENEWAL RATIOS	
CHANGES IN TYPE OF REINSURANCE AND RETENTIONS	
CHANGES IN PREMIUM VOLUME GROWTH / MARKET SHARE	
CHANGES IN POLICY TERM (I.E. 6 MO. VS ANNUAL)	
CHANGES IN BOOK OF BUSINESS PROFILE (BY RATING VARIABLE)	
USE OF CAPTIVES / FRONTING ARRANGEMENTS	

CLIENT INTERVIEW QUESTIONS
INTERNAL FACTORS AFFECTING LOSS RESERVES

CLIENT: _____ DATE: _____

BUSINESS CATEGORY:	
UNDERWRITING & PRICING	
RATEMAKING VS RESERVING DATA	
PARTICIPATION IN VOLUNTARY POOLS AND ASSOCIATIONS	
CHANGES IN POLICY FORM / COVERAGES	

CLAIMS OPERATIONS & CASE RESERVING	
CHANGES IN ADEQUACY OF CASE RESERVES	
FAST TRACK CLAIMS: DEFINITION & RESERVE PROCEDURES	
AVG RES CLAIMS: DEFINITION & RESERVE PROCEDURES	

CLIENT INTERVIEW QUESTIONS

INTERNAL FACTORS AFFECTING LOSS RESERVES

CLIENT: _____ DATE: _____

BUSINESS CATEGORY: CLAIMS OPERATIONS & CASE RESERVING	
JOHN DOE CLAIMS: DEFINITION & RESERVE PROCEDURES	
CHANGES IN USE OF STRUCTURED SETTLE-MENTS	
CHANGES IN USE OF COMPANY VS INDEPENDENT ADJUSTERS	
IMPACT OF UNBUNDLING OF CLAIM SERVICES; TPA'S	
ALAE PAYMENTS: LUMP SUM / PARTIALS ?	
LOSS PAYMENTS: CHANGES IN USE OF PARTIALS; SPEED OF CLOSING	
S & S: ARE THERE TARGETS?	
DEDUCTIBLES (1ST & 3RD PARTY): HOW IS INITIAL RESERVE SET?	
CLAIM DEPT STAFFING: CHANGES IN # AND MGMT	

CLIENT INTERVIEW QUESTIONS

INTERNAL FACTORS AFFECTING LOSS RESERVES

CLIENT: _____ DATE: _____

BUSINESS CATEGORY:

CLAIMS OPERATIONS & CASE RESERVING

CAT'S / SHOCK LOSSES / EIL CLAIMS: SPECIAL RESERVE PROCEDURES?	
ALAE RESERVE: FORMULA; INCLUDED IN CASE RESERVE?	
CLAIMS PROCEDURES MANUAL: REVIEW LAST 2 - 3 YEARS OF UPDATES	
CHANGES IN COMPANY LITI-GATION POLICY?	
CHANGES IN CLAIM CLOSING RATES (CY & AY)	
CHANGES IN CWP RATIOS (CWPS/REPORTED)	
CHANGES IN CLAIM REPORTING PATTERNS	
CHANGES IN FIELD/BRANCH AUTHORIZATION LIMITS	
CHANGES IN DEFINITION OF WHAT CONSTITUTES A CLAIM	

CLIENT INTERVIEW QUESTIONS

INTERNAL FACTORS AFFECTING LOSS RESERVES

CLIENT: _____ DATE: _____

BUSINESS CATEGORY:

CLAIMS OPERATIONS & CASE RESERVING

CALCULATION OF ULAE RESERVE	
REINSURANCE ASSUMED: MODIFICATIONS OR ADDITIONS TO RESERVES?	
XS COVERAGES / UMBRELLA LIABILITY: SPECIAL RESERVE PROCEDURES?	
UNDIGESTED CLAIMS & SUSPENSE PAYMENTS: IMPACT ON RESERVING PROCESS	
CASE RESERVE REVIEW PROCESS (BY WHOM AND WHEN ?)	

STATISTICAL & ACCOUNTING

CONSISTENCY OF CLOSING DATES & PROCEDURES	

CLIENT INTERVIEW QUESTIONS

INTERNAL FACTORS AFFECTING LOSS RESERVES

CLIENT: _____ DATE: _____

BUSINESS CATEGORY:	
STATISTICAL & ACCOUNTING	
UNDIGESTED CLAIMS & SUSPENSE PAYMENTS: HOW RECORDED?	
FAST TRACK CLAIMS: HOW RECORDED / COUNTED?	
AVG RES CLAIMS: HOW RECORDED / COUNTED?	
JOHN DOE CLAIMS: HOW RECORDED / COUNTED?	
UNBUNDLING OF CLAIM SERVICES; TPA'S: HOW RECORDED?	
CLAIM COUNTING RULES: OCCURRENCE, CLAIMANT, EVENT, CWP'S, ETC.	
S & S: HOW RECORDED?	
DEDUCTIBLES (1ST & 3RD PARTY): HOW ARE RECOVERIES BOOKED?	
CAT'S / SHOCK LOSSES /EIL CLAIMS: SPECIAL CODING?	

CLIENT INTERVIEW QUESTIONS

INTERNAL FACTORS AFFECTING LOSS RESERVES

CLIENT: _____ DATE: _____

BUSINESS CATEGORY:	
STATISTICAL & ACCOUNTING	
REOPENED CLAIM PROCEDURES: HOW COUNTED; MATCHED TO ORIG CLAIM?	
WC (MED WITH INDEMNITY): IF REPORTED AT DIFF TIME, HOW COUNTED / RECORDED?	
ALAE RESERVE: RECORDED SEPARATELY OR INCLUDED IN CASE RESERVE?	
CHANGES IN CLAIM PROCESSING: ISSUED OR CASHED BASIS OF RECORDING PAYMENTS?	
IS CASE RESERVE AUTOMATICALLY REDUCED BY PAYMENTS; CAN IT BE NEGATIVE?	
ARP'S & INVOLUNTARY POOLS & ASSOCIATIONS: PROCESSED ANY DIFFERENTLY FROM REG BUSINESS?	
CHANGE IN DEFINITION OF WHAT CONSTITUTES A CLAIM	
XS COVERAGES / UMBRELLA LIABILITY: SPECIAL RECORDING PROCEDURES?	
SEASONALITY	

CLIENT INTERVIEW QUESTIONS

INTERNAL FACTORS AFFECTING LOSS RESERVES

CLIENT: _____ DATE: _____

BUSINESS CATEGORY:

STATISTICAL & ACCOUNTING

HOW IS REINSURANCE RECORDED ?	
HANDLING OF START - UP OPERATIONS	
HANDLING OF WIND - DOWN OPERATIONS	
HOW ARE EARNED PREMIUM & EXPOSURES RECORDED ?	

CLIENT INTERVIEW QUESTIONS

EXTERNAL FACTORS AFFECTING LOSS RESERVES

CLIENT: _____ DATE: _____

BUSINESS CATEGORY:	
PARTICIPATION IN INVOLUNTARY POOLS & ASSOCIATIONS; ARP'S	
ECONOMIC INFLATION	
SOCIAL INFLATION	
LEGAL / JUDICIAL CHANGES; STATE REGULATIONS / STATUTES	
CLAIMS CONSCIOUSNESS OF PUBLIC	
ECONOMY	
COMPETITION (IMPACT ON QUALITY - VOLUME TRADEOFF)	
WEATHER (CATASTROPHES)	

SUMMARY OF REASONABLENESS TESTING RESULTS

LOSSES

CLIENT: _____ DATE: _____

BUSINESS CATEGORY:			
		COMPARATIVE FIGURES	
TEST	TEST RESULTS	COMPANY HISTORY	INDUSTRY
LOSS RATIO			
FREQUENCY / SEVERITY			
PURE PREMIUM			
SCHED O, P			
CY PD / INC RATIOS			
CHANGE IN RES. LEVEL (% & $)			

COMMENTS:

SUMMARY OF REASONABLENESS TESTING RESULTS

ALAE

CLIENT: _____ DATE: _____

BUSINESS CATEGORY:			
		COMPARATIVE FIGURES	
TEST	TEST RESULTS	COMPANY HISTORY	INDUSTRY
CHANGE IN RES. LEVEL			
CY INC RATIO (ALAE / EP)			
CY PAID RATIO (ALAE / LOSS)			

COMMENTS:

RESERVE STUDY CHECKLIST

CLIENT: _____ DATE: _____

	YES	NO	N/A	COMMENTS
INTERNAL DATA ANALYSIS COMPLETED				
EXTERNAL DATA ANALYSIS COMPLETED				
DATA ADJUSTMENT / SENSITIVITY ANALYSIS WORKSHEET COMPLETED				
RESERVE METHODOLOGY SUMMARY SHEET COMPLETED				
- LOSSES				
- ALAE				
CLIENT INTERVIEW CHECKLIST COMPLETED				
REASONABLENESS TESTS PERFORMED				
- LOSSES				
- ALAE				
STATEMENT OF OPINION COMPLETED				

GENERAL COMMENTS: _____

1990 CASUALTY LOSS RESERVE SEMINAR

Slides

James C. Votta
Milliman & Robertson, Inc.

COMMON PITFALLS IN RESERVE ANALYSIS

CASE STUDY #1

PAID DEVELOPMENT METHOD

Accident	Cumulative Paid Losses				
Year	12	24	36	48	60
1984	$50,000	$90,000	$126,000	$131,000	$151,000
1985	58,000	103,000	145,000	192,000	
1986	67,000	118,000	188,000		
1987	77,000	136,000			
1988	100,000				

	Paid Development Factors				
	12-24	24-36	36-48	48-60	
1984	1.800	1.400	1.040	1.153	
1985	1.776	1.408	1.324		
1986	1.761	1.593			
1987	1.766				
Average	1.776	1.467	1.182	1.153	
Cumulative	4.044	2.277	1.552	1.313	1.139 *

NOTE:

1.(*) Tail Factor = Incurred Loss / Paid Loss
= $172,000 / $151,000 = 1.139

COMMON PITFALLS IN RESERVE ANALYSIS

CASE STUDY #1

PAID DEVELOPMENT METHOD

Accident Year	Cumulative Paid Loss	Cumulative Paid Loss Dev. Factor	Ultimate Loss	Indicated Reserve
1984	$151,000	1.139	$171,989	$20,989
1985	192,000	1.313	252,096	60,096
1986	188,000	1.552	291,776	103,776
1987	136,000	2.277	309,672	173,672
1988	100,000	4.044	404,400	304,400

Total Indicated Reserve =	$662,933
Carried Reserve =	$1,000,000
Indicated Redundancy =	$337,067
=	33.7%

COMMON PITFALLS IN RESERVE ANALYSIS

CASE STUDY #1

INCURRED DEVELOPMENT METHOD

Accident	Cumulative Incurred Losses				
Year	12	24	36	48	60
1984	$81,000	$155,000	$167,000	$172,000	$172,000
1985	100,000	193,000	271,000	290,000	
1986	124,000	381,000	374,000		
1987	237,000	510,000			
1988	314,000				

	Incurred Development Factors				
	12-24	24-36	36-48	48-60	
1984	1.914	1.077	1.030	1.000	
1985	1.930	1.404	1.070		
1986	3.073	0.982			
1987	2.152				
Average	2.267	1.154	1.050	1.000	
Cumulative	2.748	1.212	1.050	1.000	1.000

COMMON PITFALLS IN RESERVE ANALYSIS

CASE STUDY #1

INCURRED DEVELOPMENT METHOD

Accident Year	Cumulative Inc. Loss	Cumulative Inc. Loss Dev. Factor	Ultimate Loss	Paid To Date	Indicated Reserve
1984	$172,000	1.000	$172,000	$151,000	$21,000
1985	290,000	1.000	290,000	192,000	98,000
1986	374,000	1.050	392,700	188,000	204,700
1987	510,000	1.212	618,120	136,000	482,120
1988	314,000	2.748	862,872	100,000	762,872

Total Indicated Reserve =	$1,568,692
Carried Reserve =	$1,000,000
Indicated Deficiency =	$568,692
=	56.9%

COMMON PITFALLS IN RESERVE ANALYSIS

CASE STUDY #1

REVISING PAID LOSS PROJECTIONS FOR CHANGES IN DISPOSAL RATES

Accident	Cumulative Paid Claims					
Year	12	24	36	48	60	Ultimate
1984	1,305	2,175	2,523	2,755	2,842	2,900
1985	1,239	2,065	2,390	2,626		2,950
1986	1,140	2,010	2,280			3,000
1987	1,068	1,922				3,050
1988	992					3,100
						3,150

	Claims Disposal Rates				
	12	24	36	48	60
1984	0.450	0.750	0.870	0.950	0.980
1985	0.420	0.700	0.810	0.890	
1986	0.380	0.670	0.760		
1987	0.350	0.630			
1988	0.320				

COMMON PITFALLS IN RESERVE ANALYSIS

CASE STUDY #1

ADJUSTED PAID DEVELOPMENT METHOD

Accident Year	Cumulative Adjusted Paid Losses				
	12	24	36	48	60
1984	$35,556	$74,000	$93,000	$127,250	$151,000
1985	44,190	91,750	125,909	192,000	
1986	56,421	110,966	188,000		
1987	70,400	136,000			
1988	100,000				

	Adjusted Paid Development Factors				
	12-24	24-36	36-48	48-60	
1984	2.081	1.257	1.368	1.187	
1985	2.076	1.372	1.525		
1986	1.967	1.694			
1987	1.932				
Average	2.014	1.441	1.447	1.187	
Cumulative	5.677	2.819	1.956	1.352	1.139

COMMON PITFALLS IN RESERVE ANALYSIS

CASE STUDY #1

ADJUSTED PAID DEVELOPMENT METHOD

Accident Year	Cumulative Paid Loss	Adjusted Cumulative Paid Loss Dev. Factor	Ultimate Loss	Indicated Reserve
1984	$151,000	1.139	$171,989	$20,989
1985	192,000	1.352	259,584	67,584
1986	188,000	1.956	367,728	179,728
1987	136,000	2.819	383,384	247,384
1988	100,000	5.677	567,700	467,700

Total Indicated Reserve =	$983,385
Carried Reserve =	$1,000,000
Indicated Redundancy =	$16,615
=	1.7%

COMMON PITFALLS IN RESERVE ANALYSIS

CASE STUDY #1

REVISING INCURRED LOSS PROJECTIONS FOR CHANGES IN CASE ADEQUACY

Accident	Open Claims				
Year	12	24	36	48	60
1984	1,097	591	377	145	58
1985	1,121	827	561	325	
1986	1,050	815	720		
1987	1,087	786			
1988	1,113				

	Average Case Reserves				
	12	24	36	48	60
1984	$28	$110	$109	$283	$362
1985	37	109	225	302	
1986	54	323	258		
1987	147	476			
1988	192				

COMMON PITFALLS IN RESERVE ANALYSIS

CASE STUDY #1

ADJUSTED INCURRED DEVELOPMENT METHOD

Accident	Adjusted Average Case Reserves				
Year	12	24	36	48	60
1984	$97	$244	$196	$283	$362
1985	111	281	225	302	
1986	128	323	258		
1987	147	476			
1988	192				

	Adjusted Incurred Losses				
	12	24	36	48	60
1984	$156,030	$234,343	$199,761	$172,035	$171,996
1985	182,603	335,279	271,225	290,150	
1986	201,217	381,245	373,760		
1987	236,789	510,136			
1988	313,696				

	Development Factors				
	12-24	24-36	36-48	48-60	
1984	1.502	0.852	0.861	1.000	
1985	1.836	0.809	1.070		
1986	1.895	0.980			
1987	2.154				
Average	1.847	0.880	0.966	1.000	
Cumulative	1.570	0.850	0.966	1.000	1.000

COMMON PITFALLS IN RESERVE ANALYSIS

CASE STUDY #1

ADJUSTED INCURRED DEVELOPMENT METHOD

Accident Year	Cumulative Inc. Loss	Adjusted Cumulative Inc. Loss Dev. Factor	Ultimate Loss	Paid To Date	Indicated Reserve
1984	$171,996	1.000	$171,996	$151,000	$20,996
1985	290,150	1.000	290,150	192,000	98,150
1986	373,760	0.966	361,052	188,000	173,052
1987	510,136	0.850	433,616	136,000	297,616
1988	313,696	1.570	492,503	100,000	392,503

Total Indicated Reserve =	$982,317
Carried Reserve =	$1,000,000
Indicated Redundancy =	$17,683
=	1.8%

COMMON PITFALLS IN RESERVE ANALYSIS

CASE STUDY #1

COMPARISON OF ULTIMATES

Accident Year	Adjusted Paid Ultimate	Adjusted Incurred Ultimate
1984	$171,989	$171,996
1985	259,584	290,150
1986	367,728	361,052
1987	383,384	433,616
1988	567,700	492,503
Total	$1,750,385	$1,749,317

COMMON PITFALLS IN RESERVE ANALYSIS

CASE STUDY #2

UNLIMITED INCURRED LOSS DEVELOPMENT

Accident Year	Months of Development									
	12	24	36	48	60	72	84	96	108	120
1980	$2,128	$5,423	$11,654	$17,322	$24,654	$27,325	$29,845	$30,513	$30,987	$31,268
1981	2,465	6,722	10,592	16,854	23,654	29,325	31,984	33,932	34,965	
1982	1,865	5,265	12,654	19,135	25,465	28,632	29,895	31,684		
1983	2,065	7,565	16,247	23,247	26,699	30,984	32,985			
1984	1,716	5,922	10,547	16,987	21,355	24,984				
1985	1,936	6,060	12,654	18,655	22,654					
1986	2,322	6,262	12,098	17,655						
1987	2,165	5,925	13,655							
1988	1,914	6,065								
1989	2,213									

	Development Factors								
	12-24	24-36	36-48	48-60	60-72	72-84	84-96	96-108	108-120
1980	2.548	2.149	1.486	1.423	1.108	1.092	1.022	1.016	1.009
1981	2.727	1.576	1.591	1.403	1.240	1.091	1.061	1.030	
1982	2.823	2.403	1.512	1.331	1.124	1.044	1.060		
1983	3.663	2.148	1.431	1.148	1.160	1.065			
1984	3.451	1.781	1.611	1.257	1.170				
1985	3.130	2.088	1.474	1.214					
1986	2.697	1.932	1.459						
1987	2.737	2.305							
1988	3.169								
Average	2.994	2.048	1.509	1.296	1.160	1.073	1.048	1.023	1.009
Cumulative	16.156	5.396	2.635	1.746	1.347	1.161	1.082	1.032	1.009	1.000

COMMON PITFALLS IN RESERVE ANALYSIS

CASE STUDY #2

NET INCURRED LOSS DEVELOPMENT

Accident	Months of Development									
Year	12	24	36	48	60	72	84	96	108	120
1980	$1,702	$4,067	$8,158	$11,259	$14,792	$15,975	$16,295	$16,295	$16,295	$16,295
1981	1,972	5,042	7,414	10,955	14,192	15,268	15,497	15,497	15,497	
1982	1,492	3,949	8,858	12,438	15,279	16,318	16,644	16,644		
1983	1,652	5,674	11,373	15,111	16,019	17,301	17,474			
1984	1,373	4,442	7,383	11,042	12,813	13,812				
1985	1,549	4,545	8,858	12,126	13,592					
1986	2,159	5,323	9,678	13,241						
1987	2,013	5,036	10,924							
1988	1,780	5,155								
1989	2,058									

	Development Factors								
	12-24	24-36	36-48	48-60	60-72	72-84	84-96	96-108	108-120
1980	2.390	2.006	1.380	1.314	1.080	1.020	1.000	1.000	1.000
1981	2.557	1.470	1.478	1.295	1.076	1.015	1.000	1.000	
1982	2.647	2.243	1.404	1.228	1.068	1.020	1.000		
1983	3.435	2.004	1.329	1.060	1.080	1.010			
1984	3.235	1.662	1.496	1.160	1.078				
1985	2.934	1.949	1.369	1.121					
1986	2.465	1.818	1.368						
1987	2.502	2.169							
1988	2.896								
Average	2.785	1.915	1.403	1.196	1.076	1.016	1.000	1.000	1.000	
Cumulative	9.781	3.512	1.834	1.307	1.093	1.016	1.000	1.000	1.000	1.000

COMMON PITFALLS IN RESERVE ANALYSIS

CASE STUDY #2

DEVELOPMENT OF NET INCURRED ULTIMATES

Accident Year	Cumulative Inc. Loss	Cumulative Inc. Loss Dev. Factor	Ultimate Loss	Paid To Date	Indicated Reserve
1980	$16,295	1.000	$16,295	$15,969	$326
1985	15,497	1.000	15,497	14,257	1,240
1985	16,644	1.000	16,644	14,480	2,164
1985	17,474	1.000	17,474	13,106	4,368
1985	13,812	1.016	14,033	7,858	6,175
1985	13,592	1.093	14,856	7,428	7,428
1986	13,241	1.307	17,306	7,788	9,518
1987	10,924	1.834	20,035	8,014	12,021
1988	5,155	3.512	18,104	2,716	15,388
1989	2,058	9.781	20,129	403	19,726

Total Indicated Reserve =	$78,354
Carried Reserve =	$83,000
Indicated Redundancy =	$4,646
=	5.6%

COMMON PITFALLS IN RESERVE ANALYSIS

CASE STUDY #2

INCURRED LOSS DEVELOPMENT LIMITED TO 100K

Accident	Months of Development									
Year	12	24	36	48	60	72	84	96	108	120
1980	$1,702	$4,067	$8,158	$11,259	$14,792	$15,975	$16,295	$16,295	$16,295	$16,295
1981	1,972	5,042	7,414	10,955	14,192	15,268	15,497	15,497	15,497	
1982	1,492	3,949	8,858	12,438	15,279	16,318	16,644	16,644		
1983	1,652	5,674	11,373	15,111	16,019	17,301	17,474			
1984	1,373	4,442	7,383	11,042	12,813	13,812				
1985	1,549	4,545	8,858	12,126	13,592					
1986	2,090	5,010	8,469	11,476						
1987	1,949	4,740	9,559							
1988	1,723	4,852								
1989	1,992									

	Development Factors								
	12–24	24–36	36–48	48–60	60–72	72–84	84–96	96–108	108–120	
1980	2.390	2.006	1.380	1.314	1.080	1.020	1.000	1.000	1.000	
1981	2.557	1.470	1.478	1.295	1.076	1.015	1.000	1.000		
1982	2.647	2.243	1.404	1.228	1.068	1.020	1.000			
1983	3.435	2.004	1.329	1.060	1.080	1.010				
1984	3.235	1.662	1.496	1.160	1.078					
1985	2.934	1.949	1.369	1.121						
1986	2.397	1.690	1.355							
1987	2.432	2.017								
1988	2.816									
Average	2.760	1.880	1.402	1.196	1.076	1.016	1.000	1.000	1.000	
Cumulative	9.505	3.444	1.832	1.307	1.093	1.016	1.000	1.000	1.000	1.000

COMMON PITFALLS IN RESERVE ANALYSIS

CASE STUDY #2

INCURRED LOSS DEVELOPMENT LIMITED TO 500K

Accident	Months of Development									
Year	12	24	36	48	60	72	84	96	108	120
1980	$1,915	$4,610	$9,323	$12,992	$17,258	$18,581	$19,399	$19,593	$19,593	$19,593
1981	2,219	5,714	8,474	12,641	16,558	19,941	20,790	20,998	20,998	
1982	1,679	4,475	10,123	14,351	17,826	19,470	19,432	19,626		
1983	1,859	6,430	12,998	17,435	18,689	21,069	21,440			
1984	1,544	5,034	8,438	12,740	14,948	16,989				
1985	1,742	5,151	10,123	13,991	15,858					
1986	2,159	5,323	9,678	13,241						
1987	2,013	5,036	10,924							
1988	1,780	5,155								
1989	2,058									

	Development Factors								
	12-24	24-36	36-48	48-60	60-72	72-84	84-96	96-108	108-120	
1980	2.407	2.022	1.394	1.328	1.077	1.044	1.010	1.000	1.000	
1981	2.575	1.483	1.492	1.310	1.204	1.043	1.010	1.000		
1982	2.665	2.262	1.418	1.242	1.092	0.998	1.010			
1983	3.459	2.021	1.341	1.072	1.127	1.018				
1984	3.260	1.676	1.510	1.173	1.137					
1985	2.957	1.965	1.382	1.133						
1986	2.465	1.818	1.368							
1987	2.502	2.169								
1988	2.896									
Average	2.798	1.927	1.415	1.210	1.127	1.026	1.010	1.000	1.000	
Cumulative	10.778	3.852	1.999	1.413	1.168	1.036	1.010	1.000	1.000	1.000

COMMON PITFALLS IN RESERVE ANALYSIS

CASE STUDY #2

ADJUSTED DEVELOPMENT OF NET INCURRED ULTIMATES

Accident Year	Cumulative Inc. Loss	Adjusted Cumulative Inc. Loss Dev. Factor	Ultimate Loss	Paid To Date	Indicated Reserve
1980	$16,295	1.000	$16,295	$15,969	$326
1981	15,497	1.000	15,497	14,257	1,240
1982	16,644	1.000	16,644	14,480	2,164
1983	17,474	1.000	17,474	13,106	4,368
1984	13,812	1.016	14,033	7,858	6,175
1985	13,592	1.093	14,856	7,428	7,428
1986	13,241	1.413	18,710	7,788	10,922
1987	10,924	1.999	21,837	8,014	13,823
1988	5,155	3.852	19,857	2,716	17,141
1989	2,058	10.778	22,181	403	21,778

Total Indicated Reserve =	$85,365
Carried Reserve =	$83,000
Indicated Deficiency =	$2,365
=	2.8%

COMMON PITFALLS IN RESERVE ANALYSIS

CASE STUDY #2

COMPARISON OF ULTIMATES

Accident Year	Incurred Ultimate	Adjusted Incurred Ultimate
1980	$16,295	$16,295
1981	15,497	15,497
1982	16,644	16,644
1983	17,474	17,474
1984	14,033	14,033
1985	14,856	14,856
1986	17,306	18,710
1987	20,035	21,837
1988	18,104	19,857
1989	20,129	22,181

1990 CASUALTY LOSS RESERVE SEMINAR

6C: LOSS RESERVES FOR ENVIRONMENTAL IMPAIRMENT LIABILITY

Moderator

Joel S. Chansky
Milliman & Robertson, Inc.

Panel

James F. Cerone
Milliman & Robertson, Inc.

Gerald L. Sauer
Strategic Decisions Group

Roger D. Walker
Reliance National Risk Specialists

MR. CHANSKY: My name is Joel Chansky. This is Session Number 6-C, entitled Loss Reserves for Environmental Impairment Liability. If this is not where you want to be right now, this would be an opportune time to head for the exits.

All the speakers are still here.

Today we have three distinguished panelists who will each discuss the issue of loss reserves for environmental impairment liability from a different perspective. To my immediate right is Jim Cerone and he will start off by giving us the claim department perspective.

Jim will focus on the practical issues facing the claim department and he will discuss a variety of approaches currently in use. He will also report on recent court decisions.

To Jim's right is Roger Walker, our actuary on the panel. He will discuss how a company actuary might deal with the issues related to environmental impairment liability reserves.

To his right is Dr. Gerry Sauer and he will complete the session with an overview of an approach he is currently using for an insurance company client. His approach is based on decision analysis.

Each speaker plans to take about 20 to 25 minutes apiece so we ought to have plenty of time for questions at the end. Please hold all questions until all of the speakers have completed their remarks.

Since the session is being recorded, when we do get to the question and answer session, it is important to use the microphones when asking questions. Also, the tickets for your continuing education will be collected at the end of the session for those wishing to receive credit.

Just mark the session number and your name on the tickets like you have been doing all week. Finally, it is my job to inform you that the views expressed are the views of the individuals and not necessarily views of the American Academy of Actuaries or the Casualty Actuarial Society, or of the employers of the speakers. I am still not sure if that holds true for a selfemployed speaker.

With that, I would like to get started. Our first speaker today is Jim Cerone. Jim is with the Chicago Office of Milliman and Robertson. He joined the firm following 28 years of management and technical experience as a consultant and senior executive in the insurance industry.

His area of expertise is property and casualty insurance, especially in the operation and management of claim organizations. He has extensive experience in the areas of loss

and loss expense control, case reserving, organizational design and the development of claim operating objectives and monitoring reports.

Jim has assisted insurers, self-insurers and regulators in the evaluation and rehabilitation of insurers and captive insurers. He has also provided testimony as an expert witness. Jim has a BS-BA from VillaNova University and an MBA from the University of Chicago. He has served on and chaired a number of industry trade organizations.

He has frequently spoken to a number of professional organizations and written for insurance and financial journals and the Massachusetts Bar Association. Please welcome Jim Cerone.

MR. CERONE: Thank you, Joe. I am not even sure these remarks represent my own views. (General laughter.)

My career began in 1957, and from 1957 through 1981 I worked for insurance companies in various locations in various capacities, but always in the claim department. Then from 1982 until today I have been in consulting. So I have had a chance to see the birth of the phrase "environmental claims." They started trickling into the claim departments, by my recollection, in the late 1960s. The exact starting date would depend on which company you were at.

Environmental claims have come a long way. They are a big issue today for the insurers we serve as consultants and certainly they were big issues for companies I worked for.

(Slide 1)

My presentation today will deal with the practical issues that face claim departments as they try to go about their business case reserving for environmental claims. But first I would like to put up the definition that most claim people grew up with and that still represents the standard definition of case reserves in the majority of companies.

(Slide 2)

It is very simple. The case reserve in most companies represents, simply but only, the reserve setter's best estimate of the ultimate cash cost of disposition based upon, and limited by the information currently contained in the claim file.

That is the model that works; it is the model that all claim people were trained under and I believe that the majority of companies use this approach to estimate the case reserves for their loss exposures.

About half of the companies, also additionally case reserve in the same manner for allocated expenses. Also, most companies using this approach will set a separate case reserve per claimant, per coverage exposed.

In other words, an automobile accident that results in damage to the adverse car and injuries to the owner-operator the adverse car and an injury to a passenger in the adverse car will produce one reserve for property damage and two reserves for injuries.

This approach, consistently applied, has historically worked well. In fact, I think for the majority of insurers, including those with segments of environmental exposures, it would continue to be a workable approach.

In practice, the methodology I described is sometimes used with a form in the file where you can see the overall thought process that underlies calculation of the reserve. Claim people using this approach in the way they have been trained, and they way they have applied it for the majority of the cases, either go through this thought process or actually have forms in the file where they set forth what they think the full liability value of this particular claimant represents without regard to anything else.

(Slide 3)

It works like this. They first consider the injury and what they think that case is worth. Then they discount that amount for the liability that they assess their policyholder to have and this is expressed as a percent chance of losing. By multiplication this produces an adjusted liability value.

If there are other defendants involved in the particular claim, they put their own best estimate as to how much they think they will get in contribution from the other defendants and they reduce the adjusted value.

This produces an estimate of policyholder liability. Typically, this is what the case reserve will be under a "best estimate based on current information" approach. Claim people then consider the available limits of liability and they will put the lesser of the two amounts as their case reserve.

It is pretty simple. It can work directly for some environmental claims, and it can be modified for most other types of environmental claims.

(Slide 4)

There are two characteristics that I suggest you can use to begin to broadly characterize the environmental claims that face claim departments.

Type A would be a date-certain single event. An example would be the Valdez oil spill. That is an environmental claim. A person could use the traditional approach we just looked at in the earlier slide in reserving for this environmental claim. There is a single event, a single policy period exposed.

Type B, by comparison, we could call the continuous process claim. Examples would be leaking underground storage tanks, and asbestos claims. This begins to illustrate the types of problems that claim people face in taking the best estimate system that they have been trained in, and that works for them, and applying it to environmental claims.

Now consider the problems that claim people face. I divide them into direct problems and indirect problems.

(Slide 5)

The first problem concerns coverage and what triggers coverage. This is similar to when does life begin? It is a huge issue. The second one is when did the injury or damage occur? Did it occur at exposure? Did it occur at manifestation? It has plagued everybody dealing with asbestos BI. When asbestos PD came along the first reaction was that this would be much simpler because it will be very clearly defined as to when the exposure, when the damage took place with PD.

But I think the early court decisions are saying that it is not that clear. There is an argument that property damage liability resulting from asbestos installation -- may in fact be occurring over time, just like asbestos bodily injury. The courts are saying, maybe you better go back and take a look because each day the asbestos was in there the fibers were being released and the property damage is occurring. So for claims people, their brains begin to swell, again. Asbestos BI is going to be difficult for them.

Then, there is the issue of the large number of claimants that are involved in these claims. Class action claims, for example, could involve thousands of claimants.

The problems are familiar. They have been with us for over a decade. We have spent about $400 million in having attorneys try to litigate the question of coverage trigger and which policies apply in asbestos BI. Despite this expense, I don't know of any court decision that controls, nationally, which policies apply. Maybe someone here knows of one, but I don't know of one. I doubt that we are going to get a court decision because I don't think the U.S. Supreme Court will decide it because I don't think it is a constitutional issue.

We probably are going to be in for continuing decades of arguing as to what triggers coverage.

(Slide 6)

In addition to the direct problems, claim people are faced with indirect problems. The indirect problems can be caused internally within the insurance company, or they can come from outside.

Internally, problems are produced by the Boards and senior executives of insurance companies -- not the claim executives. It is produced by actuaries and by financial people. Externally it is produced by government, environmentalists and lawyers.

Internally, senior management may voice a definitive opinion that those policies issued years ago simply did not intend to cover the claim. Has anyone ever heard a senior executive get up and say that? Their position might be "I don't care what the courts say, we clearly did not intend to cover this when we wrote those policies years ago!"

A claim guy hears that and says, oh, oh, the chief executive has spoken. Now I have a problem in going back to my case reserving model and working it. An actuary, in attempting to forecast aggregate exposures may inadvertently lead claim people into including considerations of IBNR into their reserves and reported cases for the majority of claims. This also causes deviations to a standard case reserving approach.

I think actuaries and claim people can work together beautifully. The claim people continue with their case reserving practices and all the actuary normally wants the claim person to do is to be consistent in either under-reserving or over-reserving. Actuaries they can adjust for that. Left alone, claim people can be very happy in that environment.

Claim people would be delighted to be told we don't really care if you are under-reserved or over-reserved; just be consistent. But they are seldom told that except, maybe, when a consultant comes in.

However, when you get into environmental claims because of the unknowns, the actuary is getting his own pressure to come up with an answer to "what is this going to cost us over time?" That leads to pressure in the claim department. Now claim people are asked, "tell me more about it. How many more claims are going to emerge?"

Then financial executives, see the huge numbers rolling out of all these things and they are worried about solvency, so they are putting additional pressures on claim people and actuaries.

Externally, the government, the environmentalists view the problem as society's issue and beyond the realm of policy contract and tort laws. Because of this, you can't really rely upon an interpretation of a policy contract when you go into

court as you might in a non-environmental case because there is an urge there to provide coverage, to compensate for the disasters of environmental issues.

Now consider lawyers. I am not bashing lawyers. I think they are simply doing their job in suing and defending in response to all of these concerns. Lawyers are resourceful people and in the service and interests of their clients, they can pursue matters for long periods of time in a great number of jurisdictions. And that is why the bill is about $400 million today. All the various factions are saying, no, we want to wage this battle, or that battle.

Even if one company wants to sit still and say, I am making a definitive position, we are going to pay these claims, maybe some of the other defendants aren't going to agree with them and they will file a lawsuit.

As a result of all this, the case reserves for environmental claims are handled in a lot of companies in a unique manner. They are handled in a manner that is different from all the other reported claims.

(Slide 7)

Now here are some varying approaches that we have seen in companies. When it comes to environmental claims, the method of counting is changed. Claim people start setting up one reserve per event, regardless of the number of claimants. This beings to show the deviations which are made.

A second deviation is a departure from the claim person's best estimate approach. Someone will decree and decide that for environmental claims only, the claim people will set up, say, $10 for each pollution exposure because of some decreed basis or reason -- because they didn't intend to cover it; the courts couldn't possibly find liability against it; some other insurance company is going to pay it, etc. Claim people will be given a fixed amount to use and that circumvents the basic approach to case reserving.

Consider also, IBNR. We have seen companies where, just for environmental claims, the claim department puts up their own estimate of the incurred but not reported and that is the only amount that the company will book for environmental claims. For all other claims, they have the claim department set the best estimate for reported claims and then they apply the actuarial techniques for IBNR.

I don't have the answer to when life begins but I can tell you some things that you should be aware of. For the people among us who are consultants, auditors and regulators -- some of the things that you have to remember is that when you are looking at the liabilities of companies and they have environmental claims,

recognize the potential that the case reserves for environmental claims may be treated differently from all other case reserves.

Understand and consider those differences when you are assessing and providing second opinions on the case reserves of insurance companies. They may be treating their environmental claims differently. You may not be looking at the same dollars for environment claim case reserves that you are looking at for all the other cases.

From a claim approach, I really wouldn't argue against departing and treating differently the case reserving of environmental claims. But I think if you do that, you should document exactly what you are doing, understand why you are doing it and make a record of it. Recognize that the reserves you are putting up for environmental claims are different and are probably going to behave differently from the other case reserves, if you are using the standard system for all other cases.

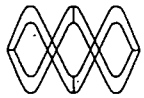
Can the standard "best estimate approach" be used for continuous process type environmental claims? Yes, I think it can. Let's go back to slide three.

(Slide 3)

If a company wanted to reserve for their environmental claims and they required of the claim department the application of their best estimate approach used for all other cases, I believe a company could adapt the form for their environmental claims. They could adapt that methodology and pass these estimates to the actuary. The actuary could make his estimates for IBNR and development on claims, just as they would for all the other claims reported.

The actuary could then pass these estimates to the CFO or the CEO and they could book values based on their particular beliefs that including "they never intended to cover these losses."

Thank you, very much. (Applause.)

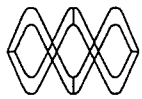


1990
CASUALTY LOSS RESERVE SEMINAR

CASE LOSS RESERVES FOR ENVIRONMENTAL CLAIMS

Slide 1

X79JC01



DEFINITION: CASE RESERVES

The reserve setter's best estimate of the ultimate cash cost of disposition based upon and limited by information currently contained in the claim file.

Slide 2

X79JC02

CASE RESERVE ESTIMATION PROCESS

Estimate of Full Liability Value . . .		$
Times Percent Chance of Losing . . .	x	_____ %
Liability Value, Adjusted . . .		
Less Estimated Contributions from Other Defendants . . .	–	$ _____
Estimate of Policyholder Liability . . .		$ _____
Available Limits of Liability . . .		$ _____

Slide 3

X79JC03

ENVIRONMENTAL CLAIM CHARACTERISTICS

Type A

A Date Certain, Single Event
Example: Exxon "Valdez"

Type B

Continuous Process, Over Time
Example: Leaking Underground Storage Tanks

Slide 4

X79JC04

ENVIRONMENTAL CLAIMS
CASE RESERVING DIRECT PROBLEMS

- Coverage: "Trigger"
  - *Applicability, e.g., definition of occurrence*
  - *Exclusion, e.g., pollution exclusion*
- Date of Injury or Damage: Exposure vs. Manifestation
- Large Numbers of Claimants/Class Action Lawsuits

Slide 5

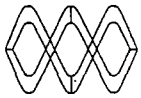
X79JC05

ENVIRONMENTAL CLAIMS
CASE RESERVING INDIRECT PROBLEMS

- Internal
  - *Boards and Senior Executives*
  - *Actuarial*
  - *Financial*
- External
  - *Government*
  - *Environmentalists*
  - *Lawyers*

Slide 6

X79JC06



ENVIRONMENTAL CLAIMS CASE RESERVING DIFFERENCES FROM OTHER CASES

- Counting – 1 Reserve per Event Regardless of the Number of Claimants
- Fixed Amount – Not a Best Estimate, e.g., $10 per Pollution Exposure
- IBNR – Include as Part of Reported Case Reserve

Slide 7

X79JCC7

MR. CHANSKY: Thank you, Jim. Our next speaker is Roger Walker. Roger is a Fellow of the Casualty Actuarial Society, Senior Vice President and Chief Actuary at Reliance National. He joined the company in November of 1987; he has been steadily building the actuarial department which is now staffed at 21.

He has been in the insurance business for 18 years and has previously worked at John Hancock P&C as vice president and corporate international actuary; Continental Insurance in various actuarial and administrative positions; and at Insurance Services Office where he started his insurance carrier.

Mr. Walker has a Bachelor of Science in mathematics from City College in New York, and a Master's of Arts Degree in mathematics from Pennsylvania State University. He has also received extensive graduate training in mathematics and statistics from the Courant Institute of Mathematics, NYU Graduate School of Business, and the New York Polytechnic University.

MR. WALKER: My remarks this morning are directed towards EIL liabilities arising from non-EIL policies, especially liability that is being retroactively imposed. And I do feel it is retroactively imposed for hazardous waste site clean-up.

My message, simply stated, is that a model should be built that reflects all known certainties and uncertainties so that you can develop ranges of estimated liabilities.

To do this, much research into past exposure, coverage and reinsurance must be performed. I would call this insurance archaeology. Now you might want to retain Indiana Jones and his Raiders of the Lost Facultative Reinsurance Certificates to do this, but I doubt that he is available and we will have to take our own steps to get the job done.

One of the most important steps a company can take to address reserving for EIL claims is the formation of an environmental claims unit. Effective management and reserving of these claims requires a concerted effort to assemble an extensive data base that can be readily analyzed and used in conjunction with various scenarios to estimate loss reserves.

This task is best handled by a group of specialists having sole jurisdiction and responsibility for EIL claims. Naturally, the backbone of an ECU will be claims personnel, but ideally, a programmer, an attorney perhaps, and an actuary will be part of the team.

I purposely listed a programmer/analyst before a lawyer or an actuary because the key product of the ECU unit will be an environmental claims data base. The construction of this data base should be the unit's initial top priority. The data base will be reserve analyst after the data base is constructed, the maintenance phase will of course require less programming.

Before addressing some key aspects of the environmental claims data base, I should get more specific about a definition of an environmental claim.

(Slide 1)

An environmental claim can involve bodily injury and/or property damage. For BI one would include injury resulting from repeated exposure by contact, inhalation, and ingestion. Toxic substances would include gasses, vapors, dust, or a pharmaceutical products.

(Slide 2)

With respect to property you should include claims for damages to buildings, property, landfills, and waste sites, in which a potentially hazardous substances has been installed, deposited, or come into contact. Clean-up, removal, abatement or containment costs are also considered environmental claims.

We all know that these clean-up activities are quite expensive. One of our engineering firms told me that just to get sludge into a proper waste site would costs something in the area of $300 per cubic yard, and that doesn't even take into account the cost of getting it dug up and transporting it. If you burn it, it costs something like $1,000 a cubic yard.

(Slide 3)

So here is a brief list of the causative agents you may encounter. You might even consider these causes of loss in some general sense. One item that you might not have expected to see on the list is noise. Noise pollution is something that we can get claims on.

I said earlier that constructing an environmental data base should be the top priority of this unit. The data base must be much more than a listing of claims and incidents. In addition, it should contain elements that will help estimate exposure for liabilities that may be retroactively imposed.

The data base should give management the ability to reassess with ease changes in potential liability due to variation in judicial opinion over time, and among jurisdictions. There should be enough detail to test the impact on potential liability of any scenario that management considers to be within the realm of possibility. Obviously, this isn't a simple task.

(Slide 4)

Let's look at some things that you might consider including in this data base. Mind you, this is meant to be a stand-alone file, separate from the company's customary claim file. Of course, you would want the two linked so that your environmental data base was always in sync with the company claim file. Of

course, you should make sure that you can easily update the environmental file from the corporate file so that they are always in agreement.

The data elements that I will mention are geared toward superfund exposures, but will serve to illustrate the basic idea.

Our basic orientation is to capture all coverage and coverage dates for an insured with a claim, incident report, or a company established account.

Establishing all coverage dates for an individual insured will enable you to evaluate, and test the effect of differing triggers of coverage to which the policies may have to respond. The four theories that have been developed largely from asbestos BI litigation are exposure and manifestation, continuous (or triple trigger), and finally, injury in fact.

To date, no clear trigger of coverage has resulted from court decisions for property damage for hazardous waste clean-up. Insureds, of course, favor triple trigger because it provides the most coverage. At this time, exposure and manifestation are the prevailing alternatives to the courts. The triple trigger has yet to be adopted by the courts.

Manifestation seems to be the most viable trigger coverage. If, for instance, you deposited a barrel of toxic chemicals and it sat around for ten years and then began to leak in the eleventh year, I think one would conclude that the manifestation occurred -- the exposure really occurred in the eleventh year, rather than years one through ten.

Let's move on to the next one, pollution exclusion dates. There are three time periods that are relevant.

First the period prior to the introduction of the first pollution exclusion, i.e. prior to 1973 if you were in step with ISO. During this period no mention was made of pollution. If policies written prior to the pollution exclusion are triggered, substantial exposure may exist.

In 1973, ISO excluded gradual pollution from its GL policy. The effectiveness of this exclusion has been seriously eroded. This erosion has largely stemmed from considering the exclusion ambiguous, especially the word "sudden".

On the other hand, there are recent court cases that have held that the pollution exclusion is not ambiguous. For instance, July of 1987, a U. S. District Court judge ruled in American Motorist Insurance Company v. General Host Corporation that "the pollution exclusion clause is not ambiguous...the language is clear and plain, something only a lawyer's ingenuity could make ambiguous."

Thus, with respect to your data base, you must categorize each jurisdiction with respect to its position on the pollution exclusion.

In 1986, the industry decided to exclude pollution completely, that is, both gradual and sudden. Thus there should be no coverage after this period.

Your company may have acted earlier or later than ISO or may have used manuscript policies with varying pollution exclusions. This must be researched and coded.

Another important field to create would capture the defense posture your company is taking. Your company may take the position that the government-ordered clean-up costs of hazardous waste sites are not covered property damages under the GL policy.

The predominant view of recent court cases favors this view. Raz v. Canadian Universal Insurance decided in November 1986 held an appeal that the insurer had no duty to defend because government-sought response costs were not property damages as defined under the policy; instead the response costs are an economic loss.

Maryland Casualty v. Armco (July 1987) and Continental Insurance v. Northeastern Pharmaceutical (Feb. 1988) also denied coverage. However, in Diamond Shamrock v. Aetna C&S, a New Jersey case decided in January of 1988, ruled that government-ordered clean-up costs are covered. In fact, it seems that New Jersey is going pretty much the route of deep-pocket and saying that the public policy should prevail and insurers will have to pay.

Damages to the environment are another matter with the courts and they generally suggest that coverage exits.

Prior to 1966, standard GL policies were written on an accident rather than occurrence basis. Since accident is usually interpreted as sudden, you may want your data base to reflect this as a defense of gradual pollution.

Another distinction that should be made is off-site vs. on-site claims. Some courts have ruled in favor of off-site coverage. Some off-site courts have ruled in favor of off-site coverage but not for on-site. While others have ruled in favor of coverage for both. The care custody or control exclusion in the GL policy itself should however provide insurers with a strong case that no-site hazardous waste claims are not covered.

Moving to the next item, market share or the number of potentially responsible parties will have a direct bearing on the ultimate cost of a claim and should be coded. Naturally, the smaller the market share, or the greater the number of potentially responsible parties in the super-fund action, the smaller will be your potential liability. So therefore, some attempt should be made to understand this and code it up.

Finally, I have listed Hazard Rating System Score as a quantity that may be of value in modeling an insured's liability. The HRS score, is a number that the EPA calculates for each waste site.

(Slide 5)

The intent here is that it is to measure relative risk or danger, taking into account the population at risk, the hazardous potential of substances at a facility, the potential for contamination of drinking water supplies, for direct human contact and for destruction of sensitive ecosystems and other factors.

In short, it is more complicated than any rating plan the insurance industry's ever created, but it may be of some use.

Three scores are assigned to hazardous facility, simplified as MS-sub-FE and S-sub-DC.

S-sub-M reflects potential for harm to humans or the environment from migration of hazardous substances away from the facility. S-subFE reflects the potential for fire or explosion, while S-sub-DC reflects potential for direct harm.

The reason I am making a point of this is to make you aware that there are quantities out there that perhaps you can, through research, gather and make some use of in dealing with this reserving problem.

When the super-fund was originally created in 1980, the requirement was that 400 sites be placed on the national priority list. The 400 highest HRS rank score was 28.5 and that has remained the cut-off for getting on the National Priority list of super-fund sites.

As if it wasn't difficult enough to model and collect data on environmental impairment, it is important to be aware that fundamental changes are taking place in the quantification of environmental risk.

(Slide 6)

Risk assessment has begun to move from "better safe than sorry" approach which compounds conservative assumption to more realistic measures of risk.

Very briefly, fresh consideration is being given to the use of high dose studies and its appropriateness for low-dose realities. We all know the famous studies of rats that have been caused to ingest tons or hazardous materials and, of course, they don't fair very well, whereas, our exposures are much, much smaller.

Chemicals are being reviewed for their relevance to human exposure because of mechanism of action, tumor-type observed,

dosing levels used, or metabolic and pharmacokinetic differences between humans and laboratory test animals.

For instance, the EPA has proposed to downgrade the potency of dioxin by as much as two orders of magnitude. Basic generic exposure assumptions are also being reviewed. For instance, the assumption that an adult drinks two liters of water a day for 70 years with an average body weight of 70 kilograms, obviously this doesn't apply in every situation.

Consequently, we must be prepared to change our models as regulation evolves.

I will end by giving some super-fund statistics to demonstrate that information is available and it is up to us to work with it.

(Slide 7)

In 1980, there were 400 super-fund sites. By 1984 538 sites had been identified and we were up to 889 in 1989, the current number should be close to 1,200 sites. The EPA estimates that ultimately, around the year 2000, we will log 2,100 sites.

I am a little suspicious of this because in fitting an exponential curve to the data I found that the annual increase from 1980 to 1989, assuming 1,200 sites in 1991, was about ten percent and that indeed just did project out to about 2,100 sites by the year 2000. That made me believe that the numbers were perhaps being managed very carefully by increasing the number of sites, 75 to 100 a year.

The Office of Technology Assessment, back in 1985, was a lot more pessimistic and indicated that they anticipated ultimately 10,000 sites. I think that will probably be closer to the ultimate number.

On this slide, below the site statistics I have listed some averages that can be used to model loss emergence; for one-third of the sites, no potentially responsible party is found. About 40 percent of the potentially responsible parties do settle with the EPA --

And the average cost of a site now is pegged at $25 million. That is the cost, as it is called for construction. This will probably move to $30 million as the more hazardous sites get worked on.

(Slide 8)

On the next slide is an abbreviated distribution of HSR scores, the hazard ranking system. This is published in the Code of Federal Regulations -- it happens to list the most recent sites at 889, and it gives you a pretty fair view of the distribution of hazard.

You will see there is not very much down at the low end because the scale effectively starts at 28.5 and you only have 5.7 percent of the sites between 28.5 and 29.76, and then it moves up rapidly towards the middle.

Using the averages I mentioned one can model the emergence of liability from PRP's. You could model via the growth in the sites against the rate of collection which would be about 26 percent -- that is, twothirds of the 40 percent. And then, compound that with some lag assumptions to produce a growth curve for liabilities that might befall PRPs in total.

(Slides 9 & 10)

I did this very quickly and without trying to be at all realistic, just to get the idea across. Obviously if you thought a lot about this, you could come up with an extremely complicated model that would take into account many, many things. And then if you thought a lot more about it, you could take the complicated model and make it simple again and probably make it workable.

One of the things I did was, since it is so easy to do with these packages, was to simulate around the growth curve. I cut the progression off in 1985 and assumed that liabilities would arrive by the fifth year. That is why the curve levels off very quickly.

I did a quick -- and this is an abuse of terminology -- age to ultimate calculation. The result was not for any particular accident period rather a rolling total. This is just illustrating the fact useful models can be guilt and as a matter of fact, that is what the Office of Technology Assessment really did in their 1985 report on super-fund strategies.

The OMB developed a fairly extensive model in that they were trying to project and test the sensitivity to various assumptions of ultimate costs of the super-fund program. So I invite you to dig for the information and try your hand at modeling.

Thank you. (Applause.)

ENVIRONMENTAL CLAIM

DEFINITION:

BODILY INJURY FROM CONTINUOUS OR REPEATED EXPOSURE BY:

Contact, Inhalation, Ingestion of:

- Toxic Substances
- Floating Particles
- Pharmaceutical Products
- Gas
- Vapor
- Dust

Slide 1

ENVIRONMENTAL CLAIM

DEFINITION:

PROPERTY DAMAGE TO:

- Buildings
- Property
- Landfills
- Waste Sites

From a Hazardous Substance Claims May Include:

- Clean-Up
- Removal
- Abatement
- Containment

Slide 2

COMMONLY ENCOUNTERED ENVIRONMENTAL AGENTS

- ASBESTOS
- AGENT ORANGE
- ACIDS - CHROMIC
- DRUGS - DILANTIN
- DUSTS - SILICA
  - TALC
- FIBERGLASS
- GASES - CHLORINE
- HAZARDOUS WASTE SITES
- HERBICIDES
- HYDROCARBONS - BENZENE
- METALS - MERCURY
- NOISE
- PAINTS
- PESTICIDES
- PLASTIC
- POLLUTION
- TOBACCO

Slide 3

ENVIRONMENTAL CLAIM

KEY TO DATA ELEMENTS

- ✓ INSURED/ACCOUNT
- ✓ ALL COVERAGE DATES
- ✓ LIMITS
- ✓ POLLUTION EXCLUSION DATES
- ✓ COVERAGE DEFENSES
- ✓ MARKET SHARE/PRP COUNT
- ✓ HAZARD RATING SYSTEM SCORE

Slide 4

ENVIRONMENTAL CLAIM

HAZARD RANKING SYSTEM MEASURES RELATIVE RISK BY ACCOUNTING FOR:

- Population at Risk
- Hazard Potential of Substances
- Potential for Contamination of Drinking Water
- Direct Human Contact
- Destruction of the Ecosystem

Slide 5

EVOLUTION OF RISK ASSESSMENT

- BETTER SAFE THAN SORRY
  - Uncertainties Replaced by Conservative Assumptions
- THIS IS BEING REPLACED BY:
- IMPROVEMENTS IN THE SCIENTIFIC BASIS FOR RISK ASSESSMENT
  - Likely Carcinogenicity
  - Dose Response Relationships
  - Environmental Exposures

Slide 6

DISTRIBUTION OF HRS SCORES

HRS SCORE	PERCENTILE
75.60	100
58.30	94.1
51.97	82.3
43.75	64.6
34.38	29.3
32.02	17.5
29.76	5.7

NUMBER OF NPL SITES

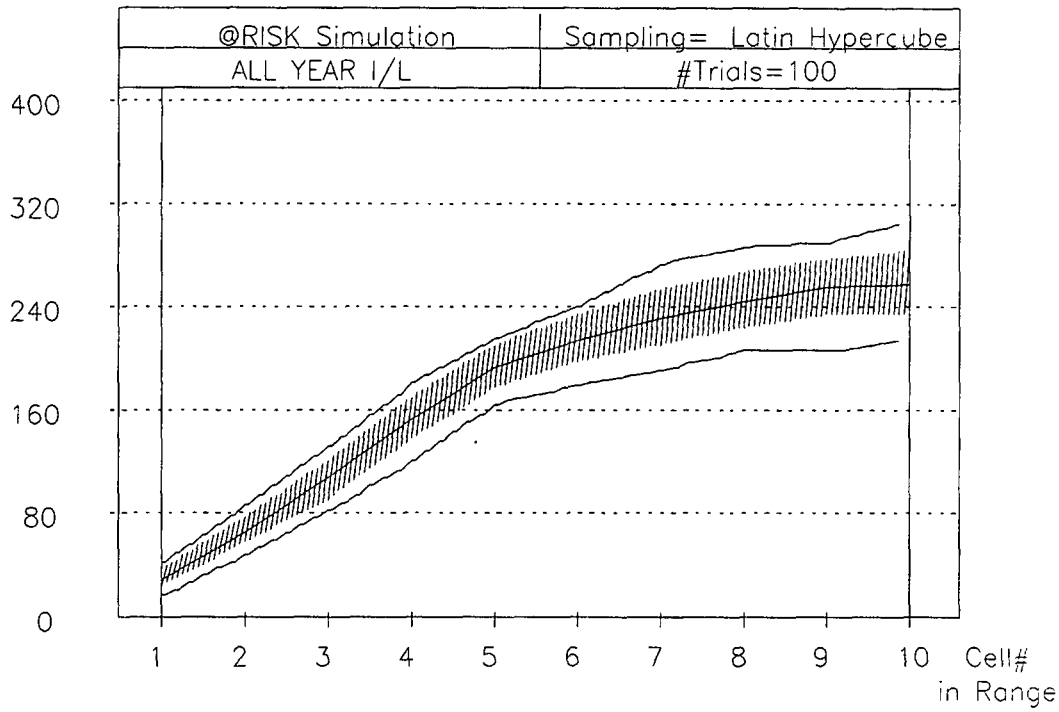
1980	400
1984	538
1988	799
1989	889

Ultimate 2,100

Annual Increase 10%

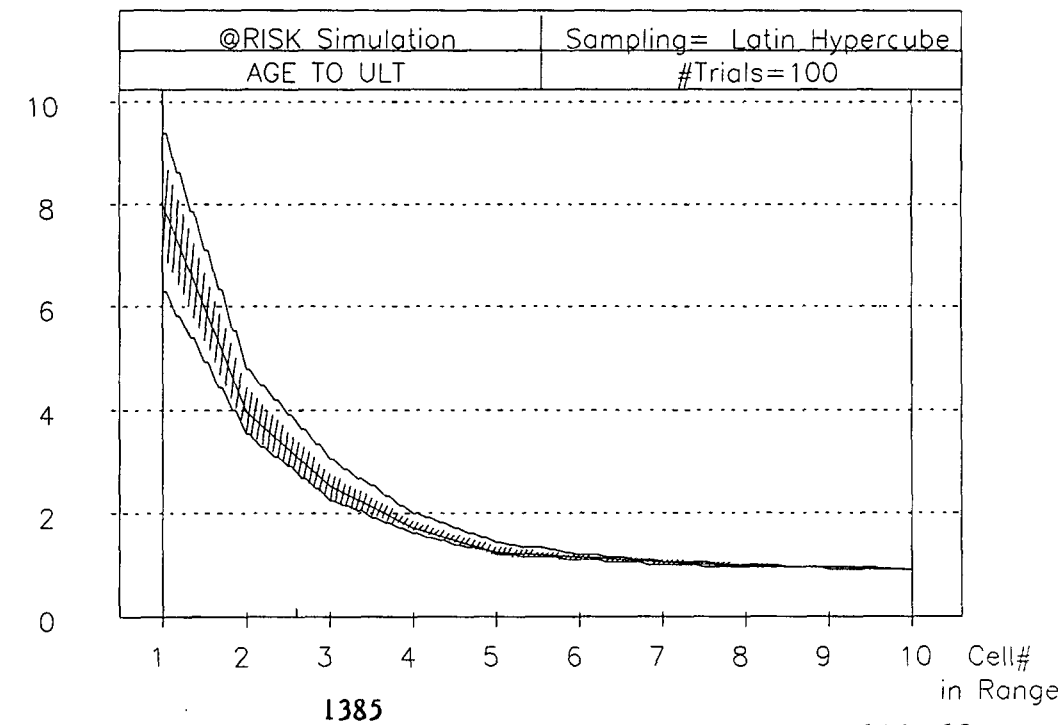
- ✓ No PRP is found for 1/3 of the sites.
- ✓ About 40% of the PRP's settle with the EPA.
- ✓ Average site cost $25 million.

Trend in Mean,
1 Std.Dev.,
5/95 Perc.



Slide 9

Trend in Mean,
1 Std.Dev.,
5/95 Perc.



Slide 10

MR. CHANSKY: Thank you, Roger. Our last speaker is Dr. Gerry Sauer. Dr. Sauer is a partner at Strategic Decisions Group, which is a management consultant firm in Menlo Park, California.

He heads the firm's financial services practice. Dr. Sauer has extensive consulting experience in insurance and banking, as well as several other industries outside financial services.

His current assignments include working with a major property casualty insurer to assess the magnitude and uncertainty of its environmental liabilities and to devise strategies to reduce legal and settlement costs. He is also assisting another large insurer in improving its risk and return measures and its capital allocation process.

Prior to joining Strategic Decisions Group in 1987, Dr. Sauer was on the faculty for five years at the Amos Tuck School of Business at Dartmouth College. There he taught and did research in decision and financial analysis and consulting applications.

Dr. Sauer has also served on the staff of the U. S. Senate where he had major responsibilities for off-shore oil and environmental legislation. Dr. Sauer has B.S. degrees in physics and electrical engineering from Washington University, and a Ph.D. in engineering economic systems from Stanford. He has also earned a degree in philosophy, politics and economics from Oxford University.

Please join me in welcoming Dr. Gerald Sauer. (Applause.)

Using Decision Analysis in Environmental Loss Reserving

Casualty Loss Reserve Seminar

Gerald L. Sauer
Strategic Decisions Group
Menlo Park, CA

September 11, 1990

Slide 1

Agenda

- General Benefits of Decision Analysis for Loss Reserving

- Steps in Applying Decision Analysis to Environmental Loss Reserving

- Conclusion

Slide 2

Decision analysis (DA) methods provide several benefits to the reserving process. (I)

- Incorporation of future events not reflected in past data
- Explicit framework for expert judgment
- Determination of the most sensitive variables for further research and analysis
- Quantification of uncertainty

Slide 3

Decision analysis (DA) methods provide several benefits to the reserving process. (II)

- Quantification of the financial costs of over- and under-reserving
- Determination of probability criteria for reserving decisions
- Identification of most promising ways to reduce losses and loss uncertainty.

Slide 4

Agenda

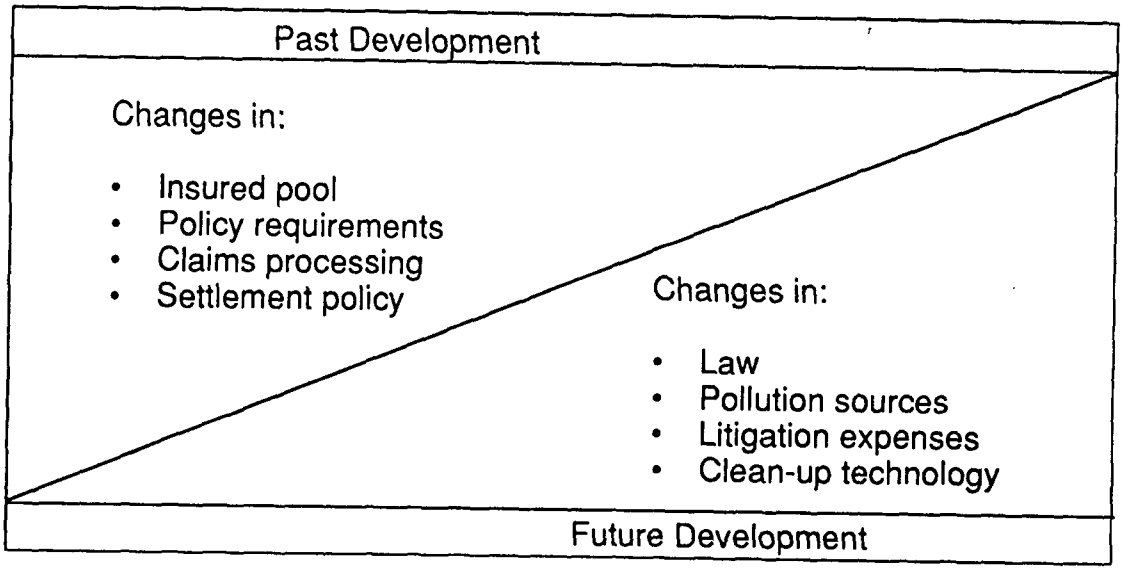
- General Benefits of Decision Analysis for Loss Reserving

- Steps in Applying Decision Analysis to Environmental Loss Reserving

- Conclusion

Slide 5

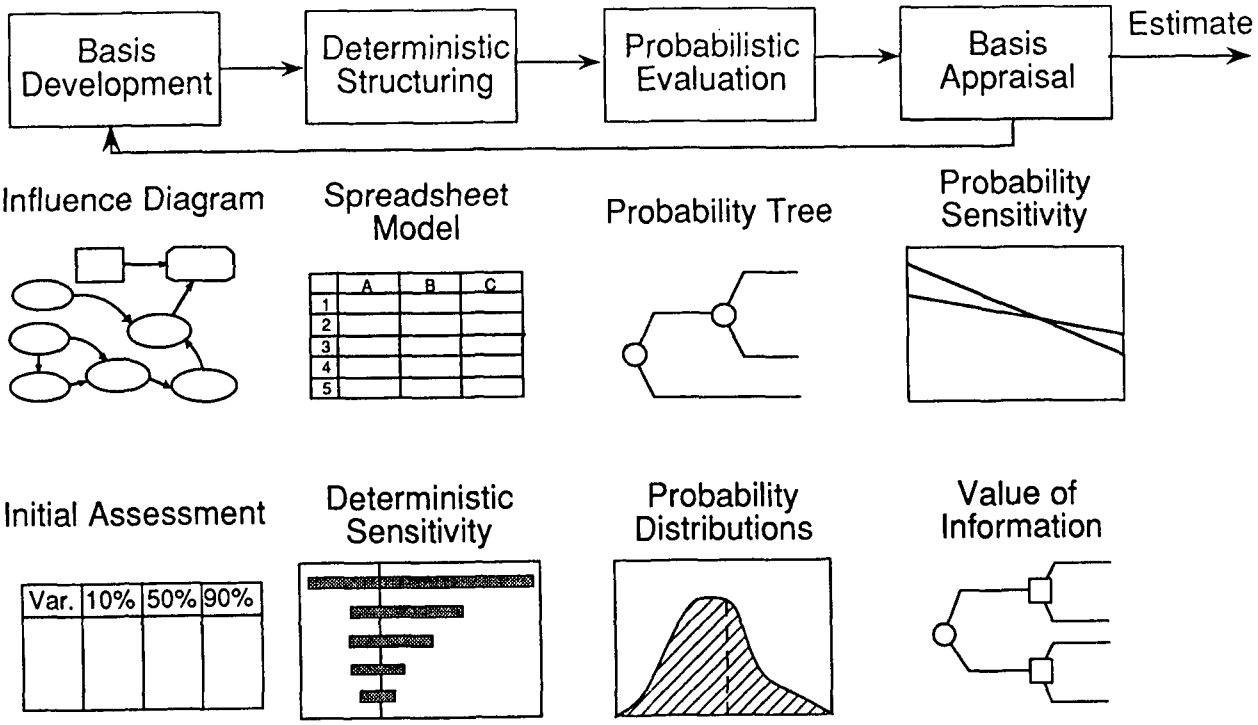
Change makes it difficult to infer future environmental losses from past data.



Each of the changes creates significant uncertainty about future losses.

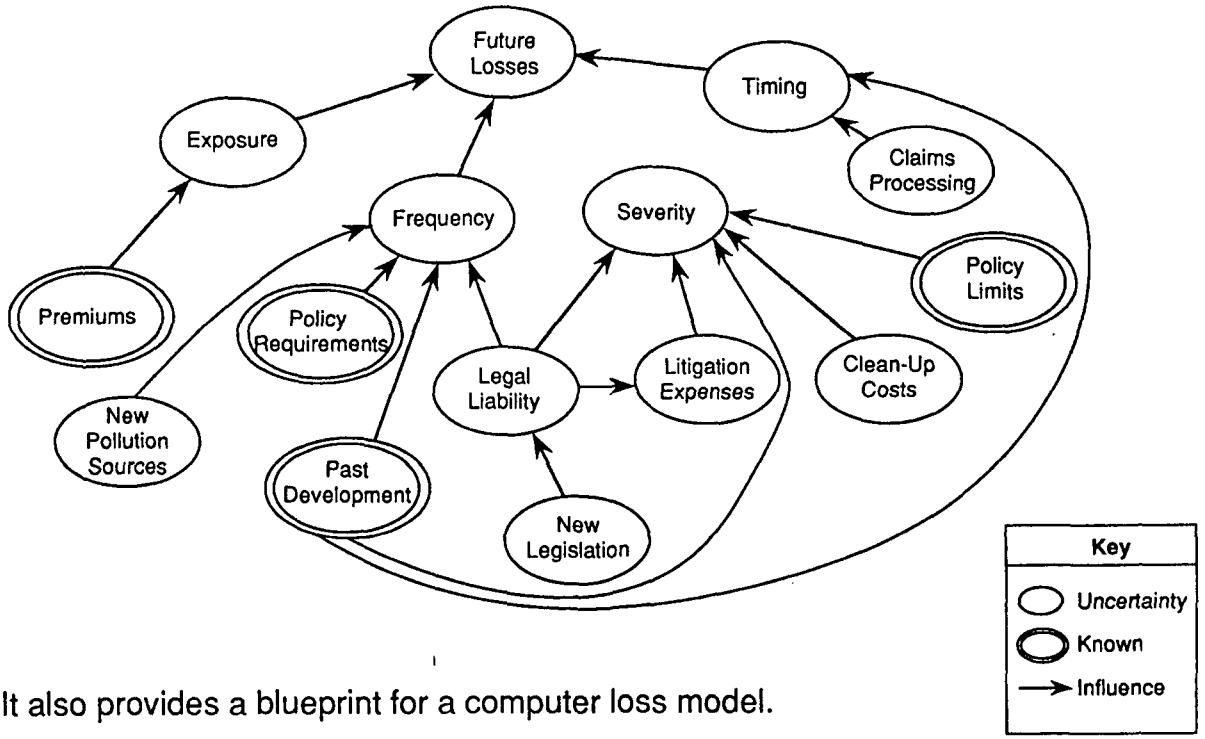
Slide 6

DA provides a logical and balanced approach to analyzing loss uncertainties.



Slide 7

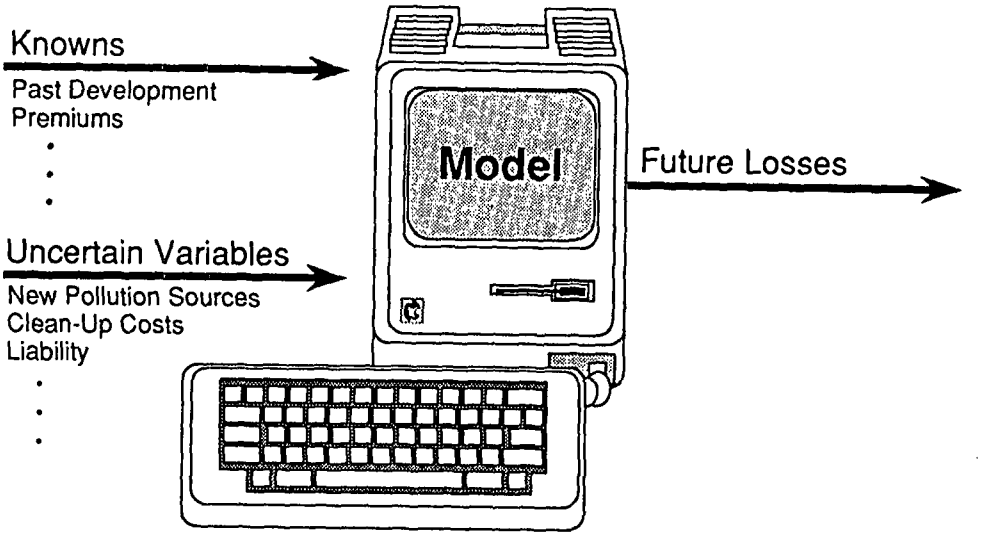
An influence diagram captures the most important loss variables and relationships.



It also provides a blueprint for a computer loss model.

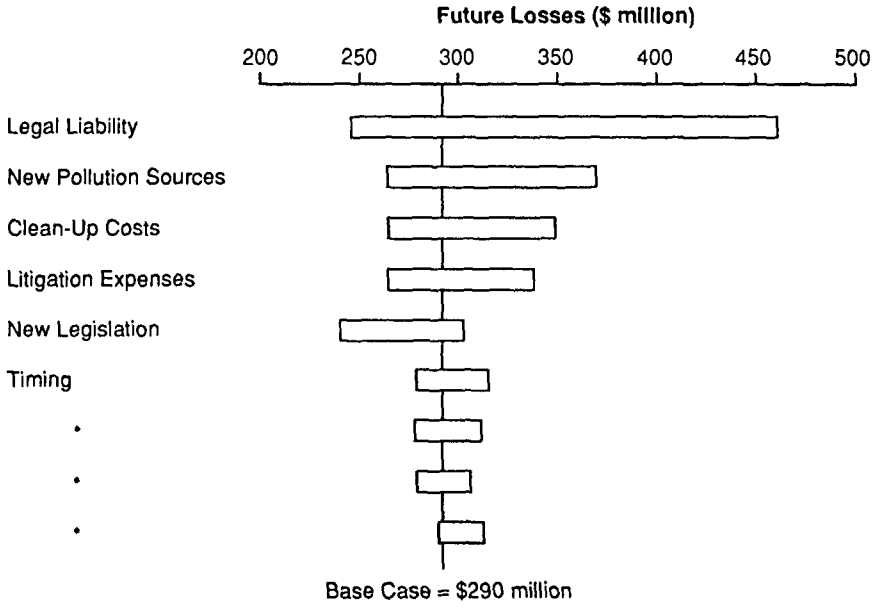
Slide 8

A "what if" computer model estimates losses based on past data and assumptions made about the future.



Slide 9

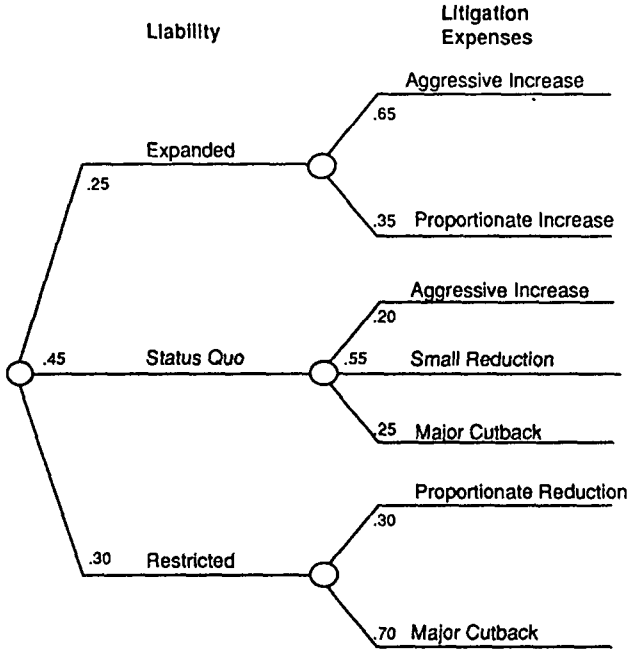
Sensitivity analysis determines the key uncertainties.



Typically, only a few of the variables acount for most of the uncertainty.

Slide 10

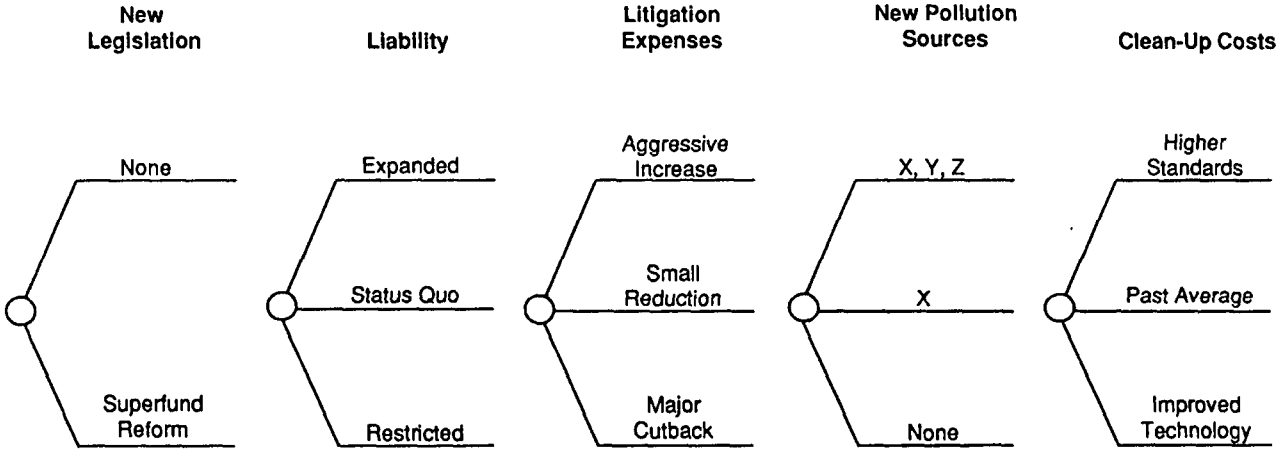
Probabilities are assessed for the key uncertainties.



Dependencies are captured in the assessment.

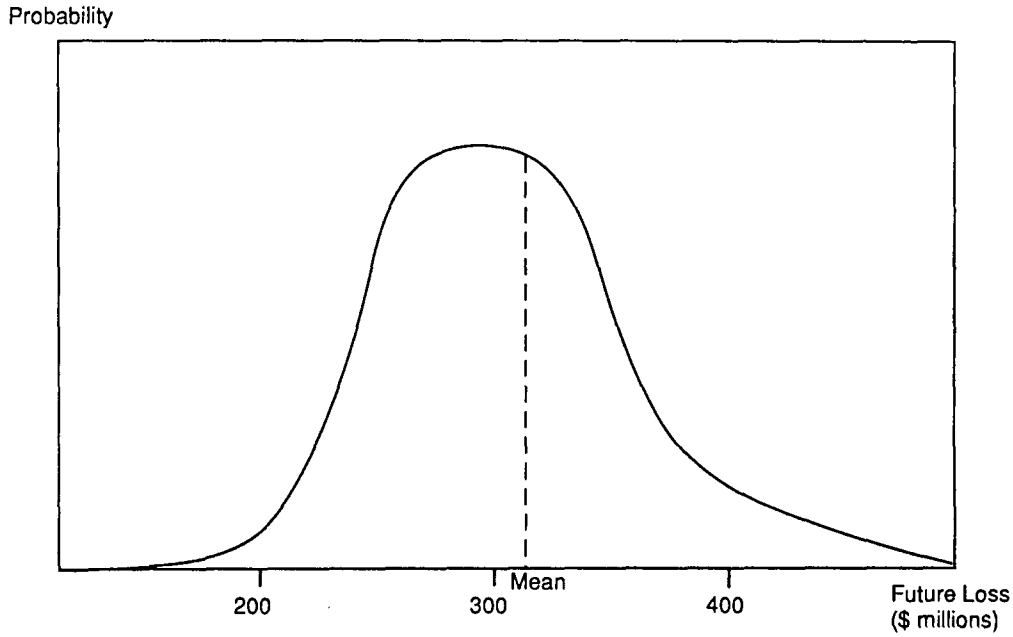
Slide 11

A probability tree is constructed to represent the range of possible scenarios.



Slide 12

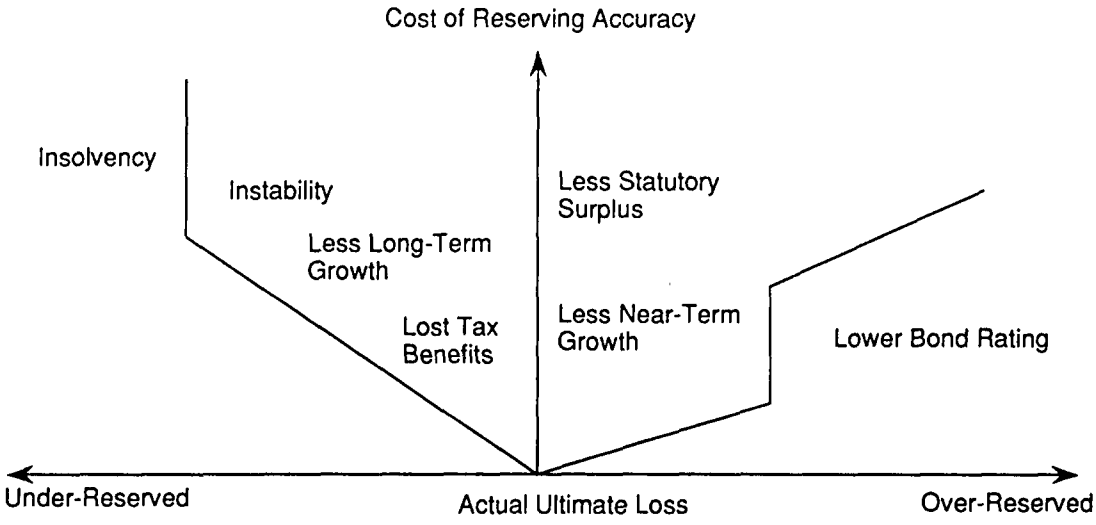
An overall probability distribution on losses is computed from the scenarios.



The mean and standard deviation summarize the distribution, but do not determine the appropriate loss reserve.

Slide 13

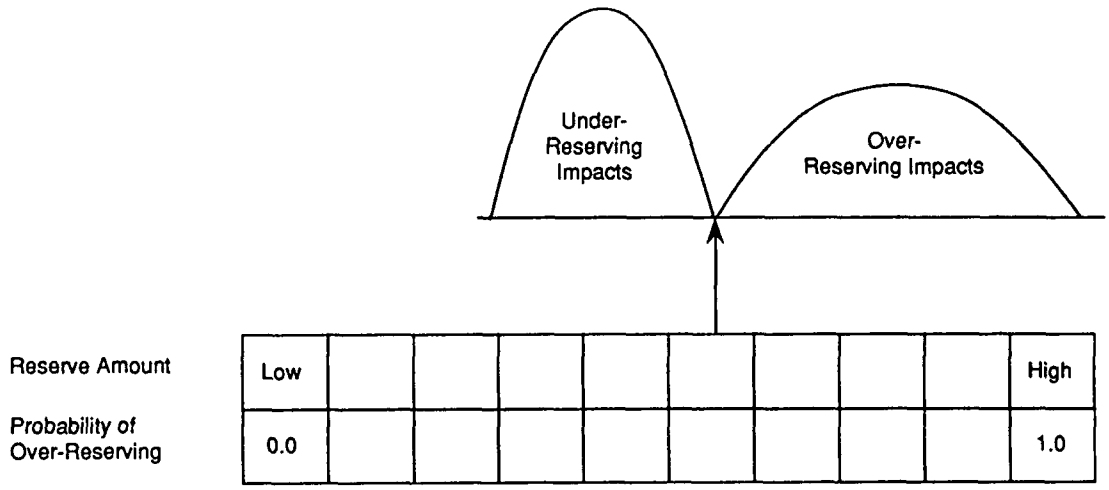
In establishing a reserve it is useful to consider the financial impacts of over- and under-reserving.



The costs of over- and under-reserving are not the same, but both costs escalate with the magnitude of the error.

Slide 14

Choosing a reserve estimate that balances the impacts produces the strongest financial cushion.



Decision analysis separates the discounting issue from the amount of prudent reserves.

Slide 15

Agenda

- General Benefits of Decision Analysis for Loss Reserving
- Steps in Applying Decision Analysis to Environmental Loss Reserving
- Conclusion

Slide 16

"If a man will begin with certainties, he will end with doubts, but if he will be content to begin with doubts, he shall end in certainties."

Francis Bacon (1561-1626)
Advancement of Learning

Slide 17

Decision analysis methods can be used to . . .

- Gain insight into environmental and other casualty losses with complex uncertainties

- Help make tough reserving decisions in a prudent manner.

Slide 18

MR. CHANSKY: We have just heard three different approaches to approaching our liability problem for the environmental exposures. Right now I would like to open it up for any questions from the audience to our speakers.

Could you step up to the microphone, please?

QUESTION: One of the problems that environmental claims units might face is that if they put reserves on cases where coverage is controverted, then possibly a court might accept that as an implicit admission by the company that the coverage does exist.

MR. CERONE: As I understand the question, if the company -I guess principally the claim department -- feels that there is no coverage, should they put up a case reserve? Most claim manuals that I have seen, and the approach that I think makes sense is, no, you, the claim person, shouldn't put up a case loss reserve if you have levied coverage.

The problem in environmental claims is that often -it is not the claim person's decision. If the claims person feels there is no coverage, I agree; you shouldn't put it up. Whether that is going to be admissible in court, or whether it is going to be protected is a question.

If a case loss is carried and if it is admitted in court, there is also the as to whether that is going to influence the judge or the jury in terms of whether there is coverage or not. I doubt it. In other words, if you honestly believe there is no coverage, you probably shouldn't put up the case loss reserve.

You probably want to reserve for such contested environmental claims in your bulk reserves. If it goes to court, it is the trier of fact that is going to ultimately decide whether the establishment of a case reserve is some form of admission of guilt or coverage.

In my opinion, I think a trier of fact would consider it. I don't think it would be conclusive in persuading him that in fact there is coverage.

QUESTION: Our environmental claims unit thinks that there is a danger there.

MR. CERONE: There is always a danger. I think the question is, is that going to be the determinant factor? Personally, I don't think so.

MR. CHANSKY: Is that a cell that we build into the data base? A case reserve and then the amount that we can or can't report?

MR. WALKER: Yes, in the sense that this is sort of an off-line data base. It might be a good place to handle such considerations. I would agree obviously that it is perhaps

better to have such reserves in your bulk for IBNR, but I would also agree that that is probably -- if you are putting up a case reserve, that is not going to be the determinant factor in the judgment.

DR. SAUER: On the risk analysis side, not in this area, but for one other insurer there was a project that involved litigation risks and they decided not to do the analysis because of some potential liabilities. That is the way the system works.

MR. CERONE: This is our version of better safe than sorry.

I guess the question we are talking about is whether the company wants to carry the reserves for its liability. You can put it on the cases, or you can decide to put it in the bulk reserve, but if I understand what we are saying, if there are some companies that fear a reserve anywhere on their books is going to be introduced into court and cause them to be found liable for coverage, and based on that fear they are not going to put it on their books in any place. I think that is in violation of some kind of rule -- SEC or regulatory.

I don't think you can say here is a legitimate reason why this company, who has thousands of asbestos cases in their files, is not booking reserves for it. You have to put it someplace. The question is, I think, where do you want to put it?

QUESTION: This client is not making some estimate. They just don't want to look -- I didn't work on this project, or didn't have a direct contact with them, but my understanding is they just did not want to look at the extreme cases.

MR. CERONE: That is a neat argument. I remember -- and this is in public record -- when we went into the Ambassador Insurance Company, which is insolvent, and we found by count 10,000 asbestos cases in a file drawer, not recorded or booked. That would have been an interesting argument if they gave that as a reason why they didn't book it.

MR. CHANSKY: Any other questions?

QUESTION: I think you each talked a little bit about the perspective of working for your company, if you will, and helping management determine a range of values for environmental liability. I wonder if you can each elaborate a little more about what the circumstances and environment is like when you are dealing in an M&A situation.

In particular, what are some of the issues that a buyer would look at when there is some potential liability. What would the seller's response be, and particularly from a consultant's viewpoint? What role does a consultant play in that area?

MR. CERONE: I will start. I have worked with Joel on some of these. If the consultant is going in and representing the potential purchaser, the consultant has an enormous burden. They have to give some sort of opinion as to the value of that company. This will include consideration of the liabilities including environmental claims.

The way the final opinion is depends on the degree of certainty that the consultant assigns in assessing how complete the target company has set forth and approached their environmental liabilities.

I have seen companies that are known to have large environmental exposures and when you ask for their documentation and their information that they rely upon to set up their cases reserves, or their aggregate reserves, that may tell you that they don't really model it. Maybe they are following theory discussed earlier which goes, "it is better we don't reserve it." In these cases you will receive an opinion as to valuation on the company, but it will have some strong caveats on it and strong exceptions.

It would be a high risk acquisition if you went forward with it. Joel, do you have any other comments?

MR. CHANSKY: This probably comes up in a number of situations, I guess, not only with respect to insurance companies and the acquisition of insurers, but also with respect to the basic industry wherein a potential buyer wants to be aware of the various contingencies that are out there and the fact that you are buying onto the acquired company's liabilities.

I think one has to do an analysis to get down to coming up with a range of results and trying to do some of the things that Gerry is talking about and put some kind of probabilities on it. I think you have to dig very deeply and come up with what you think is a worst case and (inaudible) the best case, and let the buyer beware.

QUESTION: I haven't actually worked on a sale of insurance liabilities, but I did do a project two years ago where a bank was selling a portfolio of non-performing assets. We used a similar methodology to try to quantify the value and the risks. We took a sample and worked with a sample from the portfolio and worked through some different scenarios.

Ideally, I think you work on it from the buyer's side to avoid conflict of interest, but if you work on it from the seller's side, then you just do your best independent job. I think most seller's would want you to do that.

MR. CERONE: We found that an important role for the consultant is to identify the existence of the exposure, especially if it hadn't been highlighted before. That is obviously very important to the buyer, and in many instances a deal will be struck where

there is a variable price, or the environmental piece will be excluded from the transaction.

The key service that has been provided is that it has been identified. If the range is big enough it could be that neither party, or certainly the buyer, doesn't want any part of that.

QUESTION: One other (inaudible), and again this is banking. That same project I was talking about, there were certain properties in Northern Louisiana, that we thought that the risks were much greater and the value significantly lower.

When we presented the results, the seller agreed with us and revised them downward.

QUESTION: I guess this is a super-fund kind of question. The number of sites -- I guess it was Mr. Walker who was talking about the variance between 10,000 and 21,000, given that we have so many at a certain point in time.

I have seen some valuations which have said that the number of sites will probably be increasing at a decreasing rate given that the industries are more enlightened about pollution and that most of the sites may have already been -- most of the serious sites may have already been uncovered.

I wonder if you could comment on that.

MR. WALKER: Well, I think that is correct. I can't remember the name of the federal law that came after the super-fund, but that imposes stringent requirements on the treaters and handlers of hazardous wastes to begin with. So that is something that causes a problem not to increase.

But on the other hand, we have tremendous backlog of things that have to be looked into. And I was amazed when I tried to put together some numbers on the counts that are out there and the potential problems. I think that really they are probably in the hundreds of thousands -- or, at least 100,000.

On the other hand, as I mentioned, there is that changing attitude of moving away from the better-safe-than-sorry to a more up-to-date scientific basis for making judgments which might actually cause (inaudible) -- less concern with problems, or a realistic assessment of what is really out there.

The things that I have mentioned, dioxin, what they have found is that basically dioxin is biologically available in the soil. The just assumed that it was 100 percent available and it is maybe half a percent, or something like that, available. So really, you can't adjust it the way they are thinking.

But things like that could have a major change in the future.

QUESTION: If all environmental losses ultimately are, let's say a pie chart, does anyone want to hazard a guess at two quantities? I don't know if this is an answerable question, or if anybody wants to even go out on a limb with it. I think one is tougher than the other.

But, what is X, which I think is the tougher question, and the other one that just hit me on the head is, as a pie chart of 100 percent, what percentage would you think as a ballpark would be represented by the super-fund sites that we know so much about and there is so much quantification about and how much of the pie chart in percentage terms would someone hazard a guess would be the non -- the so-called vanilla, if there is such a thing, EIL sites?

MR. WALKER: I wouldn't want to hazard a guess on that here.

MR. CERONE: (inaudible) everybody thinks that the surplus of the insurance industry is not enough.

QUESTION: I guess the other thing, which I thought was an easier question, and it may be a harder one. You hear all about the super-fund sites. We don't hear about anything else. I mean, does anyone think the super-fund ultimate losses, or half of all of them, 90 percent, 10 percent --

QUESTION: The other that I was thinking of was where, which predates super-fund is the Environmental Risk Response Act, I think it is called ERISA, or something like that. That predates all of this, and the number of sites contained there are stagnant.

MR. WALKER: The super-fund is far from the whole pie.

MR. CHANSKY: We have time for one more question.

(No response.)

MR. CHANSKY: Now we don't have time for any more questions. Don't forget to fill out your session evaluation forms and please join me in thanking our panel.

(Applause)

1990 CASUALTY LOSS RESERVE SEMINAR

6E: SCHEDULE F - REINSURANCE REQUIREMENTS/USES

Moderator

Donald P. Skrodenis, Director
Allstate Insurance Company

Panel

Kathryn P. Broderick, Partner
Preston Gates Ellis & Rouvelas Meeds

John J. Joyce, Sr. Consultant
Coopers & Lybrand

Joseph Zubretsky, Manager
Coopers & Lybrand

MR. SKRODENIS: This is Session 6E or Schedule F pertaining to reinsurance recoverables and other uses for the schedule. But before we start there are some housekeeping comments I would like to make.

The session is recorded, so please step up to the microphones to ask any questions. Those questions will be at the end of the session.

Please fill in the evaluation forms and hand them in at the door as you are leaving. If there are any problems, I've had several up here already filled out, in case you wanted to advise the opinion of the panel. Also the tickets for the continuing professional education should be handed out at the end of the session at the door.

I'd like to qualify that the views and statements made by the panelists are those of the panelists and not necessarily those of the firms that they represent. Although they may be similar in many cases.

Reinsurance recoverables and Schedule F. Several years ago or within the last decade, the industry has experienced a level of insolvent companies and peer companies that is unequal since the Great Depression. The NAIC has attempted to attack or to evaluate what that reserve should be on company statements or to point out what the reserve could be on company statements by the new changes in the Schedule F in the annual statement. We will be going into that shortly.

The structure of this panel will be Joseph Zubretsky covering the accounting issues and the details of filling out the schedule. Jack Joyce will cover the IBNR considerations. And Kathryn Broderick will answer any legal questions and give her opinion.

To begin our discussion is Joseph Zubretsky. He is a senior manager for Coopers & Lybrand with nine years of experience in the insurance industry. His clients include major property and casualty, life, pension and reinsurance companies. Previously he has spent two years experience in Europe, focusing on international and London market, reinsurance, reinaviation and insolvent companies. He is an improved instructor for Coopers & Lybrand's casualty loss reserving course. And he has also been the author of the Implementation Guide for the Provision for Overdue Authorized Reinsurance. Thank you.

MR. ZUBRETSKY: Good morning. Can everybody hear me okay?

Today's topic is the provision for overdue authorized reinsurance. The nickname that has been given commonly in the industry is the ninety-day rule.

A little background. Late in 1988, the NAIC Emerging Issues Committee was working with this issue. The regulation was passed

in late 1988; through early 1989 it received a lot of publicity. As with any major revision to the accounting rules the industry gets upset and the issue itself gets a lot of publicity. But since that time, the publicity waned a bit, and the industry really turned its attention to what they consider to be more pressing problems. If you remember during 1989, Proposition 103 was a major concern of many insurers as were bigger tax bites and just, in general, the soft market conditions. And really the industry looks at those as real surplus preservation problems; we are not going to worry about this paper entry that we have to make in our annual statement.

Well, what happened was that when companies went to prepare their annual statements for 1989, insurers generally were very much surprised by the complexity of the calculation, the issues that were raised during the preparation and the result.

I want to preface today's conversation to give you an idea of the significance of the asset that we're talking about; to put the whole issue into a context. Industry surplus is currently, I believe approximately 125 or 130 billion dollars and it is estimated that 54 or 55 percent of that surplus is represented by recoverables on paid losses. And that equals about 60 or 65 billion dollars. To go one step further, total reinsurance recoverables which would include IBNR and recoverables on unpaid losses is twice industry surplus. So that puts it in the range of 260 billion dollars.

There is a lot of uncertainty in how much is ultimately collectible. One of the major accounting firms did a study in 1988 that put a price tag on uncollectible reinsurance at about 2 or 3 billion dollars. Industry analyst, Myron Picoult, raised the price tag to 10 to 20 billion dollars. The only indication we have of how much the Schedule F penalty has actually cost insurance companies has been, I believe is Best's gathered data, and the most recent data has said that 543 million dollars is the amount of Schedule F penalty that has been calculated based on annual statement filings to date. That number should grow as they compile more data. And they say, well, why is the 543 million dollars so much less than these very pessimistic projections that other people have put on uncollectible reinsurance? And the answer is very simple. One is Schedule F penalty hopefully is a good measure of what is uncollectible, but not necessarily so. And secondly, they haven't completed the study.

To put the $543 million in context, it may sound low compared to the ten to twenty billion dollar estimate of uncollectibles, but to translate it into what it might mean for insurance company capacity at a three to one written surplus ratio. There is a billion and a half dollars of written premium capacity that's gone out of the industry by virtue of this new rule.

In terms of the uncertainty in estimating the ultimate recoverable, the estimates are all over the lot. And the reason is because the rules of the game have changed. The world has changed in the last ten years and reinsurance and insurance transactions have become that much more complex. We are dealing with complex litigation, complex coverages. And the world, really, has changed from one in which we would follow the fortunes to...well, we'll follow the fortunes but we will not follow your misfortunes .

What are some of the collection issues? I think the industry concern over uncollectible reinsurance was voiced best by Representative John Dingell in his rather passionate novel that we have all come to know as Failed Promises. And my apologies to Representative Dingell, but I am going to paraphrase an item that he has included in his summary where he makes ten recommendations that the industry needs to address, and the third one is reinsurance. He says the reinsurance chain has been weakened. Reinsurers have resorted to slow payment and litigation in order to avoid their responsibility for payment and as a result insurance company solvency has been threatened. Then he asks a question that you and I, as consulting actuaries and accountants, and auditors, really need to be concerned with. And that question is how far do auditors, actuaries and regulators need to go to check the adequacy and solvency of a company's reinsurance?

In terms of the heightened awareness, I've seen a steady growth in the amount of time and effort that ceding companies have put into monitoring reinsurance programs. Ten years ago, not all companies had a security committee and, I think now, you will see most companies have senior executives participating in a security committee where they are evaluating the financial stability of the companies they are dealing with. You will see companies, very often, sacrificing price for security and dealing with only A plus companies for long-tail liability coverages and maybe only accepting lesser security on short-tail property covers. So there definitely is a heightened awareness in the industry regarding this problem.

Which brings us to the ninety day rule. The rule was really pushed by a gentleman by the name of Ken Smith of the Illinois Insurance Department. And as the rule worked its way through the NAIC, two lobbying camps emerged. On one side, you had the direct writing reinsurers who were cheering the working group on. "This is a great rule." And on the other side, you had the brokerage market companies and perhaps some of the international companies who were taking the opposite view. And the reason is simple. Direct writers of reinsurance have more control over the speed of payment of their claims. They thought...they could possibly have a competitive advantage in the marketplace if the rule was passed.

As a demonstration of that, for you avid readers of the trade press, if in the last six or eight months you open up to the

centerfold of Business Insurance or Best's or one of the publications, you'll see the jousting that has taken place by two very prominent direct writing companies. I think it was about ten months ago, one advertisement, full page ad, had a claim notice that was stamped "May 1st received", and stamped "May 5th paid." We pay in five days. About two months later, the competitor came up with a three day payment scheme where they would pay in three days. Now the last one, you'll see the two fingers that are being held up by another reinsurer that says they will pay in two days. And I guess we can't go much further than that unless we have electronic transfer or we just give the money up front and say take what you need. So, it has had an impact on the industry and we'll get into that later, in terms of what some of the competitive issues are with regard to this rule.

How should companies react? Companies should react by paying attention to the calculation and understanding what it all means. And the reason is that surplus is expensive. I've already said that 543 million dollars of industry surplus has been eaten up by the calculation. Surplus is expensive and to replace it you might have to engage in some type of surplus relief transaction, a sale of some type of nonadmitted asset, salvage and subrogation, over ninety day receivable, agents balances, etc. and there is a real cost, a tangible, hard dollar cost associated with those transactions. So by proper planning for this penalty you could avoid taking some surplus hits.

Let's get into the calculation itself. I hate to get mechanical on you, but I think it is important. The ninety day rule really consists of three important components. There is an aging of the recoverable balances themselves. There is the performance of what is called a "slow pay test." And then the surplus penalty calculation.

In your handout, which follows along the slides and I didn't put these on the slides and I apologize for that. You will see Part 1(a), Part 2(b), and Part 2(b)2 of Schedule F. And I patterned out an example to try to demonstrate how the calculation works.

(Slide)

Part 1(a) section 1 I've got three reinsurers listed, XYZ, ABC and AAA. This is really an informational schedule. You can see that in column one there's four aging columns, one to twenty-nine days, thirty to ninety days, etc. and it totals across to the column E, the total column. Then recoverables on unpaid losses are listed and unearned premiums. And then the amount of reinsurance premiums ceded to that reinsurer.

I point you to the asterisk on the $600,000. That's over 180 days overdue from AAA. Assume that 200,000 of that 600,000 is in dispute. And it really does not make any difference for the purposes of this schedule, but it will later.

So again, this is purely an informational schedule. One note of caution here. Notice that it does say "name of reinsurer," not name of broker, or name of underwriting association, or whatever basis you happen to have your data accumulated on. You have to list the reinsurers individually. But we'll get into that later.

(Slide)

The next page, Part 2(b) section 1 is what is called the "slow pay test." I have termed it the "trigger ratio", because it triggers an excess penalty. And I think we are going to have to walk through this one carefully. Let's go across the page for XYZ reinsurance. The total ninety days overdue merely comes from columns 1(c) and (d) of the prior page. It is merely the sum total.

Now we get into the denominator of the ratio. Columns 2 and 3 will be the denominator of the slow pay ratio, and it comprises the recoverables on paid losses from the prior page and also the amounts received in cash from that reinsurer in the prior ninety days. Let's just go through the calculation and I'll come back to that. So, it's 100 over 550 is 18.2% and since that 18.2% does not exceed 20%, XY and Z reinsurance company is not a slow payer.

Now the reason I structured it that way is that I want to bring up an example here showing that...why do we add in amounts received in the last ninety days? Well, some companies screamed a little bit and said, look, there could be an aberration in my balance sheet at 12/31 of any one year or maybe a balance has gotten a little bit out of control and it is a little bit delayed. I don't want to get penalized for that. So what they did was they said, okay, we'll allow you to water down the ratio by the amount of cash you receive from that reinsurer from October through December. So if the reinsurer truly is paying and turning over those balances, you'll get credit for that and we'll be able to water down the ratio a bit. And the reason I had it at 150 is, that without the amounts received in cash, it would have been 100,000 over 400,000 for 25% and that reinsurer would have been a slow payer.

Because it is not a slow payer the $100,000 ninety day overdue balance gets popped out of the right hand column and we will deal with that on the next page.

ABC reinsurance is really straightforward because it is merely the over ninety day balances. They have nothing received in cash and the amount on recoverable unpaid losses was 500,000. So their ratio is 40% and they are clearly a slow payer.

AAA is really the example that I want to hit on. And that is the fact that $400,000 shows up in that first column, while on the prior page it has $600,000. And the reason is when amounts are considered to be in dispute you do not have to include them in

the calculation of the slow pay test. You can exclude them. So for instance, the $400,000 that shows up in this table, is the $600,000 less the $200,000. And likewise the $800,000 in column 2 is the one million dollars from the prior page less $200,00 0. But you can see that in any event it did not help this reinsurers case. He is a very slow payer. The ratio is 50%. So, excluding the item as a disputed item in this particular example did not help to remove this reinsurer from the slow pay list.

(Slide)

Now the calculation of the penalty itself. On this next schedule, Part 2(b) section 2, you are only required to bring forward the reinsurers that are slow payers. On ABC reinsurance we are merely taking the balances from the first schedule I presented and bringing them forward. However, we are including some amounts that are important.

When a reinsurer is a slow payer, you not only calculate the penalty on the amount that is billed on paid recoverables, but you also have to bring in the recoverable amount on unpaid losses, allocated loss adjustment expenses, IBNR and unearned premiums and any amounts that reinsurer owes you. So you are now required to take a 20% penalty on all balances due from that reinsurer.

Now if you notice way out to the right hand column in columns 4 and 5, we've got two other items, "deposits" and "funds withheld", and "miscellaneous balances". And what they are allowing here is for you to take credit for items that we owe to the reinsurer. I really don't particularly understand why they have done that since the right of setoff is such a major issue in the insurance industry today. I'm not sure why the NAIC allowed us to offset those amounts, but they have.

AAA reinsurance. If you remember, were a slow payer and they also had an amount in dispute. However, even with that amount in dispute they were still a slow payer and therefore the penalty is calculated on the total amount due from that reinsurer. Notice that the amount in column A is the $1,250,000 which was the total recoverable. It is not reduced by the amount in dispute. Thus, disputed items really only help you if it reduces one of your slow pay ratios down to below 20%. If you are over 20%, you are going to take the hit on the total recoverable anyway.

Coming down to the bottom of the page, this is the calculation. The penalty is 20% of the $100,000, which was the amount overdue from the reinsurer which was not a slow payer. That was the amount ninety days overdue. The 2,725 is from column 3 of this schedule, which was the total amounts due from the slow payers and then the negative 250 is the total amount of funds that are being withheld and we are allowed to take credit for that. So the 20% applied to the 2,575 is a $515,000 penalty for this particular insurance company.

I know that was fast. You've got to spend some time with the schedules, but it all makes sense. And as we work through some of these issues I think it will become a little bit clearer.

(Slide)

The next part of the presentation covers four or five implementation considerations that we have worked on with our clients and non-clients. We've done a lot of research and there are a lot of rumblings in the industry about data collection.

It's really a sad commentary that because of the new accounting rules, companies had to scurry and get data that they otherwise wouldn't have had because a businessman would sit back and say, you needed that data to manage your reinsurance programs anyway. And, again, that's where the industry is. I think...I don't like to generalize, but if I had to I would say that on the whole, reinsurance systems within ceding companies are not as sophisticated as their direct writing systems. It is not uncommon to see a company with artificial intelligence to help underwrite an auto policy. And you go to the ceded reinsurance unit and see fourteen column paper and people with green eyeshades with their sleeves rolled up. It's just the way the industry is and I think the Schedule F penalty has increased the awareness in the industry about the lack of technology. I think you'll see some enhancements.

Let's talk about some of these data collection issues. The first one, identifying the reinsurers. That sounds like an easy chore, but it is not. And one of the reasons is there are a lot of ceding companies out there that deal with the brokerage market. And in dealing with the brokerage market, they may not know who their reinsurers are. Or they may know who they are, but just don't have any clue as to how much each one owes them. Well now it's important, because now you need to include that information on Schedule F.

I think just recently there is an organization called the...help me out if I get this wrong, Don...Broker Reinsurance Marketing Association. Thank you. ...that has started to address this issue as they see that brokerage companies may have an uncompetitive advantage with direct writing companies. Now they've gone to standardized accounting forms so that ceding companies, if they are dealing with thirty or forty ultimate reinsurance companies, may be getting one type of bordereaux, one type of accounting form, one type of loss notice which will make processing that much easier. But in any event, you can not include brokers on Schedule F. And I can tell you, because I have seen it. If you go back five or six years, you'll see the big brokerage houses listed right out there on Schedule F. That's a quick way to get a regulator to give you a phone call.

The next thing you can't put on Schedule F, because they are not really a reinsurer, is Lloyd's. I mean, you have to include

Lloyd syndicates on Schedule F. But there is an interpretation by the state of Illinois that says syndicates should be reported separately. One line is fine if you are dealing with one syndicate, but companies with complex programs, if they are writing liability property and marine and aviation, they are obviously dealing with multiple syndicates and these syndicates aren't cross collateralized. If one is a slow payer, you are pretty much relying on the fortunes of the names behind that syndicate and you can't tap the cash of another syndicate. So you really are supposed to list syndicates separately. And this in itself is going to be an accounting nightmare for ceding companies.

To take that one step further, there is another interpretation that says if you want to get technical about it, every syndicate for every Lloyd's underwriting year is really a different reinsurance company that you should list on Schedule F. And the reason is technically correct. That the names behind these syndicates can change from year to year and, therefore, the security for that syndicate could be different from underwriting year to underwriting year. I have approached clients of mine with that and after they stop laughing, they decided they wouldn't do it.

The aging of balances. It sounds relatively simple. You go into any manufacturing concern and you see accounts receivable, aged, thirty, sixty, ninety days and so on and so forth, but reinsurance systems in ceding companies typically had no billing date and no due date in the system or on the bill, for that matter. And this is a problem. Companies have run into problems with aging the balances.

Segregating components of loss from LA&E is an issue as we'll get to later. You don't have to take a penalty on LA&E if your reinsurance company isn't a slow payer. But the problem, depending on how you are buying your reinsurance, is if your reinsurance is priced in such a way that LA&E is included in the definition of ultimate net loss, you probably never bothered to try to segregate the two because it really didn't matter. It was all subject to one retention and it really didn't matter to segregate the two. If you have a type of excess of loss program where LA&E is pulled out and done on some kind of proportional method, than you probably have that detail. But you'll want to go back and take a look at whether LA&E is included in your losses and whether it has any impact on the calculation.

Unearned premium is the same issue. Everybody knows what their unearned premiums are on this treaty and that treaty, but nobody has ever gone through the painful exercise, especially if there is multiple reinsurers on the treaty, to allocate that unearned premium back to actual reinsurers. And that's a problem.

How is the industry going to react? Hopefully, they will enhance their systems. I think we are going to see more integration

between reinsurance and direct systems. I think we are going to see fields added, for instance, the due date and billing date. And you are going to need to see enhancements to treaty systems. I think companies that have already done this to better manage their business are probably a step ahead in the game.

The next issue is due date determination. Well, you are probably saying, I can read a calendar. Why are we going to cover that? When this regulation was first passed I made ten phone calls to different companies and colleagues and I got ten different answers as to what they thought ninety days overdue meant and when the clock started running.

The NAIC said that the due date for a recoverable is when the contract says it is due. So if the treaty says thirty days, then the recoverable balances, the bill is due in thirty days. It also said that if the treaty is silent that they would impute a thirty day due date.

To give you an easy example...if a bill goes out on July 1st and the treaty says forty-five days, that balance is due on August 15th and is ninety days overdue on November 15th. Same bill, different reinsurance contract that happens to be silent, where as one of these London market type contracts that calls for payment in a reasonable time. But the treaty is silent. That July 1st bill is due on July 31st and is ninety days over on October 31st. Thus, unless the treaty stipulates payment in less than thirty days, a bill can never be more than ninety days overdue if it is billed out to September 1st.

Other issues that we have had to deal with...intermediaries. As you know to take credit for reinsurance, a contract generally have to have an intermediary clause which says that the credit risk is really on the reinsurer. Therefore, payment made by a re insurer to a broker is probably constructive payment from the reinsurer's point of view, but is not constructive receipt from the ceding company's point of view. Thus, you also have risk as to the solvency of the intermediaries that you are dealing with. So there is risk at the intermediary level.

What are some of the strategies that have been discussed in order to deal with this problem? Well, the first one is to aggressively bill and aggressively collect the recoverables, but we know that is not always easy to do.

The first one was rather simple. Well, let's amend our treaties. If the treaty had been silent so the NAIC would have imputed a thirty day period for collection, the practice has been for the reinsurance company that pays in ninety, then we are taking a penalty, most likely, about sixty days into the normal credit period, when we know, in fact, we are going to get paid. So if there is a practice that has been established with your reinsurer, you might want to amend the treaty to make it reflect actual practice. There is a risk here though. And the risk

revolves around the relationship with the reinsurer and the ceding company. You know, if it said thirty and they paid in ninety and you have always accepted it, that's great. Well, what happens if you put ninety in. Does that mean it is going to happen in ninety or is it going to happen in 180 now? So there could be some cash flow risk in amending the treaty and extending the credit period out, but, again, I think that depends on the relationship the ceding company has with the reinsurer.

Some companies ask whether we can do this retroactively, which really means that I have these recoverables that are aging on the right side of Schedule F and I'm just going to bill back and amend retroactively; amend my treaty so that they will no longer be overdue. Well, that's an abuse and I think that regulators will look at the business purpose of a treaty revisions and if it was merely to avoid the penalty, I think you would have a regulatory problem.

Delayed billings. I think there is a presumption in the Schedule F penalty that there is an incentive to bill promptly; there is a cash flow incentive to bill promptly. However, I don't think it is an unreasonable strategy that if you have a large bill that you are preparing late in August and it could possibly be some type of asbestos bill or environmental bill that is going into the London market and you know darn well that it is going to go to 120 - 180 days, you could delay it into early September to avoid taking a penalty. And I don't think that's an unreasonable strategy, but, again, I think the regulators would look at abuses here. Delayed billing would only help if the reinsurer is not a slow payer. You have to remember if the reinsurer is a slow payer, there are very few ways to avoid penalty. You are going to take 20% on everything that that reinsurer owes you.

Withdrawn bills. Some companies ask us, well, we didn't really mean to send that one or it still is in the negotiation stage but we billed anyway. Can we pull it back? That sounds like an abuse and we have pretty much informed our clients that we thought it was. However, there is a real issue here and I'll use an example. Claims due on asbestos from the Lloyd's market. Lloyd's has a set up where they have a group of solicitors called the Lloyd's Asbestos Council. Things will get delayed when they a re being evaluated. We have heard complaints that Lloyd's never really considers evaluating the coverage issues, the basic issues that need to be evaluated, until they get a bill. So the ceding company is between a rock and a hard place. In order to get the ball rolling, they need to bill the reinsurer and they know they are not going to get this paid on for maybe three or four months.

So we have told companies to work with their legal counsel and maybe recharacterize what they consider to be a notice of loss, a proof of loss, or a demand for payment. And that, possibly, could be a reasonable strategy in trying to avoid penalty, especially in this situation. You have to send the bill in order

for them to evaluate coverage. It seems unfair to get penalized in that situation.

And the last thing is really good common sense. And it would really be a shame to have to take a surplus hit because you didn't give your reinsurer what you promised you would give them. Generally there are the three stages of loss notification; when you reach some percentage of your retention, when you actually pierce the retention, and when the claim gets paid. And I think it is incumbent upon all ceding companies to really look hard at the claims procedures and the accounting procedures they have in place and make sure that the reinsurer has everything that they need to evaluate the claim. Because when we talk about disputes later, we will make it clear that a dispute is not the time in which a reinsurer needs to gather more information or is evaluating coverage. There is a clear distinction.

Disputed recoverables. This is probably one of the most misunderstood aspects of the rule because what happened was the NAIC came in and said, we're going to give you an allowance for dispute, everybody said, this is great, because we're dealing with brokers and companies and everything we sent them they dispute. So just about everything we have that is old, by definition, must be a dispute. Well, the NAIC made it very clear as to what a dispute was. A claim can be in dispute if it is in arbitration or litigation. And that is fairly clear and it should be very easy to document. There is one more definition of a dispute and that is you can document a dispute by way of notification from the reinsurer. That notification most be in writing and it must clearly represent the denial of validity of coverage. And that's a distinction I want to make. It is not I need more information to do my evaluation, you didn't send me this piece of paper. It is clearly a denial of the validity of coverage. And that would constitute a dispute.

Required disclosures. No matter what the impact from the Schedule F penalty, companies are required to disclose disputes if individually they represent 5% of surplus or more, or in the aggregate or 10% of surplus or more. So there are some disclosure requirements.

Now let's talk about the impact on the surplus penalty and I will refer back to the earlier example. Disputes only really help if they reduce a reinsurer's slow pay ratio from over 20% to under 20%. Because if that reinsurer is a slow payer the disputed items are included in the calculation of the penalty. So it is obviously worthwhile finding out which recoverable is a dispute because you need to collect them. But for purposes of the penalty we saw companies go to an awful lot of trouble of trying to pull together some really flimsy documentation of what they considered to be disputes and in the final analysis they cranked through the calculation and it didn't matter because the reinsurers were slow payers. They didn't pay enough attention to the mechanics of the rules and how that would impact it.

Dealing with recoverables in disputes. There's a couple of strategies that one could consider. And I say that because I'm not advocating any one of these in particular. Some companies have talked about requesting written notice. They said, look, reinsurers are not the type that write a lot to us. You know, you look at a file on a very complicated case and it tends to be very flimsy. They just don't write down a lot on paper. There's a lot of phone calls, but there is not a lot written. We are never going to get a letter that says, dear ceding company, I'm denying the validity of coverage. So some companies have thought about actually taking a more proactive view and writing to the reinsurers, basically claiming that there is a dispute and would you either confirm or deny that there is one. And if you did that, would that constitute adequate documentation for dispute. I don't know the answer to that. It is just one of the strategies that has been recommended. And there is a definite down side, that if your reinsurer really never considered the item in dispute to begin with, you are raising a red flag when really one didn't exist at all.

The other one has to do with obtaining legal opinions. Again, we said that the claim is in dispute by way of arbitration or litigation or by way of notification. Well, what if it is not an arbitration or litigation, but it is more or less pending. Whereas it is more or less an unasserted claim. Can we get in-house counsel to give us a legal opinion that the item is in dispute and use that as documentation for the dispute? Again, we don't have an answer to that. We think there are some companies out there that have done that. We know there are other companies that considered doing it and in the final analysis, chose not to. Maybe Kathryn later can speak to that point.

The other impact that this could possibly have is on the London market. Based on what I've read, the London market is scared. And one of the reasons they are scared is that they do not like to put a lot in writing and document disputes, as I said before. And they think that ceding companies in order to document disputes are going to initiate law suits, either more law suits or faster than they would have in the past. Then you are going to see a rush of law suits flooding into the London market and tying up the manpower that exists there. I don't think it has happened yet. I don't know if it will, but it could. There is one issue that one attorney wrote about that I read just recently and that is Rule 11 of the Federal Court, which addresses frivolous law suits and I guess some of these law suits could be considered frivolous if all we are doing is initiating a law suit in order to document a dispute. Maybe Kathryn, you will also address that later because I'm certainly not a lawyer, as you can tell.

One of the other issues that we want to deal with is direct write-offs. Companies that really work through the calculation noticed kind of an anomaly in the calculation that in certain situations, if you wrote off a balance, you got a surplus

pick-up. And they were right. Before I get into that let me just go over my personal views on this. The ninety day rule is a minimum penalty. If in your analysis of your financial statements, you believe that there is additional reinsurance that is uncollectible , I would say that prudency, and I think even in the spirit of statutory accounting, you would have to record additional penalty. Write-off should be encouraged when valid no matter what the impact on the penalty is. Whether it decreases surplus, increases surplus, or has no impact at all, we think from an accounting point of view, you should continue to evaluate your recoverables and when the criteria that you have always used to write-off exist then you continue to write them off. Generally those would be the criteria that you might use to document a tax deduction. Write-off merely to avoid the penalty probably would be considered an abuse.

In the paper that I've handed out, the Implementation Guide, if you go pages 16 and 17 there's an example of when a write-off actually results in a surplus pick-up when you work through the calculation.

Schedule 1 and 2 is merely a fake reinsurance company and you've got amounts ninety days overdue. You've got reinsurers recoverable on paid losses, etc., etc. for a 40% trigger ratio. Okay? And when you work your way down just the way that we did in the other example, your result in all balances due from that reinsurer of $2,500 and the 20% penalty is $500.

We are going to take that same situation and we're going to write-off $250 of the over ninety day amount. So the new numbers are 150 and 550. Amounts received in the past ninety days stays the same and the ratio has been reduced to 20%. And for purposes of this example we are going to say it is 19.5% so he is not a slow payer. Here's what happened.

The over ninety day amount is now $150. The 20% penalty is $30. However, you wrote off $250 for a total of $280, but the Schedule F penalty before the write-off was $500. What happened?

What happened was that this was probably a type of long-tail coverage where the ceded reserves on the unpaid balances were very, very high. Okay? So the relationship of the paid recoverables to the total was very low and thus if these other balances exceeded 20% of the amount overdue, through the math of the transaction, you get a surplus pick-up by writing-off a balance. Not only that, but on a statutory basis, you get a 34% tax deduction and you take the benefit that way as well.

Again, we have seen companies say, well, we thought that the Schedule F rule was more or less implemented to encourage write-offs so we are going to continue to do it. And other companies said, well, we are not going to write-off because we've got the Schedule F penalty now. And kind of our personal view is you should be somewhere in the middle. The Schedule F penalty

is a buffer. It is not the be all and end all of what your uncollectible problem is. You should continue to record uncollectible reserves in excess of the Schedule F penalty if you feel they are uncollectible. And you should continue to write-off balances when they meet certain criteria such as the IRS criteria are as good as any.

Some other considerations. When we were talking about gathering some of this data before, we mentioned ALA&E. And, again, I think we discussed it there. I won't go into it, but if the reinsurer is not a slow payer and you know that ALA&E is included in your paid loss recoverable, you might want to analyze how to get it out of there because you are taking a 20% penalty on it if you have amounts ninety days overdue. And you don't have to. ALA&E, by the mechanics of the NAIC's calculation, only enters into the calculation when the reinsurer is a slow payer.

Let's talk about some of the business impacts of the new rule. We talked about the brokerage market versus the direct writers and what some of the competitive advantages and disadvantages may be. Of course the direct writers thought they were sitting pretty when the new rule came out.

There is a view in the industry that you might see...slow paying companies, authorized slow paying companies being required to post letters of credit, other forms of collateral, being charged interest on over ninety day balances, and vehicles of this sort. And this is really to put them on parity with the fast paying companies. Fast paying companies, you'll take no penalty on your Schedule F. And slow paying companies, you might. So to put them in parity, there might be an additional cost to running their business, and that is posting collateral.

I think one of the most fascinating things that we have seen is...and this is...I'll tell you the reinsurance market ought to be commended because they are really proactive. As soon as an issue is out there somebody is right on top of it issuing a reinsurance product. And that is reinsurance on over ninety day amounts. We saw two or three product illustrations where the reinsurance treaty was actually an indemnification to the other reinsurer for not collecting its over ninety day balances. And I saw various forms of it. One was almost a prefunding, where you actually got the cash. And then as you collected your balances, it was almost treated as a subrogation or a salvage recovery and you, the reinsurer, would be paid back. And another one wasn't a prefunding. It was a premium paid and if you didn't collect the amounts they would be prefunded.

There's some issues with that. The product illustrations I saw...let me preface this, were attached to letters from attorneys that were being sent to regulators to see if they would treat this as reinsurance. Okay? So there were some issues as to whether if you did buy this reinsurance whether you could then take credit for it in your Schedule F and not take a penalty. And the answer we got back was there was no yes or no. The

answer we got back is, you know, we evaluate every reinsurance contract on its own merits, etc., etc., which is the response you would expect to get.

Has anybody bought this type of reinsurance? I don't know of anybody who has. I know there are products out there. Whether they were approved or not, I'm not certain, but I would venture to say that there probably is. Some company out there who is writing over ninety day balance indemnification reinsurance. So that was very interesting.

In terms of additional or revised NAIC requirements, I think one of the problems that you are going to have in planning for the Schedule F penalty is that right now the rules are very rigid. They are very strict. They are very mechanical. There has been talk about making the penalty a progressive penalty. And that is fairly simple. Why penalize someone whose balances are ninety-one days overdue, the same amount as somebody's balances who are two years overdue. Does that mean they are going to lower the 20% to the younger age categories? I don't know, but I really don't think so. I think you are going to see some type of stiffer penalty for the real problem accounts that are out there. So I think you need to keep this in mind if you develop some type of model to plan for the surplus penalty calculation. I think you need to keep in mind that the penalty may be a progressive penalty in the future.

I guess just to wrap up my piece, I just want to say that this list of implementation issues is not meant to be all inclusive. It is our view that the issues that will arise in this calculation will be as complex to the reinsurance transactions to which they apply. And we also don't want to give the impression that this is just some frivolous rule and one more nagging regulatory constraint that we all have to deal with. That the spirit of the new rule is really to make insurance companies look at themselves and to protect their policyholders interests by reinsuring in a responsible manner and that if this is accomplished we are probably all better off. Thank you.

(Applause)

MR. SKRODENIS: Moving along, the next consideration in the calculation of the amount is our ceded IBNR reserves which are needed in the statement. This particular topic will be covered by Jack Joyce. Jack is the senior consultant for Coopers & Lybrand's casualty actuarial practice in Chicago. He is a Fellow of the Casualty Actuarial Society, and a Member of the American Academy of Actuaries. At Coopers & Lybrand, Jack has been an actuary on the audits of many of Coopers & Lybrand's insurance clients. He has consulted on self-insurance programs for hospitals, municipalities, and other organizations. Prior to working for Coopers & Lybrand, he worked for C&A Insurance for four and a half years in various areas. He has a Masters degree from Northwestern University's School of Management. With that, Jack Joyce.

1990 CASUALTY LOSS RESERVE SEMINAR

6E: SCHEDULE F - REINSURANCE REQUIREMENTS/USES

Presented by

John J. Joyce

and

Joseph Zubretsky

The Provision for Overdue Authorized Reinsurance

"The 90-Day Rule"

Reinsurance Recoverables

- Very significant asset
- Uncertainty in estimating ultimate recoverable
- Long-term nature of asset

Collection Of Recoverables

- Recent reinsurers' insolvencies
- Lack of information/disclosure on collection issues
- Heightened awareness

Overview

- Recoverable aging
- "Slow pay" test
- Surplus penalty calculation

SCHEDULE F - PART 1A - SECTION 1

Ceded Reinsurance as of December 31, Current Year

Federal ID Number	Name of Reinsurer *	Location **	*	(1) REINSURANCE RECOVERABLE ON PAID LOSSES OVER DUE(a) Current 1-29	(b) 30-90	(c) 91-180	(d) Over 180	(e) Total	(2) Reinsurance Recoverable on Unpaid Losses	(3) Unearned Premiums (Estimated)	(4) Reinsurance Premiums Ceded
	XYZ Reinsurance			200,000	100,000	50,000	50,000	400,000	1,000,000	200,000	1,500,000
	ABC Reinsurance			150,000	150,000	150,000	50,000	500,000	300,000	50,000	2,000,000
	AAA Reinsurance			-0-	400,000	-0-	600,000 *	1,000,000	250,000	25,000	500,000

* All companies should be listed in straight alphabetical order within the following groups with subtotals shown for each group: Affiliates; U.S. insurers and U.S. branches of alien insurers; pools, associations and similar underwriting facilities; and all other insurers.
** Show the precise location of the reinsurance company.
* Insert in this column, if applicable, the following letter designation: (1) Reinsurer is subject to delinquency proceedings, i.e., conservation, rehabilitation or liquidation, or in the case of an alien reinsurer, equivalent proceedings.

* Assume $200,000 is in dispute

SCHEDULE F - PART 2B - SECTION 1

Provision for Overdue Authorized Reinsurance as of December 31, Current Year

Federal Id Number	Name of Reinsurer	(1) Amounts 90 Days Overdue	(2) Reinsurance Recoverable On Paid Losses	(3) Amounts Received Prior 90 Days	(4) Col. 1 Divided By (Col. (2)+ Col. (3))	(5) Amounts In Column 1 for Companies Reporting Less Than 20% In Col. (4)
	XYZ Reinsurance	100,000	400,000	150,000	18.2%	100,000
	ABC Reinsurance	200,000	500,000	-0-	40%	
	AAA Reinsurance	400,000	800,000	-0-	50%	
	Subtotal of Initial Page Detail for Section 1					
	Aggregate of Extension Page Subtotals for Section 1					
999999	TOTALS	700,000	1,700,000	150,000		100,000

NOTES: (1) Amounts in dispute should be excluded from Columns 1 and 2.

(2) If the results of the calculation in Column 4 exceeds 20%, complete Schedule F, Part 2B, Section 2.

(3) Carry Column 5 total to Schedule F, Part 2B, Section 2 for calculation of Provision for Overdue Authorized Reinsurance.

SCHEDULE F - PART 2B - SECTION 2

Provision for Overdue Authorized Reinsurance as of December 31, Current Year

Federal Id Number	Name of Reinsurer	(1) Unearned Premiums (Debit)	(2) (A) Paid and Unpaid Losses Recov. (Amounts in Col. 1E & 2 of Sch. F, Pt. 1A, Sec. 1 for authorized companies) (Debit)	(2) (B) Incurred but not Reported Losses Recoverable (Estimates of amounts recov. from authorized companies) (Debit)	(2) (C) Paid and Unpaid Allocated Loss Adjustment Expenses Recoverable (Debit)	(3) Total ((1) + (2A) + (2B) + (2C))	(4) Deposits by and Funds Withheld From Reinsurers (Credit)	(5) Miscellaneous Balances (Credit)	(6) Sum of (4) + (5) but not in Excess of (3)
	ABC Reinsurance	50,000	800,000	200,000	100,000	1,150,000	200,000	50,000	250,000
	AAA Reinsurance	25,000	1,250,000	100,000	200,000	1,575,000	-0-	-0-	-0-
	Subtotal of Initial Page Detail for Section 2								
	Aggregate of Extension Page Subtotals for Section 2								
999999	TOTALS	75,000	2,050,000	300,000	300,000	2,725,000	200,000	50,000	250,000

Calculation of Provision for Overdue Authorized Reinsurance

(1) Total from Column 5 of Sch. F, Part 2B, Section 1	100,000
Total from Column 5 of Sch. F, Part 2B, Section 2	2,725,000
	(250,000)
	2,575,000
	X 20%
Schedule F Penalty	$515,000

NOTES: Securities held on deposit or held in a trust account should be valued at their fair market value.
NAIC published market values must be used when available.
Amounts included in Column 4 should be identified separately as letters of credit(L), trust agreements

The 90-Day Rule

Implementation Considerations

- Data collection

Data Collection

- Identifying reinsurers
- Aging of balances
- Segregating components (Loss and LAE)
- Unearned premium detail

The 90-Day Rule

Implementation Considerations

- Data collection
- Due date determination

Due Date Determination

- Contract wording
- Treaty's silence
- Payment to intermediaries

Due Date Determination

- Treaty amendments
- Delayed billings
- Withdrawn bills
- Improve loss notification procedures

The 90-Day Rule

Implementation Considerations

- Data collection
- Due date determination
- Disputed recoverables

Disputed Recoverables

- Arbitration or litigation
- Definition - must:
  - be written from reinsurers
  - represent denial of validity of coverage
- Required disclosures
- Impact on surplus penalty
- Dealing with recoverables in dispute

The 90-Day Rule

Implementation Considerations

- Data collection
- Due date determination
- Disputed recoverables
- Direct write-offs

Direct Write-Offs

- 90 day rule is minimum penalty
- Write-offs encouraged when valid
- Write-off vs. dispute
- Write-off to avoid penalty is abusive

The 90-Day Rule

Implementation Considerations

- Data collection
- Due date determination
- Disputed recoverables
- Direct write-offs
- Ceded IBNR

Ceded IBNR

- Allocation to reinsurers
- Reinsurance programs:
  - proportional reinsurance
  - aggregate excess
  - catastrophe
  - excess-of-loss; complex placements of layers
  - facultative

Other Considerations

- Segregating ALAE
- The impact of timing of payments
- Business impact
  - brokerage market vs. direct writers
  - use of LOC's
  - reinsurance
- Additional/revised NAIC requirements
- Congressional hearings
- SEC/AICPA requirements

THE PROVISION FOR OVERDUE AUTHORIZED REINSURANCE

A Practical Guide to Implementation
June 1990

Written by

Joseph M. Zubretsky
Senior Manager
Coopers & Lybrand Insurance Industry Group

Terrence M. O'Brien
Partner
Coopers & Lybrand Casualty Actuarial Consulting Group

THE PROVISION FOR OVERDUE AUTHORIZED REINSURANCE
"The 90 Day Rule"

A Practical Guide To Implementation

Background

In December of 1988 the NAIC adopted a revolutionary proposal of the NAIC's Property and Casualty Reinsurance Working Group of the Blank Task Force, chaired by the late Ken Smith of the Illinois Insurance Department. The adopted proposal revises Schedule F beginning with the 1989 Annual Statement to include an aging of reinsurance recoverables from authorized companies on paid losses, the calculation of a surplus penalty based on that aging and disclosures of the amount of recoverables being disputed by reinsurers.

Why the New Rule?

Over the past few years, regulators have claimed that their effectiveness has been hampered by the lack of information being filed with regard to a ceding company's reinsurance. This claim has been heightened by recent insolvencies in which uncollectible reinsurance has either caused or greatly contributed to the ceding company's downfall. More pressure has been applied through the Congressional hearings, a forum that has scrutinized the financial health of the insurance industry and evaluated recent insolvencies.

The new reporting requirements may give regulators the necessary information to evaluate a ceding company's reinsurance program and also forces a charge to surplus for balances which, by application of a formula, are deemed to be uncollectible.

The Impact on the Industry

A. M. Best reported that the property and casualty's admitted surplus at the end of 1987 was $104 billion. Of this surplus, it was estimated that nearly 57% or $59.3 billion represented amounts due from reinsurers including intercompany reinsurance balances. Coopers & Lybrand has performed a study recently which estimated that as much as 4% or $4 billion of the industry's surplus could disappear as a result of the new reporting requirements and surplus penalty. Since the estimate does not apply ratably to all insurers, certain insurers may experience problems in maintaining a surplus level to support the level of business they now write. It remains to be seen whether any ceding company would become technically insolvent as a result of the new rules. As of this date, we do not have figures on the total reported industry penalty for 1989.

As the new reporting requirements were being developed two lobbying camps emerged: direct writing reinsurers who supported the rule and brokerage market reinsurers and primary carriers who were opposed to it. It is no industry secret that payments made to ceding companies from reinsurers through intermediaries generally take longer to reach the ceding company than those received directly from the reinsurer. As bills for losses work their way through the maze of brokers and reinsurers and through manual and inefficient reporting systems, the recoverables age on the books of the ceding company. Direct writers, on the other hand, are in direct control of the timing of their payments and can generally deliver the cash more promptly. As a result, direct writers believe that their competitive position in the market place has been enhanced. There is also an opportunity for brokers to enhance their position in the marketplace by improving their "backroom" operations; speedier payments may mean more business.

Along these same lines, foreign and unauthorized reinsurers also believe their competitive position has been enhanced. The new reporting rules allow ceding companies to take credit for assets held in trust or letters of credit as an offset to balances owed to them by the reinsurer. Likewise, unauthorized reinsurance has been unaffected by the new rule, so a ceding company's surplus charge for unauthorized reinsurance continues to take credit for compensating balances.

Slow paying reinsurers may discover that they will need to issue letters of credit (LOC) to remain competitive. The LOCs could mitigate the impact of the ceding company's surplus penalty. In addition, new companies may find it difficult to enter the reinsurance market because they have not had the opportunity to demonstrate their ability to settle and pay claims quickly.

Can a new Annual Statement reporting requirement alter the course of the reinsurance industry? The answer will emerge over time.

How Should the Industry React?

Ceding companies should obtain a thorough understanding of the rules, re-examine their reinsurance portfolio and plan for the implementation of the rule. Like any general rule, minute differences in circumstances will result in inequitable charges to some ceding companies' books. However, the reason for the new rules is valid; protecting the rights of policyholders by ensuring that ceding companies are reinsuring in a responsible manner.

The new rule has been cumbersome to implement. Implementation has involved increased work for data processing departments in compiling the appropriate data, and for accountants and legal counsel in interpreting provisions of reinsurance contracts and dispute issues. In determining how much effort to apply to this exercise, the cost should be weighed against the perceived benefit. Many companies were surprised at the complexity of the rules and the surplus impact of the rule when they actually completed Schedule F for the 1989 Annual Statement.

Although regulators have cracked down on certain "band-aid" approaches to creating surplus many companies still take the time and spend the money on short-term surplus creation. Financial reinsurance and securitization transactions do cost something. We believe that properly planning for and implementing the new rules may be a less costly surplus conservation opportunity.

The importance of the new reporting requirements should not be underestimated nor should the complexities and the practical implementation issues. The industry has been quiet since the rule was formally adopted in December of 1988. As Coopers & Lybrand performed postmortems on 1989, many implementation problems were identified.

We have prepared this paper as a guide to dealing with some of the practical implementation issues related to the new rule. We have heard of some of the problems being experienced by ceding companies and are anticipating others. While we are unable to be company specific in this paper, our goal is to touch on many of the issues and to offer some guidance on how to deal with them.

EXECUTIVE SUMMARY

Section 1 An Overview of the New Schedule F Reporting Requirements

In this first section we present the step by step methodology of completing the new Schedule F. The new schedules are attached to this paper and we recommend referring to them as you read the methodology. The schedules discussed in this section are:

- Part 1A-Section 1, which is the recoverable aging,
- Part 2B-Section 1, which is the calculation of the "slow pay" test,
- Part 2B-Section 2, which is the development of the information necessary to calculate the surplus penalty for the slow payers, and
- The surplus penalty calculation.

Section 2 What is a Recoverable and When is it Due?

In this section we explain that a reinsurance recoverable is 90 days overdue when 90 days have expired after the due date according to the terms of the reinsurance contract. We discuss the problems presented when the treaty is silent as to the due date or when payment has been received by the broker, but not by the ceding company.

We discuss the pros and cons of various strategies to reduce the 90-day overdue amount, such as delaying billings, extending the due date by treaty amendment and withdrawing bills or rebilling.

Section 3 Recoverables in Dispute

In this section we explain that recoverables in dispute needn't be included in the calculation of the slow payer test. A recoverable is defined as being in dispute only if it is subject to arbitration or litigation or when written notification of dispute has been received from the reinsurer.

If a recoverable is in dispute and is excluded from certain calculations disclosure must be made if the disputed item exceeds 5% of surplus, or, if disputed items in the aggregate exceed 10% of surplus.

The pros and cons of strategies for dealing with the dispute issue are discussed. These include having the ceding company provide written documentation to the reinsurer for confirmation or obtaining a legal opinion from counsel.

Section 4 The Potential Surplus Impact of Writing-Off an Account Balance

There are two schools of thought on direct write-offs; one camp believes that a write-off to avoid excess penalties is a disregard for the spirit of the rule while the others believe that the rule was structured to encourage write-offs.

Write-offs and their impact on the surplus penalty are discussed.

Section 5 Data Collection

The new rules require the compilation of data which is not currently captured by many systems. A brief listing of the types of data which are now required and some broad suggestions for re-designing reinsurance systems and integrating them with direct underwriting and loss systems are provided.

Section 6 Actuarial Considerations

In the past the allocation of the ceded IBNR to authorized Schedule F reinsurers did not matter. Under the new rules the amount of these balances allocated to a slow paying reinsurer will affect the penalty calculation.

Some broad guidelines regarding the problems you may encounter in allocating these balances to reinsurers are provided. Acceptable actuarial estimation techniques are discussed.

Section 7 Other Issues

This section involves the impact of ALAE on the calculation, the effect of reinsurers recent payments, the possibility of a progressively rated penalty in the future and how the market has responded to the penalty.

Section 1

An Overview of the Schedule F Reporting Requirements

In this first section we provide an overview of the reporting requirements and the mechanics of certain of the calculations. Attached to this paper are the various tables and exhibits of Schedule F. We suggest that you refer to those exhibits as you read this section.

A. Schedule F-Part 1A-Section 1

This table requires the ceding company to disclose the aging of the amounts recoverable from reinsurers on paid losses. Four aging buckets are provided in Column 1; Current and 1-29 days, 30-90 days, 91-180 days and over 180 days. The amounts are provided for each reinsurer with which a ceding company has amounts outstanding. Accompanying the aging schedule are columns 2-4, requiring the total amounts of recoverables on unpaid losses, unearned premiums, and premiums ceded. Wedged between column 1 and the column for the location of the reinsurer is a column requiring the ceding company to insert a code letter disclosing whether the reinsurer is subject to a delinquency proceeding, such as rehabilitation, liquidation or conservation.

The total reinsurance recoverable on paid losses from this schedule should tie directly to Line 12 on the Balance Sheet. This means that all recoverables are included in the aging, including those considered to be in dispute.

B. Schedule F-Part 2B-Section 1

This schedule begins the calculation of the surplus penalty. The ceding company must add the amounts in columns 1(c) and 1(d) from Part-1A-Section 1; this represents the total recoverables on paid losses greater than 90 days overdue. From this total the ceding company is allowed to exclude any amounts which are considered to be in dispute. The remaining over-90 day amounts are then entered in column 1 of Part 2B-Section 1. The total considered to be disputed is subtracted from the amount of total recoverables on paid losses from column 1(e) in Part 1A - Section 1, and entered in column 2 in Part 2B-Section 1. In column 3 the ceding company enters the total cash received with respect to paid losses during the prior 90 days; that is, from October 1st through December 31st of the year being reported.

In column 4, the ratio of the amounts more than 90 days overdue to the sum of total recoverables on paid losses and amounts received within the last 90 days is calculated. If the ratio is less than 20%, the total 90 day overdue amounts from column 1 are entered in column 5.

This calculation is often referred to as the "slow payer" test or the "trigger" test. The ratio is designed to identify reinsurers which have a history of being slow payers. Amounts received in the prior 90 days are added to the denominator of the ratio to depress the ratio by giving credit to the reinsurer for recent payments. A buildup of outstanding bills with very little in the way of recent payments will increase the trigger ratio. If the resulting ratio is greater than 20%, an additional penalty will have to be calculated in excess of the 20% penalty taken on amounts greater than 90 days overdue.

The losses recoverable used in these calculations do not include loss adjustment expenses. In addition, the amounts recoverable may not be netted with amounts owed to the ceding company with respect to premiums.

C. Schedule F-Part 2B-Section-2

The information developed in this table is used to calculate the penalty related to the slow paying reinsurers identified in Part 2B-Section 1. All reinsurers with ratios of 20% or greater from Part 2B-Section 1 are listed in this table. In column 1, the unearned premium debit related to the reinsurer is entered. In column 2(a) the total paid and unpaid losses recoverable are entered. Since this information is taken from Part 1A-Section 1, the amounts include recoverables in dispute. In columns 2(b) and 2(c) ceded IBNR and the total recoverable on paid and unpaid ALAE, respectively, are entered. The sum in column 3 represents all amounts due from the reinsurer.

Columns 4 and 5 quantify the reduced exposure by giving credit for funds held and amounts owed to the reinsurer. In column 4 the ceding company enters the value of deposits, trust accounts and letters of credit held as security for the particular reinsurer. In column 5 the ceding company enters reinsurance payables, that is, amounts owed to the reinsurer for premiums net of commissions or reserve funds held. The sum of columns 4 and 5 or the value of amounts owed to the reinsurer is limited to the amounts owed by the reinsurer and is entered in column 6.

D. The Penalty Calculation

At the bottom of Schedule F-Part 2B-Section 2 the formula for the penalty calculation is displayed. The 20% surplus penalty is applied to the sum of three figures previously calculated:

- The total of column 5 from Part 2B-Section 1 (recoverables on paid losses greater than 90 days overdue for all reinsurers not deemed to be slow payers), plus

- The total of column 3 from Part 2B-Section 2 (all balances owed by reinsurers deemed to be slow payers), less

. The total of column 6 from Part 2B-Section 2 (all amounts owed and the value of security withheld from reinsurers deemed to be slow payers).

The resulting penalty is entered as a liability on Line 13e of the balance sheet with the corresponding debit directly to the company's surplus.

E. Summary

Ceding companies should spend some time becoming familiar with the mechanics of the Schedule F exhibits. Depending on a company's reinsurance program and available data, practical problems will surface concerning the new reporting requirement. This brief overview provides the framework for the purpose of this paper; dealing with the practical problems of implementing rigid, mechanical rules to the complex business of reinsurance.

In the remaining sections of this paper we focus on some of these issues and offer some practical solutions. A ceding company should evaluate its particular circumstances before implementing any of the proposed solutions contained in this paper.

Section 2

The Basic Issue - What is a Recoverable and When is it Due?

A. The Overdue Rule

In our view, ceding companies will have a difficult time answering this rather simple, non-threatening question. The NAIC defines a paid loss recoverable as a balance arising in presenting a reinsurer a notice of loss or demand for payment. The date on which payment is due to the ceding company is determined by the wording in the reinsurance agreement. If no such specific definition of "due date" is evident in the contract, the NAIC has stipulated that 30 days should be used. An example follows:

Assume that on July 1 a ceding company submits a loss notification to a reinsurer. Further assume that the treaty with this reinsurer calls for payment within 45 days of billing. The recoverable is considered due on August 15 and thus would be considered 90 days overdue on November 15. If, in this same situation the treaty was silent as to when payment was due, payment would be considered due on July 31 or 30 days after billing, and be considered 90 days overdue on October 31. Thus, bills submitted after September 1 of any year could never be 90 days overdue at December 31, unless the reinsurance contract called for payment in less than 30 days.

B. Practical Issues

In practice, there are lags in payments from reinsurers to ceding companies, especially from brokerage market reinsurers. The problems that ceding companies will be confronted with may include situations similar to the following:

- A treaty is silent as to the due date for payment but practice has been for an extended credit period, say 90 days. The treaty's silence will call for the imputation of a 30 day credit period for purposes of the Schedule F penalty. Thus the recoverable will be considered 90 days overdue 30 days into the normal credit period.

- Even when claims are uncontested, receipt of payment frequently takes longer than 120 days in the brokerage market. Internationally placed reinsurance normally increases the delay.

- While payments from a reinsurer to an intermediary are often considered constructive payment by the reinsurer they are usually not considered constructive receipt by the reinsured. Intermediaries are usually considered agents of the reinsurer and thus collection problems with an intermediary could also trigger a penalty.

C. Reducing the 90 Day Overdue Amount

What can a ceding company do to legitimately reduce the level of 90 day overdue amounts? We have heard various strategies throughout the industry and present some of them below along with the benefits and drawbacks.

1. Delay billing until after September 1 Ceding companies obviously have the cash flow incentives to bill promptly. We're sure it was not the NAIC's intention that ceding companies build up an inventory of recoverables on unpaid losses to avoid the surplus penalty, but there is no current requirement to bill when the direct loss is paid; it is assumed that there is enough incentive to do so. If there is a particularly large loss that is expected to have a delayed receipt and the choice is to bill it in late August or early September, then a short billing delay would appear to be a reasonable strategy. However it would only avoid an additional penalty if it reduced the trigger ratio to less than 20% or the ratio was already below 20%. If the trigger ratio would have been exceeded in any event, the penalty would be taken on the unbilled balance as an unpaid loss recoverable.

2. Extending the due date by treaty amendment This strategy seems fairly simple to implement and one in which complete cooperation from the reinsurer is virtually assured. In our view the benefit in extending the due date depends on the relationship between the ceding company and the reinsurer and also what the practice has been historically. If the treaty specifies a 30 day payment but practice has been 90 days and this practice has been agreeable to both parties, then it would seem reasonable to have the treaty extended to 90 days to reflect actual practice. However, this must be weighed carefully against the prospect of having the reinsurer delay payment even longer and thus the relationship with the reinsurer becomes an important consideration.

   If the treaty is silent and the practice has been for payment beyond 30 days, then the ceding company benefits by making the treaty specific as to the due date. A 30 day due date would be imputed if the treaty is silent on that point. The surplus benefit would be 20% of amounts that would have been overdue if not for the amendment.

   These are practical, prospective solutions. Can this strategy be used retrospectively? Can a contract amendment be applied retroactively to a recoverable which is already billed or even 90 days overdue? This is a question better asked of legal counsel. However, a retroactive extension of the due date solely to avoid the penalty would probably not be viewed favorably by state regulators. Upon examination, they would most likely focus on the business purpose of the contract amendment and, if none existed, would probably require that the 90 day overdue balances be reinstated based on the original contract wording.

3. Withdrawing bills or rebilling Can a ceding company withdraw a bill from the market and rebill the loss to have the aging process start over? While this may sound abusive this strategy raises some interesting questions relating to the definition of a bill. A bill is a demand for payment. It is the intention of the rule for the aging to begin when this demand occurs. Some ceding companies have complained that the definitions of initial notification of loss and bill have become obscured in today's market, especially with complex liability claims. Some reinsurers, including Lloyd's syndicates, only begin to seriously evaluate a claim upon billing. For instance, an asbestos related bill submitted to the London market will immediately be sent to the Lloyd's Asbestos Council for review by the Council's solicitors. Ceding companies are forced to bill before reasonably expecting payment because they know payment is preceded by this evaluation and the evaluation will take place only upon the submission of a bill.

   This is a very gray area. We understand companies may consider recharacterizing proofs of loss and demands for payment but only after consulting with legal counsel. Whether this recharacterization can be performed retroactively is another valid question for legal counsel. Rebilling may be a legitimate strategy when the characterization of a "bill" is questionable but would be considered an abuse if done merely to avoid the penalty.

4. Evaluate the quality of information submitted to reinsurers Undoubtedly, situations occur in which reinsurers delay payment on a bill because the ceding company has not submitted all of the information the reinsurer needs to adequately assess the loss. Ceding companies should evaluate and strengthen their loss reporting procedures to ensure that delays are never caused by inaccurate or incomplete reporting. These procedures generally apply to the three stages of loss notification:

   - Preliminary notification, generally when some percentage of retention is exceeded;
   - Notification upon piercing the retention; and
   - Notification upon payment of the direct loss.

Section 3

Recoverables in Dispute

A. The Rules

There has been much confusion as to the appropriate treatment of disputed items. It is best to begin our discussion with a detailed description of the rules:

- A recoverable is in dispute if validity of coverage is being denied by way of arbitration, litigation or by notice from the reinsurer.
- Recoverables in dispute should be included in the aging schedule in Part 1A- Section 1.
- For the calculation of the slow payer test, Part 2B- Section 1, the items in dispute should be excluded from columns 1 and 2. Thus the slow pay test will not be adversely affected by disputed items.
- In calculating the penalty for the slow payers, Part 2B-Section 2, the items in dispute are included, and thus a 20% penalty is taken on the disputed items.
- If any one item in dispute is in excess of 5% of surplus or if in the aggregate all disputed items are in excess of 10% of surplus, appropriate disclosure must be made in the footnotes to the Annual Statement.

Some companies assume that a disputed item provides for surplus relief in all cases but this isn't true. The exclusion of a disputed item can be used to reduce a ceding company's penalty by reducing a reinsurer's slow payer test ratio to below 20%, thus avoiding penalties on unpaid losses, unearned premiums, etc. The exclusion of a disputed item also reduces the penalty for reinsurers who are not slow payers. However, if a reinsurer is deemed a slow payer even with the exclusion of the disputed item, then a 20% penalty is taken on the disputed item.

While written interpretations are scarce, it is safe to say that the NAIC did not intend for ceding companies to tag every old balance as a disputed item. Ceding companies need to carefully evaluate each of the outstanding balances for the characteristics of dispute and should not just apply this label liberally to their older recoverable items without such an evaluation.

B. Practical Issues

The NAIC defined a dispute narrowly to avoid abuses. It is difficult to apply rigid definitions to the very dynamic and complicated reinsurance market. We have heard many concerns raised by ceding companies with regard to the nature and treatment of disputed items. The following is a brief discussion of some of these issues.

- Some ceding companies would allege that it would be atypical for a reinsurer to notify them promptly, in writing, that the reinsurer is disputing coverage. Even when a claim is obviously being disputed, the first sign of written documentation may be the litigation or arbitration papers. Our experience somewhat corroborates these contentions; correspondence files for even contentious claims can be scant.

- The NAIC believes that the written notification from the reinsurer must contain very specific language, to the affect that "validity of coverage is denied". This may cause ceding companies even more concern as obtaining any form of written notice is thought to be difficult enough.

- There may be instances, such as when multiple coverage, layers, years or claims exist, when one portion of the recoverable would be paid with no delay if the other portion was not an issue. If the entire payment is being withheld due to a valid dispute about coverage that pertains only to a part of the recoverable, it seems appropriate to consider the entire recoverable in dispute for Schedule F purposes. The problem becomes more complex when tenuous coverage questions are cited by a troubled reinsurer mostly as a negotiating tool to delay payment and reduce ultimate settlement. The 20% surplus penalty was probably designed with recoverables from such reinsurers in mind.

The list of questions could be endless, but those shown above serve to demonstrate the basic issues. Next we will discuss potential solutions which are currently being evaluated, and their benefits and drawbacks.

C. How To Deal With the Dispute Issue

Dealing with the issue of disputes involves legal matters on which legal counsel should be consulted. Recoverables which are being disputed by way of arbitration or litigation should not be difficult to document. However the ceding company would be at risk if an item is excluded by way of dispute without having appropriate written documentation from the reinsurer.

1. Requesting written notice Some companies, realizing that some reinsurers would not be inclined to offer written documentation, have considered requesting written notice. Some have even considered preparing the written documentation, sending it to the reinsurer and having them confirm it, similar to the process an auditor would use to confirm an account balance. This strategy creates a dilemma for the ceding company in that they may alarm the reinsurer by raising a red flag when the situation may not require one. Ceding companies fear that alerting a reinsurer to a possible dispute may, in fact, cause one. This proactive strategy may be appropriate when it is obvious to all parties that a dispute exists but it should not be used recklessly.

2. Obtaining legal opinions Other companies have asked whether an opinion from legal counsel regarding the existence of a dispute would constitute adequate documentation. At this time we have not heard a definitive answer to this question. This question itself is a matter for legal counsel. However, there are some parallels to be drawn. Generally accepted accounting and auditing principles recognize the nature of unasserted claims and assessments. In accounting for loss contingencies, companies must consider their exposure to unasserted claims whether or not a formal suit or arbitration case has been filed. While the dispute situation is reversed (a gain contingency via a reduced surplus penalty rather than a loss contingency), does the essence of the legal matter prevail over its form?

3. The required disclosures Reinsurers will need to consider the sensitivity of the required disclosures. If an item is clearly in dispute but undocumented, the reinsurer may be in the position of either having the balance with the ceding company disclosed as in dispute or having the company named as a slow payer. These are not great choices. However, the dispute will only be disclosed if individually, the balance exceeds 5% of the ceding company's surplus. The reinsurer would be tagged as a slow payer if the trigger test exceeds 20%, even by a small margin. In the case of a true dispute, some incentive does exist for a reinsurer to provide adequate documentation for the dispute.

4. Partial disputes The NAIC has cited denial of the validity of coverage as the definition of a dispute. A reinsurer will withhold payment while negotiating with a ceding company even if part of the claim is certain to be paid. If validity of coverage is the issue, clearly a dispute exists. If the reinsurer is withholding payment primarily due to a lack of financial resources, then subjecting the entire claim to the penalty calculation would be appropriate. In such a situation, a reinsurer may fabricate a coverage issue to justify withholding payment.

5. Initiating suit Although it is too early to tell, the dispute rules may cause ceding companies to initiate suits faster than they normally would have in order to have a dispute clearly identified. Taking this one step further, it remains to be seen whether the dispute rules will increase the number of suits between ceding companies and reinsurers. The decision to sue early or at all will, invariably, involve consultation with company legal counsel.

Section 4

The Potential Surplus Impact of Writing Off an Account Balance

A. The Issues

We preface this section by reminding ceding companies that the surplus penalty is a minimum requirement. Companies with uncollectible reinsurance balances in excess of the Schedule F penalty should record additional reserves. Further, companies should continue evaluating old balances and write off those that are truly uncollectible. Typically, write-offs would relate to balances due from insolvent companies, balances in litigation where the probability of collection is low or balances in dispute. Normally the circumstances leading to the write-off should be well documented to support the deductibility of the write-off for tax purposes.

We have heard various views on write-offs with respect to the new Schedule F rules. Some companies have maintained that to write off account balances to avoid excess penalties is to circumvent the spirit of the new rules. Others believe that the rules were designed to encourage write-offs. Our view is that companies should continue to write off balances when the criteria for write-off exist, that is, a loss is probable and measurable. The advent of the Schedule F penalty should not impact the criteria.

The purpose of this section is neither to encourage or dissuade companies from writing reinsurance balances off but rather to display the effect of doing so on the Schedule F penalty and surplus.

In certain circumstances, a ceding company may increase surplus by writing off an overdue balance. This situation could arise on balances for a particular reinsurer tagged as a slow payer when working through the Schedule F Part 2B-Section 1. There is a very simple rule of thumb to evaluate whether a write-off increases surplus. The rule of thumb is that an increase occurs when:

a) The ratio of 90-day overdue recoverables to the sum of total recoverables and amounts received in the prior 90 days (the trigger ratio) is greater than 20%; and

b) When the 90-day overdue recoverables are less than 20% of all balances due from that particular reinsurer.

When the balances relating to a particular reinsurer satisfy these criteria, a write-off increases surplus because the penalty saved by avoiding the slow payer trigger will always exceed the write-off. This situation is most likely to occur when, under a reinsurance contract, there is a high balance of unpaid ceded losses outstanding. The effect is best demonstrated in the following example:

Schedule 1

Reinsurer	Amounts 90 Days Overdue	Reinsurance Recoverable on Paid Losses	Amounts received in the Prior 90 Days	Ratio
XYZ Co.	400	800	200	40%

Schedule 2

Reinsurer	Paid Loss Recoverables	Outstanding Loss Recoverables	Unearned Premiums	Total All Balances
XYZ Co.	800	1,600	100	2,500

Penalty Calculation:

Total all balances	2,500
Penalty rate	20%
Surplus penalty	$ 500

Note the following:

- XYZ Co. has been deemed a slow payer: the ratio of 90-day overdue amounts to the sum of total recoverables plus amounts received in the past 90 days is greater than 20%.
- Because outstanding loss recoverables of $1,600 are so high, total credits due from that reinsurer are $2,500.
- The resulting penalty is $500, or 20% of the total credits.

Using the same example, let's assume that $250 of the 90 day overdue amounts are written off for some valid reason. The same calculation would yield the following result:

Schedule 3

Reinsurer	Amounts 90 Days Overdue	Reinsurance Recoverable on Paid Losses	Amounts Received in the Prior 90 days	Ratio
XYZ Co.	150	550	200	20%*

* an additional $.01 of write-off reduces the ratio to below the 20% trigger. Figures are left in round numbers.

Since the reinsurer is no longer a slow payer the penalty would be calculated as follows:

90 Day overdue recoverables	150	
Surplus penalty rate	X 20%	
Schedule F penalty	30	
Surplus Impact:		
Schedule F Penalty		30
Write-off		250
		$280
Schedule F penalty before write-off		$500
Difference		$220

Note the following:

- The slow payer tag was avoided by writing off $250 of the original $400 90-day overdue balance.
- As such, the penalty is limited to 20% of the overdue amounts only.
- The sum of the write-off of $250 plus the revised surplus penalty of $30 is still less than the penalty in the first example. The $220 difference arises because the 90-day overdue amounts are less than 20% of all balances owed.
- The optimum level of write-off is the amount which reduces the slow payer ratio to just below 20%. Reducing the ratio further below 20% through additional write-offs actually decreases surplus.
- The surplus impact would be further enhanced by the tax deduction which would be allowed on the balance written off. In our above example, the actual surplus increase would be $305 ($220 as calculated + (34% x $250 written off)).

B. Implications

There are many implications of opting to writing off an account balance aggressively. We do not advocate write-offs unless all of the implications have been thought out. Some of the negative aspects of taking this course of action are as follows:

- The write-off is charged against profit and loss rather than as a direct charge to surplus. Companies concerned with operating results may distort key ratios.

- Once the balance is written off it should not be reinstated unless the balance is collected. Thus if the over 90-day amount and the slow payer tag is an aberration with that particular reinsurer, a balance should not be written off merely to avoid a penalty. The write-off is valid only when a balance is truly uncollectible.

- The 20% penalty is not a safe harbor. If experience shows that a more substantial penalty is needed, there is a requirement to record it. In a very poor collectibility posture, a ceding company may have to write off balances which exceed the Schedule F penalty.

- A question that comes to mind with regard to this strategy is "why write off a balance when the dispute mechanism is available to mitigate the penalty?" First, as was discussed in Section 3, disputes may be difficult to document. Secondly, the dispute mechanism can not be invoked for a financially troubled reinsurer which has not really denied coverage. Thirdly, the dispute mechanism is only available to avoid the slow pay ratio of 20%; once the 20% is triggered, disputed items are subject to the full 20% penalty.

It is important to remember that the overall goal of the financial statements is "fair presentation". If collection of a balance is "not probable", it should be written off no matter what the Schedule F mechanics are.

Section 5

Data Collection

One of the most burdensome problems ceding companies have faced in connection with the new Schedule F reporting requirements relate to the collection of the necessary data. Companies which, in the past, realized that certain of the information now required was important to the management of their reinsurance programs will be a step ahead of their peers. In many companies, reinsurance information systems were given less emphasis than information related to direct business. One benefit of the new rule may be that insurers will now focus on reinsurance information systems, automate manual records, and integrate automated reinsurance records with the mainframe underwriting and loss systems.

The problems that will be encountered will vary with the quality of the ceding companies' systems. Below, we present a representative list of issues in connection with data collection:

- Aging the recoverable loss - reinsurance systems typically omit billing dates and due dates.

- Segregating the components of recoverables - in many systems, ceded losses and allocated loss adjustment expenses (ALAE) are not identified separately, especially when ALAE is included in the definition of ultimate net loss per the reinsurance contract.

- Identifying the reinsurers - many companies still maintain their recoverables on the basis of the intermediary from which they are due rather than on the basis of the actual reinsurer. Still other companies report "Lloyds" as one line item on Schedule F. This line may actually represent many different syndicates with different attributes; a liability, marine, or property syndicate. The payment histories of different syndicates vary significantly.

  An interpretation issued by the State of Illinois would appear to require each syndicate to be reported separately. Thus, the good payment history of one syndicate may not be used to mitigate the poor payment history of another, just because they happen to be associated with Lloyds. To complicate matters further, one may make a case for reporting each syndicate for each underwriting year as a separate reinsurer. Each underwriting year for each syndicate may be viewed as a different reinsurer because each may be backed by different "Names." Thus, the underlying security for the 1985 and 1986 underwriting years of a particular syndicate may differ if Names were lost and added during the year. In addition, many syndicates have been experiencing difficulty in purchasing "reinsurance to close," so old underwriting years have been left open under Lloyds' three-year accounting system. In these "unprofitable" years payments may tend to be slower.

- Unearned premiums detail - for purposes of the slow payer penalty the allocation of unearned premiums to treaties and to underlying reinsurers will become important. Very often, ceded unearned premiums are calculated on an overall basis, rather than by treaty.

For years many insurers have struggled to identify reinsurance recoverables without the additional concern of this new reporting requirement. Special projects to analyze historical losses have been performed in order to recalculate reinsurance recoveries, resulting in the identification of millions of dollars of otherwise lost recoveries. Better reinsurance and underwriting systems are much needed in the industry.

It is difficult to make specific recommendations with regard to systems and to data gathering. However, generally speaking, ceding companies should focus on the following areas:

- Reinsurance systems should be integrated with the direct underwriting and loss systems whenever practicable. This will help ensure the completeness, accuracy, and timeliness of reinsurance management and financial information. This has been difficult in practice because each reinsurance contract is unique and may present some challenging programming problems.

- Fields should be added to the reinsurance billing system corresponding to billing dates and due dates. This data could be extracted from the treaty system, based on the number of days credit given in the treaty. This will facilitate the recoverable aging process.

- Reinsurance accounting systems may have to be better integrated with treaty systems. Accounting may be more efficient if performed by treaty. Treaties could then be converted to individual reinsurers by reference to that particular underwriting year's treaty participants. Thus, information such as unearned premium, could easily be associated with a particular reinsurer and that reinsurer's balances on all treaties could easily be aggregated.

- Companies may find it useful to develop a surplus penalty planning model which could be integrated with the main reinsurance systems. Such a model could be designed to recognize surplus preservation planning opportunities with regard to billing, cash collection, and management of the deterioration of the aging of recoverables.

The information needed to calculate the penalty is secondary to the information needed to manage the company's reinsurance program. The surplus penalty may just be a painful reminder that better information systems are needed.

Section 9

Actuarial Considerations

The aging of amounts recoverable on Schedule F emphasized the actuarial problems related to estimating reinsurance recoverables both in the aggregate and by reinsurer. Inadvertent surplus penalties may result from poorly constructed methods of estimating and allocating IBNR.

Not very long ago, most companies ignored IBNR when recording Schedule F recoverables. Through 1988, it was impossible to monitor the accuracy of estimates of recoverables via the Annual Statement. Many companies were content with a token estimate of ceded reserves. As long as the direct and the ceded estimates were understated by the same amount, there was no impact on surplus. Beginning with 1989, Schedule P now requires identification of ceded case reserves and IBNR for each category and year. The total recoverable on unpaid losses in Schedule F should tie to the ceded reserves in Schedule P - Summary. Ineffective methods of estimating ceded reserves in the aggregate should quickly become evident.

For many companies, the task of translating the aggregate ceded reserve to recoverables for each reinsurer will be a detailed effort requiring a degree of accuracy which is almost statistically unachievable. Companies writing liability coverages with numerous levels of excess reinsurance with different reinsurers on each level will be forced to predict losses that were reinsured because of their lack of predictability. Companies making heavy use of facultative reinsurance will have similar problems.

A. Aggregate Ceded Reserves

The techniques used to estimate the aggregate ceded reserve will depend on the business written by a company and the related reinsurance program. Personal lines companies will generally face a simpler problem than multi-line companies with heavy commercial lines or professional liability exposures. Retroceded business will probably cause the greatest problems. Stable reinsurance programs will have the advantage of meaningful historical data, while volatile reinsurance programs will require separate calculations for each change. The type of reinsurance will usually dictate how the ceded reserve should be calculated.

Quota Share

For a quota share treaty, the problem of calculating a net reserve and a ceded reserve are the same. The loss development patterns for direct, net, or ceded are all identical for a quota share treaty. With a little arithmetic, the ceded reserve can be derived from the net reserve.

Aggregate Excess

Generally, an aggregate excess attachment point will be based on a loss ratio or dollar amount after deduction of other reinsurance. The net development pattern, exclusive of any reduction for aggregate excess coverage, should provide the best statistical base for projecting both net reserves and those ceded to an aggregate excess coverage, assuming that individual claim retention levels have been consistent over the years.

Catastrophe

Direct losses ceded to a catastrophe treaty can be handled like an aggregate excess coverage. The uncertainty for a property catastrophe occurrence should be significantly less than for a liability aggregate excess coverage because of the short reporting lag for property losses.

Excess-of-loss

Excess-of-loss cessions can be highly complicated to estimate, especially if the excess-of-loss retention has changed over the experience period, and if the direct policy limits are considerably higher than the retention. Much of the volatility in direct development patterns arises from the excess layers that are likely to be ceded. Projections based only on case incurred losses are likely to exaggerate ceded losses in years were large losses are present and understate losses in other years. A technique that emphasizes stability of results, such as a Bornhuetter-Ferguson method, generally produces more accurate results.

Facultative

Facultative reinsurance, because it is specific to an individual policy, is even more unpredictable than excess-of-loss treaty experience. Unless facultative reinsurance is used on an entire class of business, it is extremely difficult to improve upon case reserves as an indicator of total ceded reserves. If an entire class of business is ceded through facultative reinsurance then the reserve can be calculated like an excess-of-loss projection.

B. Allocation to Reinsurer

The allocation of ceded reserves related to quota share, aggregate excess, or catastrophe reserves should simply follow the terms of the participation on treaties. However, allocating excess-of-loss ceded reserves can be a great deal more involved. Excess-of-loss treaties are usually divided into several layers with different participants on each layer. There is some room for adjustment concerning the portion of the losses that should be allocated to the higher layers.

The recognition of large losses through case reserves is frequently delayed. Losses which appear similar during early review and discovery may produce significantly different settlements. Most companies have some layers that are penetrated only once every three or more years. For such a layer, should an amount such as the pure premium be allocated to a high layer due to the delayed recognition of large losses? Or should no allocation be made because for an individual year the greatest likelihood is that no specific loss has penetrated the layer? A compromise would seem logical and a Bornhuetter-Ferguson technique provides a reasonable framework. It would make sense to consider the effect on a layer with a participating reinsurer that has triggered the inclusion of IBNR in the penalty calculation. When a calculation has a high degree of uncertainty, its application should retain some measure of flexibility.

Section 7

Other Issues

A. The Effects of Allocated Loss Adjustment Expenses (ALAE) on the Schedule F Penalty Calculation

The rules require that ceded ALAE be excluded from ceded losses and treated separately in the penalty calculation. Ceded ALAE should be excluded from the aging of recoverables, the slow-payer test and the penalty calculation unless the reinsurer is a slow payer. For a slow paying reinsurer, ALAE would be included with all other balances due from the reinsurer and subjected to the 20% penalty.

Practically speaking, many companies do not maintain ceded loss and ceded ALAE data separately. In the old Schedule F, ceded ALAE was a disclosure requirement for balances due from unauthorized companies only. Another reason this information may not have been compiled in the past is that the definition of ultimate net loss includes ALAE in many reinsurance contracts. Separate data would have been needed only if loss expenses were ceded pro-rata on an excess-of-loss contract.

The issue for ceding companies which do not have an accurate segregation of the loss and ALAE will be:

- Should you continue to include the ALAE in the penalty calculation and obtain permission for doing so from your state of domicile? and

- What impact does this have on your penalty calculation and how much incentive is there to segregate the data?

Based on analyses we performed, we believe there are surplus saving opportunities from obtaining the information necessary to exclude ALAE from the calculation. In summary we believe the following generalizations provide the incentive:

- Excluding ALAE will avoid a trigger situation, if one exists, only if the ALAE content in the overdue recoverables is greater than the ALAE content of the sum of nonoverdue recoverables and amounts paid in the last 90 days. The higher the trigger ratio, the greater the differential in ALAE would have to be to decrease the ratio to less than 20%.

- There is no effect on the surplus penalty if the trigger ratio of 20% would be exceeded both with and without ALAE.

- For those reinsurers on Schedule F whose trigger ratios are less than 20% (with or without ALAE) the benefit to be obtained by excluding ALAE is 20% of the ALAE content of the overdue recoverables.

Ceding companies with casualty reinsurance programs and with reinsurers which have not met the slow payer test should consider developing the data necessary to account for ceded ALAE separately.

B. The Impact and Timing of Payments from Reinsurers

Cash received from reinsurers in the 90 days prior to the reporting date may be used to depress the slow payer or trigger ratio. By including these payments in the denominator of the ratio, the effect of the over 90 day amounts may be reduced. Obviously this is only a factor if there are amounts 90 days overdue from reinsurers.

Some ceding companies believe reinsurers are more likely to delay payments until the fourth quarter so that these payments qualify for inclusion in the formula and shield the reinsurer from the slow payer tag. Still other ceding companies may plan collections for the fourth quarter to avoid failing the slow pay test. The incentive to both parties to delay payments until the fourth quarter may cause some insurers cash flow problems.

Coopers & Lybrand has performed various analyses demonstrating the surplus impact of delaying payments until the 4th quarter. The following statements would generally be true:

- The impact of cash received on the trigger ratio will be directly related to the quality of the aging. The worse the aging, the higher the cash receipts required to improve the trigger ratio.

- If the ratio stays above 20%, irrespective of the level of cash received, then the amount of cash received is more important than the age bucket to which it applies.

- If the ratio remains below 20%, irrespective of the amount of cash received, then the cash received provides a surplus benefit only to the extent it is applied to the over 90-day category.

Furthermore, companies should consider whether the receipt of cash from a reinsurer with respect to a recent balance, while older balances exist with that same reinsurer, is adequate support for tagging the older balance as a disputed item. Should it be assumed that cash is generally received from reinsurers and applied to balances on a first-in first-out basis?

C. Future Considerations, A Progressive Surplus Penalty

The Blanks Committee of the NAIC had discussed at one time accelerating the surplus penalty rate depending on the age of the recoverables. This progressive rate structure is premised on the assumption that the older the recoverable, the more likely it is that the balance will not be collected and, as such, should warrant a higher penalty. This logic has been used for many years in developing bad debt reserves for trade accounts receivable. Currently there is no exposure draft or discussion paper disclosing exactly how this would be applied in practice. However, we do not believe that this potential change means the 20% penalty will be reduced; the 20% will probably represent the minimum penalty for the younger overdue amounts and the rate will be increased for older accounts.

Because any change in the current rule is uncertain at this time, it is difficult to discuss its potential impact on ceding companies, except that it will result in a more severe penalty. However one thing is fairly certain; a progressive rate schedule takes away many of the surplus management opportunities discussed in this paper.

As demonstrated herein, under the current rule the penalty could be managed without aggressively collecting overdue amounts. The constant rate penalty can be mitigated by aggressive billing and collection of newer balances depending on whether or not the reinsurer is in the slow payer situation. A progressive rate would obviously provide the incentive to collect older balances first. This is more consistent with the spirit of the new rule, which is to protect policyholders against uncollectible reinsurance.

It would be advisable to consider this possible change when developing systems to gather information and when developing models to help calculate and manage the penalty. Systems and models should be flexible enough to provide for different penalty rates for the various aging categories.

D. Changes in the Market

The reinsurance market has responded in many ways. Some direct-writing reinsurers have been boasting about their ability to pay quickly and have designed entire advertising campaigns around this theme. Some reinsurers have developed products which reinsure ceding companies against non-receipt of overdue items. Presumably, entering into such a contract constitutes constructive receipt, relieves the overdue balance and avoids a penalty. While these products are available, ceding companies should be careful to ensure that such products have been approved as reinsurance by regulators.

Unauthorized reinsurers were thought to have been given a competitive edge as such entities post collateral in the normal course of business, so ceding companies can take credit for ceded reserves. Some industry watchers believe that certain authorized companies with tainted payment histories may now have to follow suit in order to remain competitive.

Some brokers have been criticized in the past for late payments and shoddy recordkeeping. Reinsurance intermediaries with strong backroom operations may be enjoying an advantage over their competitors. Backroom operations that have lagged behind, now have an increased incentive to improve.

There has been discussion in the industry about the potential for slow paying authorized reinsurers to issue LOCs to reduce the reinsured's penalty without paying cash. If a slow paying reinsurer collateralized its entire net balance due to a ceding company, the surplus penalty would be zero. This nuance in the calculation may increase the use of LOCs and care should be taken to ensure that these instruments meet all of the requirements for credit to be taken for them.

END

MR. SKRODENIS: Our last speaker will be Kathryn Broderick representing the legal issues. Kathryn is a partner in the Washington D.C. firm of Preston, Thorgrimson, Ellis & Holman. She devotes the entirety of her practice to reinsurance, concentrating on environmental, asbestos, savings and loan, and other areas currently generating controversy over coverage. She has published extensively in the reinsurance field, and has testified in London as an expert witness on U.S. insurance and reinsurance law.

MS. BRODERICK: Now that Don has given me that nice introduction which was designed to highlight my credentials and impress you all, I have to dispel that by admitting that there is an error in my paper, which I would like you to go ahead and correct because it might cause some confusion. On page 3 in both subparagraph A and subparagraph B, the words "and loss adjustment expenses" should be deleted. The NAIC is, in fact, looking at the idea of including loss adjustment expenses in the penalty calculation, but as my paper and the Coopers & Lybrand papers both make clear, it has not done so up to this time. So I apologize for that confusion, which reflects an error that just didn't get caught in final proofreading.

I've been asked to give the reinsurance lawyer's perspective on the ninety day rule. And I think it is worth bearing in mind that reinsurers, since they are themselves reinsured to at least some degree, we hope, are affected by the ninety day rule both as reinsurers and as ceding insurers vis-a-vis their retrocessionaires. And this is by no means a theoretical dual affect. I would say that I have been asked by reinsurers to institute arbitrations against their slow paying retrocessionaires about as often as a result of the ninety day rule as I've been asked to defend reinsurers who have been noticed by primary and excess carriers at year end, presumably in response to the ninety day rule.

I think we can take as given that we all recognize the rule as directed toward a genuine problem -- that of slow paying reinsurers -- and as intended to accomplish a very legitimate and worthwhile result: "Let's expose the slow paying reinsurers or the no -paying reinsurers so that the competitive marketplace can work its forces and give a deserved competitive advantage to companies that conduct themselves responsibly."

I think, however, that one can question whether the rule, in its present form, is such that those purposes will be accomplished in full without undesirable side effects. And it is probably the case that no rule could be written to accomplish those purposes in their entirety without undesirable side effects. I certainly don't have the definitive answer to the problem, but I think it is worth pointing out some of the respects in which the rule, can be criticized.

The most obvious of those is something that was alluded to in Joe's remarks: the exception from the penalty calculation for items in dispute. As has been made clear in Joe's comments and in the written papers, the dispute has got to be reflected in either a written denial of coverage from the reinsurer or arbitration or litigation. In case there is any lack of clarity on that point, reservations of rights do not count.

Now let me address some of the things that Joe indicated might be of interest. First, the notion of Rule 11 as a deterrent to putting things in dispute in litigation on frivolous grounds, merely to preserve them as collectible items.

Number one, Rule 11 applies only in the Federal courts and many disputes between insurers do not qualify to go to Federal court. Simplifying things greatly, if you've got two companies each of whom is either headquartered or has a principal place of business in the same state, there is unlikely to be any basis for Federal court jurisdiction over that dispute. Some state courts have comparable provisions for sanctioning counsel and their clients for frivolous litigation, but not all do. And Rule 11, per se, is a Federal rule of civil procedure.

Number two, many if not most reinsurance disputes are not subject to litigation at all. They are subject to arbitration. One can argue that arbitrators ought to have the inherent power to sanction parties who file frivolous arbitrations, but I think arbitrators generally are going to find themselves much more reluctant to do so than a judge would be. And not even all Federal judges are that wild about sanctioning people under Rule 11, unless it is a particularly egregious case.

Number three, Rule 11 sanctions, in many instances compared to taking a surplus penalty, are not going to be a significant deterrent. What you are talking about, generally, is being able to recover your legal fees. If you are talking about a truly frivolous case, you probably can get the case dismissed without expending very much in the way of legal fees. A company that is inclined to put things in dispute by filing litigation merely to preserve something as a collectible item is likely to regard Rule 11 sanctions as a cost of doing business. So I really wouldn't hold out much hope for Rule 11 to prevent abuses of the rule.

The other issue that I was asked to address is whether a legal opinion from in-house counsel can serve to form the basis for a conclusion that something is in dispute. Generally, that will probably not work because that, on its face, does not meet the criterion and, of being a written notification from ones reinsurer. I think there could possibly be an exception where you've had a long history of written correspondence with a reinsurer in which the reinsurer has clearly gone on record asserting a generic position on coverage. I think, perhaps, one could conclude that there is really no need to go through the paperwork of restating that position on each and every specific

billing that comes in if the reinsurer's position clearly applies to future billings that raise the same issue. But it is an interesting question.

Well, let's look at why we should even have an exception for mounts in dispute, and whether we should. If the claim is in dispute because the ceding company has filed arbitration based on truly believing that it is a recoverable item and based on a legal opinion that they have got a strong case, maybe there is some basis for treating that differently than something that is merely overdue. But this may or may not be true. The fact that something is the subject of arbitration or litigation -- and I can tell you this as someone who litigates and arbitrates these cases for a living -- tells you nothing about the validity of the claim. It is the easiest thing in the world to gin up an arbitration notice, or even a complaint in litigation, on fairly short notice. If companies are determined to avoid a surplus penalty by these devices, they can easily do so. I think it remains to be seen how strong the NAIC is going to be in insisting that those cases, once filed, be pursued with some kind of vigor. But even cases where people, with all good faith in the world, intend to pursue them to decision, can drag on for reasons beyond the control of the other party.

More importantly, it is entirely possible that when claims are the subject of arbitration or litigation, the reason is because those claims are questionable and, therefore, are perhaps not going to be paid in full. The ninety day rule, of course, assumes that those claims are more likely to be paid in full. But that is just not a conclusion that follows as a strictly logical matter.

That also gets us to one basic problem with the rule. It is aimed at slow payers. It is not aimed, I don't believe, at reinsurers who pay claims they believe they owe, but in good faith assert coverage defenses when they think they have them. But in my view, there is little way to tell, based solely on the schedules, which reinsurers on specific items fall into which group. It is probably easier to defend the part of the rule that imposes the penalty on all reinsurance recoverables from companies that meet the threshold of being across the board slow payers.

There has also been mention of contract provisions being drafted in response to the rule. And I think there are some areas where that does make sense. However, there are some areas where the contract provisions being offered in the marketplace have very little to do with the ninety day rule and the problems that it creates. The classic example of this is a provision imposing an interest penalty on an amount ultimately found to have been improperly withheld. That does nothing to change the status of the amount as overdue and, therefore, leading to a surplus penalty. You may get more interest on it when it eventually comes due, but in the interim there is really no relief from the

ninety day rule simply because you have got an interest penalty provision in your contract. And it's not likely to change the behavior of slow paying reinsurers. If they are not deterred by the prospect of losing an arbitration, they are probably not going to be deterred by the prospect of paying interest.

On the other hand, if the problem is not so much with the reinsurer's payment practices, but with the ceding insurer's reporting practices or with the speed of the intermediary's transmission to reinsurers, than such a provision is particularly useless be cause it does nothing to address those problems.

More productive areas to focus on for individual companies that want to address some of the implications of the ninety day rule would be contractual provisions that are targeted toward the nature of the communication between cedent and reinsurer -- perhaps a more particularized definition of what notice is due, what constitutes an adequate proof of loss, and the like. Most contracts have very general provisions that are not of much help, frankly, when dealing with complex situations such as asbestos and environmental and the other areas that are generating the most difficulty in compliance.

I think you are also starting to see ceding insurers, particularly in the broker market, and sometimes with the cooperation and encouragement of the brokers, do more advance consulting with their reinsurers. Not so much advanced billing, but advanced sessions in which they explain the background of complex losses and how they were settled and try to get questions answered up front.

The stress that these suggestions place on cooperative efforts is no accident. Last year two colleagues of mine and I published an article which we called "Silver Linings in the Ninety Day Rule." That title was meant to suggest that if the rule did what it was supposed to do, it would be good for the industry, and that reinsurers have their part to do by paying promptly that which is owed and abandoning any strategy of delay. But I think that it is important to emphasize, and Joe made this point very well in his remarks, that the ceding insurers' practices may have as much to do with how successful the rule is, and the ceding insurer's quality and timeliness of information transmittal to its reinsurers is likely to be a central component as well.

To sum up, since I know we want to leave some time for questions, the rule is addressed to genuine problems and seeks to accomplish legitimate purposes. If it succeeds it will be a good thing. As it is drafted, it is subject to some criticism, but the jury is very much out on the effect of the rule, and is likely to be for some time. Thank you.

(Applause)

1990 CASUALTY LOSS RESERVE SEMINAR

6F: INTERACTION WITH INDEPENDENT AUDITORS

Moderator

James A. Faber
KPMG Peat Marwick

Panel

Rodney P. Farrell
KPMG Peat Marwick

Richard H. Snader
United States Fidelity and Guaranty Company

Mark J. Sobel
Deloitte & Touche

MR. FABER: This is Session 6F, Interaction with Independent Auditors. The objective of this session is to improve the understanding among those involved with the independent audit of the financial statements of a company, in particular as respects the evaluation of a company's reserves for losses and loss adjustment expenses.

The panelists will discuss the scope of an audit and commonly used auditing techniques. The discussion will focus on areas that usually receive special attention, along with approaches to problem resolution. We will have a status report on the work of the AICPA Task Force currently drafting guidelines for the auditing of loss and loss adjustment expenses.

I am Jim Faber, a Fellow of the Casualty Actuarial Society and principal in the firm of KPMG Peat Marwick. I have responsibility for the casualty actuarial and risk management consulting practice.

The panelists this morning are Rod Farrell, Dick Snader, and Mark Sobel. This session is being recorded. If you have questions, there will be a question session at the end. Please use the microphone. It is not mandatory that you identify yourself, although you may if you desire.

At the end of the session we would ask that you turn in the tickets for credit and also the evaluation forms to the monitor who will be at the door. I should add that the opinions and comments expressed this morning are those of the individuals, not of the firms or companies that they represent, nor the Casualty Actuarial Society or the American Academy or the Conference of Actuaries.

Our format will be that each panelist will make a presentation and at the end we will have a period for questions. Rod Farrell will begin by describing the work of the AICPA Task Force and current relevant accounting literature. Dick Snader will follow with an overview of his company's loss reserving program and its interaction with its auditors.

Finally, Mark Sobel will outline the role of the actuary with the accounting firm, within the framework of the audit; the relationship to clients and the reporting of results.

I might add that there could be one additional dimension to this format, that of an outside consulting actuary retained by a company. A review of that actuary's work likely would be part of the audit program.

Rod Farrell is a Certified Public Accountant. He is a partner with Peat Marwick in New York. Currently, he serves as a deputy to the firm's national practice director for insurance. And, as I indicated, he is a Member of the AICPA Task Force with respect to auditing insurance entities' loss reserves.

MR. FARRELL: Good morning. I guess my role here is to be the token auditor in the discussion of how to deal between actuaries and auditors, and tell you a little bit about what is going on in the AICPA Task Force that has been formed to issue some kind of document to talk about auditing loss reserves.

This task force was formed this year, and I guess to this point has had three meetings. For any of you that have ever been on a task force, you know that three meetings means that you have just gotten started and maybe have an outline. That is about at the stage that we find ourselves right now.

But I wanted to talk a little bit about where we are going, what we have initially envisioned as the product of this task force, and a summarization of the accounting and auditing literature that we are dealing with right now in trying to put this procedure study in perspective of the existing literature.

The objective of the task force is to develop an auditing procedure study to provide guidance to auditors in developing procedures for auditing loss reserves of property and liability insurance companies.

There has been continuing discussion in the committee meetings as to what form this document is going to take within the framework of what the AICPA issues in the way of authoritative literature. An audit procedure study is something that is fairly quickly issued. It requires less review, but at the same time doesn't have much standing in the way of mandatory compliance.

The next level up would be to issue a statement of position which does require compliance, but at the same time takes more levels of review, longer to issue and so we are trying to resolve right now on the task force, in conjunction with the AICPA, is whether we want this document to have authoritative standing and go out as a statement of position, or be issued as a procedure study that does not have authoritative standing.

I think that we are looking at a time horizon, if it is a procedures guide, of maybe by the end of 1991, getting something out. If it is an SOP, hopefully, in our lifetime.

The scope of the document that we are working on, we have set out basically four criteria where we are starting. One, we are going to try to write something that applies to a typical property and liability company writing personal and commercial lines of business.

We spent a substantial amount of time trying to decide what a typical company was. I am not sure we got a complete handle on that, but that is our goal. Also, we hoped that the auditors of companies that have similar types of risk, such as selfinsured enterprises, will follow the guidance that we are issuing.

We are going to exclude things like government insurance pools, accident and health insurers, title insurers, insurers of financial guarantees from the document, and we are starting with the presumption that the reader of this document has already read and is aware of what has come out in the AICPA audit of property and liability audit guide -- Audits of Property and Liability Insurance Companies -- it has just been issued by the AICPA Insurance Companies committee.

So that is kind of our starting point in taking this next step to talk about auditing loss reserves.

The original outline of the document that we put together -over there in red it has chapter numbers and it is very difficult to see.

Chapter One, we are going to have just a general description of the accounting for loss reserves and some reference to the controlling accounting literature. Chapter Two, we are going to talk about establishing loss reserves -- in order that some of the procedures that are followed in establishing loss reserves.

The third chapter will be auditing objectives and planning. The fourth chapter, developing and performing audit procedures, and the fifth chapter will be evaluating the adequacy of loss reserves.

The first chapter I think is pretty basic and we are pretty well along the line of writing that, as far as just a general description of the current thinking for loss reserves. The second chapter has some detail to it.

This is kind of what we are trying to write in the second chapter, talking about the types of business, the different types of lines of business and their impact on the estimation process. The definition of components of loss reserves, the discussion of the estimating methods that are used, the use of specialists in establishing loss reserves, loss adjustment expenses, Schedule P, reinsurance captives and new company considerations.

So we are going to have a section, hopefully in chapter two, that addresses each one of those issues in relation to the establishment of loss reserves.

The third chapter is going to talk about audit risk and materiality. I know that when you start an audit, the auditor, one of the first things you do is establish the risk and materiality limits that you are willing to live with in each area of the audit. We are going to talk about evaluating the control environment, the reliance on internal controls as it relates to the development of the loss reserves.

I will talk a little later about audit risk and materiality and how we are trying to approach that, but that is the objective of

the second chapter -- to kind of lay out what the auditor should do in the planning process for the audit.

The fourth chapter is going to talk about developing the appropriate audit procedures after have you have identified the risk and materiality levels. What level of detail transaction testing should you do, how do you audit the claims data, how do you audit the case reserve, how do you audit the IBNR, the loss adjustment expenses?

What procedures do you actually perform? I don't envision that we are going to try to create an audit program that lists step by step procedures to be performed, but in some detail we are going to talk about at least the things that should be considered from a procedural standpoint in auditing loss reserves.

The fifth chapter then is going to talk about evaluating the adequacy of the reserves. This is where we are probably going to have the most difficulty and the biggest amount of time devoted to this, talking about auditing the estimated reserves, use of multiple estimation processes, development of loss reserve ranges, best estimates, auditor-prepared estimates, independent consulting actuary-prepared estimates. The whole inter-relationship.

Again, looking at it from the auditor perspective of how do you deal with all these different estimates and ranges that are prepared by the company or their consultants. Again, the use of specialists is an issue that we are really have a lot of discussion in dealing with and what kind of guidance or what kind of mandate do we want to set out for the accounting profession as to the use of specialists in auditing loss reserves, and again, in loss adjustment expense reserves. They are basically related.

And, then evaluating changes in environment and how to audit the assumptions, which is really the same thing as far as evaluating the loss reserves, but, again, trying to look at it from the auditor's perspective.

So that is our general outline of what this document is going to look like that we are preparing. The task force has seven members on it that are all partners in public accounting firms and each one of us has basically taken a piece of this and doing the original drafting and then we all get together and exchange copies of what we have drafted and go over it.

So that is really the stage that the document is in at this point; we are all really in the process of making our initial drafting of the sections once we established this outline. So you can see we still have a ways to go.

As far as the existing accounting and auditing literature that we are dealing with, we are trying to make sure that what we issue doesn't conflict with the existing accounting and auditing

literature. Those are really our boundaries, I guess, that we are having to work within at this point. We want to make sure that what we say in this document is consistent with the current audit and accounting literature.

The four major pieces of literature that we are having to deal with is, first of all, FASB interpretation 14. That basically relates to accounting for contingencies. It says that when you are accruing an estimated loss in circumstances where you can reasonably estimate a range of the loss, but where the single amount has the same probability within the range -- the amount could be any number within the range with the same probability -- then the accounting literature says you are allowed to book the bottom of the range.

We find that basically not in practice in the loss reserving, nationwide, and we find that basically unacceptable to us from the perspective of writing this document, of saying that you would establish a range and then automatically book the bottom number of the range. So we are having to figure out how to deal with this existing literature in what we are writing.

The second thing we are dealing with is auditing standards -- statement on auditing standards number 47, which is entitled "Audit Risk and Materiality in Conducting an Audit."

The statement defines audit risk as the risk that the auditor may unknowingly not modify his opinion for a material misstatement in a financial statement. So the definition of auditor risk is that you are going to issue a set of financial statements with a clean opinion on it and there is a material misstatement in those financials.

It defines an error as three things: either the misapplication of generally accepted accounting principals, the departure from facts and circumstances, or the material lack of adequate disclosure. So those are the things we are trying to identify.

It defines materiality as a matter of professional judgment based on the needs of the reasonable reader of the financial statements.

So there is no precise percentage related to materiality in any of the auditing literature. It is based on the auditor's judgment, based on what would be significant to a reasonable reader of those financial statements. It would be information that if it were not there or were misstated would mislead the reader of those financial statements.

So within that context, the statement makes some comments about auditing estimated numbers. One of the statements in 47 -- and I think the people that are standing up are going to have trouble; everybody sitting down is ready for this -- it says that accounts consisting of amounts derived from estimates pose a greater risk than accounts derived from routine factual data.

Now that is just revolutionary thinking. It goes on to say though that since an accounting estimate is not something that can be considered accurate with certainty, that the auditor must recognize the difference between an estimated amount best supported by the evidence, and the amount included in the financial statements.

So it presumes that the amount in the financial statements is not the one that is best supported by the evidence. It says that difference can be reasonable and acceptable. Again, we are back to the auditor's judgment as to what is materiality.

But, if in the auditor's judgment, the amount that is best supported by the evidence is different from the amount in the financial statements to a level that is unacceptable, then you have a likely error and you are going to have to deal with that.

So I think what we see from this language, from the perspective of the task force, is that this standard tells us that there is a range; that there is an acceptable range in which a number can be in a financial statement if it is within a range where it is acceptable and the number can be in the range where it is not acceptable.

It really all comes back to the auditor's judgment and the materiality. Again, the materiality from the perspective of the financial statements in total and not the materiality in relation to just the loss reserve number. We are auditing and giving an opinion on the financial statements in total, not on the loss reserves.

We always have to keep that perspective in mind.

The next pronouncement that we are dealing with is statement on auditing standards 57. The title of that is "Auditing Accounting Estimates". This one is pretty specific and I think for the most part can be applied to auditing loss reserves.

We are going to try to take some of the steps in there and tailor them specifically to how they would be applied in the environment of auditing casualty loss reserves. But it gives the auditors basically three steps that must be performed in auditing an estimate. Either each step should be performed, or some combination of the three steps.

Step one is to review and test the process used by management to develop the amount in the financial statement. So review and test management's numbers is the first step. The second step is to develop an independent estimate to corroborate the number that management has developed, and the third step is to review subsequent events or transactions occurring after the year-end that could affect the number.

I think the general attitude of the task force at this point is that step three is probably not very useful in the auditing of loss reserves. For the most part, especially with public companies there is not likely to be enough occurrence between the year-end and the time we have to sign the financial statements to give us a whole lot of further input on the adequacy of the loss reserves.

So we think that step three is probably not something that is of major significance. Obviously you have to look at it to see if there are any elephants walking through there, but other than that, it is not going to tell you a whole lot.

So we are focusing more on steps one and two. The SAS goes on to further develop step one, as far as the process of reviewing and testing management numbers, and it lists nine possible procedures to be performed -- or to be considered in the step of reviewing and testing management's number. I assume all of you have the hand-out.

I am not going to insult your intelligence by reading all nine of them there. But it basically lists out what you should do. You should look at the supporting date. You should look at the development of the assumptions. You should look at the historical data that -- everything, basically, that the company has used to develop that number, you go in and review and test it.

And, again, there is step number eight down there that says consider the use of a specialist regarding certain assumptions. That is the language that is directly out of SAS 57 and it refers to SAS 11 which is the last one up here -- the auditing standard that deals with the use of specialists.

So we get through 57 and we hit this step right and then we shoot over to SAS 11. SAS 11 says that an auditor is not expected to have the expertise of a person trained in another profession or occupation.

So there is not the burden on the auditor that we are allknowing in every area. It says that the auditor may choose to involve during the examination a person that possesses the necessary special skills to assist the auditor in issuing his opinion.

The cases where that is real clear-cut is if you are auditing a jewelry company and the company tells you that those diamonds are real -- I don't know whether they are real or not. I can't tell the real ones from the fake ones so you go out and get your own gemologist and come in and have him tell you that those diamonds are real and what the value of them are.

We are trying to take that and applying it to the loss reserve scenario. The statement says that the auditor may use a specialist to develop evidential matter, that the auditor

honestly must satisfy himself as to the professional credentials and qualifications for the specialist, and that the auditor should attempt to get a specialist that is unrelated to the client although under certain circumstances it is acceptable to use a specialist that has a relationship with the client.

But, if you use a specialist that has a relationship with a client you have to do -- or consider performing additional procedures to make sure that the person has fulfilled their specialist responsibility, and that the auditor must have an understanding of the assumptions and the methods used by the specialist in determining the specialist's findings.

So, needless to say we spend a lot of time going around applying this issue to the auditing of loss reserves and to what constitutes a specialist in the arena of auditing loss reserves, what constitutes the level of understanding that the auditor must have of what the specialist does, what do they mean that the specialist shouldn't have a relationship with the client.

Those are the kinds of issues that we are trying to deal with and quite frankly don't have an answer to at this point. It is difficult to try to write something on those issues that address all the possible circumstances of the different people that could be involved from the client's standpoint in establishing the loss reserves and for us to get an independent audit of that number.

So we have another meeting -- we have two more meetings scheduled in this calendar year and, you know, maybe by sometime in 1991 we will have a procedures study out that the industry --the public accounting industry can use to audit loss reserves.

MR. FABER: Thanks, Rod. Our next speaker is Dick Snader. Dick is a Fellow of the Casualty Actuarial Society. He is vice-president and corporate actuary of USF&G in Baltimore, and head of the corporate actuarial department. One of the, primary responsibilities within that department is loss reserving.

As many of you know, Dick has been active in the CAS and the American Academy. He has served as vice-president of administration of the CAS, has been a Member of the Board of Directors, and has served on numerous committees.

He is just beginning a term as secretary and a member of the executive committee of the American Academy and has served as a member of the Board and also on various Academy committees.

MR. SNADER: I am going to give an anecdotal presentation which will consist of a description of USF&G's relationship with its auditing firm as that relationship has developed over the years.

I have been working at USF&G for 25 years. During that time we have only had two auditing firms. They have both worked pretty much the same way so I can't tell you whether our experience is

typical or not. I am going to tell you how things work at USF&G, but I don't know how things work at other companies.

We have a very good working relationship with our accounting firm and with our accounting firm's consulting actuarial staff. It is a professional relationship. by that I mean it is cordial without being cozy. It is carried out in an independent arm's-length way without being adversarial.

Some general comments are in order about the way our audit is conducted. The audit is controlled by the accounting personnel in the Baltimore office, while the actuarial work is performed by actuarial consultants working out of another office. The accounting personnel consists of a managing partner for the Baltimore office, an engagement partner, a senior manager and numerous individual auditors.

The managing partner is the person who is responsible for all activities of the office, not just USF&G's audit. For USF&G's audit we have an engagement partner who is the accounting executive in charge of the USF&G audit.

The senior manager is responsible for the day-to-day coordination of the audit. This person is on site throughout the audit at year-end and also is on site frequently throughout the year. He is the individual that we, in the corporate actuarial department, have the most contact with throughout the year.

There is also a partner in charge of the insurance practice for our auditing firm. This individual is not located in Baltimore. He is located in another office but he specializes specifically in insurance and is available to aid the Baltimore staff with any problems or issues that they might encounter.

At the bottom rung is an army of individual auditors who appear at year-end. Most of them seem to have one year or less of experience.

The actuarial consultants, as I mentioned, work out of another office. The senior actuary is a principal of the firm and he has working for him other actuaries and students. Our primary contact is with the senior actuary. Our contact with the other actuaries seem to be incidental.

The purpose of the actuarial review is two-fold. First, the engagement partner must be satisfied that reserves are accurate, or at least within a reasonable range in order to conclude that GAAP accounting results have been fairly stated.

Ordinarily, the engagement partner could not accept a significant misstatement. Materiality however is a very important consideration and loss reserves is just one of many issues. For example, our department is involved with the calculation of retro-reserves, premium reserves (including that peculiar type of

premium reserve known as earned but not recorded, or EBNR), the valuation of salvage and subrogation, In addition to these items there is a whole host of other accounting issues that are not related to actuarial calculations.

The second purpose of the actuarial review is for the benefit of USF&G management likes to have an independent loss reserve opinion for statutory purposes. The consulting actuaries are, in a sense, satisfying two engagements with one review. First, for the auditors as part of the overall audit for GAAP purposes, and second, for USF&G management for the statutory loss reserve opinion.

We have a very distinct division of labor. USF&G staff actuaries calculate the reserves for reporting in the annual statement. So it is our numbers that appear in the statement. Consulting actuaries perform an independent evaluation, but use the same data base as staff actuaries. The accountants perform the audit functions.

I would like to clarify that a little bit, at least as it pertains to loss reserves. First of all, the accountants make sure that all components of the loss reserves are present and accounted for.

For example, they assure that reinsurance recoveries are properly recorded, that there is a reserve present for residual market pools, that reserves for other pools and associations are recorded and so on. They then must make sure that the reserve data base has been correctly compiled, and they must make sure that the data base accurately represents what it purports to represent. Finally, they make sure that all data adjustments are explained and accounted for.

The principal reserve components at USF&G are a reserve for primary business, reserves for reinsurance business, reserves for residual market pools and reserves for other pools. Primary business reserves consist of field reserves and bulk reserves.

Bulk reserves consist of an IBNR reserve, a case supplement and loss adjustment expense both allocated and unallocated. All bulk reserves are evaluated using an accident year data base. The accident year data base is summarized at a fairly high level from the underlying systems, but computer access to considerably more detail is available.

Numerous adjustments are made in the data base. Some examples are special handling for certain specifically reserved claim situations, and adjustment for structured settlements, an a one-time adjustment to compensate for the divestiture of our Canadian subsidiary, and numerous other adjustments.

The auditors are given a hard-copy version of the reserve data base. They must be aware of all adjustments and must have information that supports them and explains why they were made.

The auditors are not required to make the same adjustments as staff actuaries, therefore, they must have the ability to include or exclude adjustments as they see fit.

The review cycle at USF&G is quarterly, that is to say, bulk reserves on primary business are evaluated every quarter. In making this evaluation, we attempt to project the value of reserve needs for the next year-end. Our first projection is made immediately after the close of the previous year-end.

So, for example, the first projection for year-end 1990 is done with data that is available to us through the fourth quarter of 1989. This projection results in a target reserve and subsequent quarterly reviews result in revisions to the target. Projected target reserves must be met by some combination of field reserve increases, IBNR increases or increases the case supplement.

Field reserve increases occur naturally as a result of claim activity. It is managed by field adjustors. IBNR varies with exposure.

The case supplement is used to make up for any shortfall in field reserves and IBNR. Of course, it is monitored throughout the year.

The auditors review all of our quarterly reserve calculations and share the information with their actuarial consulting staff. The consulting actuaries do not actually begin their independent review until after the data base has been updated through the second quarter of the year.

This is the auditing firm's first cut at a year-end projection, while our first cut took place six months earlier. A preliminary analysis is done by auditing staff using a software package, and then their actuarial consultants make a more refined evaluation.

The consultant's evaluation is then reviewed by USF&G staff actuaries with the objective of reconciling differences. The consultants then independently present their conclusions to top management.

The process is repeated after the third quarter update, but with this update the consulting actuaries conduct a more indepth analysis of the data. This review also includes interviews with underwriting executives, claim executives and pricing actuaries.

At this point, more emphasis is placed on reconciling differences. After the third quarter update, USF&G actuaries try to nail down all the major decisions for year-end, such as what the IBNR factors are going to be, what the loss adjustment expense factors are going to be, and so on.

For USF&G the third quarter update is a final update before closing the books. At least it is the final evaluation of our

ultimate losses. The auditors can take one more look after the books are closed for the fourth quarter.

But at that time, USF&G is committed to decisions that were made prior to the fourth quarter update, and the staff actuaries are in annual statement I think of as production mode. The consulting actuaries have the luxury of enough time to conduct a final review.

Although we both use the same data base, we don't use the same methodology. The evaluation procedures are similar but not identical and therefore results are usually different.

There are instances where we may disagree on methodology or on underlying assumptions, but the consultants are not trying to reproduce our results. They are trying to make an independent evaluation and satisfy themselves that our results are within a reasonable range.

When this occurs, then they can render an unqualified loss reserve opinion.

The consulting actuaries are not confined to primary business. They also review reserves for our reinsurance segment and make and make sure other reserve components are compiled and accounted for correctly.

Incidentally, reinsurance reserves at our company are calculated by the actuarial staff of our reinsurance subsidiary, F&G RE, which is located in Morristown, New Jersey.

One disconcerting aspect of this procedure is that the consulting actuaries frequently finish their reserve reviews before we do. The reason for this is that we conduct rather extensive data investigations and very detailed and timeconsuming analyses of current trends and conditions, while their process tends to be somewhat more mechanical.

As a result, we have to spend a good deal of time reviewing their procedures and providing them with of explanations when indications are considerably different.

One thing I would like to touch on briefly is what happens when the consulting actuaries do other assignments for us. For example, in addition to working on the audit, per se, the consulting actuaries are occasionally asked to take on other assignments in connection with reserves.

A recent example involved structured settlements where we asked them to help us evaluate the impact of structured settlements on payment patterns. We write a large volume of structured settlements through our life insurance subsidiary.

They must be very careful, and we must also be careful when engaging in assignments. We have to avoid putting the auditing firm in the position of auditing its own work. So far we have maintained a pretty clear-cut distinction between their advice and the way we use it.

Because we don't always accept their conclusions as gospel, or adopt their suggestions without modification, they are free to challenge the assumptions and procedures we finally implement.

With that, I think my part is concluded.

MR. FABER: Thank you, Dick. Our third panelist this morning is Mark Sobel. Mark is a Fellow of the CAS, also a Fellow of the Conference of Actuaries. He is a principal in the firm of Deloitte and Touche, in Hartford, and serves as the national director of the Casualty Actuarial and Risk Management Consulting Practice for the firm.

Previously, Mark was the vice-president and actuary of Independent Actuarial Services, served as the chief operating officer of Integrated Risk Information Systems and was employed in various positions by the Aetna Insurance Company.

MR. SOBEL: Thank you, Jim. Good morning. When Jim first called me and asked if I would be interested in being involved in a panel entitled "Interaction with Independent Auditors", my first reaction was a little internal chuckle. Because my first thoughts turned to an AICPA task force, some of you may be aware of, called Relations Between Actuaries and Accountants.

Whenever I think of that task force or read about it, or see any of its results, I just can't help but think about a bunch of anthropologists kind of sitting around doing some esoteric studies on the mating habits of two different professional species, actuaries and accountants.

But whether we are talking about relations between actuaries and accountants, or interactions between actuaries and accountants, the fact is that communication between actuaries and accountants is a vital part of auditing the loss reserves of any property casualty insurance company.

In any event, as you can all guess after I went through some of my own internal ramblings, I did accept Jim's invitations and I am happy to be here with you all today.

Actuaries, being the elitists that we often think of ourselves as, are sometimes loathe to admit that there really is an awful lot of similarity between what we as actuaries and our fellow auditors often do in terms of our perspective and our procedures and processes vis a vis looking at insurance companies' loss reserves.

But deep down inside all of us actuaries know that we really all wanted to be accountants but just didn't quite have the personality. It is an old joke and I am sure you have all heard it.

In any event, my job during the next few minutes is going to be that of giving you a little bit of the perspective on what we do as actuaries, who are part of the audit team. What is the process that we go through, how do we work with the auditor in terms of analyzing the loss reserves of a property casualty insurance company.

You have heard a little bit -- well, more than a little bit -you have heard quite a lot from Dick Snader as to how that process works with his company, in particular. What I would like to do is give you a broader perspective in terms of the different approaches that different companies may have, or that different auditing firms may take with regards to different insurance companies.

I think something that will make this task a little easier for me is, I am going to coin a new term that I think will help in the presentation. We have a lot of different actuaries floating around. We have actuaries who work for insurance companies. We have what I would refer to as outside consulting actuaries, which I would like to define as actuaries who are not part of the audit team. Dick was using the term consulting actuary to refer to the actuaries as part of the audit team.

I would like to use that term as it relates to only actuaries who are independent of the insurance company itself, and independent of the auditing team. I would like to finally define the actuaries who are a part of the audit team -- I would like to call them "actuaries as a way of kind of reflecting what their role is in this process. So when you hear me use the term actuary and I will use it quite a bit, I am talking about those actuaries who are part of the audit team and employed by the accounting firm itself.

The process that the actuary goes through is fairly simply stated: the process is one of assisting the auditor who does have primary responsibility for the audit, assisting the auditor in helping to reach an audit opinion as to the financial condition of the insurance company.

Now clearly, probably the major part of the audit is in getting some degree of comfort or discomfort with the level of loss reserves that are booked. So the actuarial review of the loss reserves is a major component of the audit. I think most auditors will tell you that that consumes the most amount of time of both the audit staff and the actuarial staff.

The general process that one goes through is, in advance of beginning the actual engagement, the actuary and the auditor will

generally sit down together, discuss the scope of the audit. Usually the presumption is it has been a recurring engagement. It is not the first time that the firm is auditing the company, in which case the process might be a little different.

But, in general, this audit has been done for a number of years, and in advance of each year's audit the actuary will sit down with the auditor, and discuss the scope of the engagement. You heard Rod talk about materiality as a consideration, and the particular lines of business that may or may not be reviewed will be discussed. The lines of business that will or will not be reviewed will be discussed, and any of the associated issues that the auditor feels are necessary to be reviewed by the actuary will be discussed as part of the scope of the audit engagement.

The actuary will also play an important role in the process of giving perspective as to what the actuary feels are the exposure areas for review. Sometimes there may be a relatively small line of business in terms of premium volume which the auditor may view as relatively non-material, relative to the entire audit, whereas the actuary may have a perspective on this particular line of business, or program that may change the auditor's perspective in which case the line of business might be reviewed.

But in any event, the end result is some general scope is determined between the actuary and the auditor.

Usually there are going to be three different types of situations that the audit firm may find itself in when it is looking at a particular insurance company. Number one, the insurance company may not have any in-house actuarial staff.

Generally, it is going to be for the smaller insurance companies; there are certainly lots of insurance companies that still do not have in-house actuaries. I am also going to assume that in that situation the company, in fact, has not engaged any actuaries on an independent basis -- any consulting actuaries.

So when the auditor is going in and reviewing the reserves of this particular company, there is no bona fide or actuarial study that is available to the actuary or the auditor in terms of looking at this company.

The second situation is the one we have in Dick's company, where there is a large actuarial staff, in-house actuarial staff that spends a fair amount of time in analyzing its own company's loss reserves.

The third situation would be where a company doesn't have any in-house actuary and engages the services of an outside consulting actuarial firm to analyze its loss reserves.

In some cases, a company may have in-house actuaries that do a loss reserve analysis each year but may, in addition, go out and

hire an outside consulting firm, as well. In which case, there are two actuarial studies available to the auditor.

In the latter two cases, where there is either an in-house actuarial study and/or consulting actuarial studies, these studies will generally be one of the criteria, that top management will use for purposes of establishing the year-end loss reserve.

One of the things I should also mention is that up to this point my comments are predicated upon the assumption that when the actuary goes in as part of the audit team to review the loss reserves of the insurance company, the actuary has not been independently or separately engaged by the insurance company to do any actuarial work.

The engagement is for the accounting firm to audit the insurance company. Now, as Dick mentioned, at times the actuary will be asked to provide certain additional services related to loss reserving, or perhaps other non-related actuarial projects. But my perspective right now is when the actuary comes in as part of the audit team, there is no separate understanding that the actuary will provide any additional services.

Now that is changing considerably, and particularly in the last year because of the new NAIC requirement for statements of actuarial opinion in 1990. I want to talk a little bit more about that later.

But in any event, getting back to those three situations that I discussed before, how might the auditor/actuary go about looking at the loss reserves? In the cases where there is an actuarial study available to the actuary, either by an outside consulting firm, or by the in-house actuarial staff. I would say more often than not, assuming the actuarial studies provided to the actuary are considered to be credible actuarial studies performed by credible actuarial firms, more often than not the actuary will concentrate on reviewing those actuarial studies as contrasted with doing an independent actuarial study.

Now, Dick's situation is apparently different where in addition to the in-house study that is done by his staff, his accounting firm will do some independent testing. As I said, there is no rule of thumb, necessarily, and that is certainly appropriate. But I would say more often than not, if there is an outside actuarial study available, it is simply reviewed by the actuary.

As part of that review, some independent testing may ultimately prove to be necessary. Again, it depends upon the degree of thoroughness of the actuarial study, whether or not the auditor believes that it covers the material parts of the loss reserves, and can give the basis upon which enough of a degree of comfort can be placed for purposes of rendering an auditing opinion.

If a credible actuarial study does not exist -- and that is generally going to be more often the case when there are neither actuarial studies available from in-house or outside consulting actuaries -- the typical example is that the loss reserves of the company are established based upon some kind of an ad hoc study that has been done by the CFO, for example, or by the accounting staff. That is the basis of how the loss reserves have been booked.

Then, generally, the actuary will get involved in a fair amount of independent analysis, independent testing of the loss reserves.

I would say if there is a difference between the focus of an actuarial and an actuarial review, the difference is that an actuarial review is generally used as the basis for establishing and setting loss reserves by the insurance company. The actuarial review is a posteriori approach after the reserves have been booked for purposes of testing them vis a vis the audit.

The end result of the two studies is usually the same; some kind of a reasonable range or recommended range of loss reserves. But the focus is different; one is an a posteriori study, one is a posteriori study. That really is, in a very abbreviated fashion, the basic process that an actuary will go through in terms of trying to evaluate loss reserves and what some of the things are that he or she might look at.

What gets interesting is what happens after the studies are concluded. The result that we hope for is that the actuarial review will come up with a range of reserves within which the company's booked reserves generally fall in which case everybody is happy and we go on to the next engagement. At least the actuary does, and then the auditor still has to grapple with whatever other issues he or she may be dealing with.

Oftentimes, as you can well imagine, we may have a difference of opinion with the booked reserves of the company. The process that normally then occurs, if we have a difference of opinion with the booked reserves of the insurance company, is that the actuary will communicate back to the auditor, and say, Rod, we think we may have a problem here. We either have a problem with the outside actuarial study that was done, the in-house actuarial study that was done or the in-house study that was never done but the reserve was booked by the CFO.

In any case, the point is we go back to Rod and say we have a problem here. Generally, there will be some discussion about where the problem is. Is it a particular line of business, why do we think it is occurring? Just a general communication between auditor and actuary as to what is happening, what are the issues, with hopefully a game plan as to how then to approach the issue of potentially reconciling the difference.

Usually what will come out of that conversation is follow-up work on both sides of the table. Now if there has been an outside actuarial study done by an independent consulting firm, or an in-house actuarial study that is done, generally there is going to be a meeting of the minds.

I shouldn't say a meeting of the minds, but there will be a meeting whereby the actuary will review his results with the other actuary, for purposes of at least indicating areas where there are disagreements, and both actuaries -- actuary and actuary -- will then go back, typically, and rework their numbers based upon new information that has come up in that meeting -- issues that maybe one party was not aware of that the other was, misunderstandings about the particular nature of the book of business; whatever additional communications that there typically are in situations like that that can shed additional light on the process.

The parties will go back and rework their numbers, and potentially get closer together. Assuming they do get close enough together to reconcile the differences, we all get happy. If we can't reconcile our differences, then either we agree to disagree or sometimes a third party might be brought in to help arbitrate, do another independent study. But at that point, all bets are off and there is no definitive process as to what will occur then.

The auditor may choose to give a qualified opinion. The auditor may get fired. We don't know what will happen.

I want to talk about a couple of the interesting issues that we, as actuaries sometimes get involved in when we are looking at the reserves of a particular insurance company and (inaudible) these are all issues that will be addressed by the task force that is a part of. I will look forward to their recommendation, hopefully sometime in my life.

I want to talk a little bit about the issue of independence. Dick talked about how as auditing firms, we have to be very careful that we are not auditing our own results. I always have a little bit of difficulty putting that in perspective sometimes.

We know that as actuaries we cannot tell the insurance company what loss reserves to book. We cannot, in advance of the company establishing a provision for its loss reserves, tell them to book $100 million and then audit the $100 million. But what we do often get involved in are situations where the company will book $80 million. We will then go in and review the loss reserves, do our actuarial analysis, go back to the audit partner and tell him, you know, we really think reserves ought to be $100 million. We think the $80 million is a little bit off.

The auditor may agree with us, may disagree with us, but assuming that the auditor agrees with the actuary's analysis and feels

that the issue of booking the additional $20 million is material and important, the auditor may push for a booking of some additional amount with the understanding by the client that unless they book some additional amount, an unqualified audit opinion may not be forthcoming.

If the company then does go ahead and books some additional amount -- perhaps it is not the full additional $20 million, but it may or may not be -- if the auditor then gives an unqualified opinion based upon the new provision as established by the company, are we in fact independent of that estimate?

I think that is a difficult issue that we tread very lightly on and one that I know the committee will be looking at.

Some of the other things that the committee will be looking at that we deal with all the time as actuaries particularly insofar as giving independent actuarial statement of opinions are what is a reasonable range of reserve results? I think we pretty much all tend to feel comfortable if reserves are within five percent of our best estimate, but none of us really knows exactly what to do once we get beyond that point.

There is a lot of judgment, a lot of additional issues that get looked at. We, as actuaries, in fact, have a more difficult time dealing with that issue than the auditors do. This is going to become -- this is going to come back to the actuarial profession I think with a vengeance in 1990 as every property and casualty insurance company is going to need an actuarial statement of opinion.

Some of you may also be aware of the fact that the Minnesota insurance department has a statement of position, 88-1, that beginning in 1990, and every three years thereafter, requires every property/casualty insurance company, with some restrictions, but generally every property/casualty insurance company to have an independent actuarial statement of opinion on its loss reserves.

In other words, it is an opinion that cannot be provided by an actuary employed by the insurance company.

One of the provisos of that statement of opinion from Minnesota says that if an actuary, or an actuary participates -- is a part of the audit team by the independent accounting firm, then that in and of itself satisfies the spirit of the regulation. That actuary may not in fact have to even issue a stand-alone statement of opinion.

The difficulty that we as actuaries have, and some of you may have read a paper that I wrote about this a couple of years ago -- the difficulty that we as actuaries have in giving an actuarial statement of opinion is the very narrow focus that we are restricted to. If you read the literature, we as actuaries

must restrict ourselves to looking only at the loss and loss expense reserves.

We are not supposed to look at the financial condition of an insurance company in determining whether or not we can give an unqualified opinion as to the loss and loss expense reserves of an insurance company.

So if you read the literature, very straight-forward, what we are supposed to do is look at the loss reserves that are booked, look at our best estimate of loss reserves and based solely upon that, determine whether or not we feel that the loss reserves make a good and sufficient provision.

We are not allowed to look at the fact that the company may have a very, very strong financial position. It may have lots of surplus and could easily fund some reserve deficiencies -just pushing some accounts around a little bit.

We are not allowed to look at the general balance sheet strength of the company. We are not allowed to look at the going concern nature of the company. We are not allowed to look at any of the other things that an auditor will typically look at in arriving at an overall opinion as to the financial condition of an insurance company.

I think we are going to see some very interesting situations in 1990 where the actuary as a part of the audit team, will be approached by the insurance company to issue the actuarial statement of opinion. That is a very natural thing for many insurance companies to do.

They have had an independent accounting firm that has given them an audit opinion for many years. Let's assume an unqualified audit opinion. They will now go to that auditing firm and say, hey, I need this actuarial opinion for 1990; could you folks provide it? With the almost implicit assumption that because an unqualified audit opinion has been given all these years, that it ought to be a no-brainer to provide an unqualified actuarial opinion.

Now that unfortunately may not be the case. There may be situations where the actuary for a variety of reasons may have some level of discomfort with the loss reserves. Again, when viewed from that narrow focus. Whereas, the auditor, and appropriately so, has no difficult in giving an unqualified audit opinion based upon the financial strength and condition of the overall insurance company.

I think we are going to see a lot of interesting situations in 1990 as a result of this new requirement. There are going to be some difficult transition issues -- very difficult I think for a firm like ours to be able to go back to a client and say -- oh, by the way, we can't give you a clean actuarial opinion, but we can give you a clean audit opinion.

Now that doesn't mean that the insurance company could go out and necessarily find any independent actuary that would give them a clean actuarial opinion, but I think politically it is a little more difficult when it is the auditing firm that says -fine on the audit and we are not so sure on the actuarial side.

As I also said before, the actuary as part of the audit team, or the actuary, will oftentimes limit his scope to issues that are deemed to be material to the audit. I said that my comments were predicated primarily on the assumption that the actuary had not been separately engaged by the insurance company to provide a statement of opinion, but that the actuary was really only a part of the audit team.

Once the actuary is engaged to provide an independent actuarial statement of opinion, then the scope of the actuary's work has to change, or perhaps has to change. But at that point the actuary needs to make sure that he or she is doing enough work so that he or she personally is comfortable with having done enough work to provide that independent actuarial statement of opinion.

No longer is doing enough work to satisfy the materiality considerations of the auditor, solely the governing factor. There are going to be a lot of issues like that that are going to be coming up during 1990 that I think will be interesting to work through.

In closing, I just want to refer you back to something that I said at the beginning of my remarks, relating to the differences and similarities between actuaries and accountants. I oftentimes think of the story that I think is very good in terms of reflecting a little bit upon the different perspective that the actuary and the accountant sometimes have in the way they look at the world.

The story goes about the actuary and the accountant, each of whom had the task of measuring the height of a flagpole that was in front of them. The actuary had the luxury of going first and decided that he would be very clever about how he would measure the height of the flagpole and use his trigonometry, because he knew the accountant couldn't do trigonometry -- and using this he got a bead on the angle, the Sun, and the angle of the shadow of the flagpole. He got a bead on that and he measured the distance between where the shadow hit the ground to the base of the flagpole, and he looked at the tangent of the angle and he did this and that, and he came up with an estimate that the height of the flagpole was 47 feet.

Well, the accountant kind of scratched his head a little bit and said, boy, how am I going to top that? Measure the height of this flagpole. Thought about it for a minute and took out of his back pocket a little army surplus knife that he had and he actually sawed off the flagpole at its base and laid it on the ground end to end.

Then he took out of his other pocket a tape measure, measured that flagpole and came up with 49 feet. The actuary just looked at the accountant and he said, boy, I will tell you, isn't that just like an accountant? We were asked to measure the height of that flagpole and he measured the width.
(General laughter.)

Thank you, very much.

MR. FABER: Okay. We do have some time for questions, if there are any, and if you would please use the microphone.

QUESTION: The new reserve opinion, with it's March 1st deadline, more or less eliminates the consideration of year-end data by an outside firm within the time constraints involved. How will that impact the flow -- I am addressing this to either Richard or Mark, whoever would care to respond to that.

MR. SNADER: I will respond with respect to my company. I don't think it is that much of a problem to render the opinion by March 1st using year-end data for the consulting actuaries. They currently are able to take a look at year-end data in time to give the auditor's comfort before the release of earnings at the end of January. So they can certainly make the March 1st deadline for filing the statutory opinion.

MR. SOBEL: I think Dick is in a very fortunate position of having his auditors do quarterly analyses. They obviously do a lot of work and the timing issue may not be as critical for his company. I think in general it is going to be a significant challenge for firms like ours to meet the requirements.

We were very disappointed that the date was March 1st, as opposed to, say, June 30th, which is what New Jersey did when they put the requirement in. A lot of third quarter analyses are going to have to be tried to be done. We have been looking at the issue.

Just in our firm alone, we have about 125 insurance audit clients in the firm. We have about 12 senior consultants and a variety of support staff to handle that. But nevertheless, you are still trying to compress an undoable amount of work into too short a period of time unless you do something using third quarter data.

I also suspect that there are going to be a lot of late opinions in this first year.

MR. SNADER: There is another consideration, I think, with respect to the accounting firms. The audits of publicly held companies are generally done early on because there are early sign-off dates that are required. On the other hand, when you look at non-publicly held companies, (mutual companies and so on), the audit work for those companies often is not done until well after the annual statement itself is filed.

If the actuary for the accounting firm were to render an opinion, he or she would be doing so prior to any audit work being completed on that particular company.

QUESTION: Mark, I would like to ask a little more on the Minnesota requirement. Is that for domestic companies only, and would you clarify again about when the audit report could satisfy that requirement?

MR. SOBEL: I am not sure, Bill, if it is just for domestic companies, or not. The last time I looked at it I believe it is for any company licensed in Minnesota, regardless of whether they are writing any business in Minnesota.

As originally written, it also only applied to companies that had at least one-third or more of their premium volume in Schedule P lines. Now that was before the annual statement got revised and everything is in Schedule P now. But I assume that the appropriate interpretation is that the old lines from Schedule P, if they constitute more than one-third of the premium, then you are bound by the reg.

As far as how it relates to the audit opinion, there is a proviso in the SOP that says that if the statement is made by the auditing firm that a qualified actuary was a member of the auditing team, then that is deemed to satisfy the regulation which implies, if you read it technically and literally, that an independent actuarial statement of opinion is not necessary if an actuary has simply been part of the audit team.

Now in conversations that we have had with various people inside the Department of Commerce in Minnesota, we have been led to believe that while that would satisfy the technical reading of the SOP, that the spirit of the SOP is such that the actuary should -- if the actuary is part of the audit team and does not issue an independent statement of opinion, that the actuary should at least have done enough work so that he could have issued an independent actuarial statement of opinion.

If I remember correctly, the filing date for that is June 30th.

QUESTION: In practice, how often are there differences between companies and accounting firms? Is that a frequent occurrence, seldom occurrence? And, also, over the years, has that trend been increasing, decreasing or staying about the same?

MR. SNADER: I can speak from our standpoint. Our results have been fairly close over the years, at least over the recent years. It is somewhat strange though. We might arrive at similar overall, results but differ quite a lot by line of business. We find ourselves questioning each other on such questions as why they are higher than us on worker's comp and why we are higher than them on general liability. We try to reconcile these anomalies but usually without too much success.

The use of a range has been mentioned and our consulting actuaries consider a range of possible outcomes We don't come up with the exact same expected value, but we always manage to fall within a range that is acceptable to their actuaries.

MR. FARRELL: I don't know about the frequency of occurrence of that. I think it is not unusual for there to be differences. Again, as Dick said, there can be differences by line that the audit firm can get happy that the reserve in total is adequate. We try to resolve the detailed differences as best we can.

But I would say it is not unusual for differences to occur and even in total, I think that Mark's description of the follow-on process was very good. It has been my experience that that follow-on process generally goes up until whenever the deadline is to sign the audit report and then a decision is made.

But that is not an unusual circumstance.

QUESTION: I am the actuary for the Washington Worker's Compensation State Fund, which is referred to as a monopolistic state fund. We call it an exclusive state fund. We are not necessarily subject to statutory accounting principles.

We are required to remain solvent in accordance with recognized insurance principles, whatever those are. One of the subjects that has been discussed here quite a bit today in other sessions is risk margin, discounting of reserves; how do you allow for adverse deviations, is it above or below the line?

I have been subjected to just about whatever the auditor thought was appropriate himself, based on his personal philosophy a number of times in our reserves. Until the actuaries can come to grips with this question and develop some kind of a rationale for what they think should be done and why, it seems to me like the basis for an audit of a company that is not subject to statutory accounting principles is very shaky.

Do you have any comment on that?

MR. SOBEL: Rod may want to pick up on this, but clearly from the accountant's standpoint, they are guided by GAAP and to the extent that they render an opinion on a statutory basis, or any other basis, they would be required to indicate that it is not in accordance with generally accepted accounting principles, or auditing, and on what basis the audit has been conducted. It can't be a free-form.

QUESTION: My comment is that really there is a wide range for the auditor to -- and they have been at both ends of the ranges when they have audited our organization. There is a wide range in which they can base that opinion. It is difficult to live with audits when the rules are redefined each year, depending on who is doing the audit.

MR. FARRELL: Well, clearly the generally accepted accounting principles, you are not going to be able to open a book and find an exact answer to your situation. There is a lot of interpretation in judgment involved by whatever firm and whatever partner is going to sign that opinion. But, you know, the literature, I think is clear that in that area there has been to be an adequate provision for the future losses.

We would have to reach a conclusion based on the use of our specialists that that has occurred.

MR. FABER: Any other questions? I might just ask Rod one question that might be on some people's minds. That is, with respect to the operation of the task force, what outside resources are contemplated being used? Specifically what input might be sought from actuaries?

MR. FARRELL: That has been discussed. I think we have concluded that we are at the point where we do not have a consensus of opinion as to how we are going to address the document in relation to the current accounting and auditing literature in that it is the responsibility of the task force to get over that hurdle first, so that we have got at least a working draft of a document that we believe is within the framework of the existing accounting and auditing literature and at that point we plan to seek input from the actuarial profession as to what we have in there that would be impacted by their review.

But we don't believe that we are at the point yet where we are ready for somebody outside the auditing profession -- that we have to deal with it a step at a time and we have to get over the first hurdle before it would be appropriate to have actuarial input. But that will happen.

MR. FABER: This document would be in some ways an exposure draft?

MR. FARRELL: I am not real clear. I don't think if you were issued a procedures study that is not mandated to be complied with that we have to have an exposure draft. If it becomes a statement of position then we will have to go through the exposure draft process.

MR. FABER: I mention that because, as many of you probably know, in such a situation it would probably become an agenda item for the American Academy's financial reporting principles committee and some comment, at least through that committee, would be forthcoming to the *
AICPA task force.

Any one else have any questions or comments?

QUESTION: Except for the Minnesota requirement discussed earlier, are there any other pending requirements of independence

on the part of the actuary rendering the reserve certification (inaudible)?

MR. SNADER: I am not aware of any. Jim, are you?

MR. FABER: Specifically with regard to independence, I am not aware of any, other than the Minnesota and to a certain extent the New Jersey requirement. But, the new NAIC requirement does not include a requirement for independence.

All right, if there are no other questions or comments, I would like to thank each of the panelists for his participation. I would also like to thank you, the audience, for your interest and attention.

(Applause.)

1990 CASUALTY LOSS RESERVE SEMINAR

6G: ADVANCED CASE STUDY

Moderator

Robert J. Finger
William M. Mercer, Inc.

Panel

Ben Zehnwirth
Insureware Pty Ltd

MR. FINGER: This is the third in a series of sessions, the third year that we have done this, where we have tried to take a very difficult data set that is actual data and have a couple guinea pigs try to figure out what is going on with the data set. This particular year, what we are trying to focus on is differences between a regression method and a more traditional method.

It is our plan to recycle the data about every three years. We have three different data sets going now, and so, with three years of hindsight, maybe we can see how the actual data turns out, and we can go back and see if people did a fairly good job the three years before.

For this particular data set, we have medical malpractice data. It is one program in one state, and it is occurrence policies. There are several interesting features about it. First of all, there was tort reform that was enacted in about 1976, but the constitutionality of the statute was challenged, and actually the main cases did not reach the Supreme Court for about 10 years, and they were all upheld. Plaintiffs attorneys are still challenging various parts of it, especially the contingency fees limitations.

Another interesting feature of the data set is that there is an index in the primary carrier's retention. What we are looking at is the primary carrier's retention. This exhibit, Exhibit 1 is my handouts, I guess it is also in the data set handout. The way the indexing works is that starting in about 1977, there is a retention for the first year of the program, any claim paid in the first year. After the first year, the retention goes up by a stated amount.

So like in the first program year, a claim is set that is actually paid in the first year, which is pretty unique, the limit would be $110,000. Any claim settled the next year, the limit would be $121,000. The next year it would be $132,000, and so forth. In some cases, there is a maximum limit that is significant. In some cases, the maximum is really quite high. You would have to go about 20 years before you would hit it.

To make things more realistic, like real-life data sets, the retentions vary on a policy year basis, and they start in October. The data we have is accident year data. So there is always a mix of retentions So, actually, if we are looking at our accident year developments, there is not a simple index across rows; theret is a mixture.

Okay. Our plan is going to be that Ben Zehnwirth will demonstrate his regression approach. It is sort of a supplement to his Session 3G where he explained various models that can be made and his regression approach. After that, I will demonstrate a more traditional actuarial approach. It is a little bit different than things that I have seen, but I would classify it as a more traditional approach. Then probably we will have a little bit of discussion of how the conclusions come out.

In this particular case, the results are really drastically different. So I think it would be interesting to try to see why they come about. I think I understand what is going on, but I guess you could say my answer is not within Ben's standard deviation, and his answer is not within my standard deviation. So that is quite interesting.

Ben Zehnwirth is now a consultant, primarily in actuarial matters. He has been a professor of statistics and actuarial science. He most recently was at Mcquarrie University in Sydney, Australia. He has been a visiting professor in British Columbia, in Waterloo, and has been a professor at the University of Copenhagen. He has written various papers in actuarial science, econometrics, and statistics. He has a Ph.D. in statistics from the University of Melbourne where he currently resides.

His professional designations include associateship in the Institute of Actuaries and an associateship in the Institute of Australian Actuaries.

ANALYSIS OF MEDICAL MALPRACTICE LOSS DEVELOPMENT ARRAYS

PAPER II PRESENTED IN SESSION 6G,
CLRS MEETING, HELD IN DALLAS,
SEPTEMBER 1990.

THIS PAPER IS A COMPANION PAPER TO
PAPER I PRESENTED IN SESSION 3G.

Ben Zehnwirth, A.I.A., A.I.A.A., F.S.S.,
B.Sc. (Hons.), M.Sc., Ph.D.

15 Sidwell Avenue,
East St. Kilda, Vic., 3183
Australia.

1. INTRODUCTION AND SUMMARY

In the present report we analyse medical malpractice development arrays supplied by the organisers of the CLRS.

The primary objective to analyse the data for the purpose of providing projections of outstanding reserves for each of the accident years 1973 - 1985.

The loss development arrays are analysed within the integrated and consistent modelling framework discussed in **"Stochastic Development Factor Models"** presented in Session 3G. Indeed, it is assumed that the reader is familiar with the modelling framework, before reading the present paper.

The medical malpractice development arrays are used as a vehicle for illustrating concepts including:

* Non-Orthogonal Systematic Trends
* Parsimony
* Testability
* Validation
* Stability

Varying parameter stochastic (probabilistic) development factor models are used to explain the behaviour of the loss development arrays in order to:

* separate the random components in the data from the systematic components;
* identify and estimate any heterogeneity in the data;
* identify and estimate the changes in payment (calendar) year inflation;
* identify and estimate changing systematic trends across accident years;
* separate changing payment year trends from changing accident year trends.

MOST IMPORTANTLY, THE AIM IS TO DETERMINE THE TREND(S) IN THE PAYMENT/CALENDAR YEAR DIRECTION AND STABILITY THEREOF.

A number of loss development arrays were supplied and are presented in Appendix A1 -A9. Four arrays, viz.,

1. Incremental Limited Payments (Appendix A8)
2. Incremental Indexed Payments (Appendix A5)
3. Reported Counts (Appendix A2)
4. Closed Claim Counts (Appendix A3)

were analysed. For the sake of brevity, and given that we are employing the loss development arrays as a vehicle for illustrating the flexible and powerful DEVELOPMENT FACTOR MODELLING FRAMEWORK discussed in Paper I, presented in Session 3G, we select only two arrays to discuss at some length.

Since array 2 is relatively stable, in contrast to array 4 which is unstable and accordingly less predictable, these two arrays are our selection.

Summary Results

Array 2 - Incremental Indexed Payments

The tail decays exponentially from delay 11 at rate of -34.45% ($\pm$ 10.10%) per year. Payment/calendar year inflations are:

1973 - 1978	0%
1978 - 1986	22% $\pm$ 1.03%
1986 - 1989	0%

There are no accident year trends (after adjusting for exposures). The rapid growth from 1978 to 1986 seems to have slowed down to 0% in the last three payment years. The estimate of growth rate is positive, in the last three years, but insignificant.

Most of the variation (92.7%) in the payments is explained by:

* payment year trends;
* systematic development over development years.

The remaining 7.3% of the variation in the payments represents the random component - white noise. Projections (forecasts) and standard errors have been derived for each accident year according to development year. The various detailed projections are presented and discussed in Section 3.

The final identified model (for array 2) was VALIDATED tested for STABILITY. This was conducted by assigning zero weights to:

(i) the last payment year, 1989;
(ii) the last two payment years, 1988 and 1989;
(iii) the last three payment years, 1987, 1988 and 1989.

We investigated whether the model would forecast the last three payment years had we used the model at year end 1986, and moreover, tested the outstanding reserves for stability.

Incidentally, the VALIDATION process is often instrumental in arriving at the 'best' model.

We present a summary here of the forecast totals (undiscounted), for array 2.

TABLE 1.1

YEARS INCLUDED IN ESTIMATION	FORECAST ($M)	STANDARD ERROR ($M)
1973 - 1989	23.16	2.77
1979 - 1986	22.17	2.67
1979 - 1985	20.96	2.70
1979 - 1984	24.64	5.14

Note that forecasts of outstanding payments beyond payment year 1989 remain stable (within one standard error) as we remove the recent payment years from the estimation. Stability is gauged by comparing changes in mean forecasts with standard errors.

The above figures are extracted from Appendices D1, E2, F2 and G2 which also provide details of standard errors. The future liability payment stream with associated standard errors can be used for optimal ASSET/LIABILITY matching.

Array 4 - Closed Claim Counts

The tail decays exponentially from delay 11 at a rate of 12.21% $\pm$ 4.23% per year.

Payment/calendar year inflations are:

1974 - 1979	-8.02% $\pm$ 2.41%
1979 - 1980	0%
1980 - 1984	7.76% $\pm$ 2.90%

1984 - 1985	-17.30% $\pm$ 10.10%
1985 - 1986	54.71% $\pm$ 10.31%
1986 - 1987	0%
1987 - 1988	16.81% $\pm$ 11.59%
1988 - 1989	-16.43% $\pm$ 12.58%

There are slight accident year trends only from 1978 - 1980.

The changing trends across payment years, especially from 1985 - 1989 makes it difficult to predict future counts. Which trend do we use for the future? In the absence of any other information one may argue for zero trend in the future, given the average in the last three has been zero. Of course, we need to also incorporate in our model the fluctuations in the trends about the average of zero. The larger the fluctuations the larger the counts!

In Section 6 of paper I we mention that the optimal model may not validate well and is not necessarily used for forecasting. Array 4 is a case in point.

We now present the detailed analyses only of array 2.

2. PRELIMINARY ANALYSIS

2.1 PLOTS

In order to obtain some preliminary ideas of what indications there are in the data, we plot (graph) the data.

Appendix B1 presents a plot of the log normalised (adjusted for exposures) payments for accident years 1973 - 1985 against delay (development year). The peak is around development year 3 to 4, payments subsequently decreasing. The letter 'A' represents a (normalised) payment in respect of accident year 1973, whereas the letter 'B' represents a (normalised) payment in respect of accident year 1974, and so on. Note again, that in view of the fact that payment year trends are projected onto the development year direction, this type of display may not tell the story truthfully and/or may not tell all of it. We use formal regression analysis in order to discover the systematic patterns in the three directions in the data.

The plot also suggests that development (equivalently, trends) from delay 3 to 6 and 6 to 9 may be constant.

2.2 TRENDS AND STRUCTURE

In order to obtain some preliminary ideas of the structure (systematic patterns) in the data, we estimate a model that assumes;

* homogeneity in systematic development factors across accident years;
* constant inflation across payment years.

We subsequently examine displays of the observed (logarithmic) payments about the fitted model. The distribution of the observations about the fitted model (surface) should appear random if the two assumptions:

* homogeneity of systematic development factors;
* constant payment/calendar year inflation,

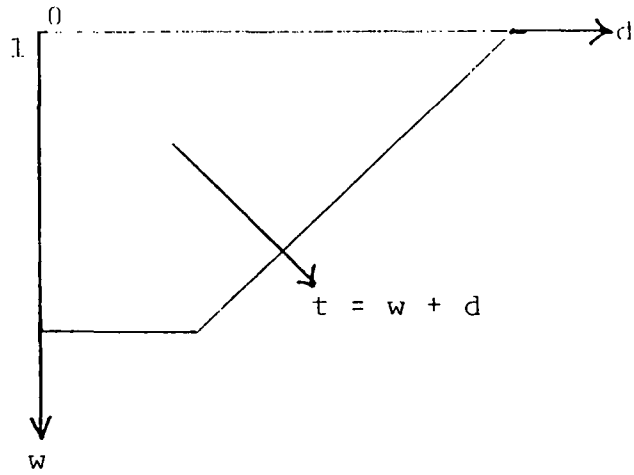
are valid. Otherwise, any systematic departure from randomness facilitates the diagnostic identification of heterogeneity (apart from constant inflation).

We estimate the model:

$$y(w,d) = \log[p(w,d)] = \alpha + \sum_{j=1}^{d} \gamma_j + \iota * (w + d - 1) + \varepsilon ,$$

where, $\gamma_4 = \gamma_5 = \gamma_6$; $\gamma_7 = \gamma_8 = \gamma_9$

and $\gamma_{11} = \gamma_{12} = \cdots = \gamma_{16}$.



where:

w is the variable denoting accident year, w = 1,2,.....13
d denotes delay (development year), d = 0,1,2,.....16
t denotes payment year, t = 1,.....17
p(w,d) is the normalised payment in respect of accident year w and delay d.

Note that the variable t (representing payment year) = w + d.

The parameter α (alpha) represents the average value of delay 0.

The parameters γ (gamma) represent the systematic base development factors. The systematic development factors are represented by the parameter $\gamma + \iota$.

The parameter ι (iota) represents the annual (force of) inflation (in the payment year direction).

Appendix B2 presents some of the (regression) results. We note:

(i) $\gamma_3 = 0$ and all other $\gamma's$ are significantly different;

(ii) average annual (force of) payment year inflation is 16.11% $\pm$ 1.46% and is significant. The parameter iota measures inflation.

We now examine the residuals (observed - predicted), given in Appendix B3, in order to diagnostically identify any systematic departures from homogeneity and constant inflation.

(i) residuals against delay appear reasonable, except for presence of heteroscedasticity;

(ii) residuals against accident years suggest some slight trends between 1981 and 1983;

(iii) most importantly residuals against payments suggest some changes in trends between 1978 and 1980 and also 1983 to 1987 - it's hard to tell and therefore we need to test formally.

Bear in mind that so far we have only conducted some preliminary diagnostic analysis in order to begin the model identification cycle described in Section 6 of Paper I.

3. THE BEST IDENTIFIED MODEL

We have identified a (varying parameter) stochastic development factor model that has three different inflation rates across payment years, adjusts for changing systematic development factors across accident years, and adjusts for heteroscedasticity. The model is VALIDATED and tested for STABILITY.

Each accident year has one parameter α (alpha) and seven γ (gamma) parameters. Between every two contiguous payment years there is an ι (iota) (inflation) parameter.

1. The α (alpha) parameter is the same for each accident year. That is, the average value at delay zero is identical across accident years.

2. The seven γ (gamma) parameters represent the systematic development factors from development years 1-2, 2-3, 3-4-5-6, 6-7-8-9, 9-10 and 10-11-12-13-14-15-16 respectively. See Appendix C1. Note that development from development year 10 to 16 is constant (equivalently, only one trend parameter).

3. There are three different ι (iota) (inflation parameters), one for each of the periods 1973 - 1978, 1978 - 1986 and 1986 - 1989. See Appendix C3.

Much of the variability in the losses, viz., 92.7% (Appendix C4), is explained by the systematic components in the data, viz.,

(i) changing payment year inflation rates;

and

(ii) systematic development of the losses over development years, equivalently, development factors.

Indeed the correlation between the observed (logarithmic normalised) payments and model payments is 0.963 ($\sqrt{.927}$). (See Appendix C4).

The % random (variability) in the normalised payments about the systematic structure is 7.3%.

Appendix C1

Here is presented the estimates of the systematic base development factors $\gamma's$ between every two contiguous development years. Each accident year has the same systematic base development factors. Note the estimate of development in the tail (from development year 10) is -37.45% $\pm$ 10%. That is a rapid yearly decay.

Appendix C2

Changes in α (alpha) represents changes in % levels between two contiguous accident years, equivalently, linear trends on a logarithmic scale. There are no changes in levels between any of the accident years.

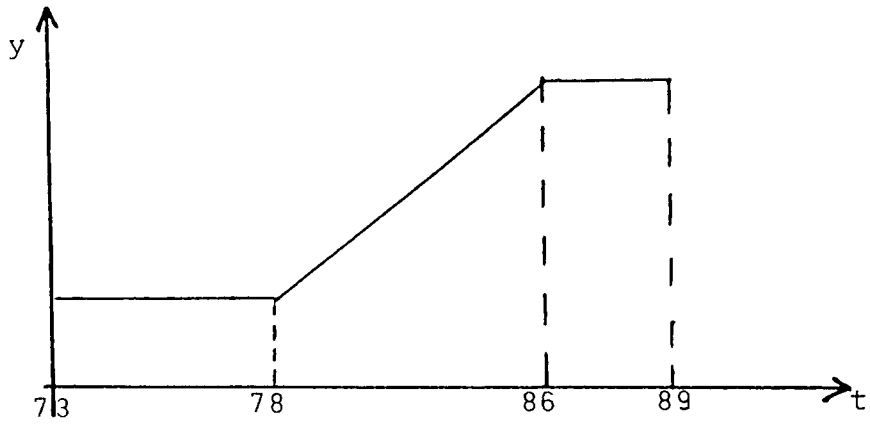
Appendix C3

Here we present the three different payment year inflation estimates:

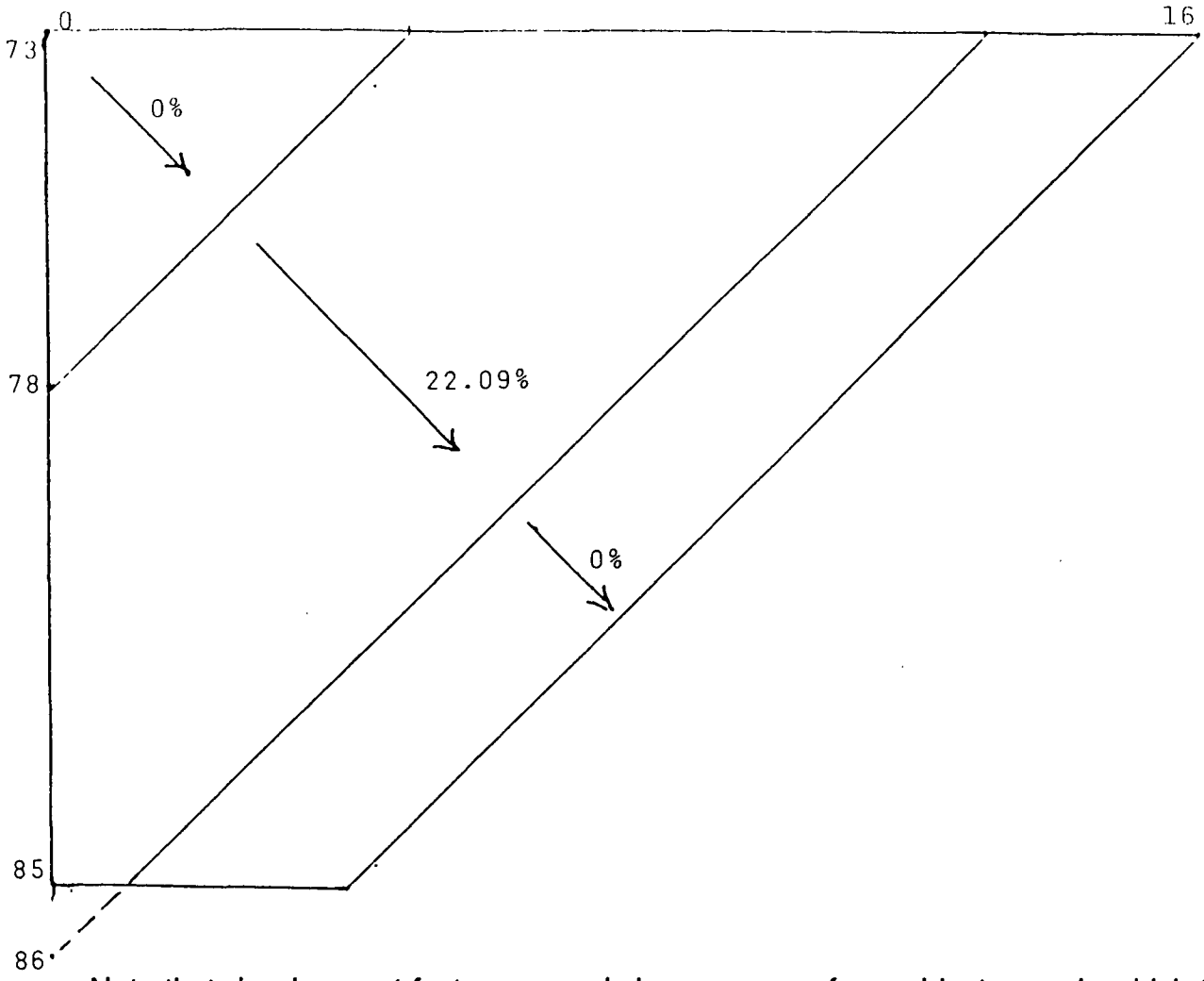
1973 - 1978	0%
1978 - 1986	22.09% $\pm$ 1.03%
1986 - 1989	0%

The T-ratios corresponding to the difference in iotas measure the significance of the two changes. Both changes are significant.

The three inflation rates are depicted below:



We also display the array indication the three inflation rates and the decay in the tail.



Note that development factors are only homogenous for accident years in which the payment year inflation is constant.

It is interesting to observe the slow down in payments in the last three calendar years. Indeed, it is this relative stability in trend in the last three calendar years that leads to 'good' VALIDATION and STABILITY results of the model.

Appendix C4

Here we present some additional regression output.

Explanations:

--- R-squared denotes the proportion of the variation in the data explained by the model. It is also the square of the correlation between observed and expected;

--- S-squared is the mean square error and S is the root mean square error;

--- AIC is Akaike Information Criterion which is based on information theory. It is used to guard against overparametrisation and compare the predictive powers of models;

--- SSPE is the sum of squares of the one-step-ahead prediction errors. It is used to compare the predictive power of models.

Appendix C5

If the estimated model captures all the structure (systematic components) in the data, then the observed 'payments' should be distributed randomly about the estimated (fitted) surface. We present residuals (observed - predicted) in the three directions delay, accident year and payment year. All the plots appear to be in good shape.

Appendix C6

This appendix presents a Box Plot of the weighted residuals. It is used to identify 'unusual' observations and asymmetry of the weighted residuals. The weighted residuals appear symmetric. Indeed, the normal probability plot and the corresponding P-value indicate that the assumption of normality (log normality of multiplicative error terms) is valid.

Appendix D1

This appendix presents:

(i) each observed payment (OBS);
(ii) each expected model payment (EXP);
(iii) forecasts for each accident year subdivided according to development year (right side of stair-case corresponding to EXP row);
(iv) standard errors of each individual forecast (below each forecast);
(v) total forecast (outstanding) for each accident year and associated standard error (right hand column);
(vi) total forecast (payment) to be made in each future payment year in respect of all the accident years and associated standard errors (bottom row);
(vii) total outstanding with associated standard error (bottom right hand corner).

The second page of this Table should be juxtaposed at the right of the first page.

Expected values and forecasts are estimates of means of log normal distributions. Standard errors are estimates of standard deviations of log normal distributions.

Forecasts are based on the assumed future payment year inflation rate of 0% and a decay rate in the tail of - 37.45% $\pm$ 10%. That is, it is assumed that the decay rate will fluctuate with a mean of - 37.45% and standard deviation of 10%.

Appendix D2

Here we present a quality of fit table comparing the original observed payments with the model expected payments. For each accident year and for each payment year; we compute the ratio of the difference in total observed and total expected to the total observed. The quality of fit is high.

Appendix D3

Here we present the base development $(\hat{\gamma}_j)$ factors, base inflation multipliers (factors) $(\hat{\iota}_t)$ and table of development factors and associated standard errors that are implied by the model.

Appendix D4

Here we present development factors and associated standard errors (on the $ scale).

Appendix D5

Here we present the multiplicative development factors and associated standard errors (on the $ scale). See Paper I for the difference between development factors and multiplicative development factors.

4. VALIDATION AND STABILITY

We would like to VALIDATE the final model and also test it for STABILITY.

Validation

The important question is whether the estimated model can predict outside the sample. Since we don't have any data beyond the 1989 payment year, we re-estimate the same model for:-

(i) payment years 1973 - 1988, that is, we remove payment year 1989 to determine if the model forecasts it;

(ii) payment years 1973 - 1987, that is, we remove the last two payments to determine if the model forecasts them;

(iii) payment years 1973 - 1986, that is, we remove the last three payment years (to determine if the model forecasts them).

Validation of the last three years is conducted by assigning zero weights to the years rather than physically removing them from the array. In this way, the residuals for the payment years being validated can be used to assess the quality of the forecasts relative to observed experience. We also test the validated residuals for normality, since the model forecasts normal distributions on a logarithmic scale.

We first validate only the last payment year 1989.

Appendix E1 presents residuals for all payment years and a normal probability plot only for the validated residuals.

Bear in mind that the last payment year 1989 is omitted from the estimation. The residuals for 1989 appear random about zero. Moreover, the validated residuals (that is, residuals for 1989) pass the normality test. This means that the observations in the 1989 payment year are generated from the forecast distributions for 1989, at year end 1988.

Appendix E2 presents the forecasting table. The expected values for 1989 are actually now forecasts that one would have obtained, using the model, at year end 1988.

The table in Appendix E3 shows that the model forecast error for 1989 is 1%.

Appendices F1 - F3 and appendices G1 - G3 present corresponding validation analysis for the validation of 1988 and 1989, and validation of 1987, 1988 and 1989 respectively.

Note that normality is accepted when validating the last three calendar years. See Appendix G1.

Stability

The concept of validation is also related to the concept of STABILITY. If we don't use the last payment years' data to estimate the model, the ultimate losses should not differ from that obtained by using the last payment years' data by more than one standard error. We would like to use a model that delivers STABILITY of reserve calculations from year to year, as we update, especially when payment/calendar year trends are stable.

The following Table presents forecasts of outstandings based on the identified model. Note that the forecasts remain stable as we remove the last three years information.

TABLE 4.1

PYMNT YRS INCLUDED IN ESTIMATION	OUTSTANDINGS ($000)	STANDARD ERROR ($000)
1973 - 1989	23,160	2,771
1973 - 1988	22,162	2,669
1973 - 1987	20,956	2,699
1973 - 1986	24,635	5,142

The Table is extracted from Appendices D1, E2, F2 and G2. This means that at the year end 1986 (with 25% fewer observations), the model gives the same answer as at year end 1989.

THAT'S A HEART WARMING RESULT !

It is because the systematic trends in the last three calendar years are relatively stable.

5. DISCUSSION OF OTHER ARRAYS ANALYSED

In the introduction (Section 1) we presented some results involving the closed claim counts, array 4.

We determined that calendar year trends were unstable. Trends for last three calendar years were:

1986 - 1987	0%		
1987 - 1988	16.81%	$\pm$	11.59%
1988 - 1989	- 16.43%	$\pm$	12.58%

Interestingly enough the average trend in the last three calendar years is close to 0 and moreover the last two trends are not significant (at 10% level, say). In the absence of any other information we may be tempted to forecast with a future trend assumption of 0%.

Here we have a situation where we don't necessarily use the 'best' model (in terms of a wealth of statistics) for forecasting purposes. Recall, that a (the best) model conveys information about the loss development array especially in respect of payment/calendar year trends and stability thereof. Assuming 0 trend in the last three calendar years and in the future our forecast of total number of claims yet to be closed is 668 $\pm$ 159.

Turning to the array comprising limited incremental paids, there is actually a negative trend from calendar year 1985 - 1989 of 6.23% $\pm$ 3.16%. That is very strong evidence that payments are slowing down (even though closed counts are unstable - upward trend followed by downward trend).

Forecast of outstanding here is 18962 $\pm$ 3072.

Both sets of payments, limited and indexed, are more stable (in respect of systematic trends) than the corresponding claim counts.

6. SUMMARY AND CONCLUSIONS

We have used the integrated, consistent and rational **DEVELOPMENT FACTOR MODELLING FRAMEWORK** described in Paper I to analyse a number of medical malpractice loss development arrays.

The following concepts were demonstrated in practice:

* PARSIMONY
* PREDICTIVE POWER
* VALIDATION
* STABILITY
* STANDARD ERRORS

AND MOST IMPORTANTLY:

SEPARATION OF SYSTEMATIC (TRENDS) FROM RANDOMNESS AND DETERMINATION OF STABILITY OF FORMER.

We determined that the incremental paid losses arrays had more stable systematic trends than the corresponding closed claim counts array. This implies, that for the particular case analysed, the incremental paid losses are better predictable than the corresponding closed claim counts.

Models contain information, equivalently assumptions. All assumptions must be tested. Moreover, the **VALIDATION** AND **STABILITY** analyses are an integral part of the **MODEL IDENTIFICATION** procedure.

1990 CASUALTY LOSS RESERVE SEMINAR

Description of Data Set

The following triangles are actual data from a medical malpractice insurance program. Coverage is on an occurrence basis. Data is arranged by calendar accident year and development year (e.g., evaluations as of 12, 24, etc. months). The data represents the primary layer (see below for limits).

During the course of this data, significant tort reform measures were enacted. All major changes have been held to be constitutional, but none of the cases reached the state supreme court until almost ten years after the legislation was enacted. Thus the impact of the changes is probably gradual.

The insurance program was changed, beginning with policy accident year 1977-78. (All insured policy effective dates are the same, thus a policy year corresponds to a fiscal accident year. The policy year begins on October 1.) Up to 1977-78, the indemnity data was limited to $100,000 per occurrence. Subsequently, the initial limit was increased and an annual index was added, based upon the date of claim settlement. For example, for policy year 1977-78, the initial limit was $110,000 and the annual index was $11,000. Thus if a claim occurred in policy year 1977-78 and was closed in development year 2 (78-79), the primary retention was $121,000.

There is also a maximum primary limit. For example, for policy year 1978-79, the initial limit is $110,000, the annual index $11,000, and the maximum limit $250,000. For any claim settled more than 12 years after the accident, the primary would include up to $250,000.

Note that the data triangles, being on a calendar accident year basis, do not correspond exactly with the policy year limits.

Exhibit I shows exposures and the indexing provisions. Subsequent exhibits show the triangles on a cumulative and, where relevant, incremental basis.

The purpose of the exercise is to project the following quantities, by calendar accident year:

1. Ultimate Reported Claim Count
2. Ultimate Allocated Expense
3. Ultimate Indemnity (Limited to $100,000)
4. Ultimate Indexed Indemnity

1990 CASUALTY LOSS RESERVE SEMINAR

EXPOSURES & INDEXING

YEAR	EARNED EXPOSURES	INITIAL LIMIT	ANNUAL INDEX	MAXIMUM LIMIT
1973	33,996	100	none	100
1974	34,494	100	none	100
1975	35,685	100	none	100
1976	39,139	100	none	100
1977	40,266	110	11.0	500
1978	39,065	110	11.0	250
1979	39,316	110	11.0	250
1980	38,208	125	12.5	250
1981	37,182	125	12.5	250
1982	35,178	150	15.0	255
1983	34,398	150	20.0	290
1984	32,332	200	20.0	360
1985	7,452	500	none	500

NOTES:
1. Earned Exposures for given accident year.
2. Indexing for policy-accident year beginning Oct. 1.
3. Limits and index in thousands.

1990 CASUALTY LOSS RESERVE SEMINAR

REPORTED CLAIM COUNT

I. CUMULATIVE

DEVELOPMENT YEAR

ACC YEAR	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
73	623	1578	1899	2008	2063	2084	2092	2100	2105	2112	2115	2115	2116	2116	2117	2118	2120
74	746	1708	1981	2085	2142	2166	2180	2190	2194	2199	2206	2208	2213	2215	2216	2216	
75	753	1811	2054	2162	2212	2228	2258	2273	2288	2291	2298	2299	2300	2301	2302		
76	909	2020	2262	2352	2404	2437	2465	2475	2487	2499	2504	2505	2505	2505			
77	963	2122	2425	2649	2692	2721	2749	2768	2780	2784	2784	2787	2788				
78	974	2104	2366	2481	2557	2599	2629	2644	2663	2665	2666	2669					
79	1019	2237	2569	2708	2787	2819	2842	2855	2868	2875	2878						
80	830	2043	2406	2559	2653	2689	2719	2738	2755	2762							
81	804	2121	2485	2646	2732	2775	2807	2822	2832								
82	873	2286	2640	2808	2899	2941	2971	2982									
83	822	2281	2664	2834	2945	3000	3021										
84	758	2186	2604	2766	2853	2899											
85	291	586	641	672	685												

II. INCREMENTAL

DEVELOPMENT YEAR

ACC YEAR	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
73	623	955	321	109	55	21	8	8	5	7	3	0	1	0	1	1	2
74	746	962	273	104	57	24	14	10	4	5	7	2	5	2	1	0	
75	753	1058	243	108	50	16	30	15	15	3	7	1	1	1	1		
76	909	1111	242	90	52	33	28	10	12	12	5	1	0	0			
77	963	1159	303	224	43	29	28	19	12	4	0	3	1				
78	974	1130	262	115	76	42	30	15	19	2	1	3					
79	1019	1218	332	139	79	32	23	13	13	7	3						
80	830	1213	363	153	94	36	30	19	17	7							
81	804	1317	364	161	86	43	32	15	10								
82	873	1413	354	168	91	42	30	11									
83	822	1459	383	170	111	55	21										
84	758	1428	418	162	87	46											
85	291	295	55	31	13												

1990 CASUALTY LOSS RESERVE SEMINAR

CLOSED CLAIM COUNT

I. CUMULATIVE

DEVELOPMENT YEAR

ACC YEAR	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
73	N/A	447	825	1184	1527	1759	1948	2042	2073	2093	2100	2106	2113	2115	2115	2115	2116
74	95	613	966	1297	1603	1830	2058	2132	2163	2173	2184	2194	2200	2208	2211	2213	
75	132	633	1021	1328	1620	1868	2089	2197	2225	2248	2258	2280	2287	2298	2300		
76	118	728	1170	1483	1807	2040	2282	2395	2435	2452	2470	2482	2493	2499			
77	144	748	1204	1541	1867	2165	2566	2668	2711	2745	2756	2767	2777				
78	108	696	1239	1560	1895	2167	2420	2516	2579	2615	2642	2655					
79	118	756	1333	1671	2059	2357	2559	2718	2792	2824	2849						
80	83	615	1211	1551	1930	2177	2460	2625	2683	2711							
81	83	650	1213	1631	1975	2303	2596	2713	2760								
82	93	651	1196	1527	2000	2385	2712	2859									
83	81	650	1174	1645	2096	2443	2783										
84	86	560	1175	1561	2080	2415											
85	26	200	313	401	537												

II. INCREMENTAL

DEVELOPMENT YEAR

ACC YEAR	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
73	N/A	447	378	359	343	232	189	94	31	20	7	6	7	2	0	0	1
74	95	518	353	331	306	227	228	74	31	10	11	10	6	8	3	2	
75	132	501	388	307	292	248	221	108	28	23	10	22	7	11	2		
76	118	610	442	313	324	233	242	113	40	17	18	12	11	6			
77	144	604	456	337	326	298	401	102	43	34	11	11	10				
78	108	588	543	321	335	272	253	96	63	36	27	13					
79	118	638	577	338	388	298	202	159	74	32	25						
80	83	532	596	340	379	247	283	165	58	28							
81	83	567	563	418	344	328	293	117	47								
82	93	558	545	331	473	385	327	147									
83	81	569	524	471	451	347	340										
84	86	474	615	386	519	335											
85	26	174	113	88	136												

1990 CASUALTY LOSS RESERVE SEMINAR

CLOSED CLAIM COUNT WITH PAYMENT

I. CUMULATIVE

DEVELOPMENT YEAR

ACC YEAR	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
73	N/A	202	376	525	64	721	765	789	800	803	803	809	811	813	813	814	815
74	50	268	392	514	611	685	752	765	769	769	769	778	778	784	787	789	
75	68	219	311	436	529	614	702	721	727	728	728	737	739	750	752		
76	47	194	303	422	530	598	680	705	713	716	722	723	734	740			
77	72	231	321	431	518	623	864	895	904	914	915	926	936				
78	45	162	295	401	504	584	680	696	724	736	763	776					
79	56	234	373	500	617	726	795	867	903	935	960						
80	40	230	361	483	584	662	769	833	883	891							
81	50	246	398	576	658	787	905	991	1001								
82	63	296	477	591	745	908	1077	1118									
83	49	297	406	610	752	894	1013										
84	81	249	477	651	846	962											
85	19	91	144	183	214												

II. INCREMENTAL

DEVELOPMENT YEAR

ACC YEAR	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
73	N/A	202	174	149	118	78	44	24	11	3	0	6	2	2	0	1	1
74	50	218	124	122	97	74	67	13	4	0	0	9	0	6	3	2	
75	68	151	92	125	93	85	88	19	6	1	0	9	2	11	2		
76	47	147	109	119	108	68	82	25	8	3	6	1	11	6			
77	72	159	90	110	87	105	241	31	9	10	1	11	10				
78	45	117	133	106	103	80	96	16	28	12	27	13					
79	56	178	139	127	117	109	69	72	36	32	25						
80	40	190	131	122	101	78	107	64	50	8							
81	50	196	152	178	82	129	118	86	10								
82	63	233	181	114	154	163	169	41									
83	49	248	109	204	142	142	119										
84	81	168	228	174	195	116											
85	19	72	53	39	31												

1990 CASUALTY LOSS RESERVE SEMINAR

PAID LOSS - INDEXED LAYER

I. CUMULATIVE

DEVELOPMENT YEAR

ACC YEAR	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
73	103	1013	2692	4065	5900	7086	7578	7928	8269	8391	8396	8496	8496	8658	8658	8658	8658
74	162	1289	2848	4483	6192	7357	9199	9520	9549	9664	10335	10605	10705	10738	10818	10973	
75	268	1037	2076	3783	6023	7921	9753	10381	10653	11369	11488	11757	11757	11933	11933		
76	259	1501	2958	5051	7025	8903	10561	11471	11723	11938	12258	12376	12493	12493			
77	214	1070	2192	4450	7207	10414	14660	15610	16323	16450	16989	17204	17304				
78	185	1101	2921	5880	8574	11866	15603	17760	18820	19281	21648	21648					
79	221	1578	4146	7585	12393	17793	22426	24806	26996	27088	28199						
80	261	1922	5586	8446	13719	18499	23039	24253	24418	25135							
81	600	2839	6292	13502	18768	23557	28081	30193	30343								
82	558	4068	9434	15759	22283	28155	34247	35397									
83	527	3745	9899	17057	22450	27352	33975										
84	170	3219	9846	17244	24882	29608											
85	348	1562	3171	4995	6379												

II. INCREMENTAL

DEVELOPMENT YEAR

ACC YEAR	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
73	103	910	1679	1373	1835	1186	492	350	341	122	5	100	0	162	0	0	0
74	162	1127	1559	1635	1709	1165	1842	321	29	115	671	270	100	33	80	155	
75	268	769	1039	1707	2240	1898	1832	628	272	716	119	269	0	176	0		
76	259	1242	1457	2093	1974	1878	1658	910	252	215	320	118	117	0			
77	214	856	1122	2258	2757	3207	4246	950	713	127	539	215	100				
78	185	916	1820	2959	2694	3292	3737	2157	1060	461	2367	0					
79	221	1357	2568	3439	4808	5400	4633	2380	2190	92	1111						
80	261	1661	3664	2860	5273	4780	4540	1214	165	717							
81	600	2239	3453	7210	5266	4789	4524	2112	150								
82	558	3510	5366	6325	6524	5872	6092	1150									
83	527	3218	6154	7158	5393	4902	6623										
84	170	3049	6627	7398	7638	4726											
85	348	1214	1609	1824	1384												

1990 CASUALTY LOSS RESERVE SEMINAR

PAID ALLOCATED EXPENSE

I. CUMULATIVE

DEVELOPMENT YEAR

ACC YEAR	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
73	283	968	1936	2862	3647	4374	4761	4986	5065	5116	5155	5155	5160	5160	5183	5187	
74	55	438	1250	2502	3571	4372	5231	5499	5617	5773	6044	6167	6273	6340	6536	6579	
75	117	470	1195	2284	3390	4416	5293	5718	5949	6237	6452	6598	6706	6722	6738		
76	56	327	1143	2413	3709	4964	6255	6906	7044	7147	7338	7515	7637	7758			
77	59	388	1466	2918	4754	6201	8361	8840	9240	9488	9638	9638	9846				
78	180	703	1927	3583	5368	7140	8648	9449	9999	10335	10776	10955					
79	34	724	2392	4552	7012	9049	11058	12343	13051	13615	14255						
80	80	662	2511	4653	7071	9332	11811	12748	13225	14165							
81	578	1271	3756	6956	9575	11300		16288	17225								
82	465	1568	5075	9082	12865	16126	20452	22589									
83	562	2016	6126	11118	14924	20008	25094										
84	662	2512	8292	13980	19555	24968											
85	564	1180	2482	3689	5511												

II. INCREMENTAL

DEVELOPMENT YEAR

ACC YEAR	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
73	0	283	685	968	926	785	727	387	225	79	51	39	0	5	0	23	4
74	55	383	812	1252	1069	801	859	268	118	156	271	123	106	67	196	43	
75	117	353	725	1089	1106	1026	877	425	231	288	215	146	108	16	16		
76	56	271	816	1270	1296	1255	1291	651	138	103	191	177	122	121			
77	59	329	1078	1452	1836	1447	2160	479	400	248	150	0	208				
78	180	523	1224	1656	1785	1772	1508	801	550	336	441	179					
79	34	690	1668	2160	2460	2037	2009	1285	708	564	640						
80	80	582	1849	2142	2418	2261	2479	937	477	940							
81	578	693	2485	3200	2619	1725		4988	937								
82	465	1103	3507	4007	3783	3261	4326	2137									
83	562	1454	4110	4992	3806	5084	5086										
84	662	1850	5780	5688	5575	5413											
85	564	616	1302	1207	1822												

1990 CASUALTY LOSS RESERVE SEMINAR

INCURRED LOSS - INDEXED LAYER

DEVELOPMENT YEAR

ACC YEAR	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
73	N/A	11245	14593	14713	13458	11675	9851	9239	9270	9098	8972	8938	8631	8658	8658	8658	8658
74	6018	12983	16050	16516	15147	13480	11910	11511	11045	11028	11749	11401	11337	11065	10946	11046	
75	5112	14970	18121	17681	16638	14215	13293	12314	12351	12491	12553	12268	12116	11958	11933		
76	8272	18380	19869	19210	17130	15820	14030	13607	13778	13959	13804	13601	12857	12607			
77	9037	21581	24361	22895	21193	18957	18581	18704	18767	18634	18089	17776	17598				
78	10661	22029	22293	22859	22763	22577	22819	22820	22937	22629	22677	22399					
79	10879	22536	24917	26750	28751	32192	32580	31843	32731	31975	31404						
80	9445	22791	26638	30174	33903	33122	31135	30442	29256	29605							
81	9547	24481	31526	40206	40508	41129	38750	36731	35962								
82	12024	31258	45775	51548	52346	51050	46140	43506									
83	10226	38880	50894	53760	56970	53181	44661										
84	11638	40911	54109	59709	52088	47784											
85	5642	12944	14246	14626	13520												

1990 CASUALTY LOSS RESERVE SEMINAR

PAID LOSS - LIMITED TO $100,000 PER CLAIM

I. CUMULATIVE

DEVELOPMENT YEAR

ACC YEAR	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
73	103	1013	2692	4065	5900	7086	7578	7928	8269	8391	8396	8496	8496	8658	8658	8658	8658
74	162	1289	2848	4483	6192	7357	9199	9520	9549	9664	10335	10605	10705	10738	10818	10973	
75	268	1037	2076	3783	6023	7921	9753	10381	10653	11369	11488	11757	11757	11933	11933		
76	259	1501	2958	5051	7025	8903	10561	11471	11723	11938	12258	12376	12493	12493			
77	214	1070	2192	4450	6832	9818	13524	14372	15019	15146	15456	15626	15727				
78	185	1101	2921	5415	7913	10669	13764	15268	15911	16178	17722	17722					
79	221	1578	3941	7047	10956	15529	19308	21015	22521	22521	23165						
80	261	1770	5247	7943	12318	15978	19624	20601	20765	21248							
81	600	2717	5896	12008	16375	20450	23845	25587	25587								
82	558	3895	8449	13775	18800	23220	28286	28648									
83	527	3410	8553	14218	18097	22079	26374										
84	170	3001	8472	14158	19567	23077											
85	348	1322	2666	4046	4920												

II. INCREMENTAL

DEVELOPMENT YEAR

ACC YEAR	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
73	103	910	1679	1373	1835	1186	492	350	341	122	5	100	0	162	0	0	0
74	162	1127	1559	1635	1709	1165	1842	321	29	115	671	270	100	33	80	155	
75	268	769	1039	1707	2240	1898	1832	628	272	716	119	269	0	176	0		
76	259	1242	1457	2093	1974	1878	1658	910	252	215	320	118	117	0			
77	214	856	1122	2258	2382	2986	3706	848	647	127	310	170	101				
78	185	916	1820	2494	2498	2756	3095	1504	643	267	1544	0					
79	221	1357	2363	3106	3909	4573	3779	1707	1506	0	644						
80	261	1509	3477	2696	4375	3660	3646	977	164	483							
81	600	2117	3179	6112	4367	4075	3395	1742	0								
82	558	3337	4554	5326	5025	4420	5066	362									
83	527	2883	5143	5665	3879	3982	4295										
84	170	2831	5471	5686	5409	3510											
85	348	974	1344	1380	874												

1990 CASUALTY LOSS RESERVE SEMINAR

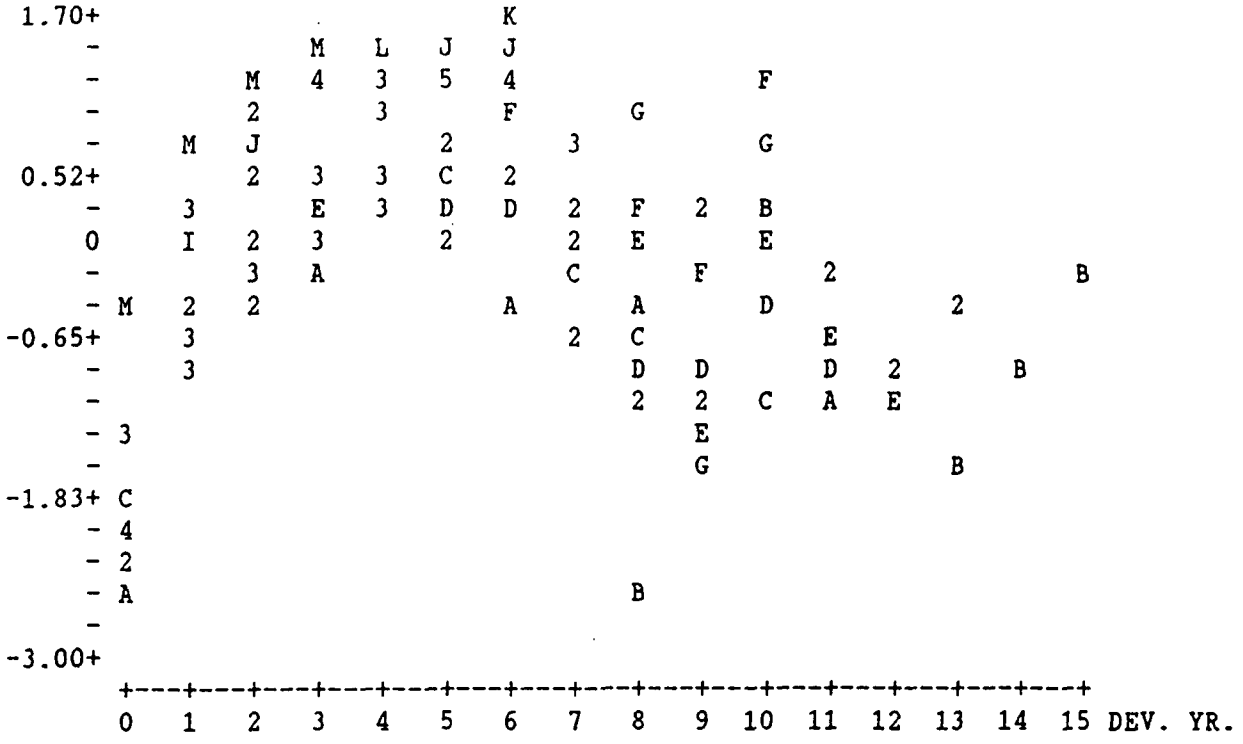
INCURRED LOSS - LIMITED TO $100,000 PER CLAIM

DEVELOPMENT YEAR

ACC YEAR	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
73	N/A	11245	14593	14713	13458	11675	9851	9239	9270	9098	8972	8938	8706	8668	8740	8667	8677
74	6018	12983	16050	16516	15147	13480	11910	11511	11045	11028	11749	11401	11337	11065	10946	11046	
75	5112	14970	18121	17681	16638	14215	13293	12314	12351	12491	12553	12268	12116	11958	11948		
76	8272	18380	19869	19210	17130	15820	14030	13607	13778	13959	13804	13601	12857	12607			
77	N/A	N/A	N/A	N/A	20377	18004	17255	17225	17180	16732	16556	16198	16021				
78	N/A	N/A	N/A	21405	20995	19946	19277	18901	18857	18273	18429	18324					
79	N/A	N/A	23759	25215	25783	27250	26940	25776	26152	25371	24946						
80	N/A	21758	25037	27299	29010	27964	25764	24838	23797	23826							
81	9067	22977	28280	33880	33635	33362	31029	29609	28829								
82	11174	29033	39593	43433	41981	39803	36185	33490									
83	9471	33803	42120	42540	42639	40092	33564										
84	10385	35461	43576	46189	40103	35838											
85	4922	11004	11551	11447	9511												

APPENDIX B1

LOGNORMALIZED (SCALED) VERSUS DEVELOPMENT YEAR



APPENDIX B2

R E G R E S S I O N T A B L E

PARAMETER ESTIMATES

DEV. YEAR	GAMMA	S.E.	T-RATIO	DIFFERENCE IN GAMMA	S.E.	T-RATIO
1	1.4626	0.2168	6.75			
2	0.3270	0.2120	1.54	-1.1357	0.3689	-3.08
3	0.1367	0.1954	0.70	-0.1902	0.3569	-0.53
4	-0.2134	0.0654	-3.26	-0.3501	0.2348	-1.49
5	-0.2134	0.0654	-3.26	0.0000	0.0000	0.00
6	-0.2134	0.0654	-3.26	0.0000	0.0000	0.00
7	-0.9970	0.0727	-13.71	-0.7836	0.1217	-6.44
8	-0.9970	0.0727	-13.71	0.0000	0.0000	0.00
9	-0.9970	0.0727	-13.71	0.0000	0.0000	0.00
10	0.6663	0.2360	2.82	1.6633	0.2823	5.89
11	-0.4536	0.0847	-5.35	-1.1198	0.2907	-3.85
12	-0.4536	0.0847	-5.35	0.0000	0.0000	0.00
13	-0.4536	0.0847	-5.35	0.0000	0.0000	0.00
14	-0.4536	0.0847	-5.35	0.0000	0.0000	0.00
15	-0.4536	0.0847	-5.35	0.0000	0.0000	0.00
16	-0.4536	0.0847	-5.35	0.0000	0.0000	0.00

NOT ALL PARAMETERS ARE SIGNIFICANT

PARAMETER ESTIMATES

ACCI YEAR	ALPHA	S.E.	T-RATIO	DIFFERENCE IN ALPHA	S.E.	T-RATIO
1973	3.5361	0.1757	20.12			
1974	3.5361	0.1757	20.12	0.0000	0.0000	0.00
1975	3.5361	0.1757	20.12	0.0000	0.0000	0.00
1976	3.5361	0.1757	20.12	0.0000	0.0000	0.00
1977	3.5361	0.1757	20.12	0.0000	0.0000	0.00
1978	3.5361	0.1757	20.12	0.0000	0.0000	0.00
1979	3.5361	0.1757	20.12	0.0000	0.0000	0.00
1980	3.5361	0.1757	20.12	0.0000	0.0000	0.00
1981	3.5361	0.1757	20.12	0.0000	0.0000	0.00
1982	3.5361	0.1757	20.12	0.0000	0.0000	0.00
1983	3.5361	0.1757	20.12	0.0000	0.0000	0.00
1984	3.5361	0.1757	20.12	0.0000	0.0000	0.00
1985	3.5361	0.1757	20.12	0.0000	0.0000	0.00

ALL PARAMETERS ARE SIGNIFICANT

APPENDIX B2 (CTD)

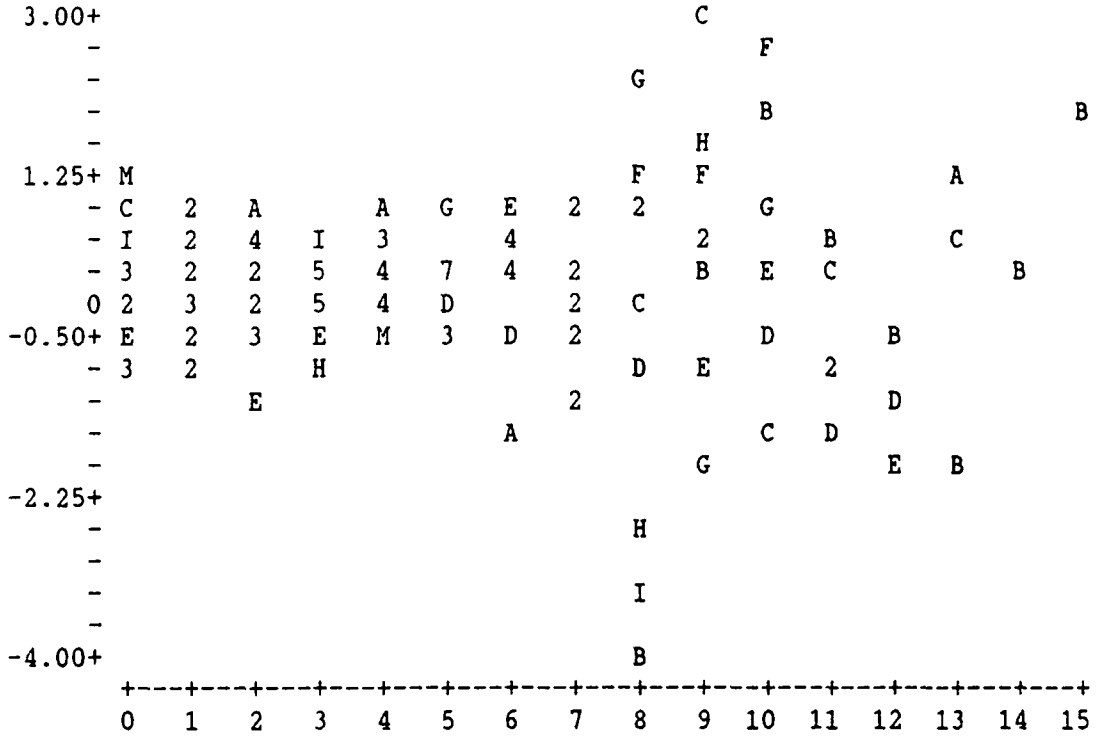
PARAMETER ESTIMATES

PMNT YEAR	IOTA	S.E.	T-RATIO	DIFFERENCE IN IOTA	S.E.	T-RATIO
1974	0.1611	0.0146	11.02			
1975	0.1611	0.0146	11.02	0.0000	0.0000	0.00
1976	0.1611	0.0146	11.02	0.0000	0.0000	0.00
1977	0.1611	0.0146	11.02	0.0000	0.0000	0.00
1978	0.1611	0.0146	11.02	0.0000	0.0000	0.00
1979	0.1611	0.0146	11.02	0.0000	0.0000	0.00
1980	0.1611	0.0146	11.02	0.0000	0.0000	0.00
1981	0.1611	0.0146	11.02	0.0000	0.0000	0.00
1982	0.1611	0.0146	11.02	0.0000	0.0000	0.00
1983	0.1611	0.0146	11.02	0.0000	0.0000	0.00
1984	0.1611	0.0146	11.02	0.0000	0.0000	0.00
1985	0.1611	0.0146	11.02	0.0000	0.0000	0.00
1986	0.1611	0.0146	11.02	0.0000	0.0000	0.00
1987	0.1611	0.0146	11.02	0.0000	0.0000	0.00
1988	0.1611	0.0146	11.02	0.0000	0.0000	0.00
1989	0.1611	0.0146	11.02	0.0000	0.0000	0.00

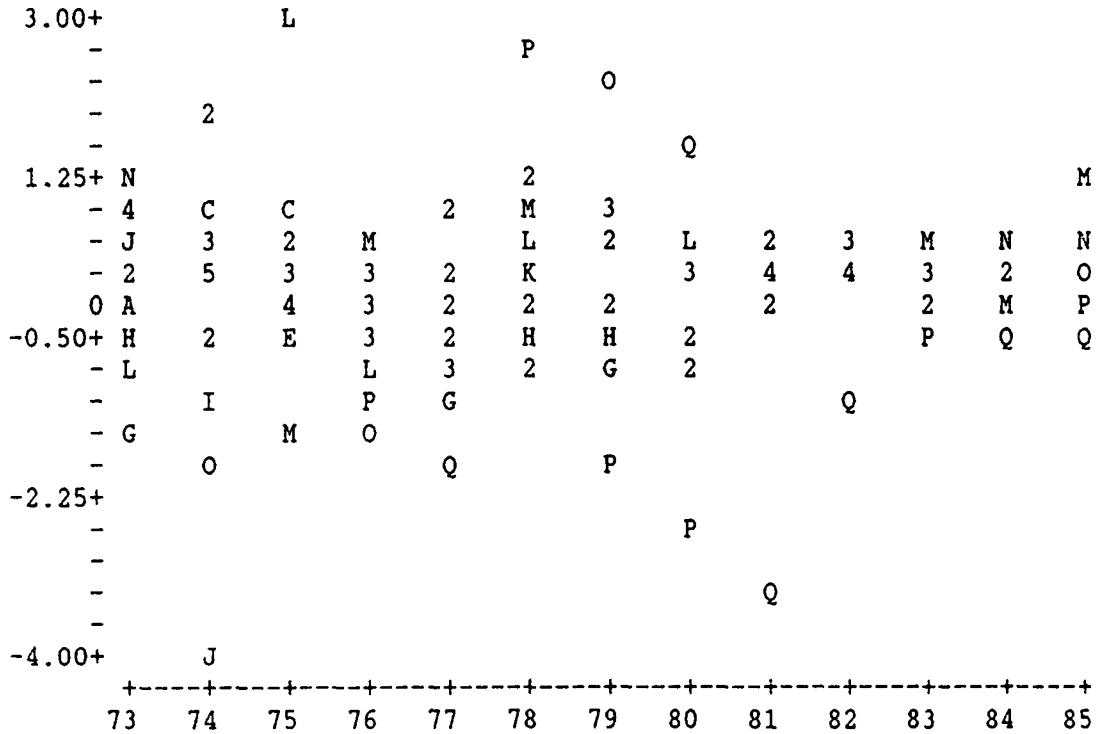
ALL PARAMETERS ARE SIGNIFICANT

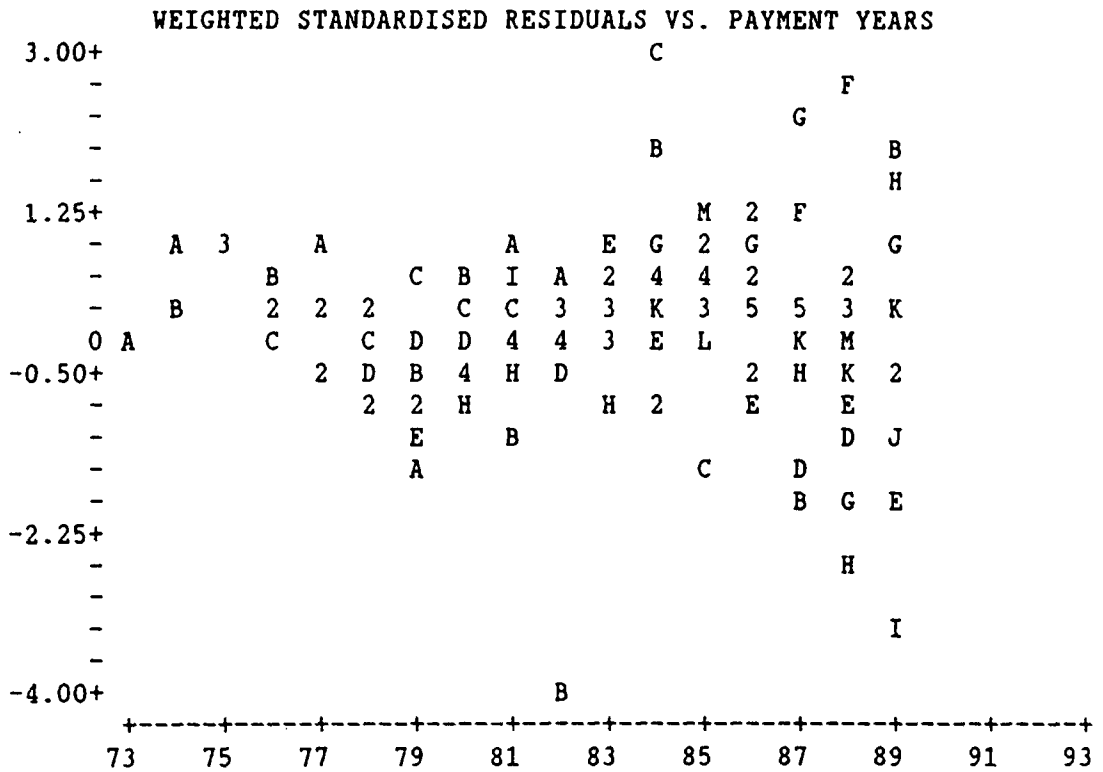
APPENDIX B3

WEIGHTED STANDARDISED RESIDUALS VS. DELAY



WEIGHTED STANDARDISED RESIDUALS VS. ACCIDENT YEARS




WEIGHTED STANDARDISED RESIDUALS VS. PAYMENT YEARS
3.00+
1.25+
0
-0.50+
-2.25+
-4.00+
73
75
77
79
81
83
85
87
89
91
93

APPENDIX C1

R E G R E S S I O N T A B L E

PARAMETER ESTIMATES

DEV. YEAR	GAMMA	S.E.	T-RATIO	DIFFERENCE IN GAMMA	S.E.	T-RATIO
1	1.4841	0.1141	13.01			
2	0.4449	0.0942	4.72	-1.0391	0.1847	-5.63
3	0.0000	0.0000	0.00	-0.4449	0.0942	-4.72
4	-0.1617	0.0307	-5.26	-0.1617	0.0307	-5.26
5	-0.1617	0.0307	-5.26	0.0000	0.0000	0.00
6	-0.1617	0.0307	-5.26	0.0000	0.0000	0.00
7	-1.0975	0.0696	-15.77	-0.9359	0.0883	-10.60
8	-1.0975	0.0696	-15.77	0.0000	0.0000	0.00
9	-1.0975	0.0696	-15.77	0.0000	0.0000	0.00
10	0.6664	0.2889	2.31	1.7639	0.3346	5.27
11	-0.3745	0.1010	-3.71	-1.0409	0.3590	-2.90
12	-0.3745	0.1010	-3.71	0.0000	0.0000	0.00
13	-0.3745	0.1010	-3.71	0.0000	0.0000	0.00
14	-0.3745	0.1010	-3.71	0.0000	0.0000	0.00
15	-0.3745	0.1010	-3.71	0.0000	0.0000	0.00
16	-0.3745	0.1010	-3.71	0.0000	0.0000	0.00

ALL PARAMETERS ARE SIGNIFICANT

APPENDIX C2

PARAMETER ESTIMATES

ACCI YEAR	ALPHA	S.E.	T-RATIO	DIFFERENCE IN ALPHA	S.E.	T-RATIO
1973	4.0304	0.0842	47.89			
1974	4.0304	0.0842	47.89	0.0000	0.0000	0.00
1975	4.0304	0.0842	47.89	0.0000	0.0000	0.00
1976	4.0304	0.0842	47.89	0.0000	0.0000	0.00
1977	4.0304	0.0842	47.89	0.0000	0.0000	0.00
1978	4.0304	0.0842	47.89	0.0000	0.0000	0.00
1979	4.0304	0.0842	47.89	0.0000	0.0000	0.00
1980	4.0304	0.0842	47.89	0.0000	0.0000	0.00
1981	4.0304	0.0842	47.89	0.0000	0.0000	0.00
1982	4.0304	0.0842	47.89	0.0000	0.0000	0.00
1983	4.0304	0.0842	47.89	0.0000	0.0000	0.00
1984	4.0304	0.0842	47.89	0.0000	0.0000	0.00
1985	4.0304	0.0842	47.89	0.0000	0.0000	0.00

ALL PARAMETERS ARE SIGNIFICANT

APPENDIX C3

PARAMETER ESTIMATES

PMNT YEAR	IOTA	S.E.	T-RATIO	DIFFERENCE IN IOTA	S.E.	T-RATIO
1974	0.0000	0.0000	0.00			
1975	0.0000	0.0000	0.00	0.0000	0.0000	0.00
1976	0.0000	0.0000	0.00	0.0000	0.0000	0.00
1977	0.0000	0.0000	0.00	0.0000	0.0000	0.00
1978	0.0000	0.0000	0.00	0.0000	0.0000	0.00
1979	0.2209	0.0103	21.35	0.2209	0.0103	21.35
1980	0.2209	0.0103	21.35	0.0000	0.0000	0.00
1981	0.2209	0.0103	21.35	0.0000	0.0000	0.00
1982	0.2209	0.0103	21.35	0.0000	0.0000	0.00
1983	0.2209	0.0103	21.35	0.0000	0.0000	0.00
1984	0.2209	0.0103	21.35	0.0000	0.0000	0.00
1985	0.2209	0.0103	21.35	0.0000	0.0000	0.00
1986	0.2209	0.0103	21.35	0.0000	0.0000	0.00
1987	0.0000	0.0000	0.00	-0.2209	0.0103	-21.35
1988	0.0000	0.0000	0.00	0.0000	0.0000	0.00
1989	0.0000	0.0000	0.00	0.0000	0.0000	0.00

ALL PARAMETERS ARE SIGNIFICANT

APPENDIX C4

(REGRESSION OUTPUT CONTINUED)

S = 0.5199 S-SQUARED = 0.2703 S-SQUARED(SCI) = 5.3696

S(B) = 0.2840 S(B)-SQUARED = 0.0807 DELTA = 0.0000

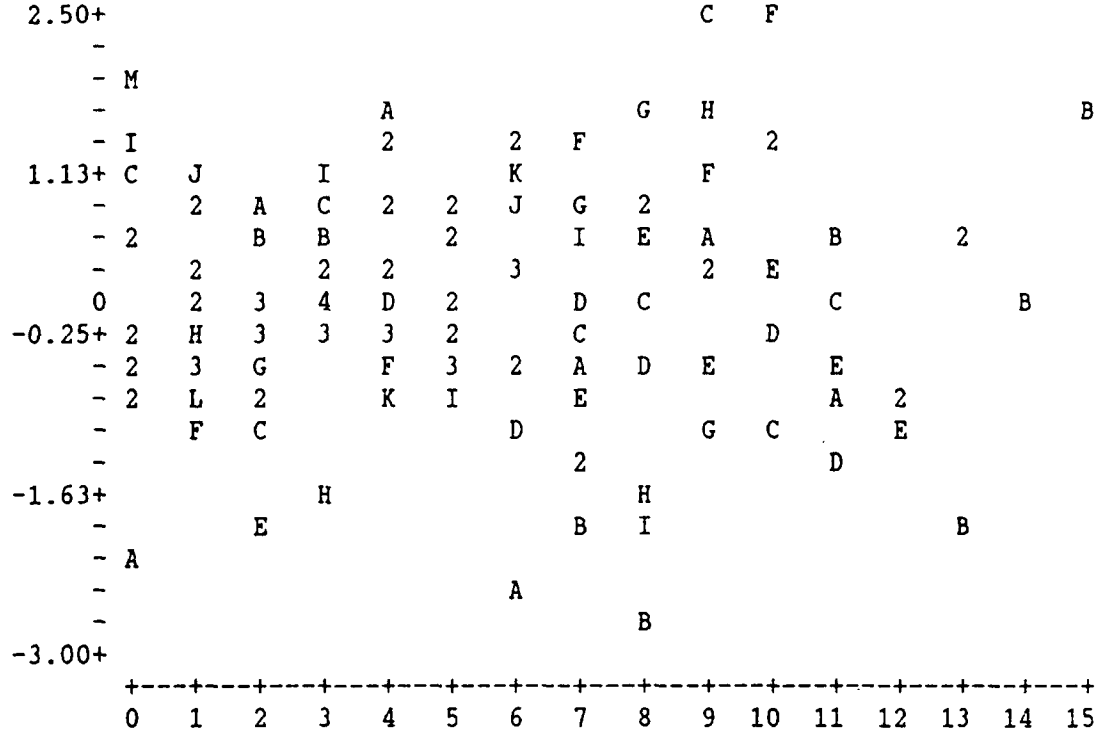
R-SQUARED = 92.7 PERCENT N = 133 P = 8.0

SSPE = 49.061 WSSPE = 18.622 AIC = 114.38 AIC(SDFI) = 695.30

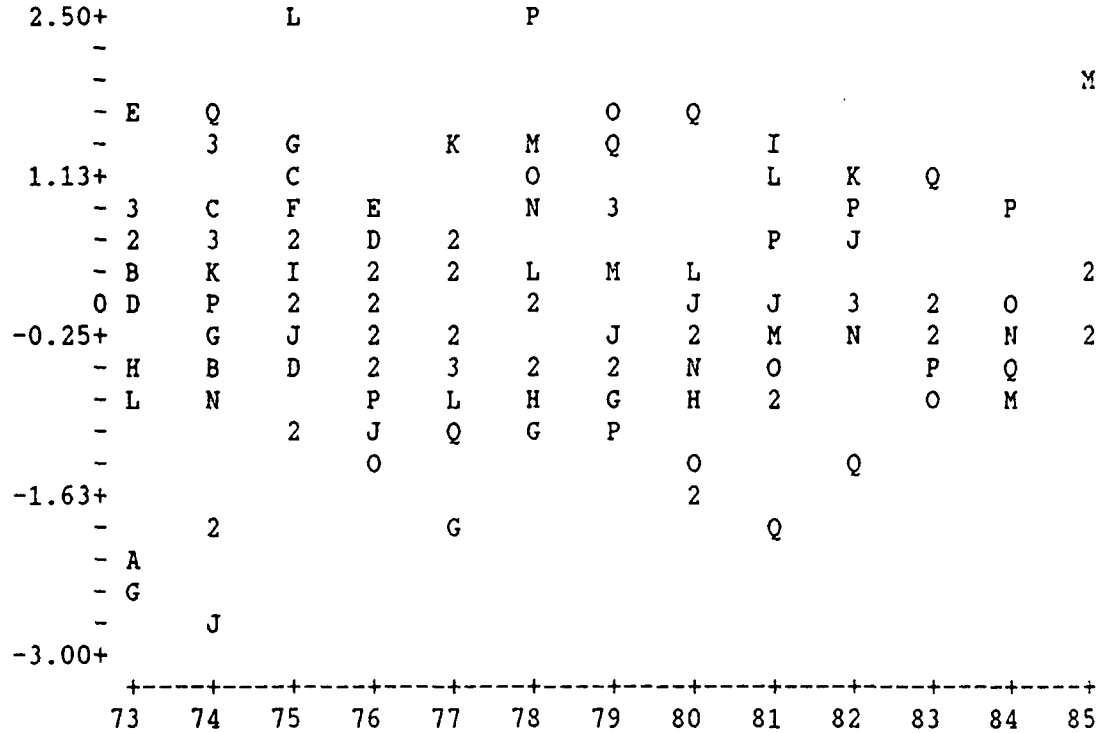
	ESTIMATED PERCENTAGE CHANGE IN LEVEL	STANDARD ERROR
1973-1989	0.00	0.00
ANNUAL	0.00	0.00

APPENDIX C5

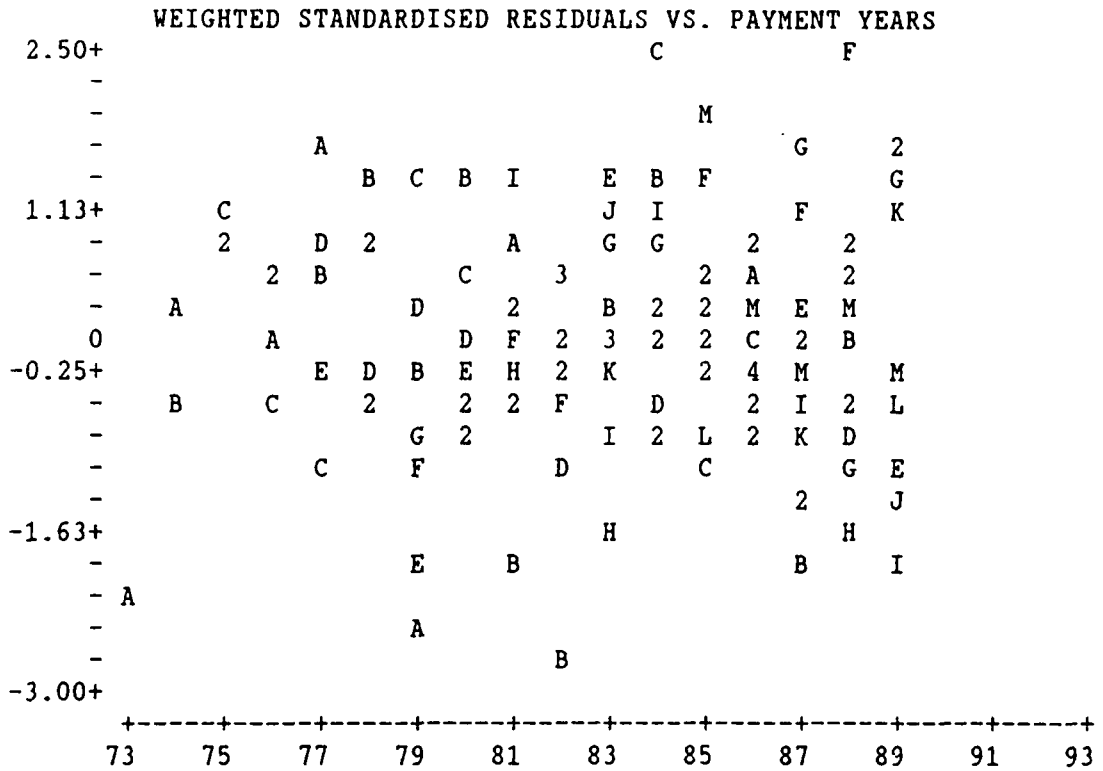
WEIGHTED STANDARDISED RESIDUALS VS. DELAY



WEIGHTED STANDARDISED RESIDUALS VS. ACCIDENT YEARS



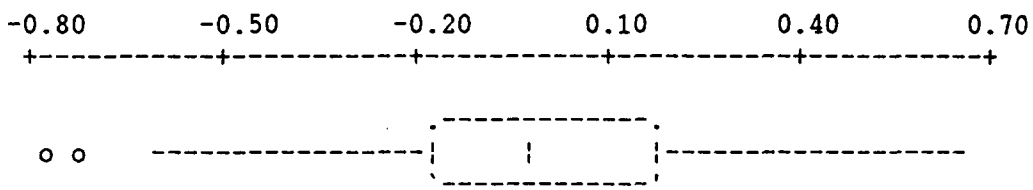
APPENDIX C5 (CTD)



APPENDIX C6

O U T L I E R A N A L Y S I S

BOXPLOT OF WEIGHTED RESIDUALS



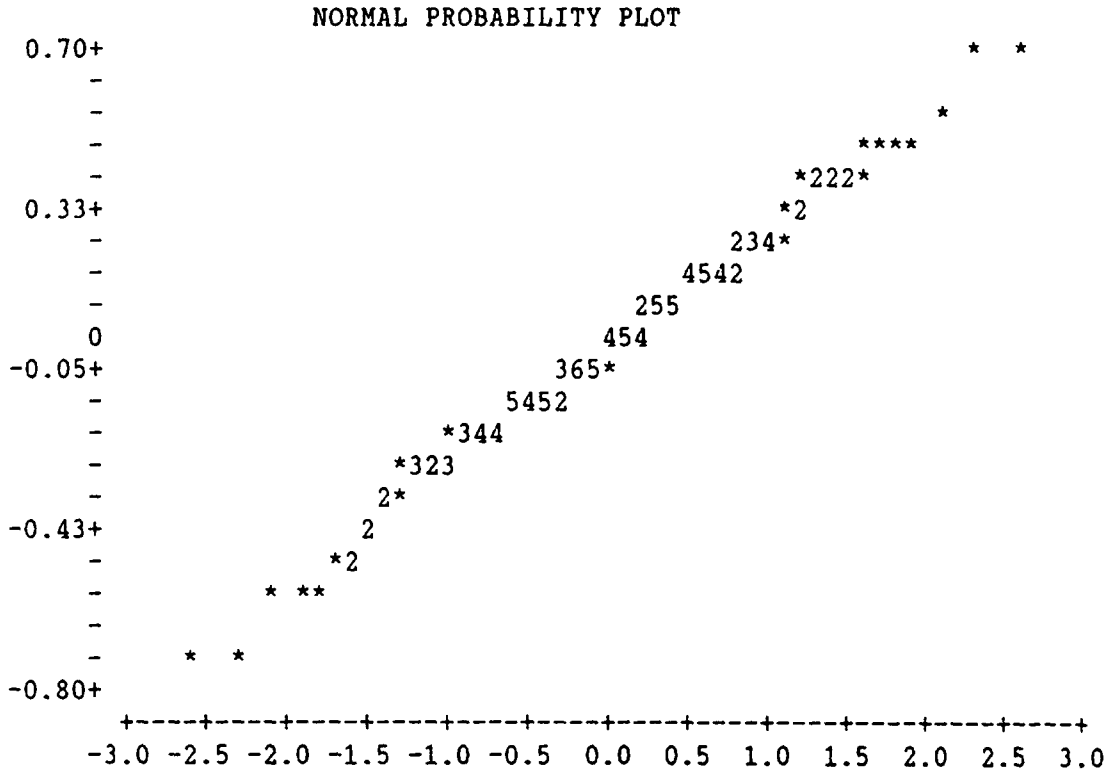
N = 133 P = 8.0 DELTA = 0.0000 SIGMA(B)-SQUARED MLE = 0.0758

LOWER QUARTILE = -0.1646 MEDIAN = -0.0047 UPPER QUARTILE = 0.1986

MIDSPREAD = 0.3633 ROBUST SIGMA(B)-SQUARED EST.= 0.0725

APPENDIX C6 (CTD)

T E S T I N G N O R M A L I T Y



SQUARED CORRELATION OF WEIGHTED RESIDUALS
AND EXPECTED NORMAL SCORES = 0.994

P-VALUE IS LARGER THAN 0.5

APPENDIX D1

YEAR		EXPECTED PAYMENTS/OBSERVED PAYMENTS				(PAYMENTS IN $1000 S)		FORECAST MEAN PAYMENTS/STANDARD ERRORS					
1973	EXP:	198	879	1370	1370	1165	991	1053	437	229	96	236	181
	OBS:	103	910	1679	1373	1835	1186	492	350	342	122	5	100
1974	EXP:	201	892	1390	1390	1182	1254	1332	554	290	121	299	229
	OBS:	162	1127	1559	1635	1709	1165	1842	321	29	115	671	273
1975	EXP:	208	923	1438	1438	1525	1618	1719	715	374	157	386	296
	OBS:	263	769	1039	1797	2240	1998	1832	628	272	716	119	269
1976	EXP:	228	1011	1575	1964	2083	2210	2348	976	510	214	527	324
	OBS:	259	1242	1457	2093	1974	1878	1658	910	252	215	320	118
1977	EXP:	235	1042	2025	2525	2677	2841	3018	1255	655	276	544	334
	OBS:	214	856	1122	2258	2757	3207	4246	950	713	127	539	215
1978	EXP:	228	1261	2450	3055	3240	3438	3653	1519	797	268	527	324
	OBS:	185	916	1820	2959	2694	3292	3737	2157	1060	461	2367	0
1979	EXP:	287	1581	3072	3832	4064	4313	4582	1906	801	269	530	326
	OBS:	221	1357	2568	3439	4808	5400	4633	2380	2199	92	1111	216
1980	EXP:	348	1916	3723	4644	4925	5227	5554	1852	778	261	515	317
	OBS:	261	1661	3664	2860	5273	4780	4540	1214	165	717	458	210
1981	EXP:	422	2327	4522	5642	5983	6351	5408	1803	758	255	502	309
	OBS:	600	2239	3453	7210	5266	4789	4524	2112	159	222	446	204
1982	EXP:	499	2748	5338	6660	7064	6009	5117	1706	717	241	475	292
	OBS:	558	3510	5366	6325	6524	5872	6092	1159	613	210	422	193
1983	EXP:	608	3350	6609	8122	6903	5873	5001	1668	701	235	464	285
	OBS:	527	3218	6154	7158	5393	4902	6623	482	596	205	413	189
1984	EXP:	713	3925	7626	7626	6482	5514	4696	1566	658	221	435	268
	OBS:	170	3049	6627	7398	7638	4726	1361	452	559	193	387	177
1985	EXP:	206	1137	1770	1770	1504	1280	1090	363	152	51	100	61
	OBS:	348	1214	1609	1824	1384	366	316	105	130	45	90	41
	TOT.FOR PAYMENT YRS:						10057	5024	2646	1725	1348	928	597
	STANDARD ERRORS:						1750	1024	815	572	497	303	217

1973	EXP:	155	134	93	66	47	9
	OBS:	0	162	0	0	0	0
1974	EXP:	196	136	95	67	47	47
	OBS:	166	33	80	155	41	41
1975	EXP:	203	140	98	69	49	118
	OBS:	0	176	81	54	42	77
1976	EXP:	222	154	107	76	54	237
	OBS:	117	81	77	59	46	127
1977	EXP:	229	158	111	78	55	403
	OBS:	166	107	79	61	48	184
1978	FOR:	222	154	107	76	54	613
	STE:	146	104	77	59	46	241
1979	FOR:	224	155	108	76	54	842
	STE:	147	104	77	59	47	330
1980	FOR:	217	150	105	74	52	1431
	STE:	143	102	75	58	45	566
1981	FOR:	211	146	103	72	51	1648
	STE:	139	99	73	56	44	594
1982	FOR:	200	138	97	68	48	2276
	STE:	132	94	69	53	42	833
1983	FOR:	195	135	94	66	47	3891
	STE:	129	91	68	52	41	958
1984	FOR:	183	127	88	62	44	8349
	STE:	121	86	64	49	38	1638
1985	FOR:	42	29	29	14	10	3210
	STE:	28	20	15	11	9	538
		384	232	125	58	10	23160
		160	115	77	43	9	2771

APPENDIX D2

TABLE OF OBSERVED AND EXPECTED BY YEAR
(WEIGHTED)

ACC. YEAR	EXPECTED	OBSERVED	DIFFERENCE	%ER	PMNT YEAR	EXPECTED	OBSERVED	DIFFERENCE	%ER
	(PAYMENTS IN $1'S)					(PAYMENTS IN $1's)			
73	7581	8054	473	5	73	198	103	-95	-92
74	8460	9781	1321	13	74	1080	1072	-8	0
75	9815	10640	825	7	75	2470	3074	604	19
76	12700	11637	-1063	-9	76	3911	3960	49	1
77	15959	15879	-80	0	77	5239	5965	726	12
78	19072	18317	-755	-4	78	6457	7100	643	9
79	23867	25292	1425	5	79	9368	8249	-1119	-13
80	28337	24379	-3958	-16	80	12374	11760	-614	-5
81	32568	30214	-2354	-7	81	15659	14625	-1034	-7
82	35142	35397	255	0	82	19580	18109	-1471	-8
83	36366	33975	-2391	-7	83	24090	23661	-429	-1
84	31173	29438	-1735	-5	84	28656	31411	2755	8
85	6387	6379	-8	0	85	34845	32923	-1922	-5
					86	38130	33568	-4562	-13
					87	29904	26501	-3403	-12
					88	21450	23077	1627	7
					89	14015	14224	209	1

APPENDIX D3

DEVELOPMENT FACTORS OF LOGNORMALIZED PAYMENTS

		EXPECTED DEVELOPMENT FACTORS/STD. ERRORS			FORECAST DEVELOPMENT FACTORS/STD. ERRORS						
		0: 1	1: 2	2: 3	3: 4	4: 5	5: 6	6: 7	7: 8	8: 9	9:10	10:11
1973	EXP:	1.4841	0.4449	0.0000	-0.1617	-0.1617	0.0593	-0.8766	-0.8766	-0.8766	0.8873	-0.1536
	SE.:	0.1141	0.0942	0.0000	0.0307	0.0307	0.0304	0.0698	0.0698	0.0698	0.2888	0.1013
1974	EXP:	1.4841	0.4449	0.0000	-0.1617	0.0593	0.0593	-0.8766	-0.8766	-0.8766	0.8873	-0.1536
	SE.:	0.1141	0.0942	0.0000	0.0307	0.0304	0.0304	0.0698	0.0698	0.0698	0.2888	0.1013
1975	EXP:	1.4841	0.4449	0.0000	0.0593	0.0593	0.0593	-0.8766	-0.8766	-0.8766	0.8873	-0.1536
	SE.:	0.1141	0.0942	0.0000	0.0304	0.0304	0.0304	0.0698	0.0698	0.0698	0.2888	0.1013
1976	EXP:	1.4841	0.4449	0.2209	0.0593	0.0593	0.0593	-0.8766	-0.8766	-0.8766	0.8873	-0.3745
	SE.:	0.1141	0.0942	0.0103	0.0304	0.0304	0.0304	0.0698	0.0698	0.0698	0.2888	0.1010
1977	EXP:	1.4841	0.6659	0.2209	0.0593	0.0593	0.0593	-0.8766	-0.8766	-0.8766	0.6664	-0.3745
	SE.:	0.1141	0.0936	0.0103	0.0304	0.0304	0.0304	0.0698	0.0698	0.0698	0.2889	0.1010
1978	EXP:	1.7050	0.6659	0.2209	0.0593	0.0593	0.0593	-0.8766	-0.8766	-1.0975	0.6664	-0.3745
	SE.:	0.1137	0.0936	0.0103	0.0304	0.0304	0.0304	0.0698	0.0698	0.0696	0.2889	0.1010
1979	EXP:	1.7050	0.6659	0.2209	0.0593	0.0593	0.0593	-0.8766	-1.0975	-1.0975	0.6664	-0.3745
	SE.:	0.1137	0.0936	0.0103	0.0304	0.0304	0.0304	0.0698	0.0696	0.0696	0.2889	0.1010
1980	EXP:	1.7050	0.6659	0.2209	0.0593	0.0593	0.0593	-1.0975	-1.0975	-1.0975	0.6664	-0.3745
	SE.:	0.1137	0.0936	0.0103	0.0304	0.0304	0.0304	0.0696	0.0696	0.0696	0.2889	0.1010
1981	EXP:	1.7050	0.6659	0.2209	0.0593	0.0593	-0.1617	-1.0975	-1.0975	-1.0975	0.6664	-0.3745
	SE.:	0.1137	0.0936	0.0103	0.0304	0.0304	0.0307	0.0696	0.0696	0.0696	0.2889	0.1010
1982	EXP:	1.7050	0.6659	0.2209	0.0593	-0.1617	-0.1617	-1.0975	-1.0975	-1.0975	0.6664	-0.3745
	SE.:	0.1137	0.0936	0.0103	0.0304	0.0307	0.0307	0.0696	0.0696	0.0696	0.2889	0.1010
1983	EXP:	1.7050	0.6659	0.2209	-0.1617	-0.1617	-0.1617	-1.0975	-1.0975	-1.0975	0.6664	-0.3745
	SE.:	0.1137	0.0936	0.0103	0.0307	0.0307	0.0307	0.0696	0.0696	0.0696	0.2889	0.1010
1984	EXP:	1.7050	0.6659	0.0000	-0.1617	-0.1617	-0.1617	-1.0975	-1.0975	-1.0975	0.6664	-0.3745
	SE.:	0.1137	0.0936	0.0000	0.0307	0.0307	0.0307	0.0696	0.0696	0.0696	0.2889	0.1010
1985	EXP:	1.7050	0.4449	0.0000	-0.1617	-0.1617	-0.1617	-1.0975	-1.0975	-1.0975	0.6664	-0.3745
	SE.:	0.1137	0.0942	0.0000	0.0307	0.0307	0.0307	0.0696	0.0696	0.0696	0.2889	0.1010

APPENDIX B1 (CTD):

		11:12	12:13	13:14	14:15	15:16
1973	EXP:	-0.1536	-0.1613	-0.1610	-0.1610	-0.1610
	SE.:	0.1613	0.1613	0.1610	0.1610	0.1610
1974	EXP:	-0.1536	-0.1745	-0.1745	-0.1745	-0.1745
	SE.:	0.1613	0.1610	0.1610	0.1610	0.1610
1975	EXP:	-0.1745	-0.1745	-0.1745	-0.1745	-0.1745
	SE.:	0.1610	0.1613	0.1610	0.1610	0.1610
1976	EXP:	-0.1745	-0.1745	-0.1745	-0.1745	-0.1745
	SE.:	0.1610	0.1610	0.1610	0.1610	0.1610
1977	EXP:	-0.1745	-0.1745	-0.1745	-0.1745	-0.1745
	SE.:	0.1610	0.1610	0.1610	0.1610	0.1610
1978	FOR:	-0.1745	-0.1745	-0.1745	-0.1745	-0.1745
	SE.:	0.1613	0.1610	0.1610	0.1610	0.1610
1979	FOR:	-0.1745	-0.1745	-0.1745	-0.1745	-0.1745
	SE.:	0.1613	0.1610	0.1610	0.1610	0.1610
1980	FOR:	-0.1745	-0.1745	-0.1745	-0.1745	-0.1745
	SE.:	0.1613	0.1613	0.1610	0.1613	0.1610
1981	FOR:	-0.1745	-0.1745	-0.1745	-0.1745	-0.1745
	SE.:	0.1613	0.1613	0.1610	0.1610	0.1610
1982	FOR:	-0.1745	-0.1745	-0.1745	-0.1745	-0.1745
	SE.:	0.1610	0.1613	0.1613	0.1610	0.1613
1983	FOR:	-0.1745	-0.1745	-0.1745	-0.1745	-0.1745
	SE.:	0.1610	0.1610	0.1610	0.1610	0.1610
1984	FOR:	-0.1745	-0.1745	-0.1745	-0.1745	-0.1745
	SE.:	0.1610	0.1610	0.1610	0.1610	0.1610
1985	FOR:	-0.1745	-0.1745	-0.1745	-0.1745	-0.1745
	SE.:	0.1610	0.1610	0.1610	0.1610	0.1610

APPENDIX B4

DEVELOPMENT FACTORS OF NORMALIZED PAYMENTS

	EXPECTED DEVELOPMENT FACTORS/STD. ERRORS				FORECAST DEVELOPMENT FACTORS/STD. ERRORS						
	0: 1	1: 2	2: 3	3: 4	4: 5	5: 6	6: 7	7: 8	8: 9	9:10	10:11
1973 EXP:	4.7893	1.6908	1.0788	0.9182	0.9182	1.1452	0.4501	0.5647	0.7084	4.2994	1.3279
SE.:	2.0263	0.7055	0.4365	0.3728	0.3728	0.4649	0.1853	0.5177	0.9758	6.2808	1.5634
1974 EXP:	4.7893	1.6908	1.0788	0.9182	1.1452	1.1452	0.4501	0.5647	0.7084	4.2994	1.3279
SE.:	2.0263	0.7055	0.4365	0.3728	0.4649	0.4649	0.1853	0.5177	0.9758	6.2808	1.5634
1975 EXP:	4.7893	1.6908	1.0788	1.1452	1.1452	1.1452	0.4501	0.5647	0.7084	4.2994	1.3279
SE.:	2.0263	0.7055	0.4365	0.4649	0.4649	0.4649	0.1853	0.5177	0.9758	6.2808	1.5634
1976 EXP:	4.7893	1.6908	1.3455	1.1452	1.1452	1.1452	0.4501	0.5647	0.7084	4.2994	1.0646
SE.:	2.0263	0.7055	0.5447	0.4649	0.4649	0.4649	0.1853	0.5177	0.9758	6.2808	1.2582
1977 EXP:	4.7893	2.1087	1.3455	1.1452	1.1452	1.1452	0.4501	0.5647	0.7084	3.4473	1.0646
SE.:	2.0263	0.8796	0.5447	0.4649	0.4649	0.4649	0.1853	0.5177	0.9758	5.0361	1.2582
1978 EXP:	5.9732	2.1087	1.3455	1.1452	1.1452	1.1452	0.4501	0.5647	0.5680	3.4473	1.0646
SE.:	2.5263	0.8796	0.5447	0.4649	0.4649	0.4649	0.1853	0.5177	0.7824	5.0361	1.2582
1979 EXP:	5.9732	2.1087	1.3455	1.1452	1.1452	1.1452	0.4501	0.4527	0.5680	3.4473	1.0646
SE.:	2.5263	0.8796	0.5447	0.4649	0.4649	0.4649	0.1853	0.4151	0.7824	5.0361	1.2582
1980 EXP:	5.9732	2.1087	1.3455	1.1452	1.1452	1.1452	0.3609	0.4527	0.5680	3.4473	1.0646
SE.:	2.5263	0.8796	0.5447	0.4649	0.4649	0.4649	0.1485	0.4151	0.7824	5.0361	1.2582
1981 EXP:	5.9732	2.1087	1.3455	1.1452	1.1452	0.9182	0.3609	0.4527	0.5680	3.4473	1.0646
SE.:	2.5263	0.8796	0.5447	0.4649	0.4649	0.3728	0.1485	0.4151	0.7824	5.0361	1.2582
1982 EXP:	5.9732	2.1087	1.3455	1.1452	0.9182	0.9182	0.3609	0.4527	0.5680	3.4473	1.0646
SE.:	2.5263	0.8796	0.5447	0.4649	0.3728	0.3728	0.1485	0.4151	0.7824	5.0361	1.2582
1983 EXP:	5.9732	2.1087	1.3455	0.9182	0.9182	0.9182	0.3609	0.4527	0.5680	3.4473	1.0646
SE.:	2.5263	0.8796	0.5447	0.3728	0.3728	0.3728	0.1485	0.4151	0.7824	5.0361	1.2582
1984 EXP:	5.9732	2.1087	1.0788	0.9182	0.9182	0.9182	0.3609	0.4527	0.5680	3.4473	1.0646
SE.:	2.5263	0.8796	0.4365	0.3728	0.3728	0.3728	0.1485	0.4151	0.7824	5.0361	1.2582
1985 EXP:	5.9732	1.6908	1.0788	0.9182	0.9182	0.9182	0.3609	0.4527	0.5680	3.4473	1.0646
SE.:	2.5263	0.7055	0.4365	0.3728	0.3728	0.3728	0.1485	0.4151	0.7824	5.0361	1.2582

		11:12	12:13	13:14	14:15	15:16
1973	EXP:	1.2045	1.2045	0.9657	0.9657	0.9657
	SE.:	1.1879	1.1879	0.9523	0.9523	0.9523
1974	EXP:	1.2045	0.9657	0.9657	0.9657	0.9657
	SE.:	1.1879	0.9523	0.9523	0.9523	0.9523
1975	EXP:	0.9657	0.9657	0.9657	0.9657	0.9657
	SE.:	0.9523	0.9523	0.9523	0.9523	0.9523
1976	EXP:	0.9657	0.9657	0.9657	0.9657	0.9657
	SE.:	0.9523	0.9523	0.9523	0.9523	0.9523
1977	EXP:	0.9657	0.9657	0.9657	0.9657	0.9657
	SE.:	0.9523	0.9523	0.9523	0.9523	0.9523
1978	FOR:	0.9657	0.9657	0.9657	0.9657	0.9657
	SE.:	0.9523	0.9523	0.9523	0.9523	0.9523
1979	FOR:	0.9657	0.9657	0.9657	0.9657	0.9657
	SE.:	0.9523	0.9523	0.9523	0.9523	0.9523
1980	FOR:	0.9657	0.9657	0.9657	0.9657	0.9657
	SE.:	0.9523	0.9523	0.9523	0.9523	0.9523
1981	FOR:	0.9657	0.9657	0.9657	0.9657	0.9657
	SE.:	0.9523	0.9523	0.9523	0.9523	0.9523
1982	FOR:	0.9657	0.9657	0.9657	0.9657	0.9657
	SE.:	0.9523	0.9523	0.9523	0.9523	0.9523
1983	FOR:	0.9657	0.9657	0.9657	0.9657	0.9657
	SE.:	0.9523	0.9523	0.9523	0.9523	0.9523
1984	FOR:	0.9657	0.9657	0.9657	0.9657	0.9657
	SE.:	0.9523	0.9523	0.9523	0.9523	0.9523
1985	FOR:	0.9657	0.9657	0.9657	0.9657	0.9657
	SE.:	0.9523	0.9523	0.9523	0.9523	0.9523

APPENDIX D6

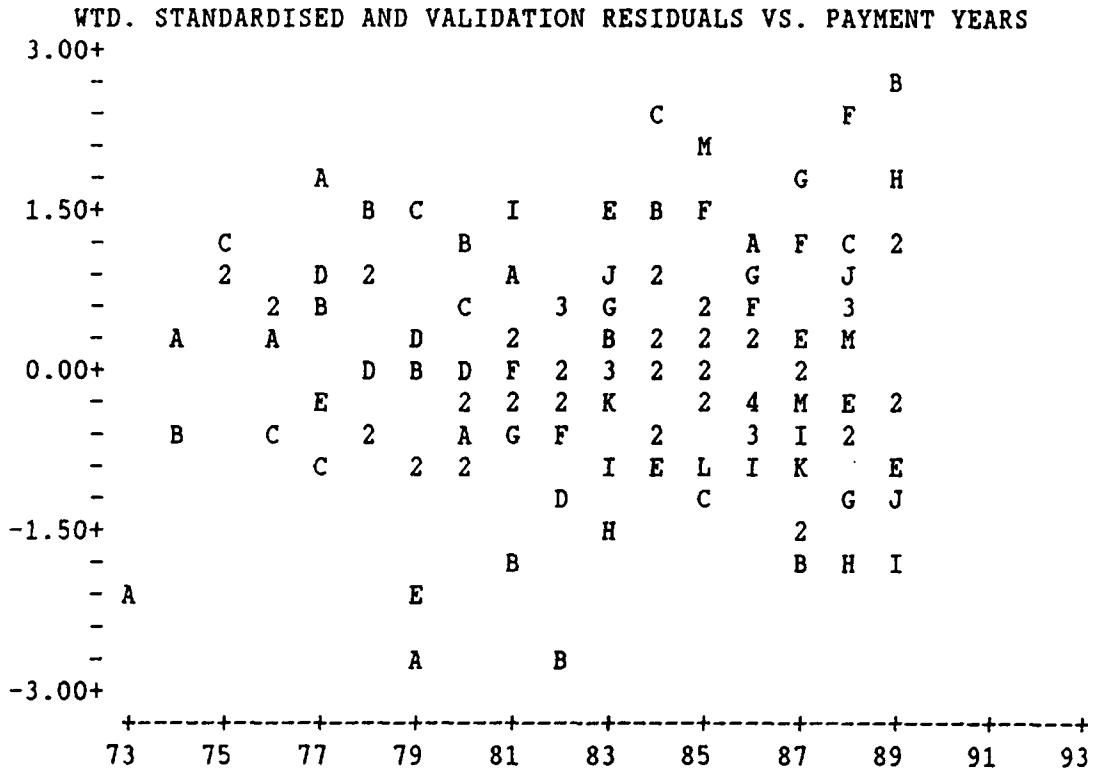
MULTIPLICATIVE DEVELOPMENT FACTORS OF NORMALISED PAYMENTS

	EXPECTED DEVELOPMENT FACTORS/STD. ERRORS			FORECAST DEVELOPMENT FACTORS/STD. ERRORS							
	0: 1	1: 2	2: 3	3: 4	4: 5	5: 6	6: 7	7: 8	8: 9	9:10	10:11
1973 EXP:	4.4107	1.5581	1.0000	0.8504	0.8512	1.0621	0.4160	0.5244	0.4201	2.4526	0.7682
SE.:	1.8278	0.6373	0.3977	0.3392	0.3395	0.4239	0.1681	0.4667	0.5030	3.0455	0.8253
1974 EXP:	4.4107	1.5581	1.0000	0.8504	1.0612	1.0621	0.4160	0.5245	0.4201	2.4527	0.7682
SE.:	1.8278	0.6373	0.3977	0.3392	0.4231	0.4238	0.1681	0.4666	0.5029	3.0449	0.8252
1975 EXP:	4.4107	1.5581	1.0000	1.0602	1.0612	1.0622	0.4160	0.5245	0.4201	2.4527	0.7683
SE.:	1.8278	0.6373	0.3977	0.4227	0.4230	0.4236	0.1680	0.4666	0.5029	3.0446	0.8253
1976 EXP:	4.4107	1.5581	1.2468	1.0603	1.0612	1.0622	0.4161	0.5246	0.4201	2.4528	0.6160
SE.:	1.8278	0.6373	0.4960	0.4226	0.4229	0.4236	0.1680	0.4666	0.5029	3.0447	0.6617
1977 EXP:	4.4107	1.9426	1.2469	1.0603	1.0613	1.0623	0.4161	0.5246	0.4202	1.9664	0.6160
SE.:	1.8278	0.7942	0.4959	0.4225	0.4228	0.4235	0.1680	0.4666	0.5030	2.4411	0.6617
1978 EXP:	5.4999	1.9426	1.2471	1.0604	1.0613	1.0623	0.4161	0.5246	0.3368	1.9664	0.6160
SE.:	2.2782	0.7940	0.4958	0.4225	0.4228	0.4235	0.1680	0.4667	0.4032	2.4411	0.6617
1979 EXP:	5.4999	1.9426	1.2472	1.0604	1.0614	1.0624	0.4162	0.4206	0.3368	1.9664	0.6160
SE.:	2.2779	0.7939	0.4958	0.4225	0.4229	0.4235	0.1681	0.3741	0.4032	2.4411	0.6617
1980 EXP:	5.4999	1.9426	1.2473	1.0604	1.0614	1.0624	0.3336	0.4206	0.3368	1.9664	0.6160
SE.:	2.2779	0.7939	0.4959	0.4226	0.4229	0.4237	0.1347	0.3741	0.4032	2.4411	0.6617
1981 EXP:	5.5000	1.9426	1.2475	1.0605	1.0615	0.8516	0.3336	0.4206	0.3368	1.9664	0.6160
SE.:	2.2780	0.7940	0.4960	0.4227	0.4231	0.3397	0.1347	0.3741	0.4032	2.4411	0.6617
1982 EXP:	5.5000	1.9426	1.2476	1.0605	0.8508	0.8516	0.3336	0.4206	0.3368	1.9664	0.6160
SE.:	2.2785	0.7941	0.4962	0.4228	0.3392	0.3397	0.1347	0.3741	0.4032	2.4411	0.6617
1983 EXP:	5.5000	1.9426	1.2477	0.8509	0.8508	0.8516	0.3336	0.4206	0.3368	1.9664	0.6160
SE.:	2.2791	0.7943	0.4964	0.3390	0.3392	0.3397	0.1347	0.3741	0.4032	2.4411	0.6617
1984 EXP:	5.5001	1.9426	1.0000	0.8500	0.8508	0.8516	0.3336	0.4206	0.3368	1.9664	0.6160
SE.:	2.2801	0.7947	0.3978	0.3390	0.3392	0.3397	0.1347	0.3741	0.4032	2.4411	0.6617
1985 EXP:	5.5001	1.5568	1.0000	0.8500	0.8508	0.8516	0.3336	0.4206	0.3368	1.9664	0.6160
SE.:	2.2812	0.6372	0.3978	0.3390	0.3392	0.3397	0.1347	0.3741	0.4032	2.4411	0.6617

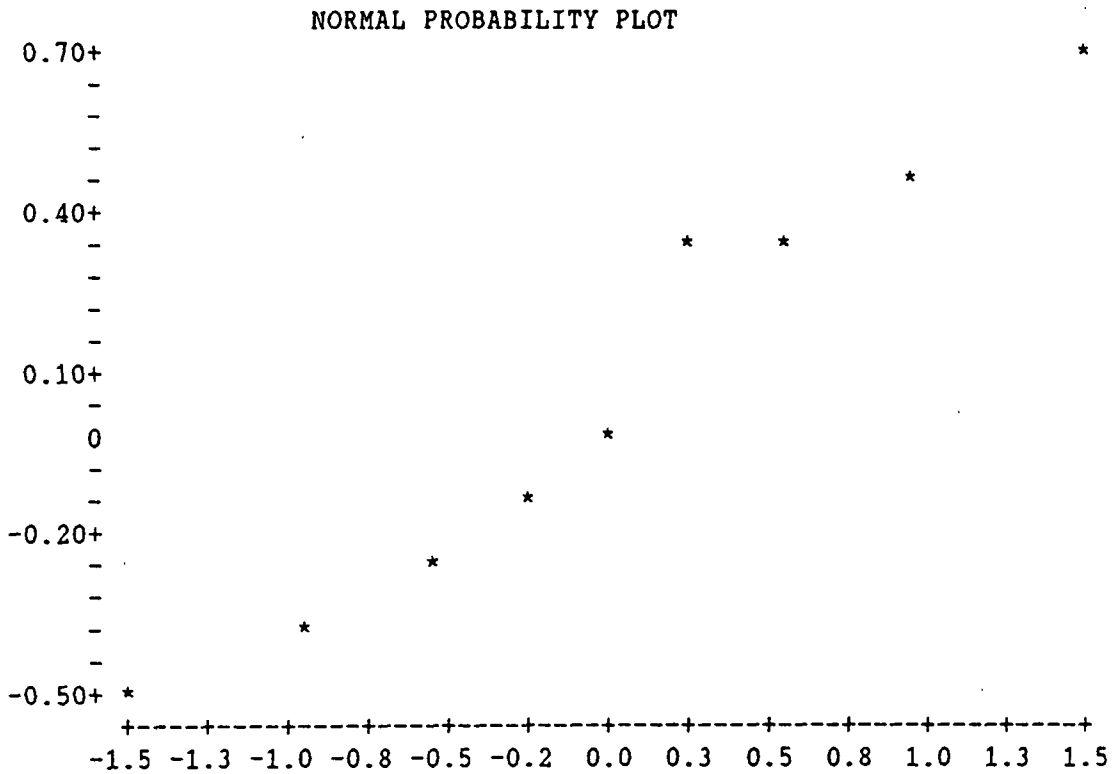
		11:12	12:13	13:14	14:15	15:16
1973	EXP:	0.3555	0.3644	0.7001	0.7073	0.7146
	SE.:	0.7770	0.7371	0.6460	0.6632	0.6934
1974	EXP:	0.3556	0.6930	0.7001	0.7073	0.7146
	SE.:	0.7770	0.6311	0.6460	0.6632	0.6934
1975	EXP:	0.6860	0.6930	0.7001	0.7073	0.7146
	SE.:	0.6229	0.6311	0.6460	0.6632	0.6934
1976	EXP:	0.6860	0.6930	0.7001	0.7073	0.7146
	SE.:	0.6229	0.6311	0.6460	0.6632	0.6934
1977	EXP:	0.6860	0.6930	0.7001	0.7073	0.7146
	SE.:	0.6229	0.6311	0.6460	0.6632	0.6934
1978	FOR:	0.6860	0.6930	0.7001	0.7073	0.7146
	SE.:	0.6229	0.6311	0.6460	0.6632	0.6934
1979	FOR:	0.6860	0.6930	0.7001	0.7073	0.7146
	SE.:	0.6229	0.6311	0.6460	0.6632	0.6934
1980	FOR:	0.6860	0.6930	0.7001	0.7073	0.7146
	SE.:	0.6229	0.6311	0.6460	0.6632	0.6934
1981	FOR:	0.6860	0.6930	0.7001	0.7073	0.7146
	SE.:	0.6229	0.6311	0.6460	0.6632	0.6934
1982	FOR:	0.6860	0.6930	0.7001	0.7073	0.7146
	SE.:	0.6229	0.6311	0.6460	0.6632	0.6934
1983	FOR:	0.6860	0.6930	0.7001	0.7073	0.7146
	SE.:	0.6229	0.6311	0.6460	0.6632	0.6934
1984	FOR:	0.6860	0.6930	0.7001	0.7073	0.7146
	SE.:	0.6229	0.6311	0.6460	0.6632	0.6934
1985	FOR:	0.6860	0.6930	0.7001	0.7073	0.7146
	SE.:	0.6229	0.6311	0.6460	0.6632	0.6934

APPENDIX E1

V A L I D A T I O N A N A L Y S I S



TESTING NORMALITY OF VALIDATION RESIDUALS



SQUARED CORRELATION OF WEIGHTED RESIDUALS
AND EXPECTED NORMAL SCORES = 0.943

P-VALUE IS LARGER THAN 0.5

APPENDIX E2

EXPECTED PAYMENTS/OBSERVED PAYMENTS (PAYMENTS IN $1 S)

YEAR													
1973	EXP:	138	974	1365	1365	1159	985	1047	439	228	96	255	176
	OBS:	103	910	1679	1373	1835	1186	492	350	341	122	5	100
1974	EXP:	201	887	1385	1385	1176	1248	1325	556	289	122	323	223
	OBS:	162	1127	1559	1635	1709	1165	1842	321	29	115	671	270
1975	EXP:	208	918	1433	1433	1519	1612	1712	718	373	158	418	289
	OBS:	268	769	1039	1707	2240	1898	1832	628	272	716	119	269
1976	EXP:	227	1006	1569	1959	2076	2203	2340	982	511	216	572	216
	OBS:	259	1242	1457	2093	1974	1878	1658	910	252	215	320	118
1977	EXP:	234	1036	2019	2520	2671	2835	3011	1263	658	278	589	326
	OBS:	214	856	1122	2258	2757	3207	4246	950	713	127	539	215
1978	EXP:	227	1255	2445	3051	3235	3433	3647	1530	797	270	572	316
	OBS:	185	916	1820	2959	2694	3292	3737	2157	1060	461	2367	0
1979	EXP:	286	1576	3069	3831	4062	4310	4579	1921	801	272	575	318
	OBS:	221	1357	2568	3439	4808	5400	4633	2380	2190	92	1111	203
1980	EXP:	347	1911	3722	4646	4926	5229	5554	1867	779	264	559	309
	OBS:	261	1661	3664	2860	5273	4780	4540	1214	165	717	481	197
1981	EXP:	422	2323	4525	5649	5990	6358	5409	1818	758	257	544	301
	OBS:	600	2239	3453	7210	5266	4789	4524	2112	150	215	469	192
1982	EXP:	498	2745	5345	6675	7078	6016	5118	1720	727	243	515	285
	OBS:	558	3510	5366	6325	6524	5872	6092	1150	584	203	444	182
1983	EXP:	608	3350	6523	8146	6917	5879	5002	1681	701	237	503	278
	OBS:	527	3218	6154	7158	5393	4992	6623	470	571	199	433	178
1984	EXP:	713	3928	7649	7649	6495	5520	4696	1578	658	223	472	261
	OBS:	170	3049	6627	7398	7638	4726	1318	441	536	186	407	167
1985	EXP:	206	1138	1775	1775	1507	1281	1090	366	152	51	109	60
	OBS:	349	1214	1609	1824	1384	354	306	102	124	43	95	39
TOT.FOR PAYMENT YRS:							9973	4934	2543	1620	1243	798	470
STANDARD ERRORS:							1703	999	793	563	490	269	179

FORECAST MEAN PAYMENTS/STANDARD ERRORS

APPENDIX E2 (CTD)

1973	EXP:	135	105	66	42	27	8
	OBS:	0	162	0	0	0	0
1974	EXP:	171	197	67	43	28	28
	OBS:	169	33	86	155	27	27
1975	EXP:	177	111	70	45	29	76
	OBS:	0	172	0	38	28	55
1976	EXP:	194	121	77	49	32	157
	OBS:	117	0	57	41	31	96
1977	EXP:	200	135	79	51	33	287
	OBS:	169	82	58	42	32	144
1978	FOR:	194	121	77	49	32	473
	STE:	124	81	57	41	31	199
1979	FOR:	195	122	77	49	32	794
	STE:	125	82	57	41	31	295
1980	FOR:	190	118	75	48	31	1329
	STE:	121	79	55	40	30	563
1981	FOR:	185	115	73	47	30	1551
	STE:	118	77	54	39	29	589
1982	FOR:	175	109	69	44	28	2185
	STE:	112	73	51	37	28	812
1983	FOR:	171	106	67	43	28	3816
	STE:	109	72	50	36	27	935
1984	FOR:	160	100	63	40	26	8278
	STE:	102	67	47	34	26	1591
1985	FOR:	36	22	14	9	6	3195
	STE:	24	16	11	3	6	523
		276	156	82	15	5	22162
		127	57	56	29	6	2689

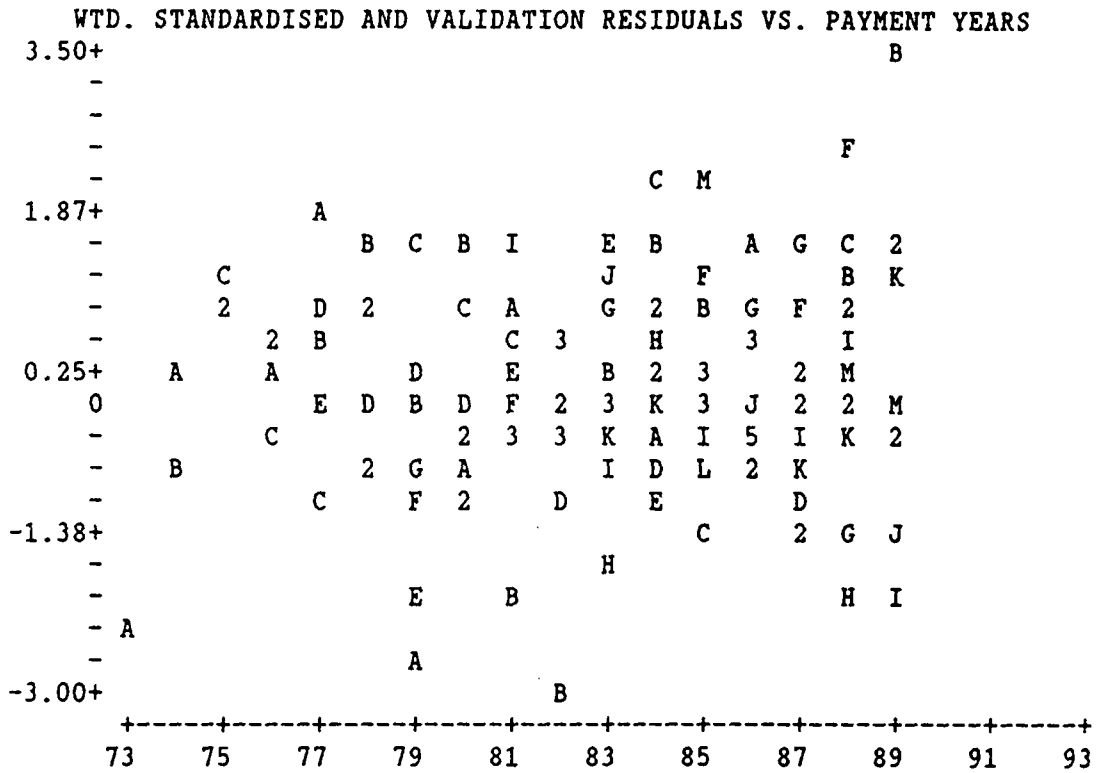
APPENDIX E3

TABLE OF OBSERVED AND EXPECTED BY YEAR
(WEIGHTED)

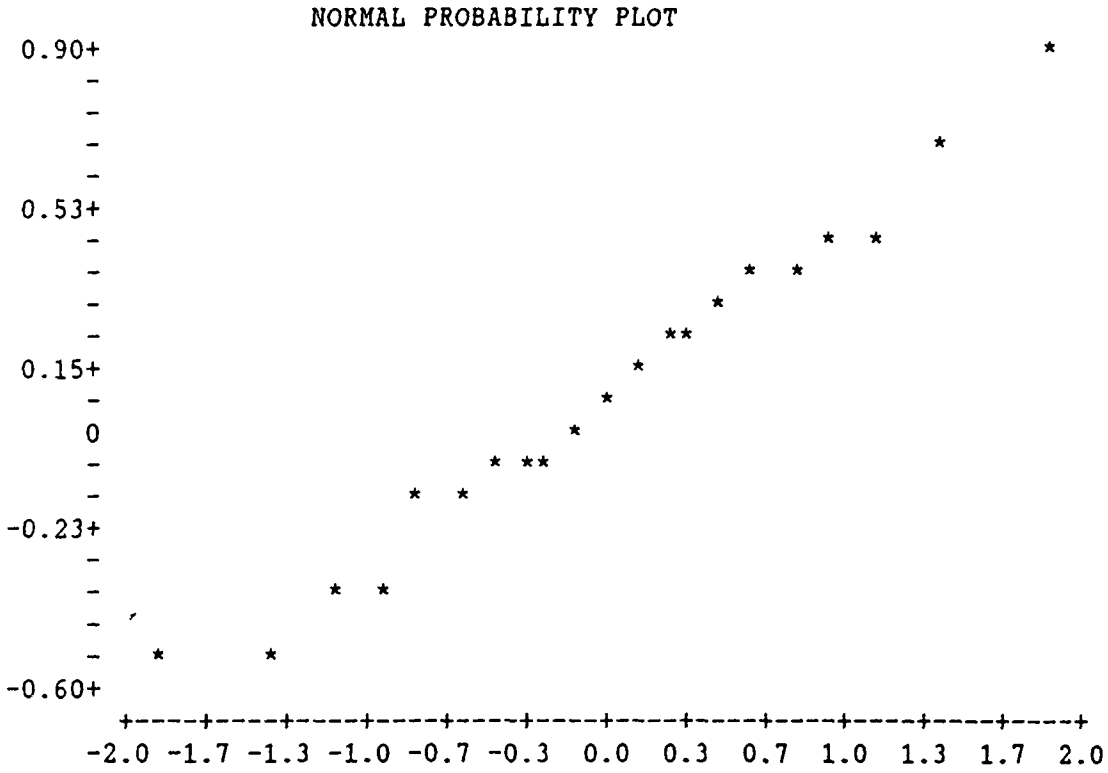
ACC. YEAR	EXPECTED	OBSERVED	DIFFERENCE	%ER	PMNT YEAR	EXPECTED	OBSERVED	DIFFERENCE	%ER
	(PAYMENTS IN $1'S)					(PAYMENTS IN $1's)			
73	7541	8054	513	6	73	198	103	-95	-91
74	8406	9781	1375	14	74	1075	1072	-3	0
75	9778	10640	862	8	75	2459	3074	615	19
76	12664	11637	-1027	-8	76	3895	3960	65	1
77	15927	15879	-48	0	77	5217	5965	748	12
78	19059	18317	-742	-4	78	6428	7100	672	9
79	23869	25292	1423	5	79	9332	8249	-1083	-13
80	28350	24379	-3971	-16	80	12339	11760	-579	-4
81	32602	30214	-2388	-7	81	15627	14625	-1002	-6
82	35196	35397	201	0	82	19557	18109	-1448	-7
83	36426	33975	-2451	-7	83	24082	23661	-421	-1
84	31241	29438	-1803	-6	84	28673	31411	2738	8
85	6402	6379	-23	0	85	34895	32923	-1972	-6
					86	38209	33568	-4641	-13
					87	29967	26501	-3466	-13
					88	21476	23077	1601	6
					89	14033	14224	191	1

APPENDIX F1

V A L I D A T I O N A N A L Y S I S



TESTING NORMALITY OF VALIDATION RESIDUALS



SQUARED CORRELATION OF WEIGHTED RESIDUALS
AND EXPECTED NORMAL SCORES = 0.923

(APPROXIMATE) P-VALUE = 0.090

APPENDIX F2

YEAR		EXPECTED PAYMENTS/OBSERVED PAYMENTS (PAYMENTS IN $1 $)						FORECAST MEAN PAYMENTS/STANDARD ERRORS					
1973	EXP:	198	878	1371	1371	1156	976	1028	449	242	106	235	152
	OBS:	103	910	1679	1373	1835	1186	492	350	341	122	5	100
1974	EXP:	201	891	1391	1391	1173	1234	1299	568	306	135	298	193
	OBS:	162	1127	1559	1635	1709	1165	1842	321	29	115	671	270
1975	EXP:	208	922	1439	1439	1512	1591	1675	732	394	174	384	249
	OBS:	268	769	1039	1707	2240	1898	1832	628	272	716	119	269
1976	EXP:	228	1010	1576	1963	2063	2170	2285	999	538	237	524	273
	OBS:	259	1242	1457	2093	1974	1878	1658	910	252	215	320	118
1977	EXP:	235	1041	2024	2521	2649	2787	2934	1283	691	305	540	281
	OBS:	214	856	1122	2258	2757	3207	4246	950	713	127	539	215
1978	EXP:	228	1258	2446	3047	3202	3369	3547	1551	836	296	524	273
	OBS:	185	916	1820	2959	2694	3292	3737	2157	1060	461	2367	0
1979	EXP:	286	1576	3064	3818	4013	4221	4446	1944	841	298	527	274
	OBS:	221	1357	2568	3439	4808	5400	4633	2380	2190	92	1111	174
1980	EXP:	346	1907	3709	4622	4858	5111	5383	1889	817	289	512	266
	OBS:	261	1661	3664	2860	5273	4780	4540	1214	165	717	442	169
1981	EXP:	420	2315	4501	5609	5896	6203	5242	1840	795	282	499	259
	OBS:	600	2239	3453	7210	5266	4789	4524	2112	150	231	431	165
1982	EXP:	495	2729	5307	6614	6953	5870	4960	1741	753	267	472	245
	OBS:	558	3510	5366	6325	6524	5872	6092	1150	599	219	408	156
1983	EXP:	604	3324	6464	8057	6795	5736	4847	1701	735	260	461	240
	OBS:	527	3218	6154	7158	5393	4902	6623	469	586	214	398	152
1984	EXP:	707	3891	7565	7565	6380	5386	4551	1597	690	244	433	225
	OBS:	170	3049	6627	7398	7638	4726	1259	440	550	201	374	143
1985	EXP:	294	1125	1756	1756	1481	1250	1056	370	160	56	100	52
	OBS:	348	1214	1609	1824	1384	340	292	102	128	47	87	33
					TOT.FOR PAYMENT YRS:		9692	4793	2423	1474	1079	665	376
					STANDARD ERRORS:		1651	984	780	529	449	252	179

1973 EXP:	111	83	51	33	21	8
OBS:	0	162	0	0	0	8
1974 EXP:	141	84	52	33	21	21
OBS:	100	33	80	155	29	29
1975 EXP:	145	87	54	34	22	56
OBS:	0	176	0	37	36	59
1976 EXP:	159	96	59	38	24	121
OBS:	117	0	52	41	33	102
1977 EXP:	164	99	61	39	25	224
OBS:	100	72	54	42	34	150
1978 FOR:	159	96	59	38	24	376
STE:	104	70	52	41	33	197
1979 FOR:	160	96	60	38	25	653
STE:	104	71	52	41	34	271
1980 FOR:	156	94	58	37	24	1146
STE:	101	69	51	40	33	514
1981 FOR:	152	91	56	36	23	1398
STE:	99	67	49	39	32	551
1982 FOR:	143	86	53	34	22	2075
STE:	93	63	47	37	30	801
1983 FOR:	140	84	52	33	21	3728
STE:	91	62	46	36	29	928
1984 FOR:	131	78	46	31	20	8051
STE:	86	58	43	34	28	1540
1985 FOR:	30	18	11	6	4	3111
STE:	20	13	10	8	6	506
	217	123	63	26	4	20903
	133	94	61	32	6	2699

APPENDIX F3

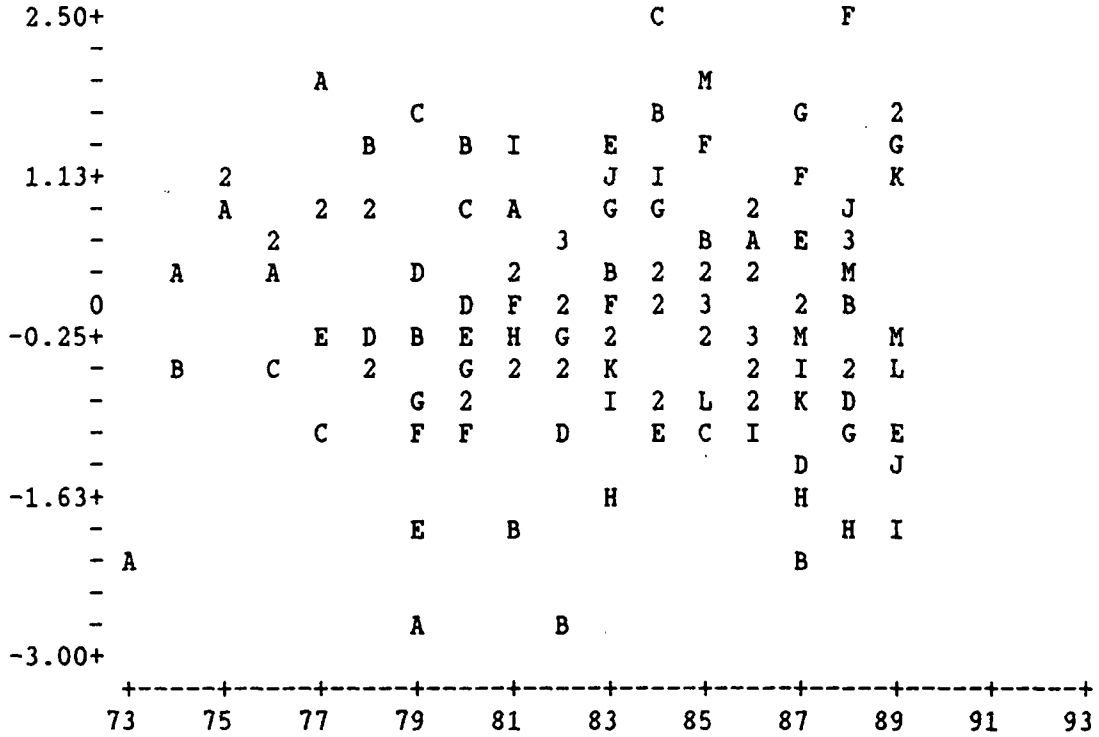
TABLE OF OBSERVED AND EXPECTED BY YEAR
(WEIGHTED)

ACC. YEAR	EXPECTED	OBSERVED	DIFFERENCE	%ER	PMNT YEAR	EXPECTED	OBSERVED	DIFFERENCE	%ER
	(PAYMENTS IN $1'S)					(PAYMENTS IN $1's)			
73	7529	8054	525	6	73	198	103	-95	-92
74	8366	9781	1415	14	74	1079	1072	-7	0
75	9730	10640	910	8	75	2469	3074	605	19
76	12579	11637	-942	-8	76	3911	3960	49	1
77	15795	15879	84	0	77	5230	5965	735	12
78	18886	18317	-569	-3	78	6433	7100	667	9
79	23606	25292	1686	6	79	9304	8249	-1055	-12
80	27983	24379	-3604	-14	80	12290	11760	-530	-4
81	32138	30214	-1924	-6	81	15535	14625	-910	-6
82	34669	35397	728	2	82	19402	18109	-1293	-7
83	35827	33975	-1852	-5	83	23846	23661	-185	0
84	30787	29438	-1349	-4	84	28329	31411	3082	9
85	6322	6379	57	0	85	34408	32923	-1485	-4
					86	37577	33568	-4009	-11
					87	29438	26501	-2937	-11
					88	21038	23077	2039	8
					89	13730	14224	494	3

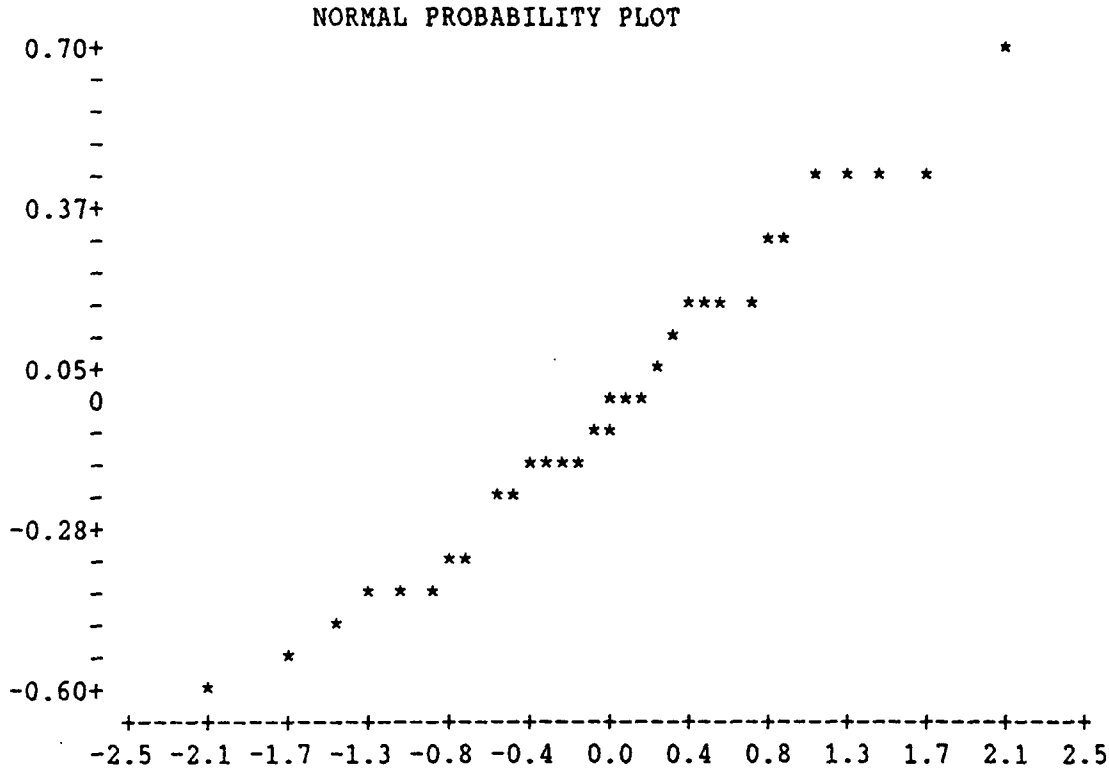
APPENDIX G1

V A L I D A T I O N A N A L Y S I S

WTD. STANDARDISED AND VALIDATION RESIDUALS VS. PAYMENT YEARS



TESTING NORMALITY OF VALIDATION RESIDUALS



SQUARED CORRELATION OF WEIGHTED RESIDUALS
AND EXPECTED NORMAL SCORES = 0.983

P-VALUE IS LARGER THAN 0.5

APPENDIX G2

YEAR		EXPECTED PAYMENTS/OBSERVED PAYMENTS (PAYMENTS IN $1 $)						FORECAST MEAN PAYMENTS/STANDARD ERRORS					
1973	EXP:	197	869	1356	1356	1153	982	1046	443	230	98	221	175
	OBS:	103	910	1679	1373	1835	1186	492	350	341	122	5	100
1974	EXP:	200	882	1376	1376	1170	1245	1326	562	292	125	280	223
	OBS:	162	1127	1559	1635	1709	1165	1842	321	29	115	671	270
1975	EXP:	207	912	1424	1424	1514	1611	1715	727	378	162	363	288
	OBS:	268	769	1039	1707	2240	1898	1832	628	272	716	119	269
1976	EXP:	226	999	1560	1950	2073	2205	2349	995	518	222	497	316
	OBS:	259	1242	1457	2093	1974	1878	1658	910	252	215	320	118
1977	EXP:	233	1030	2010	2512	2671	2842	3027	1283	668	286	513	326
	OBS:	214	856	1122	2258	2757	3207	4246	950	713	127	539	215
1978	EXP:	226	1249	2438	3048	3240	3447	3672	1556	811	278	497	316
	OBS:	185	916	1820	2959	2694	3292	3737	2157	1060	461	2367	91
1979	EXP:	285	1571	3065	3832	4074	4335	4618	1958	815	279	500	318
	OBS:	221	1357	2568	3439	4808	5400	4633	2380	2190	92	1111	204
1980	EXP:	346	1908	3723	4655	4949	5267	5612	1902	792	271	486	309
	OBS:	261	1661	3664	2860	5273	4780	4540	1214	165	717	431	198
1981	EXP:	422	2323	4533	5670	6028	6416	5465	1852	771	264	473	301
	OBS:	600	2239	3453	7210	5266	4789	4524	2112	150	217	419	193
1982	EXP:	499	2749	5365	6710	7135	6071	5171	1753	730	250	448	284
	OBS:	558	3510	5366	6325	6524	5872	6092	1150	578	205	397	183
1983	EXP:	610	3360	6558	8203	6973	5933	5054	1713	713	244	438	278
	OBS:	527	3218	6154	7158	5393	4902	6623	472	565	200	388	178
1984	EXP:	717	3947	7702	7702	6547	5571	4745	1608	670	229	411	261
	OBS:	170	3049	6627	7398	7638	4726	1312	443	530	188	364	168
1985	EXP:	207	1146	1788	1788	1519	1293	1101	373	155	52	95	60
	OBS:	348	1214	1609	1824	1384	351	305	103	123	44	85	39
	TOT.FOR PAYMENT YRS:						10291	5211	2794	1855	1467	1061	736
	STANDARD ERRORS:						1763	1097	918	729	669	576	527

APPENDIX G2 (CTD)

1973	EXP:	159	152	121	102	88	8
	OBS:	0	162	0	0	0	8
1974	EXP:	202	154	123	103	91	91
	OBS:	160	33	80	155	167	167
1975	EXP:	210	160	127	107	94	201
	OBS:	0	176	0	146	172	287
1976	EXP:	230	175	140	117	103	360
	OBS:	117	0	145	160	189	419
1977	EXP:	237	180	144	121	106	551
	OBS:	160	147	150	165	195	519
1978	FOR:	230	175	140	117	103	764
	STE:	156	142	145	163	189	570
1979	FOR:	231	176	142	118	103	1086
	STE:	156	143	146	161	190	620
1980	FOR:	224	171	136	114	100	1541
	STE:	152	139	142	157	184	711
1981	FOR:	218	166	133	111	98	1765
	STE:	148	135	138	152	180	725
1982	FOR:	207	157	126	105	93	2389
	STE:	140	128	131	144	170	903
1983	FOR:	202	154	123	103	90	4057
	STE:	137	125	128	141	166	1817
1984	FOR:	189	144	115	96	85	8554
	STE:	129	117	120	132	156	1635
1985	FOR:	43	33	26	22	19	3271
	STE:	30	27	28	31	36	533
		509	339	209	102	15	24581
		462	380	287	177	36	5142

APPENDIX G3

TABLE OF OBSERVED AND EXPECTED BY YEAR
(WEIGHTED)

ACC. YEAR	EXPECTED	OBSERVED	DIFFERENCE	%ER	PMNT YEAR	EXPECTED	OBSERVED	DIFFERENCE	%ER
	(PAYMENTS IN $1'S)					(PAYMENTS IN $1's)			
73	7523	8054	531	6	73	197	103	-94	-90
74	8420	9781	1361	13	74	1068	1072	4	0
75	9765	10640	875	8	75	2445	3074	629	20
76	12659	11637	-1022	-8	76	3872	3960	88	2
77	15945	15879	-66	0	77	5187	5965	778	13
78	19104	18317	-787	-4	78	6393	7100	707	9
79	23965	25292	1327	5	79	9298	8249	-1049	-12
80	28515	24379	-4136	-16	80	12319	11760	-559	-4
81	32819	30214	-2605	-8	81	15627	14625	-1002	-6
82	35452	35397	-55	0	82	19589	18109	-1480	-8
83	36690	33975	-2715	-7	83	24163	23661	-502	-2
84	31469	29438	-2031	-6	84	28811	31411	2600	8
85	6448	6379	-69	-1	85	35122	32923	-2199	-6
					86	38546	33568	-4978	-14
					87	30237	26501	-3736	-14
					88	21705	23077	1372	5
					89	14194	14224	30	0

MR. FINGER: Just to jump ahead a little bit, I think the main difference in our conclusions is going to come about as to how the inflation rate is handled. One of the exhibits Ben had up there was that, if he estimated the inflation rate across all of the years, it came up to something like 16 percent. Then, in his refined model, he put in I think, 0 percent for the first six years, and then 22 percent for the middle period, and 0 percent for the last period.

Basically, the difference he gets versus my method is that he's extrapolating out a 0 percent inflation rate into the future; whereas, my methods and the typical actuarial method is going to have some kind of an average inflation rate over time. So I'm projecting out a much higher inflation rate over the next few years,and I think that's where the difference comes about. So that's sort of the end ofthe story.

Briefly, I will go back and show you how this develops. I want to spend a little time going over some basic concepts of what I'm doing, because it's a little bit different than what you might have seen elsewhere. It's definitely a more traditional type method, but there are a few different twists.

Basically, what I'm doing is looking at each accident year, starting from the oldest rolling forward, and making an estimate of what I think the costs are for that accident year. Basically, what I'm doing is picking an average reserve for the open claims on that accident year, and there are three general ways that I have of coming up with that average reserve.

In this case, we're talking about accident year data,so when I say an average reserve, it's really a reserve that is going to include both the case reserves and IBNR. So maybe that's kind of a conceptual hurdle we have to jump over. But as long as the reporting pattern stays relatively consistent and our IBNR claims have more or less the same relationship to reported claims, then it all works. Typically, I do this analysis on report year claims, so there isn't really a conceptual problem of figuring out what the average reserve is.

There are three ways that I can come up with an average reserve. In practice I usually mix the different methods, but I'll explain briefly each way. I think a very important part of this data set is the limit on claims and the fact that the average claim is getting very large in comparison to the limit.

So when we look at how claims are inflating or the average size is going up, over time, much more of the cost is above the limit. So we have funny things that are happening to inflation rates and to average sizes, and, very clearly, the reporting pattern or development pattern is changing.

I think a lot of that is due to just the fact that the limit has an impact on claims. It could also be that inflation is slowing

down, and I think probably it's a combination of the two. It's a little hard to know which it is, but, very definitely, either one could result in what we're seeing in the data.

I'm going to go through briefly, looking at data limited to $100,000 per claim and show that, very definitely, the development patterns are changing. Then I'll look at the indexed layer, which is what we're trying to determine. I also have another little technique that I try to work out to put the development factors on an unlimited basis. That is to try to take out the impact of the indexing and the limit altogether. Finally, I will come back and try to compare what I get to what Ben got.

Now, the basic thing that I'm trying to do is to find patterns that are going to repeat or patterns that are consistent over time. If we look at the development of paid claims on almost any liability line, and we isolate a group of claims, the bigger claims tend to be settled later in time. So if we graph like an average closed claim cost over time, it goes up, generally speaking.

What I've done in my analysis is to, instead of looking at developments over a time period or lapsed time, 12 months, 24, 36, I look at it compared to the percentage of claims that have closed. And the reason for that is because if we have an increasing average paid claim over time, then we're going to get distortion if, say, at 48 months, we've got 75 percent settled in one accident year, and 60 percent in another. Because if we have fewer claims settled in one year, we would expect to have a lower average, other things being equal.

So in everything that I've done, I've adjusted for the percentage of claims that have been closed. When we're doing an accident year analysis, this means we've got to take an extra step and figure out how many claims we're going to have for that accident year. So that's an extra little complication.

Another problem is that we don't have historical data for 43.7 percent of the claims closed. At least it's possible, if you had individual claim data, you could go back and figure out where that was. What I do is just use the actual data, evaluate it at 12, 24, 36, 48 months, whatever it is, and then do a linear interpolation on the averages. So if I get a matrix that's payments, divide by the number of claims that have been closed, and I will interpolate among the averages.

(Slide)

Now, if we look at development patterns, companies can vary, and different lines of business can vary. There are different types of things that can happen. And I've tried to illustrate a couple of the different patterns on Exhibit 2 here. The typical thing we find is the heaviest line, the average closed claim will increase over time.

And what I graphed there is a cumulative average paid claim. If we looked at incremental average paid claims, and we had a straight line cumulative, then the incremental would be straight line also, and it would have a higher slope.

I've done some analysis to throw out claims closed without a payment and do the same thing. In that case, what I have to do is estimate the total number of claims that close with a payment, and then I interpolate over that. If I do that, I find that the development pattern tends to be a lot flatter. So I think perhaps what we find in the typical casualty line is not so much that the bigger claims take longer but just that the claims that close without a payment close earlier.

And, of course, depending on the data set, different things can happen. With this data set, we're limiting claims to either $100,000 or the index, and so we're taking out the impact of very, very large claims, and maybe if we had a higher limit, we would have more of an increase in the average over time.

Another thing that I've seen in some data sets is that different companies can have a different claim settlement philosophy, and, in particular, some may be very litigation oriented. I mean, they just don't want to pay a claim, and so if you look at the early development experience, they're paying nothing, basically, and, eventually, everything goes to trial and they get judgments or Make big settlements. So we get more of a development pattern that may be very low, and then once we get out to the last few claims, it really kind of zooms up.

In, those cases, it is relatively difficult to try to figure out what the pattern is, because almost all your dollars come at the end. But of the data that I've looked at has more of a steady pattern. It makes it a little bit easier.

(End side 1.)

MR. FINGER: The basic assumptions that we're making in doing something like this is, first of all, that the claim counts are going to be consistent. If we're looking at severities, we have to assume that the claim count is consistent. If the claim department has changed the way that they define what a claim is, we can expect that different accident years are going to have different values.

Another thing that we're basically assuming is that the order in which the claims get closed or settled is going to remain the same, so we're going to have a pattern like this that's going to remain consistent.

Basically, the way the method will work is that I will start with the earliest accident years and work towards the latest. If I come up to a year where I've got, say, 50 percent of the claims have been closed, I will project out an ultimate average for that

year by looking at the difference between my, my historical experience,(what was closed at 50 percent) versus what was closed at the ultimate. And there will be, normally, an increase in the severity over that point in time.

Okay. Another way to estimate reserves uses case reserve data. As I'm stepping forward by accident years, I've determined what I think the older accident years are going to close for. I can then establish, as of that point say, when 50 percent of the claims are closed for that accident year, that I know what my reserve should have been. I can divide the reserve by the number of claims I had open, so I have an implied average reserve as of that point.

I can compare those implied reserves to what the company actually set up as a case reserve at that point in time, and if there's some consistency in that pattern, then again I can project out what I think my reserves should be for the latest year. I can just take whatever the case reserve is and multiply by whatever that historical percentage is.

In this particular case, we're using accident year data, so our reserves are going to include the IBNR as well. So maybe, in a typical situation, we would think the case reserves might be less than the required reserves. For this particular data set, the case reserves are really quite redundant, so we're actually getting something in the area of 50 percent the ratio of the required reserve to what the company was actually holding at that time, and that includes provision for IBNR.

Another way that we can pick an average reserve is to look back in time and see what the actual average reserve was and then trend it forward to the current year. In this particular example, I'm trying to decide what accident year '89 should be, and I've got some percentage of closed -- let's just say 50 percent of the claims are closed, and the other 50 percent are open.

I go back in time and figure out, for each of the prior accident years, what my average would have been when 50 percent of the claims were open. And, normally, I expect there to be some kind of inflation in settlements, so I will put in, say, in this particular case, a 10 percent trend. So if my average reserve that I needed in 1984 was $10,000, what I'd need today would be that compounded at 10 percent or about $17,500.

This is another way of picking an average reserve amount, and I generally use it to test whether or not I've got an appropriate level of inflation in the data. Because if my implied average reserves at 10 percent are coming out much higher than what I get looking at the case redundancy or the paid development, then I know that at least those other projections have a much lower rate of inflation built into them.

Now, this may be a little bit unfamiliar, so I've put together a couple of formulas to try to compare what you might get with a more standard loss development technique versus mine. Equation number 2 here: we have a situation up with 75 percent of the claims closed and we have a paid severity loss development factor of 1.05. So the formula says that as of the point 75 percent of the claims have been closed, I expect the average severity to go up 5 percent from then to the ultimate.

That is going to correspond to an age to ultimate paid loss development factor of 1.4. So if I'm just doing a straight projection of accident year paid losses, I would expect 40 percent more to come in by the end of the period.

Similarly, we can work with the case reserve redundancy factors, and say that the case reserves should go up 20 percent from where they are to the ultimate liability, and 75 percent are closed.

If I've got 75 percent of the claims closed, 25 percent of the amount is open, then the 20 percent additional factor for the case reserves would be a traditional age to ultimate incurred loss development factor of 1.05. So that's the way they translate into more typical factors.

(Slide)

Now, there are various ways to try to get a handle on what inflation is reflected in the actual data, and Exhibit 6 here is just one way of trying to demonstrate what the inflation is.
I can compare the cummulative average closed paid amounts when 75 percent of the claims are closed. I can compare the average closed cost for accident year 1973, and I get a compounded growth rate of 7.3 percent. So if my data is relatively consistent, that's saying, my average closed claim cost has increased 7 percent.

If we look at this particular exhibit, we see that it would appear that the inflation rates have come down over the last couple of years, because we get more like 11 percent was the longer term trend. And if we look at what has happened for accident year '83, we've got 9 percent, 8 percent, 7 percent.

All of the numbers are based on the first $100,000 of loss. Two things that could be happening: First of all, the inflation could be less, or what could be happening also is that the relative relationship of the $100,000 limit to our claim size could be getting a lot closer, so that we're lopping off a bigger percentage of claim amount.

As a general rule, if we have an unlimited inflation rate of X, and we want to know what the inflation rate is on a limited basis, there's a reduction factor. The reduction factor is approximately what the losses on that first $100,000, or whatever the layer is, to the total losses.

So like, let's say, if the first $100,000 has 70 percent of the losses, then we would expect the inflation rate on the first $100,000 to be 70 percent of whatever our unlimited inflation rate is. As the average size gets closer to that limit, we're going to have a rather severe reduction in our inflation rate on that layer. Okay.

(Slide)

Now, Exhibit 7 is just the kind of the data that I get after I do my interpolations, and I'm trying to line up everything in terms of the percentage of claims that have been closed. The percentage that I choose is the percentage that has been closed in the latest accident year, so it would be the values down on the diagonal. I have ignored all of the data to the left, because it's not going to be relevant in this particular case.

In a typical situation, you have an ongoing program, and you're going to have a first observation out here. In this particular case, the program just cut off in '85, and so we've got a run-off business. We can basically ignore everything prior to the current evaluation for the latest accident year.

The cumulative average paid claim cost demonstrates the general phenomena that the values go up over time for individual accident years. So going out to the right, they're increasing pretty much.

We can also do the average case reserve in the same way.
Again, what I do is interpolate among the average reserves to get the value at the particular percentage closed.

(Slide)

Just to demonstrate how the method works, perhaps we could focus on the 1984 accident year. What we want to do is find the relationship between the cumulative closed cost at that point in time versus the ultimate. And what we do is just go through and calculate what these have been in the past. To get to 1984, of course, we made some decision on all the prior years. But for 1984, if we looked at an average of all of the past values, we say, well, the severity is going to increase 15.4 percent.

If we look at this particular array, however, we see that particularly accident year 1980 on, we get values that are quite a bit lower than 15 percent. So it looks like the pattern has changed. These values are all limited to $100,000 per claim. I think what's happening can be conceptualized as follows -- the average cannot go up as much on more current accident years because the averages are a lot closer to the limit.

So maybe in the past we went from a claim that cost $50,000 and it developed to $100,000. Now we've got a claim that costs $100,000 If it goes to $200,000, the top hundred gets lopped

off, so we don't have much of an increase. But, alternatively, what we could have is, just a changing inflation rate. That would also affect all of the subsequent developments, and we wouldn't have as big of an increase.

(Slide)

Okay. This would be the way we look at case reserve adequacy. I should have called them adequacy factors rather than redundancy factors, but, again, what we're doing is calculating for a particular point in time what the required was, and we take a ratio of that to what the actual company's case reserve was.

And if we look back in time, these tend to vary a little bit more than the severity ratios, but, again, we see somewhat of a difference in the pattern. If we're looking at 1984, we've got values up in the 70s, but, if we look at the most recent time, we've got value around 50 percent.

Now, with case reserves, I guess there's a question of whether the claims department is adequately reflecting inflation or the indexed value. And that's a harder question to answer. On the paid side, you know what the limit is, and you can kind of work out, with inflation, what's happening, and things like that. On the case reserve side, what you're looking for is a consistency in the case reserves. And whether the claims department has adjusted for that, I don't know, and it's hard to tell.

Typically, when I'm doing these things, I look at both sets of input often the claims department can have it right , but I tend to have more faith in looking at paid development patterns. But any particular situation could be different.

(Slide)

Maybe I could explain briefly how this works. If we pick, say, 57.5 percent as the case reserve redundancy factor we apply 57.5 to whatever the current case reserve is.

(Slide)

Okay. Now, the third way we can do it is to reconstruct what the implied average reserves were in the past and just analyze what the trends are. Again, if we look at 1984, we find that -- in this particular case I put in 7.5 percent annual trend -- there's a fairly consistent trend over the whole period. It's a little hard to see without looking at it for a while.

One way that we can tell whether or not the pattern is changing is by, say, looking at the values we get for all of the years versus the values if we just base our estimate on the last five. And if we have a situation where the last five is pretty much in line with the whole history, then the pattern has been

relatively consistent. Again, with the implied average reserve approach, it depends entirely on the inflation rate that is put in.

(Slide)

Now, this was for losses limited to $100,000. I've just shown the results of the analysis of basically three different ways of picking an average reserve. I either base my estimate on all of the past history or I look at just the last five data points.

Typically, what we're finding is that if we base the conclusion on just the last five data points we get much lower values and much different values this means that the patterns are definitely changing. We've got a problem. We can't necessarily apply the past pattern.

I guess what we might do is to limit losses to a particular amount and then go ahead and do our analysis. We then try to build up the increased limits by some other method. I think, in this particular case this probably would not work very well, because we don't have a lot of stability in the limited layer. We're probably going to wind up with a better result if we look at the actual indexed layer and work with that.

(Slide)

Okay. And that's basically what I did. I went through the whole analysis. I don't have the slides of the actual data, but I do have a table, Exhibit 12, that summarizes again the conclusion that I reached for the three different methods. I can either use all of the past data or the last five years.

Here we get at least a little bit more stability. Except for maybe '84 and '85, the last five years is giving pretty much the same estimate as if we use all the data. So we have a relatively stable pattern.

We do have a little bit of a problem in that using the case reserve data we come up with a little bit lower answer than if we use the paid developments. Here, I guess, it's a matter of judgment. Do I think the claims department is going to be more accurate in this case than just looking at what has happened to paid developments in the past?

Also, what you don't have is all of the individual development matrices. And we can look at those and get some feel for how variable the different things are.
Pretty much what I picked as being the best result was my paid severity development, using the last five years. The difference would come about in '84 and '85.

And for all of the years prior to 1981, the reserve is about $3.5 million. It doesn't vary a whole lot by year. So, in total,

that gives me roughly $35 million as my reserve number. And Ben's number, I think, was in the low 20s, which is quite interesting.

MR. FINGER: Now, the reason it comes out like that, years prior to '80, actually Ben had a little bit higher answer than I had. I had about $3.3 million; he had about $3.7 million. But if we go '81 forward, the average reserves that I picked were much higher -- like for '81, it's 34.7 thousand, and Ben had 19.8 thousand.

What I did was just take his dollar number and then divide by the number of claims I had as being open, just to try to compare them. If we look at '81, '82, '83, I get numbers that are double what his numbers are. They start to get a little bit closer for '84 and '85.

The key number that I have to generate my conclusions is the ratio of the paid severity as of a particular point in time, (how many claims have closed,) to the ultimate paid severity. Like for 1981, I say that the average closed claim is going to go up 6.4 percent. And with Ben, if you work it backwards, he says it's going to go up 2.3 percent.

The little formula that I had, back in Exhibit 4, would say that if we wanted a comparable age to ultimate for paid development, we take those factors there, like the 1.064, and divide by the .971. So I'm saying roughly 10 percent of the losses are unpaid on that accident year. And Ben would say roughly 5 percent or so.

I think this basically comes about because he has put in an inflation rate at zero going forward. And, more or less, when you look at my method, it's going to assume some kind of a consistent inflation rate based on the past data. I can go back and look, say for 1981, at how the average paid severity increased from that stage, 97 percent closed, to the ultimate.

Unfortunately, I didn't show that particular matrix, but the factors are relatively stable, around 1.06. Now, 1.023 ever happened in the past. If we go further on, say like accident year 1983, I'm assuming the average severity will go up 10 percent; Ben says it's going to go up 1 percent. In the past, 1 percent never happened. I mean, it depends on the given data set, but at least the way that I've set it up, the past has been relatively consistent.

So at least I'm more confident in my number.

(Laughter)

MR. FINGER: Some rebuttal.

QUESTION: (Inaudible).

MR. FINGER: I want to make just a few closing comments: a comparison between regression methods and more traditional methods.

Most of this has come from what Ben said before, the CLRS meetings and what he said in Session 3G, and it's kind of his critique of more traditional methods. I don't think there is any real doubt that his approach is a lot more statistical, it looks like statistics, and, pretty much, we're in the business of statistics. As actuaries, we are dealing with numbers and we're making projections.

Certainly, more traditional methods are very ad hoc. The basic problem I see within is that the results are very much dependent on the actual past outcomess. And it's hard to deviate from the actual past experience.

Also, doing something like I did was to look at basically different types of inputs, look at the paid patterns, look at current case reserves, look at different inflation rates, and I guess I get a comfort level by seeing that the different methods come in more or less the same, or at least I can explain what is happening. If a method is different than another one, it's because the inflation rate is different, or something like that.

I think that kind of an approach depends a lot on getting similarities in data, and maybe there are spurious correlations. For example, two different methods may be largely independent, but yield the same result.
It doesn't necessarily mean that that's the right answer. Maybe it was just spurious.

What actuaries typically do is look at a lot of different data and, in effect, the result they get is relatively stable. Maybe it's not stable in terms of the way Ben describes it, by throwing out the latest year or the latest two or three years. With the way I've done it, clearly, you could do that, and you get fairly similar results. But, again, what we do typically is more ad hoc, and what Ben does is more in line with statistical theory.

In terms of standard error or the variability in estimates,
I think it would be nice if typical actuarial methods came with a standard error. It's very difficult with most traditional methods. Probably the easiest way of getting a feel for standard errors, with what we do generally is to try different methods that depend on different assumptions and see what the differences are in result.

If you look at some of my projections two or three million dollars probably is a reasonable standard error. But, obviously, that's somewhat ad hoc. On the other hand, I would question whether the standard error that Ben comes up with, which is a result of about $22 million +/- $2 million, really captures this particular data set. The way I look at it, I the answers are a lot higher.

I think a difficult problem with Ben's method is, how do you project inflation in the future? And basically he just says, well, it's not going to be there. At least, based on my experience, I'd say, yes, I think it will be there. I don't think it's going to go from 22 to 0 overnight.

In terms of overparameterization, I would agree that a lot of traditional actuarial methods have a lot of parameters, but when you look at the conclusions that are made, I basically have five numbers that I pick. So you could say that's five parameters. They depend on a lot of different analyses and a lot of different number crunching, but I don't know that it is really overparameterized.

I think both methods really require a lot of expertise on the analyst's part. Clearly, a more traditional actuarial approach depends a lot of experience, a lot of looking at different numbers and getting a feel for where things are. But I think, also, with a regression approach, there are a lot of different varieties of models, I think it also requires quite a bit of expertise, and knowing the book of business, and knowing what is going on in a particular situation.

So I would say, with regression, a useful thing is being able to can use all of the data at one time. What I do is basically step through, accident year by accident year. Regression also has a discipline for picking the parameters. What I do is more ad hoc. So if there were an explicit method or explicit formula, I guess I'd feel a little more comfortable.

Also, in the modeling that Ben does, it's possible to test various assumptions explicitly, and I think that is valuable. On the other hand, some of the drawbacks are that it's relatively difficult to incorporate all the different types of data that is available. For instance, what I've done incorporates closed claims and case reserves, as well as payments. Ben's method was based on just the actual payments.

It's certainly possible, statistically, to build a more complicated model, but it's fairly difficult to calculate the result and to get all of those things to match.

1990 CASUALTY LOSS RESERVE SEMINAR

6G: ADVANCED CASE STUDY

Slides

OUTLINE

- Review of Data Set
- Basic Concepts
  Methods - Paid Severity
  Case Redundancy
  Implied Average Reserve
  Impact of - Fixed Dollar Limit
  Inflation
- Analysis of $100,000 Layer
- Analysis of Indexed Layer
- Adjusting to an Unlimited Basis
- Frequency and Pure Premiums

EXHIBIT I

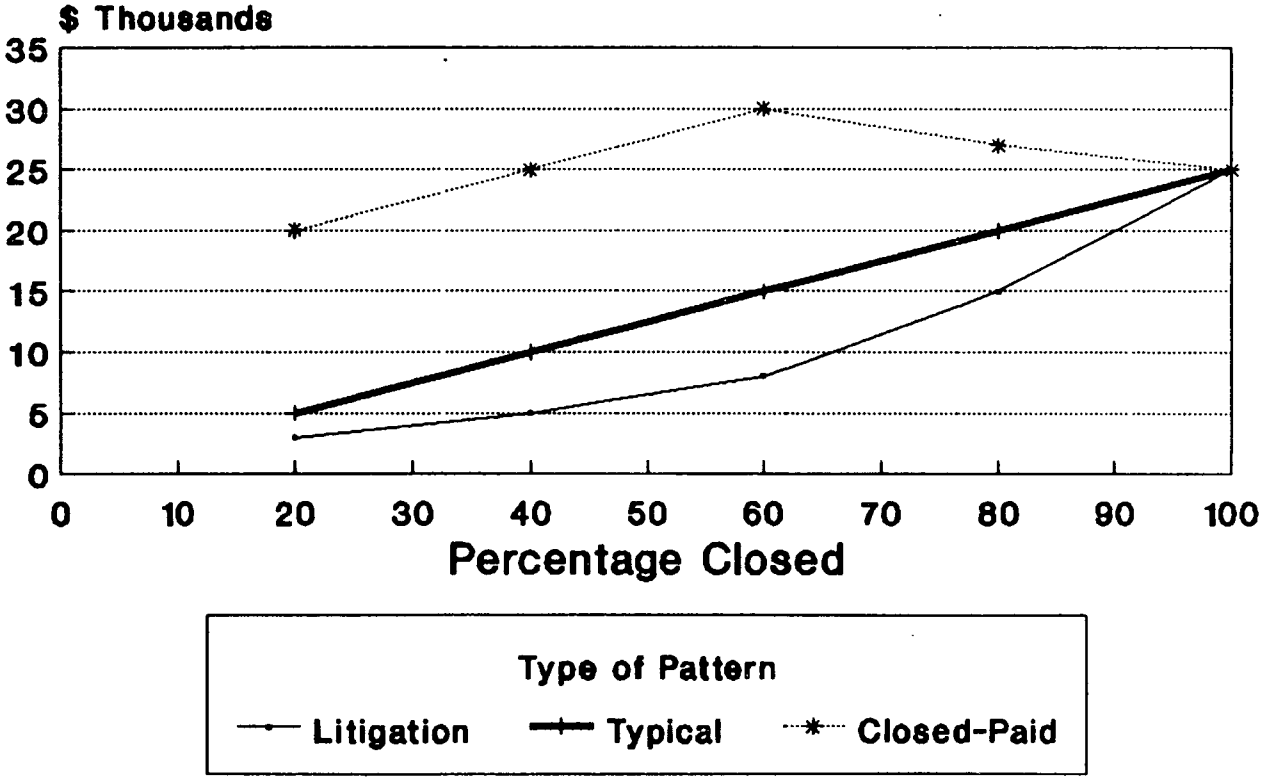
1990 CASUALTY LOSS RESERVE SEMINAR

EXPOSURES & INDEXING

YEAR	EARNED EXPOSURES	INITIAL LIMIT	ANNUAL INDEX	MAXIMUM LIMIT
1973	33,996	100	none	100
1974	34,494	100	none	100
1975	35,685	100	none	100
1976	39,139	100	none	100
1977	40,266	110	11.0	500
1978	39,065	110	11.0	250
1979	39,316	110	11.0	250
1980	38,208	125	12.5	250
1981	37,182	125	12.5	250
1982	35,178	150	15.0	255
1983	34,398	150	20.0	290
1984	32,332	200	20.0	360
1985	7,452	500	none	500

NOTES:
1. Earned Exposures for given accident year.
2. Indexing for policy-accident year beginning Oct. 1.
3. Limits and index in thousands.

Paid Development Patterns
Cumulative Average Paid Cost



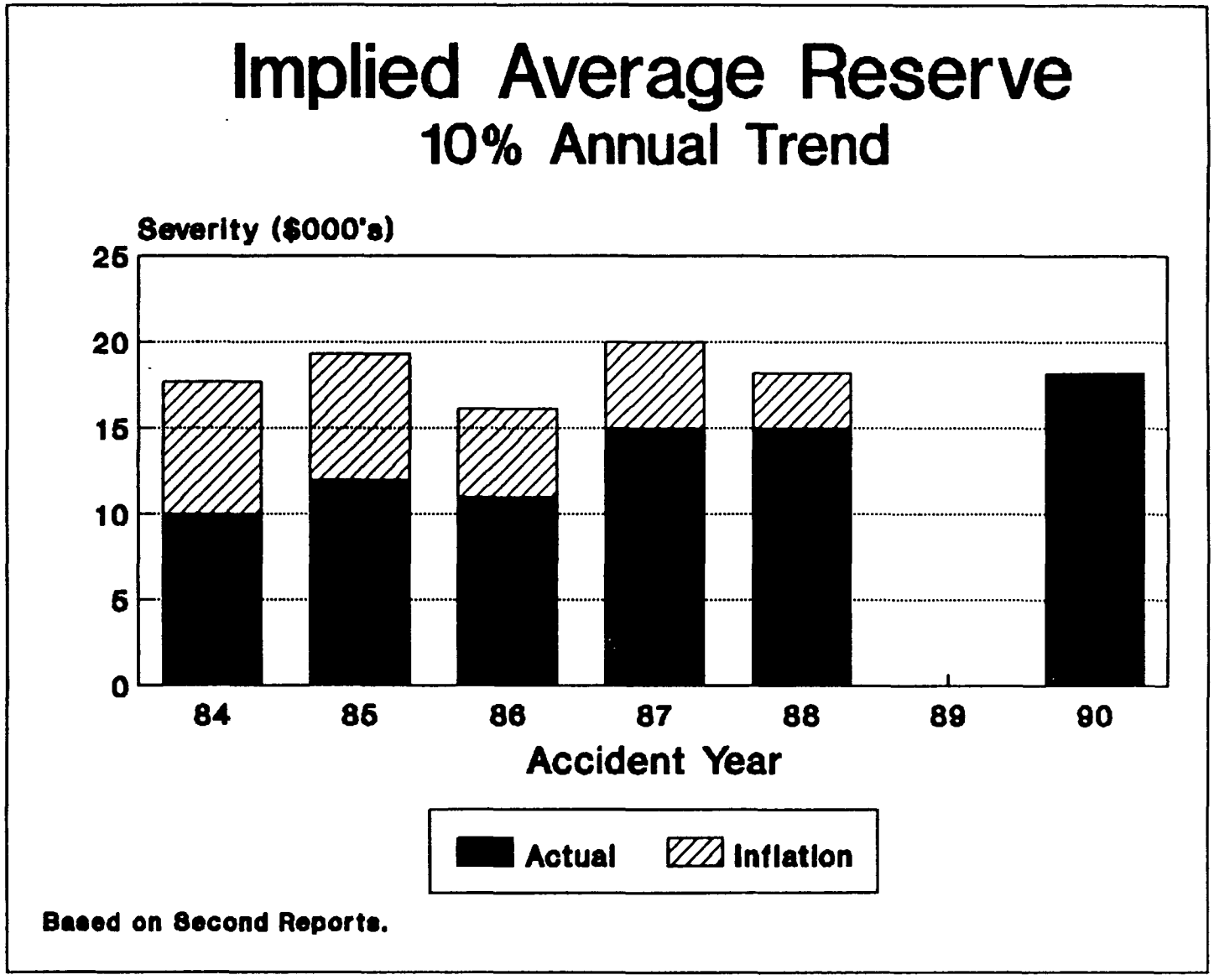


EXHIBIT IV

SOME FORMULAS

I. Definitions

a = fraction closed
c = ultimate claim count
P = paid to date amount
U = ultimate amount
f = severity LDF (age to ultimate)
r = usual LDF (age to ultimate)

o = average reserve
R = case reserve amount (includes IBNR)
b = case reserve redundancy factor
d = fraction of reported losses paid = R/(P+R)

II. Usual Paid LDF in terms of severity LDF

$r = f/a$ $\qquad 1.40 = 1.05/ .75$

III. Average Reserve in terms of Severity LDF

$$o = \frac{P\ (f - a)}{ac\ (1 - a)} \qquad 12 = \frac{10\ (1.05 - .75)}{(1 - .75)}$$

IV. Usual Incurred LDF in terms of Case Redundancy Factor

$r = d + (1 - d)\ b$ $\qquad 1.05 = .75 + .25(1.20)$

EXHIBIT V

RATIO OF INDEXED TO 100K LAYER

ACCIDENT YEAR	AVERAGE RETENTION ($000's)	PAID LOSSES 100K	PAID LOSSES INDEXED	PAID LOSSES RATIO	REPORTED LOSSES 100K	REPORTED LOSSES INDEXED	REPORTED LOSSES RATIO	SELECTED RATIO
1973	100	8,658	8,658	1.00	8,677	8,677	1.00	1.00
1974	100	10,973	10,973	1.00	11,046	11,046	1.00	1.00
1975	100	11,933	11,933	1.00	11,948	11,948	1.00	1.00
1976	100	12,493	12,493	1.00	12,607	12,607	1.00	1.00
1977	115	15,727	17,304	1.10	16,021	17,598	1.10	1.10
1978	160	17,722	21,648	1.22	18,324	22,399	1.22	1.22
1979	160	23,165	28,199	1.22	24,946	31,404	1.26	1.22
1980	165	21,248	25,135	1.18	23,826	29,605	1.24	1.19
1981	181	25,587	30,343	1.19	28,829	35,962	1.25	1.20
1982	190	28,648	35,397	1.24	33,490	43,506	1.30	1.26
1983	223	26,374	33,975	1.29	33,564	44,661	1.33	1.33
1984	253	23,077	29,608	1.28	35,838	47,784	1.33	1.37
1985	500	4,920	6,379	1.30	9,511	13,520	1.42	1.45

EXHIBIT VI

INFLATION RATE ESTIMATES
CHANGE IN CUMULATIVE AVERAGE PAID
$100,000 LAYER

FROM ACC YR	TO ACC YR	NUMBER YEARS	%CLOSED	COMPOUNDED GROWTH
73	85	12	75.3%	7.3%
73	84	11	81.3%	8.2%
73	83	10	90.8%	9.3%
73	82	9	95.0%	11.1%
73	81	8	97.1%	11.3%
73	80	7	98.0%	10.1%

EXHIBIT VII

I. CUMULATIVE AVERAGE PAID CLAIM ($000's)- LIMITED TO $100,000

ACC YEAR	PERCENTAGE CLOSED 75.3	81.3	90.8	95.0	97.1	98.0	98.9	99.3	99.4	99.6
1973	3.91	4.00	3.91	3.88	3.94	3.99	4.00	4.03	4.03	4.02
1974	3.91	4.00	4.39	4.47	4.43	4.50	4.84	4.86	4.86	4.89
1975	3.97	4.25	4.67	4.72	4.95	5.09	5.15	5.15	5.17	5.19
1976	4.06	4.37	4.63	4.78	4.82	4.90	4.99	5.01	5.01	5.00
1977	4.36	4.73	5.22	5.37	5.54	5.52	5.63	5.66	5.66	
1978	4.50	4.95	5.72	6.11	6.18	6.28	6.70	6.67		
1979	5.79	6.53	7.61	7.82	8.05	7.98	8.13			
1980	6.98	7.50	7.94	7.84	7.75	7.84				
1981	8.59	8.89	9.17	9.41	9.27					
1982	9.63	9.87	10.37	10.02						
1983	8.88	9.10	9.48							
1984	9.48	9.56								
1985	9.16									

II. AVERAGE CASE RESERVE ($000's)- LIMITED TO $100,000

ACC YEAR	PERCENTAGE CLOSED 75.3	81.3	90.8	95.0	97.1	98.0	98.9	99.3	99.4	99.6
1973	12.70	12.68	13.07	15.58	18.86	21.80	26.46	28.98	27.69	26.04
1974	14.87	15.55	16.51	20.76	25.17	30.65	30.37	28.41	26.74	14.91
1975	14.93	14.41	16.35	17.57	19.80	21.73	19.07	14.23	10.04	5.04
1976	14.50	14.72	15.21	18.27	28.01	36.26	43.22	23.70	17.50	10.34
1977	13.35	13.92	16.15	21.86	26.29	31.03	24.56	19.10	17.72	
1978	17.45	18.38	21.80	26.09	32.97	32.95	23.81	31.11		
1979	19.66	22.16	25.72	32.24	42.13	49.53	55.86			
1980	20.16	20.21	23.15	30.20	37.05	45.60				
1981	21.92	24.05	28.81	30.67	38.89					
1982	25.47	26.57	27.41	32.26						
1983	27.59	28.53	25.60							
1984	23.03	22.98								
1985	26.12									

EXHIBIT VIII

PAID SEVERITY - DEVELOPMENT FACTORS

ACC YEAR	PERCENTAGE CLOSED 75.3	81.3	90.8	95.0	97.1	98.0	98.9	99.3	99.4	ULT AVG	CALC INC'D ($000's)	REP'TED AVG
1973	1.045	1.021	1.047	1.052	1.037	1.024	1.022	1.014	1.015	4.09	8,673	4.09
1974	1.272	1.243	1.134	1.114	1.124	1.105	1.027	1.023	1.023	4.97	11,046	4.97
1975	1.306	1.217	1.109	1.097	1.046	1.017	1.005	1.005	1.002	5.18	11,948	5.18
1976	1.237	1.151	1.086	1.052	1.042	1.024	1.007	1.003	1.003	5.02	12,607	5.02
1977	1.313	1.209	1.096	1.065	1.033	1.036	1.016	1.011	1.010	5.72	15,979	5.73
1978	1.497	1.364	1.178	1.104	1.092	1.075	1.007	1.011		6.75	18,040	6.85
1979	1.421	1.262	1.082	1.053	1.023	1.032	1.013			8.24	23,724	8.66
1980	1.172	1.090	1.031	1.044	1.055	1.044				8.18	22,642	8.61
1981	1.137	1.098	1.065	1.038	1.053					9.76	27,764	10.14
1982	1.106	1.080	1.027	1.063						10.65	32,061	11.13
1983	1.148	1.120	1.076							10.20	31,238	10.95
1984	1.163	1.154								11.02	32,742	12.07
1985	1.210									11.09	7,902	13.34
WTD AV	1.210	1.154	1.076	1.063	1.053	1.044	1.013	1.011	1.010			
AV RES	16.96	17.40	17.32	22.74	26.11	24.67	17.54	16.42	15.20			
WTD-L5	1.143	1.123	1.066	1.057	1.048	1.038	1.012	1.011	1.010			
RES-L5	14.48	15.83	16.35	21.49	24.40	22.52	16.73	16.42	15.20			

EXHIBIT IX

CASE REDUNDANCY FACTORS

ACC YEAR	PERCENTAGE CLOSED 75.3	81.3	90.8	95.0	97.1	98.0	98.9	99.3	99.4	ULT AVG	CALC INC'D ($000's)
1973	0.364	0.352	0.451	0.512	0.476	0.396	0.448	0.402	0.507	4.09	8,673
1974	0.553	0.591	0.653	0.706	0.918	0.903	0.549	0.708	0.883	4.97	11,046
1975	0.595	0.639	0.625	0.791	0.643	0.432	0.392	0.608	0.703	5.18	11,948
1976	0.549	0.536	0.589	0.533	0.420	0.296	0.190	0.293	0.437	5.02	12,607
1977	0.733	0.711	0.646	0.544	0.414	0.451	0.467	0.579	0.635	5.70	15,914
1978	0.778	0.791	0.772	0.720	0.771	0.879	0.435	0.509		6.74	18,029
1979	0.808	0.719	0.580	0.531	0.377	0.460	0.391			8.28	23,862
1980	0.588	0.551	0.459	0.487	0.606	0.542				8.18	22,645
1981	0.586	0.536	0.495	0.458	0.562					9.64	27,408
1982	0.506	0.486	0.405	0.570						10.44	31,410
1983	0.473	0.471	0.555							9.91	30,363
1984	0.546	0.575								10.24	30,418
1985	0.587									10.68	7,615
WTD AV	0.587	0.575	0.555	0.570	0.562	0.542	0.391	0.509	0.635		
AVG RS	15.33	13.22	14.20	18.40	21.84	24.72	21.87	15.84	11.26		
WTD-L5	0.533	0.544	0.530	0.541	0.517	0.503	0.382	0.509	0.635		
RES-L5	13.93	12.50	13.58	17.46	20.11	22.95	21.36	15.84	11.26		

EXHIBIT X

IMPLIED AVERAGE RESERVE ($000's)

ACC YEAR	PERCENTAGE CLOSED 75.3	81.3	90.8	95.0	97.1	98.0	98.9	99.3	99.4	AVG O/S	CALC ULT AVG	INCD ($000's)
1973	4.62	4.46	5.90	7.97	8.97	8.63	11.85	11.64	14.03			8,673
1974	8.22	9.20	10.78	14.65	23.10	27.69	16.69	20.11	23.60			11,046
1975	8.89	9.20	10.21	13.90	12.74	9.38	7.48	8.66	7.05			11,948
1976	7.97	7.88	8.96	9.74	11.77	10.72	8.22	6.95	7.65			12,607
1977	9.88	10.03	10.69	12.36	11.69	15.15	13.59	14.29	15.20	15.20	5.72	15,979
1978	13.59	14.57	16.87	18.88	25.55	29.18	10.73	16.42		16.42	6.75	18,040
1979	15.69	15.67	14.40	16.17	14.24	20.44	17.54			17.54	8.24	23,724
1980	11.84	11.13	10.62	14.69	22.42	24.67				24.67	8.18	22,642
1981	12.88	12.96	14.39	14.27	22.20					22.20	9.65	27,438
1982	13.08	13.16	11.59	19.30						19.30	10.48	31,544
1983	14.02	14.71	16.80							16.80	10.15	31,092
1984	15.29	16.80								16.80	10.91	32,406
1985	17.60									17.60	11.24	8,014
TREND												
AVG	17.6	16.8	16.8	19.3	22.2	22.7	14.7	15.3	15.8			
LST5	16.6	16.9	17.0	19.0	20.9	20.7	14.1	15.3	15.8			

EXHIBIT XI

AVERAGE RESERVE ($000'S)
LAYER LIMITED TO $100,000

ACCIDENT YEAR	OPEN COUNT	PAID SEVERITY		CASE REDUNDANCY		IMPLIED AVERAGE (7.5% TREND)	
		ALL	LAST 5	ALL	LAST 5	ALL	LAST 5
1981	83.4	26.1	24.4	21.8	20.1	22.7	20.9
1982	150.1	22.7	21.2	18.4	17.2	19.3	18.8
1983	280.9	17.3	16.0	14.2	13.3	16.8	16.9
1984	555.3	17.4	15.5	13.2	12.3	16.8	16.8
1985	175.8	17.0	14.0	15.3	13.6	17.6	16.6
TOTAL RESERVE		23094	20780	18588	17215	21932	21559

EXHIBIT XII

AVERAGE RESERVE ($000'S)
INDEXED LAYER

ACCIDENT YEAR	OPEN COUNT	PAID SEVERITY ALL	PAID SEVERITY LAST 5	CASE REDUNDANCY ALL	CASE REDUNDANCY LAST 5	IMPLIED AVERAGE (12% TREND) ALL	IMPLIED AVERAGE (12% TREND) LAST 5
1981	83.4	35.1	34.7	38.8	37.0	32.0	31.9
1982	150.1	32.0	32.0	32.5	31.7	29.1	30.7
1983	280.9	25.6	25.7	22.8	22.3	26.3	28.8
1984	555.3	25.2	23.5	20.3	19.1	26.4	27.0
1985	175.8	24.5	21.1	25.7	22.9	28.3	26.8
TOTAL RESERVE		33222	31675	30309	28740	34059	35063

EXHIBIT XIII

AVERAGE RESERVE ($000'S)
INDEXED LAYER (ADJUSTED TO ULTIMATE)

ACCIDENT YEAR	OPEN COUNT	PAID SEVERITY		IMPLIED AVERAGE (10% TREND)
		ALL	LAST 5	ALL
1981	83.4	32.4	32.1	26.3
1982	150.1	29.3	29.3	23.0
1983	280.9	24.3	24.3	22.4
1984	555.3	24.3	23.2	23.0
1985	175.8	24.6	21.5	28.6
TOTAL RESERVE		31744	30564	29738

EXHIBIT XIV

ANALYSIS OF FREQUENCY AND PURE PREMIUM

ACCIDENT YEAR	EXPOSURE	ULTIMATE COUNT	FREQ.	FITTED FREQ. (4.5%)	PURE PREMIUMS		
					PAID SEVERITY	FITTED (17.5%)	CASE RED'CY
1976	39,139	2510.0	6.4%	6.4%	322	383	322
1977	40,266	2793.5	6.9%	6.7%	436	450	434
1978	39,065	2674.3	6.8%	7.0%	563	529	563
1979	39,316	2880.8	7.3%	7.3%	734	621	748
1980	38,208	2767.5	7.2%	7.6%	707	730	721
1981	37,182	2843.3	7.6%	8.0%	895	859	903
1982	35,178	3009.0	8.6%	8.3%	1143	1009	1145
1983	34,398	3063.8	8.9%	8.7%	1197	1186	1174
1984	32,332	2970.2	9.2%	9.1%	1348	1394	1264
1985	7,452	712.8	9.6%	9.5%	1433	1639	1462

1990 CASUALTY LOSS RESERVE SEMINAR

7E: ADVANCED WORKSHOP ON REINSURANCE COMMUTATIONS

Moderator

Heidi E. Hutter
Atrium Corporation

Panel

Dale F. Ogden
Dale F. Ogden & Associates

David S. Powell
Tillinghast/Towers Perrin

MS. HUTTER: Welcome to Session 7E, which is the Advanced Workshop on Reinsurance Commutations. What we are planning to do this afternoon is present two people who have a wealth of experience in the commutations arena and have an unrehearsed, unprepared, live discussion of issues and subjects that we see in the reinsurance commutation arena.

We want to invite the audience to participate in this actively. If you have questions or issues that you have encountered and would like to put them to the panelists, you are welcome to come to the microphone at any opportunity. This session, like all other sessions, is recorded and will be transcribed into the record of the program.

This morning our two speakers are Dale Ogden and Dave Powell. Dale, who is sitting immediately to my right, is President of Dale F. Ogden & Associates. Prior to forming his own firm, Dale was Executive Vice President and Chief Operating Officer at Kramer Capital Consultants and a manager at Peat, Marwick & Mitchell. He currently is on the American Academy of Actuaries Property & Liability Issues Committee.

To Dale's right is Dave Powell. Dave is a Principle and Practice Manager in the Dallas office of Tillinghast and he has been doing this since the time that commutations were an honorable calling. Now, Dave, those are your own words. I think we could all start off by asking you to elaborate on why you think commutations used to be an honorable calling and why you are implying that they may no longer be that.

MR. POWELL: I think once upon a time commutations served a legitimate business need. More often than not a way to clean up small periodic loss payments, which is typical of a workers' compensation claim. The administration of the payment stream was more costly than the payment itself and some termination of the arrangement was called for.

About five years ago, I think commutations started drifting to a way to improve people's financial position. It became a rather key element in the workout plan of many troubled companies. Today, unfortunately, we have a number of companies that discovered they didn't like the reinsurance that they wrote. It never occurred to them that there was the potential for operating loss. (Laughter)

For want of anything better to do, they are stalling, delaying, not paying claims. Sometimes you will never hear from them. You send a claim in and nothing comes back. The arbitration clauses are such that, if you want to pursue that route, you are looking at maybe a year and a half and a lot of money. The companies are stalling and sooner or later someone will say the magic words, "Let's commute this." I don't view that as a particularly honorable undertaking. The nature of that has become one of pure business negotiation. The reinsurer, in that case, typically is

not looking at actuarial evaluations of a commutation, but is saying "how little can we get out of this for" with no rationale other than the fact that they think it can be done. By harassing the ceding company, rather than being a legitimate mechanism to terminate a reinsurance arrangement, it is being used as the end of a harassment proceeding.

MS. HUTTER: Well, that's a rather controversial view of commutations, Dale. You must have something to say to that.

MR. OGDEN: Well, I'm not sure I think that reinsurance commutation are dishonorable undertakings. I have experienced situations, like Dave has described, where the reinsurer just absolutely refused to pay a totally legitimate claim and it took two years and a $100,000 of legal fees to collect a million dollar claim. There was no award of legal fees in the arbitration or anything like that. So, those things happen and they are happening more and more frequently.

On the other hand, I think that this describes the difference in Dave's and my experiences. I have never been involved in a commutation where both parties were financially solvent. So, most of the situations I'm involved in, the commutation was a way to liquidate a reinsurer with less pain and suffering in the marketplace than perhaps a court or state insurance department liquidation. The reinsurers that I have seen liquidating through commutations have been far less painful and far more money has gotten to the ceding company far more quickly than situations where the insurance department takes over, stops making payments, and maybe sometime, ten years down the road, somebody gets some money. To go even further with that, I think that in many cases I don't have any sympathy for the reinsurers who wrote tons and tons of business and now are not making good on their promises.

On the other hand, there are the ceding companies that kept buying from the low bidder, who perhaps didn't know how high their losses really were, but should have known. I have no sympathy for them either. I think we had two irresponsible and perhaps ignorant parties who got involved in a transaction and now it has been a bad outcome for both of them.

Now, from the ceding company's side I think that one of the things that has happened, and I think that Dave will probably agree on this end of it, is that there are many liquidators who perhaps are not court appointed liquidators, who are perhaps not as interested in a cost efficient liquidation as they are in maintaining their current lifestyle and generating lots of fees for their accounting firms and law firms for the next decade. There may be absolutely no legitimate reason for a ceding company to commute with a solvent, solid reinsurer except to pull some cash in the door so they can keep paying their fees. That's where I stand.

MS. HUTTER: Dale, it sounds as if the types of commutations that you have been involved in then are distinctly different that those that Dave has been involved in. Do you think that the two of you can put your experiences together and try to estimate the size of the commutation industry?

MR. POWELL: Well, to be very actuarially precise...a lot. (Laughter)

MS. HUTTER: How about a little more precision?

MR. OGDEN: There's a lot being discussed and perhaps some percentage of that actually getting done. It seems on the average commutation discussions take a couple of years from beginning to end, unless you are talking about very small commutations. So, there is always a lot going on, but it takes a long time for it to happen.

MR. POWELL: I find it hard to disagree with that. It is difficult to measure. You have things like Mission. You know, there's one monstrous commutation that may or may not happen.

MS. HUTTER: Apart from something like Mission, do you think there are more commutations being done or is it just that people are spending two to three years to try to talk about a commutation, but maybe never really achieving it?

MR. POWELL: There are more done. We clearly have workout plans from troubled companies, legitimate workout plans, that are being implemented. I think we clearly have an increase in the dishonorable types that are forcing commutations and those are being consummated. Then perhaps the more normal business reason commutation is still chugging along. So, I think we are seeing an increase.

MS. HUTTER: What do you think a ceding company could do if they feel or suspect that they are being pushed into one of these dishonorable type situations? Is there anything they can do?

MR. POWELL: I've never found it. If you go to court, the court will turn it over to arbitration. If you go to arbitration you are looking at a year and a half and a lot of money. Eventually arbitrators may start putting out legal fees as part of the award and they may start including interest, but I have not heard of that happening yet. In most situations, there is normally at least a kernel of something that smacks of impropriety to justify the arbitration. I think you get stuck in something that they really should have thought of when they bought the reinsurance. I believe now that it is too late.

QUESTION: Do you find more commutations with a treaty that was originally a financial timing treaty as opposed to a risk treaty?

MR. POWELL: I don't know. Most of the financial ones either extinguish themselves or have built in commutations provisions that are really just a way to terminate it. The things that we are seeing are more the old risk treaties generating from the late 70s through mid-80s.

MR. OGDEN: I pretty much agree with that. I haven't seen any contested financial type treaties. In 1980 through 1983 I was putting a number of those together and virtually all of them had periodic buy-outs. By the nature of those treaties all somebody wanted to do was get a guaranteed rate of return on their money and play some games with their balance sheet. They wanted to be able at any point in the future to get their money back if all of a sudden they didn't need the treaty anymore. So, they built in buy-out clauses.

MS. HUTTER: Perhaps the question alludes to some situations where two parties entered into what they thought was a financial type transaction, but did not include the kinds of provisions that Dale was just talking about; namely, periodic buy-outs or settlement clauses. I would look at it as a type of coverage dispute or a contract dispute. I think that coverage disputes do enter into a lot of the reinsurance commutation situations. Could you elaborate on that?

MR. POWELL: I might phrase that as alleged coverage disputes.

MS. HUTTER: All right. Good clarification.

MR. OGDEN: I agree with that. I think that every situation where there's a reluctance to make payments and attempt to try to commute or get some sort of guarantee that you are not going to dump a bunch of more claims on us and things like that, there is always the claim of late notice, negligent underwriting, the standard list of everything that you can do wrong as a ceding company.

For example, there are situations where there is a letter that says "we will not use managing general agents to underwrite the business" and the company uses managing general agents to underwrite the business. In one situation that I can think of the managing general agents actually did a better job than the company did, but not withstanding that, there was a letter saying we will not use managing general agents. There was a legitimate coverage dispute.

MS. HUTTER: In my experience, I don't usually think they are that clear cut. In yesterday's panel, one of the things that was discussed was that in preparing for a commutation it is important to try to get these coverage disputes out of the way and resolved quickly. Do both of you agree with that comment from yesterday?

MR. POWELL: No.

MR. OGDEN: No, I think what I actually said was that you should try to get those things resolved in advance if possible, because if there are losses that don't belong in the database, they probably should be paid now. I think the situation I just described where there is a letter that says we will not use managing general agents and then they were used, you have to go back to your data and you have to pull out premiums and losses that were related to those risks. Now, the lawyers may be arguing, well, this will go on for seven years. You kept ceding them the premium. They took the premiums. They never complained. Legally they are obligated. Well, okay, maybe they are. So, either you pull them out or you negotiate some off the top reduction or whatever. If you can do that to adjust your database before you make any actuarial projections, that is good. If you can settle, as in one case I know of, where we agreed to a $500,000 reduction in whatever we could get a couple of actuaries to agree to in advance. So eventually we calculated the present value, subtracted $500,000 and wrote a check. So I think that it is important that any little area that you can agree on is going to help.

MR. POWELL: Perhaps our differences are more negotiating style. There are arguments on both sides. The first thing I would do is try to quantify everything. Do we think the disputed area is big or small? Do the other guys think that the disputed area is big or small? I want to give my side all the ammunition they need. What's the estimate with the coverage dispute in our favor? What is it with the coverage dispute against us?

Both the negotiators then decide whether they would rather clean up coverage disputes first and then talk number or whether they want to throw everything on the table and argue. There is a give and take in all of this. It is not necessarily in anyone's best interest to resolve points sequentially. Sometimes it is better to resolve the whole pot. That is really the decision of whomever is leading the negotiation. As actuaries, our job is to arm them with the numbers in each configuration.

MS. HUTTER: Is that the extent of the actuary's job? To arm the negotiators with numbers?

MR. OGDEN: I guess it depends on what someone asks you to do. I've been very active in negotiations on a number of commutations where I've done the numbers and worked with their claims guys to quantify the losses.

MR. POWELL: As an actuary I can do lots of good stuff including hanging wallpaper. The actuarial role of the commutation is the numbers. What do we think the numbers are? What do we think the other guys think the numbers are? How will all of this effect each of our financial statements? That's the basics. If we want to go on and change to another role as negotiator, that's fine, but the basic actuarial role is still the numbers.

MS. HUTTER: Now each of you work in a consulting actuarial position. Is there any difference for a company actuary who would get involved?

MR. POWELL: No. I don't know why they should be. As actuaries, we have a certain degree of professionalism. We are not going to blindly advocate a position that is wrong. If you look at the Academy draft on expert testimony, we are allowed to be advocates. Our advocacy can not cross the bounds of actuarial science. We have to have basis for our advocacy. That ought not to change whether we are a consultant or an in-house actuary.

MR. OGDEN: I agree with that. I think the in-house actuary is going to be more likely to get involved in the broader perspective in a commutation, whereas if I hire a consultant to do things for me you are going to try to use that consultant in a cost efficient manner. As an in-house person you are often more likely to end up wearing these other hats as they take on these other roles as negotiator or anything else.

I agree that as a actuarial advocate, which I think was once described as an oxymoron, you can not go beyond a certain level of advocacy on behalf of your client. I'm not sure that negotiations in a commutation would fall into the area of expert testimony. I think being involved in a liquidation situation where I have to be ready to sit down in court in front of a judge supervising a liquidation and say this is a fair deal to both the parties is very different from the negotiating posture you may have to take when you are negotiating. Somebody is coming in with a low number, somebody else is coming in with a high number, and you are trying to reach some kind of compromise. I think there is a difference between those two situations. Sitting in court as an expert witness, you are going to have to be independent. I don't look at expert testimony as an advocacy position.

But when it finally goes to a commutation, I don't see anything wrong in taking a very strong advocacy position because the other side is too. You know, if one side has a strong advocate and the other side has a independent in the middle, the side of the independent is going to lose.

QUESTION: I would like to ask each of you a question regarding your opinion about the quality of the annual statement changes that have been made, effective with the 1989 annual statement and some impending changes. First, what do you think about the changes from an actuarial standpoint? Are they going to be helpful in terms of providing more meaningful information? The second part of the question is, could you tell us what you think the impact of the changes with respect to coverage disputes and the whole settlement process of all these liabilities?

MR. POWELL: In general, I like the changes. The major change in Schedule F of showing receivables on an aged basis is helpful

from an analytical point of view. It is telling you something about the company. It is one more symptom that reinsurance is uncollectible. As an analyst, I used to look at Schedule M to see what law firms were being used, because you start seeing a couple of hundred thousand dollars to one of the noted reinsurance law firms, you suspect there is your problem. Now the problem has a potential for showing up as an aged receivable. So that is a real good change.

The changes to Schedule P are good. They don't go far enough. I still can not adequately analyze cessions. And I can not adequately analyze assumptions. Schedule P for an assuming reinsurer is still pretty weak until it gets shifted to an underwriting year basis. You are not going to get any real analytical stuff there.

MR. OGDEN: I agree. I think having discussed and listened to some of the things that the NAIC considered for changes in the annual statement, there were more changes in codes than Schedule P.
They wanted to obtain a lot more data, gross, ceded, net. The actual changes were compromises. There was an extreme amount of lobbying by a couple of large insurers who complained about all the money it would cost. They also happened to be large insurers that used tons of reinsurance. I think one guy is an accountant that does some reinsurance work and they said they put them in a hotel for two months to do Schedule F.

MR. POWELL: Which is how they got where they are.

MR. OGDEN: So I agree that the changes haven't gone far enough and based on the desires and the constant urging of certain insurance department actuaries, I wouldn't be surprised to see Schedule P grow even more. The information that is in there, although it may be expensive to maintain, should be readily available at any company. It will give us a lot of extra tools at looking at reinsurance recoverables.

MR. POWELL: I should also point out that the changes in Schedule F, near that if the claim isn't paid it's one more lever to use against a company.

QUESTION: So far the panel has mainly talked about commutations involved in insolvent reinsurers. My company has received letters from two reinsurers so far. And the letters say we are not insolvent, however, we are really sorry that we got into the reinsurance business and we would like to commute our treaties with you. Is this a growing trend?

MR. POWELL: Yes. (Laughter)

MR. OGDEN: That is a dishonorable commutation that Dave talks about. Just like, whoops, we made a mistake. We didn't really want to do this. We didn't think we could lose the money.

MS. HUTTER: Yes. I think that was Dave's point, that the reinsurers may still be solvent at this point, but they are looking to get out of it. Your examples may fall into this category. I think that they could approach you on a commutation and, perhaps, there is room for the parties to genuinely agree on commuting the contract.

MR. POWELL: I have seen some very honorable companies say we made a mistake. We don't like this anymore. What can we do to stop? And now you are down to a genuine commutation discussion. What is it worth to you? If you are reassuming some risk, what is it worth to you to do that. They are getting rid of risk. Now they ought to pay a premium to do that. How much is it worth to them?

QUESTION: A related question. When we bought the reinsurance, the broker got a percentage of that. When they sell it back to us again, does the broker get a percent of that?

MR. OGDEN: They may perhaps when you have to commute it.

MS. HUTTER: I think that could be a very interesting negotiation.

QUESTION: When you are reporting your reserves for IRS purposes you use a discount pattern that you have selected, either your own or the industry pattern. You also have to select some sort of pattern when you are developing a commutation agreement. Is there any obligation that they be the same or has that been proposed? Or doesn't it matter?

MR. POWELL: I know of no obligation. I would use what I regard as the most realistic payment pattern.

MR. OGDEN: I get taxes confused with the real world. Taxes are written to get more money out of insurance companies without any regard for income or anything else. As I'm sure everybody knows, it is possible to start an insurance company, never make a profit and pay Federal taxes until you have exhausted your surplus. So, I think you have to negotiate your commutation on a sound economic basis and, perhaps, keep in the back of your mind the tax consequences.

MR. POWELL: Actually, more in the front of your mind. There are tax consequences to commutation and they ought to be considered. The effects you look at are after tax.

QUESTION: I guess I've never had a commutation for a solvent company.

MR. OGDEN: Taxes have never been a consideration.

MR. POWELL: But that is one of the interesting things, where two sides can have very different appraisals of the same situation.

One is not a tax payer and one is. They get different values to the commutation, even from the same actuarial projection of present value.

QUESTION: Two questions for you. I understand and appreciate the sort of dishonorable connotation of we don't like this and we want to get out of it, but what about, yeah, we want to commute with you, because if we don't we'll be insolvent. Where does that fit into the spectrum?

MR. POWELL: It falls anywhere between a very legitimate workout plan and a big financial game of chicken. You know, we are insolvent and you'll never collect anything unless you commute with us. It is just sometimes another excuse for we don't want to pay you. I've seen it both ways.

QUESTION: The other question is, have you seen what I would call a partial commutation, for example, where you have an assumed reinsurance book and the question of, say, asbestos can't really be resolved, but the other more regular GL gets commuted?

MR. POWELL: I personally have never seen that, but I know of no reason why it couldn't be done.

MR. OGDEN: It's interesting that you bring that up, because someone asked me that yesterday about partial commutations. Again, I have not seen them. I've seen where you may have a dozen treaties with one reinsurer and you commute these three, and then those four. Maybe you have one or two of them left over to run off. For example, a real high layer where you have four or five claims and you are just basically going to flip a coin as to whether these claims are going to be paid or win. But, again, there is no reason why it couldn't be done.

MS. HUTTER: New York State has recently promulgated something called Regulation 141. Could you please describe that for the audience, in brief, what that regulation does?

MR. OGDEN: Well, it sets requirements and sort of a plan to, I guess, allow a safe harbor in a workout plan. If you are a reinsurer and you wake up one morning or the insurance department decides to come in and this time they brought an actuary with them, they look at it and say, the company is dead. What do you mean we are dead? We made money for fifteen years. Well, no you never made money. You just thought you made money for fifteen years. Now, it's over.

But, you now say to the insurance department, wait a minute, give us a chance to talk to our ceding companies and we have one or two treaties that make up half of our reserves, maybe we can commute those. If we can commute those then we can, perhaps, use a few more out here and end up with a small positive surplus. Then you don't have to take us over. You don't have to be bothered with us.

The Regulation gives the insurance department the ability to let those kinds of self-rehabilitation plans work without the danger to the ceding company that they are going to be considered preferential payments later on. There is always the issue, that I have brought into several times, where if we can commute this treaty, but if the company is not successful in commuting a lot of other treaties, the courts could very well reverse the commutation and you would have gone through a lot of expense for nothing.

Now other states have let such kinds of plans go on a more informal basis. New York has promulgated these regulations to formalize it.

MR. POWELL: Whatever you do there are some benefits and detriments. The benefit is that they have allowed a workout plan to be structured. The problem with doing that is that they have insisted that everybody get the same deal. Participants on a treaty have to be offered the same commutation deal. As I read it, participants in the same class of business have to be offered the same deal.

The people on the other side of the bargaining position may have very different circumstances and different needs and would be willing, in some cases, to accept a lesser deal. Having to offer the same to everybody, I think, diminishes the creativity that can be used in that situation.

MS. HUTTER: Do you think other states might move to follow New York in adopting regulations of this type? Or do you think they will just leave New York to have their own regulation and stop at that?

MR. POWELL: I gave up trying to predict what states are going to do years ago.

MR. OGDEN: I mean New York is a state that has to be a leader in regulation, but they also tend to have a lot more regulations than virtually any other state. I guess that is changing in California. They are catching up. Regulations are different there.

MS. HUTTER: Much earlier in the discussion, Dale, you started talking about liquidations. What are the dynamics of what happens in a liquidation in terms of the claims settling practices and how might that influence the way of an actuary, say, would analyze the numbers in trying to decide whether the commutation is an effective thing or not?

MR. OGDEN: It makes it a lot tougher. There is always the theory that you commute the treaty on the basis as though this was ongoing business and what wouldn't the reinsurer have owed under the treaty if the company continued in business, which is a purely academic exercise. There are circumstances that probably

cause the actual claims to be higher than they would have been. And there are other circumstances that are going to make those claims lower than they would have been. There is also a lot of circumstances that are going to affect the relationship between primary and ceded reinsurance. I think the existence of guarantee funds is going to affect that just as much.

If you have a million dollar policy and a $300,000 limit with a guarantee fund, something that may have been a million dollar claim, may now become a $300,000 claim because, I guess, if we go back to my cynical attitude of the world, the plaintiff lawyers are not going to fight for the tough bucks. They are going to take the easy dollars and run on to the next one. They are going to take their $300,000 and run. If you are evaluating reinsurance for $500,000 excess of $500,000 you may not get hit with a claim in that case.

Now let's go to the other side of the coin, where there is no guarantee fund involved, and those situations are less common. Under liquidation, the policyholder now has to handle his own claim. Needless to say, a policyholder is inexperienced at handling claims, may not do as good a job, may do a better job in controlling defense costs or in reaching a fair and good settlement value for a claim. They may try it and go all the way to court for a case that could have been settled easily and end up with a large judgment. And they may end up with five times or ten times as much in defense cost in getting there.

Once that claim is made against the estate, they are going to get some portion of that reimbursed. However, in a lot of situations the policyholders will, as part of their total negotiating process on claim, assign their rights in collection from the insurer. The claimant says, whatever you get, if it is twenty cents, fifty cents, ninety cents on the dollar, we'll take it. The policyholder no longer has any incentive to keep the value of the claim below policy limits. And, in fact, may have an incentive to agree to a larger settlement in order to get the plaintiff to agree to accept assignment and not come after them personally. So, in that case, your $300,000 claim might become a million dollar settlement, because they are only going to get thirty cents on the dollar. The plaintiff's attorney is happy. He got everything he could have gotten. And you go on from there.

So there are all kinds of issues there. I don't know how they balance out. I don't know if you can ever know how they balance out.

MS. HUTTER: Dave, can you add something to that?

MR. POWELL: Well, yes. There are some other things to look at. Very few insolvent companies went down with their books and records in good order.

Very few liquidators have the same staff that one might find at a real well-run company. At that point we've got to think of the insolvents, depending on what they wrote. Those writing, say, treaty reinsurance. Typically you are going to have a tremendous backlog of accounting documents, but those documents are relatively pure. They are going to tend to have a small piece of a treaty. And the broker is going to send some accounting record and it is going to sit there gathering dust for six months. But at least it is undistorted. It reflects somebody's perception of reality.

As you move to facultative reinsurance you run the greater risk of the ceding company inflating the claim to the insolvent reinsurer. Again, you now have to assess, if you are looking at a statement, how old is this data? What maturity is it really? We know it is as of December 31, 1989, but they are probably fourteen months behind on their processing. So it is really less mature than it appears on the surface. Sometimes you have to get a handle on that.

As you move to direct business, subject to guarantee funds, generally speaking the claim file lives with the guarantee fund. The insolvent company knows nothing. They don't get reserve changes. They may or may not get payments. They don't have the information. They don't have it and they can't get it. All you know is that there is some unknown number of claims resident at the guarantee fund. We're looking at surplus lines business. We now have a number of claims we can count at the company. But are they really being adjusted the same way they would have been adjusted outside? No. Difficult actuarial problems compound that. If the company were solvent we'd have some string of payments and reimbursements. When a company becomes insolvent, at least as I understand some of the laws, there are ways to curtail late reported claims. Our normal developments assume that claims continue on forever. If the company has a liquidation scheme that says all claims must be presented by 1995 and we are using loss development patterns that assume some potential of very late emergence, we overstate the amount that the company legally can pay. It doesn't exist when the claims come in. We get the same thing on the payment side. The reinsurance contract reimburses the company when they pay things. Presumably, the timing of that has been contemplated in the price. If we look at a situation where the estate would be dissolved in ten years, what is the present value of the reimbursement? Is it assuming that funds will be paid and reimbursed in ten years? Or is it reflecting a more normal long-tail payment pattern?

All this stuff is still up in the air. These are the dynamics of looking at insolvent companies. What is the ultimate loss? How do we assess the data that exists? It certainly is not the same quality that we get looking at a solvent carrier. And how do we assess the present value and timing of reinsurance payments?

MR. OGDEN: Each liquidation plan is generally somewhat different. There are some that basically allow the estate to stay open indefinitely to allow all the long-tail claims to come in. For that reason they pay dividends at a much lower rate because they want to make sure the money is going to be laying around later to pay the long-tail claims.

There are other situations where they do cut-off after a certain period of time. Generally I would think that guarantee funds would be involved in those. There seems to be a tendency on the part of courts not to want to artificially cut off anyone that would otherwise have a legitimate claim. Although where you do have a cut-off you then have a question. Are we accelerating the reporting claims? Or are we just eliminating the payoff? Or is there a combination thereof? I'm sure it is a combination, but then how you take that into account is pretty arbitrary.

MR. POWELL: Yeah. If you really want to have fun we can talk about offsets.

MS. HUTTER: Well, why don't you?

MR. POWELL: Mainly because someone is going to ask the question and I have no idea what the answer is. The things are in court all the time and changing. We have lots of potential offsets. An insolvent company owes you losses or you owe them losses, they owe you premium. Are those offsetable? The losses we are projecting cause premium...we had a loss sensitive agreement, with a slide scale, or profit provision, retro rate, or something else. Is that additional premium offsetable against the loss? We had a couple of other contracts we reinsured you here and you reinsured us there. Are those offsets? What is the present value of the offsets? Can we offset? The answers vary by state and I think they are still all under appeal. I don't know if there has been an ultimate determination anywhere.

Again, significant questions in commutation. On a lot of the insolvents today, you typically have more than one involvement. Can they offset?

MS. HUTTER: With all of the uncertainty and the difficulties that are coming out or coming to light out of these reinsurance commutations or attempted commutations, do you think that any of this is being translated back into different behavior in the future? Is anything changing in the way that people buy or sell reinsurance? Have we learned anything out of all of this?

MR. POWELL: Has there always been an underwriting cycle?

MR. OGDEN: Yes. Yes. No. I've recently seen more treaties with built-in clauses to automatically reduce recoveries for late settlements. To set up some sort of language, which like all language written by lawyers ultimately will have to be interpreted by some court, but basically trying to lay out very

clearly that the ceding company had an obligation to report claims to the reinsurer at some point in time. For example, failure to do so after more than six months after that date will reduce your claim by ten percent. And each twelve months that expires after that will reduce your claim by another ten percent. I mean something to that effect. I think that will help eliminate one of the alleged coverage disputes because it sets up a penalty for not reporting on time.

I've also seen treaties that have commutation clauses built in. They call them profit sharing, but they really are commutation clauses. At some point in time they take the premium minus an expense factor, subtract out the reported claims at that point, and pay over the difference, and then we will pay out these remaining claims. But if you have additional development on those claims, that's tough. That is your problem. Generally they are at the option of the ceding company to decide at some point that they want to close out the treaty and then let it go.

I've seen treaties on occurrence based policies with reporting cut-offs as soon as six months after the expiration of the treaty.

MS. HUTTER: Isn't that a claims made policy?

MR. OGDEN: It is a claims made reinsurance policy on top of the occurrence based primary policy. That's what it amounts to. And what the company did was that they had a July 1 to June 30 treaty and by December 31 of that year, they reported every claim that they had to the reinsurer. Now to the extent that additional claims come in to them, they are not covered.

MS. HUTTER: So you are saying that you see some things happening in the reinsurance industry that may reflect the experiences that some people have had with reinsurance insolvencies or commutations. Dave, have you seen these things happening on the reinsurance side?

MR. POWELL: Well, I think you see an absence of some of the types of companies that caused the problems to begin with. I don't think you see as many very small reinsurers today as you saw ten years ago. I think there is an increased awareness that it somewhat pays who you buy your reinsurance from. That in turn gets around a lot of the problems.

MS. HUTTER: So, I think you are saying that we have gotten a little bit smarter?

MR. POWELL: I hope so.

MS. HUTTER: We've talked a little bit about attorneys. Where do the attorneys fit into the commutation picture?

MR. POWELL: It depends on what the situation is. Certainly there is ultimately a contract. There's a written document that ought to be about three sentences long but it customarily is five pages. They ought to be reviewing that. If we are looking at real live questions of coverage or alleged improprieties, that is certainly an attorney's role. If we are dealing with an insolvent company and we have to worry about offset, we are looking at preferential treatment, there too you must have legal advice. Beyond that, attorneys also make good negotiators.

MR. OGDEN: I think that attorneys are involved wherever they can get involved. There are areas where you need legal advice, particularly in terms on preferential payments and drawing up a contract that erases the old contract. Although sometimes I do wonder why they are five pages long. Here's the money. You don't owe us anymore money ever and we don't owe anymore money ever. It seems that's enough for me, but I didn't go to law school.

I also think that lawyers provide perspective different than that of an actuary or a claims person. I think in all these coverage issues that get involved, there are common law types of issues that I've never heard of before. If you owe somebody some money and it is an uncertain amount of money and if there is something done intentionally to increase that amount to your detriment then somehow that erases the debt. To this day I'm not sure that I understand that concept, but I've never seen it used other than as a negotiating tool. The lawyers worry about it too, so it must exist.

I mean those kinds of fine points of law are things that I would have never thought of. Never heard of.

MS. HUTTER: Yesterday on our panel, we had Scott Moore who is a partner at Coopers & Lybrand. In the introductory session he talked about the accounting considerations for reinsurance commutation. Have either of you ever seen a situation where the accounting consequences of the commutation interfered or determined whether the commutation would take place?

MR. POWELL: If you would include the effects of properly booking the commutation on surplus, yes.

MS. HUTTER: So you have encountered a situation where a commutation might have made business sense to proceed with, but the bottom line impact when you went through all the accounting reflections of the transaction actually interfered with or prevented it from getting done?

MR. OGDEN: Yes, I have.

MR. POWELL: Yes.

MR. OGDEN: Let me retract an earlier statement. I said I never did a commutation for a solvent company. I lied. There was one. And in that situation there was a very complicated situation involving an acquisition, a guarantee by a parent who was a major stockholder and principle reinsurer had gone under and it got all complicated. They wanted to commute, but the buyer of the company did not want to take the hit on the balance sheet. Yet they would have been willing otherwise to do so.

So, there is a very complicated structure put together with another very solid reinsurer where some money was paid over, some stream of payments was guaranteed. The new reinsurer did not take any risk, but now on Schedule F it says, you know, super solid reinsurer instead of fly-by-night group. And that makes the company very happy. Even if at some point the money that is in this fund, accruing interest and deducting claims payments, will run dry and they will still have another ten or fifteen million dollars left. But don't worry about that. In eight or ten years, when it happens, they are going to be very big and very profitable and it will no longer matter.

MS. HUTTER: So we'll have a happy ending to the story.

MR. OGDEN: I doubt it. It may be the only company to get into liquidation twice.

MS. HUTTER: Dale, earlier you were talking about some of the contract provisions that you have seen, maybe that have been spurred by the reinsurance commutation activities. I've seen a number of clauses that call for something that I've named actuarial arbitration, which says that somewhere down the road the parties will commute and the way that they will commute is that they will each choose an actuary to determine the value. Then if those actuaries can't agree, there is this actuarial arbitration that is set in motion. There are various ways to do it. Have either of you been involved in a situation like that? Can you share some views on whether that is advisable or not?

MR. POWELL: I might even pay to see that. I do not see how that would work. I think the Guides to Professional Conduct also preclude it. We are professionally obligated to recognize that there can be more than one point of view. Arbitrations don't work. I mean, right now so many arbitrations are determined by lot. I've got my guy, you've got your guy and they flip a coin to see who gets to pick the umpire. I would hate to see the actuarial profession stoop that low.

There are situations, certainly, where two actuaries can sit down and at least reconcile their differences to explain to everybody why they disagree and let everyone else fight that out. The concept of having a third actuary pick an answer, either one or the other or something in between, I just find unworkable. At some point you can just get all the actuaries in the world and take an average or something silly like that. There are

legitimate differences and they have to be recognized as legitimate differences.

MR. OGDEN: I guess I disagree. I know that such an actuarial arbitration has been used, but the circumstances under which I've seen it used were not to have Actuary A, Actuary B, and Actuary C who splits the difference. But, where both sides submit their results, their assumptions, and whatever, to the third actuary who then picks one or the other. Again, while I would like to think that all actuaries follow all the Guides to Professional Conduct and everybody is honest and open minded and everything, the fact is that these legitimate disagreements can occur. And both parties to the transaction may feel better about closing it out and using some arbitration method. While I understand Dave's criticism of arbitrations, because they are expensive, this is not a legal, sit down, present tons of evidence kind of arbitration. This is, obviously hiring three consulting actuaries or maybe only hiring one to be the independent third party. It can still be expensive, but I think it can work. Obviously, that can be abused too.

But, to go one step further, I have been in situations where that sort of compromise has been offered. Let's call me Actuary A. Actuary B has a very different number than me. Then we will find a completely disinterested actuary and let them pick one or the other. In those situations, it has become an incentive for the other actuary to get closer to my numbers. So, I think that demonstrates that perhaps there is more accuracy in the actuarial profession than we would like to think.

QUESTION: Before, it sounded like advocacy was okay. Does advocacy include arguing for a number other than things like interest rates? Arguing for an estimated ultimate amount that you think is reasonable, but not equal to your best estimate?

MR. OGDEN: I'm not sure how in some of these cases, how you define the best estimate. I think that when you consider all the factors, including if you had a solvent reinsurer who is getting off the hook for something, there is no reason why they shouldn't be paying a premium to get rid of that risk. And I think that is a valid part of the commutation. I think that within a range of reasonable estimates there is always the element of, let's say, prudent conservatism in a reserve estimate. There is also the possibility that you could remove every conceivable element of conservatism from a reserve estimate. Those two numbers would be very different.

Typically I would produce, and we will share with the other side, a best estimate and a range of results and a demand or an offer, depending on which side of the table I happen to be on. So, I don't think there's any misrepresentation in terms of what the best estimate is, but the demand may be higher than the best estimate.

MR. POWELL: If I might just give you a quick example of how you can get an advocacy situation without an estimate problem. Well, this almost wasn't hypothetical. You have a treaty that has a retrospective rating provision. The other side forgets it. You are sitting there and you have a projection of ultimate loss. The ultimate loss implies you are going to pay some more premium. If you sit there and advocate that the proper commutation cost is the present value of ultimate loss without subtracting that additional premium that you owe, I'd accuse you of being an advocate. Perhaps, certainly stretching the balance. If you argue that here is present value of ultimate losses, you are not advocating. You are stating a fact. And here we can have a dispute where both sides have the same projection of ultimate loss, but one remembers the retro feature and one doesn't.

QUESTION: I have a question for either one of you. I have seen other reinsurance contracts that were among affiliates. And I have actually seen the same officer, the same person sign both sides of the treaty as an officer of both companies. I would think that in an insolvency scenario, that this could really raise some special problems. I wondered if that has ever happened and if you have any pitfalls that you might want to point out?

MR. OGDEN: In one situation where we were voluntarily liquidating an allegedly solvent company. The parent company was very wealthy and it was going to make sure that the subsidiary was liquidated and still solvent. In that situation, we executed some rather broad based reinsurance treaties between the affiliates that moved everything from one company, that had just a few licenses. In fact, I signed all those treaties. Subsequent to that, a couple of the companies that were made into shells and were sold off to other people. We did have disputes over what those treaties said. As we got more and more into them, it was actually a situation where all we could say was that we really don't know. I mean, the intent was to move everything into this company and now you are getting into certain things like guarantee fund assessments, ISO assessments, National Council assessments, assigned risk pools assessments, etc. All kinds of these little knit-picking licensing fees and things like that. We had to determine which of those were a cost of keeping the company in business going forward, and which of those related to past business. It is amazing how much money is involved.

MR. POWELL: Based on what I'm seeing in the paper, there is a real possibility of a big one of those in Texas. That's a voidable preference problem. When the thing was commuted between the two kin folk, did they know or have reason to believe that the company was insolvent? If they did, from what the lawyers tell me, that is a voidable preference and it will be reversed.

MR. OGDEN: One point that I was thinking about, Dave, is that all those treaties that I signed were also approved by six different insurance departments.

MS. HUTTER: I think I can offer a comment on related party transactions. New York State has a pretty stringent requirement for companies in a holding company group where affiliated reinsurance transactions have to be approved by the department. From some of the comments earlier about New York State, their tendency towards regulations and, I think, their desire to perpetuate that type of regulation within the country, one could reasonably expect that New York will be advocating that other states adopt the same kinds of regulations.

There are many legitimate situations where you have intercompany transactions or should have them to utilize capabilities and capacities within a holding company group. Down the road insurance departments, will be looking to have more and more knowledge about that. Then the fact that the same person signs for both sides is a legal formality.

I think Dale very clearly had covered himself by making sure that the department was aware of it. If you are entering into something that is above board, generally you can get your insurance department to understand that and to ultimately agree. Then I think you have got the strongest grounds for not encountering the voidable preference issues.

QUESTION: There are a lot of commutations, I guess, going on these days. And I wondered if you have any comments as to why the retrocessionaires should agree to a commutation?

MR. POWELL: The situation you are looking at is the retrocessionaire of the reinsurer who commutes their inward business and passes it along to the retrocessionaire. I have never found an attorney that would give me an opinion in writing as to whether that is binding on the retrocessionaire. The issue comes about as to whether that is a normal claim settlement. If it is then the follow the fortune clause comes in and the retrocessionaire is on the hook. It starts, to my mind, becoming a little foggier as you move away from quota share into high layer excess. I've done these, where we have sent the bill to a third layer excess for a commutation that they have never seen any reported claim.

If we have commuted, say, at a reasonable present value of unpaid loss, it is a fairly strong argument that that should be passed through the quota share retrocessionaire, who in turn will turn around and argue that it was done for the benefit of the reinsurer and their own convenience and they don't want any part of it.

As far as I know, that has never gone to an arbitration. It would be real interesting if it did. Certainly, as you move up to the higher layer excesses who are saying, well, we want to take our chances, that's what we are in business for. We are going to get a big loss or we are going to get nothing and I don't want to pay you a little bit now. They, to me, have a more

compelling argument that this is not a follow the fortune situation. To the best of my knowledge there is no definitive practice that will tell you one way or the other. And it is a real consideration for the reinsurer in the commutations.

MR. OGDEN: I think one of the comments that I made yesterday was that you are the reinsurer. It is important to get your retrocessionaires involved. Maybe they don't have to show up at every session or any negotiating sessions, but let's say a quota share usually you can get agreement. Again, coming from the point of view of the insolvent reinsurance company, if the insolvent reinsurer is commuting on very favorable terms, it would be in the best interest of the retrocessionaire to agree to those because the retrocessionaire also benefits from those terms.

In the case of an excess of loss treaty, it becomes more complicated because, the ceding company has paid no claims in excess of the retention. That was what Dave was talking about. The retrocessionaire might say, I want to take my chances.

A couple of ways around that, one of which I hadn't thought about before yesterday, but we mentioned earlier, would be a partial commutation. If in some way you could agree that you will commute your net retention and that you will pass through money on the excess on the bigger claims from the retrocessionaire. That gets very complicated.

MR. POWELL: Actually, that's real interesting. I've done one of those. Because one of the first problems that you run into is guaranteed net retention from the reinsurer. You then get involved in some claim settlement issues where the reinsurer supposedly is representing the interests of the retrocessionaire and has now carved himself out of the path which is probably grounds for the retrocessionaire to deny the claim. There is a possibility of assignment, where you assign your interest. That too has never legally been settled. I've seen it where the retrocessionaires agree to be assigned. In other words, they agree that the reinsurers take themselves out of the middle, and you commute your net retention and with the retrocessionaire's agreement, they are now a reinsurer of the ceding company.

MR. OGDEN: I think that the key word in all of this is agreement.
If you are commuting on some favorable basis where there is nothing that is going to damage your retrocessionaire, then it is important to get their agreement. If you are kind of going to hang them out to dry, then you probably are not going to accomplish much.

One other way that has worked once for me, was to, fit all the claims, every claim in the company's database to some loss distributions. Then we split the ultimate claims into the layers. We had the $0 to $300,000 layer, $300,000 to a million

dollar layer, and a million to two million dollar layer, because that was the way the claims fell to the different reinsurers. The retrocessionaire, the reinsurer and the primary insurer agreed, and everybody paid up their money and it was over.

Again, agreement seems to be the case. If your retrocessionaires are going to fight you then it is going to take a lot longer and it is going to be a lot tougher.

MR. POWELL: The problem is that with many retrocessionaires, it is a little tough to get agreement.

MS. HUTTER: As a final question I'd like to ask whether either one or both of you would care to make any predictions about the future? What do you see ahead for reinsurance commutations?

MR. POWELL: I think we have a ways to go with the current wave. And at some point in the future, hopefully, we will return to a more normal situation where commutations are relatively uncommon. We will have liquidated the insolvent companies, worked out those that can be salvaged and we are left with where we were, say, ten years ago where commutations are relatively infrequent.

MR. OGDEN: Unfortunately, I sort of agree that with commutatary work ten years ago and that five years from now we are going to have another rash of these insolvencies. I don't think they are going to go away.

There are a lot of companies that seemed to survive the last soft market that maintain solvency but aren't. I am much more of a bear on the industry. It's going to take seven years to work out and there is likely to be another after that.

MS. HUTTER: Well, at this point, I would just like the audience to please join me in a round of applause for our two panelists.

American Academy of Actuaries
7th Floor
1720 I Street, NW
Washington, DC 20006